Geochemical Investigations of Ancient Silicic Magmatism in Western Arizona and Southern Brazil: Timing, Longevity, and Evolution

By

Susanne Mathilde McDowell

Dissertation

Submitted to the Faculty of the

Graduate School of Vanderbilt University

in partial fulfillment of the requirements

for the degree of

DOCTOR OF PHILOSOPHY

in

Environmental Engineering

August, 2014

Nashville, Tennessee

Approved:

Calvin F. Miller, Ph.D.

Guilherme Gualda, Ph.D.

John C. Ayers, Ph.D.

James H. Clarke, Ph.D.

George M. Hornberger, Ph.D.

To Sam and Trent, my family

ACKNOWLEDGEMENTS

This research was made possible by NSF grant EAR-0911726, the Tinker Field Research grant, and generous support (financial and otherwise) from the Vanderbilt University Earth and Environmental Sciences department. I am particularly indebted to my advisors, Drs. Calvin F. Miller and Guilherme Gualda, who served as reliable sounding boards, provided meaningful feedback and encouragement, and always challenged me to approach my work critically and from new perspectives. Drs. John Ayers, George Hornberger, and James Clarke offered invaluable guidance and helped me complete my dissertation in a timely manner.

I am grateful to have had the opportunity to work with an outstanding group of collaborators and friends: Tamara Carley, Ayla Pamukçu, Abraham Padilla, Tenley Banik, Aaron Covey, Lily Claiborne, Will Frazier, Nicole Burdakin, Paige Lambert, Colin Brooks, Marsha Lidzbarski, Sarah Overton, Nick Lang, Charles Ferguson, Jonathan Miller, Roland Mundil, Joe Wooden, and Chris Fisher. Jennifer Pickering, Carol Wilson, Leslie Wallace Auerbach, Chris Tasich, and my family provided much-appreciated support, friendship, comic relief, commiseration, and coffee breaks.

As expected, my graduate experience fostered professional growth. But it has also been a time of intense personal transformation. For their extraordinary kindness, their willingness to stand by me even in the most difficult moments, their unwavering confidence in me, and their investment in my personal growth, I thank Trent McDowell, Sam McDowell, C.F.M., and Z.L.T. The best way I can express my gratitude is to pay your kindness forward.

TABLE OF CONTENTS

Appendix

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

Continental silicic magmatism (>65 wt% SiO_2) generates several geologic products with major societal significance: ores, geothermal energy, and explosive volcanic eruptions. The upper crust (< ~10 km depth), where gas and metal-rich hydrothermal fluids exsolve from cooling, crystallizing melts and where structural weaknesses offer pathways for the ascent of eruptible magma, is a principal source of all three. However, whereas ores and geothermal energy are generally beneficial for human populations, eruptions wreak havoc and destruction. Even relatively small volcanic eruptions (for example, Mt. St. Helens in 1980, Mt. Pinatubo in 1991, and Eyjafjallajökull in 2010) can devastate infrastructure, agriculture, and the economy. The largest eruptions – supereruptions – pose a far greater threat, one that prominent geoscientists have called “the most catastrophic of all natural processes on earth” (Miller & Wark, 2008; see also Self, 2006).

Despite decades of research, a considerable body of questions still surrounds silicic magmatism: over what timescales do silicic magma bodies, especially dangerous supereruption-sized magmas, develop and reside in the continental crust (e.g., Vasquez & Reid, 2004; Crowley et al., 2007; Reid, 2008; Annen, 2009; Druitt et al., 2012; Gualda et al., 2012)? How do continental volcanic centers evolve with respect to magmatic sources and processes, and over what timescales (e.g., Lipman, 2007; Watts et al., 2011, 2012; Drew et al., 2013; Simon et al., 2014)? What are the relationships between magma that is erupted at the Earth’s surface and contemporaneous magma that remains within the crust and solidifies as plutonic rock (e.g., Bachmann & Bergantz, 2004; Glazner et al., 2008; Tappa et al., 2011; Zimmerer & McIntosh, 2012a, b; Mills & Coleman, 2013)? Finally, how does supereruptive magmatism compare to “normal” magmatism, and how do supereruptive magmas/processes relate to their less voluminous magmatic counterparts (e.g., Miller & Wark, 2008; Wilson, 2008; Tappa et al., 2011)?

To address these questions, geochemists have long relied on whole rock geochemistry to elementally and isotopically characterize silicic magmatism. Whole rock elemental geochemistry permits a broad characterization of a rock’s geochemical characteristics, whereas whole rock isotope geochemistry helps constrain magmatic sources, processes, and – less common now – ages. However, these techniques are rather blunt and often low-precision tools compared to recently developed (within the past few decades) analytical techniques that permit high-resolution, high-precision elemental, isotopic, and age characterization of individual minerals extracted from rock samples.

The accessory mineral zircon, ubiquitous in silicic rocks, has proven to be one of the most exceptional targets for these newer methods (Hanchar & Hoskin, 2003 and references therein). First, it is a reliable U-Pb geochronometer that can be dated using a variety of high-precision techniques (i.e., thermal ionization mass spectrometry, secondary ion mass spectrometry, and laser ablation inductively coupled plasma mass spectrometry). Second, because it takes up minor and trace elements (e.g., Th, Ti, REEs) during crystallization, and because it has low elemental diffusivities, it serves as a robust recorder of magmatic processes that can be investigated using in-situ, high spatial-resolution elemental and isotopic analysis. Zircon’s efficacy is best showcased when age, elemental, and isotopic analyses from a single grain are integrated to construct magmatic processes and timescales (e.g., Claiborne et al., 2010).

In the three research projects presented here, I combine traditional whole rock elemental and isotopic analyses with high-precision, high spatial resolution zircon analyses (elemental, isotopic, and geochronologic) to investigate (1) the longevity and evolution of silicic magma centers within the continental crust and (2) the temporal and genetic relationships between spatially related volcanic and plutonic rocks. Whereas whole rock techniques permit broad geochemical characterization of sampled units, zircon data provide more precise constraints on magmatic timescales and evolution. Most compelling are instances in which the combination of whole rock and zircon analyses yields powerful constraints on magmatic evolution that neither could offer alone (e.g., Drew, 2013).

The research focuses on two regions with well-exposed silicic plutonic-volcanic systems. The first is located in western Arizona within the northern Colorado River Extensional Corridor, where late Cenozoic crustal extension has exposed a series of ~20-12 Ma volcanic and intrusive assemblages (Miller & Miller, 2002; Metcalf, 2004). Here the Miocene rock record includes an extensive supereruption-generated pyroclastic flow deposit, the caldera from which it erupted, and a series of pre- and post-supereruption units. Chapter 2 explores the timescales of magmato-thermal evolution of the pre- to post-supereruption units exposed within and near the caldera. Chapter 3 investigates the magmatic evolution of the same pre- to post-supereruption units with respect to magmatic sources and processes; it also investigates the petrogenetic relationships between the plutonic and volcanic caldera units.

The second region is in southern Brazil, where a discontinuous string of ~540 – 600 Ma granites, silicic lavas, and pyroclastic deposits extends northeastward from the border of Uruguay for hundreds of kilometers (Almeida et al., 2010). In Chapter 4, I use whole rock and zircon geochemistry to examine whether these units are petrogenetically related to one another and whether they may be linked to large-scale tectonic processes operating in western Gondwana near the end of the Precambrian era.

CHAPTER 2

ZIRCON EVIDENCE FOR A 200 K.Y. SUPERERUPTION-RELATED THERMAL FLAREUP IN THE MIOCENE SOUTHERN BLACK MOUTAINS, WESTERN ARIZONA, USA

Abstract

The Silver Creek caldera (southern Black Mountains, western Arizona) is the source of the 18.8 Ma, >700 km^3 Peach Spring Tuff (PST) supereruption, the largest eruption generated in the Colorado River Extensional Corridor of the southwestern United States. Within and immediately surrounding the caldera is a sequence of volcanics and intrusions ranging in age from ~ 19 to 17 Mas. These units offer a record of magmatic processes prior to, during, and immediately following the PST eruption.

To investigate the thermal evolution of the magmatic center that produced the PST, we applied a combination of Ti-in-zircon thermometry, zircon saturation thermometry, and high-precision U-Pb CA-TIMS zircon dating to representative pre- and post-supereruption volcanic and intrusive units from the caldera and its environs. Similar to intracaldera PST zircons, zircons from a pre-PST trachytic lava (19 Ma) and a post-PST caldera intrusion (18.8 Ma) yield exceptionally high Ti concentrations (most >20 ppm, some up to nearly 60 ppm), corresponding to calculated temperatures that exceed 900 °C. In these units, Ti-in-zircon temperatures typically surpass zircon saturation temperatures, suggesting entrainment of zircon that had grown in hotter environments within the magmatic system. Titanium concentrations in younger volcanic and intrusive units (~18.7 – 17.5 Ma) decline through time, corresponding with an average cooling

rate of $10^{-3.5}$ °C/yr.

The 200 k.y. thermal peak evident at Silver Creek caldera is spatially limited: elsewhere in the Miocene record of the northern Colorado River extensional corridor, Ti-in-zircon concentrations and zircon saturation temperatures are much lower, suggesting that felsic magmas were generally substantially cooler.

Introduction

Over the past decade, silicic volcanic centers capable of producing large-volume eruptions (including supereruptions, classified as eruptions of >450 km^3 magma) have drawn widespread interest throughout the petrologic and geochemical communities (see Elements Magazine, 2008, v. 4). Numerous recent studies have investigated questions regarding the relationships between large-volume ignimbrites and resurgent plutons in ignimbrite source calderas (Mills & Coleman, 2013); variations in magmatic flux throughout caldera lifespans (Lipman, 2007; Annen, 2009; Tappa et al., 2011); relationships among magmas emplaced and erupted throughout the history of a system (Mills et al., 1997; Vazquez & Reid, 2002; Simon et al., 2014); the petrogenesis of large volumes of felsic magma in the shallow crust (Bindeman & Valley, 2001; Watts et al., 2012); and supereruption triggers (Wark et al., 2007; Bachmann & Bergantz, 2008; Allan et al., 2012; Gregg et al., 2012). At the crux of many of these investigations is zircon: as a widespread, reliable repository of geochronologic, elemental, and isotopic information, zircon permits fingerprinting and comparison of caldera-related units (Mills & Coleman, 2013), constrains magmatic processes and sources (Watts et al., 2012), and offers insights into the temperatures of supereruptive magma bodies (Reid et al., 2011).

In this paper we combine zircon saturation thermometry (Watson & Harrison, 1983; Boehnke et al., 2013), Ti-in-zircon thermometry (Watson and Harrison, 2005; Watson et al., 2006; Ferry & Watson, 2007), and high-precision U-Pb zircon dating and place them in a petrologic context to track the evolution of magmatic temperatures in a supereruptive magma center. Both zircon saturation thermometry and Ti-in-zircon thermometry offer constraints on magma temperature: the former, by estimating the temperature at which a melt of a given composition is saturated in zircon (Watson & Harrison, 1983; Miller et al., 2003; Harrison et al., 2007; Moecher at al., 2014), and the latter, by estimating the temperature of a magma during crystallization of zircon. By integrating calculated zircon temperatures with zircon ages, we can evaluate how temperatures changed from pre- to post-supereruption.

Specifically, our investigation focuses on the thermal evolution of the magmatic center that produced the 18.8 Ma, >700 km^3 Peach Spring Tuff (PST) supereruption (Ferguson et al., 2013; Pamukcu et al., 2013). The PST is a petrologically distinctive unit that has long served as a key stratigraphic marker throughout western Arizona, southern Nevada, and southeastern California (e.g. Young & Brennan, 1974; Glazner et al., 1986). The source of the PST, the Silver Creek caldera, is located within the southern Black Mountains of western Arizona and includes a substantial (0.5 km thick) remnant of the PST's intracaldera component (figure 1; Ferguson et al., 2013). Using zircon saturation thermometry, Pamukcu et al. (2013) found that portions of the PST magma body reached at least 900°C prior to its eruption, much higher (often by >100°C) than most other Ti-in-zircon temperatures reported in the literature (e.g., Fu et al., 2008; Barth & Wooden, 2010; Carley et al., 2011; Reid et al., 2011).

The Silver Creek caldera and its immediate environs also preserve a well-exposed sequence of volcanic and intrusive units that temporally bracket the PST eruption (Ferguson et al., 2013).

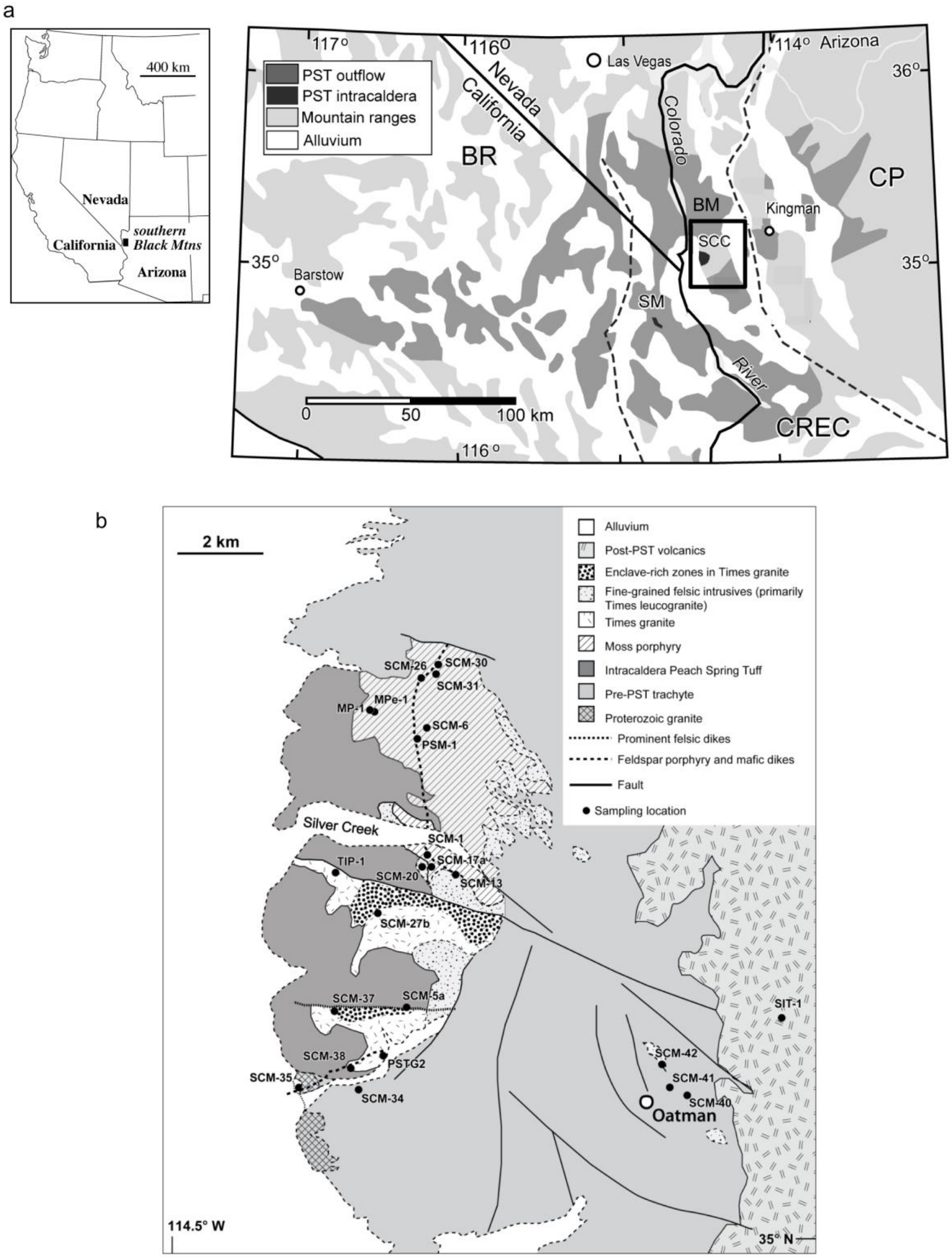


Figure 1: Maps of Silver Creek caldera and environs. a) General location of the Silver Creek caldera (source of the 18.8 Ma Peach Spring Tuff [PST]) and the extent of the PST outflow. The Silver Creek caldera is located in the southern Black Mountains (BM) within the Colorado River Extensional Corridor (CREC). Fragments of the caldera have been located to the west in the Sacramento Mountains (SM). BR = Basin and range, CP = Colorado Plateau. b) Geologic map of area bounded by box in 1a. Exposed within the caldera is a suite of post-PST intrusions, including the Moss porphyry, Times porphyry, and crosscutting dikes. Pre- and post-PST volcanics are exposed to the north, east, and south of the caldera.

center as the PST (Ferguson et al., 2013) and therefore offer a record of the PST volcanic center's magmatic evolution.

Constraining Magmatic Temperatures: ZSTs and Ti-in-Zircon Thermometry

The zircon saturation temperature (ZST) is determined by solubility experiments. The model of Watson and Harrison (1983) yielded the following equation:

$$T_{Zr}\ (°K) = 12900/[2.95 + 0.85(M + \ln(Zr_{zircon}/Zr_{melt})].$$

We utilize the Watson & Harrison calculation in this study; a recent model by Boehnke et al. (2013) produces broadly similar but not identical results (a comparison of calculated temperatures using both equations is presented in appendix 3).

M is a factor based on major element composition ((Na + K + 2·Ca)/(Al·Si), all in fraction of total cations) of melt, and Zr_{zircon} and Zr_{melt} are concentrations of Zr in zircon (here we use ~500,000 ppm) and melt, respectively. To be directly applicable, the saturation equation requires the composition of a melt that was saturated in zircon. Because igneous rocks do not strictly represent melt compositions, there is uncertainty about M and Zr_{melt}. Furthermore, especially in plutonic rocks, initial zircon saturation may be difficult to verify. With natural materials, the thermometer strictly yields a magma temperature *only* when applied to the composition of a glass that, when molten, was in equilibrium with zircon. Nonetheless, ZST provides valuable constraints: even for plutonic rocks, uncertainties in M values and Zr concentrations of melts generally introduce only tens of degrees of uncertainty in ZST (cf. Miller et al., 2003; Harrison et al., 2007). If there is evidence to suggest that a volcanic rock was zircon-saturated prior to eruption or that a plutonic rock was saturated early during its crystallization interval, ZST provides a useful, approximate estimate of temperature. If not – if the rock represents initially zircon-undersaturated magma – the ZST establishes a minimum possible temperature.

In contrast to ZST, the Ti-in-zircon thermometer relies on in-situ Ti measurements to estimate the temperature at which an analyzed zone in zircon crystallized. It yields a spectrum of temperatures from initial saturation to the solidus, and importantly, it can identify temperature fluctuations (e.g. Claiborne et al, 2006). The thermometer as presented by Ferry and Watson (2007) is:

$$T_{\text{Ti-zirc}}\ (°K) = -4800/(\log_{\text{Tizirc}} + \log_{aSiO2} - \log_{aTiO2} - 5.711)$$

where Ti_{zirc} is the concentration of Ti in zircon (ppm) and $\log_{aSiO2}$ and $\log_{aTiO2}$ are referenced to quartz and rutile saturation. The accuracy of the thermometer thus hinges upon not only the accuracy with which Ti can be measured, but also on estimates of activities of both TiO_2 and SiO_2. Overestimation of a_{SiO2} and a_{TiO2} yields overestimates and underestimates of temperature, respectively. Most workers have estimated a_{TiO2} during zircon crystallization to be relatively high (~0.5 to 1; e.g. Watson and Harrison, 2005; Claiborne et al., 2006; Hayden and Watson, 2007; Barth and Wooden, 2010), primarily based upon nearly ubiquitous co-existing Ti-rich phases (ilmenite, sphene). Recent work by Ghiorso and Gualda (2013) suggests a broader spectrum of a_{TiO2} in felsic magmas, approximately in the range 0.3-0.9. Activity of TiO_2 generally increases systematically as temperature falls during crystallization of magmas (figure 9; Ghiorso & Gualda, 2013), so the difference between maximum and minimum T calculated by Ti-in-zircon thermometry is likely to be an underestimate of the true temperature range. Excluding the effect of temperature, a_{TiO2} within a magma or suite of magmas is unlikely to vary dramatically, and variability is especially limited if melts are saturated in Fe-Ti oxides (Ghiorso & Gualda, 2013). Thus, comparisons amongst $T_{\text{Ti-zrc}}$ are likely to be meaningful.

Geological Context

The southern Black Mountains are located within the Northern Colorado River Extensional Corridor (NCREC), a 70-100 km-wide zone of NNW trending, normal fault-bounded crustal blocks situated at the eastern edge of the Basin and Range in western Arizona and southern Nevada (figure 1; Faulds et al., 1990; Faulds et al., 2001). The NCREC formed between ~20 and 12 Ma when lithospheric extension dismembered Proterozoic- (1.4-1.8 Ga) and Mesozoic-age continental crust (e.g. Faulds et al., 1990, 2001; Varga et al., 2004; Lang et al., 2008). Widespread intermediate to silicic magmatism preceded and accompanied extension (Faulds et al., 1990; Miller and Miller, 2002; Metcalf et al., 2004).

Preserved within the southern Black Mountains is Silver Creek caldera, the source of by far the largest eruption within the NCREC, the Peach Spring Tuff "supereruption" at 18.8 Ma (>700 km^3 D.R.E.; Buesch, 1992; Ferguson et al., 2013; Pamukcu et al., 2013). Post-PST Miocene extension within the CREC dismembered the original caldera (figure 1; Ferguson, 2013). A series of ~19-17 Ma pre- and post-PST intrusive and volcanic units (previously described and mapped by Ransome [1923], Thorson [1971], DeWitt et al. [1986], Lang et al., [2008], Pearthree et al. [2009], and Ferguson et al. [2013]) are exposed in and around the caldera fragment. For the purposes of this study, we divide these units into three categories:

(1) Pre-PST pericaldera volcanics consist of a thick (>1 km) sequence of feldspar-rich (~25%), trachytic to trachydacitic lavas and subordinate basaltic to trachyandesitic lavas (figures 1, 2a; Lang, 2001; Lang et al., 2008; Pearthree et al., 2009). Collectively, this sequence extends at least 15 km to the north, east and south from the caldera margin; the caldera fragment is truncated by a basin-bounding fault on the west (figure 1; Thorson, 1971; DeWitt et al., 1986; Faulds et al, 2001; Varga et al., 2004; Spencer et al., 2007; Lang et al., 2008; Pearthree et al., 2009; Ferguson

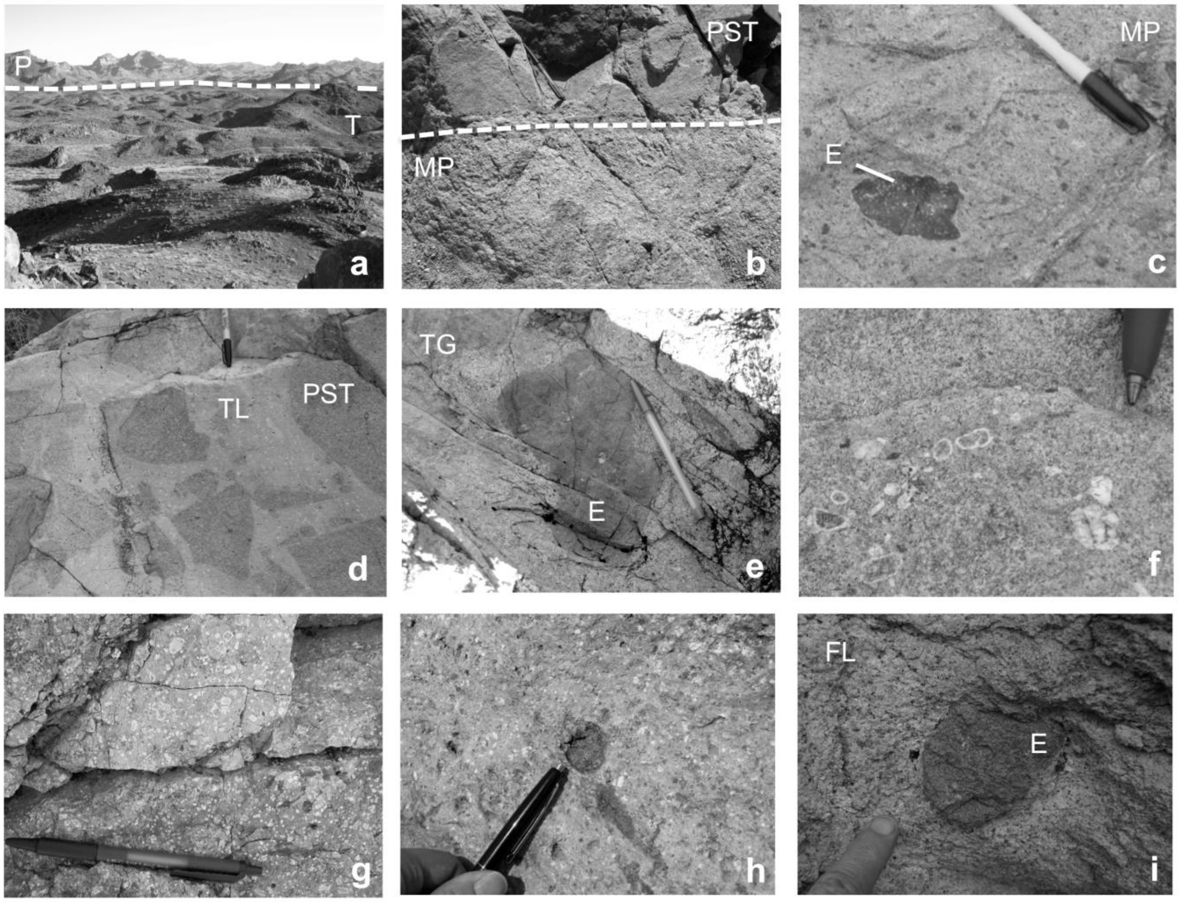


Figure 2: Representative field photographs of Miocene-age southern Black Mountains units sampled in this study. a) Pre-PST trachytic lavas (T) to the north of Silver Creek caldera, where they are unconformably overlain by post-PST lavas (P). b) Intrusive contact between the PST and Moss porphyry (MP) within the Silver Creek caldera. c) Moss porphyry (MP) with magmatic enclave (E). Magmatic enclaves in the Moss porphyry are rounded and fine-grained, with chilled margins and feldspars culled from the surrounding matrix. d) Blocks of Peach Spring Tuff (PST) in Times leucogranite (TL). e) Buttresses of Times granite in the southern half of Silver Creek caldera. f) Times granite porphyry (TG) with fine-grained magmatic enclave (E) containing rimmed alkali feldspars. g) Block of post-PST feldspar porphyry dike characterized by ~25-35% alkali feldspar phenocrysts. h) Felsic porphyry dike with abundant quartz phenocrysts. Pen for scale. i) Fine-grained magmatic enclave (E) within post-PST felsic lava (FL).

et al., 2013; Murphy et al., 2013). Ages for these lavas are roughly constrained at ~19 Ma (Faulds et al., 1995; Lang, 2001).

(2) Post-PST caldera intrusions include two intermediate to felsic stocks – the Moss and Times porphyries – and mafic to felsic porphyry dikes (figures 1, 2; Pearthree et al., 2009; McDowell et al., 2011, 2012). The Moss porphyry is exposed in the northern portion of the intrusive complex, where it crosscuts the PST and pre-PST trachyte lavas (figures 1; 2b-c). The Times porphyry, which comprises a medium-grained granite and a fine-grained leucogranite, intrudes the PST and the Moss and constitutes the dominant intrusive lithology in the southern half of the Silver Creek caldera (figures 2d-f). The areal extent of the two stocks is ~30 km^2 (figure 1; McDowell et al., 2012). Crosscutting dikes intrude the Moss and Times and extend eastward into pre-PST trachyte. They include feldspar porphyry dikes (characterized by abundant [~25%] feldspar phenocrysts; figure 2g); felsic porphyry dikes (characterized by abundant quartz and alkali feldspar phenocrysts; figure 2h); and fine-grained mafic dikes (figure 1; McDowell et al., 2011, 2012).

The stocks and dikes contain locally abundant magmatic enclaves that record substantial open-system interaction between relatively mafic and felsic magmas: ~10 cm – 2 m globular enclaves in the Times granite (figures 1; 2e); rounded to globular ~10 cm enclaves within the Moss porphyry (figures 1; 2c); and rounded ~5-10 cm enclaves in the feldspar porphyry and felsic porphyry dikes (figure 2h). Commonly, enclaves have crenulated (sometimes quenched) margins (figures 2c, 2e, 2h) and contain euhedral to subrounded, cm-scale feldspar xenocrysts with distinctive rims (figure 2f), indicating that the enclaves and more felsic host magma were both partially molten when contacts developed and, furthermore, that the felsic intrusions were partially crystallized (see Wiebe, 1993; Wiebe & Adams, 1997; Patrick & Miller, 1997; Miller &

Miller, 2002). The enclaves thus document replenishment of intrusions by, and subsequent disaggregation of, relatively mafic magma (McDowell et al., 2011).

(3) Post-PST pericaldera volcanics consist of a ~100-800 meter-thick sequence of small-volume, post-PST lavas of intermediate to rhyolitic composition as well as volcaniclastic sediments exposed to the north, east, and south of the caldera (figures 1, 2i; Lang et al., 2008; Pearthree et al., 2009; Murphy & Faulds, 2013). They unconformably overlie pre-PST trachytes within a radius of at least 10 km from the caldera (figure 1; Lang et al., 2008; McDowell et al., 2012; Ferguson et al., 2013). One of the post-PST units (two are analyzed in this study) contains ~10-20 cm globular mafic enclaves that, based on their fine-grained texture and chilled margins, are magmatic in origin (figure 2i).

Although most of the pre- to post-PST volcanic and intrusive units retain their igneous textures and mineral assemblages, portions of the caldera-related record – especially near and to the east-northeast of the probable caldera margin – are mildly to intensely hydrothermally altered, as indicated by quartz and calcite veins, localized propylitic and argillic alteration, and secondary minerals such as calcite, fluorite, and chlorite (DeWitt et al., 1986). Most of our whole rock elemental analyses – based on samples selected for apparent freshness – appear to be little modified by this alteration, but some leucocratic samples reflect it in very high SiO_2 (>78 wt%) and low Na_2O (< 2 wt%).

Methods

Complete whole rock major and trace element characterizations for 26 crushed and powdered representative samples were obtained from Activation Laboratories in Ontario, Canada using ICP, ICP-MS, and INAA (Appendix A).

We performed U-Pb age dating on cathodoluminescence-imaged zircon grains using a combination of SHRIMP and CA-TIMS dating. We used the SHRIMP-RG at the Stanford/USGS SUMAC laboratory to conduct reconnaissance in-situ U-Pb dating, which allowed us to assess abundances and ages of xenocrystic and antecrystic zircon in our sample set (Appendix B). U-Pb analysis spot size was ~20 µm. In total, we dated 152 grains. U-Pb data were reduced using zircon standard R33 (age: 419 Ma) on the SQUID and IsoPlot software programs (Black et al., 2004).

To obtain precise zircon ages of pre- to post-PST magmatism at Silver Creek caldera, we obtained U-Pb single zircon CA-TIMS ages at Berkeley Geochronology Center for eight representative samples from six units: the stratigraphically lowest section of pre-PST trachyte (SCM-34, 5 grains); two samples of Moss porphyry (MP-1, 6 grains; SCM-6, 6 grains); Times granite (TIP-1, 8 grains) and Times leucogranite (SCM-38, 6 grains); a feldspar porphyry dike (SCM-1b, 7 grains); a felsic porphyry dike (SCM-5a, 8 grains); and a sample of post-PST felsic lava collected 7 km east of the caldera (SIT-1, 6 grains) (figure 1; Appendix C). Analytical and data reduction protocols for U-Pb single zircon CA-TIMS follow those described in Mundil et al. (2004). Intercalibration with ages from different labs is facilitated by analyses of calibration solutions distributed by the Earthtime initiative (see Irmis et al., 2011).

We performed trace element analyses of zircon employing the analytical operations and routines described by Mazdab & Wooden (2006) and Claiborne et al. (2010a) to constrain melt compositions and ambient temperatures. Where possible, multiple analyses were conducted on single grains to evaluate core-to-rim variations. The Stanford USGS Microanalysis Center intralaboratory MAD gem quality zircon was used as the elemental concentration standard (Barth & Wooden, 2010). We performed a total of 369 zircon analyses on 263 grains from 19 samples (Appendix D). For purposes of this study, we exclude 27 analyses that showed clear evidence of Precambrian age or non-zircon inclusions.

Lastly, to obtain independent constraints on the temperature regime of Black Mountains magmas, we calculated zircon saturation temperatures using the original Watson and Harrison (1983) formulation and Ti-in-zircon crystallization temperatures using the thermometer of Ferry and Watson (2007) (Appendix D). The analytical precision of Ti concentrations in zircon using SHRIMP-RG is approximately ± <1 ppm (1 sigma). Assuming SiO_2 and TiO_2 activities are held constant, corresponding uncertainties in Ti-in-zircon temperature range from ± ~3-13 °C at the range of Ti concentrations that we observe (higher uncertainties correspond with lower Ti concentrations). A thorough evaluation of how changes in activity affect Ti-in-zircon temperatures is presented in the discussion.

Results

Whole Rock Elemental Geochemistry

Our two pre-PST volcanic rocks yield 63 to 64 wt% SiO_2 (appendix A; figure 3); these are trachytes in the geochemical classification of Le Bas (1986). Post-PST intrusions and volcanics have SiO_2 concentrations of 55 to 80 wt% and 65 to 71 wt%, respectively (an enclave in post-PST lava SIT-1 has 57 wt% SiO_2) (appendix A; figure 3). In all units, Al_2O_3, MgO, Fe_2O_3, CaO, TiO_2, Ba and Sr decrease and K_2O and Rb increase with increasing SiO_2 (appendix A; figure 3a-e). Two felsic porphyry dikes reach 78 and 80 wt % SiO_2, but these are not likely magmatic values, as evidenced by low CaO and Na_2O and very high K_2O (nonetheless, their abundant quartz phenocrysts, high Rb, and low Zr and mafic content verify their highly felsic original composition). Zr concentrations are lowest in the leucogranite (135-220 ppm) and felsic

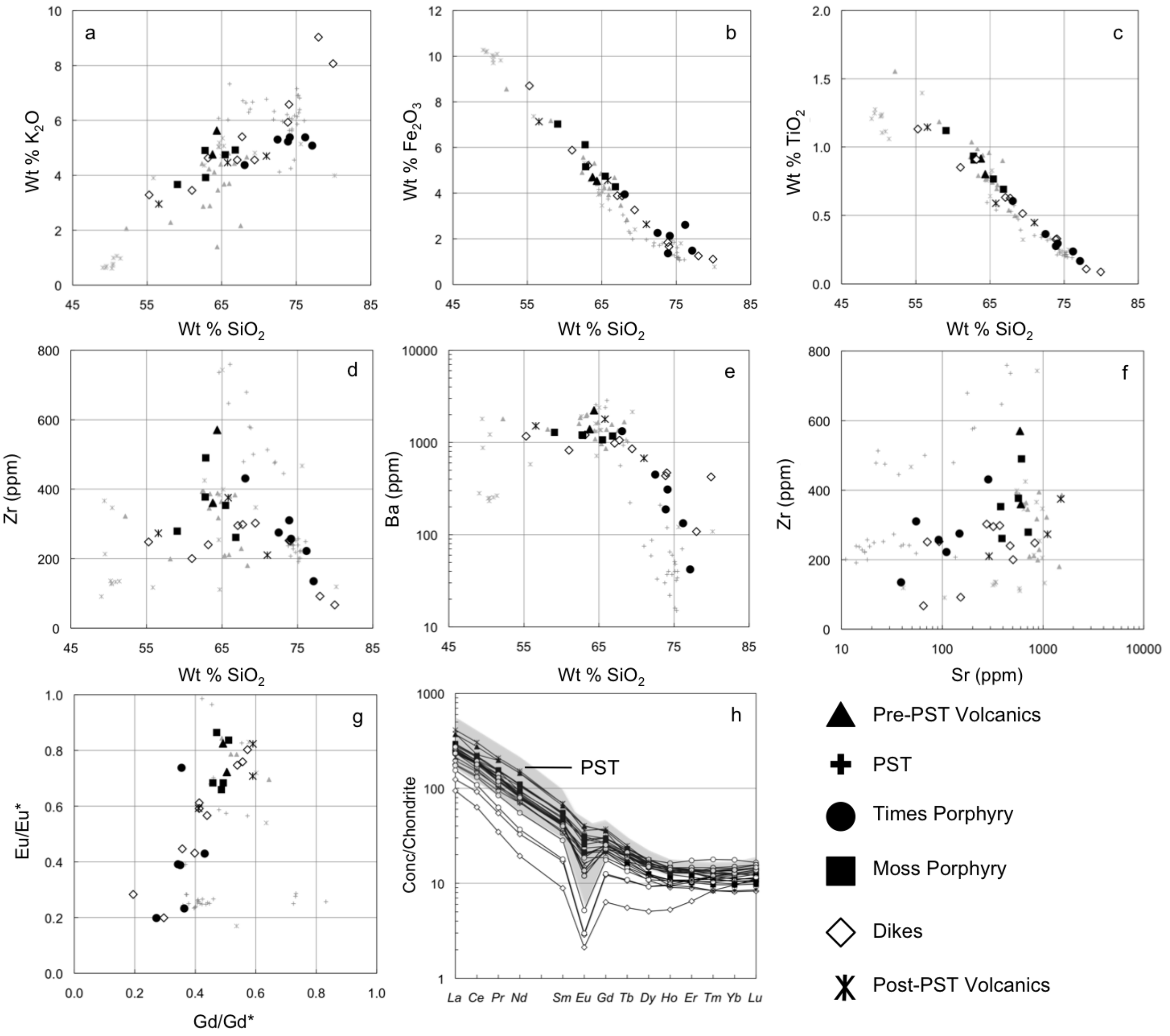


Figure 3: Whole rock element plots of analyzed Silver Creek intrusions and pericaldera pre- and post-PST volcanics. a-f: Scatter plots of analyzed units from Silver Creek and surrounding volcanics. Previous analyses of Peach Spring Tuff (gray plus signs), pre-PST trachytes (gray triangles), and post-PST volcanics (gray asterisks) analyses are shown for comparison (Pamukcu et al., 2013; Ferguson et al., 2013; Pearthree et al., 2009). g-h: Rare earth element signatures of Silver Creek intrusions and surrounding volcanics. The gray zone indicates the range of analyses for the PST (Frazier, 2013).

porphyry dikes (<100 ppm) and highest in the pre-PST trachyte and Moss (~500 and 570 ppm, respectively) (figure 3d, f). As silica content increases within the rock suite, light and middle rare earth element (LREE and MREE) concentrations decrease and relative MREE and Eu depletion become more pronounced (figure 3g, h).

Whole rock elemental analyses are consistent with those previously obtained for other pre- and post-PST units in the southern Black Mountains (figure 3; Lang, 2001, Lang et al., 2008; Pearthree et al., 2009). Compared to the PST, however, pre- and post-PST units have higher Sr and Ba and lower Zr for a given wt% SiO_2 (figure 3; appendix A; Pamukcu et al., 2013).

U-Pb Zircon Ages

The CA-TIMS weighted mean $^{206}Pb/^{238}U$ zircon age for zircons in pre-PST trachyte (SCM-34) is 19.01 ± 0.26 Ma (MSWD = 2.2, 5 grains; all uncertainties are 2σ) (appendix C). Ages for Moss samples MP-1 (18.76 ± 0.11 Ma, MSWD = 0.85; 6 grains) and SCM-6 (18.84 ± 0.15 Ma, MSWD = 1.9, 6 grains) are within 2-sigma error of one another and of the $^{40}Ar/^{39}Ar$ sanidine eruption age and U-Pb zircon CA-TIMS age of the PST (18.84 ± 0.02 Ma, $^{40}Ar/^{39}Ar$, Ferguson et al., 2013; 18.85 ± 0.04 Ma, CA-TIMS zircon, Lidzbarski et al., 2012) (figure 4; appendix C). The Times granite (TIP-1; 18.63 ± 0.08, MSWD = 0.53, 8 grains), Times leucogranite (SCM-38; 18.52 ± 0.12, MSWD = 0.67, 6 grains), and the feldspar porphyry dike (SCM-1b; 18.65 ± 0.07, MSWD = 0.75, 7 grains) yield zircon ages that are within error of one another. The youngest sample, a felsic porphyry dike (SCM-5a), gives a weighted mean age of 18.21 ± 0.07 (MSWD = 1.7, 8 grains). Post-PST felsic lava (SIT-1) yields a zircon age of 18.50 ± 0.16 Ma (MSWD = 0.36, 6 grains). All weighted mean ages show reasonable coherence, but protracted crystallization of a few tens of k.y. to as much as 100 k.y. may be masked by relatively large

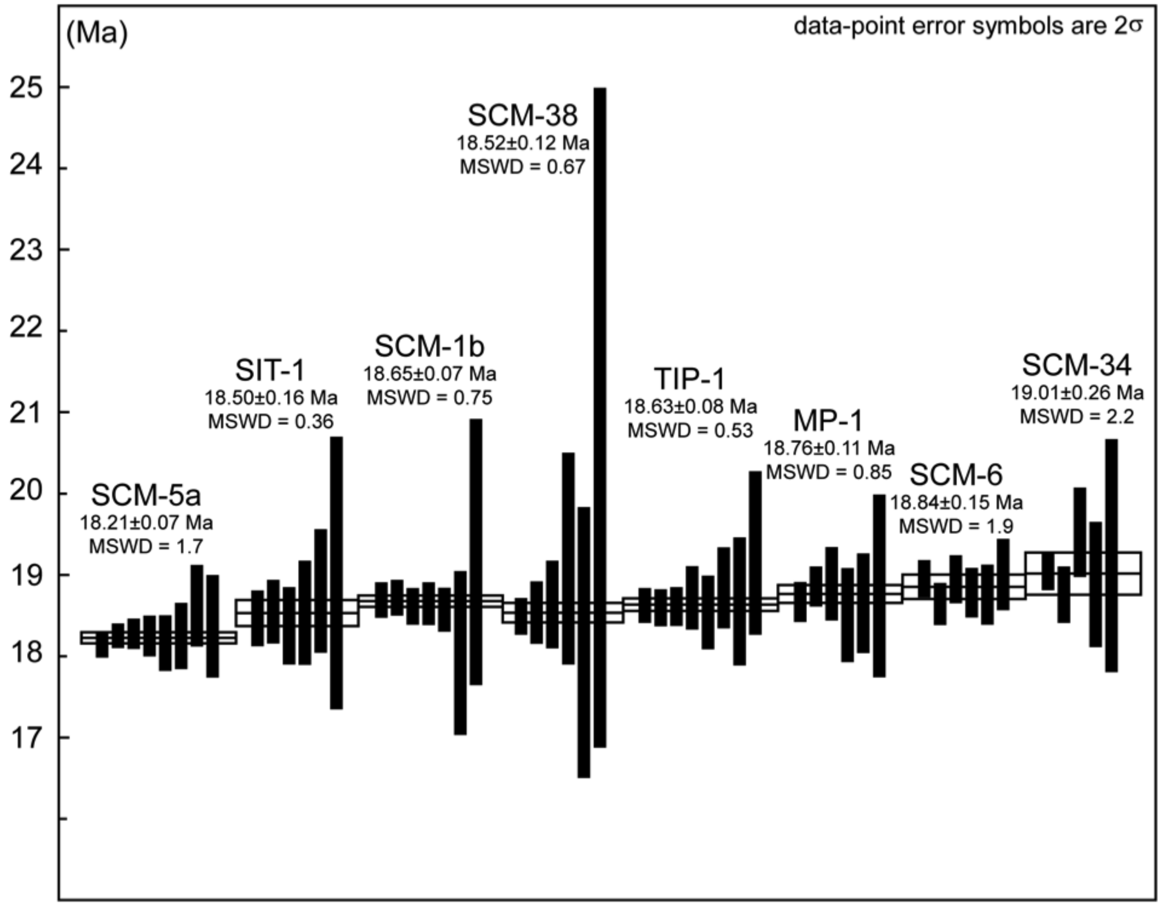


Figure 4: ^{206}Pb/^{238}U CA-TIMS zircon ages (error bars sorted by uncertainty) and weighted mean ages for eight representative samples. Uncertainties are given at the 95% confidence level.

uncertainties on individual crystal ages due to small sample size and low to moderate U concentration (due in part to chemical abrasion).

Reconnaissance U-Pb SHRIMP dating of zircons from all representative units indicates that ~10% (2 grains) of zircon cores/interiors from pre-PST trachyte and ~20% (8 grains) from the Moss porphyry (SCM-6 and MP-1 combined) have ^{204}Pb-corrected ^{207}Pb/^{206}Pb ages of 1.6-1.7 Ga (appendix B). In the Moss, 5% (2 grains) of zircons yielded ^{207}Pb-corrected ^{206}Pb/^{238}U ages of 20-21 Ma. Analyses of zircons from Times granite, feldspar porphyry dikes, and felsic porphyry dikes showed no indication of xenocrysts or antecrysts among 62 analyses: SHRIMP ages range up to ~19 Ma, but 2 sigma errors are too large to unambiguously distinguish them from younger ages.

Zircon Geochemistry

When normalized to chondrite concentrations, zircons yield REE patterns that are typical in that they reveal negative Eu anomalies, positive Ce anomalies, and enormous relative enrichment of HREE (chondrite-normalized La = ~10^{-2}, chondrite-normalized Lu = ~10^{4}) (appendix D; figure 5). Zircons from the Times granite, Times leucogranite, and feldspar porphyry dikes show slightly greater enrichment in chondrite-normalized HREEs compared to the pre-PST trachyte, Moss, and post-PST lavas. In all units, LREE concentrations are far more variable than HREEs; Nd/Yb spans nearly two orders of magnitude (0.001 – 0.1), with the Times, felsic porphyry dikes, and feldspar porphyry dikes yielding the widest ranges as well as the most pronounced Eu anomalies (figure 6a).

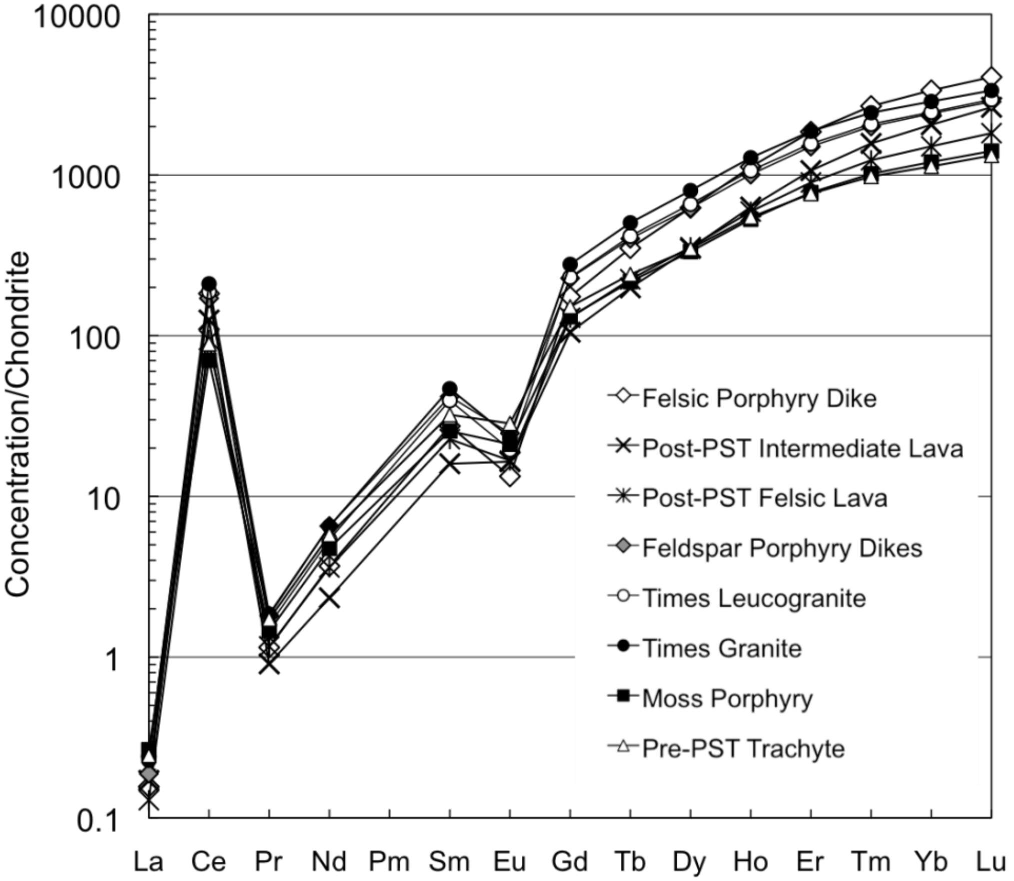


Figure 5: Chondrite-normalized zircon REE analyses. Zircons in the Times granite, Times leucogranite, feldspar porphyry dikes, and felsic porphyry dikes tend to have higher concentrations of heavy rare earth elements and more pronounced Eu anomalies than zircons from the Moss, pre-PST trachyte, and post-PST lavas.

Concentrations of Hf (~7000 to ~16000 ppm) and U (~10 to ~1500 ppm) for the entire zircon sample suite show a positive correlation with whole-rock silica content, with the pre-PST trachyte and Moss porphyry yielding the lowest abundances and quartz porphyry dikes yielding the highest (appendix D; figure 6b). High Ti distinguishes most Moss and pre-PST trachyte zircon analyses; more than 90% of these zircons have Ti >20 ppm, and the highest Ti concentrations approach 60 ppm. Zircons in felsic units have lower Ti maxima: concentration ranges are ~5-40 ppm (feldspar porphyry dikes), ~5-30 ppm (Times granite and leucogranite), ~10-30 ppm (post-PST volcanics), and <10 ppm (felsic porphyry dikes) (figure 6b).

The subset of analyzed zircons from which we obtained two or more trace element analyses per grain reveal significant differences in interior-rim relationships for the different lithologic units (figure 7). Zircons in the Moss and pre-PST trachyte typically exhibit low-U (<100 ppm), low-Hf (~8000-10000 ppm), high-Ti (~20-47 ppm) rims surrounding higher-U, higher-Hf, lower-Ti interiors, while Times granite and leucogranite show systematic increases in Hf from interior to rim. In the feldspar porphyry dikes, zircon interior compositions vary considerably, though rim compositions converge at U ≈ 200 ppm, Ti ≈ 7 ppm, and Hf ≈ 11000 ppm. The post-PST felsic lava has more variable interior-rim trends: in some cases Ti decreases and U increases from core to rim, whereas in other instances the opposite is true. Felsic porphyry dikes show no discernable core-rim trends.

Zircon Saturation Temperatures (ZSTs) and Ti-in-Zircon Thermometry

Using the Watson & Harrison (1983) ZST calibration, ZSTs for analyzed samples range from ~725 to 870 °C (figure 8): ~820-870 °C in pre-PST trachytes, ~775-860 °C in the Moss and

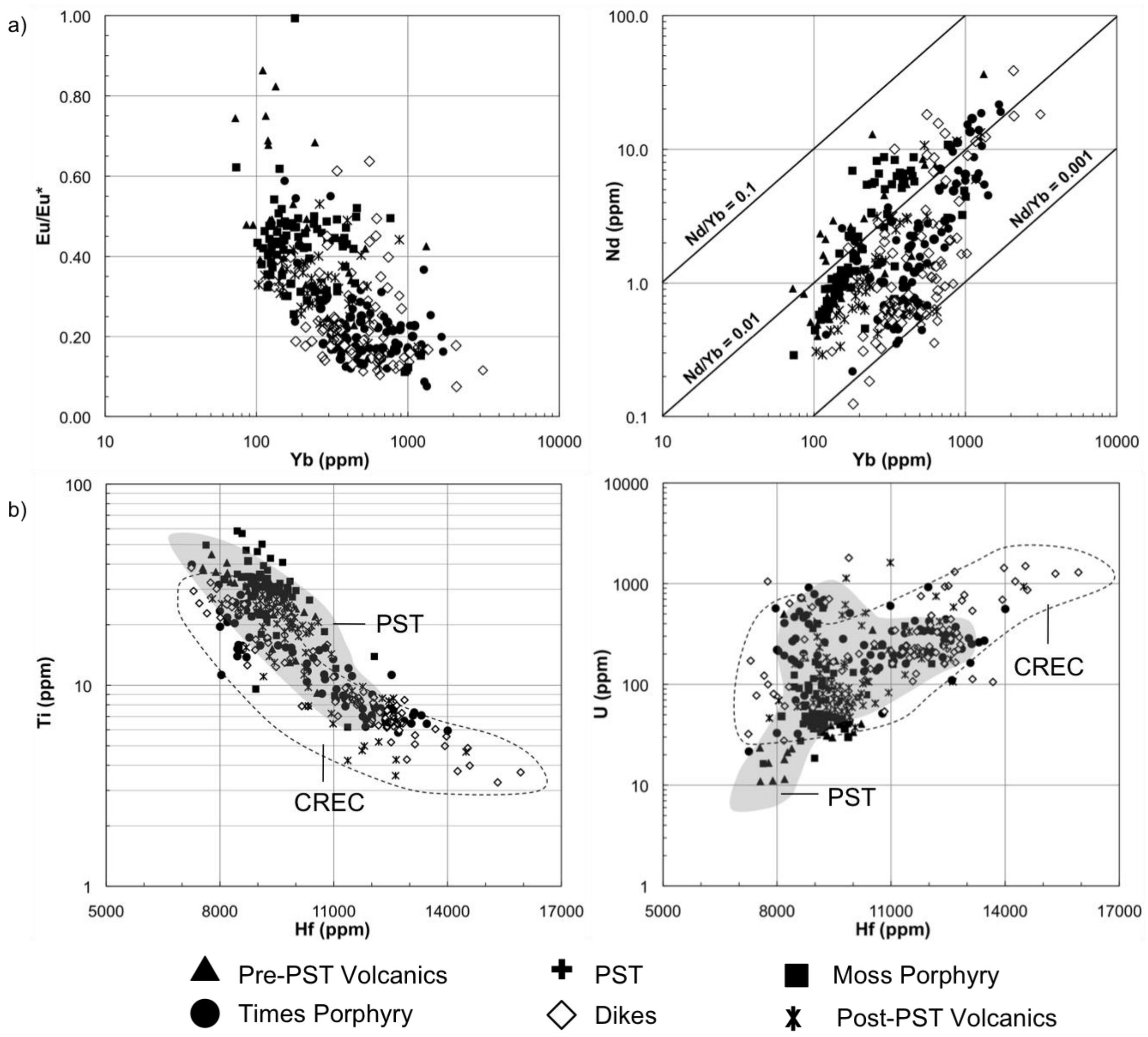


Figure 6: Elemental plots of Ti, U, and Hf concentrations in zircons from pre- to post-PST volcanics and intrusions. Zircons from the Times granite, Times leucogranite, felsic porphyry dikes, and feldspar porphyry dikes yield higher U and Hf concentrations and lower Ti concentrations than grains from the Moss, pre-PST trachyte, and post-PST lavas. Zircon elemental concentrations in the Moss and pre-PST trachyte show greater similarity to zircons from the Peach Spring Tuff (PST, indicated by gray field) than to those from other portions of the Colorado River Extensional Corridor (CREC, bounded by dashed line).

Times intrusions, ~730-850 °C in the intermediate to felsic dikes, and 800-840 °C in post-PST lavas. Enclaves in the Moss porphyry and the post-PST lava yield temperatures of ~750-775 °C, and an enclave in Times porphyry gives a ZST of 860 °C. Quartz-rich felsic porphyry dikes yield the lowest ZSTs (725-750 °C) (appendix A; figure 8). Calculations using the Boehnke et al. (2013) ZST calibration generate temperatures that are ~50 °C lower (640 – 825 °C); disparities in calculated temperatures decrease with increasing temperature and at lower M values (appendices A, D).

The older units in the southern Black Mountains – pre-PST trachyte, Moss porphyry, and Moss enclave – have the highest Ti concentrations and corresponding $T_{Ti\text{-}zirc}$ of up to nearly 1000 ºC, assuming a_{TiO2} = 0.7 and a_{SiO2} = 1 (based on the rationale applied by other researchers to studies of felsic magmatism in the CREC [e.g., Claiborne et al., 2010b]) (figure 8). Mean Ti concentrations in zircons in these units are 28 - 30 ppm ($T_{Ti\text{-}zirc}$ = 890-900 ºC), similar to average concentrations in the intracaldera PST but much higher than concentrations in outflow PST (figure 8; Pamukcu et al., 2013). Average values in younger, ~18.5 – 18.8 Ma units, including Times granite, Times leucogranite, and feldspar porphyry dikes, are approximately ~13 ppm (800 ºC average). Zircons in the felsic glassy lava and enclave (SIT-1, SIT-1b) yield average Ti concentrations of ~20 ppm, corresponding with temperatures of 850 ºC. The youngest units, the felsic porphyry dikes and a 17.5 Ma intermediate-composition lava (SIT-2; Ferguson, unpublished data), yield ~8 ppm mean Ti in zircon and 750 ºC ZST (figure 8).

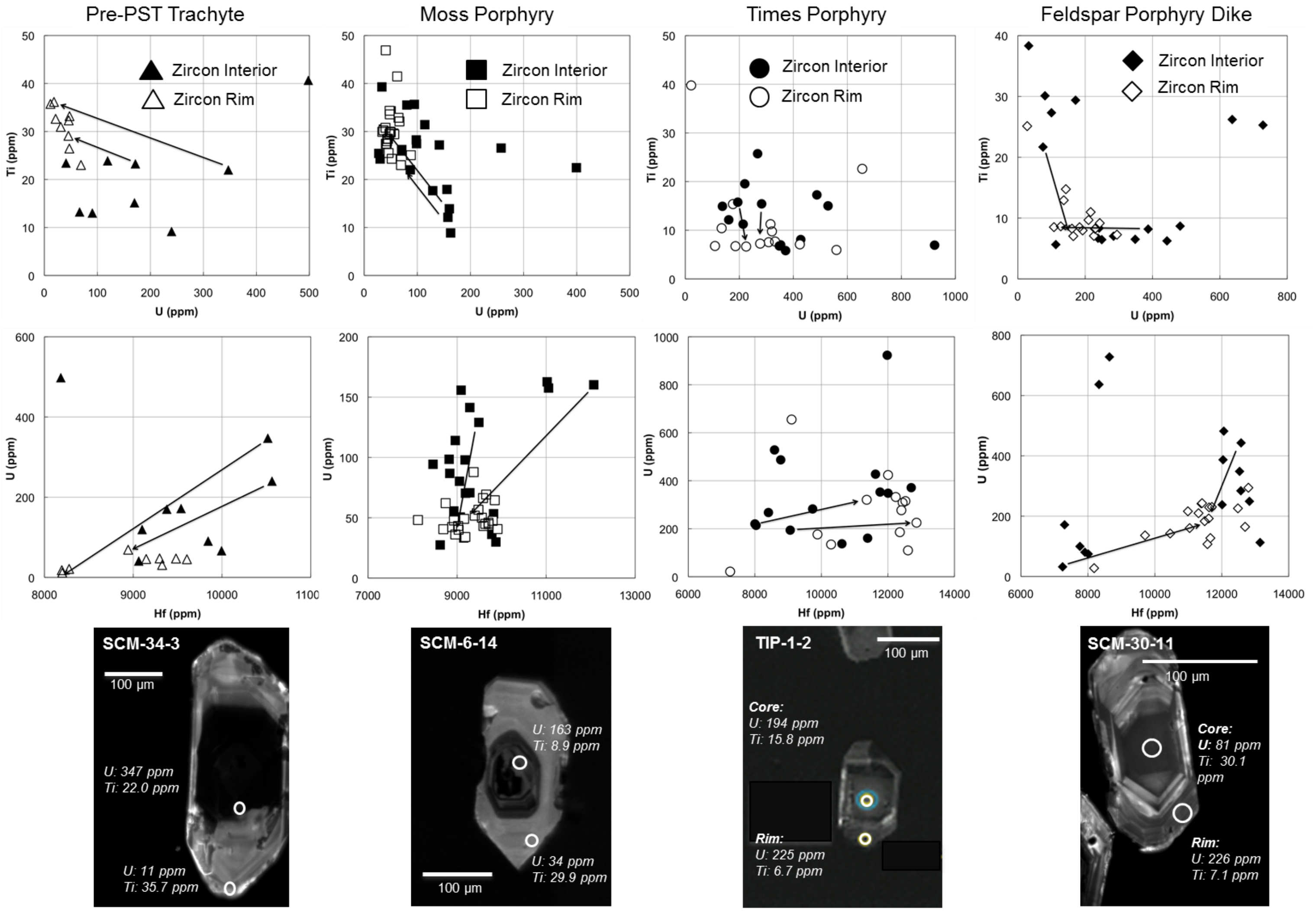


Figure 7: Core-to-rim trends in zircon geochemistry for pre-PST trachyte, Moss, Times granite and leucogranite, and feldspar porphyry dikes. Arrows indicate examples of core-rim pairs representative of trends for those particular units. Images show representative zircon grains in CL (cathodoluminescence).

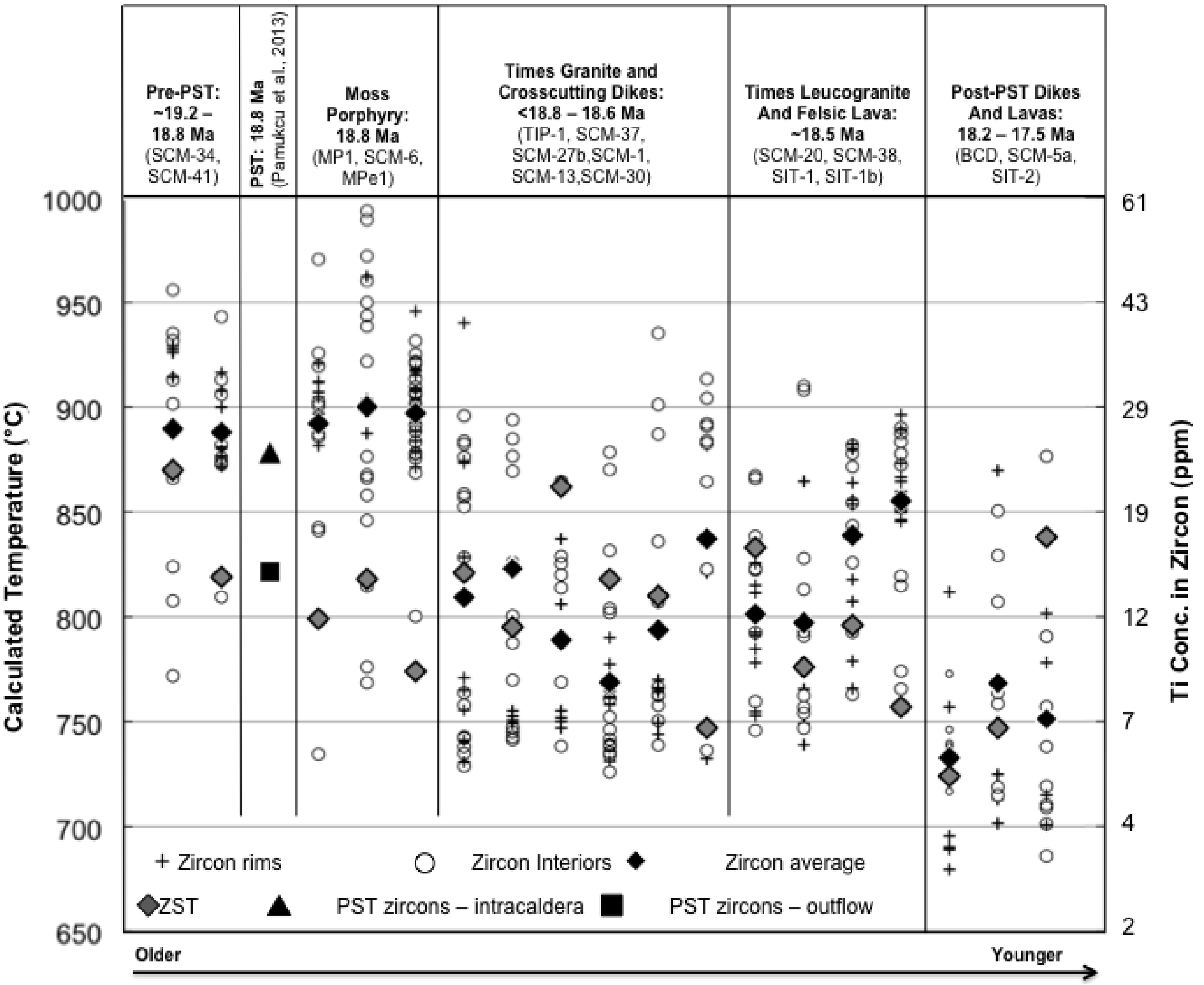


Figure 8: Ti concentrations and calculated Ti-in-zircon temperatures for individual samples (temperatures here assume $a_{SiO2} = 1$ and $a_{TiO2} = 0.7$; Ferry & Watson, 2007). For each sample, Ti concentrations and zircon cores (circles) and rims (plus signs) are plotted, as well as average Ti-in-zircon temperatures (black diamonds). ZSTs (calculated using equation from Watson & Harrison, 1983) are also shown. In the PST column, intracaldera and outflow PST zircon data from Pamukcu et al., 2013 are plotted for comparison. In the pre-PST trachyte and Moss samples, Ti-in-zircon temperatures exceed ZSTs, suggesting that the analyzed grains may have grown in hotter portions of the southern Black Mountains magma system, a hypothesis consistent with the morphology of zircons from these samples (partially-resorbed cores surrounded by lower-U, higher-Ti rims; see figure 7)

Discussion

Timescales of Pre- to Post-PST Magmatism at Silver Creek Caldera

Pre-PST trachyte zircons (19.0 Ma) appear to be older than the Moss and PST by roughly 200 k.y., though there is substantial uncertainty in this estimate (± 0.26 Ma 2σ) as a consequence of low U concentrations and resultant low radiogenic Pb (figure 4). The Moss, Times, and feldspar porphyry dikes, which together constitute the bulk of the Silver Creek intrusive suite, record ~300 ka of post-PST intrusive magmatism. Moss zircon CA-TIMS weighted mean ages are ~18.8 Ma, well within error of PST sanidine ^{40}Ar/^{39}Ar and zircon U-Pb ages (18.84 - 18.85 Ma; Lidzbarski et al., 2012; Ferguson et al., 2013). Ages of the Times granite and leucogranite, feldspar porphyry dike, and post-PST lava are in the range ~18.5-18.7 Ma. The age of the felsic porphyry dike is significantly younger than those of all other analyzed units (18.2 Ma). Zircon age distributions are consistent with field relationships, which show the Moss and Times (granite and leucogranite) intruding the PST, pre-PST trachyte, and Precambrian granite; Times intruding the Moss; feldspar porphyry dikes intruding the Times and Moss; and felsic porphyry dikes intruding all other major units (figure 1).

Comparison of $T_{Ti\text{-}zirc}$ and ZSTs

Based on Ti-in-zircon and zircon saturation thermometry, our best estimates for dominant temperatures of zircon growth in the Peach Spring Tuff volcanic center are ~750-950 ºC (figure 8). ZSTs yield a much more limited range than $T_{Ti\text{-}zirc,}$ but that is to be expected, since zircon growth continues to the solidus, and in situ crystallization of initially zircon-undersaturated magma, e.g. in a plutonic magma after emplacement, can lead to zircon growth at temperatures substantially higher than ZST calculated for a whole rock composition (Harrison et al., 2007).

Zircons in the pre-PST trachyte and Moss porphyry have the highest Ti concentrations of all sampled units and therefore the highest estimated Ti-in-zircon temperatures (in some cases, >950 °C). These, along with zircons from post-PST lavas, appear to have grown at much higher temperatures than their zircon saturation temperatures (figure 8); furthermore, the majority of analyses for which $T_{Ti\text{-}zrc}$ < ZST are from zircon interiors, not rims. Ti-in-zircon temperatures for the Times granite and leucogranite, feldspar porphyry dikes, felsic porphyry dikes, and post-PST lavas lie both above and below ZSTs (figure 8). All $T_{Ti\text{-}zrc}$s for enclaves from Moss (MPe-1) and post-PST lava (SIT-1b) exceed their respective ZSTs, whereas in the Times enclave (SCM-27b), $T_{Ti\text{-}zrc}$s lie below the ZST.

$T_{Ti\text{-}zrc}$s that are *lower* than ZST are readily explained by zircon growth continuing from saturation to the solidus. The many Silver Creek $T_{Ti\text{-}zrc}$s that exceed ZST of host rocks, however, are much more puzzling. Assuming that ZSTs do not *under*estimate magmatic temperatures (a reasonable assumption at this point, based on the long-term application of the Watson and Harrison [1983] zircon saturation thermometer), we identify three possible explanations for $T_{Ti\text{-}zirc}$s that are substantially higher than ZSTs:

(1) Apparent differences in zircon saturation temperatures and Ti-in-zircon temperatures are an artifact of errors in estimated a_{TiO2} and a_{SiO2}. We acknowledge the possibility that a_{TiO2} varies by a few tenths (Gualda & Ghiorso, 2013). Higher Ti activities yield lower Ti-in-zircon temperatures, whereas lower activities yield higher temperatures (Ferry & Watson, 2007). For example, if Ti = 30 ppm and a_{SiO2} =1, Ti activities of 0.3, 0.5, 0.7, and 1 yield $T_{Ti\text{-}zrc}$s of 1020 °C, 947 °C, 904 °C, and 861 °C, respectively (figure 9; appendix D). However, even the maximum a_{TiO2} of 1 yields average Moss and trachyte Ti-in-zircon temperatures that, for the most part,

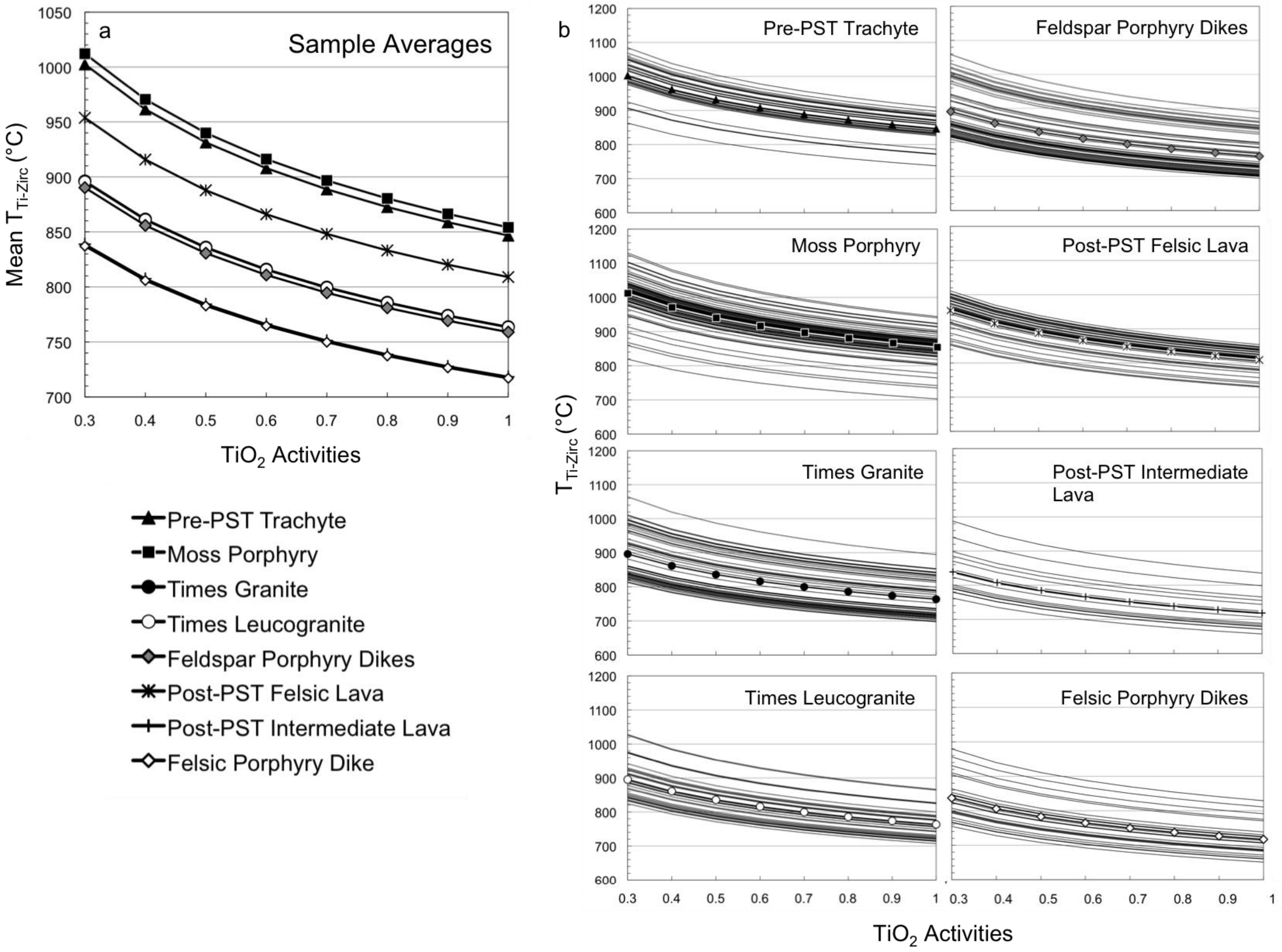


Figure 9: Plots of Ti-in-zircon temperatures (Ferry & Watson, 2007) at TiO_2 activities ranging from 0.3 to 1 (range selection based on Gualda & Ghiorso, 2013). a. Average Ti-in-zircon temperatures for each unit. b. Temperatures of individual analyses are plotted for a_{TiO2} = 0.3 to 1 in order to illustrate overall temperature ranges. Moss enclaves are plotted with Moss, Times enclaves are plotted with Times granite, and felsic lava enclaves are plotted with post-PST felsic lava.

exceed zircon saturation temperatures by at least a few tens of degrees. a_{SiO2} was probably <1 (quartz-undersaturated melt) for at least a fair part of zircon growth (thereby partially countering low a_{TiO2}), but it was likely greater than a_{TiO2}. We are confident that if there are substantial errors in activity estimates, they result in underestimates rather than overestimates of temperature and therefore do not explain the differences in ZST and $T_{Ti\text{-}zrc}$.

Figure 9 demonstrates that, in the absence of reliable, accurate estimates of a_{TiO2}, $T_{Ti\text{-}zrc}$ are relatively imprecise approximations of temperature during growth. The data are nonetheless revealing. Regardless of a_{TiO2}, zircon growth took place at relatively high temperature. With the exception of the felsic porphyry dike and the ~17.5 Ma intermediate lava, even assuming a_{TiO2} = 0.9, $T_{Ti\text{-}zrc}$ are primarily in the range ~725-875 °C. Using a more realistic a_{TiO2} value of 0.7, the estimated dominant growth T range rises to ~760-925 °C. Plausibly lower activities permit growth temperatures 50-100 °C higher.

(2) The trachyte and Moss parent magmas were initially undersaturated in zircon, and in situ fractional crystallization led to zircon saturation at higher T than suggested by bulk rock composition. Because Zr behaves incompatibly in the absence of zircon saturation, Zr concentration rises in crystallizing melts prior to zircon saturation. At the same time, major element composition evolves toward lower M value (Watson & Harrison, 1983; melt becomes more silicic and peraluminous), which lowers the saturation concentration (Harrison et al., 2007). If other minerals grew from the trachyte and Moss melts prior to zircon saturation and were retained in the evolving magma, the Zr concentrations in the resulting bulk rocks would be lower and M value higher than that in the melt from which zircon grew. Zircons would therefore register Ti temperatures higher than bulk rock ZST. This rationale is unlikely to fully account for temperature trends in the Silver Creek units. Not only is it improbable that all of the zircon grew

from evolved, trapped in-situ liquid, but the trachyte phenocryst content (~25% [Lang et al., 2008]) and whole-rock Zr concentration (~350-600 ppm) indicate that Zr in the erupted melt phase cannot have exceeded ~800 ppm, and therefore that saturation T was at most ~910 °C, several tens of degrees lower than the highest Ti-in-zircon temperatures (figure 8).

(3) Zircons in the analyzed units include grains that grew in different environments under high-T conditions not experienced by their host Silver Creek magmas. Lack of U-Pb evidence for older ages of high-Ti zircons (Ti concentrations of Precambrian-age grains fall at the lower end of the sample spectrum) suggests that these are not accidental xenocrystic grains, but that they may have grown in hotter portions of the southern Black Mountains magma system. We posit that this explanation, in conjunction with open system processes that transferred zircon from one host to another, accounts for most of the differences between ZSTs and unusually high $T_{\text{Ti-zirc}}$s in the pre- to post-PST samples described here.

Magma mingling transfers zircon from one host to another and/or modifies temperature, as documented elsewhere in the CREC and other settings (Claiborne et al, 2006, 2010a, 2010b; Bromley et al., 2008). In the southern Black Mountains, mingling (as indicated by magmatic enclaves and feldspar xenocrysts – see Geologic Context for descriptions) likely accounts for high-Ti zones corresponding with $T_{\text{Ti-Zirc}}$s (900-1000 ºC at reasonable a_{TiO2}) that far exceed ZSTs. These zones may have grown in melt in hotter portions of the southern Black Mountains magma system and then been entrained in a cooler ascending host, or they may reflect thermal perturbations when a cooler host was invaded by hotter magma. Pamukcu et al. (2013) propose that very high-Ti rims on zircons in late-erupted, phenocryst-rich PST grew in melt pockets during heating and reactivation of stagnant cumulate mush. Similar processes may have occurred repeatedly and provided the highest-Ti zircon to our pre-PST trachyte and Moss samples. This hypothesis is compatible with Moss and pre-PST zircon morphology, which is typified by partially-resorbed cores surrounded by lower-U, higher-Ti rims (figure 6), as well as with other field and petrographic manifestations of magmatic disequilibrium (e.g., rimmed/rounded feldspars, magmatic enclaves; figure 2).

Magma mingling may also explain the wide range in calculated $T_{Ti\text{-}Zirc}$ in zircons from the Times (granite and leucogranite), feldspar porphyry dikes, and post-PST felsic lava. Calculated Ti-in-zircon temperatures in these units generally lie both above and below ZSTs (with the exception of zircons from felsic lava enclave SIT-1b, the ZST of which lies below all Ti-in-zircon temperatures – see figure 8). Most grains with $T_{Ti\text{-}zrc}$s > ZST are zircon interiors, possibly derived from magma related to the Moss and/or pre-PST trachyte. Other interiors, as well as some rims, yield $T_{Ti\text{-}zrc}$s < ZSTs and likely reflect zircon growth below the liquidus. Temperature distributions are consistent with zircon geochemistry, the wide range in which indicates multiple zircon populations in the Times and feldspar porphyry dikes (figure 6a); and with U-Pb zircon dating, which shows that the Times and the dikes are younger than the Moss and pre-PST trachyte (figure 4).

Rims and cores for zircons in the post-PST felsic lava SIT-1 also indicate temperatures that are both lower and higher than the ZST. Ti concentrations of some SIT-1 and SIT-1b zircon analyses correspond with calculated temperatures of ~850 °C, higher than mean Ti-in-zircon temperatures in other post-Moss, ~18.5 to <18.8 Ma units. Given the presence of magmatic enclaves (e.g., SIT-1b) within SIT-1 and the abundance of rims with $T_{Ti\text{-}zrc}$s > ZST, we infer that the data may reflect incorporation of zircons from older units +/- growth of new zircon in areas of hot magmatic recharge.

The considerably younger quartz porphyry dikes (SCM-5a, BCD) and intermediate composition lava (SIT-2) have the lowest $T_{Ti\text{-}zrc}$s (figure 8), signaling cooler magmatic temperatures by ~18.2 Ma.

Evidence for Transient High-Temperature Magmatism in the Southern Black Mountains

The Miocene southern Black Mountains experienced a high-temperature magmatic event that was both geographically and temporally (18.8 – 19 Ma) focused. The unique zircon geochemical fingerprint associated with southern Black Mountains magmatism suggests that volcanic and intrusive units erupted near or emplaced at Silver Creek caldera immediately prior to and following the PST eruption may record heating events uncharacteristic of the region as a whole. The oldest units described in this study are considerably richer in Zr and have much higher Ti in zircon than silicic intrusions and silicic volcanic rocks found elsewhere in the northern CREC (figure 6b; ZST initially emplaced, chilled granites and rhyolites, ~690-750 ºC; mean Ti ~averaging ~10-12 ppm [e.g. Walker et al., 2007; Bromley et al., 2008; Claiborne at al., 2010a; Colombini et al., 2011; Metcalf, 2004; Frazier, 2013]). This suggests that the heat source associated with the development and eruption of the PST magma body and its immediate predecessors was highly localized within the CREC.

Integrated zircon age and geochemical data reveal that the thermal "flareup" preceding the PST eruption spanned at least 200 k.y. Pre-PST trachyte, Moss porphyry, and intracaldera PST (Pamukcu et al., 2013) display low-U, high-Ti (>30 ppm) rims corresponding with temperatures of ~900 °C between 18.8 and 19 Ma (figures 8, 9). In comparison, zircons in the Times granite and feldspar porphyry dikes have significantly lower Ti concentrations (~12 ppm), and yield zircon temperatures ~100 °C cooler than their magmatic predecessors (figure 8). Zircons in

~18.5 Ma felsic lava show Ti-in zircon evidence for limited new zircon growth in relatively hot magmas (Ti = ~19 ppm; 850 °C), though nowhere near as warm as those of the pre-PST trachytes and Moss (Ti = ~30 ppm; 900 °C); this may reflect limited periodic magmatic recharge throughout the volcanic center's post-PST history. The youngest dikes (18.2 Ma) and sampled lavas (~17.5 Ma; Ferguson, unpublished data) have even lower Ti in zircon concentrations and corresponding zircon temperatures (~7 ppm; $T_{Ti\text{-}zirc}$s ~750 °C). Therefore, based on these temperature estimates, magmatic temperatures within ~200-600 ka following the PST supereruption declined at approximate rates of ~2.5–5 x 10^{-4} °C/yr.

Conclusions

(1) Ti-in-zircon thermometry indicates that in the ~200 k.y. preceding the PST eruption (~19 – 18.8 Ma), some magmas within the southern Black Mountains reached temperatures commonly exceeding 900 °C (figure 8).

(2) Temperatures of silicic magmas in the southern Black Mountains appear to have been highest (~900°C) before, during, and immediately after the PST eruption. Following the PST eruption, magmatic temperatures declined at rates on the order of $10^{-3.5}$ °C/yr.

(3) Based on zircon morphology and geochemistry, the predominance of $T_{Ti\text{-}zirc}$ > ZSTs in 18.8 – 19.0 Ma intrusive and volcanic units of the southern Black Mountains appears to reflect zircon growth in zones of high-temperature magmatism: either in localized "hot zones" within the magma system, or in areas where hotter magma invades a cooler host.

(4) Some younger units (such as an ~18.5 Ma felsic lava) yield zircon evidence indicative of limited new zircon growth and may indicated limited, occasional recharge of the magmatic system in the post-PST stage of the volcanic center's history.

(5) The thermal peak associated with the southern Black Mountains magmatic center between ~18.8 – 19.0 Ma appears to be unique in the northern CREC, where younger felsic magmas were substantially cooler.

Note: This portion of the dissertation was published in the peer-reviewed journal *Contributions to Mineralogy and Petrology* in July 2014:

McDowell, S.M., Miller, C.F., Mundil, R., Ferguson, C.A., and Wooden, J.L. (2014). Zircon evidence for a ~200 k.y. supereruption-related thermal flare-up in the Miocene southern Black Mountains, western Arizona, USA: Contributions to Mineralogy and Petrology, DOI 10.1007/s00410-014-1031-5.

CHAPTER 3

WHOLE ROCK AND ZIRCON ISOTOPIC INSIGHTS INTO THE MAGMATIC EVOLUTION OF THE SUPERERUPTIVE SOUTHERN BLACK MOUNTAINS VOLCANIC CENTER, WESTERN ARIZONA, USA

Abstract

The >700 km^3, 18.8 Ma Peach Spring Tuff (PST) is the only supereruption-sized ignimbrite in the northern Colorado River Extensional Corridor, a zone of major Miocene extension and magmatism. The PST erupted from the Silver Creek caldera in the southern Black Mountains of western Arizona. Although it was by far the largest eruption generated in southern Black Mountains volcanic center (SBMVC), it was by no means the only significant magmatic event. The SBMVC also produced a suite of ~19 – 17 Ma, pre- and post-caldera volcanic rocks and caldera-related intrusions that provide a detailed record of supereruption antecedence and aftermath.

Whole rock Sr-Nd-Pb-Hf isotopic data combined with complementary zircon O and Hf isotopic data from a suite of pre- to post-PST samples provide robust constraints on (1) how the SBMVC evolved with respect to magmatic sources and processes throughout its ~2 Ma history and (2) the petrogenetic relationships between the PST and slightly younger intracaldera plutons. Both pre- and post-PST units have isotopic ranges (ε_{Nd} = -11.6 to -8.3, ε_{Hf} = -14 to -8.2, $^{87}Sr/^{86}Sr_i$ = 0.7091-0.7124; $^{206}Pb/^{204}Pb$ = 18.19-18.49, $^{207}Pb/^{204}Pb$ = 15.60-15.62, $^{208}Pb/^{204}Pb$ = 38.95-39.29) that fall within the spectrum of Miocene CREC rocks and are consistent with mixing of substantial fractions of Proterozoic (Mojave) crust and juvenile material derived from

regional enriched mantle. Compared to the PST, which has relatively uniform isotopic ratios, pre- and post-PST units are generally less evolved and more diverse.

Consistent with whole rock isotopes, zircon ε_{Hf} and oxygen isotope analyses for most pre- and post-PST units also show wider ranges and less evolved values than those yielded by the PST. Moreover, zircon isotopic compositions become increasingly primitive in post-PST samples. A small number of zircon analyses from post-PST intrusions display relatively low oxygen isotope values (i.e., $\delta^{18}O$ = 4-5), possibly recording very limited melting and assimilation of hydrothermally altered rock.

Collectively, whole rock and zircon elemental and isotopic analyses indicate that (1) most pre- and post-PST units are less evolved and less homogenized than the PST itself; (2) intrusions in the Silver Creek caldera are petrogenetically distinct from the PST and therefore represent discrete magmatic pulses instead of unerupted PST mush; (3) regional enriched mantle input increased in the SBMVC following the paroxysmal PST eruption; (4) post-PST history of the SBMVC was characterized by periodic influx of magmas with varying juvenile fractions into pre-existing mushy or solidified intrusions, resulting in variable and incomplete hybridization; and (5) melting and assimilation of hydrothermally-altered crust played a relatively minor role in the generation and evolution of magmas in the SBMVC.

Introduction

The Miocene southern Black Mountains volcanic center (SBMVC) in the northern Colorado River Extensional Corridor of northwestern Arizona hosts a prolific igneous record that includes the >700 km^3, 18.8 Ma supereruption-sized Peach Spring Tuff (PST); the PST's source, the Silver Creek caldera; and a collection of well-exposed pre- to post-supereruption volcanic units and intracaldera intrusions that were erupted or emplaced over a period of 2 m.y. (Ferguson, 2013; Pamukcu et al., 2013; McDowell et al., 2014). The completeness of the SBMVC's magmatic record, and the recent finding that the PST overlaps in age with zircons from one of the intracaldera intrusions (McDowell et al., 2014), make it an apposite locale for exploring two questions that have attracted widespread interest in the petrologic community within the past decade: (1) How do volcanic centers that produce large-volume explosive eruptions evolve with respect to magmatic source(s), composition, and processes (e.g., Lipman, 2007; Tappa et al., 2011; Watts et al., 2011, 2012)? (2) What are the petrogenetic relationships between volcanic rocks and spatially associated subvolcanic intrusions (e.g., Bachmann & Bergantz, 2004; Bachmann et al., 2007; Glazner et al., 2008)? More specifically, what are the relationships between supereruption ignimbrites and the ~contemporaneous plutons in their source calderas (e.g., Lipman, 1984; Bachmann & Bergantz, 2008; Zimmerer & McIntosh, 2012a, b; Mills & Coleman, 2013)? In the case of the SBMVC, are the intracaldera intrusions unerupted remnants of supereruption magmas, or do they represent discrete magmatic pulses?

To address these topics with respect to the SBMVC, we call upon a powerfully complementary combination of whole rock and zircon isotopic analysis. Whole rock radiogenic isotopes, including Sr, Nd, Pb, and somewhat more recently, Hf, have long been used as tracers of magmatic sources and processes (e.g., DePaolo & Wasserburg, 1976; Hamilton, 1977; DePaolo, 1981; White & Patchett, 1984; Wooden et al., 1988). Because Sr, Nd, Pb, and Hf isotopes are not appreciably fractionated from one another during closed-system events (crystallization and crystal-melt segregation, for instance), over timescales of magmatic processes, isotopic ratios for closed systems remain constant. Only open-system events, like magma mixing and crustal assimilation, create isotopic variability.

Moreover, isotopic ratios constrain source composition and age: previous studies have shown that Precambrian, Mesozoic, and Miocene-age rocks in the Mojave Desert region, which includes the SBMVC, have distinctive Sr, Nd, and Pb isotopic signatures (e.g., Bennett & DePaolo, 1987; Farmer et al., 1989; Feuerbach et al., 1993; Miller & Wooden, 1994; Falkner et al., 1995; Metcalf et al., 1995; Miller et al., 2000; Bachl et al., 2001; Ericksen et al., 2004). These serve as well-established regional benchmarks against which we can compare the isotopic signatures of the SBMVC and with which we can constrain open-system processes such as crustal contamination and mixing.

More recently, the introduction of high-precision, high-resolution analytical techniques has permitted characterization of isotopic ratios in minerals. For investigations of magmatic processes, zircon is perhaps the most versatile analytical target (e.g., Hanchar & Hoskin, 2003 and references therein; Harley & Kelly, 2007). Not only is it a durable, reliable geochronometer, it readily takes up minor and trace elements (Hf, U, REEs) that have very low diffusivities in zircon (Cherniak & Watson, 2001; Cherniak & Watson, 2003). Thus, it is an excellent recorder of magmatic processes and evolution (e.g., Claiborne et al., 2006; Barth & Wooden, 2010; Claiborne et al., 2010).

Hf and O isotopic compositions of zircons offer particularly valuable insights into magmatic evolution. To a more precise degree than Hf in host rocks, Hf isotopes in zircon provide constraints on magmatic sources, degree of magmatic heterogeneity, and open-system processes. (e.g., Hawkesworth & Kemp, 2006; Kemp et al., 2006; Kemp et al., 2007; Kemp et al., 2010; Drew et al., 2013; Wooden et al., 2013). Zircon O isotopes, too, shed light on magmatic homogeneity and sources; in particular, they indicate relative source input from the mantle, crust, supracrustal material (i.e., that involving sedimentary input), and hydrothermally altered crust, all of which have distinctive O isotope ranges (e.g., Bindeman & Valley, 2001; Valley et al., 2005; Bindeman et al., 2007; Kemp et al., 2007; Watts et al., 2011; Watts et al., 2012).

We combine our isotopic data with new and existing whole rock and zircon elemental data to characterize representative pre- and post-PST volcanic and intrusive units in the SBMVC. We then apply the constraints offered by the data set to investigate magmatic sources and processes and plutonic-volcanic connections. We show that the integration of whole rock and zircon isotopic data, especially when combined with age and elemental data, permits a much more detailed understanding of magmatism in this supereruption-producing volcanic system than any of these approaches can offer on their own.

Geological Context

The 70 to 100 km-wide Northern Colorado River Extensional Corridor (NCREC) is a zone of N/NW trending normal fault-bounded crustal blocks located at the eastern edge of the Basin and Range in western Arizona and southern Nevada (figure 10; Faulds et al., 1990; Faulds et al., 2001). It developed between ~20 and 12 Ma when lithospheric extension, preceded and accompanied by intermediate to silicic magmatism, dismembered Precambrian- and Cretaceous-age continental crust (Faulds et al., 1990; Varga et al., 2004; Lang et al., 2008). Evidence for the region’s tectonic and volcanic upheaval during the middle Miocene is well preserved and spectacularly exposed within the NCREC as thick sequences (>3 km) of volcanic and sedimentary strata and dissected shallow (<13 km) plutons (e.g., Faulds, 1990; Falkner et al., 1995; Bachl et al., 2001; Miller & Miller, 2002; Metcalf, 2004; Walker et al., 2007; Lang et al., 2008).

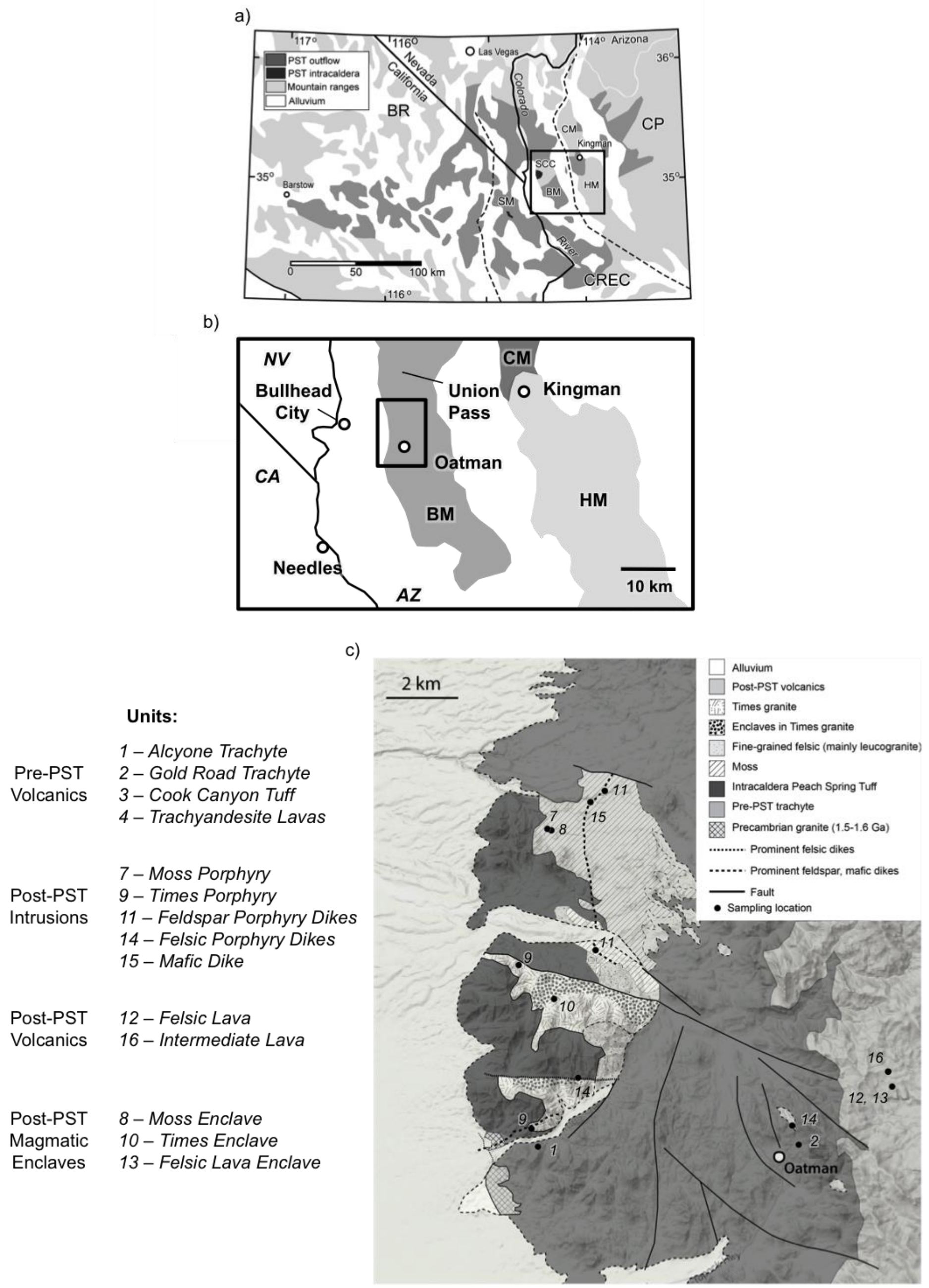


Figure 10: SBMVC location map. a) Extent of the 18.8 Ma rhyolitic Peach Spring Tuff outflow and location of its source, the Silver Creek Caldera, in which dense, trachytic PST is exposed (Ferguson, 2013; Pamukcu, 2013). BR = Basin and Range, CP = Colorado Plateau, CREC = Colorado River Extensional Corridor, SM = Sacramento Mountains, BM = Black Mountains, CM = Cerbat Mountains, HM = Hualapai Mountains, SCC = Silver Creek Caldera. Box shows approximate extent of the Southern Black Mountains Volcanic Center (SBMVC). b) Detailed map of SBMVC within area of box shown in a). The northern boundary of the SBMVC is near Union Pass. The western boundary is just west of the Silver Creek caldera fragment (Pearthree et al., 2010); Kingman, Arizona is at the eastern margin. The southern boundary of the study area is at the southernmost extent of the Black Mountains. Box shows extent of Silver Creek caldera and its immediate environs. BM = Black Mountains, CM = Cerbat Mountains, HM = Hualapai Mountains. c) Detailed map of boxed area shown in b). The Silver Creek caldera and its immediate environs includes intracaldera PST, post-PST intrusions, and pre- and post-PST volcanics that span an age range of ~19 – 17 Ma. Numbers denote sample locations for units listed in table 1.

The southern Black Mountains of northwestern Arizona produced the most voluminous eruption in the NCREC: the "supereruption" of the Peach Spring Tuff (PST) magma body at ~18.8 Ma (Lidzbarski et al., 2012; Ferguson et al., 2013). The PST ignimbrite is widely recognized in the stratigraphic records of southeastern California, southern Nevada, and western Arizona (Young & Brennan, 1974; Glazner et al., 1986; Buesch & Valentine, 1992) (figure 10a). Its source, the Silver Creek caldera, is a dismembered remnant of the original caldera structure, which was torn apart during post-PST extension (Ferguson et al., 2013).

Although the PST represents the largest eruption in the southern Black Mountains, it was bracketed by ~2 million years of volcanic activity (Pearthree et al., 2010; McDowell et al., 2012; McDowell et al., 2014; table 1). The Silver Creek caldera and its environs (figure 10) provide a rich temporal record of pre- to post-PST magmatism that, given the extent and type of volcanic deposits, must have originated at or near the Silver Creek caldera and certainly from the immediate vicinity of the caldera in the SBMVC (Lang, 2001; Lang et al., 2008; McDowell et al., 2014).

We define the extent of the SBMVC based on the geographical footprint of the southern Black Mountains and the extent of voluminous pre-PST magmatism, described below (figure 10). According to these criteria, the northern boundary of the SBMVC is near Union Pass, a zone identified by Murphy and Faulds (2003) and Murphy et al. (2004) as a "temporal domain boundary" between 19-17 Ma CREC extension to the south and <16 Ma extension to the north (figure 10); it is also at or near the northernmost extent of thick, intermediate-composition pre-PST volcanic units (Faulds et al., 1995; Lang, 2001; Murphy et al., 2013). We place the western boundary just west of the Silver Creek caldera fragment, where pre- and post-PST exposures cease; Kingman, Arizona, where pre-PST trachyte is absent from the volcanic record, is at the

Stage of SBMVC Magmatism	***Description of Magmatism***	***Units Analyzed in This Study***		***Sample names*** *(Ages given, where available)*
		Unit number	***Unit name***	
Post-PST Volcanics ***(18.5 – 16.9 Ma[g])***	*Compositionally diverse effusive and explosive volcanism*	*16*	*Trachyte Lava*	***SIT-2*** *(17.58±0.05 Ma)[d]*
		13	*Felsic Lava Enclave*	***SIT-1b***
		12	*Felsic Lava*	***SIT-1****(18.50±0.16 Ma)[c]*
Post-PST Intrusions ***(18.8 – 18.2 Ma)***	*Intermediate to silicic intracaldera intrusive magmatism (Times Porphyry, Moss Porphyry); intrusion of compositionally diverse crosscutting dikes within and in the immediate vicinity of the caldera*	*15*	*Mafic Dike*	**SCM-26**
		14	*Felsic Porphyry Dikes*	***SCM-5a*** *(18.21±0.07 Ma)[c], BCD,* **SCM-42**
		11	*Feldspar Porphyry Dikes*	***SCM-1b*** *(18.65±0.07 Ma)[c], SCM-13, SCM-30*
		10	*Times Enclave*	***SCM-27b***
		9	*Times Porphyry*	***TIP-1*** *(18.63±0.08 Ma)[c], SCM-37, SCM-20, SCM-38*
		8	*Moss Enclave*	***MPe1***
		7	*Moss Porphyry*	***MP1 (****18.76±0.11 Ma[c]), SCM-6 (18.84±0.15 Ma[c])*
PST ***(18.8 Ma)[a,b]***	*PST supereruption, producing phenocryst-rich trachytic intracaldera tuff and rhyolitic outflow (>700 km^3; covers ~32,000 km^2)*	*6*	*Outflow Rhyolite[e]*	*See Frazier, 2013; Frazier et al., in prep*
		5	*Outflow Trachyte[e]*	
Pre-PST Volcanics ***(~19 – 18.8 Ma)***	*Thick (up to ~1 km), phenocryst-rich intermediate-composition trachytic effusive magmatism (~1000 – 2000 km^3); intermediate composition explosive volcanism (Cook Canyon Tuff); minor intermediate-composition effusive magmatism*	*4*	*Trachyte and Trachyandesite Lavas*	**PSK-6a, PSK-7, PSK-14,** ***PST-11***
		3	*Cook Canyon Tuff*	**WSE-3a,** *MLPT-7a, MLPT-7b*
		2	*Gold Road Trachyte[f]*	***SCM-41***
		1	*Alcyone Trachyte[f]*	***SCM-34*** *(19.01±0.26 Ma[c])*

a – Ferguson et al., 2013 (sanidine Ar/Ar)
b – Lidzbarski et al., 2012 (TIMS and SHRIMP zircon U-Pb)
c – McDowell et al., 2014 (TIMS zircon U-Pb)
d – McIntosh & Ferguson, unpublished data (sanidine Ar/Ar)
e – Frazier, 2013; Frazier et al., in prep
f – Ransome, 1923; Thorson, 1971
g – Lang, 2001; Lang et al., 2008
**Units in bold: whole rock isotopic analysis; units in italics: zircon isotopic analysis*

Table 1: Stages of SBMVC Magmatism and Units Analyzed

eastern margin. The southern boundary of the study area is at the southernmost extent of the Black Mountains, approximately 20 km southeast of the Silver Creek caldera (figure 10).

Stages of SBMVC Magmatism

Here we divide SBMVC magmatism into four stages based on whole rock geochemistry from this and previous studies (e.g., Lang, 2008; Pearthree et al., 2010; Pamukcu et al., 2013; McDowell et al., 2014), which record its evolution from predominantly intermediate-composition effusive volcanism to high-silica, large-volume explosive volcanism (the PST supereruption) and finally to compositionally-diverse, small-volume volcanism and epizonal intrusive magmatism (figure 11):

1) Pre-PST magmatism is dominated by thick, phenocryst-rich (~10-40%, biotite and plagioclase) trachytic, trachydacitic, and trachyandesitic lavas that overlie Precambrian basement and are exposed from Union Pass to the southernmost Black Mountains (figures 10 and 11; Ransome, 1927; Thorson, 1971; DeWitt et al., 1986; Faulds et al., 1999; Lang, 2001; Murphy, 2004; Lang et al., 2008; Pearthree et al., 2010). These intermediate-composition lavas exceed ~1 km thickness throughout the southern 40 km of the Black Mountains, thinning to less than 200 m 15 km north of Silver Creek caldera (figure 10) (Lang et al., 2008; Ferguson et al., 2013; Murphy, 2004; Murphy et al., 2013). This suggests a total volume on the order of 10^3 km^3. Faulds et al. (1999) obtained biotite $^{40}Ar/^{39}Ar$ ages for the pre-PST lavas of 19.19 +/- 0.06 Ma and 19.59 +/- 0.03 Ma (Faulds et al., 1999); CA-TIMS U-Pb dating of zircons extracted from the base of the lava pile yielded a weighted mean age of 19.01 +/- 0.2 Ma (McDowell et al., 2014). In this paper we focus on two portions of this lava sequence: the Alcyone trachyte, situated at the

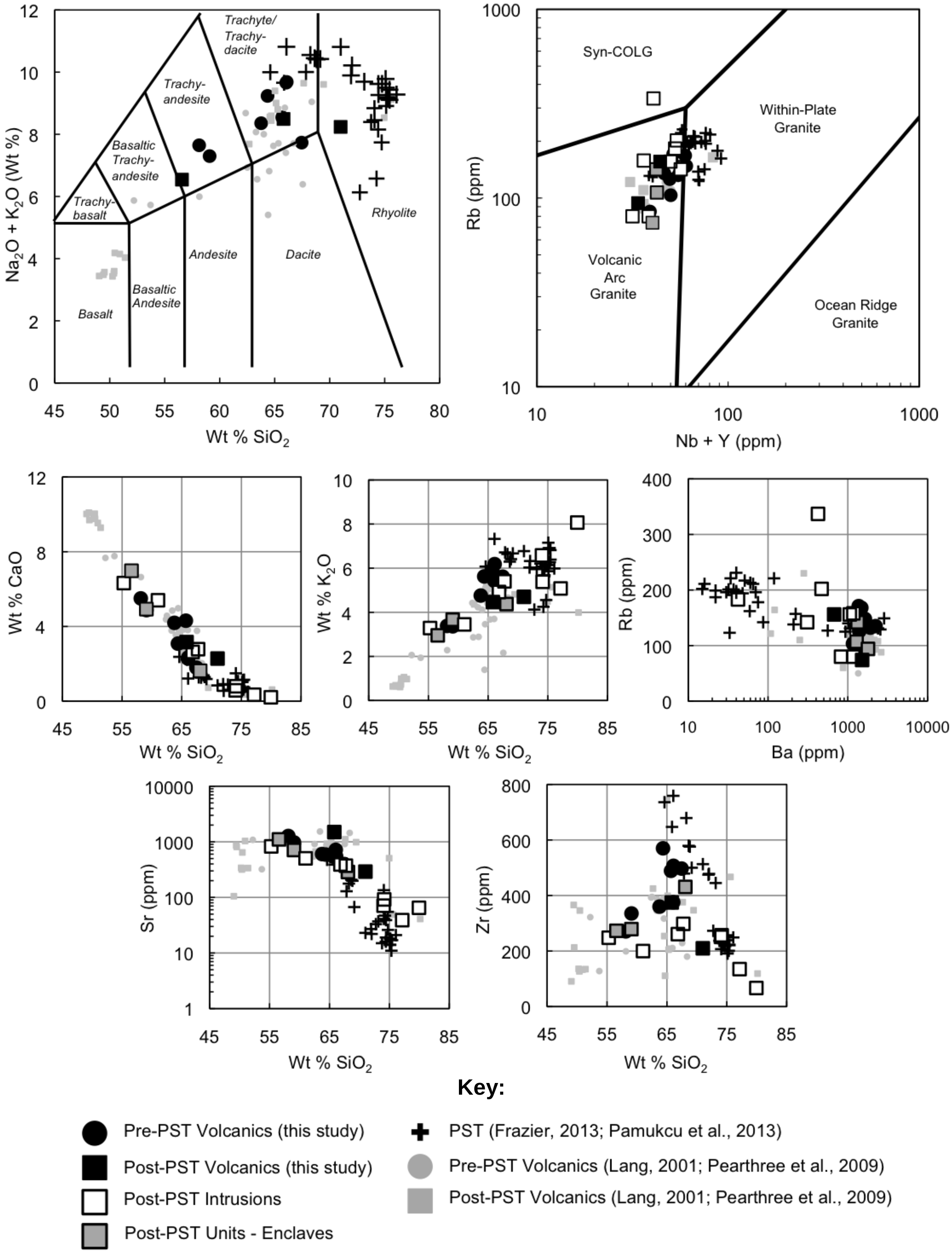


Figure 11: Whole rock elemental geochemistry of pre- and post-PST units in the SBMVC. Data from this study are superimposed on elemental plots of previously published datasets from temporally correlative units in the SBMVC region (e.g., Lang, 2001; Pearthree et al., 2010) and the PST (Frazier, 2013; Pamukcu et al., 2013).

base of the sequence; and the Gold Road trachyte near the top (Ransome, 1927; Thorson, 1971; Dewitt et al., 1986).

The pre-PST magmatic stage also includes: (1) the intermediate-composition Cook Canyon Tuff, produced by the largest explosive eruption in the SBMVC other than the PST. It consists of fall deposits overlain by ignimbrite (Buesch & Valentine, 1986). Cook Canyon thicknesses vary widely throughout the NCREC, from ~10 – 100 m (Buesch and Valentine, 1986; Murphy, 2004; Murphy et al., 2013); and (2) thinner trachyte, trachyandesite, and basaltic trachyandesite lavas that overlie the thick trachyte sequence. These are exposed to the southeast of the Silver Creek caldera and near Union Pass (figure 10, Pearthree et al., 2009; Ferguson et al., 2013; Murphy et al., 2013). We analyze the Cook Canyon Tuff and three of these lavas, including the Wrigley Mine and Esperanza units (Pearthree et al., 2010).

To date, pre-PST volcanic stratigraphy is somewhat unresolved, in large part because many of these units are not exposed in the same locations (Ferguson, personal comm.). In particular, the relative timing of Cook Canyon magmatism with respect to other pre-PST stratigraphy is currently an area of active investigation.

2) The PST consists of a >0.5 km-thick, phenocryst-rich intracaldera trachyte at Silver Creek, and outflow predominantly characterized by relatively phenocryst-poor rhyolite (Pamukcu et al., 2013; Ferguson et al., 2013). Outflow PST is found throughout at least 32,000 km^2 of the southwestern United States but is conspicuously absent from the volcanostratigraphic record within ~15 km of the caldera's margins (figure 10; Ferguson et al., 2013). Sanidine ^{40}Ar/^{39}Ar dating yielded a PST age of 18.78 +/- 0.02 Ma (Ferguson et al., 2013); a correction of systematic bias using the algorithms of Renne et al. (2010, 2011) gives an older age of 18.84 ± 0.02 Ma (McDowell et al., 2014).

3) Post-PST intrusions within and in the immediate vicinity (within 10 km radius) of the caldera consist of two stocks (the intermediate to felsic Moss Porphyry and the felsic Times Porphyry; total area of exposure ≈ 30 km^2) and a series of compositionally diverse, porphyritic crosscutting dikes (Ransome, 1923; Thorson, 1971; DeWitt et al., 1986; McDowell et al., 2014), all of which we include in our study (figure 10). The stocks intrude the PST and display evidence for magmatic hybridization, including magmatic enclaves and rounded, rimmed feldspars (McDowell et al., 2014). Magmatic enclaves and rounded phenocrysts of feldspar and quartz are also locally present in the intermediate and silicic dikes (McDowell et al., 2014). U-Pb CA-TIMS zircon ages for the Moss Porphyry are within error of PST U-Pb zircon and Ar/Ar sanidine ages (~18.8 Ma; Lidzbarski et al., 2012; Ferguson et al., 2013); other intrusions associated with the caldera range from ~18.7 – 18.2 Ma (McDowell et al., 2014).

4) Post-PST volcanism preserved in the southern Black Mountains consists of an array of ~18.7-16.9 Ma intermediate to felsic ignimbrites, block-and-ash flow deposits, lava flows, and volcanogenic sediments that are abundant to the north, east, and south of the caldera (figure 10; Faulds et al., 1999; Murphy, 2004; Lang et al., 2008; Pearthree et al., 2010; Murphy et al., 2013; Ferguson, unpublished data). In this study we investigate two of these units: a prominent, glassy ~18.5 Ma felsic lava (McDowell et al., 2014) and its magmatic enclaves, and a 17.5 Ma intermediate-composition lava containing 2-3 cm euhedral feldspars (McIntosh & Ferguson, unpublished data).

Methods

Whole Rocks

Whole rock radiogenic isotope compositions for Sr, Hf, Nd and Pb were measured at the Radiogenic Isotope and Geochronology Laboratory (RIGL) at Washington State University. Analyses included 19 pre- to post-PST samples from the SBMVC. Fifteen of these were previously characterized for major and trace element geochemistry (McDowell et al., 2014; Pamukcu et al., 2013; Frazier, 2013). In this manuscript we also present major and trace element analyses for four new samples.

Approximately 0.25 g of each powdered sample were placed in Teflon vessels, dissolved in ~7 mL 10:1 HF:HNO_3, and immediately dried down at 120 °C to eliminate silica. Samples were redissolved in ~7 mL 10:1 HF:HNO_3 and placed in steel-jacketed Parr bombs at 150°C for 5-7 days. The solutions were dried down and redissolved overnight in a mixture of 6M HCl/boric acid to minimize the production of fluoride species. Finally, samples were dried down and redissolved in Parr bombs at 150°C for 24 hours in 6M HCl until sample solutions were clear.

Samples were then dissolved in a mixture of 1M HCl and 0.1M HF, and Sr, Nd, and Hf were separated using cation exchange columns loaded with AG 50W-X12 resin (200-400 mesh). Following the method of Patchett & Tatsumoto (1981), Hf was eluted at the beginning of the procedure in 1M HCl/0.1M HF, followed by elution of Sr in 2.5M HCl and REE separation in 6M HCl. Ti was removed from the Hf fraction in a second stage chemistry (a crucial step, as excess Ti has been shown to alter the measured Hf isotopic composition – Blichert-Toft et al., 1997). Any remaining Yb and Lu in the Hf aliquot were removed in a third stage of column chemistry. Sr aliquots were subsequently purified using 0.18 mL Sr-spec resin and HNO_3 (e.g., Gaschnig et al., 2011). Finally, Nd was separated from other REEs using LN Spec resin (Pin & Zalduegui, 1997).

To minimize Pb blanks, we dissolved additional aliquots of each sample specifically for Pb analysis and, following the approach of Prytulak et al. (2006), separated Pb from solution using Biorad AG1-X8 anion resin. Pb aliquots were then spiked with Tl, in order to correct for mass fractionation as described by Gaschnig et al. (2011).

Aliquots of each purified species (Sr, Nd, Hf, Pb) were redissolved in 2% HNO_3 for determination of isotopic compositions on the WSU Thermo-Finnigan MC-ICP-MS. Whole rock Hf analyses were corrected for mass fractionation using $^{179}Hf/^{177}Hf = 0.7325$ and normalized using Hf standard JMC475 ($^{179}Hf/^{177}Hf = 0.282160$). Sr analyses were corrected for mass fractionation using $^{86}Sr/^{88}Sr = 0.1194$ and normalized using standard NBS-987 ($^{87}Sr/^{86}Sr = 0.710240$). Nd analyses were corrected for mass fractionation using $^{146}Nd/^{144}Nd = 0.7219$ and normalized using Nd standard Ames ($^{143}Nd/^{144}Nd = 0.511858$). We corrected for mass bias in the Pb analyses using $^{205}Tl/^{203}Tl = 2.388$ and normalized the mass bias corrected values for standard NBS 981 using $^{206}Pb/^{204}Pb = 16.9405$, $^{207}Pb/^{204}Pb = 15.4963$, $^{208}Pb/^{204}Pb = 36.7219$, $^{207}Pb/^{206}Pb = 0.91475$, and $^{208}Pb/^{206}Pb = 2.16770$ (Galer & Abouchami, 1998).

In Situ Zircon Analyses (dO^{18} and Lu-Hf)

We performed oxygen and Lu-Hf zircon analysis on zircon grains from five pre-PST volcanic samples, 13 intrusive post-PST samples, and three volcanic post-PST samples. Zircon grains were mounted in epoxy, polished to the approximate core, and imaged using SEM cathodoluminescence. Following the methods of Trail et al. (2007), we carried out a total of 467 O isotope analyses (93 pre-PST, 312 post-PST intrusive, 62 post-PST volcanic) at UCLA using the CAMECA SIMS IMS 1270 (spot size ~20-25 microns). Analyses were calibrated using zircon standard R33. $\delta^{18}O$ was calculated using VSMOW of Baertschi (1976). . External 2-sigma precision was ≤ 0.48‰.

Following analyses for O isotopic composition the mounts were lightly repolished and the age and Lu-Hf isotope composition was determined on a subset of the same grains using LA-MC-ICP-MS at RIGL (Table 5). We conducted a total of 239 analyses: four pre-PST samples (29 analyses), three PST samples (30 analyses), 12 post-PST intrusive samples (139 analyses), and three post-PST volcanic samples (41 analyses). Analyses were carried out using the laser ablation split-stream method (LASS) whereby U-Pb age and Lu-Hf isotope composition are determined simultaneously (Fisher et al., 2014). Given the young age, and thus low Pb concentrations, relatively large analytical uncertainties exist for age determinations, and thus we prefer the higher precision SIMS age (McDowell et al., 2014). However, as is demonstrated below the LASS approach allows us to detect the presence of ancient inherited cores when targeting Miocene age zircon domains (Fisher et al., 2014) When possible, we selected Hf sites that overlapped with previous O isotope analysis locations. Care was taken to avoid placing the laser beam over multiple CL zones. Analyses were calibrated using zircon standard R33. ε_{Hf} was calculated using $^{176}Hf/^{177}Hf$ of CHUR (0.282785) reported by Bouvier et al. (2008). External 2-sigma precision was ≤ 1.5 ε_{Hf}.

Results

Whole rock geochemistry records SBMVC magmatic evolution from predominantly intermediate-composition effusive volcanism (pre-PST), to high-silica explosive magmatism (PST; Frazier, 2013), and finally to compositionally diverse volcanic and intrusive magmatism (post-PST). Consistent with whole rock geochemistry obtained previously for temporally equivalent units in the SBMVC (figure 11; Lang, 2001; Pearthree et al., 2010; Frazier, 2013; McDowell et al., 2014), pre-PST volcanics yield whole rock concentrations of 58 to 66 wt% SiO_2; post-PST intrusions, 55 to 80 wt%; and post-PST volcanics, 57 to 71 wt% (figure 11; appendix E). In all units, Al_2O_3, MgO, CaO, TiO_2, Ba and Sr decrease and K_2O and Rb increase with increasing SiO_2. In the tectonic discrimination diagrams of Pearce et al. (1984), samples lie primarily within the "volcanic arc granite" field; volcanic samples have high-alkali designations (basaltic trachyandesite, trachyandesite, trachydacite, dacite, etc.) according to the classification scheme of Le Bas et al. (1986). Notably, pre- and post-PST units are elementally distinct from the PST, which has lower Sr and Ba and higher Zr and Rb than its magmatic predecessors and successors and which uniquely straddles the "volcanic arc granite" and "within-plate granite" fields (figure 11).

Sr, Nd, and Hf isotopic ranges for pre-PST units ($^{87}Sr/^{86}Sr_i$ = 0.7093 to 0.7110, ε_{Nd} = -8.3 to -11.6, and ε_{Hf} = -8.2 to -14.0) are similar to those of post-PST volcanics and intrusions ($^{87}Sr/^{86}Sr_i$ = 0.7091 to 0.7124, ε_{Nd} = -8.4 to -10.4, and ε_{Hf} = -8.8 to -13.1) (figure 12; appendix F). Times and Moss magmatic enclaves (SCM-27b and MPe1, respectively) yield the most primitive isotopic ratios (e.g., highest ε_{Hf} and ε_{Nd}). Throughout the sample suite, ε_{Nd} shows a strong positive correlation with ε_{Hf}. All pre- and post-PST units have Pb isotopic signatures within the ranges $^{206}Pb/^{204}Pb$ = 18.19-18.49, $^{207}Pb/^{204}Pb$ = 15.60-15.62, and $^{208}Pb/^{204}Pb$ = 38.95-39.29 (figure 12; appendix F). Compared with the PST, the older and younger samples show greater isotopic variability, higher ε_{Nd} and ε_{Hf}, and generally lower $^{87}Sr/^{86}Sr_i$ (figure 12). Collectively, SBMVC units have isotopic signatures consistent with those determined for other Miocene intrusive and

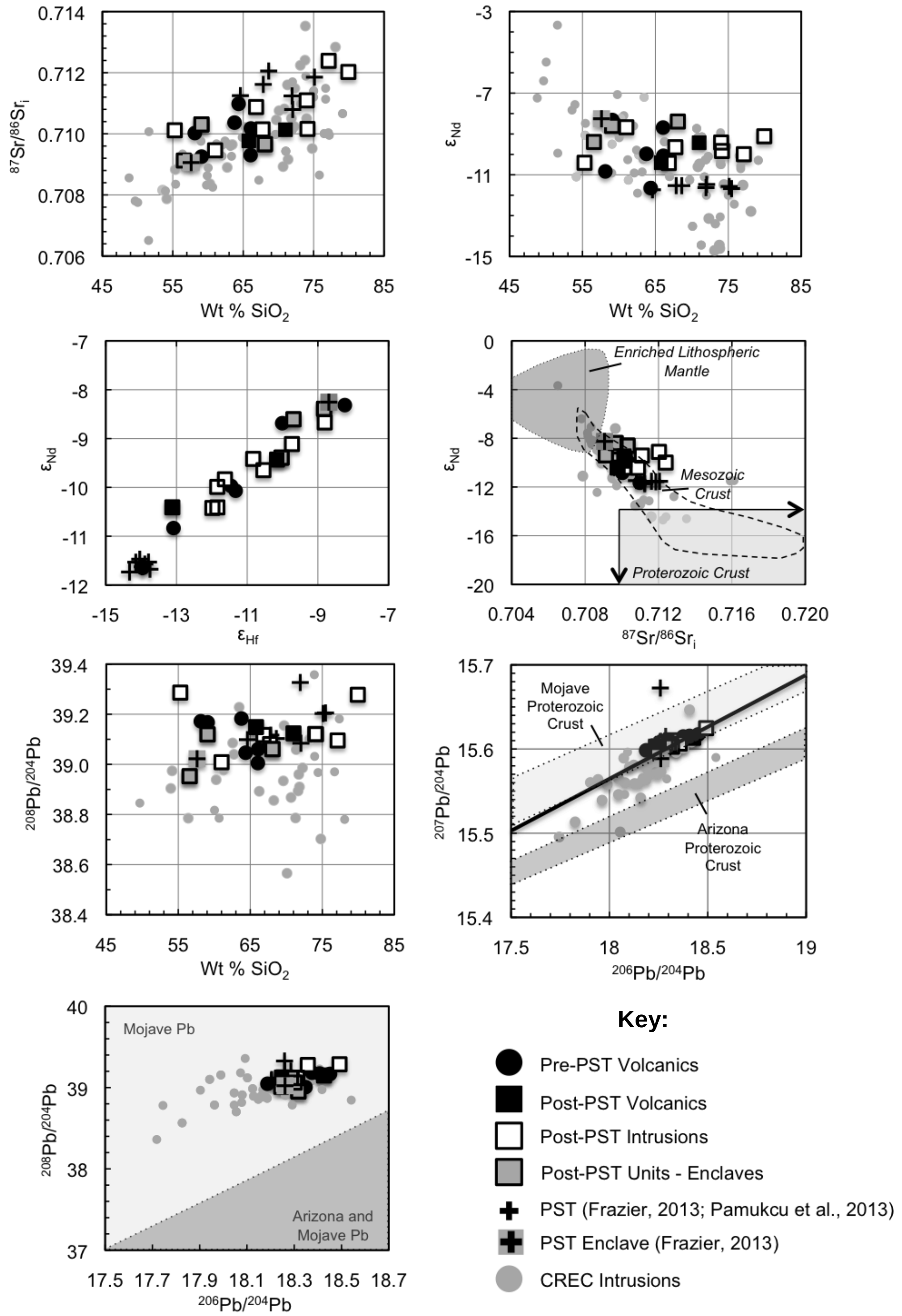


Figure 12: Whole rock isotopic geochemistry of pre- to post-PST SBMVC units. Data from this study are superimposed on isotopic data from the PST (Frazier, 2013) and other CREC intrusions (Falkner et al., 1995; Miller et al., 2000; Bachl et al., 2001). Fields for enriched mantle are from Feuerbach et al. (1993). Fields for Proterozoic and Mesozoic crust are from DePaolo and Wasserburg (1979) and Bennett & DePaolo (1987). Fields for Mojave and Arizona terranes are from Wooden et al. (1988), Wooden & Miller (1990), and Feuerbach et al. (1998).

volcanic units within the NCREC (e.g., Wooden & Miller, 1994; Metcalf et al., 1995; Falkner at al., 1995; Miller et al., 2000; Bachl et al., 2001; Ericksen et al., 2004) (figure 12).

Zircon $\delta^{18}O$ in the majority of pre-PST, PST, and post-PST units fall within the range +5 – +7.3‰, with several higher outliers between $\delta^{18}O$ = +7.8 to +8.8 (one extreme outlier yields $\delta^{18}O$ = +12.2) and lower outliers between +4.2 to +5.0 (figure 13; appendix G) (Frazier et al., in prep). Broadly, zircons exhibit a decline in $\delta^{18}O$ from older to younger units: average $\delta^{18}O$ = +6.8 in ~19 Ma Alcyone trachyte (SCM-34), whereas average $\delta^{18}O$ = +5.6 in ~18.2 Ma felsic porphyry dikes (BCD, SCM-5a) (figure 13). Zircon Hf isotopes for pre- to post-PST samples are primarily in the range of ε_{Hf} = -8 to -16 (figure 13; appendix H). Zircons trend towards higher ε_{Hf} from older to younger SBMVC units (e.g., average ε_{Hf} = -13.9 in ~19 Ma pre-PST trachyte [SCM-34], average ε_{Hf} = -9.8 in ~18.2 Ma felsic porphyry dikes [BCD, SCM-5a]) (figure 13). The pre-PST trachyte, PST, Moss porphyry, and the feldspar porphyry dike all reveal a subset of zircons with ε_{Hf} = -30 to -34, values that are typical for 1.4 Ga zircons (cf. Goodge & Vervoort, 2006).

PST zircons have distinct $\delta^{18}O$ and ε_{Hf} compared to pre- and post-PST zircons (figures 13, 14). The PST (and Alcyone trachyte SCM-34) yield comparatively low ε_{Hf} (-14), and both $\delta^{18}O$ and ε_{Hf} display relatively narrow ranges compared to pre- and post-PST units. In a subset of analyses representing paired O and Hf analyses obtained from the same areas of single grains (appendix I; figure 14a), $\delta^{18}O$ increases with decreasing ε_{Hf}. Post-PST intrusions span the greatest range in $\delta^{18}O$ - ε_{Hf} space, whereas the PST occupies a comparatively narrow field towards the lower end of the SBMVC's ε_{Hf} spectrum and higher end of $\delta^{18}O$.

A comparison of $\varepsilon_{Hf\text{-zircon}}$ and $\varepsilon_{Hf\text{-whole rock}}$ (including only those samples for which both types of data are available; figure 14b) shows that in the majority of these units, zircon and whole rock ε_{Hf} are identical within a few tenths of the error weighted mean of zircon ε_{Hf}. We identify four

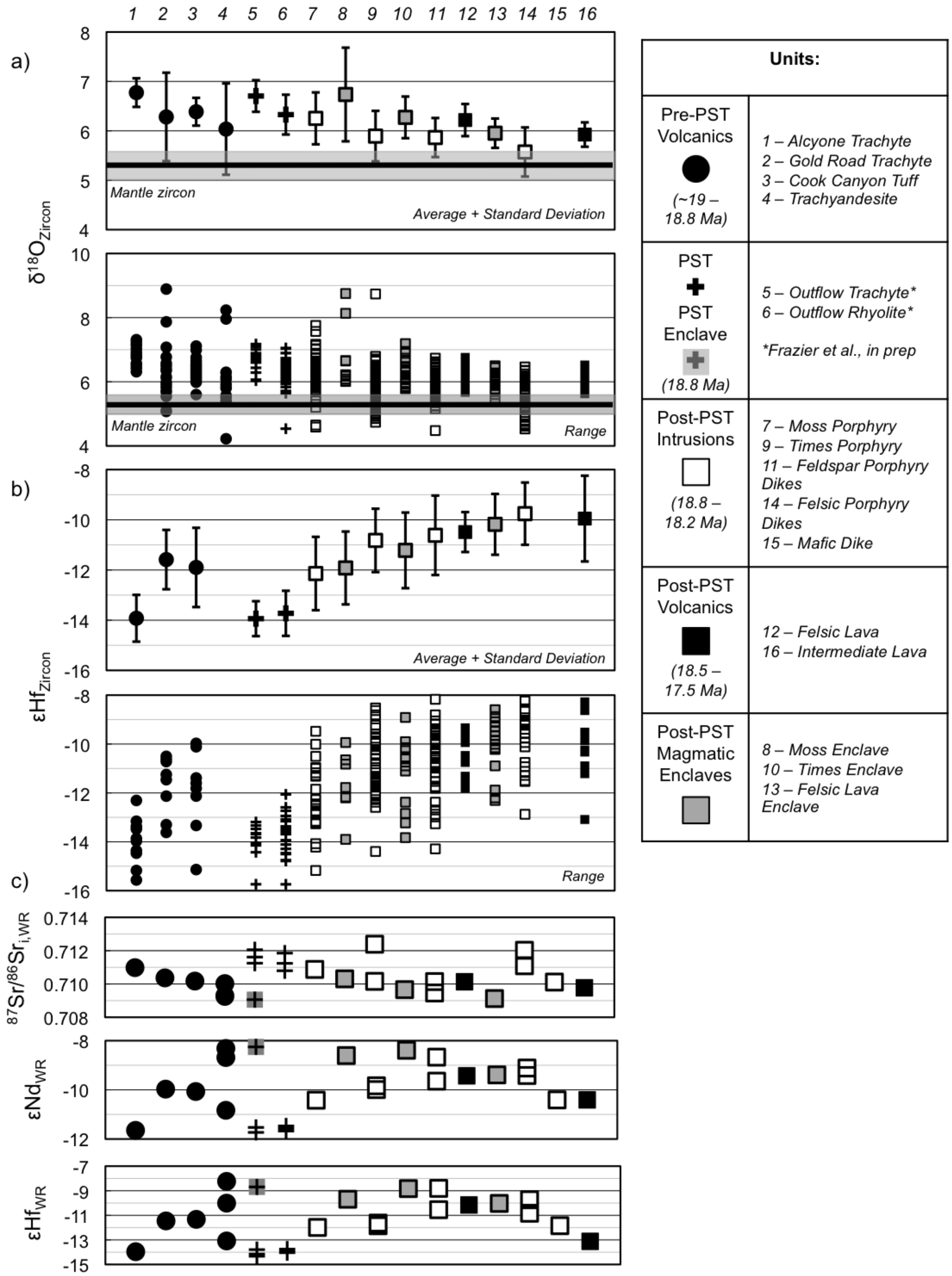


Figure 13: Plots of zircon and whole rock isotopic data for pre-PST units (left hand side of graphs) to post-PST units (right hand side of graphs). Data from this study are integrated with equivalent whole rock and zircon PST isotopic data from Frazier (2013) and Frazier et al. (in prep). Numbers along the top of the graphs correlate with unit numbers in table 1; this represents a general sequence from pre- to post-PST, but units are not necessarily in stratigraphic order. a) Oxygen isotopes in zircon. Top graph shows average values and standard deviations; bottom graph shows full range of zircon $\delta^{18}O$ for each sample. Range of mantle zircon ($\delta^{18}O = +5.5 \pm 0.3‰$) shown for comparison. b) Hafnium isotopes in zircon. Top graph shows average values and standard deviations; bottom graph shows full range of zircon εHf for each sample. c) Whole rock εNd, εHf, and $^{87}Sr/^{86}Sr_i$ for all included units.

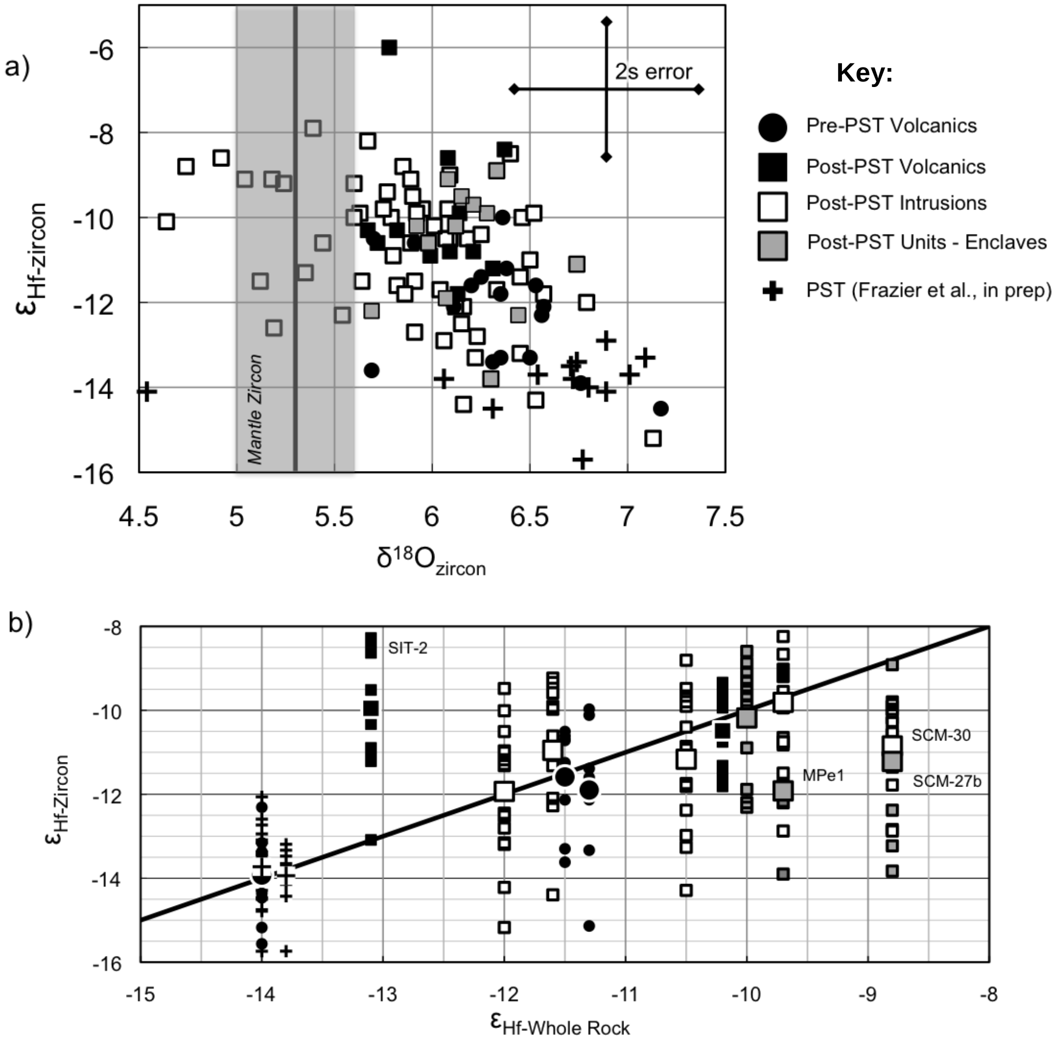


Figure 14: Zircon O and Hf data from SBMVC units. a) Subset of analyses representing paired O and Hf analyses obtained from the same areas in single grains. $\delta^{18}O$ increases with decreasing ε_{Hf}. Post-PST intrusions span the greatest range in $\delta^{18}O$ - ε_{Hf} space, whereas the PST occupies a comparatively narrow field towards the lower end of the SBMVC's ε_{Hf} spectrum and higher end of $\delta^{18}O$ (Frazier et al., in prep). Range of $\delta^{18}O$ in mantle zircon shown for comparison. Error bars show 2 sigma uncertainties for ε_{Hf} (≤ 1.5) and $\delta^{18}O$ (≤ 0.48 ‰). b) Whole rock ε_{Hf} vs. zircon ε_{Hf} for pre- to post-PST units. Line shows trend of equivalent whole rock and zircon $\varepsilon_{Hf.}$ Zircon and whole rock ε_{Hf} are identical within a few tenths $\varepsilon_{Hf,}$ with four exceptions: three in which $\varepsilon Hf_{whole\ rock} > \varepsilon Hf_{zircon}$ (Times enclave [SCM-27b], Moss enclave [MPe1], and feldspar porphyry dike [SCM-30]), and one in which $\varepsilon Hf_{whole\ rock} > \varepsilon Hf_{zircon}$ (post-PST intermediate lava [SIT-2]) (figure 13b). Data are integrated with equivalent whole rock and zircon PST isotopic data from Frazier (2013) and Frazier et al. (in prep).

clear exceptions: three in which $\varepsilon Hf_{whole\ rock} > \varepsilon Hf_{zircon}$ (Times enclave [SCM-27b], Moss enclave [MPe1], and feldspar porphyry dike [SCM-30]), and one in which $\varepsilon Hf_{whole\ rock} < \varepsilon Hf_{zircon}$ (post-PST intermediate lava [SIT-2]) (figure 14b).

Discussion

Whole Rock Sr-Nd-Hf-Pb Isotopes

In the SBMVC, whole rock isotopes serve as robust tracers of general sources, processes, and relationships between distinct magmatic pulses. The pre-Cenozoic lithosphere of southeastern California, southern Nevada, and northwestern Arizona comprises Proterozoic (1.4 Ga and 1.6-1.8 Ga) and Mesozoic (160-70 Ma) crust, and enriched mantle lithosphere (Bennett & DePaolo, 1987; Wooden & Miller, 1990; Feuerbach et al., 1993; Miller & Wooden, 1994; Miller et al., 2000). An extensive record of Sr, Nd, and Pb isotopic data that has emerged from this region over the past 25 years shows not only that the crust has an isotopic signature distinct from that of the mantle (e.g., Bennett & DePaolo, 1987; Farmer et al., 1989; Feuerbach et al., 1993), but the crust itself is isotopically quite variable (e.g., Bennett & DePaolo, 1987; Wooden et al., 1988; Wooden & Miller, 1990; Miller & Wooden, 1994; Gerber et al., 1995) (figure 12). Studies of Cenozoic CREC magmatism have made use of, and further contributed to, this extensive isotopic database (e.g., Wooden & Miller, 1994; Metcalf et al., 1995; Falkner et al., 1995; Bachl et al., 2001; Ericksen et al., 2004).

Sr_i and Nd isotopes for SBMVC samples overlap with those of other Miocene units within the CREC ($Sr_i = 0.709$ to 0.714, $\varepsilon_{Nd} = -8$ to -15) (figure 12). Like the PST and other CREC igneous units (Frazier, 2013), isotopic signatures of SBMVC pre- and post-PST volcanics and intrusions indicate that they formed via variable mixing between regional enriched mantle (as described by

Farmer et al., 1989; Feuerbach et al., 1993; Beard & Glazner, 1995; Metcalf et al., 1995; and Mukasa & Wilshire, 1997; Miller et al., 2000) and Proterozoic crust (as described by Bennett & DePaolo, 1987; Wooden & Miller, 1990; Miller & Wooden, 1994). Whole rock isotopic data for Mesozoic igneous units in the CREC also overlap with those of the SBMVC, but because the southern Black Mountains lacks Mesozoic-age exposures, and because extensive zircon dating has found no evidence of Mesozoic inheritance (McDowell et al., 2014; Lidzbarski et al., 2012), we surmise that Mesozoic crust did not serve as a significant magmatic source for the SBMVC.

Lead isotope ratios further constrain the nature of the Proterozoic crustal component. The CREC crust consists of two Proterozoic crustal terranes, the Arizona province and the Mojave province, each of which has a unique Pb isotopic signature (Wooden et al., 1988; Wooden & Miller, 1990; Feuerbach et al., 1998). Geographically, the SBMVC lies near the junction between the Proterozoic Arizona and Mojave crustal terranes; Pb isotopes from all analyzed units lie well within the field established for the Mojave terrane, thereby marking it as the SBMVC's primary lithospheric contributor (figure 12).

Along with the Alcyone trachyte (SCM-34), the intracaldera and outflow PST (rhyolite and trachyte) yield the most evolved, crustal whole rock isotopic values of all sampled units. Moreover, except for a magmatic enclave in the PST that bears the most juvenile signature of all samples (ε_{Nd} = -8.3, ε_{Hf} = -8.7, and Sr_i = 0.7091), PST isotopes lie within a strikingly narrow range of ε_{Nd} and ε_{Hf} (-11.5 and -14 on average, respectively). This is consistent with a relatively homogeneous PST-generating magma body formed by the mixing of magmas derived from Proterozoic crust and enriched mantle lithosphere (Frazier, 2013; figure 12).

In comparison, pre- and post-PST volcanics and intrusions display a wider range of whole rock isotopic values and yield more primitive isotopic compositions on average (figure 12). Lower-SiO_2 units – particularly pre-PST lavas PSK-14 and PST-11, and post-PST magmatic enclaves in the Times, Moss, and felsic lava SIT-1 - have a closer affinity to a more juvenile source (likely enriched mantle endmember; c.f. Metcalf et al., 1995; figure 12), with relatively high ε_{Nd} and ε_{Hf} and low $^{87}Sr/^{86}Sr_i$. Higher-SiO_2 units yield lower ε_{Nd} and ε_{Hf}, and higher $^{87}Sr/^{86}Sr_i$ (figure 12).

Based on the isotopic distinction between the PST and most pre- and post-PST units (including intracaldera stocks and cross-cutting dikes), the PST and intrusions appear to be petrogenetically distinct magmatic pulses. In fact, the PST appears to be petrogenetically distinct from almost all of its 19 – 17 Ma predecessors and successors; the only exception is the Alcyone trachyte (SCM-34), which looks isotopically identical to the PST.

Zircon O and Hf Isotopes

Zircon ε_{Hf} data corroborate whole rock data and suggest that magmatic sources consisted of juvenile (higher ε_{Hf}) and ancient crustal (lowest ε_{Hf}) components (figure 13; appendix I). Oxygen isotopes in zircon are also consistent with crustal ($\delta^{18}O > 6$) and mantle-derived ($\delta^{18}O < 6$) igneous sources; the paucity of $\delta^{18}O$ values >+7 to +8‰ indicates minimal input from metasedimentary sources (e.g. the abundant paragneisses of the Mojave terrane) (figure 13; appendix G). A few relatively low $\delta^{18}O$ analyses ($\delta^{18}O$ = +4-5‰) from felsic porphyry dike and Times granite zircons may reflect limited melting and assimilation of hydrothermally-altered rock during the SBMVC's post-PST magmatic stage (Bindeman & Valley, 2001), but the dearth of these data relative to higher oxygen values suggests that, unlike in other large-volume intraplate continental magmatic centers such as the Yellowstone-Snake River Plain (Bindeman & Valley, 2001; Watts et al., 2011; Drew et al., 2013), this process played a relatively minor role in the development and evolution of the PST and other SBMVC magmas.

Whereas PST zircons yield a narrow range of relatively high $\delta^{18}O$ and low ε_{Hf} values – consistent with crystallization within an isotopically homogeneous magma body – most pre- and post-PST zircon suites display wider isotopic ranges and have lower average $\delta^{18}O$ and higher average ε_{Hf} (figures 13 and 14). The isotopic range in non-PST SBMVC zircons implies that they crystallized from more compositionally diverse magmas with greater juvenile source input. Increasing average $\varepsilon_{Hf\text{-}Zircon}$ and decreasing $\delta^{18}O_{Zircon}$ in post-PST units is broadly consistent with whole rock isotopic data that indicate increasing input of mantle-derived material into the SBMVC system after the PST eruption, an assertion supported by the relative abundance of post-PST grains with mantle zircon isotopic signatures (figure 14a) .

Like the whole rock data, zircon isotopes reveal a petrogenetic distinction between the PST and intrusions. Moss porphyry zircon ages are within error of PST age (McDowell et al., 2014), but the two units are clearly distinct: the Moss displays a greater range in $\delta^{18}O$ and ε_{Hf} than the PST and has a distinctly higher $\varepsilon_{Hf\text{-}WR}$, $\varepsilon_{Nd\text{-}WR}$, and average $\varepsilon_{Hf\text{-}Zircon}$; the Times porphyry and the dikes exhibit broadly similar averages and trends. Thus, whereas effective isotopic homogenization of the PST magma body occurred prior to zircon saturation and crystallization (Frazier, 2013), zircons in the intrusions crystallized in isotopically distinct melts prior to magmatic mingling and mixing.

Integration of Zircon and Whole Rock Data

Comparison and integration of zircon and whole rock ε_{Hf} data offer constraints on SBMVC magmatic evolution beyond the scope of the individual data sets (figure 14b). In most intermediate to silicic crustal rocks a great majority of Hf and Zr resides in zircon; therefore, if zircon crystallizes in a melt that evolved only by closed system processes, mean zircon ε_{Hf} should be very close to ε_{Hf} in host rocks. Where this is not the case, it reveals that a large fraction of whole rock Hf is not represented by the analyzed zircon: either the analyzed zircon was highly non-representative (an important part of the range of compositions was missed), or much of the Hf in the rock is in other phases and has a distinctly different isotopic composition.

Hafnium isotopic compositions in zircon from almost all samples are variable, though in most cases, the range spans whole rock ε_{Hf} (figure 14b). This isotopic variability demonstrates, well beyond analytical uncertainty, magmatic disequilibrium and open system processes. Diverse zircon crystals must have grown from multiple, isotopically distinct melts that mingled after zircon growth, a scenario supported by zircon trace element data from these same SBMVC units (McDowell et al., 2014).

More puzzling than the obvious disequilibrium and evidence for mixing is the apparent mismatch in four samples – two magmatic enclaves (one in the Moss porphyry [MPe1], one in the Times porphyry [SCM-27b]), a mafic zone within a composite feldspar porphyry dike (SCM-30), and a post-PST intermediate-composition lava (SIT-2) – in which most or all zircon ε_{Hf} values are either lower or higher than ε_{Hf} of their host whole rocks. In three cases zircon values are equal to or less than whole rock, and in the fourth they are equal to or greater than whole rock (Figure 14b).

In the magmatic enclaves and dike, whole rock ε_{Hf} exceeds calculated mean zircon ε_{Hf} by ~2; ε_{Hf-WR} records a more juvenile source (ε_{Hf} = -8 to -10) than $\varepsilon_{Hf-Zircon}$. However, the range of ε_{Hf} in magmatic enclave zircons is nearly identical to zircon ε_{Hf} ranges in their respective Times and Moss porphyry host rocks (figure 14b). We suggest that enclave zircons are likely xenocrysts culled from the partially crystallized Times and Moss host magmas during the injection of more mafic, juvenile material. Similarly, the range of zircon ε_{Hf} in SCM-30 matches the ε_{Hf} range in a more silicic section of the same composite dike (SCM-1b), again indicating that the zircon bears the isotopic signature of its original host instead of the more juvenile magma into which it was incorporated. Assuming that our sample set is sufficiently statistically robust, any zircons that grew within the enclaves and dike melts were likely too small to extract via typical mechanical and gravimetric mineral separation methods.

In SIT-2, approximate mean zircon ε_{Hf} exceeds whole rock ε_{Hf} by ~3; the zircon has a more juvenile signature than its more evolved host. Petrographic investigations of SIT-2 show that it is characterized by large, 2-3 cm rounded feldspar glomerocrysts (some with reaction rims), phenocrysts (or xenocrysts) of biotite and sphene with reaction textures, and sparse clinopyroxene microlites of feldspar within a glassy matrix. We surmise that the differences in zircon and whole rock ε_{Hf} reflect the injection of a more evolved magma into, and the partial resorption of, a less evolved feldspar-rich cumulate. We propose that the analyzed zircon was derived from the disaggregated cumulate, and therefore that its isotopic composition approaches that of the more primitive magma from which the cumulate crystallized, whereas the whole rock composition of SIT-2 reflects that of the injected, more isotopically evolved, magma. The less radiogenic component of whole rock Hf is probably in large part contained within the glassy matrix (melt).

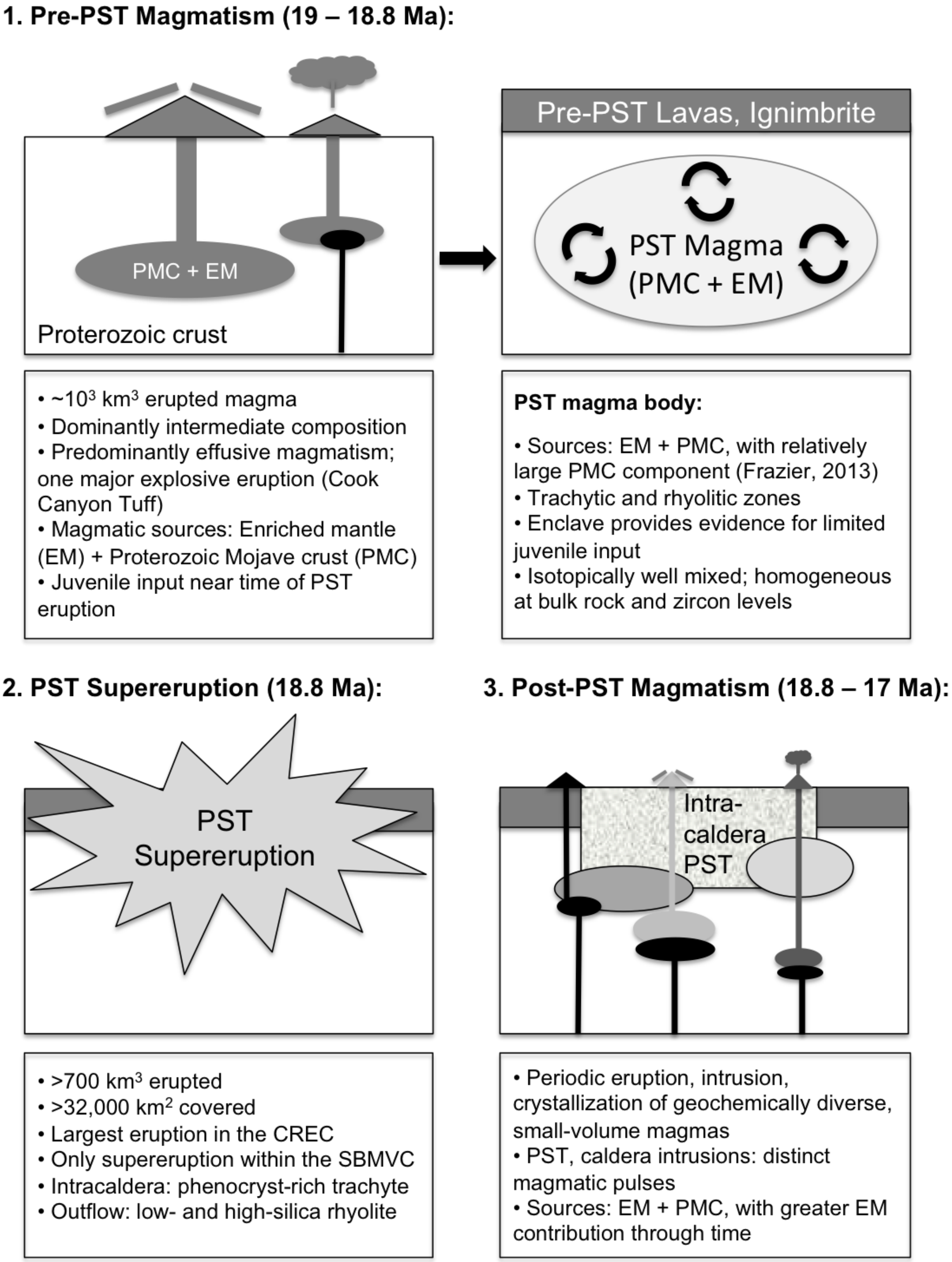
The combination of whole rock and zircon isotopic data resolves in detail the processes operating in the SBMVC, from pre- to post-supereruption: it reveals that the SBMVC experienced multiple episodes of crystallization and subsequent magmatic rejuvenation in the ~1.5 Ma following the PST eruption. Moreover, it indicates that some of these episodes involved the intrusion of relatively juvenile magma, whereas others involved intrusion of more isotopically evolved magma.

Magmatic History of the SBMVC, ~19-17 Ma

We propose the following reconstruction of the SBMVC's magmatic evolution based on isotopic constraints in conjunction with field, elemental and petrographic data (figure 15):

(1) ~19 – 18.8 Ma: Eruption of intermediate composition, large-volume (~10^3 km^3 total) trachytic lavas as well as Cook Canyon Tuff and subordinate trachybasaltic to trachyandesitic lavas, all produced from a combination of juvenile and Proterozoic Mojave crustal sources. Relative crustal contributions to pre-PST lavas were variable; trachyte at the base of the pre-PST trachytic lava section (SCM-34) records the greatest crustal contribution of analyzed pre-PST units (figures 12 and 13). Two pre-PST lavas and a PST magmatic enclave provide clear evidence for the input of juvenile material prior to and during the PST episode.

(2) 18.8 Ma: Accumulation, mixing, and eruption of >700 km^3 PST magma body. The narrow, relatively crust-dominated whole rock and zircon isotopic ranges in rhyolitic and trachytic PST (figures 12, 13, and 14) suggest that this was a unique phase in the SBMVC's history, characterized by the generation of a well-mixed, high-silica, exceptionally high-volume silicic magma body (Frazier, 2013). The uniformity of zircon isotopic compositions suggest that zircon growth postdated mixing (Frazier et al., in prep).



1. Pre-PST Magmatism (19 – 18.8 Ma):

- ~10^3 km^3 erupted magma
- Dominantly intermediate composition
- Predominantly effusive magmatism; one major explosive eruption (Cook Canyon Tuff)
- Magmatic sources: Enriched mantle (EM) + Proterozoic Mojave crust (PMC)
- Juvenile input near time of PST eruption

PST magma body:

- Sources: EM + PMC, with relatively large PMC component (Frazier, 2013)
- Trachytic and rhyolitic zones
- Enclave provides evidence for limited juvenile input
- Isotopically well mixed; homogeneous at bulk rock and zircon levels

2. PST Supereruption (18.8 Ma):

- >700 km^3 erupted
- >32,000 km^2 covered
- Largest eruption in the CREC
- Only supereruption within the SBMVC
- Intracaldera: phenocryst-rich trachyte
- Outflow: low- and high-silica rhyolite

3. Post-PST Magmatism (18.8 – 17 Ma):

- Periodic eruption, intrusion, crystallization of geochemically diverse, small-volume magmas
- PST, caldera intrusions: distinct magmatic pulses
- Sources: EM + PMC, with greater EM contribution through time

Figure 15: Cartoon of magmatic evolution of the SBMVC as indicated by elemental, isotopic, and field data.

(3) 18.8 – 17 Ma: Episodic eruption/intrusion of relatively small volume, elementally and isotopically diverse magmas. Like their magmatic predecessors, post-PST magmas were generated from a combination of enriched mantle- and Proterozoic crust-derived sources. However, juvenile sources contributed more heavily to post-PST magmatism than to older magmatic pulses in the SBMVC, and that influence increased through time. Influx of magmatic material into the SBMVC periodically reinvigorated the volcanic center throughout its history, locally disaggregating and assimilating resident crystal mushes or previously crystallized material.

Conclusions

(1) Whole rock isotopic signatures of pre- and post-PST volcanics and intrusions suggest they formed via variable mixing between regional enriched mantle and Proterozoic Mojave crust.

(2) Pre- and post-PST volcanics and intrusions display a wider range of zircon ε_{Hf} and oxygen isotope values compared to the PST, indicating that pre- and post-PST magmas were less homogeneous (and by implication less well mixed) than the PST magma body.

(3) Post-PST volcanics and intrusions yield more primitive whole rock and zircon isotopic compositions than the PST on average; moreover, these isotopic compositions become more primitive through time, indicating that regional enriched mantle input increased in the post-PST stage of the SBMVC's history.

(4) Although low oxygen isotope values (i.e., $\delta^{18}O = 4\text{-}5$) in some post-PST intrusions may record melting and assimilation of hydrothermally-altered rock (Bindeman & Valley, 2001), their relative scarcity data suggest that – in comparison to some other large-volume intercontinental magmatic centers such as Yellowstone and Heise (Bindeman & Valley, 2001;

Watts et al., 2011; Drew et al., 2013) – this process played a relatively minor role in the generation of SBMVC magmas.

(5) Elemental and isotopic data for the PST and intracaldera plutons indicate that they are petrogenetically unrelated: the caldera intrusions are less homogeneous and record more juvenile source input than the PST.

(6) Integration of whole rock and isotopic data resolves fine-scale magmatic processes in the SBMVC in a way that neither data set can do alone. In particular, integration of the whole rock and zircon Hf data sets reveals that the post-PST history of the SBMVC was characterized by periodic influx of magmas with varying juvenile fractions into pre-existing mushy or solidified intrusions, resulting in variable disaggregation and incorporation into the final, imperfectly hybridized, products.

CHAPTER 4

ZIRCON ISOTOPIC AND GEOCHEMICAL INSIGHTS INTO EDIACARAN-EARLY CAMBRIAN SILICIC MAGMATISM, WESTERN GONDWANA (SOUTHERN BRAZIL)

Abstract

A prominent chain of Ediacaran to early Cambrian siliciclastic basins, volcanic units, and silicic plutons extends for >1000 kilometers throughout northern Uruguay and southern Brazil. These features developed during a period of substantial continental growth in western Gondwana (e.g., Condie et al., 2009; Condie & Aster, 2010). The tectonic settings in which the basins and silicic units formed, the timing and extent of Ediacaran-Cambrian magmatism in this region, and the geochronologic and petrogenetic relationships between the system's widely dispersed silicic units are not fully constrained.

To evaluate the extent and duration of Ediacaran-Cambrian silicic magmatism in southern Brazil and the petrogenetic relationships between igneous units within this silicic system, we conducted simultaneous LA-ICP-MS elemental and U-Pb isotopic analysis on zircons from representative plutons and volcanic strata in and near the Camaquã basin (at the southern extent of the basin system) and Itajaí basin (near the middle of the system), and compared the results to an analogous data set obtained from silicic plutons in the Serra da Graciosa region to the north (Braun et al., 2010). Zircons in Camaquã volcanics yield a ^{206}Pb/^{238}U age of ~540 Ma, whereas Camaquã intrusions display ^{206}Pb/^{238}U age peaks at ~580 Ma (coeval with Serra da Graciosa magmatism) and ~540 Ma (coeval with hydrothermal alteration in the Serra da Graciosa plutons). Most zircons have typical low LREE concentrations consistent with magmatic

crystallization, but some are richer in LREE, suggesting hydrothermal alteration and/or presence of inclusions. Volcanics and intrusions from the Itajaí basin yield a discrete $^{206}Pb/^{238}U$ age peak of ~520 Ma, reflecting a more localized magmatic event not strongly recorded in the Camaquã or Serra da Graciosa regions.

Geochronologic and geochemical similarities between silicic units of the Camaquã basin and the Graciosa province indicate widespread, episodic magmatic activity in western Gondwana during the pivotal Neoproterozoic-Paleozoic transition. Magmatic crystallization of major plutons occurred throughout the region at ~580 Ma, followed by plutonic and volcanic magmatism and associated hydrothermal activity at ~540 Ma. We posit that the ~580 Ma Graciosa magmatic province extends from the northern regions of the basin system southward to at least the area where the Camaquã basin is located, and that the influence of ~540 Ma magmatism may have extended over a similar area. The distribution of ~580 and ~540 Ma magmatism may reflect pervasive crustal growth coincident with regional extension throughout western Gondwana at the end of the Ediacaran.

Introduction

A discontinuous, ~1500 km-long series of more than a dozen Ediacaran-early Cambrian basins extends from northern Uruguay into southeastern Brazil (figure 16). The basins developed in western Gondwana after the Pan-African/Brasiliano orogeny (~800 – 550 Ma; da Silva et al., 2005) and before the opening of the Paraná basin during the Ordovician (Almeida et al., 2010, Janikian et al., 2012). Many of the basins preserve thick sequences of 610-530 Ma siliciclastic strata along with a rich record of silicic (>68 wt% SiO_2) magmatism in the form of lava flows

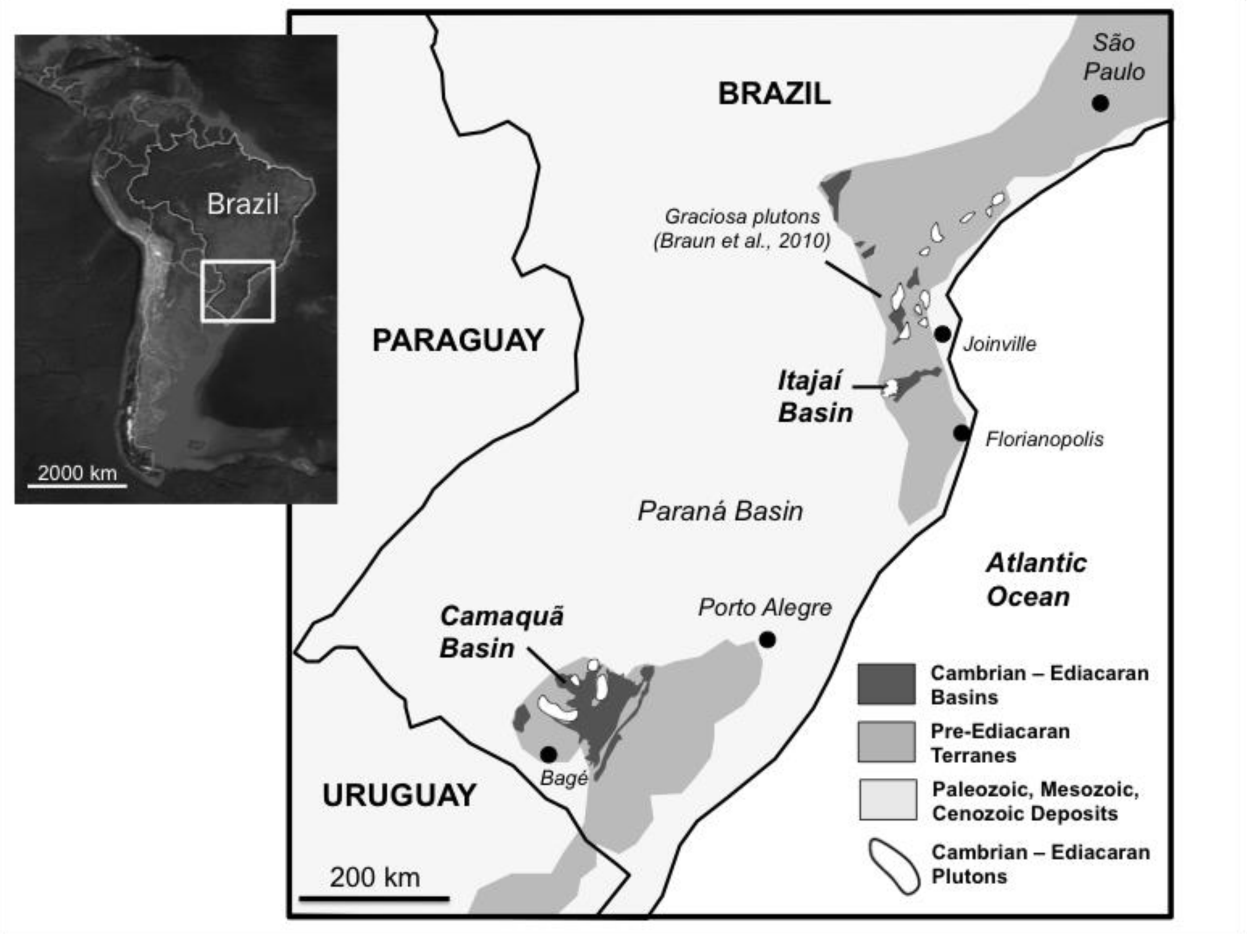


Figure 16: Map of study area in southern Brazil, including Ediacaran-Cambrian siliciclastic basins, geographically associated plutons, Precambrian metamorphic terranes, and the Ordovician-age Paraná basin. A previous study by Braun et al. (2010) employed the methodological approach described here to characterize plutons from the Serra da Graciosa region. This study focuses on silicic volcanic and plutonic units to the southwest of the Graciosa province, including those in and adjoining the Itajaí basin and the Camaquã basin. Adapted from Almeida et al., 2010.

and pyroclastic deposits (Almeida et al., 2010; Janikian et al., 2008, 2012; Wildner et al., 2002). In the same region, a series of substantial Ediacaran-Cambrian granite and syenite plutons are exposed (e.g., Leite et al., 1998; Braun et al., 2010; Vlach et al., 2011; figure 16). Their ages broadly overlap with that of the silicic magmatism preserved in the basins (table 2), and their overall geochemical characteristics include relatively high FeO_T and Zr and low Sr, consistent with "A-type," or ferroan, magmatism (Whalen et al., 1987; Eby, 1990; Bonin, 2007; Gualda & Vlach, 2007; Frost & Frost, 2011).

Of global significance, these Ediacaran-Cambrian basin deposits and their contiguous igneous associations span a critical period of juvenile continental growth in what is now South America (Condie et al., 2009; Condie & Aster, 2010). Of regional significance, the tectonic histories of the basins remain unresolved. Various tectonic settings for their formation have been proposed, including foreland basin (e.g. Gresse et al., 1996; Basei et al., 2000), strike slip (e.g., Brito Neves, 1999; Sommer et al., 2006), and continental rift environments (e.g., Fragoso-Cesar et al., 2000; Almeida et al., 2010). Almeida et al. (2010) have recently suggested that the basins, though geographically discrete entities, share a common tectonic origin: they call upon a combination of structural, sedimentary, and volcanic correlations to propose that they may in fact represent one extensive post-Brasiliano rift system.

In this study, we address three questions regarding Ediacaran-Cambrian silicic magmatism in southern Brazil:

(1) What are the extent, timing, and duration of this magmatism?

(2) What are the relationships between silicic units associated with basins throughout this geographically extensive system? Do they share a common tectonic and/or petrogenetic history (in line with the hypothesis of Almeida et al. [2010])? Silicic units are broadly equivalent in age

		Unit	Previously Published Ages	Dating Method	References
Near Camaquã Basin	**Plutonics**	Caçapava Granite	561±6 Ma (zircon cores) 540±11 Ma (zircon rims)	U-Pb zircon SHRIMP	Leite et al., 1998
			562±8 Ma	U-Pb zircon SHRIMP	Remus et al., 2000b
		Sao Sepé Granite	519±8 Ma	Whole rock Rb-Sr	Soliani, 1985
			521±14 Ma	Whole rock Rb-Sr	Gastal & Lafon, 1998
			525±40 Ma	^{207}Pb/^{206}Pb zircon	Gastal & Lafon, 1998
			558±8 Ma (monzogranite) 550±6 Ma (microgranite)	U-Pb zircon SHRIMP	Remus et al., 1999
		Lavras Granite	568±6 Ma	Whole rock Rb-Sr	Vieira & Soliani, 1989
			594± 5 Ma	U-Pb zircon SHRIMP	Remus et al., 2000a
			610±10 Ma (zircon cores) 583±11 Ma (zircon rims)	U-Pb zircon SHRIMP	Leite et al., 1998
		Ramada Granite	463±12.5 Ma	Whole rock Rb-Sr	Naime & Nardi, 1991
	Volcanics	Acampamento Velho Formation	573±18 Ma	U-Pb zircon	Chemale et al., 2000
			545±12.7 Ma	Whole rock Rb-Sr	Almeida et al., 2003, 2005
			574-570 Ma	U-Pb zircon SHRIMP, LA-ICP-MS	Janikian et al., 2008, 2012
		Bom Jardim Group	605-580 Ma	U-Pb zircon SHRIMP, LA-ICP-MS	Janikian et al., 2008, 2012
		Younger silicic volcanism	544.2±5.5 Ma	U-Pb zircon LA-ICP-MS	Janikian et al., 2012
Near Itajaí Basin		Apiuna Rhyolite	523±92 Ma	Whole rock Rb-Sr	Basei, 1985
			558±6.6 Ma	U-Pb zircon SHRIMP	Basei et al., 2011
		Subida Granite	535±22 Ma	Whole rock Rb-Sr	Basei, 1985
			520±5.5 Ma	U-Pb zircon SHRIMP	Basei et al., 2011
Northern Extent of Basin System		Graciosa Plutons	580±2 Ma (gabbro-diorite) 583±3 Ma (gabbro-diorite) 584±8 Ma (gabbro-diorite) 585±12 Ma (monzogranite)	U-Pb zircon ID-TIMS	Vlach et al., 2011
			581±3 Ma	U-Pb zircon LA-ICP-MS	Braun et al., 2010

Table 2: Previous Geochronologic Studies of Ediacaran-Cambrian Silicic Units in Southern Brazil

(Ediacaran-Cambrian), and simplistically, we would expect that if the basins, volcanics, and intrusions were approximately coeval (consistent with the hypothesis that the basins are part of one extensive continental rifting system), they would share characteristics that reflect origins in similar tectonic environments.

(3) What are the relationships between silicic volcanics and plutons in portions of the basin system where they are temporally and spatially associated? Are the volcanic and plutonic units petrogenetically connected, or do they represent separate magmatic events?

Evaluation of these questions using extensive, previously published data sets is somewhat hindered by the wide range of geochemical and age-dating techniques applied to different units within the basin system at various times over a period of several decades (table 2). Geochronologic approaches have included Rb-Sr whole rock dating (e.g., Vieira & Solani, 1989; Naime, 1988), U-Pb SHRIMP dating (e.g., Leite et al., 1998; Janikian et al., 2012), U-Pb TIMS dating (Vlach et al., 2011), and U-Pb LA-ICPMS dating (Janikian et al., 2012). Even in instances where the same dating method was applied to units in different parts of the basin system, differences in sample size and precision limit meaningful comparisons amongst current data.

In this study we use laser ablation-inductively coupled plasma mass spectrometry (LA-ICPMS) to systematically "fingerprint" zircon populations from representative Ediacaran-Cambrian silicic volcanics and intrusions exposed throughout southern Brazil (Almeida et al., 2010). As a durable, reliable recorder of magmatic geochemistry and crystallization ages (see Hanchar & Hoskin and references therein), zircon permits reconstruction of magmatic histories. The benefits of applying LA-ICPMS analysis to zircon are multifold: it is relatively fast and cost-effective, allowing large numbers of analyses and quick recognition of significantly older, inherited grains (e.g., Kosler & Sylvester, 2003); it permits simultaneous in-situ elemental analysis and U-Pb age dating; and it produces data that are comparable between different portions of the basin system and between basins and plutons. Furthermore, because Braun et al. (2010) used an identical approach to characterize silicic intrusions at the northern extent of the basin system, we can integrate our data with theirs to establish a more comprehensive understanding of Ediacaran-Cambrian silicic magmatism throughout the entire region (figure 16).

Geological Context

The Neoproterozoic record of southern Brazil documents the accretion of South America with western Africa during the final stages of the long-lived Brasiliano orogeny and the attendant formation of Gondwana (de Almeida, 1981; Brito Neves et al., 1999; Basei et al., 2000; da Silva et al., 2005). Brasiliano units of southern Brazil include high-grade metamorphic terranes and syn-collisional intrusions along with a patchwork of pre-Brasiliano terranes up to 3.2 Ga in age (Babinski et al., 1997; Chemale, 2000); Paleozoic-Mesozoic sediments and volcanics, including those of the vast, 1.6 x 10^6 km^2 Paraná basin (figure 16), stratigraphically overlie the Neoproterozoic-Cambrian basin units (de Almeida, 1981).

Basin lithologies and structures vary widely. Some of the basins, such as the Camaquã basin, comprise thick sequences of well-characterized, temporally constrained volcanic and sedimentary units. Others, such as the Cerros de Aguirre and Camarinha basins, comprise only limited sedimentary or volcanic sequences (Almeida et al., 2010). In other cases, basin stratigraphy is obscured by complicated structural geology; for example, extensive faulting in the 800 km^2 Castro Basin has disrupted the volcanic and sedimentary stratigraphic sequences (Almeida et al., 2010). The small size and relative isolation of some of the basins, combined with the paucity of definite correlative units in some locations, help explain the piecemeal way in which these basins have been investigated and why the study of inter-basin relationships has proven so challenging (Almeida et al., 2010).

Our study focuses on the Itajaí and Camaquã basins at the middle and southern regions of the basin system, respectively (figure 17). We selected these basins first because they contain some of the most complete volcanic-sedimentary sequences of the basin system, and second because they are spatially associated with approximately coeval silicic volcanic units and granitic intrusions.

The ~1200 km^2 Itajaí basin, located <100 km west of Florianopolis, was identified as a foreland-style basin by Basei et al. (2000) (figures 16, 17a). It contains a thick sequence of sediments interbedded with felsic lava domes, including the Apiúna rhyolite (previously dated at 558 Ma), and the ~80 km^2 Subida pluton (previously dated at 520 Ma), both of which we analyze in this study (figure 17a; Basei et al., 2011).

The ~3000 km^2 Camaquã basin (~100 km southwest of Porto Alegre) is the largest of the Ediacaran-Cambrian basins (figures 16, 17b). Numerous tectonic settings for the formation of the Camaquã basin have been proposed (e.g., strike-slip basin, forearc basin), with extension emerging as a recent favored hypothesis (cf. Almeida et al., 2010). The basin contains >10,000 m of interbedded volcanic and siliciclastic units ranging in age from ~630 to 540 Ma (Fragoso-Cesar et al., 2000; Janikian et al., 2008; Janikian et al., 2012).

Volcanic units in the Camaquã Basin record three major eruptive intervals (Janikian et al., 2012): effusive and pyroclastic mafic to intermediate volcanism preserved in the Bom Jardim Group (605 – 580 Ma; Fragoso-Cesar et al., 2000; Janikian et al., 2008, 2012); silicic effusive

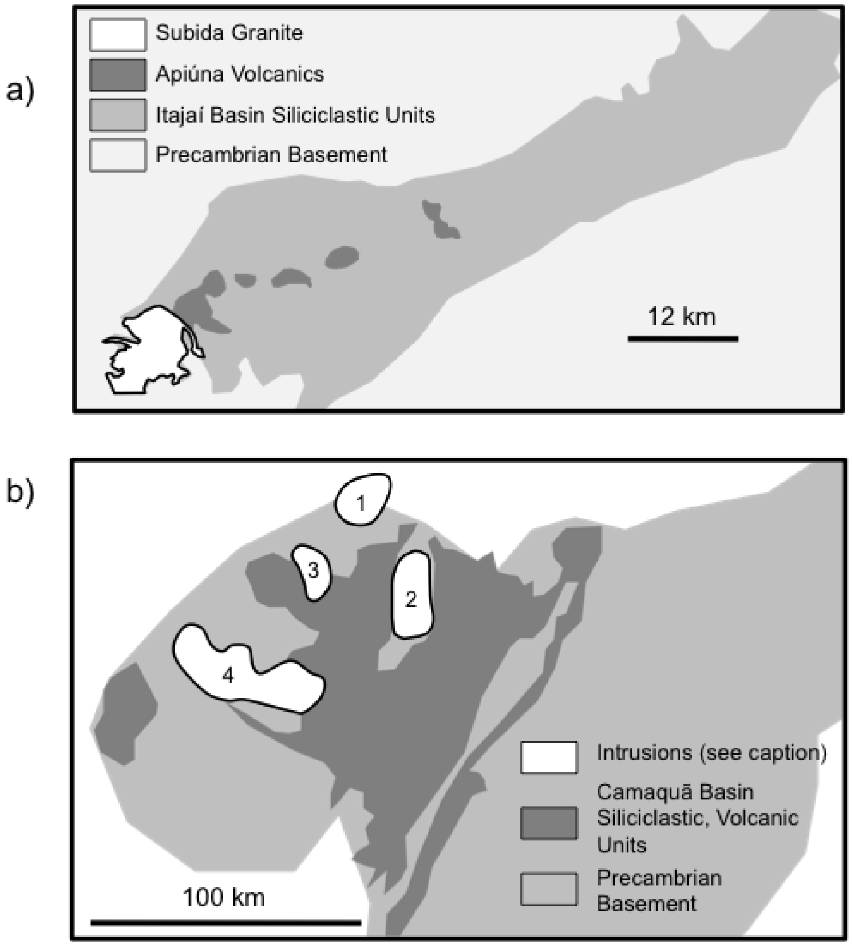


Figure 17: Geologic maps of igneous and sedimentary units within the Itajaí and Camaquã basins. The Itajaí basin (a) consists of a thick sedimentary sequence intruded by felsic lava domes (the Apiúna rhyolite) and the Subida granite (Basei et al., 2011). Total area of the Itajaí basin is ~1200 km^2. The Camaquã basin (b) consists of >10,000 meters of siliciclastic and silicic volcanic units over an area of ~3000 km^2. Nearby are several silicic plutons, the largest of which are shown in Figure 17: *(1) the São Sepé granite*, *(2) the Caçapava granite*, *(3) the Ramada granite*, and *(4) the Lavras granite*. Smaller plutons, including the Cerro da Cria pluton, are not shown. Adapted from Basei et al., 2011 (top) and Bonin et al., 1998 (bottom).

and explosive volcanism preserved in the Acampamento Velho Formation (574 – 570 Ma; Janikian et al., 2012); and silicic effusive and explosive volcanism at ~540 Ma that extends beyond the Camaquã Basin (Janikian et al., 2012). We analyze lavas from the latter two of these eruptive phases.

Proximal to the Camaquã Basin are several silicic plutons (figure 17b) that have been dated via a variety of techniques to 540 – 600 Ma (table 2); they are characterized as post-orogenic or within-plate granites (e.g., Nardi & Bonin, 1991; Bonin et al., 1998). The São Sepé granite (Soliani, 1985; Gastal & Lafon, 1998; Remus et al., 1999), Lavras granite (Vieira & Soliani, 1989; Leite et al., 1998; Remus et al., 2000a), Ramada granite (Naime & Nardi, 1991), and Caçapava do Sul granite (Leite et al., 1998; Remus et al., 2000b) are the largest plutons in the region (figure 17b), but a handful of subordinate plutons (including the Cerro da Cria, Jaguari, and Piquiri intrusions) are also locally exposed (e.g., Naime, 1988; Nardi & Bonin, 1991).

Methods

We studied two samples from the Itajaí area: one sample of the crystal-poor dome-forming Apiúna rhyolite (c.f. Basei et al., 2011) and a sample from the Subida Granite. From the Camaquã area, we studied 13 representative samples (six volcanic[1], seven plutonic; appendix J). The samples were crushed using a jaw crusher and sent to Activation Laboratories in Ontario, Canada for major and trace element characterization using ICP-MS and instrumental neutron activation analysis (INAA).

We conducted zircon elemental and U-Pb isotopic analysis from a representative subset of these units: five of the plutons, namely, the Subida granite in the Itajaí basin and the São Sepé,

---

[1] Volcanic data described here were acquired in collaboration with Vanderbilt undergraduate Nicole Burdakin; see Burdakin et al., 2013.

Cerro da Cria, Ramada, and Lavras granites in the Camaquã Basin; and five volcanic samples, specifically, the Apiúna rhyolite from the Itajaí basin and, in the Camaquã Basin, three volcanic samples from the Acampamento Velho Formation and one sample from volcanics previously dated to ~540 Ma (c.f. Janikian et al., 2012).

Zircons were extracted using standard mechanical and gravimetric mineral separation procedures (crushing, water table separation, magnetic separation, and heavy liquid separation). We randomly selected 75 – 100 zircon grains from each of the plutonic samples, all of which yielded abundant zircon separates, and 40 – 70 grains from each of the volcanic samples, which yielded sparser zircon populations. Zircon crystals were grouped according to approximate size, mounted in epoxy, polished to expose grain centers, and imaged using cathodoluminescence on a Tescan VEGA3 Scanning Electron Microscope (SEM) equipped with a Tescan panchromatic CL detector, installed at the Vanderbilt University Earth and Environmental Sciences department (figure 18).

We conducted zircon trace element and U-Pb isotope analyses using a Perkin-Elmer Sciex ELAN 6100 DRC-II quadrupole ICP-MS coupled with a New Wave 213 nm laser ablation system in the Civil and Environmental Engineering department at Vanderbilt University. We measured 25 analytes, including several REEs (figure 18). To achieve the counts necessary for simultaneous in-situ geochemical and isotopic zircon analysis, we applied continuous ablation at an energy output of 100% (resulting in a fluence of ~4-5 J/cm^2), a laser spot size of 60 µm, and laser frequency of 9-10 Hz (9 Hz for smaller grains). He carrier gas flow was 0.9 L min^{-1}. Dwell times per cycle ranged from 5 to 20 seconds; approximate total analytical time was 1 minute per sample, with an interval of 60 seconds between each analysis to permit recovery to background analyte concentrations (figure 18).

Procedure:

Extraction of zircons via standard mineral separation techniques.
Per sample:

-75-100 zircons
(from each of 8 plutons)

-40-70 zircons
(from each of 7 volcanics)

↓

Zircon grain mounting, imaging (cathodoluminescence, backscatter electron) using Tescan VEGA3 Scanning Electron Microscope (SEM) with Tescan panchromatic CL detector

↓

LA-ICP-MS zircon analysis following typical routine and specs described at right.

For each analysis:
Background analyte levels: 60 sec
Ablation + analyte measurement: 60 sec
-Recovery to background analytes: 60 sec

↓

Reduction of data using Glitter software program

Analytical Routine:

NIST610 x4 (P-TE)
NIST612 x4 (S-TE)
Std91500 x4 (P-Z)
Zirconia x4 (S-Z)
Unknown x10
Zirconia x2
Std91500 x2
NIST612 x2
NIST610 x2
Unknown x10
End of analytical session:
NIST610 x4
NIST612 x4
Std91500 x4
Zirconia x4

LA-ICP-MS specs:

LA: New Wave 213 nm

ICP-MS: Perkin-Elmer Sciex ELAN 6100 DRC-II quadrupole

Energy output: 100%

Fluence: 4 – 5 J/cm^2

Analytical spot size: 60 μm

Laser frequency: 9 – 10 Hz

Carrier gas: He (0.9 L/min)

Analytes and Dwell Times	
Si29	5 (ms)
Ca42	5
Ti49	5
Fe56	5
Y89	10
Zr90	5
Nb93	10
Ce140	10
Nd143	10
Sm147	10
Eu151	10
Gd155	10
Dy161	10
Yb173	10
Lu175	10
Hf177	5
Hg202	5
Pb204	20
Tl205	5
Pb206	20
Pb207	20
Pb208	20
Th232	10
U235	10
U238	10

Figure 18: Summary of analytical methods and protocol for this study: zircon and glass standards, LA-ICP-MS settings, measured analytes, and analyte dwell times (in milliseconds).

For data calibration, we used the trace element glass standards NIST 610 (primary) and NIST 612 (secondary), and zircon age standards 91500 (primary) and Zirconia (in-house secondary standard) (Wiedenbeck et al., 1995; Pearce et al., 1997; Braun et al., 2009; Covey et al., 2013). Each analytical session commenced and culminated with at least four analyses of each primary and secondary trace element and zircon standard. We analyzed zircon standards after every 10-12 unknown analyses.

We reduced trace element and isotope data using the GLITTER software program (Griffin et al., 2008). We used linear fits to ratios of the standard analyses immediately bracketing each set of 10-12 unknown analyses. Geochemical and isotopic data associated with low or erratic analytical counts or exceptionally high Fe concentrations (indicating the presence of an inclusion), or those that were clearly inherited grains (>620 Ma), were rejected. Isotope data were further analyzed with the IsoPlot program (Ludwig, 2003). For age determinations, we used weighted mean $^{206}Pb/^{238}U$ ages. ^{207}Pb counts were often too low to yield reliable $^{207}Pb/^{235}U$ ratios, though we did utilize $^{207}Pb/^{235}U$ ratios to identify highly discordant analyses. We used Tera-Wasserburg plots to identify samples with high common Pb.

Results

Whole Rock Elemental Geochemistry

Volcanic and plutonic samples from the Itajaí and Camaquã basins are silicic (most yield wt% $SiO_2 > 68\%$) and, like the Graciosa plutons (Braun et al., 2010), fall into the “ferroan granite” field characterized by high Fe# ($[FeO_T/[FeO_T+MgO]]_{mol}$) (appendix J, figure 19a; Frost & Frost, 2011). The Itajaí samples are strictly metaluminous, whereas the Camaquã units – similar to the

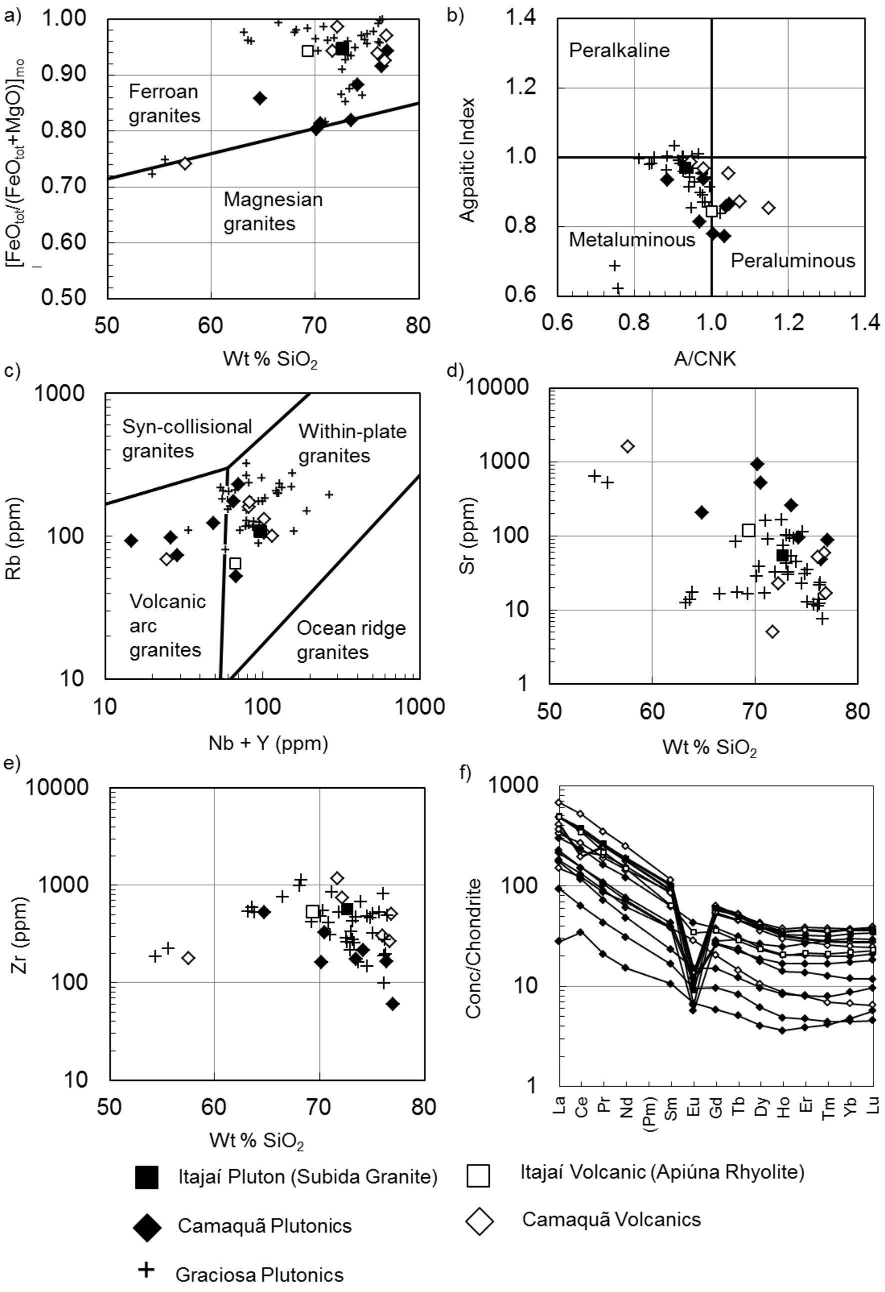


Figure 19: Whole rock elemental characteristics of silicic units of the Graciosa Province (from Gualda & Vlach, 2007) and Itajaí and Camaquã basin regions. (a) Total FeO vs. wt% SiO$_2$. Typically, Ediacaran-Cambrian volcanic and plutonic units in/near these three regions are labeled as ferroan based on the classification scheme of Frost & Frost (2011). (b) Aluminum content of analyzed samples compared with that of Graciosa province plutons. The two Itajaí units are strictly metaluminous, whereas the Camaquã and Graciosa units range from metaluminous to slightly peraluminous. (c) Tectonic discrimination diagram of Pearce et al. (1984). Itajaí samples fall in the within-plate granite fields; Camaquã units span the within-plate granite and volcanic arc granite fields. Graciosa units (Braun et al., 2010) have higher Rb and Nb + Y concentrations and are classified predominantly as within-plate granites. (d) Sr concentrations in Graciosa, Itajaí, and Camaquã region units. (e) Zircon concentrations in sampled units compared with those in previously-analyzed Graciosa samples. For a given SiO$_2$ concentration, Camaquã plutons yield the lowest Zr concentrations; Camaquã volcanics yield some of the highest. (f) Rare earth element plot of whole rock compositions in Itajaí and Camaquã basin units.

aluminous association in the Serra da Graciosa plutons (Gualda & Vlach, 2007; Vlach & Gualda, 2007) – range from metaluminous to slightly peraluminous (figure 19b).

On Nb + Y vs. Rb tectonic discrimination diagrams, Itajaí samples lie in the within-plate granite field; Camaquã units span the within-plate granite and volcanic arc granite fields (figure 19c; Pearce et al., 1984). In comparison, compositional ranges in Graciosa units show higher Nb + Y and Rb (Gualda & Vlach, 2007) and plot almost exclusively in the within-plate granite field. Sr concentrations in Camaquã intrusions are generally higher (50 – 1000 ppm) than in the majority of silicic Serra da Graciosa plutons, Camaquã volcanics, and both Itajaí samples (~10 – 200 ppm) (figure 19d).

Zr concentrations in the Camaquã units range from 162 to 520 ppm in the plutonic rocks and 263-1170 ppm in the volcanic rocks (figure 19e). Using the Watson & Harrison (1983) calibration, zircon saturation temperatures range from ~700 to 850 °C for plutonic rocks and ~850 to 980 °C for volcanic rocks; calculations using the calibration of Boehnke et al. (2013) are ~50 °C cooler, with some calculated temperatures <700 ºC (appendix J). In the Itajaí samples, Zr ≈ 550 ppm; this corresponds to a calculated zircon saturation temperature of ~850 °C using the Watson & Harrison (1983) calibration (appendix J). Graciosa plutonic units have Zr concentrations that are roughly equivalent to those in the Apiúna rhyolite and Subida granite (Itajaí units) but higher than Zr concentrations in Camaquã plutons.

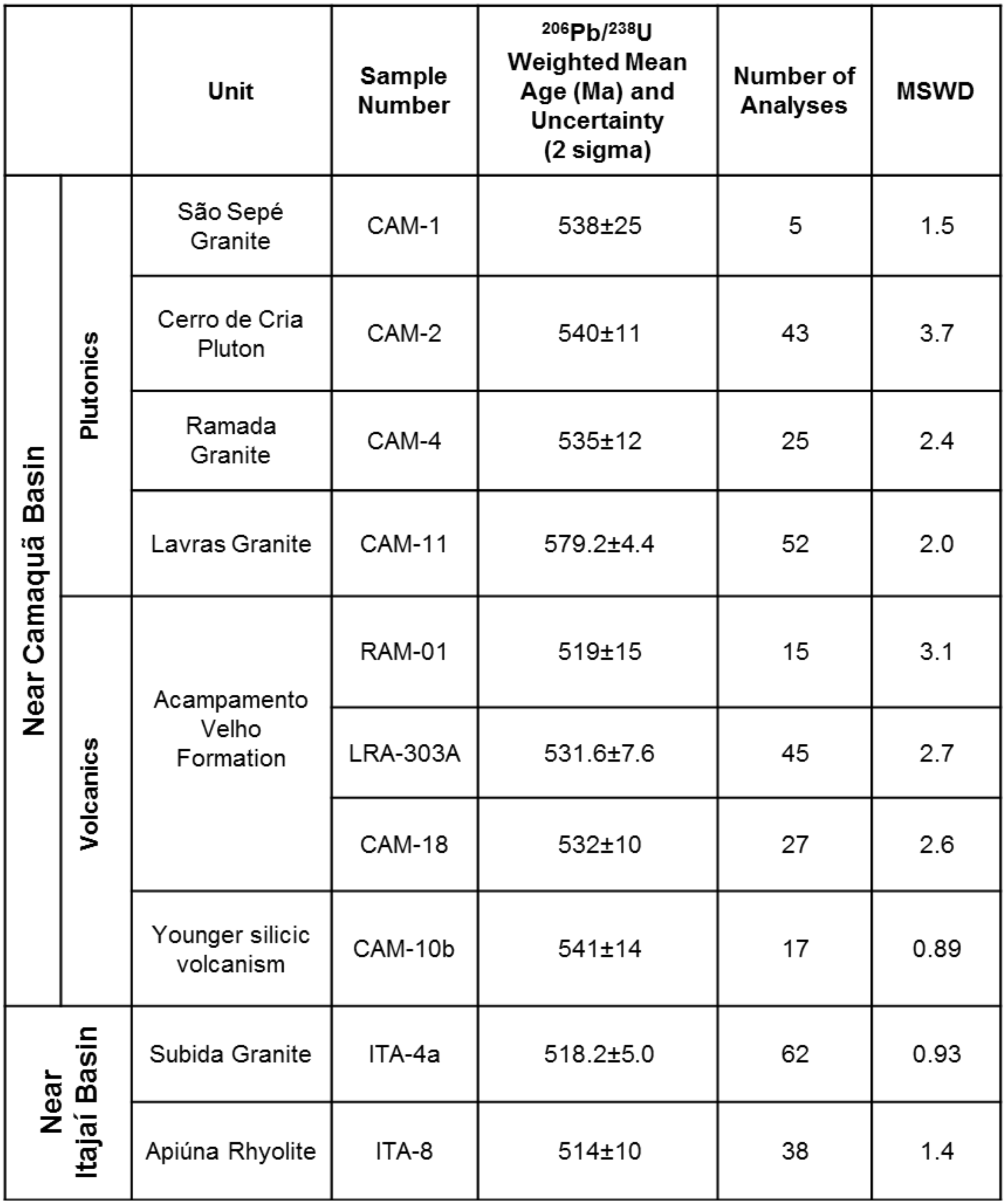
Camaquã plutonics and volcanics have REE ranges with broadly similar trends (conc/chondrite = $10^1 – 10^2$ HREEs, $10^2 – 10^3$ LREEs) (figure 19f). REE concentrations in volcanics are generally higher and more consistent (with larger Eu anomalies) than in the plutons. Itajaí samples share similar REE concentrations, although the plutonic sample displays a larger Eu anomaly.

U-Pb Zircon Ages

Weighted mean $^{206}Pb/^{238}U$ zircon ages for all analyzed zircons are presented in table 3 and figures 20-23. The Apiúna rhyolite and Subida granite from the Itajaí region yield weighted mean zircon ages that are within error of one another at ~515 – 520 Ma (514 ± 10 Ma for rhyolite ITA-8; 518 ± 5 Ma for granite ITA-4a) (table 3; appendix K; figures 20, 23). This is consistent with the age that Basei et al. (2011) determined via U-Pb zircon SHRIMP dating of the Subida granite (520 ± 5.5 Ma), but inconsistent with the age determined for the Apiúna rhyolite by the same authors (559 ± 7 Ma). We found no ages indicative of a 560 Ma zircon population. A two-tailed t-test to compare the $^{206}Pb/^{238}U$ zircon ages of the two Itajaí samples indicates that there is no statistically significant difference between the mean $^{206}Pb/^{238}U$ ages for the Itajaí volcanic sample ITA-8 and intrusive sample ITA-4a ($t\ (98) = 1.02$, $p = 0.31$).

Age distributions in the Camaquã volcanic and plutonic units are more complex. Age data for the Camaquã plutonic units broadly cluster at ~540 Ma (CAM-1, CAM-2, and CAM-4) and ~580 Ma (CAM-11: Lavras Granite) (table 3; figure 21), a finding that is generally consistent with age distributions determined by previous researchers for intrusions in the Camaquã Basin (e.g. Leite et al., 1998; Remus et al., 2000a, b; table 2). Most of the volcanic units yield weighted mean ages of ~530 – 540 Ma (an exception is RAM01A, which yields a younger age of ~520 Ma). The age scatter and relatively high MSWD in some units suggest multiple age populations (figure 22; table 3).

A one-way ANOVA test was used to test for differences among age populations of our eight Camaquã region samples. Because mean ages were found to differ significantly across the eight age populations, we used a Tukey HSD post-hoc test to compare mean ages of each of the eight units to one another. The post-hoc test indicates that the mean age for Camaquã intrusive sample



		Unit	Sample Number	$^{206}Pb/^{238}U$ Weighted Mean Age (Ma) and Uncertainty (2 sigma)	Number of Analyses	MSWD
Near Camaquã Basin	Plutonics	São Sepé Granite	CAM-1	538±25	5	1.5
		Cerro de Cria Pluton	CAM-2	540±11	43	3.7
		Ramada Granite	CAM-4	535±12	25	2.4
		Lavras Granite	CAM-11	579.2±4.4	52	2.0
	Volcanics	Acampamento Velho Formation	RAM-01	519±15	15	3.1
			LRA-303A	531.6±7.6	45	2.7
			CAM-18	532±10	27	2.6
		Younger silicic volcanism	CAM-10b	541±14	17	0.89
Near Itajaí Basin		Subida Granite	ITA-4a	518.2±5.0	62	0.93
		Apiúna Rhyolite	ITA-8	514±10	38	1.4

Table 3: Zircon U-Pb LA-ICP-MS Ages, Camaquã and Itajaí Regions. Results from this study.

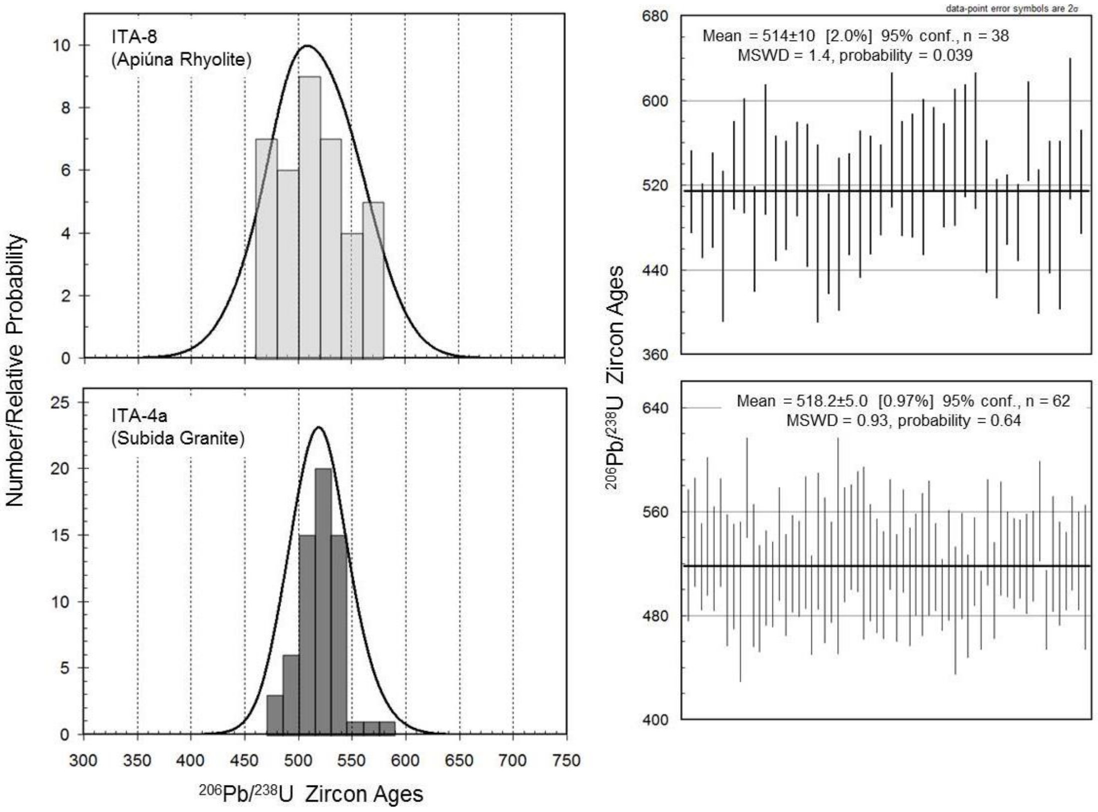


Figure 20: Probability density plots (left) and weighted mean LA-ICP-MS ^{206}Pb/^{238}U zircon ages (right) for Itajaí samples: Apiúna rhyolite (ITA-8) and Subida granite (ITA-4a). In the diagrams to the right, vertical bars represent individual analytical results (including uncertainties), while horizontal bars represent weighted mean ages.

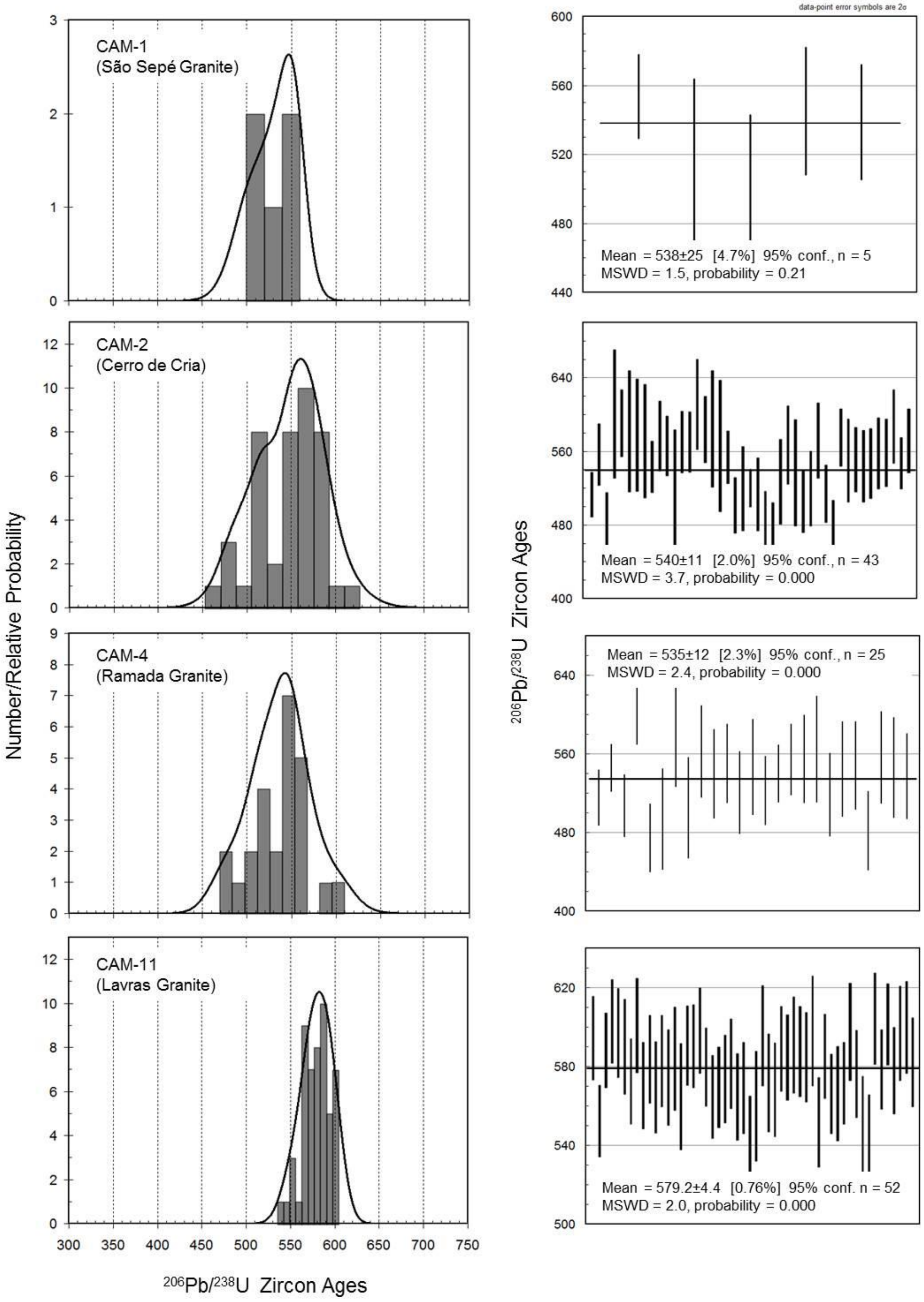


Figure 21: Probability density plots (left) and weighted mean LA-ICP-MS ^{206}Pb/^{238}U zircon ages (right) for Camaquã region plutons, including the São Sepé granite, Lavras granite, Ramada granite, and Cerro da Cria pluton. In the diagrams to the right, vertical bars represent individual analytical results (including uncertainties), while horizontal bars represent weighted mean ages.

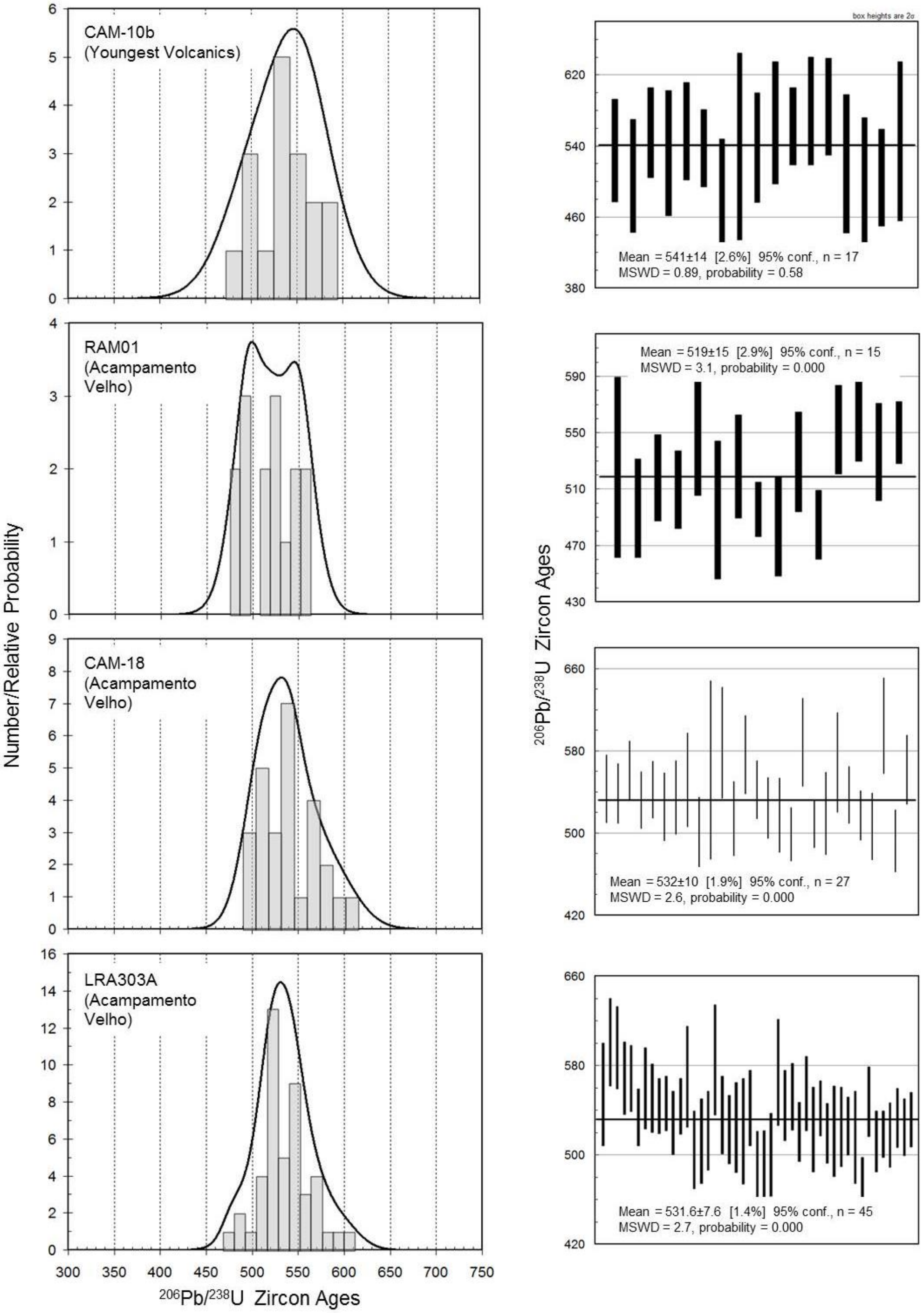


Figure 22: Probability density plots (left) and weighted mean LA-ICP-MS ^{206}Pb/^{238}U zircon ages (right) for Camaquã region volcanics, including three samples from the Acampamento Velho formation (CAM-18, LRA303A, and RAM-01) and one from the stratigraphically highest volcanic units in the region (CAM10b). In the diagrams to the right, vertical bars represent individual analytical results (including uncertainties), while horizontal bars represent weighted mean ages.

CAM-11 differs significantly from mean ages of all other intrusive and volcanic samples. Mean ages (~540 Ma) for the seven other volcanic and intrusive units in the Camaquã basin do not significantly differ from one another (figure 23).

Notably, volcanic samples from the Acampamento Velho formation (CAM-18, RAM01A, and LRA303) yield younger ages than the previous 570-574 Ma U-Pb SHRIMP ages reported by Janikian et al. (2012) for Acampamento Velho samples. CAM-10b, which is stratigraphically higher in the volcanic section, produces an age consistent with that of younger silicic volcanism within the Camaquã basin (Janikian et al., 2012).

Zircon Elemental Geochemistry

Chondrite-normalized zircon REEs for the most part follow typical patterns characterized by negative Eu anomalies and HREE concentrations several orders of magnitude higher than LREEs (HREE conc/chon = 10^3 to 10^4 vs. LREE conc/chon = 10^1 to 10^2) (figure 24; appendix L). Most samples, however, also contain zircon populations with markedly high LREE concentrations (conc/chon = 10^2 – 10^3), even after analyses that had clearly penetrated inclusions were removed from the data set (figure 7). In these instances, chondrite-normalized Ce, Pr, and Nd produce distinctively straight lines on REE plots with conc/chondrite >100. All samples display fairly consistent HREEs (conc/chon = 10^3 – 10^4). Such high LREE concentrations are inconsistent with crystallographic considerations and strongly suggest the presence of very small LREE-rich inclusions (see Colombini et al., 2011).

SEM backscatter electron and cathodoluminescence images reveal that (1) samples with a high percentage of “atypical” LREE patterns have more mineral inclusions and display more patchy zoning than samples with a lower percentage of high-LREE patterns (for example,

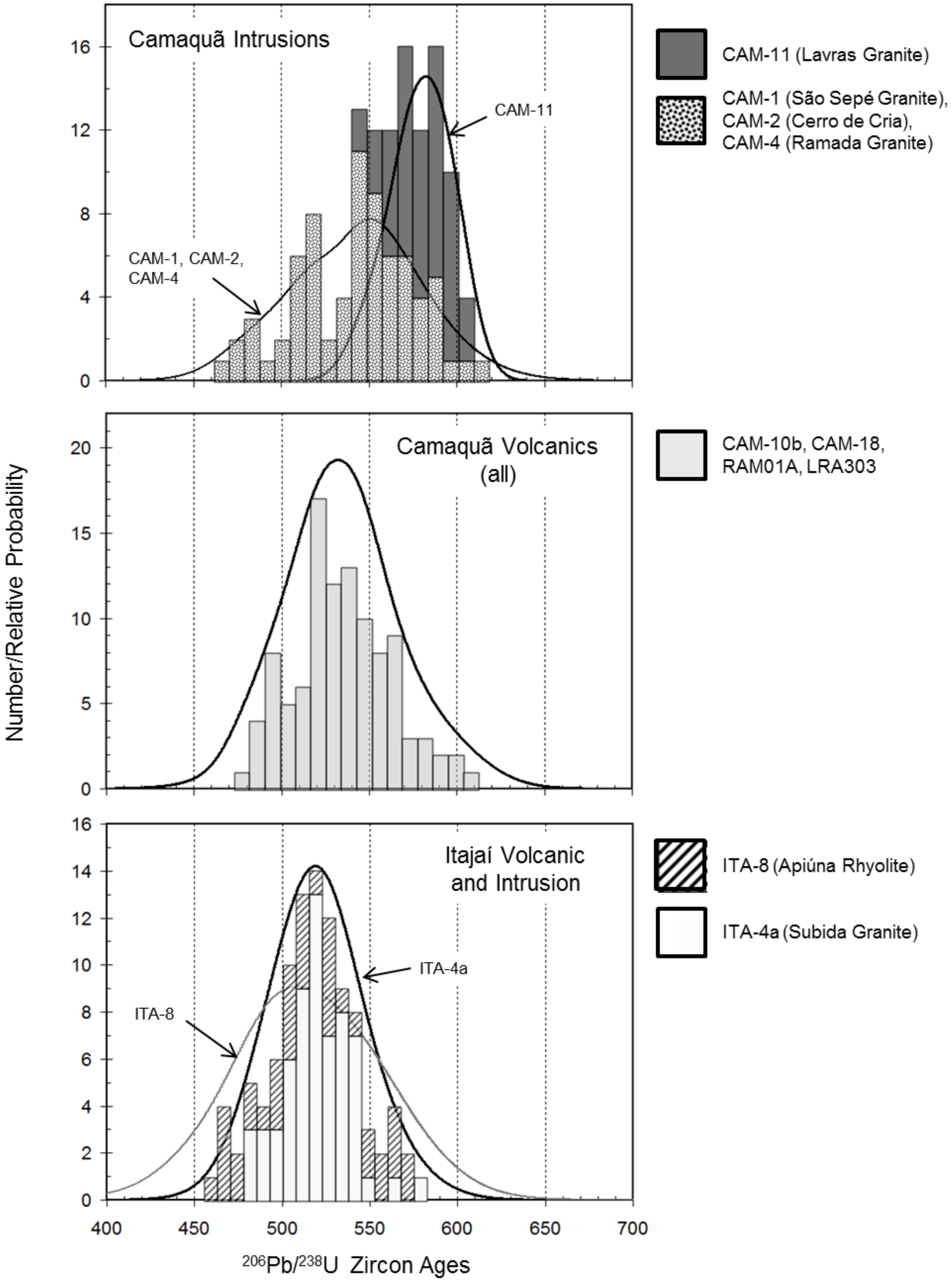


Figure 23: ^{206}Pb/^{238}U zircon age distribution comparisons of volcanic and plutonic units associated with the Camaquã and Itajaí basins. Collectively, ages for plutonic and volcanic units in and near the Camaquã basin define three major peaks: one at ~520 Ma, representing magmatism in the Itajaí basin (bottom graph); one at ~540 Ma, representing plutonic and volcanic magmatism in the Camaquã basin (top and middle graphs); and one at ~580 Ma, representing an episode of plutonic magmatism in the Camaquã basin (top graph).

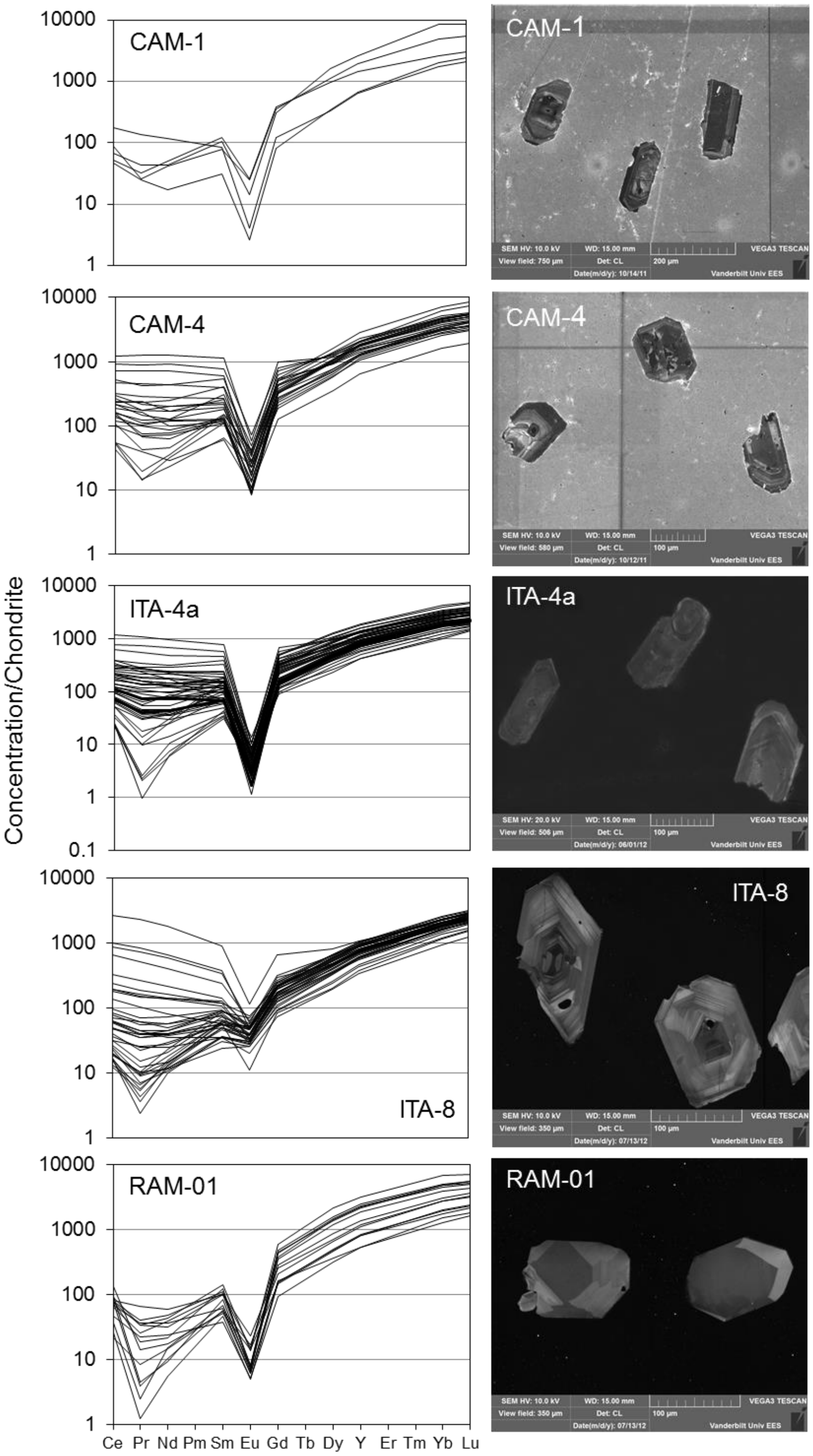


Figure 24: Zircon CL images and REE plots for representative volcanic and plutonic units in the Camaquã and Itajaí regions. Volcanic units yield euhedral zircons with oscillatory zoning and relatively few visible inclusions. In comparison, zircons from plutonic units have more abundant inclusions and display more patchy zoning. All samples yield a subset of high-LREE zircon analyses, the plutonic zircons.

CAM-4 in figure 24), (2) volcanic zircon grains tend to be more euhedral, have fewer obvious inclusions, and more commonly display oscillatory zoning than plutonic zircons, and (3) among the plutonic samples, CAM-11 and ITA-4a have the most euhedral, inclusion-free zircons, whereas CAM-1 and CAM-4 have the most inclusion-rich zircons.

Discussion

Episodic Ediacaran-Cambrian Magmatism: Timing and Petrogenetic Relationships

Our data indicate that Ediacaran-early Cambrian magmatism in southern Brazil was episodic, consisting of at least three distinct magmatic events at ~520 Ma, ~540 Ma, and ~580 Ma. The Subida granite (ITA-4a) and Apiúna rhyolite (ITA-8) in the Itajaí basin yield zircon ages that are consistent with one another at ~515 – 520 Ma (table 3; figure 23) but that are clearly younger than most zircon populations in magmatic units of the Camaquã region and regions to the north (figure 23), suggesting that the ~520 Ma magmatic event was limited in extent. Zircon fingerprinting and whole rock geochemistry indicate that ITA-4a and ITA-8 are likely petrogenetically related: in addition to having similar U-Pb zircon ages, they share similar geochemical characteristics. Both have distinctively low Sr and Rb, high Zr, and high zircon saturation temperatures (~900 °C – a minimum temperature for the rhyolite, and a maximum temperature for the granite; see Miller et al., 2003), suggesting that they are part of the same magmatic suite (figure 19).

In contrast, volcanics and plutonics associated with the Camaquã basin have distinct age and geochemical signatures. Collectively, the data appear to cluster at ~580 and ~540 Ma, though the bulk of the ~580 Ma signature originates from one sample, the Lavras granite (CAM-11) (figure 23). Compared to the two Itajaí basin units, Camaquã plutons and volcanic units have relatively diverse geochemical signatures. The silicic volcanics have low Sr (<60 ppm) and high Fe# $[FeO_T/[FeO_T+MgO]]_{mol}$>0.90); they lie exclusively in the within-plate granite field on tectonic discrimination diagrams (figure 19). The intrusions have higher Sr (~50 – 920 ppm) and somewhat lower Fe# (0.80 – 0.94), and more than half fall in the volcanic arc granite field (figure 19). At a given weight percent silica, Camaquã volcanics have much higher Zr concentrations and therefore higher zircon saturation temperatures (at least 840 - 980°C) than the intrusions (no more than 710 - 860°C; appendix J). Therefore, although many of the Camaquã units broadly share a magmatic crystallization age of ~540 Ma, they appear to record diverse magmatic processes and limited volcanic-plutonic connections.

Evidence for Hydrothermal Alteration of Zircon

Some age data for individual intrusions (particularly CAM-1 and CAM-4) show excessive scatter, indicating that zircon populations represent more than a single crystallization age. CL images of zircons from these units display evidence for inclusions, fracturing, and high-LREE mineral inclusions (figure 24). Braun et al. (2010) made similar observations in a subset of Serra da Graciosa plutonic zircons. These yielded abundant zircon ages of ~540 Ma, which – based on their observation of abundant inclusions, including LREE-rich minerals such as fluocerite – they interpreted as reflecting hydrothermal alteration (c.f. Geisler et al., 2007).

For both Camaquã and Serra da Graciosa units, grains with these morphological features (especially zircons from samples CAM-1 and CAM-4) have high LREE abundances that produce flat LREE patterns (figure 24; appendix L). Given that LREEs (with the exception of Ce^{4+}) cannot be readily incorporated into zircon (see Colombini et al. 2011 and references therein), these high LREE concentrations in zircon indicate the presence of LREE-rich inclusions, which may be small enough to be undetectable in our CL images. We note that these inclusions may be below the depth from which the CL signal emanates, which is much shallower than the depth sampled by laser ablation (at least 20 µm); inadvertent sampling of inclusions may be unavoidable given the depth of ablation.

Correlations between high LREEs and ages can be elusive. In some instances, younger ages from zircon sets correlate with relatively high chondrite-normalized LREE concentrations. For example, CAM-4 zircons with measured $^{206}Pb/^{238}U$ ages between 580 and 600 Ma have chondrite-normalized LREEs <100, whereas ages of <520 million years have LREEs > 200. In other cases, a clear correlation between LREE concentration and age is absent; that is, high LREEs do not always correlate with younger ages, and “typical” LREE concentrations do not always produce older ages. Echoing the hypothesis of Braun et al. (2010), we speculate that the hydrothermal processes that produced the atypical zircon signatures may also be responsible for modifying isotopic ratios in individual zircons. Alternatively, magmas that crystallized at ~540 Ma may have inherited some older, hydrothermal zircons, although we see no clear correlations between ages and geochemical signatures that are consistent with hydrothermal origins.

Regional Magmatism in Western Gondwana in the Ediacaran-Early Cambrian

Comparison of the isotopic and elemental data presented here for the Camaquã region with existing equivalent data for the Serra da Graciosa region (see Gualda & Vlach, 2007; Vlach & Gualda, 2007; Braun et al., 2010; Vlach et al., 2011) reveals similarities between some of the plutonic rocks exposed in these areas, particularly with respect to age and, broadly, geochemistry (e.g., high Fe#). Phanerozoic units of the Paraná Basin obscure the Precambrian basement between these two regions (figure 16), but we conclude that the magmatism that formed the 580

Ma Graciosa Province in southeastern Brazil likely extended to the southwest for several hundreds of kilometers to the Camaquã region, where it produced the Lavras Granite (CAM-11), other intrusions not analyzed in this study (table 2), and the silicic volcanics of the Bom Jardim group (~580-605 Ma; Janikian et al., 2012). We thus propose that ~580 Ma plutons and contemporaneous volcanics in the Camaquã region be included as part of the Graciosa Province.

The development of such an extensive magmatic province may be consistent with the far-reaching ~580 Ma tectonic processes proposed by Almeida et al. (2010). If continental rifting in the late Ediacaran was extensive, attendant magmatism may have been widespread as well; in that case, the ~580 Ma plutons may serve as a magmatic indicator of large-scale rifting processes.

The 540 Ma units in the Camaquã basin and 520 Ma units in the Itajaí basin appear to be geochemically as well as temporally disparate from Graciosa magmatism and therefore represent entirely separate magmatic pulses. We posit that the ~540 Ma peak in Graciosa plutons and in volcanic and plutonic units of the Camaquã area represents a widespread magmatic event at the beginning of the Cambrian period. However, this magmatism may have manifested differently through the region: in and near the Camaquã basin, ~540 Ma magmatism generated silicic magmatism as well as hydrothermal activity that may have altered pre-existing units, including ~580 Ma intrusions. In the Graciosa province, putative ~540 Ma magmatism is evidenced only by hydrothermal alteration of plutonic zircons; subsequent uplift and erosion that ultimately exposed plutonic rocks, as well as deposition of Paraná sediments and volcanics in the Ordovician period, could have obscured or removed ~540 Ma volcanic units that may have been present within that portion of the region.

Moreover, the Camaquã Basin represents repeated events of extension over time (Almeida et al., 2010). If the connection between extension and magmatism inferred for the ~580 Ma event is correct, then magmatism at ~540 Ma and ~520 Ma might reflect periods of enhanced extension within the rift system.

Conclusions

(1) Late Ediacaran-early Cambrian silicic magmatism in southern Brazil was episodic and occurred in at least three pulses: ~580 Ma (evident in plutonic units of the Serra da Graciosa and Camaquã regions), ~540 Ma (evident in volcanic and plutonic units of the Camaquã region), and ~520 Ma (evident in the volcanic and plutonic units of the Itajaí basin).

(2) The broad overlap in ~540 and ~580 Ma zircon age peaks in silicic units of the Camaquã basin and those to the north (including Serra da Graciosa plutons dated by Braun et al. [2010]) reflects widespread, sporadic magmatic activity in western Gondwana in the Ediacaran and earliest Cambrian. Magmatic crystallization of major plutons occurred at ~580 Ma, followed by volcanism, plutonism, and hydrothermal activity at ~540 Ma.

(3) Zircon fingerprinting of Serra da Graciosa and Camaquã intrusions yield unusually high LREEs compared with typical zircon LREEs (e.g., Colombini et al., 2011). Based on zircon morphology, zircon inclusions, and correlations between the abundance of high LREEs and scatter in age data, we suggest that atypical LREE patterns may reflect extensive hydrothermal activity within and near the basin system at ~540 Ma, concurrent with early Cambrian magmatism.

(4) Plutonic-volcanic connections are strongly indicated by age and geochemical similarities in the Itajaí rhyolite and granite, suggesting that these formed from the same magma system. In

contrast, geochemical evidence indicates that volcanism and plutonism in the Camaquã basin were relatively decoupled.

(5) Based on geochronologic and geochemical similarities between ~580 Ma granites from throughout southern Brazil, we propose that the ~580 Ma Serra da Graciosa magmatic province extends from the northern regions of the basin system southward to at least the Camaquã basin. We also suggest that, if ~540 Ma hydrothermal activity in the Graciosa region is related to coeval magmatism in the Camaquã basin, then the ~540 Ma magmatic event may have been equally as widespread. The extent of episodic silicic magmatism during this time period may reflect widespread lithospheric response to extension throughout western Gondwana at the end of the Ediacaran period and indicate a connection between tectonic environment and continental growth.

CHAPTER 5

CONCLUSIONS AND PLANS FOR FUTURE WORK

Conclusions pertaining to my specific research projects are provided at the end of each of the previous chapters. Here I first outline some of the unifying themes and insights that emerged for me during my dissertation work, and then describe opportunities for future research.

Research Themes

Selection of U-Pb Dating Method

Each U-Pb zircon dating method – ID-TIMS (isotope dilution - thermal ionization mass spectrometry), SIMS (secondary ion mass spectrometry), and LA-ICPMS (laser ablation-inductively coupled plasma mass spectrometry) – has unique advantages and disadvantages with respect to cost, time, precision, and spatial resolution (see Hanchar & Hoskin, 2003 and references therein). I used all three methods during my dissertation research; the experience reinforced for me the idea that the "best" zircon dating method is study-specific. It depends upon the scope of the research question, research goals, geological context, and time and budget constraints. In some instances, integrating multiple dating techniques may be the most appropriate approach.

For example, although LA-ICP-MS lacks the precision of TIMS and SIMS, it is more cost- and time-effective; moreover, it permits simultaneous acquisition of age and elemental data. It was therefore the most appropriate technique for our reconnaissance study of silicic magmatism in southern Brazil, where prevalent zircon inheritance has hampered several previous higher-precision studies (involving smaller zircon sample sets) of magmatic crystallization of Ediacaran-Cambrian plutons. What our study lacks in precision, it makes up for in the sheer number of analyses that we were able to collect from different units spanning a wide temporal and geographic range.

On the other hand, reconnaissance in-situ SIMS dating (using the sensitive high resolution ion microprobe, or SHRIMP) and elemental analysis of zircons from the southern Black Mountains helped us characterize grains that we then analyzed via high-precision TIMS. SIMS dating helped us identify inherited grains, assess their abundance in the units of interest, and select target grains for TIMS analysis. Because TIMS is so costly and time-consuming, we wanted to avoid using it to unnecessarily date xenocrystic zircons.

Nevertheless, TIMS dating *was* fundamental to reconstructing the ~2 Ma Miocene magmatic history of the supereruption-producing southern Black Mountains volcanic center. High precision ages were necessary in order to constrain the timing of magmatism and magmatic evolution.

Limitations and Efficacy of Zircon Thermometry

Despite the numerous assumptions required by zircon saturation thermometry and Ti-in-zircon thermometry, they are both highly useful tools for constraining magmatic temperatures *as long as* their limitations and associated uncertainties are acknowledged. For example, a criticism of the Ti-in-zircon thermometer is that its utility is restricted by its dependence upon the activity of SiO_2 and TiO_2 in zircon, values that can be difficult to constrain (and that can change as a magma evolves). In my research (chapter 2), I calculated Ti-in-zircon temperatures using a range of reasonable activities instead of attempting to pin down specific SiO_2 and TiO_2 activities. The resulting calculated temperature ranges ultimately reinforced our findings (i.e., that the southern Black Mountains volcanic center was exceptionally hot immediately preceding and following the PST supereruption, and that temperatures declined considerably within 200 k.y. of the supereruption) rather than undermining them.

As for zircon saturation thermometry, to be directly applicable, the saturation equation requires the composition of a melt that was saturated in zircon. Because igneous rocks do not strictly represent melt compositions, there is uncertainty about variables such as the M value and the concentration of Zr in melt. Especially in plutonic rocks, initial zircon saturation may also be difficult to verify. With natural materials, the thermometer strictly yields a magma temperature *only* when applied to the composition of a glass that, when molten, was in equilibrium with zircon. Nonetheless, ZST provides valuable constraints: even for plutonic rocks, uncertainties in M values and Zr concentrations of melts generally introduce only tens of degrees of uncertainty in ZST.

Integration of Whole Rock and Mineral Analyses

Integration of traditional and newer analytical methods – especially when combined fieldwork-based ground-truthing – may be powerfully complementary and yield insights that individual approaches alone may not be able to offer.

The integration of analytical methods is a theme that ties together the three studies stemming from my dissertation research. In the first, I integrated zircon saturation thermometry and Ti-in-zircon thermometry; the differences between the calculated zircon saturation and Ti-in-zircon temperatures helped elucidate magmatic processes (particularly magmatic hybridization and crystal transfer) suggested by field evidence. In the second study, I integrated whole rock isotopic and elemental analyses with zircon isotopic analyses. Differences between whole rock and zircon isotopes – in instances when they “should” have been the same – provided subtle but significant information about the evolution of silicic magmatism within the SBMVC. In the third study, simultaneous zircon age dating and elemental analysis allowed us to explore *why* some of the samples yielded such excessive age scatter.

Opportunities to Build on Reconnaissance Studies

My research in Brazil and western Arizona were both reconnaissance investigations of silicic systems that are clearly ripe for further investigation. My projects in western Arizona helped establish a broad petrologic framework for the pre- to post-PST evolution of the southern Black Mountains Volcanic center. However, questions remain as to what triggered the PST eruption, how pre-PST units (e.g., pre-PST trachytes and the Cook Canyon Tuff) are related to one another and to the PST, and how landscape/topography changed throughout SBMVC history.

In Brazil, we are now fairly confident that the Ediacaran-Cambrian silicic units that stretch from just south of Saõ Paulo all the way to northern Uruguay are at least temporally related. However, more research is necessary in order to explore plutonic-volcanic connections (especially where they are fairly apparent, such as the Itajaí Basin) and obtain reliable ages from other major plutons in the Camaquã basin.

Future Research

My plans for future research include field-based, geochemistry- and petrology-oriented projects that focus on questions related to silicic magmatism. Some of the projects stem from my dissertation work whereas others venture into new areas of investigation.

PST Heating and Supereruption Triggering

In collaboration with undergraduates participating in the NSF-sponsored Research Experience for Undergraduates "Before and After a Supereruption," I will help investigate the thinly-bedded mafic units that immediately underlie the PST as well as mafic enclaves within the intracaldera PST. The relatively small-volume supereruption precursors are currently not well characterized, but we think they may hold important clues as to how and why the PST erupted.

We will explore possible correlations between mafic input, magmatic heating, and supereruption triggering (a major area of research) through field observations, petrographic analysis, SEM mineral characterization (especially of mafic minerals, like pyroxene, that can provide thermobarometric constraints), and elemental analysis of zircon, if it is available.

Exploring Relationships Between the PST and its Intermediate-Composition Precursors

Although the PST supereruption was the largest eruption in the SBMVC, it was certainly not the only major eruption produced in the region. In the ~200 k.y. before the PST erupted, the SBMVC generated a thick sequence (~1 km) of phenocryst-rich, intermediate-composition lava flows as well as the ~100 km^3 Cook Canyon Tuff (CCT). Neither the lavas nor the CCT are petrologically well characterized, and their ages are relatively poorly constrained (McDowell et al., 2014). Moreover, although they are temporally and spatially close to the PST, whether they are petrogenetically related to the PST is currently unknown. If they are, they may offer valuable insights into how the PST magma body formed and elucidate how large-volume, high-silica magmas are generated.

In collaboration with undergraduates participating in the NSF-sponsored Research Experience for Undergraduates "Before and After a Supereruption," I will help explore the relationships between the trachyte lavas, CCT, and PST. Our approach will include field observations, detailed petrographic characterization of the lavas and the CCT, and SEM and LA-ICP-MS analysis of mineral tracers (such as feldspars) and xenocrysts within these units.

Exploring Plutonic-Volcanic Connections in the Itajaí basin of Southern Brazil

In evaluating the ages of silicic units within the Itajaí basin, we came to two major conclusions (see chapter 4): first, Ediacaran-Cambrian magmatism in the Itajaí basin occurred later than magmatism to the south and to the north; and second, the plutonic and volcanic units in the Itajaí basin appear to be petrogenetically related. Not only are they similar in age, they also have complementary whole rock and zircon geochemical signatures. The relationship between silicic volcanics and spatially associated plutons is currently a major area of petrologic research (e.g., Mills & Coleman, 2013; Zimmerer & McIntosh, 2012): are spatially associated plutons the unerupted cousins of contemporaneous volcanics? Are they related by processes such as fractional crystallization or partial melting (e.g., Bachmann & Bergantz, 2004)? Or are they petrogenetically unrelated?

Given the intriguing similarities between the Subida granite and the Apiúna rhyolite, the Itajaí basin offers an excellent locale to explore these themes in detail. The project would likely involve careful field descriptions of the Subida granite and the Apiúna rhyolite, additional whole rock geochemical analyses, SEM analysis of Apiúna rhyolite glass, and SEM and LA-ICP-MS characterization of minerals (including feldspar and zircon) that appear in both units.

Using Zircon Geochemistry to Constrain Tectonic Environments of Silicic Magmatism in Southern Brazil

For decades, petrologists have tried to use igneous rock geochemistry to constrain tectonic environments of magmatism (e.g., Pearce et al., 1984; Frost & Frost, 2011). If it worked, this would be an elegantly simple approach; however, processes such as hydrothermal alteration, subsolidus alteration, magmatic hybridization, and crustal recycling can modify original magmatic compositions, making tectonic discrimination diagrams limited in their utility. More recently, Grimes et al. (2009) and Carley et al. (in review) have proposed that zircon trace element geochemistry may help elucidate environments of magma genesis. The benefit of zircon over whole rock is that it is more durable and is better able to maintain its original geochemistry.

As described in chapter 4, although the tectonic environments in which Ediacaran-Cambrian granites of southern Brazil were generated are of great interest, they remain unclear. I propose to use high spatial resolution analytical techniques (e.g., SIMS or LA-ICP-MS) to characterize zircons from throughout this silicic system and then classify them based on the Grimes classification scheme. At the very least, the approach would permit comparison of Neoproterozoic-early Paleozoic igneous units from throughout southern Brazil and indicate whether these units formed in similar environments. At best, the approach may help us test the hypothesis offered by Almeida et al. (2010) that these units formed in an extensive continental rift.

Zircon Characterization of the ~1.4 Ga Granite-Rhyolite Terrane

A swath of geochemically uniform, ~1.4 Ga granites and rhyolites extends from Canada and into the Midwestern and western United States (e.g., Bickford et al., 1986; Van Schmus et al., 1996). How and in what environment this vast terrane formed is poorly understood. The most recent in-depth investigations focused on whole rock analytical techniques and took place in the 1990s.

Vanderbilt undergraduate researcher Paige Lambert and I are using zircon geochemistry – something that up to this point has not been used to study the Granite-Rhyolite Terrane (GRT) – to explore GRT magmatism. We have collected a set of volcanic and granitic samples from the St. Francis Mountains in southeastern Missouri, a location that offers one of the few GRT exposures in the Midwest. Using SIMS, we will obtain high spatial resolution elemental analyses of representative zircons. Specifically, we will use Ti-in-zircon thermometry to test the hypothesis that the GRT formed in a high temperature environment, as suggested by high Zr concentrations in some previously analyzed GRT samples (Moecher & Samson, 2006).

Appendix A: Whole Rock Elemental Geochemistry, Silver Creek Caldera and Environs

	Pre-PST Trachyte		Moss				Enclave in Moss	
Sample	**SCM-34**	**SCM-41**	**MP1**	**SCM-6**	**SCM-17a**	**PSM1**	**MPe1**	**TIP-1**
Location [1]	*35° 1' 52.2" N* *114° 27' 17.2" W*	*35° 1' 51.3" N* *114° 22' 30.5" W*	*35° 6' 36.9" N* *114° 27' 6.6" W*	*35° 6' 22.8" N* *114° 26' 13.5" W*	*35° 4' 35.5" N* *114° 26' 12.5" W*	*35° 6' 15.2" N* *114° 26' 22.1" W*	*35° 6' 35.8" N* *114° 27' 3.0" W*	*35° 4' 35.7" N* *114° 27' 37.5" W*
Oxide wt%, norm. to 100%:								
SiO_2	64.35	63.77	66.83	62.77	65.47	62.84	59.07	74.13
Al_2O_3	16.10	16.44	14.92	15.29	15.25	16.12	16.29	13.14
Fe_2O_3(total)	4.53	4.70	4.27	6.12	4.74	5.15	7.02	2.13
MnO	0.07	0.09	0.06	0.09	0.04	0.10	0.08	0.04
MgO	1.51	1.20	1.49	2.42	2.00	2.41	3.24	0.26
CaO	3.08	4.19	2.64	3.92	2.81	3.84	4.93	0.80
Na_2O	3.61	3.60	3.97	3.26	3.96	4.39	4.15	3.80
K_2O	5.63	4.76	4.92	4.90	4.75	3.92	3.67	5.38
TiO_2	0.80	0.91	0.69	0.93	0.77	0.90	1.12	0.29
P_2O_5	0.32	0.34	0.21	0.31	0.22	0.33	0.43	0.02
LOI	1.94	2.62	2.57	2.57	3.79	1.72	3.26	0.91
(SUM [2] ***)***	98.65	97.29	95.94	96.46	95.85	98.25	96.58	98.66
trace elements, ppm								
Rb	135	126	158	147	147	108	107	142
Sr	590	602	391	569	380	611	712	92
Ba	2226	1391	1175	1206	1068	1193	1287	309
Cs	1.4	1.4	1.8	1.7	1.8	1	1.4	2.3
Pb	29	24	19	46	15	33	15	24
Ga	21	21	20	21	22	22	20	20
Ge	1.9	1.9	1.7	1.8	1.6	2.2	1.8	1.9
Tl	1.144	1.412	1.31	3.3	0.24	0.87	0.56	0.72
Ta	1.13	1.42	1.1	1.32	1.53	1.3	1.3	1.97
Nb	19.4	22.5	17.2	20.6	22.7	19.5	21.4	27.5
V	60	81	62	99	69	94	121	14
Zn	91	72	57	47	56	86	48	55
Cu	12	25	14	22	26	11	14	4
Co	7.6	8.4	10.1	10.8	13.4	13.3	20.9	1.7
Cr	33.8	24.8	19.7	47.7	33	45.4	52	6.9
Ni	14	16	15	32	24	32	33	2
Sc	8.47	8.39	7.61	11.8	8.75	10.7	12.5	3.83
Y	27	27	19	28	24	24	21	29
Hf	11.1	8.4	6.3	8.7	8.4	12.1	6.4	7.7
Zr	570	360	261	377	353	490	279	257
Th	17.1	19.2	16.7	18.6	21	20.1	13	26.1
U	2.75	3.47	2.64	2.73	2.81	4.11	2.38	3.52
S	220	290	40	160	80	430	210	30
La	115	87.1	75.8	89.3	91.8	80.7	74.1	84.9
Ce	223	172	146	176	178	160	146	157
Pr	24.1	18.5	15.6	19	18.9	18.7	15.9	15.8
Nd	86.7	66.2	53.4	66.3	64.9	55.5	56.6	49.4
Sm	12.70	10.30	8.39	10.8	10.5	9.63	9.27	8.06
Eu	2.95	2.14	1.57	2.06	1.89	2.31	2.17	0.885
Gd	9.29	7.86	5.8	7.76	7.22	6.84	6.69	5.94
Tb	1.10	1.00	0.77	1.08	0.97	0.98	0.94	0.9
Dy	5.75	5.36	4.03	5.6	5.05	5.27	4.79	5.1

Appendix A: Whole Rock Elemental Geochemistry, Silver Creek Caldera and Environs

	Pre-PST Trachyte		Moss				Enclave in Moss	
Sample	**SCM-34**	**SCM-41**	**MP1**	**SCM-6**	**SCM-17a**	**PSM1**	**MPe1**	**TIP-1**
Ho	1.05	1.00	0.78	1.04	0.97	1.03	0.89	1.05
Er	2.95	2.84	2.14	2.82	2.66	2.96	2.43	3.07
Tm	0.44	0.40	0.31	0.40	0.37	0.43	0.35	0.47
Yb	2.81	2.57	2.01	2.60	2.32	2.63	2.20	3.13
Lu	0.46	0.41	0.31	0.41	0.36	0.39	0.34	0.50
Eu/Eu[3]	0.82	0.72	0.68	0.68	0.66	0.86	0.84	0.39
Gd/Gd[4]	0.49	0.50	0.46	0.49	0.49	0.47	0.51	0.35
M[5]	1.83	1.91	1.80	1.98	1.81	1.97	2.21	1.49
ZST[6]	823	761	742	758	772	788	701	778
ZST[7]	870	819	799	818	826	844	774	821

[1] NAD83

[2] sum of oxides prior to normalization

[3] Eu/(Sm*Gd)$^{0.5}$ [chondrite-normalized]

[4] Gd/(La*Lu)$^{0.5}$ [chondrite-normalized]

[5] (Na+K+2*Ca)/(Al·Si) [mol; Watson & Harrison, 1983]

[6] zircon saturation T [Boehnke et al., 2013]

[7] zircon saturation T [Watson & Harrison, 1983]

Appendix A: Whole Rock Elemental Geochemistry, Silver Creek Caldera and Environs

	Times Granite		**Times Leucogranite**		**Enclave in Times**	**Mafic Dike**		
Sample	**SCM-37**	**PSTG2**	**SCM-20**	**SCM-38**	**SCM-27b**	**SCM-26**	**SCM-1**	**SCM-13**
Location [1]	*35° 2' 49.3" N* *114° 27' 17.1" W*	*35° 2' 17.3" N* *114° 26' 58.1" W*	*35° 4' 43.1" N* *114° 26' 13.1" W*	*35° 2' 8.0" N* *114° 27' 23.7" W*	*35° 4' 7.3" N* *114° 26' 58.2" W*	*35° 7' 4.5" N* *114° 26' 18.1" W*	*35° 4' 46.7" N* *114° 26' 12.1" W*	*35° 4' 38.2" N* *114° 25' 47.3" W*
Oxide wt%, norm. to 100%:								
SiO_2	72.49	73.89	76.20	77.14	68.08	55.28	67.74	67.09
Al_2O_3	13.81	13.41	12.49	12.21	15.37	14.97	14.94	15.27
Fe_2O_3(total)	2.26	1.36	2.61	1.48	3.94	8.70	3.87	3.88
MnO	0.07	0.07	0.02	0.04	0.07	0.12	0.07	0.08
MgO	0.45	0.25	0.24	0.14	1.01	6.11	1.21	1.29
CaO	1.24	0.90	0.47	0.35	1.63	6.32	2.78	3.13
Na_2O	3.94	4.57	2.34	3.39	4.72	3.61	3.16	3.92
K_2O	5.30	5.23	5.38	5.08	4.37	3.29	5.40	4.56
TiO_2	0.36	0.28	0.24	0.17	0.61	1.13	0.63	0.63
P_2O_5	0.08	0.05	0.02	0.01	0.19	0.47	0.19	0.16
LOI	0.82	1.29	1.17	0.72	2.00	3.74	3.73	4.07
(SUM [2] ***)***	97.53	99.65	97.38	97.83	97.65	96.19	95.52	96.28
trace elements, ppm								
Rb	148	185	184	183	142	80	156	125
Sr	148	55	110	39	286	827	372	321
Ba	448	188	133	42	1324	1167	1059	980
Cs	2.1	2.3	4	1.1	1.1	1.3	1.7	2.3
Pb	19	29	57	27	28	13	30	22
Ga	19	20	14	17	20	20	20	20
Ge	2	2.2	1.2	1.7	1.5	1.9	1	0.9
Tl	1.03	1.09	0.98	1.09	0.78	0.47	0.26	0.16
Ta	1.66	2.1	2.08	1.97	1.7	0.82	1.63	1.57
Nb	26.3	30.9	31.2	31.8	21.1	14.4	23.9	23.6
V	21	14	10	8	35	150	51	55
Zn	51	49	39	37	71	76	74	64
Cu	6	2	10	4	4	46	6	5
Co	2.8	2.3	1.6	1.3	6.2	31.9	7.6	8.2
Cr	4.5	2.6	7.2	< 0.5	3.9	205	10.9	9.3
Ni	5	1	6	2	1	96	9	9
Sc	3.73	3.55	1.93	2.08	5.26	19.8	7.16	7.01
Y	27	30	20	21	21	24	26	27
Hf	7	9.6	6.9	5	9.5	5.9	7.4	7.4
Zr	275	310	222	135	431	248	298	295
Th	26	28.6	34.7	33.7	15.2	11.5	19.3	19.1
U	3.21	4.84	3.6	4.78	2.24	1.99	3.35	3.19
S	140	300	130	60	100	780	30	60
La	72.7	82	53.9	48	73.9	73.5	79.3	78
Ce	144	158	106	87.8	132	149	153	150
Pr	14.4	17.1	10.3	7.64	13.2	17.0	16.1	15.6
Nd	48	47.2	33.1	22.1	43.7	63.2	53.4	53.1
Sm	7.78	8.02	5.52	3.49	6.6	10.60	8.63	8.53
Eu	1.01	0.884	0.384	0.22	1.37	2.38	1.45	1.49
Gd	6.55	5.87	4.55	3.25	4.82	7.65	6.42	6.41
Tb	0.88	0.99	0.63	0.51	0.69	1.04	0.96	0.92
Dy	4.81	5.69	3.51	2.97	3.79	5.30	5.18	4.96

	Times Granite		**Times Leucogranite**		**Enclave in Times**	**Mafic Dike**		
Sample	**SCM-37**	**PSTG2**	**SCM-20**	**SCM-38**	**SCM-27b**	**SCM-26**	**SCM-1**	**SCM-13**
Ho	1	1.17	0.76	0.7	0.75	1.00	1.04	0.99
Er	2.88	3.64	2.28	2.27	2.19	2.69	2.89	2.82
Tm	0.44	0.57	0.37	0.38	0.33	0.38	0.43	0.42
Yb	2.89	3.68	2.53	2.67	2.26	2.32	2.88	2.85
Lu	0.47	0.53	0.43	0.44	0.37	0.36	0.45	0.46
Eu/Eu [3]	0.43	0.39	0.23	0.20	0.74	0.80	0.59	0.61
Gd/Gd [4]	0.43	0.34	0.36	0.27	0.35	0.57	0.41	0.41
M [5]	1.55	1.61	1.17	1.33	1.59	2.74	1.70	1.79
ZST [6]	777	782	803	730	823	637	767	755
ZST [7]	823	829	833	776	862	728	818	810

[1] NAD83

[2] sum of oxides prior to normalization

[3] Eu/(Sm*Gd)$^{0.5}$ [chondrite-normalized]

[4] Gd/(La*Lu)$^{0.5}$ [chondrite-normalized]

[5] (Na+K+2*Ca)/(Al·Si) [mol; Watson & Harrison, 1983]

[6] zircon saturation T [Boehnke et al., 2013]

[7] zircon saturation T [Watson & Harrison, 1983]

	Feldspar Porphyry Dike		
Sample	**SCM-30**	**SCM-31**	**SCM-35**
Location [1]	*35° 7' 7.8" N*	*35° 7' 7.1" N*	*35° 1' 55.2" N*
	114° 26' 2.6" W	*114° 26' 2.9" W*	*114° 28' 12.3" W*
Oxide wt%, norm. to 100%:			
SiO_2	61.01	69.41	63.16
Al_2O_3	14.85	14.42	16.24
Fe_2O_3(total)	5.88	3.26	5.20
MnO	0.09	0.07	0.08
MgO	5.18	1.22	1.89
CaO	5.40	2.16	3.35
Na_2O	3.01	4.21	4.19
K_2O	3.45	4.56	4.63
TiO_2	0.85	0.51	0.91
P_2O_5	0.28	0.17	0.33
LOI	5.46	2.59	2.95
(SUM [2] ***)***	92.74	95.63	95.69
trace elements, ppm			
Rb	80	126	150
Sr	504	276	471
Ba	823	854	1208
Cs	1.7	0.5	0.9
Pb	16	22	15
Ga	18	18	20
Ge	1.8	1.5	1.4
Tl	0.4	0.9	1.04
Ta	0.81	1.47	0.94
Nb	14.6	22.8	16.6
V	108	41	102
Zn	70	58	64
Cu	71	46	17
Co	19.9	6.3	12.1
Cr	231	25.6	13.1
Ni	84	22	12
Sc	13.9	5.72	9
Y	17	24	21
Hf	4.7	7.5	5.8
Zr	200	302	240
Th	11.9	23.5	15.1
U	1.86	3.41	2.46
S	310	240	270
La	55.3	76.7	60.5
Ce	110	149	121
Pr	11.5	14.9	12.7
Nd	42.1	50.6	46.3
Sm	6.94	8.27	7.83
Eu	1.55	1.38	1.73
Gd	5.54	6.62	6.32
Tb	0.68	0.89	0.81
Dy	3.45	4.65	3.99

	Feldspar Porphyry Dike		
Sample	**SCM-30**	**SCM-31**	**SCM-35**
Ho	0.65	0.93	0.78
Er	1.86	2.67	2.20
Tm	0.27	0.41	0.33
Yb	1.70	2.66	2.05
Lu	0.27	0.44	0.34
Eu/Eu [3]	0.76	0.57	0.75
Gd/Gd [4]	0.56	0.44	0.54
M [5]	2.20	1.70	1.89
ZST [6]	672	769	722
ZST [7]	747	820	784

[1] NAD83

[2] sum of oxides prior to normalization

[3] Eu/(Sm*Gd)$^{0.5}$ [chondrite-normalized]

[4] Gd/(La*Lu)$^{0.5}$ [chondrite-normalized]

[5] (Na+K+2*Ca)/(Al·Si) [mol; Watson & Harrison, 1983]

[6] zircon saturation T [Boehnke et al., 2013]

[7] zircon saturation T [Watson & Harrison, 1983]

Appendix A: Whole Rock Elemental Geochemistry, Silver Creek Caldera and Environs

	Felsic Dike		**Quartz Porphyry Dike**		**Post-PST Lavas**		
Sample	**SCM-40**	**SCM-42**	**BCD**	**SCM-5a**	**SIT-1**	**SIT-1b**	**SIT-2**
***Location*[1]**	*35° 1' 32.7" N* *114° 22' 16.4" W*	*35° 1' 59.3" N* *114° 22' 40.3" W*	*34° 59' 7.8" N* *114° 25' 29.7" W*	*35° 2' 55.8" N* *114° 26' 25.6" W*	*35° 2' 34.1" N* *114° 20' 36.2" W*	*35° 2' 34.3" N* *114° 20' 36.3" W*	*35° 2' 55.9" N* *114° 20' 51.9" W*
Oxide wt%, norm. to 100%:							
SiO_2	73.86	74.02	77.98	79.93	71.00	56.57	65.80
Al_2O_3	13.80	14.08	11.01	10.03	14.41	17.14	16.34
Fe_2O_3(total)	1.84	1.66	1.25	1.11	2.63	7.12	4.56
MnO	0.04	0.02	0.03	0.02	0.05	0.09	0.09
MgO	0.36	0.73	0.12	0.21	0.82	3.91	0.68
CaO	0.84	0.58	0.10	0.21	2.28	6.98	3.16
Na_2O	2.95	1.95	0.36	0.33	3.54	3.59	4.03
K_2O	5.93	6.58	9.03	8.07	4.70	2.95	4.46
TiO_2	0.32	0.33	0.11	0.09	0.45	1.14	0.59
P_2O_5	0.05	0.04	0.01	0.01	0.12	0.49	0.29
LOI	1.59	2.66	0.41	0.83	2.89	2.84	0.98
(SUM[2])	99.01	98.02	98.21	99.90	97.23	97.83	97.02
trace elements, ppm							
Rb	188	202	397	337	156	74	94
Sr	93	71	152	65	291	1106	1498
Ba	435	469	108	423	674	1511	1789
Cs	2.5	1.9	5.7	2.4	2.5	1.4	1.1
Pb	33	26	22	13	25	10	33
Ga	18	17	13	10	18	23	22
Ge	1.7	2	1.4	1.3	1.7	1.8	1.8
Tl	0.88	1.124	4.86	4.13	0.97	0.76	0.53
Ta	1.85	1.99	2.28	2.04	1.57	0.82	0.8
Nb	28.2	28.9	30.5	27.7	22.1	15.2	15.8
V	14	15	10	8	36	154	56
Zn	36	39	32	11	40	84	75
Cu	4	7	23	6	6	35	13
Co	2.4	1.1	1.3	1.1	5.8	22.7	7.4
Cr	6.4	30.5	4.8	5.3	7	54.2	6.4
Ni	3	4	< 1	3	9	55	5
Sc	3.35	3.13	1.67	1.58	4.68	15.4	5.42
Y	28	25	19	13	22	25	18
Hf	7.2	7	3.7	3	5.6	6.2	8.4
Zr	252	251	92	67	210	273	375
Th	35.4	29.1	40.3	32.7	28.5	18.8	25.7
U	5.5	4.13	5.38	5.72	4.64	2.11	3.25
S	630	50	80	40	120	430	180
La	78.3	74.4	38.4	29.3	66.1	117	128
Ce	153	144	74.6	50.9	126	184	247
Pr	15.5	14.7	6.66	4.23	12.5	24.1	25.6
Nd	51.4	49	19.7	11.6	42.3	86.9	91.4
Sm	8.15	7.77	3.33	1.73	6.67	13.50	13.4
Eu	1.03	0.97	0.21	0.16	1.18	2.66	2.99
Gd	6.45	5.64	3.17	1.64	5.49	9.65	9.08
Tb	0.90	0.80	0.50	0.26	0.74	1.17	0.91
Dy	4.87	4.68	2.97	1.63	3.84	5.43	4.03

	Felsic Dike		**Quartz Porphyry Dike**		**Post-PST Lavas**		
Sample	**SCM-40**	**SCM-42**	**BCD**	**SCM-5a**	**SIT-1**	**SIT-1b**	**SIT-2**
Ho	0.98	0.95	0.68	0.38	0.78	0.94	0.68
Er	2.84	2.78	2.15	1.36	2.27	2.71	1.93
Tm	0.43	0.46	0.38	0.27	0.35	0.36	0.267
Yb	2.98	3.00	2.62	2.00	2.40	2.18	1.74
Lu	0.50	0.50	0.44	0.36	0.40	0.34	0.273
Eu/Eu [3]	0.43	0.45	0.20	0.28	0.59	0.71	0.82
Gd/Gd [4]	0.40	0.36	0.30	0.19	0.41	0.59	0.59
M [5]	1.34	1.16	1.29	1.26	1.58	2.42	1.72
ZST [6]	795	818	698	672	746	677	790
ZST [7]	831	846	747	724	796	757	838

[1] NAD83

[2] sum of oxides prior to normalization

[3] $Eu/(Sm*Gd)^{0.5}$ [chondrite-normalized]

[4] $Gd/(La*Lu)^{0.5}$ [chondrite-normalized]

[5] (Na+K+2*Ca)/(Al·Si) [mol; Watson & Harrison, 1983]

[6] zircon saturation T [Boehnke et al., 2013]

[7] zircon saturation T [Watson & Harrison, 1983]

Appendix B: SHRIMP U-Pb Zircon Data, Silver Creek Caldera and Environs

Isotope Ratio Data for Samples	**SquidSampleData**	**Std6r38**	**.067**	**Comm64**	**18.049**
(errors are 1s unless otherwise specified)		**UstdPpmU**	**4200**	**Comm76**	**.864**
		UstdConst	**13.280**	**Comm_76err**	**.005**

Spot Name	**Date/Time**	**Hours**	**Pb/U const #rej**	**204 cts /sec**	**204 /206**	**% err**	**207 /206**	**% err**	**208 /206**	**% err**	**Obs 206 /238**	**% err**	**248 /254**
SCM-34_9.1c	04 May, 2012 00:19	9.57	0	0.03	6.5E-4	66	.059	7.9	.491	4.4	.005	1.8	1.371
SCM-34-1.1c	03 May, 2012 18:53	4.14	0	0.07	2.7E-3	45	.049	10.7	.915	4.5	.005	2.5	2.751
SCM-34-11.1c	04 May, 2012 01:03	10.31	0	0.00	---	0	.050	10.0	.646	5.0	.006	2.2	2.059
SCM-34-14.1c	04 May, 2012 02:02	11.30	0	0.02	9.8E-4	66	.046	10.6	.912	4.4	.006	2.3	2.739
SCM-34-15.1c	04 May, 2012 02:18	11.56	1	0.07	7.6E-6	59	.100	0.6	.059	2.6	.676	1.1	.211
SCM-34-16.1c	03 May, 2012 19:59	5.24	1	0.02	8.5E-4	67	.048	9.9	.729	4.4	.005	2.8	2.212
SCM-34-2.1c	03 May, 2012 22:21	7.60	0	0.02	7.1E-4	66	.045	9.1	.535	4.5	.005	1.9	1.433
SCM-34-3.1c	03 May, 2012 22:35	7.85	0	0.00	---	0	.103	0.5	.136	4.7	.512	2.0	.467
SCM-34-4.1c	03 May, 2012 22:50	8.09	0	0.54	1.4E-2	20	.277	5.0	1.199	4.6	.008	3.2	1.524
SCM-34-6.1c	03 May, 2012 23:34	8.83	0	0.05	1.7E-3	70	.046	9.4	.847	3.9	.005	4.1	2.489
SCM-34-10.1i	04 May, 2012 00:49	10.07	0	0.14	1.6E-3	38	.093	4.1	.883	2.4	.006	3.1	2.149
SCM-34-12.1i	04 May, 2012 01:18	10.56	0	0.00	---	0	.050	12.0	.550	6.2	.006	2.7	1.660
SCM-34-13.1i	04 May, 2012 01:33	10.81	0	0.02	4.9E-4	66	.041	8.2	.965	3.0	.006	1.8	2.853
SCM-34-5.1i	03 May, 2012 23:05	8.34	0	0.02	1.1E-3	65	.049	10.9	.746	5.0	.005	3.3	2.019
SCM-34-7.1i	03 May, 2012 23:49	9.08	0	0.03	6.4E-4	66	.046	8.4	.435	4.6	.005	3.0	1.283
SCM-34-8.1i	04 May, 2012 00:04	9.32	0	0.04	1.2E-3	65	.053	10.8	.532	4.5	.006	1.9	1.576
MP1-1.1	02 May, 2012 22:51	12.09	0	0.00	---	0	.062	11.6	.547	6.6	.006	2.8	1.562
MP1-15.1c	03 May, 2012 03:04	16.29	1	0.08	4.0E-5	45	.104	0.8	.205	1.5	.544	1.5	.662
MP1-2.1c	02 May, 2012 21:02	10.27	0	0.00	---	0	.044	7.2	.444	3.6	.005	3.2	1.356
MP1-3.1c	02 May, 2012 23:21	12.58	0	-0.08	-1.1E-5	64	.103	0.4	.149	0.6	.453	2.1	.482
MP1-4.1c	02 May, 2012 23:36	12.83	0	0.00	---	0	.049	9.0	.713	4.1	.007	2.0	2.181
MP1-8.1c	03 May, 2012 00:50	14.06	0	-0.03	-6.2E-4	50	.047	7.2	.868	2.9	.006	1.5	2.598
MP1-10.1t	03 May, 2012 01:20	14.56	0	0.00	---	0	.049	12.8	.393	5.2	.006	3.9	1.139
MP1U-21.1E	19 Aug, 2011 00:20	13.59	0	0.23	2.5E-2	43	.057	16.6	.683	7.3	.005	3.4	1.368
MP1U-21.2E	19 Aug, 2011 00:37	13.86	0	0.17	1.5E-2	43	.046	14.3	.559	6.9	.006	4.5	1.370
MP1-11.1i	03 May, 2012 01:49	15.06	0	0.02	8.3E-4	66	.048	11.2	.253	6.8	.006	2.1	.731
MP1-12.1i	03 May, 2012 02:04	15.30	0	0.00	---	0	.103	0.5	.214	1.4	.568	1.7	.682
MP1-13.1	03 May, 2012 02:19	15.55	1	-0.08	-6.9E-6	50	.100	0.3	.100	0.5	.480	4.4	.330
MP1-14.1i	03 May, 2012 02:34	15.80	0	0.09	1.1E-3	50	.048	6.2	.474	3.1	.006	1.3	1.475
MP1-16.1i	03 May, 2012 03:18	16.54	0	-0.07	-4.2E-3	64	.060	14.3	.449	7.2	.006	2.8	1.261
MP1-5.1	02 May, 2012 23:50	13.07	0	0.00	---	0	.103	0.9	.219	1.6	.521	0.9	.695
MP1-6.1i	03 May, 2012 00:05	13.32	0	0.05	1.3E-3	86	.054	7.7	.469	4.4	.005	2.9	1.249
MP1-7.1i	03 May, 2012 00:35	13.81	0	0.02	7.1E-4	66	.046	9.3	.557	4.6	.005	3.2	1.650
MP1-9.1i	03 May, 2012 01:05	14.32	1	0.10	8.8E-6	50	.103	0.3	.198	0.6	.501	2.1	.636
MP1U-16.1I	18 Aug, 2011 19:42	8.94	0	0.15	7.8E-3	33	.052	9.9	.722	4.8	.006	2.9	1.845
MP1U-19.1I	18 Aug, 2011 23:15	12.50	1	0.13	4.5E-5	38	.103	0.6	.153	2.0	.458	6.2	.424
MP1U-20.1I	19 Aug, 2011 00:04	13.31	0	0.10	1.2E-2	47	.055	18.2	.733	9.4	.006	3.6	1.417
MP1U-22.1I	19 Aug, 2011 01:09	14.40	0	0.00	1.7E-5	99	.051	10.2	.799	4.3	.006	4.1	2.176
MP1U-23.1I	19 Aug, 2011 01:25	14.67	0	0.02	1.4E-3	99	.045	18.3	.546	7.7	.006	3.1	1.449
MP1U-24.1I	19 Aug, 2011 01:42	14.94	0	0.18	1.7E-2	47	.059	16.6	.639	6.9	.006	3.1	1.369
MP1U-25.1I	19 Aug, 2011 01:58	15.21	0	0.24	3.1E-2	40	.048	21.8	.518	9.0	.006	3.7	1.289
SCM-6_1.1E	02 May, 2012 17:45	6.99	0	-0.09	-3.2E-2	50	.026	76.4	.626	16.3	.005	7.1	1.559
SCM-6_2.1C	02 May, 2012 18:00	7.23	0	0.06	6.1E-4	50	.045	5.7	.621	2.6	.006	1.4	1.702
SCM-6_3.1C	02 May, 2012 18:38	7.86	0	-0.02	-3.4E-4	99	.049	7.1	.539	3.6	.005	1.5	1.532
SCM-6_4.1C	02 May, 2012 18:52	8.11	0	0.10	5.4E-3	44	.036	14.0	.806	5.7	.006	2.7	2.269
SCM-6_6.1C	02 May, 2012 19:13	8.44	0	0.10	1.0E-3	45	.049	5.2	.560	3.0	.005	2.0	1.690
SCM-6-12.1i	02 May, 2012 19:50	9.06	1	0.00	---	0	.102	0.9	.105	1.5	.525	2.3	.340
SCM-6-2.1t	02 May, 2012 20:28	9.70	0	-0.03	-1.4E-3	59	.051	14.5	.760	5.1	.006	4.3	2.030

Appendix B: SHRIMP U-Pb Zircon Data, Silver Creek Caldera and Environs

Isotope Ratio Data for Samples
(errors are 1s unless otherwise specified)

SquidSampleData

Std6r38	**.067**	**Comm64**	**18.049**
UstdPpmU	**4200**	**Comm76**	**.864**
UstdConst	**13.280**	**Comm_76err**	**.005**

Spot Name	**Date/Time**	**Hours**	**Pb/U const #rej**	**204 cts /sec**	**204 /206**	**% err**	**207 /206**	**% err**	**208 /206**	**% err**	**Obs 206 /238**	**% err**	**248 /254**
SCM-6-3.1c	02 May, 2012 20:12	9.43	0	0.06	1.9E-3	45	.053	9.3	.817	4.0	.005	2.0	2.239
SCM6U-19.1I	19 Aug, 2011 03:03	16.29	0	-0.08	-7.7E-3	45	.059	14.8	.492	8.0	.007	5.1	1.422
SCM6U-20.1I	19 Aug, 2011 03:19	16.56	0	0.08	9.5E-4	45	.053	5.1	.635	2.5	.006	2.4	1.785
SCM6U-22.1E	19 Aug, 2011 04:24	17.65	0	0.12	1.1E-2	46	.045	13.8	.633	6.5	.006	2.9	1.801
SCM6U-23.1E	19 Aug, 2011 06:24	19.64	0	0.17	5.3E-3	41	.048	8.2	.237	5.9	.007	1.8	.649
TIP1-1.1c	03 May, 2012 03:33	16.79	0	0.02	3.3E-4	66	.050	6.0	.859	3.0	.006	1.7	2.490
TIP1-15.1c	03 May, 2012 07:15	20.48	0	0.17	5.1E-3	36	.072	7.5	1.022	3.6	.006	3.3	2.964
TIP1-21.1c	03 May, 2012 08:58	22.20	0	0.07	6.1E-3	75	.044	16.4	.964	6.4	.005	3.4	2.429
TIP1-3.1c	03 May, 2012 04:18	17.53	0	-0.08	-3.5E-3	56	.050	10.9	1.101	4.2	.006	2.4	3.094
TIP1-5.1c	03 May, 2012 04:47	18.02	0	0.07	3.8E-3	49	.045	12.8	1.092	6.1	.006	2.7	2.963
TIP1-7.1c	03 May, 2012 05:32	18.76	0	0.00	---	0	.044	5.9	1.254	2.1	.005	3.1	3.698
TIP-1-9.1c	02 May, 2012 21:53	11.12	0	0.10	5.9E-4	45	.050	3.9	1.247	1.5	.006	2.0	3.672
TIP1U-23.1CI	18 Aug, 2011 14:05	3.33	0	0.07	1.1E-3	41	.050	6.1	.567	2.9	.006	2.7	1.587
TIP1-10.1i	03 May, 2012 06:01	19.25	0	0.01	1.3E-3	99	.058	16.4	.867	6.8	.005	3.4	2.167
TIP1-12.1i	03 May, 2012 06:45	19.99	0	0.02	1.3E-3	66	.049	12.2	.656	5.7	.005	2.7	1.760
TIP1-13.1i	03 May, 2012 07:59	21.22	1	0.10	1.4E-3	67	.065	5.3	1.101	2.4	.005	4.6	3.222
TIP1-14.1i	03 May, 2012 07:00	20.24	0	0.07	2.8E-3	48	.050	9.7	.765	4.4	.006	2.5	2.259
TIP1-16.1i	03 May, 2012 07:30	20.73	0	-0.02	-3.9E-4	53	.046	8.3	.500	5.6	.005	1.6	1.459
TIP-1-17.1i	02 May, 2012 22:20	11.56	0	0.09	1.6E-3	45	.047	7.0	.671	3.2	.005	1.5	2.046
TIP1-19.1i	03 May, 2012 08:29	21.71	0	-0.10	-3.8E-3	50	.051	10.6	1.533	3.5	.005	2.2	4.442
TIP1-2.1i	03 May, 2012 03:48	17.03	0	0.02	3.1E-4	99	.048	8.6	.663	3.0	.006	1.9	2.004
TIP1-20.1i	03 May, 2012 08:43	21.96	0	0.15	3.9E-3	35	.048	8.6	.958	3.4	.006	2.8	2.823
TIP1-4.1i	03 May, 2012 04:32	17.77	0	0.00	---	0	.058	11.0	.801	5.2	.005	4.0	2.397
TIP1-8.1i	03 May, 2012 05:46	19.01	0	0.02	7.5E-4	65	.045	9.8	.718	4.2	.005	4.0	1.977
TIP1U-24.1I	18 Aug, 2011 16:02	5.28	0	0.19	1.9E-3	35	.046	6.1	.930	1.9	.006	1.3	2.656
TIP1-11.1e	03 May, 2012 06:16	19.50	0	0.04	7.9E-4	66	.051	7.2	.484	3.9	.006	1.6	1.349
TIP1-18.1e	03 May, 2012 08:14	21.47	1	0.16	5.8E-3	35	.056	9.2	.449	5.4	.006	3.0	1.136
TIP1-22.1e	03 May, 2012 09:28	22.70	0	0.06	2.0E-3	62	.045	9.5	.505	5.8	.006	2.0	1.494
TIP1-6.1e	03 May, 2012 05:02	18.27	0	-0.12	-2.5E-3	46	.040	9.2	.978	3.1	.005	3.0	2.815
TIP1U-22.1e	18 Aug, 2011 13:16	2.51	0	0.35	1.2E-2	29	.054	8.0	.548	4.3	.006	3.5	1.397
SCM-1b_1.1e	03 May, 2012 09:44	22.97	0	0.04	1.5E-3	50	.055	9.9	.293	7.2	.005	2.6	.898
SCM-1b_10.1c	03 May, 2012 12:48	26.03	0	-0.10	-1.8E-3	55	.050	7.1	1.061	2.7	.005	1.8	3.134
SCM-1b_2.1i	03 May, 2012 10:04	23.30	0	0.05	2.8E-3	50	.054	11.7	.839	5.2	.005	2.7	2.458
SCM-1b_3.1c	03 May, 2012 10:20	23.57	1	0.03	6.7E-4	74	.051	7.3	.395	4.4	.006	2.6	1.106
SCM-1b_4.1c	03 May, 2012 10:54	24.13	0	0.00	---	0	.049	7.7	.390	4.6	.005	1.9	1.174
SCM-1b_5.1e	03 May, 2012 11:09	24.39	0	0.02	5.5E-4	67	.052	7.4	.460	4.2	.006	2.0	1.277
SCM-1b_6.1c	03 May, 2012 11:26	24.66	0	0.14	1.4E-3	41	.046	5.4	1.406	2.3	.006	2.6	4.285
SCM-1b_7.1c	03 May, 2012 11:58	25.20	0	0.00	---	0	.052	8.5	.916	2.5	.006	1.3	2.646
SCM-1b_8.1e	03 May, 2012 12:16	25.49	0	-0.06	-1.3E-3	50	.041	8.9	.499	5.7	.005	2.7	1.483
SCM-1b_9.1c	03 May, 2012 12:31	25.75	0	0.03	4.7E-4	74	.053	6.1	.986	2.6	.006	2.2	2.862
SCM1BU-18.1I	21 Aug, 2011 00:56	1.69	0	0.17	6.9E-3	35	.052	9.0	.387	5.6	.007	2.0	1.093
SCM1BU-19.1E	21 Aug, 2011 02:21	3.10	0	-0.03	-1.3E-3	69	.049	10.2	.359	6.0	.006	2.3	.983
SCM1BU-20.1E	21 Aug, 2011 03:30	4.25	0	-0.01	-5.2E-4	71	.051	10.8	.365	5.6	.005	4.6	.999
SCM1BU-21.1E	21 Aug, 2011 04:38	5.38	1	0.00	-1.2E-4	48	.040	25.1	.311	7.6	.006	2.6	.820
SCM1BU-22.1I	21 Aug, 2011 05:28	6.22	0	0.00	7.8E-5	99	.044	7.1	.540	3.2	.006	1.4	1.544
SCM1BU-23.1C	21 Aug, 2011 06:02	6.78	0	0.20	3.7E-3	35	.048	7.7	.576	3.2	.006	2.1	1.564
SCM1BU-24.1E	21 Aug, 2011 06:52	7.63	0	0.01	1.9E-4	99	.047	8.7	.355	5.0	.006	3.1	.948
SCM1BU-25.1C	21 Aug, 2011 07:09	7.91	0	-0.17	-3.0E-3	41	.048	6.5	.878	2.6	.006	3.5	2.450

Appendix B: SHRIMP U-Pb Zircon Data, Silver Creek Caldera and Environs

Isotope Ratio Data for Samples
(errors are 1s unless otherwise specified)

SquidSampleData

Std6r38	**.067**	**Comm64**	**18.049**
UstdPpmU	**4200**	**Comm76**	**.864**
UstdConst	**13.280**	**Comm_76err**	**.005**

Spot Name	Date/Time	Hours	Pb/U const #rej	204 cts /sec	204 /206	% err	207 /206	% err	208 /206	% err	Obs 206 /238	% err	248 /254
SCM1BU-26.1E	21 Aug, 2011 02:04	2.82	0	0.13	4.7E-3	50	.043	10.2	.355	6.9	.006	2.0	1.055
SCM-30-1.1c	03 May, 2012 15:46	1.02	0	-0.08	-9.8E-3	56	.060	18.7	1.007	7.4	.005	3.9	2.752
SCM-30-10.1c	03 May, 2012 18:36	3.86	0	0.08	1.8E-3	66	.053	7.8	1.169	3.1	.006	1.9	3.452
SCM-30-2.1c	03 May, 2012 16:09	1.40	0	0.05	1.4E-3	50	.054	8.2	.908	3.6	.005	1.9	2.502
SCM-30-3.1c	03 May, 2012 16:24	1.65	0	0.05	1.6E-3	66	.050	9.4	1.102	3.7	.006	2.7	3.394
SCM-30-4.1i	03 May, 2012 16:53	2.14	0	0.00	---	0	.051	7.1	.476	4.0	.006	3.0	1.317
SCM-30-5.1i	03 May, 2012 17:08	2.39	0	0.06	1.4E-3	50	.053	7.9	.456	4.4	.006	2.9	1.270
SCM-30-6.1c	03 May, 2012 17:23	2.63	0	0.19	4.1E-3	38	.061	8.2	.794	3.4	.005	2.2	2.406
SCM-30-7.1c	03 May, 2012 17:37	2.88	0	0.18	1.7E-3	37	.057	4.6	1.135	1.9	.006	1.4	3.223
SCM-30-8.1e	03 May, 2012 18:07	3.37	0	0.00	---	0	.053	8.8	.373	5.6	.005	4.1	1.019
SCM-30-9.1i	03 May, 2012 18:22	3.62	0	0.00	---	0	.049	8.4	.499	4.4	.005	3.8	1.392
28829-23.1I	16 May, 2010 01:21	27.96	0	0.04	2.6E-3	48	.049	11.5	.465	7.9	.005	2.6	.870
BCD-1.1i	04 May, 2012 02:33	11.80	0	0.03	1.0E-3	65	.055	9.6	.528	5.3	.005	4.2	1.453
BCD-10.1i	03 May, 2012 21:16	6.52	0	0.00	---	0	.048	4.3	.441	2.4	.005	1.0	1.242
BCD-11.1c	04 May, 2012 05:15	14.51	0	-0.03	-2.5E-4	55	.046	4.6	.396	2.6	.005	1.0	1.175
BCD-12.1i	04 May, 2012 05:45	15.01	0	0.07	3.4E-4	50	.049	3.9	.379	4.6	.005	2.9	1.091
BCD-13.1e	04 May, 2012 06:00	15.26	0	0.24	1.6E-3	33	.065	3.7	.422	2.4	.006	0.9	1.061
BCD-14.1i	04 May, 2012 06:15	15.50	0	0.03	3.3E-4	67	.047	6.1	.515	3.1	.005	2.0	1.435
BCD-15.1e	04 May, 2012 06:29	15.75	0	0.15	1.5E-3	45	.051	5.0	.382	3.1	.006	1.1	1.079
BCD-2.1e	04 May, 2012 02:47	12.05	0	0.00	---	0	.055	7.9	.889	3.5	.005	3.4	2.644
BCD-3.1e	04 May, 2012 03:17	12.54	0	0.06	7.4E-4	45	.048	5.6	.422	3.1	.005	2.7	1.281
BCD-4.1e	04 May, 2012 03:32	12.79	0	0.00	---	0	.051	5.0	.381	4.0	.006	1.1	1.149
BCD-5.1i	04 May, 2012 03:47	13.03	0	0.08	2.8E-3	48	.046	10.3	.613	4.8	.006	2.2	1.678
BCD-6.1i	04 May, 2012 04:01	13.28	0	0.03	1.3E-4	73	.047	3.7	.525	1.9	.006	1.4	1.536
BCD-7.1e	04 May, 2012 04:31	13.78	0	0.03	2.1E-4	50	.048	4.1	.374	2.4	.005	1.9	1.196
BCD-8.1c	04 May, 2012 04:46	14.02	0	0.03	2.4E-4	50	.044	4.5	.408	2.5	.006	1.7	1.231
BCD-9.1e	04 May, 2012 05:00	14.26	0	0.00	---	0	.049	4.9	.431	2.7	.006	1.1	1.258
SCM-5A_1.1C	02 May, 2012 11:41	0.92	0	-0.02	-2.7E-4	55	.047	7.2	.903	2.8	.006	1.8	2.638
SCM-5A_10.1E	02 May, 2012 14:49	4.05	1	0.05	2.6E-4	50	.047	3.8	.364	2.3	.006	2.5	1.038
SCM-5A_11.1E	02 May, 2012 15:04	4.30	0	0.00	---	0	.053	7.5	.844	3.4	.006	1.9	2.513
SCM-5A_12.1E	02 May, 2012 15:19	4.55	1	0.00	---	0	.050	12.4	.626	11.4	.005	13.3	1.387
SCM-5A_13.1E	02 May, 2012 15:55	5.16	0	0.07	4.7E-4	50	.045	4.5	.690	2.0	.005	2.6	2.087
SCM-5A_14.1E	02 May, 2012 16:10	5.40	0	0.00	1.1E-5	99	.048	3.9	.375	2.3	.005	1.9	1.123
SCM-5A_15.1E	02 May, 2012 16:25	5.65	0	0.08	5.0E-4	50	.050	4.1	.364	2.5	.006	2.0	1.051
SCM-5A_16.1E	02 May, 2012 16:39	5.89	0	0.11	6.6E-3	45	.051	12.4	.562	6.5	.004	2.8	1.494
SCM-5A_17.1E	02 May, 2012 17:16	6.50	0	0.05	5.4E-4	50	.047	5.5	.806	2.8	.006	1.2	2.308
SCM-5A_18.1E	02 May, 2012 17:30	6.74	0	0.02	1.4E-3	66	.040	15.4	.614	6.1	.006	2.7	1.861
SCM-5A_2.1E	02 May, 2012 11:57	1.18	0	0.16	9.4E-4	38	.047	4.1	.390	2.4	.005	2.3	1.155
SCM-5A_3.1E	02 May, 2012 12:12	1.44	0	0.00	---	0	.054	10.9	.786	5.1	.005	2.5	2.315
SCM-5A_4.1E	02 May, 2012 12:27	1.69	0	0.04	2.4E-4	99	.046	4.0	.276	2.7	.006	2.6	.819
SCM-5A_5.1E	02 May, 2012 13:13	2.45	0	0.00	---	0	.051	8.0	.535	4.3	.005	4.3	1.759
SCM-5A_6.1E	02 May, 2012 13:28	2.70	0	-0.03	-2.4E-4	84	.045	4.5	.409	2.5	.006	1.7	1.223
SCM-5A_7.1E	02 May, 2012 13:43	2.94	0	0.00	---	0	.048	5.9	.262	4.1	.006	2.4	.800
SCM-5A_8.1E	02 May, 2012 13:57	3.19	0	0.59	7.1E-3	30	.147	8.8	.620	5.9	.006	3.1	1.153
SCM-5A_9.1E	02 May, 2012 14:29	3.72	0	-0.04	-2.0E-4	50	.048	3.6	.428	2.0	.005	2.2	1.252
28828-15.1E	16 May, 2010 04:15	30.87	0	0.10	9.0E-4	41	.055	4.7	.305	2.8	.005	1.0	.830
28828-4.4R	16 May, 2010 05:20	31.96	0	0.25	2.4E-3	32	.062	4.1	.625	2.2	.005	2.1	1.718
28828-9.2I	16 May, 2010 08:14	34.86	0	0.00	---	0	.048	7.7	.354	6.9	.006	1.7	.925

Appendix B: SHRIMP U-Pb Zircon Data, Silver Creek Caldera and Environs

Isotope Ratio Data for Samples
(errors are 1s unless otherwise specified)

SquidSampleData

Std6r38	**.067**	**Comm64**	**18.049**
UstdPpmU	**4200**	**Comm76**	**.864**
UstdConst	**13.280**	**Comm_76err**	**.005**

Spot Name	Date/Time	Hours	Pb/U const #rej	204 cts /sec	204 /206	% err	207 /206	% err	208 /206	% err	Obs 206 /238	% err	248 /254
28828-16.1T	16 May, 2010 11:09	37.76	0	0.00	---	0	.048	3.2	.417	1.6	.006	1.8	1.158
28828-17.1T	16 May, 2010 11:30	38.13	0	0.23	8.1E-3	32	.049	8.5	.711	4.0	.005	2.3	1.869
SIT-2-1.1c	04 May, 2012 06:59	16.24	0	0.12	1.8E-3	41	.045	6.7	.439	3.5	.005	3.9	1.252
SIT-2-15.1i	03 May, 2012 20:50	6.09	0	0.07	2.2E-3	45	.047	9.1	.451	4.8	.005	1.9	1.265
SIT-2-2.1e	04 May, 2012 07:14	16.49	0	0.08	2.5E-3	47	.049	9.2	.664	4.4	.005	2.4	1.912
SIT-2-3.1e	04 May, 2012 07:28	16.73	0	0.05	6.2E-4	50	.046	6.0	.511	3.0	.005	1.3	1.525
SIT-2-4.1e	04 May, 2012 07:43	16.98	0	0.00	---	0	.052	8.3	.452	7.1	.005	1.9	1.167
SIT-2-5.1c	03 May, 2012 20:24	5.65	0	0.07	3.1E-3	62	.056	10.2	.573	6.9	.006	2.4	1.798

Appendix B: SHRIMP U-Pb Zircon Data, Silver Creek Caldera and Environs

Isotope Ratio Data for Samples
(errors are 1s unless otherwise speci

Comm86	**2.097**
Comm86err	**0.050**
Comm64err	**0.50**

Spot Name	**% err**	**254 /238**	**% err**	**238 /196**	**Pb/U: UO/U^2**	**% err**	**% comm 206**	**ppm U**	**ppm Th**	**232Th /238U**	**Ln UO/U**	**Ln Pb/U**	**Corr 206 /238**	**% err**	**ppm Rad 206Pb**
SCM-34_9.1c	0.2	4.99	0.3	.356	.00021	1.9	1.18	288	411	1.47	1.608	-5.258	.003	1.9	0.7
SCM-34-1.1c	1.2	5.07	1.6	.216	.00020	2.4	4.96	176	506	2.97	1.624	-5.308	.003	2.4	0.4
SCM-34-11.1c	0.3	5.21	0.4	.234	.00020	2.3	0.00	195	421	2.23	1.651	-5.195	.003	2.3	0.5
SCM-34-14.1c	0.4	5.15	0.4	.213	.00021	2.3	1.77	176	504	2.96	1.639	-5.205	.003	2.3	0.5
SCM-34-15.1c	0.9	5.58	0.8	.658	.02162	0.4	0.01	573	129	0.23	1.720	-0.392	.306	0.4	150.5
SCM-34-16.1c	0.3	5.14	0.4	.258	.00020	2.5	1.53	213	493	2.39	1.638	-5.233	.003	2.5	0.5
SCM-34-2.1c	0.3	4.99	0.4	.322	.00021	2.0	1.28	260	388	1.54	1.607	-5.266	.003	2.0	0.7
SCM-34-3.1c	3.3	5.06	0.6	.467	.01989	0.4	0.00	382	186	0.50	1.622	-0.669	.281	0.4	92.2
SCM-34-4.1c	0.3	5.34	0.4	.234	.00029	1.9	26.10	198	319	1.66	1.676	-5.089	.004	1.9	0.7
SCM-34-6.1c	0.4	5.10	0.4	.290	.00021	2.0	3.07	238	619	2.69	1.628	-5.248	.003	2.0	0.6
SCM-34-10.1i	0.7	5.04	1.1	.735	.00023	1.3	2.98	598	1339	2.31	1.617	-5.166	.003	1.3	1.7
SCM-34-12.1i	1.7	5.33	0.6	.138	.00022	2.7	0.00	117	205	1.81	1.674	-5.077	.003	2.7	0.3
SCM-34-13.1i	0.2	5.25	0.3	.422	.00021	1.6	0.88	353	1057	3.10	1.658	-5.182	.003	1.6	0.9
SCM-34-5.1i	0.8	5.11	0.5	.187	.00021	2.5	2.04	153	324	2.18	1.631	-5.245	.003	2.5	0.4
SCM-34-7.1i	0.3	5.03	0.3	.364	.00021	1.8	1.16	296	396	1.38	1.615	-5.228	.003	1.8	0.8
SCM-34-8.1i	0.3	5.32	0.4	.288	.00022	2.0	2.08	243	404	1.72	1.671	-5.103	.003	2.0	0.6
MP1-1.1	0.7	5.13	0.6	.108	.00021	2.9	0.00	100	164	1.69	1.635	-5.176	.003	2.9	0.3
MP1-15.1c	0.4	5.12	0.5	.163	.02068	0.8	0.07	152	105	0.72	1.634	-0.609	.287	0.8	37.4
MP1-2.1c	0.5	4.84	0.8	.473	.00021	1.5	0.00	423	593	1.45	1.577	-5.326	.003	1.5	1.0
MP1-3.1c	0.4	5.00	0.5	.654	.01796	0.3	-0.02	599	300	0.52	1.610	-0.793	.249	0.3	128.2
MP1-4.1c	0.5	5.51	0.9	.216	.00022	2.0	0.00	211	488	2.39	1.707	-5.029	.003	2.0	0.5
MP1-8.1c	0.2	5.18	0.4	.444	.00021	1.5	-1.12	416	1133	2.81	1.645	-5.191	.003	1.5	1.0
MP1-10.1t	0.5	5.02	1.1	.263	.00022	2.0	0.00	242	287	1.23	1.614	-5.179	.003	2.0	0.6
MP1U-21.1E	0.5	5.10	0.6	.080	.00021	3.5	1.39	64	91	1.48	1.630	-5.838	.003	3.5	0.2
MP1U-21.2E	0.4	5.48	0.9	.076	.00021	3.1	-0.08	63	92	1.50	1.701	-5.384	.003	3.1	0.2
MP1-11.1i	0.4	5.24	0.4	.199	.00023	2.1	1.50	188	144	0.79	1.655	-5.073	.003	2.1	0.5
MP1-12.1i	0.6	5.17	0.5	.456	.02119	0.4	0.00	426	304	0.74	1.642	-0.565	.294	0.4	107.7
MP1-13.1	0.4	4.95	1.0	1.092	.01964	0.3	-0.01	992	340	0.35	1.599	-0.735	.273	0.3	232.3
MP1-14.1i	1.1	5.30	0.3	.558	.00023	1.3	1.95	530	824	1.61	1.667	-5.070	.003	1.3	1.4
MP1-16.1i	0.4	5.10	0.5	.140	.00021	2.9	-7.52	130	172	1.36	1.629	-5.119	.003	2.9	0.3
MP1-5.1	1.0	5.06	0.5	.143	.02025	0.7	0.00	132	95	0.75	1.622	-0.652	.281	0.7	31.8
MP1-6.1i	0.5	5.08	0.7	.302	.00021	1.8	2.26	279	364	1.35	1.626	-5.230	.003	1.8	0.7
MP1-7.1i	1.0	5.02	0.5	.251	.00021	2.0	1.29	231	396	1.78	1.613	-5.227	.003	2.0	0.6
MP1-9.1i	0.2	5.08	0.4	.932	.01938	0.3	0.02	861	572	0.69	1.626	-0.691	.269	0.3	199.2
MP1U-16.1I	0.6	5.46	0.5	.138	.00019	2.4	0.69	115	224	2.02	1.697	-5.305	.003	2.4	0.3
MP1U-19.1I	0.8	4.85	2.1	.251	.01883	0.6	1.10	192	84	0.45	1.579	-0.781	.263	0.6	43.4
MP1U-20.1I	3.0	5.32	0.7	.054	.00021	3.7	1.12	44	66	1.54	1.671	-5.380	.003	3.7	0.1
MP1U-22.1I	0.3	5.52	2.9	.199	.00021	2.2	0.53	166	383	2.39	1.708	-5.083	.003	2.2	0.4
MP1U-23.1I	0.5	5.52	0.6	.073	.00021	3.2	-0.18	61	94	1.59	1.709	-5.098	.003	3.2	0.2
MP1U-24.1I	0.4	5.39	0.6	.067	.00021	3.2	1.57	55	80	1.50	1.684	-5.433	.003	3.2	0.1
MP1U-25.1I	0.6	5.34	0.7	.048	.00022	3.8	0.16	39	53	1.41	1.675	-5.905	.003	3.8	0.1
SCM-6_1.1E	0.9	5.08	1.3	.018	.00020	7.3	-57.02	17	27	1.68	1.626	-4.820	.003	7.3	0.0
SCM-6_2.1C	0.2	5.15	0.2	.596	.00021	1.2	1.10	556	991	1.84	1.639	-5.208	.003	1.2	1.4
SCM-6_3.1C	0.2	4.92	0.4	.413	.00020	1.6	-0.62	374	594	1.64	1.593	-5.297	.003	1.6	0.9
SCM-6_4.1C	0.3	5.22	0.5	.120	.00021	2.7	9.76	113	268	2.46	1.652	-5.271	.003	2.7	0.3
SCM-6_6.1C	0.8	4.92	0.9	.744	.00021	1.1	1.82	673	1179	1.81	1.593	-5.300	.003	1.1	1.7
SCM-6-12.1i	0.2	5.12	0.3	.712	.02006	0.4	0.00	662	235	0.37	1.634	-0.645	.278	0.4	158.3
SCM-6-2.1t	0.7	5.27	0.6	.139	.00020	2.6	-2.57	132	282	2.21	1.661	-5.166	.003	2.6	0.3

Appendix B: SHRIMP U-Pb Zircon Data, Silver Creek Caldera and Environs

Isotope Ratio Data for Samples
(errors are 1s unless otherwise speci

Comm86	**2.097**
Comm86err	**0.050**
Comm64err	**0.50**

Spot Name	% err	254 /238	% err	238 /196	Pb/U: UO/U^2	% err	% comm 206	ppm U	ppm Th	232Th /238U	Ln UO/U	Ln Pb/U	Corr 206 /238	% err	ppm Rad 206Pb
SCM-6-3.1c	0.3	5.10	0.4	.229	.00020	2.1	3.52	213	498	2.42	1.630	-5.279	.003	2.1	0.5
SCM6U-19.1I	0.5	5.50	1.1	.063	.00022	3.3	1.61	53	80	1.56	1.705	-4.882	.003	3.3	0.1
SCM6U-20.1I	0.3	5.48	0.7	.507	.00021	1.2	0.89	421	798	1.96	1.701	-5.092	.003	1.2	1.0
SCM6U-22.1E	1.7	5.41	0.7	.076	.00021	3.0	-0.13	63	119	1.97	1.688	-5.305	.003	3.0	0.2
SCM6U-23.1E	1.3	5.65	0.5	.187	.00021	1.8	0.15	159	110	0.72	1.731	-5.094	.003	1.8	0.4
TIP1-1.1c	0.5	5.19	0.3	.620	.00021	1.3	0.60	581	1517	2.70	1.646	-5.173	.003	1.3	1.5
TIP1-15.1c	2.1	5.15	0.4	.264	.00021	2.0	9.16	247	766	3.21	1.639	-5.262	.003	2.0	0.6
TIP1-21.1c	0.4	5.00	1.1	.099	.00019	3.5	11.03	90	229	2.61	1.610	-5.461	.003	3.5	0.2
TIP1-3.1c	0.5	5.20	0.5	.178	.00021	2.5	-6.28	167	542	3.35	1.649	-5.097	.003	2.5	0.4
TIP1-5.1c	0.3	5.21	0.5	.133	.00021	2.7	6.91	125	389	3.21	1.651	-5.219	.003	2.7	0.3
TIP1-7.1c	0.5	5.07	0.9	.723	.00021	1.2	0.00	667	2574	3.99	1.623	-5.232	.003	1.2	1.6
TIP-1-9.1c	1.6	5.22	0.6	1.288	.00021	0.9	1.07	1212	4673	3.98	1.652	-5.183	.003	0.9	3.0
TIP1U-23.1CI	0.2	5.34	0.6	.499	.00020	1.3	0.43	408	683	1.73	1.676	-5.169	.003	1.3	1.0
TIP1-10.1i	0.5	5.08	0.6	.092	.00020	3.5	2.32	85	192	2.34	1.624	-5.305	.003	3.5	0.2
TIP1-12.1i	0.3	5.09	1.2	.151	.00020	2.7	2.39	140	257	1.90	1.627	-5.258	.003	2.7	0.3
TIP1-13.1i	0.5	4.78	1.8	.688	.00020	1.5	2.46	611	2030	3.43	1.565	-5.375	.003	1.5	1.5
TIP1-14.1i	0.3	5.21	0.4	.212	.00021	2.2	5.02	199	473	2.45	1.650	-5.228	.003	2.2	0.5
TIP1-16.1i	0.3	5.12	0.7	.421	.00020	1.7	-0.71	391	596	1.58	1.633	-5.239	.003	1.7	0.9
TIP-1-17.1i	0.4	5.11	0.4	.424	.00021	1.5	2.89	394	842	2.21	1.632	-5.246	.003	1.5	1.0
TIP1-19.1i	0.3	5.16	0.4	.231	.00020	2.2	-6.77	216	1004	4.81	1.641	-5.162	.003	2.2	0.5
TIP1-2.1i	0.6	5.14	0.4	.550	.00021	1.4	0.56	512	1075	2.17	1.637	-5.195	.003	1.4	1.3
TIP1-20.1i	0.5	5.24	0.4	.304	.00021	1.9	7.07	287	850	3.07	1.656	-5.210	.003	1.9	0.7
TIP1-4.1i	0.3	5.13	0.7	.152	.00020	2.6	0.00	142	356	2.59	1.635	-5.243	.003	2.6	0.3
TIP1-8.1i	0.3	5.12	0.5	.250	.00020	2.1	1.35	232	479	2.14	1.633	-5.240	.003	2.1	0.6
TIP1U-24.1I	0.4	5.47	0.4	.712	.00020	1.0	-0.11	591	1666	2.91	1.700	-5.128	.003	1.0	1.4
TIP1-11.1e	0.2	5.08	0.3	.404	.00021	1.6	1.42	373	526	1.45	1.626	-5.211	.003	1.6	0.9
TIP1-18.1e	0.3	5.16	0.4	.226	.00020	2.5	10.48	211	251	1.23	1.641	-5.312	.003	2.5	0.5
TIP1-22.1e	0.4	5.10	0.4	.269	.00021	2.0	3.54	249	389	1.61	1.630	-5.223	.003	2.0	0.6
TIP1-6.1e	0.2	4.89	1.0	.435	.00020	1.7	-4.48	392	1144	3.01	1.587	-5.293	.003	1.7	0.9
TIP1U-22.1e	0.8	5.27	0.4	.250	.00020	1.9	0.94	202	297	1.52	1.661	-5.420	.003	1.9	0.5
SCM-1b_1.1e	0.3	4.86	0.6	.210	.00021	2.4	2.64	188	175	0.96	1.582	-5.318	.003	2.4	0.5
SCM-1b_10.1c	0.2	5.03	0.7	.500	.00021	1.5	-3.25	459	1500	3.37	1.616	-5.212	.003	1.5	1.1
SCM-1b_2.1i	0.3	5.10	0.9	.153	.00020	2.7	5.01	142	365	2.65	1.629	-5.289	.003	2.7	0.3
SCM-1b_3.1c	0.6	5.12	0.3	.389	.00021	1.9	1.21	361	418	1.20	1.633	-5.193	.003	1.9	0.9
SCM-1b_4.1c	1.3	4.97	0.5	.373	.00021	1.8	0.00	339	414	1.26	1.603	-5.241	.003	1.8	0.9
SCM-1b_5.1e	0.4	5.19	0.6	.347	.00021	1.7	0.99	325	436	1.38	1.646	-5.161	.003	1.7	0.8
SCM-1b_6.1c	1.2	5.18	0.7	.900	.00020	1.2	2.55	843	3784	4.64	1.644	-5.226	.003	1.2	2.1
SCM-1b_7.1c	0.6	5.28	0.3	.622	.00021	1.3	0.00	590	1644	2.88	1.665	-5.125	.003	1.3	1.5
SCM-1b_8.1e	0.2	5.14	0.3	.371	.00021	1.8	-2.43	346	537	1.60	1.638	-5.183	.003	1.8	0.9
SCM-1b_9.1c	1.9	5.22	0.4	.561	.00021	1.4	0.85	527	1585	3.10	1.652	-5.173	.003	1.4	1.3
SCM1BU-18.1I	0.7	5.73	1.3	.292	.00020	2.1	0.75	271	317	1.21	1.745	-5.146	.003	2.1	0.7
SCM1BU-19.1E	1.7	5.58	0.6	.222	.00020	2.1	0.35	202	212	1.08	1.718	-5.041	.003	2.1	0.5
SCM1BU-20.1E	0.7	5.19	1.2	.266	.00020	2.0	0.61	232	243	1.08	1.647	-5.210	.003	2.0	0.6
SCM1BU-21.1E	0.8	5.51	0.8	.188	.00019	3.0	-0.83	170	148	0.90	1.707	-5.108	.003	3.0	0.4
SCM1BU-22.1I	0.4	5.61	0.4	.429	.00020	1.4	-0.36	393	648	1.70	1.725	-5.076	.003	1.4	1.0
SCM1BU-23.1C	0.4	5.45	0.7	.438	.00020	1.4	0.21	393	652	1.71	1.695	-5.216	.003	1.4	0.9
SCM1BU-24.1E	0.5	5.29	0.8	.224	.00020	1.8	0.13	197	197	1.03	1.665	-5.174	.003	1.8	0.5
SCM1BU-25.1C	0.2	5.46	1.2	.432	.00020	1.3	0.15	388	1009	2.68	1.698	-5.068	.003	1.3	0.9

Appendix B: SHRIMP U-Pb Zircon Data, Silver Creek Caldera and Environs

Isotope Ratio Data for Samples	**Comm86**	**2.097**
(errors are 1s unless otherwise speci	**Comm86err**	**0.050**
	Comm64err	**0.50**

Spot Name	**% err**	**254 /238**	**% err**	**238 /196**	**Pb/U: UO/U^2**	**% err**	**% comm 206**	**ppm U**	**ppm Th**	**232Th /238U**	**Ln UO/U**	**Ln Pb/U**	**Corr 206 /238**	**% err**	**ppm Rad 206Pb**
SCM1BU-26.1E	0.7	5.46	0.4	.238	.00020	2.0	-0.45	214	239	1.16	1.697	-5.199	.003	2.0	0.5
SCM-30-1.1c	0.9	4.95	0.8	.071	.00021	4.0	-17.75	57	164	2.95	1.600	-5.108	.003	4.0	0.1
SCM-30-10.1c	0.4	5.20	0.3	.380	.00020	1.8	3.29	316	1144	3.74	1.649	-5.228	.003	1.8	0.8
SCM-30-2.1c	0.2	5.21	0.4	.319	.00020	1.9	2.55	265	696	2.71	1.650	-5.263	.003	1.9	0.6
SCM-30-3.1c	0.3	5.40	0.9	.254	.00021	2.1	2.95	216	777	3.71	1.686	-5.135	.003	2.1	0.5
SCM-30-4.1i	0.6	5.20	0.3	.437	.00021	1.6	0.00	363	502	1.43	1.649	-5.161	.003	1.6	0.9
SCM-30-5.1i	0.2	5.16	0.3	.366	.00021	1.8	2.52	302	402	1.37	1.641	-5.199	.003	1.8	0.8
SCM-30-6.1c	0.6	5.11	0.4	.440	.00020	1.7	7.43	361	909	2.60	1.632	-5.325	.003	1.7	0.9
SCM-30-7.1c	0.6	5.42	0.2	.897	.00022	1.1	3.05	767	2617	3.53	1.691	-5.070	.003	1.1	2.0
SCM-30-8.1e	0.9	5.09	0.5	.283	.00020	2.1	0.00	232	247	1.10	1.626	-5.250	.003	2.1	0.6
SCM-30-9.1i	0.2	5.07	0.8	.353	.00019	1.9	0.00	289	419	1.50	1.623	-5.286	.003	1.9	0.7
28829-23.1I	3.6	4.94	0.5	.120	.00021	2.6	4.75	102	87	0.89	1.598	-5.302	.003	2.6	0.3
BCD-1.1i	0.3	5.13	0.8	.228	.00020	2.3	1.86	188	285	1.57	1.635	-5.244	.003	2.3	0.5
BCD-10.1i	0.4	5.16	0.2	1.391	.00021	0.9	0.00	1151	1497	1.34	1.641	-5.207	.003	0.9	2.9
BCD-11.1c	0.5	5.17	0.2	1.280	.00021	1.0	-0.45	1061	1306	1.27	1.643	-5.199	.003	1.0	2.6
BCD-12.1i	0.5	5.18	1.2	1.571	.00020	1.0	0.61	1303	1490	1.18	1.645	-5.250	.003	1.0	3.2
BCD-13.1e	0.3	5.18	0.4	1.125	.00022	1.0	2.98	932	1037	1.15	1.644	-5.149	.003	1.0	2.5
BCD-14.1i	0.9	5.25	0.8	.515	.00020	1.3	0.60	431	649	1.56	1.658	-5.211	.003	1.3	1.0
BCD-15.1e	0.4	5.28	0.2	.668	.00020	1.1	2.65	561	637	1.17	1.664	-5.219	.003	1.1	1.4
BCD-2.1e	0.5	5.08	0.8	.388	.00019	1.8	0.00	318	877	2.85	1.625	-5.312	.003	1.8	0.7
BCD-3.1e	0.2	5.06	0.5	.832	.00020	1.2	1.34	679	908	1.38	1.621	-5.299	.003	1.2	1.6
BCD-4.1e	0.2	5.33	0.2	.850	.00021	1.1	0.00	718	871	1.25	1.673	-5.119	.003	1.1	1.8
BCD-5.1i	0.3	5.29	0.4	.230	.00021	2.2	5.00	193	341	1.83	1.665	-5.191	.003	2.2	0.5
BCD-6.1i	0.4	5.25	0.3	1.819	.00021	0.8	0.23	1522	2458	1.67	1.658	-5.163	.003	0.8	3.8
BCD-7.1e	0.3	5.14	0.2	1.529	.00021	0.9	0.37	1261	1577	1.29	1.636	-5.209	.003	0.9	3.2
BCD-8.1c	0.1	5.33	0.2	1.309	.00020	1.0	0.43	1107	1437	1.34	1.673	-5.168	.003	1.0	2.7
BCD-9.1e	0.4	5.39	0.2	.982	.00021	1.1	0.00	836	1112	1.37	1.684	-5.134	.003	1.1	2.1
SCM-5A_1.1C	0.2	5.23	0.3	.431	.00020	1.5	-0.49	406	1125	2.86	1.654	-5.180	.003	1.5	1.0
SCM-5A_10.1E	0.3	5.25	0.5	1.555	.00021	1.0	0.47	1468	1602	1.13	1.657	-5.113	.003	1.0	3.8
SCM-5A_11.1E	0.9	5.19	0.4	.357	.00021	1.8	0.00	335	882	2.72	1.646	-5.165	.003	1.8	0.8
SCM-5A_12.1E	1.1	5.38	1.2	.224	.00021	3.9	0.00	215	315	1.51	1.682	-5.288	.003	3.9	0.5
SCM-5A_13.1E	0.8	4.93	0.9	.963	.00019	1.0	0.84	872	1888	2.24	1.594	-5.358	.003	1.0	2.0
SCM-5A_14.1E	0.2	5.12	0.7	1.148	.00020	0.9	0.02	1067	1253	1.21	1.633	-5.254	.003	0.9	2.5
SCM-5A_15.1E	0.3	5.49	0.3	.866	.00021	0.9	0.90	843	940	1.15	1.704	-5.086	.003	0.9	2.1
SCM-5A_16.1E	0.3	4.82	0.8	.125	.00018	2.8	11.99	112	173	1.59	1.572	-5.594	.003	2.8	0.2
SCM-5A_17.1E	0.6	5.40	0.3	.611	.00021	1.2	0.98	589	1438	2.52	1.687	-5.123	.003	1.2	1.4
SCM-5A_18.1E	0.3	5.13	0.6	.110	.00021	2.8	2.56	102	199	2.01	1.635	-5.221	.003	2.8	0.3
SCM-5A_2.1E	0.2	5.05	0.9	1.289	.00021	0.9	1.70	1188	1430	1.24	1.620	-5.259	.003	0.9	2.9
SCM-5A_3.1E	0.3	5.06	0.5	.158	.00020	2.6	0.00	146	353	2.49	1.621	-5.262	.003	2.6	0.4
SCM-5A_4.1E	0.2	5.27	0.5	1.362	.00020	0.9	0.43	1290	1111	0.89	1.662	-5.196	.003	0.9	3.1
SCM-5A_5.1E	0.7	5.02	0.7	.314	.00020	1.9	0.00	288	527	1.89	1.613	-5.265	.003	1.9	0.7
SCM-5A_6.1E	0.2	5.22	0.3	1.149	.00021	1.0	-0.43	1081	1389	1.33	1.653	-5.172	.003	1.0	2.7
SCM-5A_7.1E	0.3	5.14	0.6	.618	.00021	1.3	0.00	576	482	0.86	1.637	-5.167	.003	1.3	1.5
SCM-5A_8.1E	0.2	5.00	0.6	.573	.00024	1.3	12.83	525	629	1.24	1.610	-5.260	.003	1.3	1.5
SCM-5A_9.1E	0.1	5.10	0.4	1.780	.00020	0.8	-0.35	1650	2159	1.35	1.630	-5.247	.003	0.8	3.9
28828-15.1E	0.4	5.04	0.2	1.074	.00021	1.0	1.62	922	758	0.85	1.617	-5.238	.003	1.0	2.3
28828-4.4R	0.2	4.96	0.6	.847	.00021	1.0	4.41	719	1221	1.75	1.601	-5.290	.003	1.0	1.8
28828-9.2I	0.3	5.07	0.6	.264	.00021	1.7	0.00	227	208	0.95	1.622	-5.175	.003	1.7	0.6

Appendix B: SHRIMP U-Pb Zircon Data, Silver Creek Caldera and Environs

Isotope Ratio Data for Samples	**Comm86**	**2.097**
(errors are 1s unless otherwise speci	**Comm86err**	**0.050**
	Comm64err	**0.50**

Spot Name	**% err**	**254 /238**	**% err**	**238 /196**	**Pb/U: UO/U^2**	**% err**	**% comm 206**	**ppm U**	**ppm Th**	**232Th /238U**	**Ln UO/U**	**Ln Pb/U**	**Corr 206 /238**	**% err**	**ppm Rad 206Pb**
28828-16.1T	0.1	5.19	0.2	1.902	.00021	0.6	0.00	1664	1919	1.19	1.646	-5.174	.003	0.6	4.1
28828-17.1T	0.2	5.11	0.4	.202	.00020	1.9	14.57	175	325	1.92	1.631	-5.393	.003	1.9	0.4
SIT-2-1.1c	0.2	4.95	0.7	.502	.00019	1.4	3.27	404	525	1.34	1.599	-5.377	.003	1.4	0.9
SIT-2-15.1i	0.3	5.24	0.8	.308	.00019	2.0	3.90	258	343	1.37	1.657	-5.271	.003	2.0	0.6
SIT-2-2.1e	0.3	5.35	0.4	.220	.00019	2.1	4.47	186	376	2.09	1.677	-5.281	.003	2.1	0.4
SIT-2-3.1e	0.7	5.10	0.7	.626	.00020	1.3	1.12	514	819	1.65	1.630	-5.283	.003	1.3	1.2
SIT-2-4.1e	0.5	5.12	0.5	.299	.00019	1.9	0.00	246	301	1.26	1.633	-5.310	.003	1.9	0.6
SIT-2-5.1c	0.3	5.30	0.5	.192	.00020	2.4	5.52	162	307	1.96	1.668	-5.233	.003	2.4	0.4

Appendix B: SHRIMP U-Pb Zircon Data, Silver Creek Caldera and Environs

Isotope Ratio Data for Samples
(errors are 1s unless otherwise speci

Spot Name	Total 208Pb /232Th	% err	204corr 206Pb /238U Age	1s err	207corr 206Pb /238U Age	1s err	208corr 206Pb /238U Age	1s err	204corr 207Pb /206Pb Age	1s err	204corr 208Pb /232Th Age	1s err	% Dis- cor- dant
SCM-34_9.1c	.0010	4.8	18.9	0.4	**18.9**	**0.4**	18.9	0.5	143	382	19	1	657
SCM-34-1.1c	.0009	5.2	17.4	0.6	**18.2**	**0.4**	18.7	1.1			16	1	
SCM-34-11.1c	.0008	5.5	18.5	0.4	**18.4**	**0.4**	19.4	0.8	210	232	17	1	1035
SCM-34-14.1c	.0009	5.0	19.1	0.5	**19.5**	**0.5**	20.0	1.1	-1001	1043	18	1	-5330
SCM-34-15.1c	.0774	2.8	1718.6	6.2	**1730.3**	**7.1**	1725.2	6.5	1625	10	1500	40	-5
SCM-34-16.1c	.0008	5.1	17.7	0.5	**17.9**	**0.5**	18.4	0.9	-680	774	16	1	-3947
SCM-34-2.1c	.0010	4.9	18.8	0.4	**19.1**	**0.4**	18.5	0.6	-777	676	20	1	-4234
SCM-34-3.1c	.0758	5.8	1596.7	6.2	**1587.4**	**6.9**	1605.0	8.7	1680	10	1476	70	5
SCM-34-4.1c	.0030	5.0	19.6	1.5	**19.0**	**0.6**	15.2	1.3	914	1790	33	6	4562
SCM-34-6.1c	.0009	4.4	18.3	0.6	**18.9**	**0.4**	19.0	0.9			17	1	
SCM-34-10.1i	.0012	2.8	20.3	0.3	**19.7**	**0.3**	18.7	0.6	910	298	23	1	4389
SCM-34-12.1i	.0009	7.0	19.8	0.5	**19.7**	**0.6**	20.2	0.9	172	280	19	1	770
SCM-34-13.1i	.0009	3.5	18.5	0.3	**18.8**	**0.3**	19.1	0.8	-787	494	18	1	-4345
SCM-34-5.1i	.0010	5.7	18.3	0.5	**18.6**	**0.5**	18.0	0.9	-929	1135	19	1	-5181
SCM-34-7.1i	.0009	5.0	19.0	0.4	**19.3**	**0.4**	19.3	0.5	-576	554	18	1	-3125
SCM-34-8.1i	.0010	5.0	19.5	0.5	**19.8**	**0.4**	20.1	0.6	-669	995	18	1	-3531
MP1-1.1	.0010	7.2	19.2	0.6	**18.8**	**0.6**	19.0	0.9	670	248	19	1	3399
MP1-15.1c	.0822	1.7	1626.5	11.4	**1618.9**	**12.8**	1630.6	12.9	1692	15	1586	27	4
MP1-2.1c	.0009	3.9	18.4	0.3	**18.4**	**0.3**	18.6	0.4	-105	176	18	1	-671
MP1-3.1c	.0719	0.7	1435.3	4.5	**1413.1**	**4.9**	1437.3	4.9	1674	8	1407	10	17
MP1-4.1c	.0009	4.6	19.3	0.4	**19.2**	**0.4**	20.0	0.8	162	211	18	1	739
MP1-8.1c	.0009	3.3	18.6	0.3	**18.4**	**0.3**	18.9	0.7	437	223	18	1	2247
MP1-10.1t	.0010	5.6	19.8	0.4	**19.7**	**0.4**	19.7	0.5	140	300	20	1	609
MP1U-21.1E	.0013	8.1	9.7	3.6	**18.2**	**0.7**	16.0	16.0					
MP1U-21.2E	.0011	7.6	13.4	2.1	**18.6**	**0.6**	17.6	17.6					
MP1-11.1i	.0010	7.1	20.4	0.5	**20.6**	**0.5**	20.7	0.5	-687	779	18	2	-3474
MP1-12.1i	.0854	1.6	1662.5	6.1	**1661.1**	**6.9**	1663.0	7.2	1674	9	1657	24	1
MP1-13.1	.0766	0.7	1554.5	4.4	**1547.5**	**4.8**	1557.4	4.6	1622	6	1495	9	4
MP1-14.1i	.0009	3.6	19.9	0.3	**20.3**	**0.3**	20.8	0.4	-1009	829	17	1	-5160
MP1-16.1i	.0010	7.8	20.5	1.1	**18.7**	**0.6**	18.9	0.8	1901	535	27	5	9171
MP1-5.1	.0821	2.0	1597.2	10.4	**1587.2**	**11.6**	1597.3	12.0	1687	16	1596	28	6
MP1-6.1i	.0010	4.8	18.4	0.5	**18.7**	**0.4**	18.4	0.5	-680	1334	19	2	-3786
MP1-7.1i	.0009	5.1	18.9	0.4	**19.2**	**0.4**	19.3	0.6	-690	656	18	1	-3743
MP1-9.1i	.0777	0.7	1536.2	4.6	**1520.8**	**5.0**	1538.6	5.1	1684	6	1511	10	10
MP1U-16.1I	.0010	5.4	14.8	0.9	**17.3**	**0.4**	16.4	16.4			11	3	
MP1U-19.1I	.0886	2.2	1502.9	7.7	**1489.1**	**8.3**	1491.3	1491.3	1659	12	1699	36	10
MP1U-20.1I	.0014	10.6	14.4	2.0	**18.4**	**0.7**	15.8	15.8			10	8	
MP1U-22.1I	.0010	4.8	18.6	0.4	**18.6**	**0.4**	18.1	18.1	211	238	20	1	1034
MP1U-23.1I	.0010	8.3	18.0	0.7	**18.5**	**0.6**	18.0	18.0			18	2	
MP1U-24.1I	.0013	7.6	13.2	2.8	**19.0**	**0.7**	17.3	17.3					
MP1U-25.1I	.0011	9.8	8.2	4.2	**19.4**	**0.8**	18.6	18.6			0	0	
SCM-6_1.1E	.0010	17.9	27.7	5.4	**18.1**	**1.4**	16.6	2.1	3617	458	60	23	12980
SCM-6_2.1C	.0010	2.9	18.4	0.2	**18.6**	**0.2**	18.2	0.4	-641	405	19	1	-3590
SCM-6_3.1C	.0009	3.9	18.4	0.3	**18.2**	**0.3**	18.1	0.5	384	249	19	1	1989
SCM-6_4.1C	.0010	6.3	16.9	0.9	**18.9**	**0.5**	18.4	1.1			14	2	
SCM-6_6.1C	.0009	3.3	18.3	0.3	**18.6**	**0.2**	18.9	0.4	-820	622	17	1	-4577
SCM-6-12.1i	.0793	1.5	1583.7	5.0	**1574.5**	**5.8**	1585.7	5.4	1668	17	1543	23	5
SCM-6-2.1t	.0010	5.7	18.3	0.5	**17.7**	**0.5**	17.1	0.9	973	392	21	1	5228

Appendix B: SHRIMP U-Pb Zircon Data, Silver Creek Caldera and Environs

Isotope Ratio Data for Samples
(errors are 1s unless otherwise speci

Spot Name	**Total 208Pb /232Th**	**% err**	**204corr 206Pb /238U Age**	**1s err**	**207corr 206Pb /238U Age**	**1s err**	**208corr 206Pb /238U Age**	**1s err**	**204corr 207Pb /206Pb Age**	**1s err**	**204corr 208Pb /232Th Age**	**1s err**	**% Dis- cor- dant**
SCM-6-3.1c	.0009	4.6	17.4	0.5	**17.9**	**0.4**	17.4	0.8			17	1	
SCM6U-19.1I	.0010	8.7	22.3	1.4	**19.2**	**0.7**	19.6	19.6	2423	425	31	6	10760
SCM6U-20.1I	.0009	2.8	18.3	0.3	**18.4**	**0.2**	18.5	18.5	-398	465	18	1	-2274
SCM6U-22.1E	.0009	7.4	15.0	1.7	**18.7**	**0.6**	18.6	18.6			7	6	
SCM6U-23.1E	.0010	6.4	17.2	0.8	**19.1**	**0.4**	19.0	19.0					
TIP1-1.1c	.0009	3.3	18.7	0.3	**18.8**	**0.3**	18.9	0.6	-71	242	19	1	-478
TIP1-15.1c	.0009	4.6	17.2	0.7	**18.3**	**0.4**	18.9	1.1			15	1	
TIP1-21.1c	.0010	7.3	15.0	1.5	**17.0**	**0.6**	15.1	1.4			15	4	
TIP1-3.1c	.0010	4.9	20.2	0.8	**18.9**	**0.5**	18.4	1.4	1597	491	22	2	7820
TIP1-5.1c	.0010	6.7	17.7	0.8	**19.0**	**0.5**	17.8	1.6			18	2	
TIP1-7.1c	.0009	2.4	18.4	0.2	**18.5**	**0.2**	18.8	0.9	-138	146	18	0	-852
TIP-1-9.1c	.0009	2.3	18.3	0.2	**18.4**	**0.2**	19.0	0.8	-300	277	18	0	-1742
TIP1U-23.1CI	.0009	3.1	17.8	0.3	**18.1**	**0.2**	18.0	18.0	-863	660	17	1	-4949
TIP1-10.1i	.0010	7.7	17.1	0.7	**17.2**	**0.6**	15.9	1.3	-436	1474	19	2	-2653
TIP1-12.1i	.0010	6.4	17.9	0.6	**18.2**	**0.5**	17.7	0.9			18	2	
TIP1-13.1i	.0009	2.9	17.5	0.4	**17.5**	**0.3**	17.8	0.8	-42	764	17	1	-340
TIP1-14.1i	.0009	5.0	17.5	0.6	**18.3**	**0.4**	18.6	0.8			16	1	
TIP1-16.1i	.0009	5.9	18.0	0.3	**17.9**	**0.3**	17.9	0.5	261	216	18	1	1349
TIP-1-17.1i	.0009	3.6	17.9	0.4	**18.5**	**0.3**	18.9	0.5			16	1	
TIP1-19.1i	.0009	4.2	19.2	0.7	**17.8**	**0.4**	17.9	2.5	1679	443	20	1	8664
TIP1-2.1i	.0009	3.4	18.7	0.3	**18.7**	**0.3**	19.1	0.5	-174	358	18	1	-1033
TIP1-20.1i	.0009	3.9	17.7	0.6	**19.0**	**0.4**	19.4	0.9			16	1	
TIP1-4.1i	.0009	5.9	17.8	0.5	**17.5**	**0.5**	18.1	1.0	513	241	17	1	2784
TIP1-8.1i	.0009	4.7	17.9	0.4	**18.2**	**0.4**	17.7	0.7	-801	727	18	1	-4564
TIP1U-24.1I	.0009	2.2	17.7	0.3	**18.3**	**0.2**	18.3	18.3			17	1	
TIP1-11.1e	.0010	4.2	18.8	0.3	**19.0**	**0.3**	18.8	0.5	-409	578	19	1	-2277
TIP1-18.1e	.0010	6.0	16.1	0.8	**17.8**	**0.5**	17.4	0.6			11	4	
TIP1-22.1e	.0009	6.1	18.5	0.6	**19.2**	**0.4**	19.2	0.6			16	2	
TIP1-6.1e	.0009	3.5	18.6	0.5	**18.0**	**0.3**	17.5	0.8	1070	430	20	1	5650
TIP1U-22.1e	.0010	4.7	14.1	1.1	**17.8**	**0.3**	17.3	17.3					
SCM-1b_1.1e	.0009	7.6	18.4	0.5	**18.7**	**0.5**	19.0	0.6	-840	1079	15	2	-4667
SCM-1b_10.1c	.0009	3.1	19.1	0.4	**18.4**	**0.3**	18.7	0.8	1097	369	19	1	5653
SCM-1b_2.1i	.0009	5.9	17.1	0.7	**17.9**	**0.5**	18.1	1.1			16	1	
SCM-1b_3.1c	.0010	4.8	18.9	0.4	**19.0**	**0.4**	19.0	0.5	-313	527	19	1	-1756
SCM-1b_4.1c	.0009	5.1	19.1	0.3	**19.0**	**0.3**	19.2	0.5	144	181	19	1	656
SCM-1b_5.1e	.0010	4.6	19.0	0.4	**19.1**	**0.3**	19.0	0.5	-123	377	19	1	-748
SCM-1b_6.1c	.0009	2.8	17.8	0.3	**18.2**	**0.2**	20.4	1.4			17	1	
SCM-1b_7.1c	.0009	2.9	19.0	0.3	**18.9**	**0.3**	19.0	0.6	287	194	19	1	1411
SCM-1b_8.1e	.0009	5.9	18.9	0.4	**18.6**	**0.3**	18.6	0.5	638	360	20	1	3274
SCM-1b_9.1c	.0009	3.5	18.5	0.3	**18.5**	**0.3**	18.7	0.8	-4	319	18	1	-123
SCM1BU-18.1I	.0009	6.0	16.3	0.9	**18.5**	**0.4**	18.7	0.5			6	5	
SCM1BU-19.1E	.0010	6.6	19.1	0.5	**18.6**	**0.4**	18.5	0.5	877	418	22	2	4494
SCM1BU-20.1E	.0010	6.0	18.4	0.4	**18.1**	**0.4**	18.0	0.5	560	282	20	1	2943
SCM1BU-21.1E	.0009	8.2	17.7	0.5	**17.8**	**0.6**	17.5	0.7	-248	608	19	2	-1496
SCM1BU-22.1I	.0009	3.5	18.2	0.3	**18.3**	**0.3**	18.2	0.4	-201	196	18	1	-1205
SCM1BU-23.1C	.0009	3.5	16.8	0.5	**18.0**	**0.3**	17.7	0.4			14	2	
SCM1BU-24.1E	.0010	5.3	18.6	0.3	**18.6**	**0.3**	18.4	0.4	-76	271	20	1	-507
SCM1BU-25.1C	.0009	2.9	19.3	0.5	**18.3**	**0.3**	17.9	0.6	1404	357	21	1	7179

Appendix B: SHRIMP U-Pb Zircon Data, Silver Creek Caldera and Environs

Isotope Ratio Data for Samples
(errors are 1s unless otherwise speci

Spot Name	**Total 208Pb /232Th**	**% err**	**204corr 206Pb /238U Age**	**1s err**	**207corr 206Pb /238U Age**	**1s err**	**208corr 206Pb /238U Age**	**1s err**	**204corr 207Pb /206Pb Age**	**1s err**	**204corr 208Pb /232Th Age**	**1s err**	**% Dis- cor- dant**
SCM1BU-26.1E	.0009	7.2	16.9	0.9	**18.6**	**0.4**	18.7	0.5			9	5	
SCM-30-1.1c	.0010	8.5	22.7	2.1	**19.0**	**0.8**	18.2	2.0	2664	536	28	5	11642
SCM-30-10.1c	.0009	3.6	18.0	0.5	**18.4**	**0.3**	19.1	1.2			17	1	
SCM-30-2.1c	.0010	4.1	17.8	0.4	**18.1**	**0.4**	17.6	0.8	-846	1014	18	1	-4853
SCM-30-3.1c	.0009	4.3	18.3	0.5	**18.7**	**0.4**	20.5	1.3			17	1	
SCM-30-4.1i	.0010	4.3	19.2	0.3	**19.1**	**0.3**	18.9	0.5	236	164	20	1	1130
SCM-30-5.1i	.0010	4.7	18.7	0.4	**19.0**	**0.4**	19.0	0.5	-964	1063	18	1	-5253
SCM-30-6.1c	.0009	3.8	16.9	0.6	**17.9**	**0.3**	18.7	0.7			14	1	
SCM-30-7.1c	.0010	2.3	19.4	0.3	**19.7**	**0.2**	19.8	0.7	-975	927	19	1	-5132
SCM-30-8.1e	.0010	6.1	18.3	0.4	**18.1**	**0.4**	18.1	0.5	331	201	19	1	1709
SCM-30-9.1i	.0009	4.8	17.7	0.3	**17.7**	**0.3**	17.5	0.5	131	199	18	1	637
28829-23.1I	.0015	9.1	17.7	0.6	**18.5**	**0.5**	16.7	0.7			24	4	
BCD-1.1i	.0010	5.7	18.1	0.5	**18.2**	**0.4**	18.1	0.7	-369	753	18	1	-2141
BCD-10.1i	.0010	2.6	18.7	0.2	**18.6**	**0.2**	18.5	0.3	83	101	19	0	343
BCD-11.1c	.0009	2.8	18.7	0.2	**18.7**	**0.2**	18.8	0.3	193	135	19	1	930
BCD-12.1i	.0009	4.7	18.5	0.2	**18.6**	**0.2**	18.6	0.3	-129	179	18	1	-797
BCD-13.1e	.0012	2.6	19.7	0.3	**19.9**	**0.2**	19.7	0.3	-343	565	20	1	-1841
BCD-14.1i	.0009	3.5	17.9	0.2	**18.0**	**0.2**	17.8	0.4	-209	259	18	1	-1266
BCD-15.1e	.0009	3.3	17.6	0.3	**18.0**	**0.2**	18.0	0.3			16	1	
BCD-2.1e	.0008	4.0	17.2	0.3	**17.0**	**0.3**	17.5	0.8	423	175	17	1	2357
BCD-3.1e	.0008	3.4	17.6	0.2	**17.8**	**0.2**	18.0	0.3	-587	424	16	1	-3436
BCD-4.1e	.0009	4.1	19.2	0.2	**19.1**	**0.2**	19.4	0.3	248	116	18	1	1193
BCD-5.1i	.0010	5.3	18.0	0.6	**19.0**	**0.4**	18.6	0.7			17	2	
BCD-6.1i	.0009	2.1	18.9	0.2	**18.9**	**0.2**	19.0	0.2	-70	122	18	0	-469
BCD-7.1e	.0008	2.6	18.8	0.2	**18.8**	**0.2**	19.3	0.2	-71	136	17	0	-479
BCD-8.1c	.0009	2.7	18.2	0.2	**18.3**	**0.2**	18.5	0.2	-295	166	17	0	-1723
BCD-9.1e	.0009	3.0	18.7	0.2	**18.6**	**0.2**	18.7	0.3	129	115	18	1	593
SCM-5A_1.1C	.0009	3.2	18.3	0.3	**18.2**	**0.3**	18.4	0.7	238	180	18	1	1196
SCM-5A_10.1E	.0010	2.5	19.1	0.2	**19.2**	**0.2**	19.2	0.2	-156	153	19	1	-913
SCM-5A_11.1E	.0009	3.9	18.9	0.3	**18.7**	**0.3**	19.3	0.8	344	171	18	1	1721
SCM-5A_12.1E	.0012	12.1	18.3	0.7	**18.3**	**0.7**	16.7	1.3	195	288	24	3	965
SCM-5A_13.1E	.0008	2.3	17.2	0.2	**17.4**	**0.2**	17.7	0.3	-495	284	16	0	-2975
SCM-5A_14.1E	.0008	2.5	17.7	0.2	**17.7**	**0.2**	17.8	0.2	95	92	17	0	435
SCM-5A_15.1E	.0009	2.7	18.2	0.2	**18.3**	**0.2**	18.4	0.2	-180	249	17	1	-1087
SCM-5A_16.1E	.0009	7.1	14.2	1.0	**16.1**	**0.5**	15.6	0.7			10	4	
SCM-5A_17.1E	.0009	3.1	18.2	0.2	**18.4**	**0.2**	18.4	0.5	-404	323	18	1	-2319
SCM-5A_18.1E	.0009	6.7	18.3	0.6	**18.9**	**0.5**	19.1	0.9			16	2	
SCM-5A_2.1E	.0009	2.5	18.1	0.2	**18.4**	**0.2**	18.4	0.2	-935	523	16	1	-5274
SCM-5A_3.1E	.0009	5.7	18.0	0.5	**17.8**	**0.5**	18.1	1.0	375	245	18	1	1986
SCM-5A_4.1E	.0009	2.8	17.7	0.2	**17.8**	**0.2**	17.9	0.2	-179	232	17	1	-1110
SCM-5A_5.1E	.0008	4.7	18.2	0.3	**18.1**	**0.3**	19.1	0.6	231	185	16	1	1167
SCM-5A_6.1E	.0009	2.7	18.5	0.2	**18.5**	**0.2**	18.6	0.2	131	171	18	1	607
SCM-5A_7.1E	.0009	4.3	19.1	0.2	**19.1**	**0.3**	19.3	0.3	91	140	18	1	376
SCM-5A_8.1E	.0016	6.1	18.5	0.8	**18.6**	**0.4**	18.4	0.6	-255	2362	19	4	-1480
SCM-5A_9.1E	.0009	2.2	18.0	0.1	**17.9**	**0.1**	17.9	0.2	252	101	18	0	1304
28828-15.1E	.0010	3.0	18.5	0.2	**18.6**	**0.2**	18.4	0.2	-219	367	19	1	-1286
28828-4.4R	.0010	2.4	17.8	0.3	**18.3**	**0.2**	17.8	0.3			18	1	
28828-9.2I	.0011	7.1	18.4	0.3	**18.3**	**0.3**	17.8	0.4	117	181	22	2	539

Appendix B: SHRIMP U-Pb Zircon Data, Silver Creek Caldera and Environs

Isotope Ratio Data for Samples
(errors are 1s unless otherwise speci

Spot Name	Total 208Pb /232Th	% err	204corr 206Pb /238U Age	1s err	207corr 206Pb /238U Age	1s err	208corr 206Pb /238U Age	1s err	204corr 207Pb /206Pb Age	1s err	204corr 208Pb /232Th Age	1s err	% Dis- cor- dant
28828-16.1T	.0010	1.7	18.3	0.1	**18.3**	**0.1**	17.9	0.2	118	75	20	0	546
28828-17.1T	.0010	4.4	15.2	0.9	**17.7**	**0.4**	16.6	0.6			12	3	
SIT-2-1.1c	.0009	3.8	17.0	0.3	**17.6**	**0.3**	17.5	0.4			15	1	
SIT-2-15.1i	.0009	5.2	16.9	0.5	**17.6**	**0.4**	17.5	0.5			15	2	
SIT-2-2.1e	.0008	4.9	16.1	0.5	**16.8**	**0.4**	16.9	0.6			15	1	
SIT-2-3.1e	.0009	3.4	17.6	0.2	**17.8**	**0.2**	18.0	0.4	-541	394	17	1	-3168
SIT-2-4.1e	.0010	7.4	17.1	0.3	**17.0**	**0.3**	16.6	0.5	304	188	19	1	1678
SIT-2-5.1c	.0008	7.4	17.2	0.8	**18.0**	**0.5**	18.8	0.8			13	2	

Appendix B: SHRIMP U-Pb Zircon Data, Silver Creek Caldera and Environs

Isotope Ratio Data for Samples
(errors are 1s unless otherwise speci

Spot Name	4corr 208r /232	% err	Total 238 /206	% err	Total 207 /206	% err	4corr 238/ 206r	% err	4corr 207r /206r	% err	4corr 207r /235	% err	4corr 206r /238	% err	err corr
SCM-34_9.1c	.0009	6.0	336.34	1.9	.0585	7.9	340.36	2.0	.0489	16.3	0.02	16.4	.0029	2.0	.124
SCM-34-1.1c	.0008	7.7	352.49	2.4	.0485	10.7	370.88	3.3					.0027	3.3	
SCM-34-11.1c	.0008	5.5	348.12	2.3	.0503	10.0	348.12	2.3	.0503	10.0	0.02	10.3	.0029	2.3	.220
SCM-34-14.1c	.0009	5.7	330.21	2.3	.0463	10.6	336.16	2.6	.0316	35.2	0.01	35.3	.0030	2.6	.075
SCM-34-15.1c	.0770	2.7	3.27	0.4	.1002	0.6	3.27	0.4	.1001	0.6	4.21	0.7	.3055	0.4	.588
SCM-34-16.1c	.0008	6.0	358.62	2.5	.0481	9.9	364.20	2.7	.0354	28.0	0.01	28.1	.0027	2.7	.097
SCM-34-2.1c	.0010	6.0	338.22	2.0	.0448	9.1	342.59	2.1	.0342	23.9	0.01	24.0	.0029	2.1	.089
SCM-34-3.1c	.0758	4.7	3.56	0.4	.1031	0.5	3.56	0.4	.1031	0.5	3.99	0.7	.2811	0.4	.648
SCM-34-4.1c	.0016	18.0	242.75	1.9	.2769	5.0	328.48	7.5	.0695	87.0	0.03	87.3	.0030	7.5	.086
SCM-34-6.1c	.0009	7.3	340.60	2.0	.0461	9.4	351.40	3.0	.0201	96.2	0.01	96.3	.0028	3.0	.031
SCM-34-10.1i	.0012	3.9	307.96	1.3	.0930	4.1	317.41	1.7	.0694	14.5	0.03	14.6	.0032	1.7	.117
SCM-34-12.1i	.0009	6.8	324.78	2.7	.0495	12.0	324.78	2.7	.0495	12.0	0.02	12.3	.0031	2.7	.222
SCM-34-13.1i	.0009	3.7	344.31	1.6	.0414	8.2	347.37	1.8	.0340	17.5	0.01	17.5	.0029	1.8	.100
SCM-34-5.1i	.0009	6.9	344.84	2.5	.0493	10.9	352.01	2.8	.0324	38.9	0.01	39.0	.0028	2.8	.073
SCM-34-7.1i	.0009	6.3	334.35	1.8	.0463	8.4	338.27	2.0	.0367	20.5	0.01	20.6	.0030	2.0	.097
SCM-34-8.1i	.0009	7.6	323.36	2.0	.0527	10.8	330.21	2.4	.0355	36.1	0.01	36.2	.0030	2.4	.066
MP1-1.1	.0010	7.2	336.02	2.9	.0619	11.6	336.02	2.9	.0619	11.6	0.03	11.9	.0030	2.9	.241
MP1-15.1c	.0816	1.7	3.48	0.8	.1043	0.8	3.48	0.8	.1037	0.8	4.10	1.1	.2870	0.8	.691
MP1-2.1c	.0009	3.9	350.02	1.5	.0441	7.2	350.02	1.5	.0441	7.2	0.02	7.3	.0029	1.5	.199
MP1-3.1c	.0721	0.7	4.01	0.3	.1026	0.4	4.01	0.4	.1027	0.4	3.53	0.6	.2494	0.4	.618
MP1-4.1c	.0009	4.6	333.28	2.0	.0493	9.0	333.28	2.0	.0493	9.0	0.02	9.2	.0030	2.0	.218
MP1-8.1c	.0009	3.6	349.57	1.5	.0466	7.2	345.70	1.6	.0556	10.0	0.02	10.1	.0029	1.6	.162
MP1-10.1t	.0010	5.5	325.77	2.0	.0488	12.8	325.77	2.0	.0488	12.8	0.02	12.9	.0031	2.0	.152
MP1U-21.1E			348.70	3.5	.0573	16.6	665.08	36.9					.0015	36.9	
MP1U-21.2E			347.04	3.1	.0458	14.3	479.49	16.0					.0021	16.0	
MP1-11.1i	.0009	11.8	311.45	2.1	.0477	11.2	316.19	2.4	.0353	28.1	0.02	28.2	.0032	2.4	.084
MP1-12.1i	.0854	1.5	3.40	0.4	.1027	0.5	3.40	0.4	.1027	0.5	4.17	0.6	.2942	0.4	.662
MP1-13.1	.0768	0.6	3.67	0.3	.0998	0.3	3.67	0.3	.0999	0.3	3.76	0.5	.2727	0.3	.687
MP1-14.1i	.0009	5.8	316.54	1.3	.0477	6.2	322.83	1.6	.0315	27.9	0.01	28.0	.0031	1.6	.058
MP1-16.1i	.0013	18.5	337.56	2.9	.0601	14.3	313.96	5.4	.1163	29.8	0.05	30.3	.0032	5.4	.177
MP1-5.1	.0821	1.8	3.56	0.7	.1034	0.9	3.56	0.7	.1034	0.9	4.01	1.1	.2812	0.7	.648
MP1-6.1i	.0009	10.8	341.22	1.8	.0541	7.7	349.13	2.7	.0354	48.3	0.01	48.3	.0029	2.7	.056
MP1-7.1i	.0009	6.0	335.70	2.0	.0459	9.3	340.08	2.2	.0352	23.7	0.01	23.8	.0029	2.2	.092
MP1-9.1i	.0776	0.7	3.72	0.3	.1034	0.3	3.72	0.3	.1033	0.3	3.83	0.5	.2691	0.3	.691
MP1U-16.1l	.0006	24.6	370.56	2.4	.0519	9.9	433.92	6.0					.0023	6.0	
MP1U-19.1l	.0877	2.1	3.81	0.6	.1025	0.6	3.81	0.6	.1019	0.7	3.69	0.9	.2626	0.6	.657
MP1U-20.1l	.0005	86.2	345.23	3.7	.0552	18.2	447.96	13.8					.0022	13.8	
MP1U-22.1l	.0010	4.8	345.15	2.2	.0506	10.2	345.26	2.2	.0504	10.2	0.02	10.5	.0029	2.2	.209
MP1U-23.1l	.0009	14.0	348.70	3.2	.0450	18.3	358.34	4.1					.0028	4.1	
MP1U-24.1l			333.94	3.2	.0589	16.6	487.16	20.9					.0021	20.9	
MP1U-25.1l	-.0015	71.7	331.15	3.8	.0477	21.8	790.20	51.8					.0013	51.8	
SCM-6_1.1E	.0030	37.7	365.22	7.3	.0256	76.4	232.59	19.7	.3301	29.9	0.20	35.8	.0043	19.7	.551
SCM-6_2.1C	.0009	3.5	346.59	1.2	.0450	5.7	350.45	1.3	.0359	14.8	0.01	14.8	.0029	1.3	.090
SCM-6_3.1C	.0010	4.5	352.49	1.6	.0493	7.1	350.33	1.7	.0543	11.1	0.02	11.2	.0029	1.7	.149
SCM-6_4.1C	.0007	16.3	344.24	2.7	.0359	14.0	381.48	5.5					.0026	5.5	
SCM-6_6.1C	.0008	4.6	345.06	1.1	.0487	5.2	351.45	1.4	.0336	21.8	0.01	21.9	.0028	1.4	.064
SCM-6-12.1i	.0793	1.5	3.59	0.4	.1024	0.9	3.59	0.4	.1024	0.9	3.93	1.0	.2785	0.4	.369
SCM-6-2.1t	.0010	6.9	361.47	2.6	.0512	14.5	352.41	2.9	.0716	19.2	0.03	19.4	.0028	2.9	.152

Appendix B: SHRIMP U-Pb Zircon Data, Silver Creek Caldera and Environs

Isotope Ratio Data for Samples
(errors are 1s unless otherwise speci

Spot Name	4corr 208r /232	% err	Total 238 /206	% err	Total 207 /206	% err	4corr 238/ 206r	% err	4corr 207r /206r	% err	4corr 207r /235	% err	4corr 206r /238	% err	err corr
SCM-6-3.1c	.0009	6.4	356.19	2.1	.0526	9.3	369.18	2.6	.0230	63.5	0.01	63.6	.0027	2.6	.042
SCM6U-19.1I	.0015	19.0	329.97	3.3	.0591	14.8	288.50	6.4	.1569	25.0	0.07	25.8	.0035	6.4	.246
SCM6U-20.1I	.0009	3.9	345.82	1.2	.0535	5.1	352.08	1.4	.0393	17.8	0.02	17.9	.0028	1.4	.079
SCM6U-22.1E	.0003	84.4	344.78	3.0	.0454	13.8	429.57	11.3					.0023	11.3	
SCM6U-23.1E			336.97	1.8	.0476	8.2	373.98	4.7					.0027	4.7	
TIP1-1.1c	.0009	3.4	341.28	1.3	.0496	6.0	343.34	1.4	.0447	9.9	0.02	10.0	.0029	1.4	.140
TIP1-15.1c	.0008	9.3	340.58	2.0	.0723	7.5	374.93	4.2					.0027	4.2	
TIP1-21.1c	.0007	24.9	380.91	3.5	.0440	16.4	428.13	10.0					.0023	10.0	
TIP1-3.1c	.0011	7.8	339.20	2.5	.0505	10.9	319.14	4.1	.0986	26.3	0.04	26.6	.0031	4.1	.155
TIP1-5.1c	.0009	10.1	338.51	2.7	.0452	12.8	363.62	4.5					.0028	4.5	
TIP1-7.1c	.0009	2.4	349.48	1.2	.0435	5.9	349.48	1.2	.0435	5.9	0.02	6.0	.0029	1.2	.203
TIP-1-9.1c	.0009	1.9	347.98	0.9	.0496	3.9	351.74	1.0	.0408	10.8	0.02	10.9	.0028	1.0	.091
TIP1U-23.1CI	.0009	4.6	354.31	1.3	.0498	6.1	361.83	1.5	.0331	22.9	0.01	23.0	.0028	1.5	.066
TIP1-10.1i	.0010	9.6	368.01	3.5	.0579	16.4	376.75	4.2	.0387	56.1	0.01	56.3	.0027	4.2	.075
TIP1-12.1i	.0009	8.4	352.00	2.7	.0490	12.2	360.61	3.2	.0290	51.3	0.01	51.4	.0028	3.2	.062
TIP1-13.1i	.0009	4.3	359.51	1.5	.0654	5.3	368.60	2.3	.0453	31.4	0.02	31.5	.0027	2.3	.072
TIP1-14.1i	.0008	9.2	349.93	2.2	.0500	9.7	368.44	3.4					.0027	3.4	
TIP1-16.1i	.0009	6.1	359.32	1.7	.0457	8.3	356.80	1.7	.0515	9.4	0.02	9.6	.0028	1.7	.178
TIP-1-17.1i	.0008	5.7	348.53	1.5	.0466	7.0	358.90	2.0	.0222	52.7	0.01	52.7	.0028	2.0	.038
TIP1-19.1i	.0010	6.0	358.70	2.2	.0515	10.6	335.95	3.9	.1030	24.0	0.04	24.3	.0030	3.9	.160
TIP1-2.1i	.0009	3.8	343.12	1.4	.0475	8.6	345.06	1.5	.0429	14.4	0.02	14.5	.0029	1.5	.106
TIP1-20.1i	.0008	7.6	337.81	1.9	.0477	8.6	363.50	3.3					.0028	3.3	
TIP1-4.1i	.0009	5.9	362.01	2.6	.0576	11.0	362.01	2.6	.0576	11.0	0.02	11.3	.0028	2.6	.234
TIP1-8.1i	.0009	5.4	354.08	2.1	.0451	9.8	358.93	2.3	.0339	25.6	0.01	25.7	.0028	2.3	.088
TIP1U-24.1I	.0008	3.7	351.22	1.0	.0455	6.1	363.99	1.6	.0167	65.1	0.01	65.1	.0027	1.6	.025
TIP1-11.1e	.0009	6.0	337.82	1.6	.0508	7.2	342.69	1.9	.0391	22.1	0.02	22.2	.0029	1.9	.084
TIP1-18.1e	.0005	34.6	357.44	2.5	.0558	9.2	399.28	4.9					.0025	4.9	
TIP1-22.1e	.0008	12.4	336.30	2.0	.0448	9.5	348.65	3.1					.0029	3.1	
TIP1-6.1e	.0010	5.4	361.22	1.7	.0397	9.2	345.73	2.6	.0751	21.4	0.03	21.6	.0029	2.6	.120
TIP1U-22.1e			357.37	1.9	.0538	8.0	455.96	7.9					.0022	7.9	
SCM-1b_1.1e	.0007	13.9	340.71	2.4	.0553	9.9	349.94	2.7	.0334	37.7	0.01	37.8	.0029	2.7	.072
SCM-1b_10.1c	.0010	4.6	348.63	1.5	.0504	7.1	337.65	2.3	.0761	18.4	0.03	18.6	.0030	2.3	.125
SCM-1b_2.1i	.0008	9.3	356.64	2.7	.0540	11.7	375.46	3.8					.0027	3.8	
SCM-1b_3.1c	.0009	7.0	336.74	1.9	.0505	7.3	340.86	2.1	.0406	20.6	0.02	20.7	.0029	2.1	.102
SCM-1b_4.1c	.0009	4.9	337.22	1.8	.0489	7.7	337.22	1.8	.0489	7.7	0.02	7.9	.0030	1.8	.221
SCM-1b_5.1e	.0009	5.6	335.45	1.7	.0519	7.4	338.79	1.9	.0438	15.3	0.02	15.4	.0030	1.9	.121
SCM-1b_6.1c	.0008	3.0	352.99	1.2	.0460	5.4	362.22	1.6	.0246	37.8	0.01	37.8	.0028	1.6	.042
SCM-1b_7.1c	.0009	2.8	338.54	1.3	.0520	8.5	338.54	1.3	.0520	8.5	0.02	8.6	.0030	1.3	.155
SCM-1b_8.1e	.0010	7.5	348.72	1.8	.0414	8.9	340.43	2.1	.0610	16.7	0.02	16.9	.0029	2.1	.126
SCM-1b_9.1c	.0009	3.2	344.49	1.4	.0529	6.1	347.43	1.5	.0460	13.2	0.02	13.3	.0029	1.5	.115
SCM1BU-18.1I	.0003	77.8	344.74	2.1	.0523	9.0	395.51	5.4					.0025	5.4	
SCM1BU-19.1E	.0011	10.7	345.73	2.1	.0491	10.2	337.33	2.7	.0683	20.2	0.03	20.4	.0030	2.7	.131
SCM1BU-20.1E	.0010	7.0	353.47	2.0	.0512	10.8	350.05	2.1	.0588	13.0	0.02	13.1	.0029	2.1	.161
SCM1BU-21.1E	.0010	8.2	363.86	3.0	.0398	25.1	363.02	3.0	.0417	24.0	0.02	24.2	.0028	3.0	.122
SCM1BU-22.1I	.0009	3.6	353.55	1.4	.0436	7.1	354.06	1.4	.0424	7.8	0.02	7.9	.0028	1.4	.178
SCM1BU-23.1C	.0007	12.0	356.37	1.4	.0481	7.7	382.81	2.9					.0026	2.9	
SCM1BU-24.1E	.0010	5.7	344.99	1.8	.0474	8.7	346.20	1.8	.0446	11.1	0.02	11.2	.0029	1.8	.163
SCM1BU-25.1C	.0011	5.6	352.08	1.3	.0476	6.5	333.58	2.5	.0890	18.6	0.04	18.8	.0030	2.5	.133

Appendix B: SHRIMP U-Pb Zircon Data, Silver Creek Caldera and Environs

Isotope Ratio Data for Samples
(errors are 1s unless otherwise speci

Spot Name	4corr 208r /232	% err	Total 238 /206	% err	Total 207 /206	% err	4corr 238/ 206r	% err	4corr 207r /206r	% err	4corr 207r /235	% err	4corr 206r /238	% err	err corr
SCM1BU-26.1E	.0004	52.2	346.72	2.0	.0429	10.2	379.87	5.0					.0026	5.0	
SCM-30-1.1c	.0014	17.4	333.98	4.0	.0600	18.7	283.65	9.4	.1812	32.4	0.09	33.7	.0035	9.4	.278
SCM-30-10.1c	.0008	5.5	346.51	1.8	.0528	7.8	358.29	2.9	.0253	76.8	0.01	76.9	.0028	2.9	.038
SCM-30-2.1c	.0009	5.1	352.27	1.9	.0545	8.2	361.48	2.3	.0333	35.4	0.01	35.5	.0028	2.3	.066
SCM-30-3.1c	.0008	5.8	341.91	2.1	.0500	9.4	352.29	2.9	.0253	68.9	0.01	69.0	.0028	2.9	.042
SCM-30-4.1i	.0010	4.3	335.81	1.6	.0509	7.1	335.81	1.6	.0509	7.1	0.02	7.3	.0030	1.6	.224
SCM-30-5.1i	.0009	8.1	335.35	1.8	.0529	7.9	344.00	2.2	.0320	36.1	0.01	36.2	.0029	2.2	.061
SCM-30-6.1c	.0007	10.0	352.98	1.7	.0607	8.2	381.31	3.5					.0026	3.5	
SCM-30-7.1c	.0009	3.1	321.92	1.1	.0573	4.6	332.06	1.6	.0319	31.4	0.01	31.5	.0030	1.6	.051
SCM-30-8.1e	.0010	6.0	351.98	2.1	.0530	8.8	351.98	2.1	.0530	8.8	0.02	9.1	.0028	2.1	.230
SCM-30-9.1i	.0009	4.8	363.42	1.9	.0486	8.4	363.42	1.9	.0486	8.4	0.02	8.7	.0028	1.9	.215
28829-23.1I	.0012	15.5	347.00	2.6	.0492	11.5	364.29	3.5					.0027	3.5	
BCD-1.1i	.0009	7.8	349.27	2.3	.0550	9.6	355.87	2.6	.0397	29.0	0.02	29.2	.0028	2.6	.089
BCD-10.1i	.0010	2.5	344.75	0.9	.0477	4.3	344.75	0.9	.0477	4.3	0.02	4.4	.0029	0.9	.216
BCD-11.1c	.0009	3.0	345.07	1.0	.0463	4.6	343.54	1.0	.0500	5.8	0.02	5.9	.0029	1.0	.172
BCD-12.1i	.0009	5.0	345.92	1.0	.0487	3.9	348.04	1.1	.0437	7.3	0.02	7.3	.0029	1.1	.148
BCD-13.1e	.0010	6.4	316.59	1.0	.0646	3.7	326.31	1.4	.0401	21.9	0.02	21.9	.0031	1.4	.064
BCD-14.1i	.0009	3.8	357.04	1.3	.0472	6.1	359.18	1.4	.0423	10.3	0.02	10.4	.0028	1.4	.133
BCD-15.1e	.0008	8.3	355.50	1.1	.0514	5.0	365.18	1.7	.0293	35.9	0.01	35.9	.0027	1.7	.047
BCD-2.1e	.0008	3.9	373.66	1.8	.0553	7.9	373.66	1.8	.0553	7.9	0.02	8.1	.0027	1.8	.227
BCD-3.1e	.0008	4.7	360.76	1.2	.0477	5.6	365.66	1.4	.0366	15.6	0.01	15.7	.0027	1.4	.087
BCD-4.1e	.0009	4.1	335.53	1.1	.0512	5.0	335.53	1.1	.0512	5.0	0.02	5.2	.0030	1.1	.220
BCD-5.1i	.0008	11.3	338.80	2.2	.0461	10.3	356.64	3.4					.0028	3.4	
BCD-6.1i	.0009	2.2	340.57	0.8	.0466	3.7	341.35	0.8	.0447	5.0	0.02	5.0	.0029	0.8	.164
BCD-7.1e	.0008	2.8	341.61	0.9	.0478	4.1	342.89	0.9	.0447	5.6	0.02	5.6	.0029	0.9	.162
BCD-8.1c	.0008	2.9	352.56	1.0	.0444	4.5	354.08	1.0	.0409	6.5	0.02	6.6	.0028	1.0	.149
BCD-9.1e	.0009	2.9	344.84	1.1	.0486	4.9	344.84	1.1	.0486	4.9	0.02	5.0	.0029	1.1	.217
SCM-5A_1.1C	.0009	3.3	352.61	1.5	.0470	7.2	350.91	1.5	.0509	7.8	0.02	8.0	.0028	1.5	.192
SCM-5A_10.1E	.0009	2.8	335.05	1.0	.0471	3.8	336.65	1.0	.0432	6.2	0.02	6.2	.0030	1.0	.159
SCM-5A_11.1E	.0009	3.8	340.43	1.8	.0534	7.5	340.43	1.8	.0534	7.5	0.02	7.8	.0029	1.8	.228
SCM-5A_12.1E	.0012	12.1	351.03	3.9	.0500	12.4	351.03	3.9	.0500	12.4	0.02	13.0	.0028	3.9	.304
SCM-5A_13.1E	.0008	2.6	370.66	1.0	.0448	4.5	373.81	1.0	.0379	10.7	0.01	10.7	.0027	1.0	.097
SCM-5A_14.1E	.0008	2.5	363.52	0.9	.0481	3.9	363.60	0.9	.0479	3.9	0.02	4.0	.0028	0.9	.215
SCM-5A_15.1E	.0009	3.8	350.64	0.9	.0502	4.1	353.82	1.0	.0428	10.0	0.02	10.0	.0028	1.0	.104
SCM-5A_16.1E	.0005	37.0	398.06	2.8	.0510	12.4	452.30	6.7					.0022	6.7	
SCM-5A_17.1E	.0009	3.3	349.93	1.2	.0473	5.5	353.39	1.3	.0392	12.4	0.02	12.4	.0028	1.3	.104
SCM-5A_18.1E	.0008	9.2	343.63	2.8	.0396	15.4	352.64	3.3	.0179	89.2	0.01	89.2	.0028	3.3	.037
SCM-5A_2.1E	.0008	4.6	350.28	0.9	.0465	4.1	356.35	1.1	.0323	17.9	0.01	17.9	.0028	1.1	.062
SCM-5A_3.1E	.0009	5.7	357.68	2.6	.0541	10.9	357.68	2.6	.0541	10.9	0.02	11.2	.0028	2.6	.230
SCM-5A_4.1E	.0008	4.4	361.33	0.9	.0463	4.0	362.88	1.0	.0428	9.3	0.02	9.3	.0028	1.0	.103
SCM-5A_5.1E	.0008	4.7	353.06	1.9	.0508	8.0	353.06	1.9	.0508	8.0	0.02	8.2	.0028	1.9	.226
SCM-5A_6.1E	.0009	3.2	349.31	1.0	.0451	4.5	347.81	1.0	.0486	7.3	0.02	7.4	.0029	1.0	.138
SCM-5A_7.1E	.0009	4.3	336.18	1.3	.0478	5.9	336.18	1.3	.0478	5.9	0.02	6.0	.0030	1.3	.216
SCM-5A_8.1E	.0009	23.5	304.10	1.3	.1471	8.8	348.86	4.5	.0415	93.2	0.02	93.4	.0029	4.5	.049
SCM-5A_9.1E	.0009	2.4	359.38	0.8	.0484	3.6	358.11	0.8	.0513	4.4	0.02	4.5	.0028	0.8	.182
28828-15.1E	.0009	5.9	343.04	1.0	.0554	4.7	348.69	1.2	.0421	14.6	0.02	14.6	.0029	1.2	.081
28828-4.4R	.0009	6.0	345.56	1.0	.0625	4.1	361.51	1.8	.0255	49.3	0.01	49.3	.0028	1.8	.036
28828-9.2I	.0011	7.1	350.27	1.7	.0484	7.7	350.27	1.7	.0484	7.7	0.02	7.9	.0029	1.7	.218

Appendix B: SHRIMP U-Pb Zircon Data, Silver Creek Caldera and Environs

Isotope Ratio Data for Samples
(errors are 1s unless otherwise speci

Spot Name	4corr 208r /232	% err	Total 238 /206	% err	Total 207 /206	% err	4corr 238/ 206r	% err	4corr 207r /206r	% err	4corr 207r /235	% err	4corr 206r /238	% err	err corr
28828-16.1T	.0010	1.7	351.39	0.6	.0484	3.2	351.39	0.6	.0484	3.2	0.02	3.2	.0028	0.6	.194
28828-17.1T	.0006	24.3	362.60	1.9	.0494	8.5	424.43	5.7					.0024	5.7	
SIT-2-1.1c	.0008	8.5	366.44	1.4	.0451	6.7	378.83	2.0	.0174	69.7	0.01	69.7	.0026	2.0	.028
SIT-2-15.1i	.0007	11.2	365.51	2.0	.0468	9.1	380.33	2.7					.0026	2.7	
SIT-2-2.1e	.0007	9.2	380.87	2.1	.0490	9.2	398.68	3.0					.0025	3.0	
SIT-2-3.1e	.0008	4.1	361.05	1.3	.0465	6.0	365.15	1.4	.0372	14.7	0.01	14.8	.0027	1.4	.096
SIT-2-4.1e	.0010	7.4	376.53	1.9	.0524	8.3	376.53	1.9	.0524	8.3	0.02	8.5	.0027	1.9	.225
SIT-2-5.1c	.0007	17.4	353.38	2.4	.0558	10.2	374.03	4.4					.0027	4.4	

Appendix C: CA-ID-TIMS U-Pb Zircon Data, Silver Creek Caldera and Environs

												age in Ma	
sample	**cm.Pb (pg)**	**Th/U**	**^{206}Pb/^{204}Pb**	**^{208}Pb/^{204}Pb**	**^{207}Pb/^{235}U**	**2s %er**	**^{206}Pb/^{238}U**	**2s %er**	**r**	**^{207}Pb/^{206}Pb**	**2s %er**	**^{206}Pb*/^{238}U**	
SCM-5a.Z01	1.4	1.52	45	50.5	0.0175	28.34	0.002835	1.82	.61	0.04472	27.27	**18.25**	**0.33**
SCM-5a.Z02	1.2	1.17	139	82.7	0.0182	6.29	0.002835	0.42	.57	0.04662	6.06	**18.25**	**0.08**
SCM-5a.Z03	1.5	1.13	150	85.1	0.0176	6.03	0.002816	0.40	.64	0.04520	5.78	**18.13**	**0.07**
SCM-5a.Z04	1.2	1.05	82	59.1	0.0156	28.54	0.002821	1.47	.86	0.03997	27.28	**18.16**	**0.27**
SCM-5a.Z05	1.1	1.22	107	72.2	0.0190	8.25	0.002839	0.60	.59	0.04837	7.91	**18.28**	**0.11**
SCM-5a.Z06	1.4	1.26	40	46.5	0.0228	29.63	0.002893	2.30	.62	0.05689	28.25	**18.62**	**0.43**
SCM-5a.Z07	1.4	1.53	71	63.4	0.0179	14.71	0.002835	0.96	.64	0.04585	14.11	**18.25**	**0.18**
SCM-5a.Z08	1.2	1.01	35	43.2	0.0164	52.80	0.002853	3.03	.63	0.04150	50.95	**18.37**	**0.55**
SIT-1.Z01	1.2	1.89	52	58.0	0.0201	20.26	0.002869	1.45	.61	0.05080	19.42	**18.47**	**0.27**
SIT-1.Z02	1.4	1.56	34	45.9	0.0188	45.47	0.002879	3.06	.63	0.04710	43.61	**18.53**	**0.56**
SIT-1.Z03	1.4	1.66	40	49.5	0.0170	36.37	0.002854	2.18	.60	0.04306	35.12	**18.37**	**0.40**
SIT-1.Z04	1.3	1.59	34	45.8	0.0235	50.11	0.002921	3.66	.69	0.05803	47.66	**18.80**	**0.68**
SIT-1.Z05	1.6	1.79	48	54.7	0.0202	24.26	0.002881	1.70	.65	0.05064	23.18	**18.55**	**0.31**
SIT-1.Z06	1.9	1.66	24	40.9	0.0141	172.15	0.002955	8.44	.63	0.03403	166.97	**19.02**	**1.60**
SCM-1b.Z01	1.6	1.08	29	41.6	0.0111	138.19	0.002802	5.19	.69	0.02846	134.66	**18.04**	**0.93**
SCM-1b.Z02	1.1	2.09	67	70.3	0.0185	15.24	0.002885	1.04	.56	0.04647	14.69	**18.57**	**0.19**
SCM-1b.Z06	1.0	1.19	100	68.7	0.0202	11.19	0.002891	0.80	.74	0.05070	10.61	**18.61**	**0.15**
SCM-1b.Z09	1.2	2.68	67	79.3	0.0182	14.93	0.002897	1.00	.59	0.04553	14.37	**18.65**	**0.19**
SCM-1b.Z11	1.6	1.29	94	68.9	0.0193	11.39	0.002908	0.77	.70	0.04796	10.87	**18.72**	**0.14**
SCM-1b.Z12	0.9	1.31	25	40.8	0.0269	93.15	0.002995	8.13	.73	0.06434	87.43	**19.28**	**1.56**
SCM-1b.Z24	1.9	1.27	84	64.6	0.0206	10.86	0.002903	0.76	.58	0.05139	10.44	**18.69**	**0.14**
SCM-38.Z01	1.0	1.77	78	71.6	0.0176	12.44	0.002872	0.81	.59	0.04445	11.98	**18.49**	**0.15**
SCM-38.Z02	1.7	2.70	50	65.3	0.0173	28.29	0.002880	1.66	.67	0.04338	27.20	**18.54**	**0.31**
SCM-38.Z03	1.5	2.04	21	39.6	0.0252	244.76	0.003253	19.09	.61	0.05470	233.55	**20.93**	**3.98**
SCM-38.Z04	1.9	2.78	26	44.5	0.0236	79.74	0.002982	6.41	.60	0.05692	76.07	**19.20**	**1.23**
SCM-38.Z05	1.4	3.41	38	59.4	0.0156	45.79	0.002895	2.49	.63	0.03909	44.25	**18.64**	**0.46**
SCM-38.Z05	2.4	1.50	26	41.4	0.0154	172.24	0.002822	8.79	.80	0.03910	165.33	**18.17**	**1.59**
TIP-1.Z04	3.0	2.26	28	44.9	0.0249	56.25	0.002994	4.84	.60	0.05995	53.48	**19.27**	**0.93**
TIP-1.Z06	1.8	1.84	43	52.1	0.0226	29.62	0.002927	2.25	.68	0.05590	28.14	**18.84**	**0.42**
TIP-1.Z11	3.1	1.72	74	68.4	0.0188	12.89	0.002891	0.87	.58	0.04716	12.41	**18.61**	**0.16**
TIP-1.Z14	1.6	2.45	82	87.4	0.0187	12.27	0.002889	0.81	.65	0.04697	11.76	**18.59**	**0.15**
TIP-1.Z16	1.5	3.21	98	119.3	0.0183	11.88	0.002893	0.73	.75	0.04585	11.34	**18.62**	**0.14**
TIP-1.Z2	3.3	3.01	42	60.3	0.0186	30.38	0.002880	2.03	.61	0.04669	29.18	**18.54**	**0.38**
TIP-1.Z21	2.7	2.85	32	50.4	0.0218	51.44	0.002901	3.82	.69	0.05424	48.86	**18.67**	**0.71**
TIP-1.Z22	3.3	2.82	68	82.5	0.0172	29.79	0.002908	1.68	.81	0.04274	28.44	**18.72**	**0.31**
MP-1.Z01	1.2	2.45	35	50.9	0.0197	41.88	0.002898	2.89	.60	0.04904	40.20	**18.65**	**0.54**
MP-1.Z03	1.3	2.07	88	83.9	0.0178	14.65	0.002900	0.92	.67	0.04449	14.06	**18.67**	**0.17**
MP-1.Z04	1.2	1.61	75	66.7	0.0205	13.32	0.002930	0.91	.60	0.05069	12.80	**18.86**	**0.17**
MP-1.Z13	1.3	1.85	44	53.3	0.0227	26.75	0.002935	2.00	.65	0.05601	25.50	**18.89**	**0.38**
MP-1.Z14	1.2	1.46	41	48.4	0.0159	60.82	0.002874	2.72	.66	0.04002	59.06	**18.50**	**0.50**
MP-1.Z20	2.2	1.74	27	42.9	0.0299	55.27	0.002931	5.58	.64	0.07344	51.91	**18.86**	**1.05**
SCM-6.Z11	0.9	1.91	60	63.2	0.0195	18.04	0.002918	1.23	.62	0.04847	17.30	**18.78**	**0.23**
SCM-6.Z12	1.4	1.47	44	50.0	0.0178	37.12	0.002952	1.91	.49	0.04369	36.23	**19.00**	**0.36**
SCM-6.Z14	0.8	1.51	70	62.5	0.0181	15.93	0.002896	0.98	.58	0.04529	15.39	**18.64**	**0.18**
SCM-6.Z16	1.3	2.11	60	65.7	0.0206	16.72	0.002944	1.16	.54	0.05061	16.12	**18.95**	**0.22**
SCM-6.Z17	1.1	1.99	51	58.5	0.0194	28.73	0.002914	1.57	.53	0.04824	27.93	**18.76**	**0.29**
SCM-6.Z18	2.4	2.48	88	92.4	0.0188	11.76	0.002944	0.82	.56	0.04629	11.32	**18.95**	**0.15**

Appendix C: CA-ID-TIMS U-Pb Zircon Data, Silver Creek Caldera and Environs

												age in Ma	
sample	**cm.Pb (pg)**	**Th/U**	**$^{206}Pb/^{204}Pb$**	**$^{208}Pb/^{204}Pb$**	**$^{207}Pb/^{235}U$**	**2s %er**	**$^{206}Pb/^{238}U$**	**2s %er**	**r**	**$^{207}Pb/^{206}Pb$**	**2s %er**	**$^{206}Pb^*/^{238}U$**	
SCM-34.Z01	1.2	1.88	32	46.1	0.0121	90.39	0.002933	3.68	.64	0.02978	88.08	**18.88**	**0.69**
SCM-34.Z02	1.1	2.12	52	60.5	0.0173	24.83	0.002914	1.45	.59	0.04285	24.01	**18.76**	**0.27**
SCM-34.Z06	1.1	1.61	85	72.1	0.0186	12.52	0.002958	0.81	.65	0.04555	12.01	**19.04**	**0.15**
SCM-34.Z07	2.5	2.39	43	56.5	0.0232	36.06	0.003033	2.44	.68	0.05537	34.44	**19.53**	**0.47**
SCM-34.Z08	1.2	1.96	26	42.8	0.0210	104.50	0.002989	7.07	.68	0.05044	99.80	**19.24**	**1.36**

Pb blank composition is $^{206}Pb/^{204}Pb = 18.55 \pm 0.63$, $^{207}Pb/^{204}Pb = 15.50 \pm 0.55$, $^{208}Pb/^{204}Pb = 38.07 \pm 1.56$, and a $^{206}Pb/^{204}Pb$-$^{207}Pb/^{204}Pb$ correlation of +0.9.
Present day Th/U ratio is calculated from radiogenic $^{208}Pb/^{206}Pb$ and age. Isotopic ratios are corrected for tracer contribution and mass fractionation (0.15 ± 0.09 %/amu).
Ratios of radiogenic Pb versus U are corrected for mass fractionation, tracer contribution and common Pb contribution. r is correlation coefficient of radiogenic $^{207}Pb/^{235}U$ versus $^{206}Pb/^{238}U$.
Uncertainties of individual ratios and ages are given at the 2σ level and do not include decay constant errors. Ratios involving ^{206}Pb are corrected for initial disequilibrium
in $^{230}Th/^{238}U$ adopting Th/U=6 for the crystallization environment, resulting in a correction of ca. 80 ky.

Appendix D: Zircon SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

Sample Name	**Unit**	**Date and Time**	**Li ppm Est.**	**Be ppm**	**B ppm**	**F ppm**	**Na ppm Est.**	**Al ppm Est.**	**P ppm**	**K Rel.**	**Ca ppm Est.**	**Sc ppm**	**48/49**	**Ti from 48 ppm**
							23	**27**	**30.97**	**39**	**40**	**44.96**		
SCM1B-1.1I	Feldspar Porphyry Dike	1:30:49 PM 16/ 8/2011	0.0	0.1	0.1	12	1.9	10	222	1.6	0.9	38	14.1	6.8
SCM1B-2.1E	Feldspar Porphyry Dike	1:42:10 PM 16/ 8/2011	0.0	0.0	0.1	9	2.5	9	212	1.8	1.4	18	13.3	8.4
SCM1B-2.2C	Feldspar Porphyry Dike	1:53:07 PM 16/ 8/2011	0.0	0.9	0.1	20	2.4	9	248	1.8	1.1	60	12.8	7.7
SCM1B-3.1C	Feldspar Porphyry Dike	2:05:20 PM 16/ 8/2011	0.1	29.8	0.2	51	2.7	9	715	1.9	2.0	85	13.5	16.2
SCM1B-4.1C	Feldspar Porphyry Dike	2:16:40 PM 16/ 8/2011	0.0	36.8	0.2	31	2.7	9	431	2.0	2.4	52	13.9	23.4
SCM1B-5.1I	Feldspar Porphyry Dike	2:39:39 PM 16/ 8/2011	0.0	0.7	0.4	37	2.9	11	183	2.6	1.4	30	13.3	5.9
SCM1B-6.1E	Feldspar Porphyry Dike	2:50:37 PM 16/ 8/2011	0.0	0.5	0.1	12	2.5	11	254	1.8	1.4	20	13.9	8.5
SCM1B-6.2C	Feldspar Porphyry Dike	3:01:21 PM 16/ 8/2011	0.0	8.5	0.2	35	7.6	12	178	14.7	1.6	35	14.0	7.3
SCM1B-7.1E	Feldspar Porphyry Dike	3:13:11 PM 16/ 8/2011	0.0	0.0	0.3	13	5.8	12	344	6.4	2.3	28	13.3	10.8
SCM1B-7.2C	Feldspar Porphyry Dike	3:28:45 PM 16/ 8/2011	0.0	6.5	0.2	31	2.6	10	165	2.4	1.6	31	14.1	6.7
SCM1B-8.1C	Feldspar Porphyry Dike	3:40:03 PM 16/ 8/2011	0.0	1.3	0.1	29	5.5	10	189	3.3	6.4	26	13.7	6.2
SCM1B-10.1C	Feldspar Porphyry Dike	4:03:09 PM 16/ 8/2011	0.0	13.4	0.1	38	2.5	10	187	2.2	2.1	38	12.7	5.9
SCM1B-10.2E	Feldspar Porphyry Dike	4:14:00 PM 16/ 8/2011	0.0	1.5	0.1	15	2.8	10	268	2.6	2.1	17	14.0	8.3
SCM1B-11.1C	Feldspar Porphyry Dike	4:25:46 PM 16/ 8/2011	0.0	2.7	0.2	40	2.7	10	206	2.1	2.4	38	13.0	6.3
SCM1B-11.2E	Feldspar Porphyry Dike	4:36:12 PM 16/ 8/2011	0.0	0.0	0.1	14	3.6	10	315	2.6	2.6	26	13.4	9.6
SCM1B-12.1C	Feldspar Porphyry Dike	4:46:56 PM 16/ 8/2011	0.0	19.3	0.8	49	324.5	563	242	1146.9	10.1	44	13.2	12.0
SCM1B-13.1C	Feldspar Porphyry Dike	4:58:35 PM 16/ 8/2011	0.0	0.4	0.2	19	3.1	16	158	2.5	2.3	26	13.3	7.4
SCM1B-14.1SZ	Feldspar Porphyry Dike	5:10:30 PM 16/ 8/2011	0.0	0.3	0.0	7	1.9	12	383	2.0	1.8	16	14.1	6.5
SCM1B-14.2I	Feldspar Porphyry Dike	5:21:00 PM 16/ 8/2011	0.0	2.2	0.2	30	2.2	10	221	1.9	2.1	35	12.7	6.3
SCM1B-14.3E	Feldspar Porphyry Dike	5:31:40 PM 16/ 8/2011	0.0	0.1	0.1	15	2.6	8	285	1.9	1.9	17	12.9	8.8
SCM1B-15.1I	Feldspar Porphyry Dike	5:51:50 PM 16/ 8/2011	0.0	0.1	0.0	13	0.7	7	80	1.0	0.7	24	13.2	5.5
SCM1B-15.2E	Feldspar Porphyry Dike	6:02:33 PM 16/ 8/2011	0.0	0.2	0.1	15	3.0	10	288	3.2	2.2	16	13.3	8.1
SCM1B-16.1I	Feldspar Porphyry Dike	6:14:00 PM 16/ 8/2011	0.0	2.1	0.0	12	2.6	10	432	2.2	1.8	58	13.7	24.6
SCM1B-17.1C	Feldspar Porphyry Dike	6:25:32 PM 16/ 8/2011	0.0	90.2	0.1	126	3.2	14	749	12.2	4.7	28	15.0	13.9
SCM-13_1.1I	Feldspar Porphyry Dike	01/05/12	0.000	3	0.1	66	3.9	12	170	2.8	25.5	24	14.5	6.9
SCM-13_11.1c	Feldspar Porphyry Dike	01/05/12	0.000	2	0.0	2	3.9	12	155	4.9	3.0	32	13.0	16.1
SCM-13_2.1e	Feldspar Porphyry Dike	01/05/12	0.002	1	0.1	4	6.0	11	259	2.6	4.3	16	13.5	8.9
SCM-13_3.1c	Feldspar Porphyry Dike	01/05/12	0.000	28	0.2	17	5.9	11	272	1.9	4.3	64	13.3	37.5
SCM-13_3.2e	Feldspar Porphyry Dike	01/05/12	0.003	4	0.2	6	3.5	9	245	1.8	2.4	17	13.0	8.1
SCM-13_4.1i	Feldspar Porphyry Dike	01/05/12	0.006	7	0.2	22	4.3	11	213	2.0	5.4	38	13.4	7.2
SCM-13_5.1c	Feldspar Porphyry Dike	01/05/12	0.009	36	0.1	23	6.3	11	553	3.2	8.0	74	13.4	28.9
SCM-13_5.2e	Feldspar Porphyry Dike	01/05/12	0.003	1	0.1	5	4.6	11	212	2.5	4.8	16	13.2	8.4
SCM-13_6.1c	Feldspar Porphyry Dike	01/05/12	0.003	26	0.0	13	3.1	9	994	1.3	2.7	61	13.1	25.3
SCM-13_6.2i	Feldspar Porphyry Dike	01/05/12	0.000	1	0.1	3	2.8	10	288	1.5	3.4	34	14.0	13.3
SCM-13_7.1c	Feldspar Porphyry Dike	01/05/12	0.000	17	0.0	10	6.0	11	145	2.4	3.1	53	13.8	8.5
SCM-13_7.2e	Feldspar Porphyry Dike	01/05/12	0.035	5	0.1	4	5.3	10	195	3.6	2.6	31	14.1	7.5
SCM-13_8.1c	Feldspar Porphyry Dike	01/05/12	0.023	31	0.2	30	5.8	10	279	2.0	3.6	62	13.8	8.8
SCM-13_8.1i	Feldspar Porphyry Dike	01/05/12	0.000	3	0.0	6	4.5	10	277	1.9	4.7	14	13.2	8.1
SCM-13_9.1e	Feldspar Porphyry Dike	01/05/12	0.019	4	0.2	19	4.1	11	230	1.6	2.7	42	14.3	7.2
SCM-13_10.1i	Feldspar Porphyry Dike	01/05/12	0.002	3	0.1	6	4.2	10	166	4.3	6.8	26	13.9	8.1
SCM-30_1.1c	Feldspar Porphyry Dike	01/05/12	0.010	4	0.1	22	4.1	12	316	1.9	4.9	39	13.8	22.0
SCM-30_1.2e	Feldspar Porphyry Dike	01/05/12	0.034	0	0.1	12	4.9	9	186	2.0	3.7	14	14.4	7.5
SCM-30_10.1e	Feldspar Porphyry Dike	01/05/12	0.015	0	0.1	48	4.0	12	255	2.3	13.6	28	14.5	15.7
SCM-30_10.2c	Feldspar Porphyry Dike	01/05/12	0.119	6	0.2	33	5.3	13	1001	2.0	5.2	65	13.3	24.7
SCM-30_11.1c	Feldspar Porphyry Dike	01/05/12	0.013	1	0.2	27	7.1	12	457	2.9	8.6	57	13.2	29.2
SCM-30_11.2e	Feldspar Porphyry Dike	01/05/12	0.036	0	0.2	32	9.0	17	230	4.8	12.6	17	14.4	7.5
SCM-30_2.1c	Feldspar Porphyry Dike	01/05/12	0.200	23	0.4	173	7.2	17	1601	2.9	8.0	104	13.6	32.3
SCM-30_3.1c	Feldspar Porphyry Dike	01/05/12	0.007	3	0.2	11	4.9	12	363	1.8	4.0	64	13.8	25.8

Appendix D: Zircon SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

Sample Name	Unit	Date and Time	Li ppm Est.	Be ppm	B ppm	F ppm	Na ppm Est.	Al ppm Est.	P ppm	K Rel.	Ca ppm Est.	Sc ppm	48/49	Ti from 48 ppm
							23	**27**	**30.97**	**39**	**40**	**44.96**		
SCM-30_4.1i	Feldspar Porphyry Dike	01/05/12	0.009	0	0.2	19	6.0	13	308	3.0	16.3	24	13.5	17.1
SCM-30_5.1e	Feldspar Porphyry Dike	01/05/12	0.016	0	0.2	2	6.0	14	102	2.1	3.2	18	12.9	5.7
SCM-30_6.1i	Feldspar Porphyry Dike	01/05/12	0.004	0	0.1	2	4.6	11	335	1.6	2.9	38	13.2	26.2
SCM-30_7.1c	Feldspar Porphyry Dike	01/05/12	0.031	0	0.2	17	6.6	12	326	2.3	6.1	40	15.0	7.0
SCM-30_8.1c	Feldspar Porphyry Dike	01/05/12	0.136	72	0.4	182	60.9	95	1559	123.5	10.9	30	13.7	15.1
SCM-30_9.1c	Feldspar Porphyry Dike	01/05/12	0.016	3	0.1	22	5.5	9	453	1.8	4.0	42	13.6	27.4
SCM-30_9.2e	Feldspar Porphyry Dike	01/05/12	0.009	0	0.2	24	4.1	11	243	2.2	8.3	32	13.5	25.0
Averages	**Feldspar Porphyry Dike**		**0.027**	**9.153**	**0.158**	**27.902**	**11.069**	**22.547**	**351.630**	**25.832**	**4.711**	**36.786**	**13.611**	**13.235**
SCM-20_1.1c	Leucogranite	4:26:43 PM 30/ 4/2012	0.017	50	0.8	21	3.0	13	715	1.4	2.7	35	14.0	11.6
SCM-20_1.2e	Leucogranite	5:05:48 PM 30/ 4/2012	0.025	2	0.1	12	3.1	18	304	3.2	3.8	42	14.0	10.1
SCM-20_2.1e	Leucogranite	5:16:21 PM 30/ 4/2012	0.005	3	0.1	19	2.6	11	448	1.2	1.7	38	14.2	14.5
SCM-20_3.1e	Leucogranite	5:26:28 PM 30/ 4/2012	0.071	0.3	0.0	13	4.0	12	288	1.5	2.1	44	12.4	10.1
SCM-20_4.2e	Leucogranite	5:56:01 PM 30/ 4/2012	0.105	2	0.3	14	4.0	19	411	1.6	3.0	48	13.5	13.4
SCM-20_5.1i	Leucogranite	6:05:46 PM 30/ 4/2012	0.077	64	0.3	89	4.6	13	913	1.7	2.9	67	13.0	20.9
SCM-20_6.1c	Leucogranite	6:16:04 PM 30/ 4/2012	0.015	1	0.2	13	3.4	11	207	1.2	2.3	77	13.2	7.8
SCM-20_6.2e	Leucogranite	7:47:59 PM 30/ 4/2012	0.012	2	0.1	8	3.1	11	455	1.2	2.4	30	14.1	15.9
SCM-20_8.1e	Leucogranite	6:35:45 PM 30/ 4/2012	0.089	0.6	0.3	16	5.8	61	224	2.7	5.5	40	11.6	9.6
SCM-20_8.2c	Leucogranite	6:45:50 PM 30/ 4/2012	0.067	15	0.4	13	4.0	12	728	1.4	2.3	45	13.0	16.4
SCM-20_9.1c	Leucogranite	4:49:40 PM 30/ 4/2012	0.035	2	0.6	39	3.6	12	188	1.6	2.6	52	14.4	7.4
SCM-20_9.2e	Leucogranite	7:58:36 PM 30/ 4/2012	0.054	4	0.2	17	4.4	13	371	1.5	2.8	55	12.5	7.0
SCM-20_10.1i	Leucogranite	6:56:01 PM 30/ 4/2012	0.010	2	0.1	9	3.4	11	337	1.6	2.4	34	14.2	23.2
SCM-20_11.1c	Leucogranite	7:06:21 PM 30/ 4/2012	0.015	34	0.2	13	3.3	13	842	1.4	2.3	60	13.0	14.4
SCM-20_11.2e	Leucogranite	7:16:29 PM 30/ 4/2012	0.010	0.9	0.1	8	3.1	10	245	1.4	2.2	26	14.4	11.0
SCM-20_12.1c	Leucogranite	7:26:30 PM 30/ 4/2012	0.035	0.1	0.0	12	5.9	13	251	2.4	3.6	32	14.0	15.4
SCM-20_12.2e	Leucogranite	7:36:40 PM 30/ 4/2012	0.078	2	0.2	20	5.1	12	208	19.7	3.0	50	13.5	7.5
SCM-38_1.1i	Leucogranite	01/05/12	0.009	0	0.1	8	4.9	11	157	1.8	3.6	45	13.8	8.4
SCM-38_12.1i	Leucogranite	01/05/12	0.000	0	0.2	53	16.5	15	165	10.1	12.4	62	12.9	7.5
SCM-38_2.1i	Leucogranite	01/05/12	0.003	0	0.0	3	8.4	18	219	10.6	5.8	34	13.9	11.6
SCM-38_3.1c	Leucogranite	01/05/12	0.003	3	0.3	7	3.6	10	978	1.4	3.2	67	14.1	32.7
SCM-38_4.1e	Leucogranite	01/05/12	0.040	0	0.1	16	7.1	13	199	2.0	4.2	37	13.8	9.7
SCM-38_5.1e	Leucogranite	01/05/12	0.000	1	0.1	39	5.1	11	615	3.0	14.0	42	14.3	22.8
SCM-38_6.1e	Leucogranite	01/05/12	0.017	0	0.1	19	4.2	11	165	1.9	3.5	39	13.7	6.5
SCM-38_7.1c	Leucogranite	01/05/12	0.040	1	0.2	67	9.1	93	382	237.4	5.3	42	13.4	11.5
SCM-38_8.1c	Leucogranite	01/05/12	0.023	0	0.1	4	5.1	11	295	9.2	2.9	43	12.8	29.2
SCM-38_8.2e	Leucogranite	01/05/12	0.009	0	0.1	18	4.9	13	158	2.2	3.9	54	13.8	8.7
SCM-38_9.1c	Leucogranite	01/05/12	0.026	0	0.2	28	5.8	11	181	2.0	4.5	79	13.8	7.7
SCM-38_10.2e	Leucogranite	01/05/12	0.074	0	0.4	104	14.0	31	211	12.2	8.1	42	13.8	7.3
SCM-38_11.1c	Leucogranite	01/05/12	0.032	0	0.2	18	5.9	12	286	2.0	4.7	50	14.9	12.1
SCM-38_13.1c	Leucogranite	01/05/12	0.012	0	0.2	29	59.8	68	226	49.0	16.1	41	13.3	13.3
SCM-38_14.1c	Leucogranite	01/05/12	0.005	0	0.3	21	6.8	12	150	2.9	4.2	37	14.1	7.3
SCM-38_15.1c	Leucogranite	01/05/12	0.012	0	0.2	11	10.8	16	401	3.3	6.0	30	13.1	15.1
Average	**Leucogranite**		**0.031**	**5.799**	**0.200**	**23.630**	**7.225**	**18.837**	**361.349**	**12.052**	**4.543**	**46.044**	**13.589**	**12.961**
SCM6-1.1E	Moss	6:38:18 PM 16/ 8/2011	0.0	0.0	0.0	12	1.6	42	275	1.4	1.0	36	13.4	46.6
SCM6-1.2I	Moss	6:49:29 PM 16/ 8/2011	0.0	0.1	0.0	17	2.0	20	155	1.9	1.1	27	13.5	39.3
SCM6-2.1I	Moss	7:00:06 PM 16/ 8/2011	0.0	0.8	0.0	38	2.3	14	157	3.0	1.2	43	13.0	17.8
SCM6-3.1I	Moss	7:12:56 PM 16/ 8/2011	0.0	1.2	0.0	45	2.4	11	293	2.0	1.6	42	13.6	58.7
SCM6-4.1I	Moss	7:39:03 PM 16/ 8/2011	0.0	0.3	0.0	25	2.5	11	277	1.8	1.5	40	13.4	45.7

Appendix D: Zircon SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

Sample Name	**Unit**	**Date and Time**	**Li ppm Est.**	**Be ppm**	**B ppm**	**F ppm**	**Na ppm Est.**	**Al ppm Est.**	**P ppm**	**K Rel.**	**Ca ppm Est.**	**Sc ppm**	**48/49**	**Ti from 48 ppm**
							23	**27**	**30.97**	**39**	**40**	**44.96**		
SCM6-5.1l	Moss	7:52:12 PM 16/ 8/2011	0.0	0.6	0.1	38	2.4	12	260	1.9	1.2	38	13.5	42.7
SCM6-6.1l	Moss	8:02:42 PM 16/ 8/2011	0.0	0.1	0.1	11	4.3	15	263	2.9	2.0	42	13.1	33.6
SCM6-7.1e	Moss	8:13:32 PM 16/ 8/2011	0.0	0.0	0.1	13	2.2	14	246	2.0	1.3	40	13.9	30.8
SCM6-7.2c	Moss	8:23:54 PM 16/ 8/2011	0.0	1.1	0.1	69	3.3	11	89	2.1	1.6	53	13.1	13.4
SCM6-8.1i	Moss	8:36:44 PM 16/ 8/2011	0.0	0.1	0.0	13	4.4	16	263	2.8	4.3	39	13.9	29.5
SCM6-9.1c	Moss	8:47:07 PM 16/ 8/2011	0.1	25.9	0.1	231	6.3	14	1217	2.9	2.7	49	13.9	24.7
SCM6-10.1c	Moss	8:58:07 PM 16/ 8/2011	0.1	17.3	0.1	159	4.0	13	996	210.0	4.7	53	13.8	21.0
SCM6-11.1c	Moss	9:09:02 PM 16/ 8/2011	0.0	0.7	0.1	73	3.1	10	230	2.3	2.6	48	14.0	23.1
SCM6-12.1e	Moss	9:20:08 PM 16/ 8/2011	0.0	0.0	0.1	10	2.7	24	226	2.0	2.3	29	13.4	29.3
SCM6-12.2c	Moss	9:30:37 PM 16/ 8/2011	0.0	0.8	0.0	30	5.1	12	308	2.5	3.0	64	13.4	21.7
SCM6-13.1e	Moss	9:41:33 PM 16/ 8/2011	0.0	0.0	0.0	10	2.8	18	238	2.0	2.4	33	13.3	25.9
SCM6-14.1e	Moss	9:53:06 PM 16/ 8/2011	0.0	0.0	0.0	16	2.7	32	201	110.3	2.3	34	12.9	28.6
SCM6-14.2c	Moss	10:07:49 PM 16/ 8/2011	0.0	0.2	0.0	19	2.7	9	147	2.0	2.2	52	14.4	9.5
SCM6-15.1i	Moss	10:18:25 PM 16/ 8/2011	0.0	0.9	0.1	47	2.7	10	291	2.2	2.7	43	13.2	49.1
SCM6-15.2i	Moss	10:29:17 PM 16/ 8/2011	0.0	0.0	0.1	12	2.6	38	248	1.7	2.4	32	13.5	40.7
SCM6-16.1c	Moss	10:39:56 PM 16/ 8/2011	0.0	2.5	0.1	55	14.5	16	279	61.0	4.7	31	13.6	29.6
SCM6-17.1c	Moss	10:50:57 PM 16/ 8/2011	0.0	0.6	0.0	40	2.1	11	270	1.5	2.1	41	13.3	55.8
SCM6-18.1c	Moss	11:02:39 PM 16/ 8/2011	0.0	11.7	0.1	57	2.4	11	664	2.3	2.4	30	13.6	9.6
MP1-1.1c	Moss	4:06:23 AM 17/ 8/2011	0.0	0.3	0.1	30	2.3	10	289	2.1	2.5	52	13.8	18.3
MP1-1.2e	Moss	4:17:01 AM 17/ 8/2011	0.0	0.0	0.1	10	2.3	11	299	2.1	1.6	43	13.6	25.2
MP1-2.1i	Moss	4:28:24 AM 17/ 8/2011	0.0	0.1	0.0	33	2.6	24	238	2.1	2.0	70	13.9	51.1
MP1-3.1e	Moss	4:39:56 AM 17/ 8/2011	0.0	0.0	0.0	25	4.2	18	281	4.8	131.1	41	13.6	27.5
MP1-3.2c	Moss	4:51:46 AM 17/ 8/2011	0.0	0.1	0.0	34	2.3	10	254	2.2	2.0	39	13.4	26.0
MP1-4.1e	Moss	5:04:05 AM 17/ 8/2011	0.0	0.0	0.1	10	1.9	10	245	1.9	1.8	42	13.8	30.8
MP1-4.2c	Moss	5:15:20 AM 17/ 8/2011	0.0	1.0	0.0	52	2.2	8	242	1.6	1.6	46	13.8	18.0
MP1-5.1c	Moss	5:26:57 AM 17/ 8/2011	0.0	0.1	0.0	23	2.4	10	206	1.7	1.9	38	13.6	29.9
MP1-5.2e	Moss	5:37:42 AM 17/ 8/2011	0.0	0.0	0.1	11	2.5	13	251	1.9	1.9	39	13.7	31.2
MP1-6.1c	Moss	5:48:43 AM 17/ 8/2011	0.0	0.0	0.0	16	2.5	9	224	47.5	3.8	39	13.5	33.9
MP1-7.1e	Moss	5:59:36 AM 17/ 8/2011	0.0	0.0	0.0	7	1.7	14	233	1.2	1.4	40	12.7	30.1
MP1-8.1e	Moss	6:11:17 AM 17/ 8/2011	0.0	0.0	0.1	9	2.5	22	223	2.0	2.6	29	13.6	28.5
MP1-9.1e	Moss	6:21:53 AM 17/ 8/2011	0.0	0.0	0.0	10	2.9	15	255	2.5	3.2	41	13.4	28.2
MP1-9.2c	Moss	6:32:45 AM 17/ 8/2011	0.0	0.0	0.0	22	2.2	11	248	1.9	2.5	41	13.8	26.4
MP1-10.1c	Moss	6:43:40 AM 17/ 8/2011	0.1	0.9	0.1	55	2.9	10	199	2.2	2.6	46	13.5	6.2
MP1-11.1i	Moss	6:56:09 AM 17/ 8/2011	0.0	0.1	0.0	21	2.4	10	248	2.4	2.4	41	14.2	30.8
MP1-12.1e	Moss	7:07:01 AM 17/ 8/2011	0.0	0.0	0.0	13	2.2	13	302	1.8	2.2	45	13.3	30.4
MP1-13.1e	Moss	7:17:48 AM 17/ 8/2011	0.0	0.0	0.0	9	2.6	21	257	2.2	2.5	39	13.0	33.1
MP1-13.2c	Moss	7:29:09 AM 17/ 8/2011	0.0	0.1	0.0	56	2.5	9	329	1.9	2.4	52	14.0	28.4
MP1-14.1c	Moss	7:41:57 AM 17/ 8/2011	0.0	2.3	0.0	35	2.4	9	448	2.1	2.3	60	13.4	35.4
MP1-14.2e	Moss	7:52:33 AM 17/ 8/2011	0.0	0.0	0.1	8	3.0	13	279	2.1	2.5	34	14.1	33.4
MPe1-En-10C	Moss Enclave	1:59:49 AM 24/ 1/2013	0.0	0.8	0.0	40	3	10	276	0.8	2.5	45	13.7	35.8
MPe1-En-10E	Moss Enclave	1:50:15 AM 24/ 1/2013	0.0	0.0	0.0	7	3	16	230	0.7	2.2	29	13.3	29.1
MPe1-En-11C	Moss Enclave	2:09:31 AM 24/ 1/2013	0.0	0.0	0.0	16	3	14	320	0.8	2.1	50	13.4	33.9
MPe1-En-14C	Moss Enclave	2:29:33 AM 24/ 1/2013	0.0	0.0	0.0	33	3	10	268	0.6	2.1	44	13.7	34.7
MPe1-En-15C	Moss Enclave	2:39:03 AM 24/ 1/2013	0.0	0.0	0.0	16	3	12	308	0.8	2.5	50	13.4	31.8
MPe1-En-16E	Moss Enclave	2:48:29 AM 24/ 1/2013	0.0	0.0	0.0	8	3	16	200	0.7	2.5	28	14.4	25.9
MPe1-En-19E	Moss Enclave	2:58:19 AM 24/ 1/2013	0.0	0.0	0.0	15	2	17	219	0.7	2.2	34	13.9	33.9
MPe1-En-1E	Moss Enclave	11:24:49 PM 23/ 1/2013	0.0	0.0	0.1	9	4	12	269	0.8	2.1	36	13.1	26.4
MPe1-En-20E	Moss Enclave	3:08:15 AM 24/ 1/2013	0.0	0.0	0.0	12	2	19	200	0.6	1.8	30	12.2	25.9
MPe1-En-25C	Moss Enclave	3:18:10 AM 24/ 1/2013	0.0	0.0	0.1	67	2	6	315	0.5	1.8	46	12.9	26.7

Appendix D: Zircon SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

Sample Name	**Unit**	**Date and Time**	**Li ppm Est.**	**Be ppm**	**B ppm**	**F ppm**	**Na ppm Est.**	**Al ppm Est.**	**P ppm**	**K Rel.**	**Ca ppm Est.**	**Sc ppm**	**48/49**	**Ti from 48 ppm**
							23	**27**	**30.97**	**39**	**40**	**44.96**		
MPe1-En-25E	Moss Enclave	3:27:40 AM 24/ 1/2013	0.0	0.0	0.0	9	3	8	300	0.7	2.1	41	13.4	33.0
MPe1-En-2C	Moss Enclave	11:44:00 PM 23/ 1/2013	0.0	0.0	0.0	30	5	10	249	0.9	2.8	47	13.7	34.5
MPe1-En-2E	Moss Enclave	11:53:43 PM 23/ 1/2013	0.0	0.0	0.0	7	4	22	388	0.7	2.4	44	13.7	41.5
MPe1-En-3C	Moss Enclave	12:03:31 AM 24/ 1/2013	0.0	0.3	0.0	27	5	8	305	0.6	2.1	43	13.6	29.4
MPe1-En-4C	Moss Enclave	12:13:11 AM 24/ 1/2013	0.0	0.0	0.0	6	3	32	313	0.7	2.0	45	14.1	31.6
MPe1-En-4E	Moss Enclave	12:22:43 AM 24/ 1/2013	0.0	0.0	0.0	7	2	16	210	0.5	1.6	31	13.2	27.5
MPe1-En-5C	Moss Enclave	12:32:25 AM 24/ 1/2013	0.0	0.4	0.0	52	3	10	1584	2.3	2.0	50	14.3	23.5
MPe1-En-5S	Moss Enclave	12:42:09 AM 24/ 1/2013	0.0	0.0	0.0	13	4	8	209	0.7	2.4	37	14.3	25.5
MPe1-En-6E	Moss Enclave	12:51:55 AM 24/ 1/2013	0.0	0.0	0.0	8	4	14	212	0.7	2.2	32	14.0	29.3
MPe1-En-7C	Moss Enclave	1:11:15 AM 24/ 1/2013	0.0	0.1	0.1	65	3	9	300	0.8	2.4	45	14.0	27.9
MPe1-En-7E	Moss Enclave	1:01:51 AM 24/ 1/2013	0.0	0.0	0.0	8	3	18	211	0.7	2.3	30	13.6	28.4
MPe1-En-8C	Moss Enclave	1:20:55 AM 24/ 1/2013	0.0	0.0	0.0	8	2	15	165	0.6	1.9	26	13.9	24.6
MPe1-En-8E	Moss Enclave	1:30:24 AM 24/ 1/2013	0.0	0.0	0.0	7	3	17	210	0.8	2.3	30	13.8	28.2
MPe1-En-9C	Moss Enclave	1:40:29 AM 24/ 1/2013	0.0	0.1	0.0	9	2	7	262	0.6	1.8	42	13.1	29.6
MPe1-NonEn-10C	Moss Enclave	2:46:05 PM 24/ 1/2013	0.0	0.0	0.0	19	2	7	255	0.8	1.9	48	14.8	25.8
MPe1-NonEn-11C	Moss Enclave	2:55:42 PM 24/ 1/2013	0.0	0.2	0.0	34	8	8	341	0.7	2.0	55	13.7	31.5
MPe1-NonEn-11E	Moss Enclave	3:05:07 PM 24/ 1/2013	0.1	0.0	0.0	6	4	18	198	0.9	2.6	27	14.1	28.3
MPe1-NonEn-1C	Moss Enclave	12:30:36 PM 24/ 1/2013	0.0	0.0	0.0	9	3	10	221	0.7	1.8	35	14.1	25.2
MPe1-NonEn-1E	Moss Enclave	12:40:00 PM 24/ 1/2013	0.0	0.0	0.0	7	4	15	243	0.9	2.7	33	13.9	29.9
MPe1-NonEn-2C	Moss Enclave	12:49:22 PM 24/ 1/2013	0.0	0.0	0.1	21	6	9	203	1.1	2.9	32	13.5	12.0
MPe1-NonEn-2E	Moss Enclave	12:59:11 PM 24/ 1/2013	0.6	0.0	0.0	43	13	32	287	100.8	114.2	44	13.3	22.4
MPe1-NonEn-3C	Moss Enclave	1:09:08 PM 24/ 1/2013	0.0	0.0	0.0	9	4	27	284	0.8	2.5	46	13.4	36.7
MPe1-NonEn-4C	Moss Enclave	1:18:33 PM 24/ 1/2013	0.0	0.0	0.0	8	4	16	112	0.8	2.5	22	13.3	23.6
MPe1-NonEn-5E	Moss Enclave	1:37:56 PM 24/ 1/2013	0.0	0.0	0.0	8	4	20	246	0.9	2.7	34	13.4	30.5
MPe1-NonEn-6C	Moss Enclave	1:57:19 PM 24/ 1/2013	0.0	5.5	0.1	137	5	10	568	0.8	2.3	99	14.0	27.3
MPe1-NonEn-6E	Moss Enclave	1:47:24 PM 24/ 1/2013	0.0	0.0	0.1	9	4	14	218	0.9	2.7	32	14.4	26.9
MPe1-NonEn-7E	Moss Enclave	2:06:59 PM 24/ 1/2013	0.1	0.0	0.0	9	5	10	256	1.4	4.3	30	14.3	27.7
MPe1-NonEn-8C	Moss Enclave	2:16:30 PM 24/ 1/2013	0.0	0.0	0.0	36	3	10	224	1.2	3.6	40	14.1	26.2
MPe1-NonEn-8E	Moss Enclave	2:26:16 PM 24/ 1/2013	0.0	0.0	0.0	7	2	10	240	0.5	1.8	30	13.6	32.8
MPe1-NonEn-9C	Moss Enclave	2:36:10 PM 24/ 1/2013	0.0	0.0	0.1	7	2	8	260	0.5	1.5	42	14.1	31.7
Average	**Moss**		**0.0**	**0.9**	**0.0**	**28.3**	**3.4**	**14.4**	**295.5**	**7.7**	**5.2**	**41.0**	**13.6**	**29.6**
SCM-5a_1.1e	Felsic Porphyry Dike	12:24:17 PM 30/ 4/2012	0.002	9	0.1	14	3.9	10	352	1.1	2.5	25	13.9	8.0
SCM-5a_2.1c	Felsic Porphyry Dike	12:34:39 PM 30/ 4/2012	0.047	2	0.1	15	4.0	12	431	1.7	3.5	33	14.7	7.1
SCM-5a_2.2e	Felsic Porphyry Dike	12:44:34 PM 30/ 4/2012	0.090	0.5	0.1	12	4.7	12	241	1.7	3.4	44	16.4	4.0
SCM-5a_3.1e	Felsic Porphyry Dike	12:55:31 PM 30/ 4/2012	0.006	3	0.2	9	4.4	11	169	1.9	3.3	32	14.2	8.2
SCM-5a_3.2c	Felsic Porphyry Dike	1:05:30 PM 30/ 4/2012	0.094	11	0.2	15	4.9	14	576	1.9	3.7	49	13.1	8.9
SCM-5a_4.2e	Felsic Porphyry Dike	1:27:40 PM 30/ 4/2012	0.012	0.6	0.1	10	2.5	10	247	1.7	2.8	46	14.5	3.9
SCM-5a_5.1c	Felsic Porphyry Dike	1:39:22 PM 30/ 4/2012	0.002	12	0.1	8	3.3	10	434	1.6	3.0	46	14.2	7.3
SCM-5a_5.2e	Felsic Porphyry Dike	1:50:24 PM 30/ 4/2012	0.005	4	0.1	5	3.7	11	352	2.4	2.9	41	13.4	13.3
SCM-5a_6.1i	Felsic Porphyry Dike	2:00:59 PM 30/ 4/2012	0.066	7	0.1	14	4.0	12	419	1.9	3.4	38	14.0	6.6
SCM-5a_7.1e	Felsic Porphyry Dike	2:11:34 PM 30/ 4/2012	0.013	0.3	0.1	32	2.7	11	265	1.3	2.9	43	12.8	3.5
SCM-5a_8.2i	Felsic Porphyry Dike	2:37:23 PM 30/ 4/2012	0.007	4	0.1	7	3.8	11	234	1.7	3.6	53	13.9	5.2
SCM-5a_9.1e	Felsic Porphyry Dike	2:47:37 PM 30/ 4/2012	0.042	0.0	0.1	8	2.9	11	234	1.3	2.9	35	12.9	3.8
BCD_1.1i	Felsic Porphyry Dike	01/05/12	0.002	0	0.1	17	4.1	13	151	1.6	4.7	23	12.4	14.5
BCD_2.1c	Felsic Porphyry Dike	01/05/12	0.075	0	0.1	21	6.7	12	687	2.2	5.5	43	13.8	5.3
BCD_3.1e	Felsic Porphyry Dike	01/05/12	0.018	0	0.1	7	3.0	10	315	1.1	3.0	52	12.2	5.0
BCD_4.1e	Felsic Porphyry Dike	10:25:52 PM 30/ 4/2012	0.097	0	0.2	6	3.9	11	724	1.3	3.5	46	12.6	4.0
BCD_5.1c	Felsic Porphyry Dike	01/05/12	0.062	120	0.2	189	5.4	13	1444	2.2	7.9	99	13.5	19.0

Appendix D: Zircon SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

Sample Name	Unit	Date and Time	Li ppm Est.	Be ppm	B ppm	F ppm	Na ppm Est.	Al ppm Est.	P ppm	K Rel.	Ca ppm Est.	Sc ppm	48/49	Ti from 48 ppm
							23	27	30.97	39	40	44.96		
BCD_5.2e	Felsic Porphyry Dike	01/05/12	0.040	8	0.1	9	4.4	11	598	1.8	3.8	79	13.3	22.1
BCD_6.1c	Felsic Porphyry Dike	01/05/12	0.079	2	0.1	33	4.3	16	426	1.9	7.2	44	12.8	12.2
BCD_7.1i	Felsic Porphyry Dike	01/05/12	0.046	0	0.2	7	2.5	10	253	1.0	2.5	33	12.8	4.7
BCD_7.2c	Felsic Porphyry Dike	01/05/12	0.052	1	0.1	15	16.3	41	379	25.3	4.2	31	14.1	8.7
BCD_8.1i	Felsic Porphyry Dike	01/05/12	0.011	2	0.2	10	3.1	11	352	1.6	3.1	33	13.5	7.9
BCD_9.2e	Felsic Porphyry Dike	01/05/12	0.091	0	0.1	8	3.3	13	296	1.7	4.6	48	13.4	4.8
Average	**Felsic Porphyry Dike**		**0.042**	**8.154**	**0.124**	**20.422**	**4.420**	**12.814**	**416.515**	**2.700**	**3.828**	**44.276**	**13.577**	**8.170**
TIP1-1.1c	Times Granite	11:16:52 PM 16/ 8/2011	0.0	27.1	0.2	23	1.2	9	564	0.9	1.3	54	13.7	19.8
TIP1-1.2e	Times Granite	11:27:58 PM 16/ 8/2011	0.0	0.0	0.1	12	2.3	27	301	1.4	1.5	54	12.7	37.2
TIP1-2.1c	Times Granite	11:38:50 PM 16/ 8/2011	0.0	1.1	0.4	15	2.5	11	432	2.3	1.8	33	12.8	14.9
TIP1-2.2e	Times Granite	11:49:30 PM 16/ 8/2011	0.0	0.1	0.1	15	2.4	9	167	2.3	1.9	29	13.6	6.7
TIP1-3.1c	Times Granite	12:00:04 AM 17/ 8/2011	0.0	0.6	0.1	34	3.0	11	237	2.4	2.2	31	13.9	7.0
TIP1-3.2e	Times Granite	12:10:51 AM 17/ 8/2011	0.1	0.3	0.1	11	2.6	10	111	2.1	1.9	60	13.4	5.9
TIP1-4.1i	Times Granite	12:21:36 AM 17/ 8/2011	0.0	0.1	0.2	22	2.8	11	240	2.2	2.4	55	12.9	7.6
TIP1-6.1e	Times Granite	12:50:22 AM 17/ 8/2011	0.0	0.2	0.0	15	2.1	9	353	1.9	2.1	25	13.3	15.5
TIP1-7.1esz	Times Granite	1:01:25 AM 17/ 8/2011	0.0	0.0	0.1	15	2.2	9	160	2.3	2.0	35	12.9	6.4
TIP1-7.2c	Times Granite	1:12:01 AM 17/ 8/2011	0.0	0.2	0.1	44	4.2	10	190	15.7	2.5	39	13.3	5.7
TIP1-8.1ci	Times Granite	1:23:17 AM 17/ 8/2011	0.0	0.2	0.4	23	2.4	10	151	1.8	2.2	45	13.4	8.4
TIP1-9.1i	Times Granite	1:37:21 AM 17/ 8/2011	0.0	0.0	0.0	12	2.5	11	204	2.3	2.6	44	14.2	26.8
TIP1-10.1i	Times Granite	1:48:12 AM 17/ 8/2011	0.0	0.1	0.2	19	2.2	10	204	1.9	2.5	31	13.4	6.4
TIP1-11.1e	Times Granite	1:59:56 AM 17/ 8/2011	0.0	0.1	0.2	13	124.3	10	260	853.7	3.3	32	13.3	8.4
TIP1-12.1e	Times Granite	2:11:18 AM 17/ 8/2011	0.0	0.0	0.1	8	2.2	10	250	1.8	2.3	31	14.0	9.4
TIP1-13.1e	Times Granite	2:22:46 AM 17/ 8/2011	0.0	0.0	0.1	7	2.4	10	215	1.7	2.4	42	13.1	22.6
TIP1-14.1c	Times Granite	2:34:02 AM 17/ 8/2011	0.3	2.1	0.2	27	6.7	25	763	5.7	4.0	71	13.4	23.7
TIP1-15.1i	Times Granite	2:45:19 AM 17/ 8/2011	0.0	0.1	0.0	9	2.0	9	181	2.0	2.0	39	13.4	6.2
TIP1-16.1i	Times Granite	2:56:22 AM 17/ 8/2011	0.0	16.2	0.2	43	2.0	10	1036	2.0	2.4	60	13.7	20.9
TIP1-17.1e	Times Granite	3:07:13 AM 17/ 8/2011	0.0	0.0	0.3	39	4.2	11	222	2.8	4.5	38	13.7	7.8
TIP1-18.1e	Times Granite	3:18:07 AM 17/ 8/2011	0.1	0.3	0.4	10	3.4	11	571	2.8	3.3	54	13.5	23.5
TIP1-19.1i	Times Granite	3:29:05 AM 17/ 8/2011	0.0	0.0	0.1	18	5.9	11	264	2.2	2.8	42	13.5	28.1
TIP1-20.1i	Times Granite	3:40:04 AM 17/ 8/2011	0.0	8.9	0.3	16	2.1	11	579	1.8	2.6	42	13.8	20.7
TIP1-21.1c	Times Granite	3:51:11 AM 17/ 8/2011	0.1	4.3	0.1	20	2.3	9	864	1.8	2.3	67	13.1	24.4
SCM-37_1.1c	Times Granite	9:47:37 PM 30/ 4/2012	0.038	3	0.1	33	3.5	8	252	3.7	7.2	114	13.9	7.1
SCM-37_1.2i	Times Granite	01/05/12	0.011	0	0.1	5	2.7	8	192	2.0	3.1	52	14.8	7.7
SCM-37_10.1e	Times Granite	01/05/12	0.015	0	0.1	7	5.1	12	209	3.5	4.4	33	12.7	7.0
SCM-37_11.1c	Times Granite	01/05/12	0.009	1	0.2	38	6.0	13	202	3.8	5.5	43	13.6	10.7
SCM-37_12.1c	Times Granite	01/05/12	0.003	2	0.2	8	5.8	12	721	2.9	9.5	49	13.8	26.1
SCM-37_12.1i	Times Granite	01/05/12	0.015	2	0.1	7	3.1	10	682	1.4	2.7	53	13.2	21.9
SCM-37_2.1c	Times Granite	01/05/12	0.017	8	0.2	31	3.9	9	1163	2.3	1.7	31	13.5	27.5
SCM-37_3.1c	Times Granite	01/05/12	0.005	1	0.5	10	5.0	11	247	2.3	2.9	29	13.7	12.2
SCM-37_3.2i	Times Granite	01/05/12	0.000	0	0.1	8	3.2	8	105	1.9	3.2	24	12.8	6.3
SCM-37_4.1e	Times Granite	01/05/12	0.024	0	0.1	18	4.4	10	157	3.4	6.0	50	12.9	7.3
SCM-37_5.1i	Times Granite	01/05/12	0.014	2	0.2	11	3.4	9	837	1.9	5.1	65	12.9	22.8
SCM-37_6.1c	Times Granite	01/05/12	0.005	3	0.2	21	5.7	12	408	2.0	5.3	39	14.3	16.2
SCM-37_6.2i	Times Granite	01/05/12	0.023	1	3.6	9	7.9	13	149	3.7	4.9	71	13.4	8.8
SCM-37_6.3e	Times Granite	01/05/12	0.010	0	0.1	18	2.8	9	214	1.5	4.1	36	13.1	7.0
SCM-37_7.1c	Times Granite	10:07:05 PM 30/ 4/2012	0.012	11	0.2	20	4.3	12	918	2.4	2.4	63	14.7	16.4
SCM-37_8.1c	Times Granite	01/05/12	0.005	0	0.1	17	3.5	9	143	1.4	2.1	49	12.7	6.2
SCM-37_9.1e	Times Granite	01/05/12	0.015	0	0.1	70	9.7	10	300	4.2	9.7	42	15.1	8.2

Appendix D: Zircon SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

Sample Name	Unit	Date and Time	Li ppm Est.	Be ppm	B ppm	F ppm	Na ppm Est.	Al ppm Est.	P ppm	K Rel.	Ca ppm Est.	Sc ppm	48/49	Ti from 48 ppm
							23	**27**	**30.97**	**39**	**40**	**44.96**		
SCM27B-10I	Times Enclave	5:05:48 PM 24/ 1/2013	0.0	0.1	0.0	16	3	7	180	0.7	1.8	30	14.0	6.6
SCM27B-12E	Times Enclave	5:25:19 PM 24/ 1/2013	0.0	0.0	0.1	13	3	7	186	0.6	2.0	26	14.4	8.1
SCM27B-13E	Times Enclave	5:35:10 PM 24/ 1/2013	0.0	0.0	0.1	13	3	7	181	0.6	2.0	33	13.0	6.7
SCM27B-14E	Times Enclave	5:45:02 PM 24/ 1/2013	0.0	0.5	0.0	13	3	6	345	0.7	2.0	31	13.5	12.7
SCM27B-1C	Times Enclave	3:36:40 PM 24/ 1/2013	0.0	6.0	0.0	52	3	7	652	0.6	2.0	36	12.1	14.1
SCM27B-2C	Times Enclave	3:46:37 PM 24/ 1/2013	0.0	0.0	0.0	6	3	8	152	0.6	2.1	20	13.6	15.3
SCM27B-3E	Times Enclave	3:56:19 PM 24/ 1/2013	0.0	0.0	0.0	14	3	6	189	0.6	2.0	19	14.0	7.5
SCM27B-4C	Times Enclave	4:06:56 PM 24/ 1/2013	0.0	0.5	0.0	27	25	19	205	16.3	2.8	43	13.2	8.6
SCM27B-5E	Times Enclave	4:16:43 PM 24/ 1/2013	0.0	0.2	0.0	11	3	7	374	0.6	1.9	41	13.5	16.9
SCM27B-6E	Times Enclave	4:26:10 PM 24/ 1/2013	0.0	0.1	0.0	12	4	7	247	0.8	2.4	17	14.6	8.0
SCM27B-7I	Times Enclave	4:36:12 PM 24/ 1/2013	0.0	0.8	0.0	21	3	7	479	0.7	2.5	54	14.2	15.2
SCM27B-8E	Times Enclave	4:45:37 PM 24/ 1/2013	0.0	0.1	0.0	11	3	7	177	1.1	2.2	26	14.5	6.8
SCM27B-9C	Times Enclave	4:55:41 PM 24/ 1/2013	0.0	3.6	0.0	31	2	7	1027	0.5	1.7	43	13.6	13.7
SCM27B-15C	Times Enclave	5:55:46 PM 24/ 1/2013	0.0	4.9	0.0	65	2	7	1032	0.6	1.9	48	13.7	21.7
Average	**Times Granite**		**0.0**	**2.0**	**0.2**	**20.1**	**6.0**	**10.1**	**379.0**	**18.0**	**3.1**	**43.0**	**13.5**	**13.6**
SIT-1B-10C	Post-PST Lava Enclave	8:55:31 PM 23/ 1/2013	2.8	0.0	0.0	8	2	7	328	0.5	1.8	35	13.5	24.0
SIT-1B-10E	Post-PST Lava Enclave	8:45:58 PM 23/ 1/2013	0.4	0.0	0.0	6	2	12	214	0.5	1.9	27	13.8	22.0
SIT-1B-12C	Post-PST Lava Enclave	9:24:55 PM 23/ 1/2013	0.3	0.0	0.0	29	1	7	237	0.4	1.5	35	13.0	22.1
SIT-1B-12E	Post-PST Lava Enclave	9:15:12 PM 23/ 1/2013	0.0	0.0	0.0	7	2	12	218	0.5	2.1	27	14.3	21.8
SIT-1B-13C	Post-PST Lava Enclave	9:34:27 PM 23/ 1/2013	2.7	0.0	0.0	20	2	7	264	0.7	1.8	34	14.2	20.3
SIT-1B-13E	Post-PST Lava Enclave	9:44:04 PM 23/ 1/2013	0.2	0.0	0.0	10	2	8	243	0.8	1.7	29	13.6	18.3
SIT-1B-14E	Post-PST Lava Enclave	9:54:29 PM 23/ 1/2013	0.0	0.0	0.0	6	1	6	233	0.4	1.2	33	13.7	19.4
SIT-1B-15C	Post-PST Lava Enclave	10:05:01 PM 23/ 1/2013	0.0	0.1	0.0	18	1	7	205	0.4	1.4	32	13.9	14.8
SIT-1B-16C	Post-PST Lava Enclave	10:15:17 PM 23/ 1/2013	13	0.1	0.0	25	2	7	314	0.4	1.5	54	13.8	14.0
SIT-1B-17E	Post-PST Lava Enclave	10:25:07 PM 23/ 1/2013	1.9	0.0	0.0	8	2	9	511	0.5	1.6	57	14.3	29.6
SIT-1B-1C	Post-PST Lava Enclave	6:17:29 PM 23/ 1/2013	24	0.0	0.0	17	4	8	237	0.7	2.4	65	13.8	8.7
SIT-1B-1E	Post-PST Lava Enclave	6:07:59 PM 23/ 1/2013	2.3	0.0	0.0	5	3	14	209	0.8	2.1	26	14.3	21.6
SIT-1B-20C	Post-PST Lava Enclave	10:35:15 PM 23/ 1/2013	0.1	0.1	0.0	29	3	14	311	6.0	3.9	33	13.1	24.4
SIT-1B-20E	Post-PST Lava Enclave	10:44:36 PM 23/ 1/2013	0.0	0.0	0.0	6	2	12	211	0.6	1.9	29	13.7	23.6
SIT-1B-2E	Post-PST Lava Enclave	6:33:44 PM 23/ 1/2013	3.8	0.0	0.0	6	3	10	164	0.6	1.8	25	13.6	20.5
SIT-1B-3E	Post-PST Lava Enclave	6:43:38 PM 23/ 1/2013	0.1	0.0	0.0	6	3	13	160	0.6	2.1	23	14.2	19.9
SIT-1B-4E	Post-PST Lava Enclave	6:53:20 PM 23/ 1/2013	0.1	0.0	0.0	3	3	13	179	0.6	1.8	23	13.8	19.4
SIT-1B-5C	Post-PST Lava Enclave	7:12:41 PM 23/ 1/2013	0.0	0.2	0.0	11	2	11	253	0.7	1.9	39	13.5	24.1
SIT-1B-5E	Post-PST Lava Enclave	7:03:04 PM 23/ 1/2013	0.0	0.1	0.0	8	3	9	275	0.7	2.2	38	14.0	19.0
SIT-1B-6C	Post-PST Lava Enclave	7:24:04 PM 23/ 1/2013	4.4	0.0	0.0	13	3	8	273	0.5	1.8	52	13.9	27.4
SIT-1B-7E	Post-PST Lava Enclave	7:57:11 PM 23/ 1/2013	0.0	0.0	0.0	8	2	8	273	0.5	1.8	36	13.7	22.2
SIT-1B-8C	Post-PST Lava Enclave	8:06:51 PM 23/ 1/2013	22	0.0	0.0	22	2	7	267	0.5	1.8	44	13.2	9.0
SIT-1B-8E	Post-PST Lava Enclave	8:16:31 PM 23/ 1/2013	3.1	0.0	0.0	8	3	13	276	0.6	2.2	37	13.9	27.2
SIT-1B-9C	Post-PST Lava Enclave	8:26:26 PM 23/ 1/2013	1.3	0.3	0.1	65	17	24	657	38.6	3.4	28	14.0	26.9
SIT-1B-9E	Post-PST Lava Enclave	8:36:19 PM 23/ 1/2013	0.0	0.1	0.0	7	3	10	309	0.6	1.9	38	14.1	20.9
SIT-1-11C	Post-PST Lava	10:14:06 AM 24/ 1/2013	0.0	0.0	0.1	6	2	10	216	0.5	1.7	28	13.8	18.2
SIT-1-12E	Post-PST Lava	10:23:55 AM 24/ 1/2013	0.0	0.1	0.0	7	2	10	251	0.6	1.6	32	14.2	18.1
SIT-1-13C	Post-PST Lava	10:33:30 AM 24/ 1/2013	0.0	0.2	0.0	11	2	7	204	0.5	1.7	29	12.6	18.3
SIT-1-14E	Post-PST Lava	10:43:06 AM 24/ 1/2013	0.0	0.0	0.0	8	2	15	228	0.5	1.6	33	13.9	25.7
SIT-1-15E	Post-PST Lava	11:03:33 AM 24/ 1/2013	0.0	0.0	0.0	9	2	7	366	0.5	1.7	42	12.4	19.6
SIT-1-16C	Post-PST Lava	11:13:08 AM 24/ 1/2013	0.1	0.6	0.0	50	2	6	354	0.4	1.6	51	13.3	15.0
SIT-1-16E	Post-PST Lava	11:22:41 AM 24/ 1/2013	0.0	0.0	0.0	12	1	6	211	0.3	1.4	30	13.7	13.1
SIT-1-1C	Post-PST Lava	7:57:42 AM 24/ 1/2013	0.0	1.1	0.1	60	7	14	670	22.9	3.2	79	14.1	25.9

Appendix D: Zircon SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

Sample Name	Unit	Date and Time	Li ppm Est.	Be ppm	B ppm	F ppm	Na ppm Est.	Al ppm Est.	P ppm	K Rel.	Ca ppm Est.	Sc ppm	48/49	Ti from 48 ppm
							23	**27**	**30.97**	**39**	**40**	**44.96**		
SIT-1-1E	Post-PST Lava	8:07:21 AM 24/ 1/2013	0.0	0.0	0.1	8	3	9	258	0.7	2.0	29	13.7	19.8
SIT-1-2C	Post-PST Lava	8:17:25 AM 24/ 1/2013	0.0	0.1	0.0	18	4	6	180	0.6	2.0	43	13.6	8.3
SIT-1-2E	Post-PST Lava	8:27:19 AM 24/ 1/2013	0.0	0.0	0.0	12	3	6	310	0.6	2.0	25	13.7	9.9
SIT-1-3C	Post-PST Lava	8:37:17 AM 24/ 1/2013	0.0	0.0	0.0	13	2	7	170	0.5	1.6	17	12.8	10.6
SIT-1-3E	Post-PST Lava	8:46:46 AM 24/ 1/2013	0.0	0.0	0.0	8	3	7	162	0.6	2.1	19	13.3	8.4
SIT-1-4C	Post-PST Lava	8:56:45 AM 24/ 1/2013	0.0	0.0	0.0	9	3	7	479	0.7	1.8	50	14.0	24.8
SIT-1-5E	Post-PST Lava	9:06:33 AM 24/ 1/2013	0.0	0.0	0.0	5	3	7	265	0.6	1.8	39	13.0	23.5
SIT-1-6C	Post-PST Lava	9:16:00 AM 24/ 1/2013	0.0	0.1	0.0	8	3	8	316	0.7	2.0	49	14.3	26.2
SIT-1-8E	Post-PST Lava	9:35:32 AM 24/ 1/2013	0.0	0.1	0.0	12	2	8	225	0.4	1.8	32	14.0	20.6
SIT-1-9E	Post-PST Lava	9:54:31 AM 24/ 1/2013	0.0	0.0	0.1	9	2	7	234	0.5	1.8	29	13.7	14.4
SIT-1-9S	Post-PST Lava	9:44:58 AM 24/ 1/2013	0.0	0.3	0.0	19	2	7	244	0.5	1.9	37	13.5	22.9
Average	**Post-PST Felsic Lava**		**1.9**	**0.1**	**0.0**	**14.4**	**2.9**	**9.3**	**276.4**	**2.1**	**1.9**	**36.2**	**13.7**	**19.6**
SIT-2_1.1i	Post-PST Lava	05-01-2012-01:21	0.220	34	0.2	7	5.6	11	115	1.7	4.5	89	12.4	4.8
SIT-2_10.1i	Post-PST Lava	05-01-2012-03:01	0.011	16	0.1	6	5.8	10	109	2.1	4.9	37	13.5	4.7
SIT-2_12.1c	Post-PST Lava	05-01-2012-03:32	4.458	3	0.2	14	5.6	20	66	3.5	8.7	22	14.7	3.8
SIT-2_2.1c	Post-PST Lava	9:12:17 PM 30/ 4/2012	0.424	19	0.1	77	5.5	14	612	3.0	9.3	43	14.0	4.4
SIT-2_3.1i	Post-PST Lava	05-01-2012-01:41	0.010	19	0.1	4	3.8	10	296	1.2	2.9	58	13.0	7.5
SIT-2_6.1c	Post-PST Lava	05-01-2012-02:11	0.183	31	0.3	37	24.2	87	244	114.2	21.7	38	14.7	5.0
SIT-2_7.1c	Post-PST Lava	05-01-2012-02:21	10.463	52	0.2	51	8.0	18	525	2.8	10.5	95	13.1	23.1
SIT-2_8.1c	Post-PST Lava	9:29:29 PM 30/ 4/2012	0.651	162	0.2	42	8.4	22	385	3.7	8.2	88	13.6	6.4
SIT-2_9.1c	Post-PST Lava	05-01-2012-02:51	0.032	65	0.2	8	10.9	28	493	32.1	4.4	69	14.9	12.1
SIT-2_11.2e	Post-PST Lava	05-01-2012-03:22	0.102	88	0.2	21	6.9	14	668	20.4	18.1	91	12.1	15.1
SIT-2_12.2e	Post-PST Lava	05-01-2012-03:42	0.031	8	0.1	6	4.6	10	109	2.0	7.0	37	14.0	4.3
SIT-2_2.2e	Post-PST Lava	05-01-2012-01:31	0.116	20	0.2	8	5.7	12	217	2.0	4.4	64	13.4	7.1
SIT-2_4.1e	Post-PST Lava	05-01-2012-01:51	0.023	9	0.2	49	5.1	11	105	2.4	18.9	34	12.5	4.6
SIT-2_5.1e	Post-PST Lava	05-01-2012-02:02	0.219	90	0.2	8	16.0	22	328	11.5	5.5	112	12.3	11.1
SIT-2_7.2e	Post-PST Lava	05-01-2012-02:31	0.537	12	0.1	5	5.9	12	224	2.3	3.9	42	12.8	9.1
Average	**Post-PST Intermediate Lava**		**1.165**	**41.855**	**0.174**	**22.921**	**8.134**	**20.113**	**299.577**	**13.664**	**8.857**	**61.176**	**13.403**	**8.221**
SCM-34_1.2e	Pre-PST Trachyte	10:47:14 PM 30/ 4/2012	0.013	0	0.2	35	65.2	68	269	23.5	39.1	67	13.5	36.2
SCM-34_2.2i	Pre-PST Trachyte	11:07:41 PM 30/ 4/2012	0.000	9	0.1	12	4.3	11	258	1.7	3.6	78	13.8	38.8
SCM-34_3.1c	Pre-PST Trachyte	11:17:57 PM 30/ 4/2012	0.031	8	0.1	144	6.4	14	258	3.6	8.4	75	13.4	21.6
SCM-34_3.2e	Pre-PST Trachyte	11:28:07 PM 30/ 4/2012	0.002	1	0.2	6	3.9	38	185	1.8	6.6	44	13.4	35.2
SCM-34_4.1c	Pre-PST Trachyte	11:38:23 PM 30/ 4/2012	0.015	15	0.2	16	6.0	12	490	2.9	3.7	85	13.6	29.4
SCM-34_5.1c	Pre-PST Trachyte	11:48:46 PM 30/ 4/2012	0.005	70	0.1	41	5.0	12	419	1.9	7.8	30	13.8	15.3
SCM-34_5.2i	Pre-PST Trachyte	11:58:53 PM 30/ 4/2012	0.014	4	0.1	9	14.9	32	261	31.1	3.6	74	13.2	31.2
SCM-34_5.3e	Pre-PST Trachyte	01/05/12	0.003	0	0.3	221	5.3	33	253	2.0	7.3	48	13.4	32.2
SCM-34_6.1e	Pre-PST Trachyte	8:53:55 PM 30/ 4/2012	0.000	4	0.1	21	4.6	12	293	1.8	8.5	40	13.5	22.7
SCM-34_6.2c	Pre-PST Trachyte	01/05/12	0.003	13	0.1	67	4.4	11	286	2.0	10.1	52	14.9	10.0
SCM-34_7.1e	Pre-PST Trachyte	01/05/12	0.000	0	0.1	7	5.0	32	268	1.7	13.4	60	13.0	34.6
SCM-34_7.2i	Pre-PST Trachyte	01/05/12	0.006	1	0.2	21	6.3	13	227	2.1	6.6	41	13.4	22.1
SCM-34_7.3c	Pre-PST Trachyte	01/05/12	0.003	7	0.1	67	3.6	8	289	1.8	7.6	34	13.5	12.9
SCM-34_8.1c	Pre-PST Trachyte	01/05/12	0.006	1	0.1	6	6.0	49	258	2.0	6.6	66	13.5	36.9
SCM-34_9.1i	Pre-PST Trachyte	01/05/12	0.003	0	0.1	97	6.8	54	317	2.5	19.3	74	13.8	45.3
SCM-41-11C	Pre-PST Trachyte	6:58:43 AM 24/ 1/2013	0.0	18	0.0	78	2	9	1256	0.5	3.6	100	13.3	39.6
SCM-41-11E	Pre-PST Trachyte	7:08:20 AM 24/ 1/2013	0.0	0.0	0.0	7	2	20	244	0.5	1.7	35	13.6	33.1
SCM-41-13C	Pre-PST Trachyte	7:28:02 AM 24/ 1/2013	0.0	0.1	0.0	9	2	14	208	0.5	1.7	31	13.4	24.7
SCM-41-14E	Pre-PST Trachyte	7:37:50 AM 24/ 1/2013	0.5	1.3	0.0	8	3	11	204	1.7	2.2	33	13.5	24.6

Appendix D: Zircon SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

Sample Name	**Unit**	**Date and Time**	**Li ppm Est.**	**Be ppm**	**B ppm**	**F ppm**	**Na ppm Est.**	**Al ppm Est.**	**P ppm**	**K Rel.**	**Ca ppm Est.**	**Sc ppm**	**48/49**	**Ti from 48 ppm**
							23	**27**	**30.97**	**39**	**40**	**44.96**		
SCM-41-15E	Pre-PST Trachyte	7:47:42 AM 24/ 1/2013	0.0	0.1	0.0	10	2	19	166	0.6	3.4	25	13.9	29.6
SCM-41-1E	Pre-PST Trachyte	4:31:42 AM 24/ 1/2013	0.0	0.0	0.0	7	3	14	170	0.6	2.0	25	13.5	22.8
SCM-41-2E	Pre-PST Trachyte	4:41:19 AM 24/ 1/2013	0.0	0.0	0.0	8	2	12	165	0.6	1.7	27	14.1	24.9
SCM-41-3E	Pre-PST Trachyte	5:00:51 AM 24/ 1/2013	0.0	0.1	0.0	7	3	10	240	0.6	1.8	34	13.8	26.2
SCM-41-4C	Pre-PST Trachyte	5:10:41 AM 24/ 1/2013	0.0	1.7	0.1	34	56	52	496	0.9	2.0	17	13.7	23.9
SCM-41-4E	Pre-PST Trachyte	5:20:32 AM 24/ 1/2013	0.0	0.0	0.0	7	3	10	239	0.6	2.0	37	13.1	25.4
SCM-41-5C	Pre-PST Trachyte	5:30:21 AM 24/ 1/2013	0.0	44	0.0	26	3	7	386	0.6	1.9	47	13.5	23.0
SCM-41-5E	Pre-PST Trachyte	5:39:41 AM 24/ 1/2013	0.0	1.0	0.0	8	3	16	224	0.6	2.3	34	13.5	28.7
SCM-41-6C	Pre-PST Trachyte	5:49:32 AM 24/ 1/2013	0.0	1.0	0.0	8	2	7	191	0.4	1.6	41	13.8	13.4
SCM-41-6E	Pre-PST Trachyte	5:59:29 AM 24/ 1/2013	0.0	0.0	0.0	6	2	21	168	0.4	1.7	27	13.7	31.1
SCM-41-7C	Pre-PST Trachyte	6:19:07 AM 24/ 1/2013	0.0	2.6	0.0	22	2	7	305	0.4	1.6	47	14.3	24.5
SCM-41-7S	Pre-PST Trachyte	6:09:18 AM 24/ 1/2013	0.0	0.5	0.1	14	1	7	208	0.3	1.5	41	13.5	32.0
SCM-41-8C	Pre-PST Trachyte	6:29:09 AM 24/ 1/2013	0.0	0.0	0.0	7	2	28	248	0.4	1.4	38	13.8	30.8
SCM-41-9E	Pre-PST Trachyte	6:39:05 AM 24/ 1/2013	0.0	0.2	0.0	7	2	9	235	0.5	1.5	32	13.8	25.2
Average	**Pre-PST Trachyte**		**0.0**	**6.2**	**0.1**	**31.7**	**7.3**	**20.4**	**293.4**	**2.8**	**5.7**	**46.7**	**13.6**	**27.5**

[1] Anders & Grevesse (1989) * 1.3596 Korotev Wed Site Wash. U

Appendix D: Zircon SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

Sample Name	**Unit**	**Ti from 49 ppm**	**Fe ppm**	**Y ppm**	**Nb ppm**	**Zr92H Rel.**	**Zr96/Si30**	**La ppm**	**Ce ppm**	**Nd ppm**	**Sm ppm**	**Eu ppm**	**Gd ppm**	**Ho ppm**
				88.91	**93**			**138.91**	**140.12**	**144.24**	**150.4**	**151.96**	**164.93**	**157.25**
SCM1B-1.1I	Feldspar Porphyry Dike	6.5	0.3	717	11	1.1	2.43	0.007	54	0.5	1.18	0.276	10	26
SCM1B-2.1E	Feldspar Porphyry Dike	8.5	0.3	542	8	1.1	2.55	0.016	43	0.3	1.05	0.222	9	20
SCM1B-2.2C	Feldspar Porphyry Dike	8.2	0.3	1449	33	0.9	2.61	0.022	108	0.8	1.48	0.238	16	47
SCM1B-3.1C	Feldspar Porphyry Dike	16.2	0.5	3286	44	1.1	2.41	0.032	315	4.1	9.45	2.498	84	126
SCM1B-4.1C	Feldspar Porphyry Dike	22.8	0.3	2354	5	1.1	2.49	0.118	69	8.7	13.77	5.591	86	93
SCM1B-5.1I	Feldspar Porphyry Dike	6.0	0.3	1625	9	1.0	2.47	0.015	75	1.3	2.93	0.427	24	54
SCM1B-6.1E	Feldspar Porphyry Dike	8.3	0.6	775	11	1.1	2.61	0.015	54	0.6	1.55	0.354	14	29
SCM1B-6.2C	Feldspar Porphyry Dike	7.0	0.3	1632	10	1.0	2.40	0.015	79	1.1	2.53	0.356	22	54
SCM1B-7.1E	Feldspar Porphyry Dike	11.0	1.1	937	13	1.0	2.43	0.098	69	0.9	2.19	0.457	18	35
SCM1B-7.2C	Feldspar Porphyry Dike	6.5	0.2	1527	7	1.0	2.38	0.007	77	1.1	2.53	0.552	21	47
SCM1B-8.1C	Feldspar Porphyry Dike	6.2	0.5	1364	7	1.1	2.60	0.037	70	0.8	2.09	0.350	20	43
SCM1B-10.1C	Feldspar Porphyry Dike	6.2	0.3	2158	13	1.1	2.61	0.012	100	2.2	3.71	0.435	29	75
SCM1B-10.2E	Feldspar Porphyry Dike	8.0	0.3	911	16	1.1	2.35	0.003	60	0.6	1.59	0.375	16	33
SCM1B-11.1C	Feldspar Porphyry Dike	6.5	0.3	2004	11	1.0	2.38	0.011	89	2.1	3.48	0.421	29	67
SCM1B-11.2E	Feldspar Porphyry Dike	9.7	0.2	894	13	1.0	2.47	0.009	66	0.7	1.91	0.394	17	34
SCM1B-12.1C	Feldspar Porphyry Dike	12.3	4.3	2344	7	1.1	2.35	0.209	120	5.8	9.02	3.216	67	94
SCM1B-13.1C	Feldspar Porphyry Dike	7.5	0.4	1065	7	1.1	2.39	0.052	65	0.6	1.70	0.346	18	43
SCM1B-14.1SZ	Feldspar Porphyry Dike	6.2	1.5	705	12	0.9	2.56	0.013	41	0.3	1.08	0.248	11	25
SCM1B-14.2I	Feldspar Porphyry Dike	6.7	0.2	1821	13	1.0	2.48	0.013	79	1.7	3.44	0.471	28	59
SCM1B-14.3E	Feldspar Porphyry Dike	9.2	0.2	964	15	1.1	2.51	0.009	72	0.7	2.14	0.400	19	36
SCM1B-15.1I	Feldspar Porphyry Dike	5.6	0.2	488	7	1.3	2.50	0.008	43	0.2	0.54	0.107	5	16
SCM1B-15.2E	Feldspar Porphyry Dike	8.2	0.3	979	17	1.0	2.40	0.014	66	0.7	1.92	0.434	17	36
SCM1B-16.1I	Feldspar Porphyry Dike	24.4	0.3	1009	5	0.9	2.35	0.018	62	2.3	3.90	1.537	30	40
SCM1B-17.1C	Feldspar Porphyry Dike	12.6	0.9	5797	19	1.2	2.44	0.082	277	11.4	25.17	4.092	206	251
SCM-13_1.1I	Feldspar Porphyry Dike	6.5	0.9	648	13	2.2	2.98	0.253	69	0.5	0.91	0.136	8	21
SCM-13_11.1c	Feldspar Porphyry Dike	16.9	2.2	820	2	1.9	2.79	0.016	67	2.0	4.56	1.850	34	43
SCM-13_2.1e	Feldspar Porphyry Dike	9.0	0.5	822	13	2.0	2.74	0.019	67	0.6	1.85	0.422	16	31
SCM-13_3.1c	Feldspar Porphyry Dike	38.3	0.5	1312	2	1.9	2.81	0.118	82	10.0	13.78	6.358	72	58
SCM-13_3.2e	Feldspar Porphyry Dike	8.5	0.5	942	12	1.9	2.88	0.000	63	0.7	1.89	0.412	17	36
SCM-13_4.1i	Feldspar Porphyry Dike	7.3	0.4	925	16	1.8	2.75	0.008	91	0.5	1.21	0.219	12	32
SCM-13_5.1c	Feldspar Porphyry Dike	29.4	0.4	2265	20	1.9	2.74	0.067	255	6.8	10.38	4.230	78	90
SCM-13_5.2e	Feldspar Porphyry Dike	8.6	0.8	564	9	1.9	2.68	0.073	48	0.4	1.10	0.194	10	21
SCM-13_6.1c	Feldspar Porphyry Dike	26.2	0.3	5266	57	2.0	2.75	0.051	518	9.0	26.34	4.069	229	236
SCM-13_6.2i	Feldspar Porphyry Dike	12.9	0.3	1179	9	1.9	2.77	0.010	107	1.7	3.90	0.844	28	46
SCM-13_7.1c	Feldspar Porphyry Dike	8.4	0.8	1263	6	1.9	2.71	0.030	67	2.2	3.46	0.931	22	42
SCM-13_7.2e	Feldspar Porphyry Dike	7.3	0.4	846	15	1.9	2.71	0.014	83	0.6	1.26	0.271	11	27
SCM-13_8.1c	Feldspar Porphyry Dike	8.7	0.4	1543	36	1.9	2.72	0.001	128	0.9	2.01	0.287	17	50
SCM-13_8.1i	Feldspar Porphyry Dike	8.3	0.4	929	16	1.9	2.81	0.010	68	0.6	1.73	0.346	17	34
SCM-13_9.1e	Feldspar Porphyry Dike	6.9	0.4	1044	21	2.0	2.68	0.003	89	0.6	1.28	0.166	12	33
SCM-13_10.1i	Feldspar Porphyry Dike	7.9	1.2	656	13	2.0	2.80	0.125	70	0.6	0.95	0.130	8	21
SCM-30_1.1c	Feldspar Porphyry Dike	21.7	0.4	2250	4	1.9	2.74	0.085	110	9.1	13.40	5.133	95	95
SCM-30_1.2e	Feldspar Porphyry Dike	7.0	0.4	666	13	2.0	2.67	0.004	56	0.4	1.05	0.254	10	24
SCM-30_10.1e	Feldspar Porphyry Dike	14.8	1.0	726	9	2.0	2.77	0.015	52	0.9	1.96	0.634	15	26
SCM-30_10.2c	Feldspar Porphyry Dike	25.3	0.5	6419	67	2.1	2.71	0.088	671	12.4	33.91	5.204	264	287
SCM-30_11.1c	Feldspar Porphyry Dike	30.1	0.6	3000	5	1.9	2.73	0.174	190	15.7	27.85	7.750	163	130
SCM-30_11.2e	Feldspar Porphyry Dike	7.1	1.3	848	15	2.1	2.78	0.008	68	0.6	1.67	0.283	14	31
SCM-30_2.1c	Feldspar Porphyry Dike	32.4	7.2	11153	116	2.4	2.62	0.165	1200	38.7	91.39	13.533	589	507
SCM-30_3.1c	Feldspar Porphyry Dike	25.5	0.5	2070	4	1.9	2.88	0.210	132	18.2	25.36	11.539	120	92

Appendix D: Zircon SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

Sample Name	**Unit**	**Ti from 49 ppm**	**Fe ppm**	**Y ppm**	**Nb ppm**	**Zr92H Rel.**	**Zr96/Si30**	**La ppm**	**Ce ppm**	**Nd ppm**	**Sm ppm**	**Eu ppm**	**Gd ppm**	**Ho ppm**
				88.91	**93**			**138.91**	**140.12**	**144.24**	**150.4**	**151.96**	**164.93**	**157.25**
SCM-30_4.1i	Feldspar Porphyry Dike	17.2	0.7	1081	7	2.0	2.83	0.019	103	1.7	4.62	0.932	38	47
SCM-30_5.1e	Feldspar Porphyry Dike	6.1	0.5	369	7	1.8	2.73	0.003	38	0.1	0.36	0.072	4	12
SCM-30_6.1i	Feldspar Porphyry Dike	27.0	0.4	1042	5	1.9	2.76	0.021	117	2.8	5.67	1.616	39	45
SCM-30_7.1c	Feldspar Porphyry Dike	6.3	0.8	941	13	2.0	2.76	0.041	64	0.6	1.31	0.207	12	33
SCM-30_8.1c	Feldspar Porphyry Dike	15.0	2.5	10798	63	2.2	2.72	0.682	599	17.7	44.98	3.217	378	476
SCM-30_9.1c	Feldspar Porphyry Dike	27.3	0.5	3403	6	1.9	2.77	0.149	209	13.2	25.85	7.106	175	146
SCM-30_9.2e	Feldspar Porphyry Dike	25.1	0.5	624	2	1.9	2.78	0.008	76	1.8	3.54	1.215	24	26
Averages	**Feldspar Porphyry Dike**	**13.258**	**0.765**	**1886.542**	**16.581**	**1.566**	**2.631**	**0.060**	**140.174**	**4.024**	**8.362**	**1.879**	**60.881**	**75.984**
SCM-20_1.1c	Leucogranite	11.3	0.5	5519	14	3.6	2.71	0.173	313	17.0	37.01	7.469	270	253
SCM-20_1.2e	Leucogranite	9.8	1.5	1369	18	2.8	2.72	0.100	126	1.2	2.99	0.464	27	52
SCM-20_2.1e	Leucogranite	13.9	0.4	3817	11	3.8	2.69	0.087	201	10.5	22.59	4.232	158	167
SCM-20_3.1e	Leucogranite	11.1	0.5	1471	20	3.2	2.67	0.033	144	1.3	3.10	0.526	30	55
SCM-20_4.2e	Leucogranite	13.5	0.8	2155	32	3.3	2.68	0.103	234	2.1	5.22	0.918	52	84
SCM-20_5.1i	Leucogranite	22.0	0.5	5246	72	3.5	2.63	0.065	519	6.1	18.21	2.805	159	217
SCM-20_6.1c	Leucogranite	8.1	0.4	1052	23	3.4	2.79	0.037	103	0.7	1.26	0.294	11	33
SCM-20_6.2e	Leucogranite	15.4	0.5	1835	17	3.5	2.72	0.028	137	2.2	6.23	1.215	56	79
SCM-20_8.1e	Leucogranite	11.2	5.4	1101	25	5.2	2.66	0.538	103	0.9	1.80	0.312	18	39
SCM-20_8.2c	Leucogranite	17.3	1.3	3858	43	3.4	2.69	0.040	327	4.9	16.16	2.619	144	168
SCM-20_9.1c	Leucogranite	7.0	0.5	1923	9	3.4	2.76	0.061	94	2.9	3.99	0.817	28	62
SCM-20_9.2e	Leucogranite	7.7	0.6	1176	29	3.3	2.68	0.050	81	0.6	1.06	0.154	12	37
SCM-20_10.1i	Leucogranite	22.2	0.4	1311	7	3.2	2.68	0.028	125	2.9	6.39	1.401	47	56
SCM-20_11.1c	Leucogranite	15.0	0.6	4781	51	3.4	2.75	0.080	428	6.5	21.29	3.431	180	212
SCM-20_11.2e	Leucogranite	10.4	0.3	918	9	3.3	2.82	0.034	85	1.0	2.59	0.460	23	37
SCM-20_12.1c	Leucogranite	14.9	0.4	752	7	3.3	2.67	0.034	68	1.1	2.31	0.717	19	30
SCM-20_12.2e	Leucogranite	7.5	1.3	1138	25	3.3	2.71	0.032	90	0.7	1.37	0.176	12	37
SCM-38_1.1i	Leucogranite	8.3	0.6	620	9	2.0	2.72	0.019	69	0.5	1.16	0.285	9	20
SCM-38_12.1i	Leucogranite	7.9	1.8	761	14	2.3	2.85	0.036	63	0.5	0.89	0.209	8	25
SCM-38_2.1i	Leucogranite	11.3	4.1	826	9	2.1	2.83	0.421	78	1.0	2.18	0.600	18	31
SCM-38_3.1c	Leucogranite	31.5	1.0	5562	43	2.4	2.83	0.084	505	13.6	34.91	6.173	251	252
SCM-38_4.1e	Leucogranite	9.6	0.7	1314	6	1.9	2.75	0.023	69	1.9	4.06	1.068	30	47
SCM-38_5.1e	Leucogranite	21.7	0.7	4175	15	2.2	2.77	0.088	243	11.3	25.26	4.866	182	188
SCM-38_6.1e	Leucogranite	6.5	0.6	1158	14	1.9	2.71	0.007	69	0.8	1.71	0.282	14	38
SCM-38_7.1c	Leucogranite	11.7	2.2	1631	10	1.9	2.69	0.011	81	2.6	6.17	1.426	48	71
SCM-38_8.1c	Leucogranite	31.0	0.5	646	3	2.0	2.73	0.015	53	1.5	3.18	1.142	21	25
SCM-38_8.2e	Leucogranite	8.6	0.9	679	9	2.0	2.73	0.008	77	0.7	1.11	0.314	9	22
SCM-38_9.1c	Leucogranite	7.6	0.6	1343	19	1.8	2.74	0.008	88	1.3	2.24	0.449	17	43
SCM-38_10.2e	Leucogranite	7.2	2.9	1107	23	2.1	2.77	0.101	104	0.8	1.38	0.179	12	36
SCM-38_11.1c	Leucogranite	11.1	1.2	1191	16	1.9	2.70	0.006	103	1.3	2.87	0.673	23	43
SCM-38_13.1c	Leucogranite	13.7	6.9	814	11	2.1	2.81	0.103	78	1.4	2.34	0.579	16	29
SCM-38_14.1c	Leucogranite	7.1	0.7	827	10	2.1	2.74	0.020	64	0.5	1.15	0.176	12	31
SCM-38_15.1c	Leucogranite	15.7	0.7	3096	10	2.1	2.71	0.056	163	7.1	17.04	2.561	121	137
Average	**Leucogranite**	**12.995**	**1.270**	**1974.956**	**19.109**	**2.783**	**2.730**	**0.077**	**154.049**	**3.314**	**7.916**	**1.485**	**61.756**	**80.432**
SCM6-1.1E	Moss	46.9	0.4	507	2	0.9	2.61	0.021	30	1.7	2.90	0.847	18	20
SCM6-1.2I	Moss	39.3	7.0	394	2	0.9	2.62	0.016	25	0.9	1.90	0.639	14	16
SCM6-2.1I	Moss	18.5	0.5	843	8	0.9	2.51	0.017	63	1.3	2.32	0.648	17	32
SCM6-3.1I	Moss	58.5	0.5	1251	2	0.9	2.51	0.208	46	8.3	9.58	2.384	52	52
SCM6-4.1I	Moss	46.2	0.4	1070	2	1.0	2.38	0.045	49	6.6	9.21	2.345	49	43

Appendix D: Zircon SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

Sample Name	Unit	Ti from 49 ppm	Fe ppm	Y ppm	Nb ppm	Zr92H Rel.	Zr96/Si30	La ppm	Ce ppm	Nd ppm	Sm ppm	Eu ppm	Gd ppm	Ho ppm
				88.91	**93**			**138.91**	**140.12**	**144.24**	**150.4**	**151.96**	**164.93**	**157.25**
SCM6-5.1l	Moss	42.8	0.5	957	2	0.9	2.36	0.044	45	5.5	7.76	1.863	43	37
SCM6-6.1l	Moss	34.6	0.4	484	2	0.9	2.39	0.013	33	1.1	2.07	0.955	15	19
SCM6-7.1e	Moss	30.0	0.4	483	2	1.0	2.49	0.013	37	1.1	2.15	0.923	16	19
SCM6-7.2c	Moss	13.9	0.6	764	3	1.0	2.41	0.023	52	0.8	2.25	1.138	22	34
SCM6-8.1i	Moss	28.8	0.4	501	3	1.0	2.40	0.030	42	1.1	2.21	0.876	16	19
SCM6-9.1c	Moss	24.0	3.6	5010	69	1.1	2.31	0.032	318	4.9	16.14	1.929	158	204
SCM6-10.1c	Moss	20.5	1.1	4837	75	1.0	2.38	0.038	319	4.4	14.96	1.904	148	200
SCM6-11.1c	Moss	22.3	0.4	1549	3	1.1	2.34	0.032	67	5.8	9.65	4.048	58	67
SCM6-12.1e	Moss	29.5	0.4	376	3	0.9	2.40	0.015	38	0.6	1.38	0.432	10	14
SCM6-12.2c	Moss	22.0	0.6	978	6	1.1	2.36	0.036	76	2.6	4.70	1.897	30	37
SCM6-13.1e	Moss	26.3	0.3	439	3	1.0	2.52	0.011	43	0.9	1.75	0.632	13	17
SCM6-14.1e	Moss	29.9	7.9	369	2	1.0	2.47	0.013	28	0.6	1.51	0.601	10	14
SCM6-14.2c	Moss	8.9	1.3	597	7	1.1	2.48	0.055	52	0.5	1.19	0.483	10	19
SCM6-15.1i	Moss	50.3	0.3	1049	2	1.0	2.52	0.065	47	8.2	9.91	2.342	51	41
SCM6-15.2i	Moss	40.8	0.4	396	2	0.9	2.49	0.012	28	0.9	1.76	0.496	12	15
SCM6-16.1c	Moss	29.5	2.1	1408	4	1.0	2.46	0.084	74	6.3	9.82	1.824	58	56
SCM6-17.1c	Moss	56.8	0.4	1196	2	1.0	2.45	0.136	49	8.8	9.83	2.319	51	47
SCM6-18.1c	Moss	9.6	0.8	5083	20	1.2	2.43	0.055	241	11.5	27.79	4.008	230	265
MP1-1.1c	Moss	17.9	0.3	1587	5	0.9	2.50	0.038	111	6.3	10.63	2.870	65	67
MP1-1.2e	Moss	25.1	0.4	690	5	0.8	2.55	0.019	50	1.3	2.54	0.683	20	27
MP1-2.1i	Moss	49.7	0.2	699	1	0.8	2.49	0.086	30	6.9	7.54	5.424	37	29
MP1-3.1e	Moss	27.5	0.7	498	2	0.8	2.50	0.038	33	1.2	2.11	0.849	15	19
MP1-3.2c	Moss	26.2	0.3	1004	2	0.9	2.50	0.018	48	2.7	5.54	2.253	40	39
MP1-4.1e	Moss	30.2	0.3	467	2	0.8	2.39	0.015	31	1.0	2.04	0.915	15	18
MP1-4.2c	Moss	17.7	0.2	1527	4	0.8	2.36	0.031	77	5.8	10.02	3.018	60	62
MP1-5.1c	Moss	29.6	0.3	768	2	0.9	2.64	0.018	38	3.3	6.17	2.500	37	37
MP1-5.2e	Moss	30.8	0.2	483	2	0.8	2.42	0.011	33	1.0	2.03	0.781	14	18
MP1-6.1c	Moss	34.0	3.5	860	2	0.9	2.61	0.069	43	5.4	7.49	2.243	40	34
MP1-7.1e	Moss	32.0	0.2	435	2	0.9	2.44	0.007	32	0.9	1.93	0.908	13	17
MP1-8.1e	Moss	28.4	1.0	384	3	0.8	2.42	0.011	37	0.6	1.37	0.441	10	14
MP1-9.1e	Moss	28.4	0.4	506	2	0.8	2.41	0.019	34	1.1	1.99	0.869	15	19
MP1-9.2c	Moss	25.9	0.4	1102	2	0.8	2.71	0.031	51	5.0	7.87	2.768	46	46
MP1-10.1c	Moss	6.2	0.3	2307	13	0.8	2.35	0.020	105	3.1	5.10	0.993	38	79
MP1-11.1i	Moss	29.3	0.3	908	2	0.8	2.51	0.025	39	2.2	4.50	1.771	28	28
MP1-12.1e	Moss	30.8	0.3	608	3	0.9	2.59	0.022	39	1.6	2.89	1.112	20	23
MP1-13.1e	Moss	34.3	0.3	468	2	0.7	2.44	0.011	37	0.9	2.18	0.879	15	18
MP1-13.2c	Moss	27.5	0.3	1500	3	0.8	2.37	0.062	62	6.6	10.10	3.889	62	60
MP1-14.1c	Moss	35.7	0.3	2041	4	0.8	2.39	0.117	63	8.7	12.07	4.996	77	74
MP1-14.2e	Moss	32.1	0.3	531	4	0.8	2.41	0.012	49	1.1	2.38	0.615	16	20
MPe1-En-10C	Moss Enclave	35.5	0.6	1219	3	1.0	2.15	0.098	49	5.5	8.44	3.008	50	50
MPe1-En-10E	Moss Enclave	29.8	2.1	395	2	1.0	2.22	0.013	35	0.9	1.75	0.561	12	16
MPe1-En-11C	Moss Enclave	34.6	1.6	610	3	1.0	2.15	0.057	30	1.5	2.82	1.150	19	24
MPe1-En-14C	Moss Enclave	34.5	0.8	820	3	1.0	2.17	0.078	37	3.4	5.17	2.044	32	33
MPe1-En-15C	Moss Enclave	32.4	0.9	939	3	0.9	2.13	0.062	49	3.3	5.46	1.997	35	40
MPe1-En-16E	Moss Enclave	24.5	0.8	348	2	0.9	2.21	0.008	34	0.5	1.15	0.422	9	14
MPe1-En-19E	Moss Enclave	33.3	0.7	385	2	1.0	2.19	0.018	31	0.7	1.81	0.751	13	16
MPe1-En-1E	Moss Enclave	27.4	0.9	546	3	1.0	2.13	0.021	47	1.2	2.56	0.885	17	21
MPe1-En-20E	Moss Enclave	29.0	0.7	330	2	1.0	2.19	0.010	29	0.5	1.33	0.512	10	13
MPe1-En-25C	Moss Enclave	28.2	0.6	1470	3	1.1	2.15	0.107	60	6.7	10.36	3.756	65	58

Appendix D: Zircon SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

Sample Name	**Unit**	**Ti from 49 ppm**	**Fe ppm**	**Y ppm**	**Nb ppm**	**Zr92H Rel.**	**Zr96/Si30**	**La ppm**	**Ce ppm**	**Nd ppm**	**Sm ppm**	**Eu ppm**	**Gd ppm**	**Ho ppm**
				88.91	**93**			**138.91**	**140.12**	**144.24**	**150.4**	**151.96**	**164.93**	**157.25**
MPe1-En-25E	Moss Enclave	33.6	0.6	599	3	1.0	2.20	0.024	41	1.3	2.77	0.803	20	25
MPe1-En-2C	Moss Enclave	34.3	0.4	1040	2	1.0	2.11	0.106	41	5.7	7.72	2.853	44	41
MPe1-En-2E	Moss Enclave	41.5	0.6	665	3	0.9	2.15	0.032	44	2.2	4.03	1.025	25	26
MPe1-En-3C	Moss Enclave	29.5	0.6	1332	3	1.1	2.17	0.207	63	6.3	9.38	3.203	56	57
MPe1-En-4C	Moss Enclave	30.5	3.5	470	2	1.1	2.18	0.041	24	1.0	2.05	0.825	14	20
MPe1-En-4E	Moss Enclave	28.5	0.8	388	2	1.0	2.24	0.015	34	0.7	1.54	0.558	10	15
MPe1-En-5C	Moss Enclave	22.5	0.7	4307	46	1.0	2.15	0.098	199	3.2	11.56	1.415	128	189
MPe1-En-5S	Moss Enclave	24.3	0.6	735	2	0.9	2.14	0.013	37	1.8	3.71	1.454	25	30
MPe1-En-6E	Moss Enclave	28.6	0.6	385	2	1.0	2.24	0.025	32	0.6	1.50	0.621	12	15
MPe1-En-7C	Moss Enclave	27.2	0.6	1616	3	1.0	2.18	0.165	63	6.9	10.36	3.614	66	68
MPe1-En-7E	Moss Enclave	28.5	1.4	370	2	1.0	2.16	0.016	34	0.7	1.31	0.605	11	15
MPe1-En-8C	Moss Enclave	24.3	0.6	343	2	0.9	2.17	0.013	26	0.4	1.21	0.490	10	13
MPe1-En-8E	Moss Enclave	28.0	1.2	383	2	1.0	2.20	0.015	31	0.7	1.69	0.602	12	15
MPe1-En-9C	Moss Enclave	30.8	0.5	625	3	0.9	2.20	0.049	35	1.8	3.30	1.203	23	26
MPe1-NonEn-10C	Moss Enclave	23.8	0.5	1097	3	0.8	2.20	0.034	67	5.1	8.35	3.160	56	55
MPe1-NonEn-11C	Moss Enclave	31.4	0.4	1417	4	0.8	2.18	0.117	65	5.8	8.96	3.165	56	58
MPe1-NonEn-11E	Moss Enclave	27.4	2.0	322	2	0.9	2.19	0.072	32	0.6	1.14	0.407	9	13
MPe1-NonEn-1C	Moss Enclave	24.3	0.5	458	2	0.9	2.14	0.016	38	0.8	1.74	0.697	14	18
MPe1-NonEn-1E	Moss Enclave	29.4	0.8	457	3	0.8	2.22	0.023	41	1.2	2.06	0.745	14	18
MPe1-NonEn-2C	Moss Enclave	12.1	0.6	1028	6	0.9	2.19	0.027	63	1.4	3.65	0.950	27	37
MPe1-NonEn-2E	Moss Enclave	23.0	7.9	569	3	3.6	2.20	3.432	67	2.3	3.60	0.983	22	24
MPe1-NonEn-3C	Moss Enclave	37.3	2.0	648	2	0.9	2.21	0.032	29	2.5	3.84	1.535	25	26
MPe1-NonEn-4C	Moss Enclave	24.2	0.4	197	1	0.8	2.18	0.007	14	0.3	0.65	0.399	6	8
MPe1-NonEn-5E	Moss Enclave	31.0	2.7	416	2	0.7	2.16	0.024	34	1.1	2.14	0.782	14	17
MPe1-NonEn-6C	Moss Enclave	26.5	2.6	2955	14	1.0	2.18	0.215	252	10.8	18.60	7.626	118	117
MPe1-NonEn-6E	Moss Enclave	25.5	0.6	419	2	0.7	2.17	0.034	36	0.7	1.67	0.646	12	16
MPe1-NonEn-7E	Moss Enclave	26.5	1.0	536	4	0.8	2.23	0.019	56	0.9	2.09	0.487	16	21
MPe1-NonEn-8C	Moss Enclave	25.4	0.6	407	2	1.0	2.17	0.031	26	1.1	2.14	1.111	14	17
MPe1-NonEn-8E	Moss Enclave	32.9	0.8	476	3	0.8	2.27	0.023	48	0.9	1.83	0.519	15	19
MPe1-NonEn-9C	Moss Enclave	30.7	0.5	527	2	0.8	2.22	0.023	28	1.2	2.06	0.944	16	21
Average	**Moss**	**29.5**	**1.0**	**978.1**	**5.4**	**1.0**	**2.3**	**0.1**	**57.7**	**2.9**	**5.1**	**1.6**	**35.0**	**40.0**
SCM-5a_1.1e	Felsic Porphyry Dike	7.9	1.1	2305	8	3.9	2.74	0.051	95	2.8	7.15	1.832	58	93
SCM-5a_2.1c	Felsic Porphyry Dike	6.5	0.5	1864	37	3.6	2.66	0.041	106	1.1	3.57	0.584	34	70
SCM-5a_2.2e	Felsic Porphyry Dike	3.3	0.4	1441	46	3.6	2.71	0.033	90	0.6	1.33	0.167	14	45
SCM-5a_3.1e	Felsic Porphyry Dike	7.9	0.5	1268	4	3.8	2.67	0.035	69	1.5	4.11	1.114	30	49
SCM-5a_3.2c	Felsic Porphyry Dike	9.3	1.0	2151	41	3.6	2.63	0.035	122	1.5	4.58	0.912	43	82
SCM-5a_4.2e	Felsic Porphyry Dike	3.7	1.6	1379	47	3.4	2.80	0.048	86	0.5	1.14	0.125	12	42
SCM-5a_5.1c	Felsic Porphyry Dike	7.0	0.5	2435	30	3.6	2.70	0.046	119	2.1	5.08	1.097	45	90
SCM-5a_5.2e	Felsic Porphyry Dike	13.5	0.7	1479	12	3.6	2.72	0.047	128	1.8	4.23	1.459	36	59
SCM-5a_6.1i	Felsic Porphyry Dike	6.4	0.5	2141	51	3.7	2.69	0.034	127	1.4	3.66	0.605	38	80
SCM-5a_7.1e	Felsic Porphyry Dike	3.7	0.7	2670	27	3.9	2.70	0.062	97	1.7	3.81	0.503	33	87
SCM-5a_8.2i	Felsic Porphyry Dike	5.1	0.5	1233	25	3.5	2.64	0.031	108	0.6	1.39	0.300	13	40
SCM-5a_9.1e	Felsic Porphyry Dike	4.0	0.5	1203	32	3.4	2.73	0.037	72	0.5	1.33	0.155	13	39
BCD_1.1i	Felsic Porphyry Dike	15.9	0.5	341	3	1.9	2.69	0.009	26	0.3	0.78	0.257	8	13
BCD_2.1c	Felsic Porphyry Dike	5.2	0.5	2634	34	2.1	2.73	0.013	103	1.6	4.76	0.713	45	96
BCD_3.1e	Felsic Porphyry Dike	5.6	0.3	2029	58	2.0	2.86	0.007	132	1.0	2.44	0.304	25	68
BCD_4.1e	Felsic Porphyry Dike	4.3	0.4	1432	24	2.1	2.72	0.003	56	0.4	1.44	0.221	17	48
BCD_5.1c	Felsic Porphyry Dike	19.2	0.7	12975	154	2.7	2.64	0.217	1098	18.3	41.03	4.390	325	492

Appendix D: Zircon SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

Sample Name	**Unit**	**Ti from 49 ppm**	**Fe ppm**	**Y ppm**	**Nb ppm**	**Zr92H Rel.**	**Zr96/Si30**	**La ppm**	**Ce ppm**	**Nd ppm**	**Sm ppm**	**Eu ppm**	**Gd ppm**	**Ho ppm**
				88.91	**93**			**138.91**	**140.12**	**144.24**	**150.4**	**151.96**	**164.93**	**157.25**
BCD_5.2e	Felsic Porphyry Dike	22.7	0.4	3510	49	2.0	2.75	0.024	369	5.5	15.08	4.245	121	147
BCD_6.1c	Felsic Porphyry Dike	12.9	1.0	1587	9	2.2	2.75	0.044	73	3.5	6.23	1.588	45	63
BCD_7.1i	Felsic Porphyry Dike	5.0	0.5	1319	28	2.0	2.78	0.017	85	0.7	1.57	0.300	18	46
BCD_7.2c	Felsic Porphyry Dike	8.4	3.9	1497	26	1.9	2.73	0.287	95	1.2	2.80	0.573	29	58
BCD_8.1i	Felsic Porphyry Dike	8.0	0.5	2118	10	1.9	2.73	0.007	80	2.7	6.60	1.539	52	82
BCD_9.2e	Felsic Porphyry Dike	4.9	0.4	1800	51	1.9	2.77	0.017	114	0.9	1.87	0.333	22	59
Average	**Felsic Porphyry Dike**	**8.276**	**0.768**	**2296.140**	**35.077**	**2.892**	**2.719**	**0.050**	**150.001**	**2.268**	**5.478**	**1.014**	**46.716**	**84.782**
TIP1-1.1c	Times Granite	19.5	0.3	5422	15	1.4	2.57	0.193	346	18.6	38.06	11.900	256	246
TIP1-1.2e	Times Granite	39.8	0.3	545	2	0.9	2.35	0.024	60	2.6	3.92	1.848	23	22
TIP1-2.1c	Times Granite	15.8	0.3	3799	11	1.2	2.47	0.049	190	9.6	21.90	3.608	161	171
TIP1-2.2e	Times Granite	6.7	0.3	784	15	1.0	2.55	0.021	77	0.5	1.14	0.190	10	25
TIP1-3.1c	Times Granite	6.8	0.4	2251	12	1.0	2.52	0.022	102	2.6	4.73	0.687	37	79
TIP1-3.2e	Times Granite	5.9	0.4	885	24	1.0	2.61	0.019	90	0.4	0.99	0.212	9	26
TIP1-4.1i	Times Granite	7.9	0.4	1267	30	0.9	2.50	0.007	101	0.7	1.41	0.202	13	40
TIP1-6.1e	Times Granite	15.8	0.3	1419	11	0.9	2.43	0.019	106	2.1	5.23	1.030	44	61
TIP1-7.1esz	Times Granite	6.7	0.2	750	15	1.0	2.46	0.010	56	0.4	0.84	0.163	9	24
TIP1-7.2c	Times Granite	5.8	0.4	1968	12	1.0	2.44	0.044	95	1.8	3.34	0.367	26	64
TIP1-8.1ci	Times Granite	8.4	0.4	1373	5	0.9	2.45	0.015	68	2.0	3.33	0.879	28	50
TIP1-9.1i	Times Granite	25.5	0.3	955	1	0.8	2.40	0.023	67	3.7	6.38	2.900	40	42
TIP1-10.1i	Times Granite	6.4	0.3	1771	9	0.9	2.50	0.018	73	1.4	3.10	0.517	27	60
TIP1-11.1e	Times Granite	8.5	4.2	1268	17	1.0	2.63	0.456	111	1.0	2.44	0.368	21	49
TIP1-12.1e	Times Granite	9.1	0.3	1175	15	1.0	2.64	0.014	82	1.0	2.76	0.513	26	47
TIP1-13.1e	Times Granite	23.4	0.2	609	3	0.8	2.45	0.024	66	1.7	3.12	1.427	20	25
TIP1-14.1c	Times Granite	24.0	0.9	4449	58	1.1	2.35	0.085	432	5.8	17.04	2.879	151	183
TIP1-15.1i	Times Granite	6.2	0.3	837	16	0.9	2.66	0.018	62	0.4	0.88	0.148	9	27
TIP1-16.1i	Times Granite	20.6	0.4	8681	33	1.4	2.42	0.179	528	21.6	51.01	9.059	374	384
TIP1-17.1e	Times Granite	7.7	0.5	991	17	1.0	2.36	0.012	97	0.7	1.54	0.292	14	32
TIP1-18.1e	Times Granite	23.6	0.4	2699	24	0.8	2.35	0.031	312	5.1	11.59	3.450	98	113
TIP1-19.1i	Times Granite	28.1	0.5	706	3	0.8	2.40	0.073	74	2.1	3.98	1.309	27	29
TIP1-20.1i	Times Granite	20.3	0.5	4851	12	1.0	2.31	0.127	279	15.3	31.92	6.287	221	206
TIP1-21.1c	Times Granite	25.2	0.4	5431	73	1.2	2.60	0.050	514	8.8	24.89	3.853	207	234
SCM-37_1.1c	Times Granite	6.9	1.1	2661	18	2.1	2.80	0.081	194	4.5	6.83	1.438	44	95
SCM-37_1.2i	Times Granite	7.1	0.7	921	15	1.8	3.02	0.023	104	0.9	1.49	0.321	12	30
SCM-37_10.1e	Times Granite	7.5	1.0	986	17	2.0	2.81	0.011	91	0.6	1.26	0.163	12	33
SCM-37_11.1c	Times Granite	10.7	1.4	1404	9	3.1	2.86	0.095	90	2.6	5.15	1.258	35	54
SCM-37_12.1c	Times Granite	25.7	0.8	3347	26	2.0	2.76	0.042	277	5.4	15.68	3.131	129	153
SCM-37_12.1i	Times Granite	22.6	0.7	3845	45	2.1	2.88	0.045	399	5.5	15.10	2.679	137	166
SCM-37_2.1c	Times Granite	27.7	0.7	6958	55	2.1	2.73	0.070	421	10.6	30.85	2.623	270	324
SCM-37_3.1c	Times Granite	12.1	2.4	1543	6	1.9	2.83	0.276	84	2.3	6.07	1.481	46	61
SCM-37_3.2i	Times Granite	6.8	0.4	404	7	2.0	2.92	0.011	43	0.2	0.65	0.142	5	14
SCM-37_4.1e	Times Granite	7.7	0.8	865	15	1.9	2.73	0.005	94	0.8	1.29	0.259	10	28
SCM-37_5.1i	Times Granite	24.0	0.7	5464	82	2.2	2.92	0.033	513	6.6	19.65	3.068	180	239
SCM-37_6.1c	Times Granite	15.4	0.3	1671	17	2.0	2.88	0.112	217	7.0	13.46	2.810	104	144
SCM-37_6.2i	Times Granite	9.0	5.6	840	16	2.0	2.77	0.278	76	1.1	1.30	0.258	12	27
SCM-37_6.3e	Times Granite	7.3	0.7	1052	20	2.0	2.81	0.020	96	0.7	1.43	0.167	12	35
SCM-37_7.1c	Times Granite	15.2	1.2	7566	37	2.5	2.74	0.133	459	19.1	45.65	6.549	330	354
SCM-37_8.1c	Times Granite	6.7	0.6	1728	8	2.1	2.77	0.023	83	2.4	3.79	0.815	26	58
SCM-37_9.1e	Times Granite	7.4	1.2	1291	25	2.0	2.80	0.459	127	1.6	1.85	0.244	17	44

Appendix D: Zircon SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

Sample Name	**Unit**	**Ti from 49 ppm**	**Fe ppm**	**Y ppm**	**Nb ppm**	**Zr92H Rel.**	**Zr96/Si30**	**La ppm**	**Ce ppm**	**Nd ppm**	**Sm ppm**	**Eu ppm**	**Gd ppm**	**Ho ppm**
				88.91	**93**			**138.91**	**140.12**	**144.24**	**150.4**	**151.96**	**164.93**	**157.25**
SCM27B-10I	Times Enclave	6.5	0.6	833	16	0.8	2.20	0.007	80	0.5	1.10	0.190	11	28
SCM27B-12E	Times Enclave	7.7	0.7	816	13	0.8	2.27	0.016	76	0.6	1.62	0.269	15	30
SCM27B-13E	Times Enclave	7.1	0.6	916	16	0.8	2.22	0.023	84	0.6	1.15	0.148	11	31
SCM27B-14E	Times Enclave	12.8	0.7	1610	16	0.8	2.21	0.020	136	1.9	4.77	0.824	46	69
SCM27B-1C	Times Enclave	15.8	0.5	5841	19	1.1	2.19	0.196	308	13.9	34.59	5.647	262	286
SCM27B-2C	Times Enclave	15.4	0.8	346	4	0.8	2.20	0.137	42	0.4	0.97	0.312	9	15
SCM27B-3E	Times Enclave	7.3	0.7	744	14	0.8	2.24	0.012	68	0.5	1.24	0.249	11	27
SCM27B-4C	Times Enclave	8.9	5.7	1646	8	0.9	2.14	0.093	72	2.8	4.86	1.073	33	60
SCM27B-5E	Times Enclave	17.1	0.8	1790	15	0.8	2.30	0.035	195	2.8	6.47	1.917	53	74
SCM27B-6E	Times Enclave	7.5	0.8	972	17	0.8	2.22	0.009	72	0.7	1.76	0.385	17	36
SCM27B-7I	Times Enclave	14.6	1.1	2970	34	0.9	2.26	0.072	288	3.1	8.19	1.421	79	124
SCM27B-8E	Times Enclave	6.4	0.7	743	14	0.9	2.18	0.005	72	0.5	1.10	0.194	11	25
SCM27B-9C	Times Enclave	13.8	0.6	3704	23	0.9	2.20	0.050	167	4.9	13.56	1.971	126	155
SCM27B-15C	Times Enclave	21.7	0.6	6176	90	1.1	2.19	0.075	468	5.5	16.08	1.286	164	256
Average	**Times Granite**	**13.6**	**0.9**	**2300.7**	**20.9**	**1.3**	**2.5**	**0.1**	**172.4**	**4.0**	**9.4**	**1.8**	**74.2**	**96.7**
SIT-1B-10C	Post-PST Lava Enclave	24.3	0.6	762	5	1.1	2.13	0.034	59	1.5	2.86	0.692	19	30
SIT-1B-10E	Post-PST Lava Enclave	21.7	1.1	393	2	0.9	2.18	0.010	28	0.6	1.21	0.402	11	15
SIT-1B-12C	Post-PST Lava Enclave	23.2	0.5	1685	3	1.0	2.18	0.031	85	5.6	9.87	4.029	63	67
SIT-1B-12E	Post-PST Lava Enclave	20.8	0.9	437	3	0.9	2.16	0.007	18	0.3	0.89	0.285	8	14
SIT-1B-13C	Post-PST Lava Enclave	19.5	0.5	1282	3	1.1	2.15	0.048	53	3.1	6.35	1.575	46	53
SIT-1B-13E	Post-PST Lava Enclave	18.4	0.6	564	4	1.1	2.14	0.029	47	0.7	1.67	0.425	13	21
SIT-1B-14E	Post-PST Lava Enclave	19.4	0.6	515	3	1.1	2.21	0.010	33	0.6	1.53	0.523	13	20
SIT-1B-15C	Post-PST Lava Enclave	14.5	0.6	1287	4	1.0	2.18	0.015	75	2.5	6.23	1.828	48	55
SIT-1B-16C	Post-PST Lava Enclave	13.9	0.7	1652	14	1.1	2.24	0.032	181	2.7	5.21	1.997	44	66
SIT-1B-17E	Post-PST Lava Enclave	28.3	0.6	1155	6	1.0	2.17	0.039	71	2.8	4.65	1.546	34	44
SIT-1B-1C	Post-PST Lava Enclave	8.6	0.7	1341	39	1.0	2.22	0.023	100	0.6	1.19	0.165	13	44
SIT-1B-1E	Post-PST Lava Enclave	20.6	0.8	384	3	1.1	2.12	0.019	29	0.4	1.14	0.326	9	15
SIT-1B-20C	Post-PST Lava Enclave	25.4	1.4	2230	3	1.1	2.18	0.243	101	10.7	17.72	5.104	128	111
SIT-1B-20E	Post-PST Lava Enclave	23.4	0.7	402	2	0.9	2.23	0.023	30	0.6	1.34	0.467	10	16
SIT-1B-2E	Post-PST Lava Enclave	20.6	0.6	335	2	1.1	2.15	0.013	25	0.4	0.92	0.337	7	13
SIT-1B-3E	Post-PST Lava Enclave	19.1	0.6	276	2	1.1	2.16	0.005	21	0.3	0.74	0.228	6	11
SIT-1B-4E	Post-PST Lava Enclave	19.2	0.7	315	2	0.9	2.16	0.007	26	0.3	0.90	0.291	7	12
SIT-1B-5C	Post-PST Lava Enclave	24.3	0.8	870	3	1.0	2.18	0.037	34	2.0	3.45	1.134	24	29
SIT-1B-5E	Post-PST Lava Enclave	18.5	0.6	639	4	1.0	2.20	0.010	34	1.0	2.02	0.641	16	24
SIT-1B-6C	Post-PST Lava Enclave	26.9	0.6	866	3	1.1	2.20	0.061	99	3.2	5.60	2.447	35	39
SIT-1B-7E	Post-PST Lava Enclave	22.1	0.6	624	4	1.1	2.12	0.012	42	1.0	2.26	0.771	16	24
SIT-1B-8C	Post-PST Lava Enclave	9.4	0.6	1584	24	1.1	2.12	0.015	152	1.4	2.80	0.551	30	59
SIT-1B-8E	Post-PST Lava Enclave	26.7	0.7	536	3	1.1	2.20	0.015	37	0.9	1.97	0.773	16	21
SIT-1B-9C	Post-PST Lava Enclave	26.3	5.7	5324	20	1.1	2.20	0.303	309	13.3	31.35	4.919	249	260
SIT-1B-9E	Post-PST Lava Enclave	20.2	0.7	594	4	1.0	2.15	0.012	38	1.0	2.26	0.743	16	22
SIT-1-11C	Post-PST Lava	18.1	0.6	436	3	0.8	2.20	0.011	29	0.5	1.30	0.428	10	17
SIT-1-12E	Post-PST Lava	17.5	0.7	594	3	1.0	2.24	0.027	34	0.9	2.22	0.556	17	25
SIT-1-13C	Post-PST Lava	19.9	0.6	788	3	0.8	2.19	0.009	38	0.9	2.61	0.654	19	28
SIT-1-14E	Post-PST Lava	25.2	0.5	524	4	0.8	2.18	0.016	33	0.8	1.66	0.584	13	21
SIT-1-15E	Post-PST Lava	21.6	0.5	854	5	0.9	2.24	0.030	57	1.5	3.03	0.938	22	33
SIT-1-16C	Post-PST Lava	15.4	1.1	3312	8	0.9	2.19	0.199	194	11.5	21.04	7.879	140	149
SIT-1-16E	Post-PST Lava	13.0	0.6	854	6	0.8	2.23	0.013	90	1.4	3.15	1.157	24	35
SIT-1-1C	Post-PST Lava	25.1	3.2	4578	73	1.0	2.15	0.163	541	6.0	15.05	2.525	131	187

Appendix D: Zircon SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

Sample Name	**Unit**	**Ti from 49 ppm**	**Fe ppm**	**Y ppm**	**Nb ppm**	**Zr92H Rel.**	**Zr96/Si30**	**La ppm**	**Ce ppm**	**Nd ppm**	**Sm ppm**	**Eu ppm**	**Gd ppm**	**Ho ppm**
				88.91	**93**			**138.91**	**140.12**	**144.24**	**150.4**	**151.96**	**164.93**	**157.25**
SIT-1-1E	Post-PST Lava	19.7	0.6	572	4	0.9	2.20	0.005	45	0.9	1.90	0.440	14	23
SIT-1-2C	Post-PST Lava	8.4	0.5	982	21	0.9	2.20	0.002	84	0.6	1.36	0.393	13	33
SIT-1-2E	Post-PST Lava	9.8	0.6	879	13	0.9	2.16	0.015	61	0.7	2.12	0.397	18	34
SIT-1-3C	Post-PST Lava	11.3	0.4	1159	5	1.0	2.18	0.039	65	3.0	6.15	1.403	47	61
SIT-1-3E	Post-PST Lava	8.6	0.5	593	10	1.0	2.17	0.012	62	0.4	0.98	0.243	10	23
SIT-1-4C	Post-PST Lava	24.3	0.6	1519	14	1.0	2.19	0.084	156	3.2	6.50	1.450	51	67
SIT-1-5E	Post-PST Lava	24.7	0.4	605	3	0.9	2.25	0.007	34	1.2	2.18	0.703	16	23
SIT-1-6C	Post-PST Lava	25.1	0.5	700	4	0.9	2.16	0.028	34	1.3	2.33	0.851	19	26
SIT-1-8E	Post-PST Lava	20.1	0.8	808	3	0.9	2.21	0.030	35	1.5	2.82	0.894	24	33
SIT-1-9E	Post-PST Lava	14.3	0.5	560	4	0.8	2.25	0.014	37	0.6	1.40	0.409	12	22
SIT-1-9S	Post-PST Lava	23.0	0.6	1120	3	0.9	2.20	0.051	44	3.2	5.93	1.740	39	46
Average	**Post-PST Felsic Lava**	**19.5**	**0.8**	**1079.3**	**8.1**	**1.0**	**2.2**	**0.0**	**77.3**	**2.2**	**4.5**	**1.3**	**34.5**	**44.7**
SIT-2_1.1i	Post-PST Lava	5.2	9.3	657	12	2.4	2.74	0.004	82	0.5	1.04	0.570	9	21
SIT-2_10.1i	Post-PST Lava	4.7	0	482	6	2.3	2.78	0.006	48	0.5	0.90	0.392	8	17
SIT-2_12.1c	Post-PST Lava	3.6	15	178	3	2.3	2.83	0.018	23	0.1	0.20	0.095	2	6
SIT-2_2.1c	Post-PST Lava	4.3	1.4	1425	18	2.4	2.77	0.019	60	0.6	1.52	0.325	18	49
SIT-2_3.1i	Post-PST Lava	7.9	0.6	1394	16	2.4	2.78	0.010	146	1.7	3.89	1.626	36	54
SIT-2_6.1c	Post-PST Lava	4.7	18	1300	36	2.8	2.69	0.050	82	0.6	1.41	0.197	15	42
SIT-2_7.1c	Post-PST Lava	24.0	1.4	1541	10	2.3	2.70	0.016	56	2.0	4.51	1.589	36	58
SIT-2_8.1c	Post-PST Lava	6.4	14	2848	77	2.5	2.76	0.056	348	2.6	7.81	2.893	69	113
SIT-2_9.1c	Post-PST Lava	11.0	2.0	2173	6	2.4	2.73	0.185	72	4.9	8.63	3.724	67	88
SIT-2_11.2e	Post-PST Lava	17.0	15	2325	26	2.4	2.74	0.172	228	3.9	8.39	3.155	70	94
SIT-2_12.2e	Post-PST Lava	4.2	0.5	446	5	2.4	2.77	0.006	35	0.2	0.73	0.355	6	16
SIT-2_2.2e	Post-PST Lava	7.2	2.3	786	9	2.4	2.75	0.144	65	0.8	1.82	0.787	15	28
SIT-2_4.1e	Post-PST Lava	5.0	0.7	381	5	2.6	2.82	0.010	38	0.2	0.58	0.292	6	13
SIT-2_5.1e	Post-PST Lava	12.3	6.9	2302	28	2.4	2.70	0.116	197	2.0	4.59	1.941	46	89
SIT-2_7.2e	Post-PST Lava	9.8	0.5	688	7	2.3	2.73	0.006	60	0.8	1.91	0.813	17	28
Average	**Post-PST Intermediate Lava**	**8.486**	**5.826**	**1261.719**	**17.583**	**2.415**	**2.753**	**0.055**	**102.681**	**1.439**	**3.195**	**1.250**	**28.064**	**47.728**
SCM-34_1.2e	Pre-PST Trachyte	36.6	2.3	410	2	2.7	2.84	0.061	38	1.6	3.17	1.904	19	17
SCM-34_2.2i	Pre-PST Trachyte	38.3	0.5	1026	2	2.5	2.81	0.134	79	12.9	14.25	6.993	68	45
SCM-34_3.1c	Pre-PST Trachyte	22.0	0.7	1301	16	2.6	2.71	0.023	113	1.8	3.52	1.056	25	43
SCM-34_3.2e	Pre-PST Trachyte	35.7	2.8	235	2	2.4	2.82	0.043	35	0.9	1.38	0.886	10	10
SCM-34_4.1c	Pre-PST Trachyte	29.5	1.8	1684	10	2.4	2.73	0.055	198	5.5	10.87	3.316	73	72
SCM-34_5.1c	Pre-PST Trachyte	15.1	0.6	2960	9	2.6	2.77	0.047	122	7.5	16.95	3.457	127	135
SCM-34_5.2i	Pre-PST Trachyte	32.3	1.2	614	2	2.4	2.71	0.046	78	2.6	4.93	2.034	28	26
SCM-34_5.3e	Pre-PST Trachyte	32.6	0.9	412	2	2.3	2.79	0.013	52	1.5	2.79	1.527	17	17
SCM-34_6.1e	Pre-PST Trachyte	23.0	0.5	880	6	2.4	2.83	0.007	91	1.8	4.34	1.310	34	37
SCM-34_6.2c	Pre-PST Trachyte	9.2	1.4	1551	22	2.7	2.82	0.033	140	1.6	3.83	0.844	33	59
SCM-34_7.1e	Pre-PST Trachyte	36.2	1.3	429	1	2.6	2.72	0.017	57	2.1	3.58	1.925	20	18
SCM-34_7.2i	Pre-PST Trachyte	22.5	0.7	531	4	2.3	2.80	0.010	72	1.2	2.92	0.937	20	22
SCM-34_7.3c	Pre-PST Trachyte	13.0	2.1	1091	10	2.4	2.83	0.030	66	1.2	3.70	0.870	31	45
SCM-34_8.1c	Pre-PST Trachyte	37.3	0.9	389	1	2.4	2.70	0.018	34	2.3	3.40	2.344	20	16
SCM-34_9.1i	Pre-PST Trachyte	44.7	1.7	446	2	2.4	2.73	0.021	52	2.9	4.21	2.676	23	19
SCM-41-11C	Pre-PST Trachyte	40.7	2.6	6616	22	0.9	2.17	0.801	386	36.5	61.65	19.478	315	250
SCM-41-11E	Pre-PST Trachyte	33.2	0.8	438	2	0.9	2.17	0.023	34	1.1	2.19	0.872	15	18
SCM-41-13C	Pre-PST Trachyte	25.1	0.7	398	2	1.0	2.18	0.018	37	0.5	1.42	0.657	12	16
SCM-41-14E	Pre-PST Trachyte	24.7	1.8	423	2	0.9	2.19	0.030	35	0.7	1.60	0.620	12	17

Appendix D: Zircon SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

Sample Name	Unit	Ti from 49 ppm	Fe ppm	Y ppm	Nb ppm	Zr92H Rel.	Zr96/Si30	La ppm	Ce ppm	Nd ppm	Sm ppm	Eu ppm	Gd ppm	Ho ppm
				88.91	**93**			**138.91**	**140.12**	**144.24**	**150.4**	**151.96**	**164.93**	**157.25**
SCM-41-15E	Pre-PST Trachyte	29.1	4.3	266	2	0.9	2.24	0.662	25	0.8	1.01	0.452	8	11
SCM-41-1E	Pre-PST Trachyte	23.1	0.7	296	2	0.9	2.17	0.003	31	0.4	0.88	0.329	7	12
SCM-41-2E	Pre-PST Trachyte	24.0	0.7	305	2	0.9	2.18	0.005	29	0.5	1.02	0.409	8	12
SCM-41-3E	Pre-PST Trachyte	26.0	0.7	476	3	1.0	2.20	0.007	44	0.8	2.00	0.766	15	19
SCM-41-4C	Pre-PST Trachyte	23.9	8.5	3061	9	1.0	2.20	0.114	129	7.7	19.94	2.540	143	147
SCM-41-4E	Pre-PST Trachyte	26.4	0.6	478	3	0.9	2.17	0.019	36	0.9	2.03	0.755	13	19
SCM-41-5C	Pre-PST Trachyte	23.3	0.6	2041	5	1.0	2.18	0.180	90	8.5	12.94	4.524	83	85
SCM-41-5E	Pre-PST Trachyte	29.1	1.1	423	3	0.9	2.21	0.007	36	0.8	1.77	0.672	13	17
SCM-41-6C	Pre-PST Trachyte	13.2	0.5	551	3	0.9	2.20	0.014	45	0.7	2.03	0.924	17	26
SCM-41-6E	Pre-PST Trachyte	31.0	0.7	286	2	0.9	2.23	0.012	25	0.5	1.13	0.473	8	11
SCM-41-7C	Pre-PST Trachyte	23.4	0.5	1479	3	0.9	2.19	0.032	90	4.5	8.94	2.424	59	55
SCM-41-7S	Pre-PST Trachyte	32.3	0.5	785	2	0.9	2.18	0.051	38	3.0	5.00	2.060	32	33
SCM-41-8C	Pre-PST Trachyte	30.5	1.2	380	2	0.8	2.24	0.019	24	0.8	1.49	0.668	12	15
SCM-41-9E	Pre-PST Trachyte	24.9	0.7	473	3	0.9	2.19	0.012	46	0.8	1.81	0.655	14	19
Average	**Pre-PST Trachyte**	**27.6**	**1.4**	**1004.0**	**4.9**	**1.6**	**2.5**	**0.1**	**72.9**	**3.5**	**6.4**	**2.2**	**40.4**	**41.3**

[1] Anders & Grevesse (1989) * 1.3596 Korotev Wed Site Wash. U

Appendix D: Zircon SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

Sample Name	Unit	Tb	Dy	Er	Tm	Yb	Lu	Hf	Pb7/6	U	Th	
		ppm	ppm	ppm	ppm	ppm	ppm	ppm	Est,	ppm	ppm	
						176=	176=	177=				Chon. Abun.[1]
						0.127	0.0259	0.1861				
		158.93	162.5	167.26	168.93	173.04	174.97	178.49				Atomic #
SCM1B-1.1I	Feldspar Porphyry Dike	4.0	56	141	35	326	66	11969	0.3604	186	203	
SCM1B-2.1E	Feldspar Porphyry Dike	3.5	45	98	23	211	39	11572	0.0000	107	90	
SCM1B-2.2C	Feldspar Porphyry Dike	6.5	93	262	66	644	128	12037	0.0000	387	418	
SCM1B-3.1C	Feldspar Porphyry Dike	29.3	328	548	112	909	150	9273	0.0275	652	1944	
SCM1B-4.1C	Feldspar Porphyry Dike	25.3	259	390	78	622	110	7658	0.0000	122	269	
SCM1B-5.1I	Feldspar Porphyry Dike	9.4	118	289	69	644	126	12731	0.0000	324	489	
SCM1B-6.1E	Feldspar Porphyry Dike	5.5	67	139	33	298	55	11039	0.0000	161	154	
SCM1B-6.2C	Feldspar Porphyry Dike	8.2	114	296	72	642	124	12570	0.0562	284	445	
SCM1B-7.1E	Feldspar Porphyry Dike	7.1	81	166	38	325	60	10987	0.1786	216	232	
SCM1B-7.2C	Feldspar Porphyry Dike	8.5	106	257	63	600	117	12825	0.0571	249	406	
SCM1B-8.1C	Feldspar Porphyry Dike	7.6	93	210	48	422	80	12398	0.1205	162	225	
SCM1B-10.1C	Feldspar Porphyry Dike	11.5	155	406	99	879	169	12576	0.0778	443	725	
SCM1B-10.2E	Feldspar Porphyry Dike	6.1	76	163	38	325	59	11610	0.0893	192	192	
SCM1B-11.1C	Feldspar Porphyry Dike	11.1	149	365	88	797	150	12530	0.0897	348	563	
SCM1B-11.2E	Feldspar Porphyry Dike	6.7	80	165	37	319	59	11305	0.0000	210	214	
SCM1B-12.1C	Feldspar Porphyry Dike	22.0	241	428	92	743	134	9481	0.1681	167	354	
SCM1B-13.1C	Feldspar Porphyry Dike	7.4	99	240	56	510	99	12409	0.0000	240	368	
SCM1B-14.1SZ	Feldspar Porphyry Dike	4.2	56	128	30	278	54	12409	0.0000	159	124	
SCM1B-14.2I	Feldspar Porphyry Dike	10.2	127	291	65	573	109	12009	0.1389	238	338	
SCM1B-14.3E	Feldspar Porphyry Dike	7.0	86	175	40	343	62	11411	0.0000	243	267	
SCM1B-15.1I	Feldspar Porphyry Dike	2.2	32	90	24	232	50	13144	0.1786	113	103	
SCM1B-15.2E	Feldspar Porphyry Dike	6.8	82	176	41	346	64	11622	0.0752	229	236	
SCM1B-16.1I	Feldspar Porphyry Dike	9.3	102	174	36	293	53	8314	0.0000	94	136	
SCM1B-17.1C	Feldspar Porphyry Dike	68.7	714	955	167	1170	177	8722	0.1042	279	740	
SCM-13_1.1I	Feldspar Porphyry Dike	3.4	45	116	29	272	57	12768	0.0548	222	266	
SCM-13_11.1c	Feldspar Porphyry Dike	11.3	124	189	37	292	52	8944	0.0400	59	122	
SCM-13_2.1e	Feldspar Porphyry Dike	5.9	73	150	34	294	55	11509	0.0968	213	236	
SCM-13_3.1c	Feldspar Porphyry Dike	19.6	179	224	45	341	62	7244	0.0000	32	108	
SCM-13_3.2e	Feldspar Porphyry Dike	6.8	84	175	39	339	60	11489	0.1111	183	191	
SCM-13_4.1i	Feldspar Porphyry Dike	4.8	64	169	42	381	75	12211	0.1122	330	471	
SCM-13_5.1c	Feldspar Porphyry Dike	24.0	252	384	79	615	110	7303	0.0800	171	438	
SCM-13_5.2e	Feldspar Porphyry Dike	3.9	49	106	23	211	40	11659	0.0938	127	111	
SCM-13_6.1c	Feldspar Porphyry Dike	72.4	711	843	152	1037	160	8331	0.0505	637	2634	
SCM-13_6.2i	Feldspar Porphyry Dike	10.5	118	200	41	331	60	9707	0.0682	136	268	
SCM-13_7.1c	Feldspar Porphyry Dike	7.9	94	225	55	512	105	11383	0.0541	241	391	
SCM-13_7.2e	Feldspar Porphyry Dike	4.5	59	150	37	360	74	12795	0.0638	294	404	
SCM-13_8.1c	Feldspar Porphyry Dike	7.5	100	278	69	658	130	12059	0.0570	482	693	
SCM-13_8.1i	Feldspar Porphyry Dike	6.5	81	167	38	324	58	11704	0.0667	231	247	
SCM-13_9.1e	Feldspar Porphyry Dike	5.0	68	187	46	431	86	12364	0.0684	351	472	
SCM-13_10.1i	Feldspar Porphyry Dike	3.5	45	115	30	283	60	12663	0.0597	209	277	
SCM-30_1.1c	Feldspar Porphyry Dike	28.5	275	379	72	558	96	8011	0.2083	75	216	
SCM-30_1.2e	Feldspar Porphyry Dike	4.2	54	120	27	256	49	12695	0.1017	165	158	
SCM-30_10.1e	Feldspar Porphyry Dike	5.6	64	129	30	260	49	10457	0.1563	143	169	
SCM-30_10.2c	Feldspar Porphyry Dike	87.4	823	1086	192	1359	213	8643	0.0781	728	3042	
SCM-30_11.1c	Feldspar Porphyry Dike	45.0	386	490	89	662	111	7911	0.2069	81	288	
SCM-30_11.2e	Feldspar Porphyry Dike	5.5	71	153	36	310	59	12482	0.1111	226	234	
SCM-30_2.1c	Feldspar Porphyry Dike	178.5	1641	1812	304	2080	305	7753	0.0404	1049	6490	
SCM-30_3.1c	Feldspar Porphyry Dike	32.0	286	375	71	557	98	7456	0.0526	78	331	

Appendix D: Zircon SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

Sample Name	Unit	Tb	Dy	Er	Tm	Yb	Lu	Hf	Pb7/6	U	Th	
		ppm	ppm	ppm	ppm	ppm	ppm	ppm	Est,	ppm	ppm	
						176=	176=	177=				**Chon. Abun.[1]**
						0.127	0.0259	0.1861				
		158.93	162.5	167.26	168.93	173.04	174.97	178.49				**Atomic #**
SCM-30_4.1i	Feldspar Porphyry Dike	12.1	126	188	37	273	46	9254	0.2121	84	190	
SCM-30_5.1e	Feldspar Porphyry Dike	1.6	24	68	19	182	39	13679	0.1591	106	92	
SCM-30_6.1i	Feldspar Porphyry Dike	13.0	130	179	34	267	46	8205	0.1154	61	160	
SCM-30_7.1c	Feldspar Porphyry Dike	5.1	70	186	47	427	85	12181	0.1566	207	261	
SCM-30_8.1c	Feldspar Porphyry Dike	130.6	1348	1814	305	2093	301	8928	0.0526	585	1880	
SCM-30_9.1c	Feldspar Porphyry Dike	47.1	426	550	99	734	123	7762	0.1111	100	367	
SCM-30_9.2e	Feldspar Porphyry Dike	7.3	72	105	20	168	31	8186	0.1429	28	58	
Averages	**Feldspar Porphyry Dike**	**19.796**	**205.497**	**324.825**	**65.938**	**532.959**	**94.397**	**10733.363**	**0.086**	**244.339**	**554.571**	
SCM-20_1.1c	Leucogranite	79.0	760	908	156	1107	176	8037	0.1507	214	717	
SCM-20_1.2e	Leucogranite	10.7	130	251	55	461	83	11362	0.1474	321	525	
SCM-20_2.1e	Leucogranite	47.4	476	617	112	796	131	8459	0.0735	170	445	
SCM-20_3.1e	Leucogranite	11.7	138	265	57	498	87	11480	0.0410	332	655	
SCM-20_4.2e	Leucogranite	19.3	222	377	78	621	107	10984	0.1093	601	1795	
SCM-20_5.1i	Leucogranite	55.3	593	875	165	1180	189	8835	0.0806	913	3591	
SCM-20_6.1c	Leucogranite	4.8	64	190	50	487	106	11626	0.0781	427	569	
SCM-20_6.2e	Leucogranite	19.1	209	321	63	458	78	9882	0.1111	176	324	
SCM-20_8.1e	Leucogranite	7.1	90	193	45	406	78	12525	0.1322	315	424	
SCM-20_8.2c	Leucogranite	48.0	495	640	117	835	131	8777	0.0710	487	1362	
SCM-20_9.1c	Leucogranite	10.2	134	333	80	733	146	11764	0.0758	353	601	
SCM-20_9.2e	Leucogranite	4.9	73	201	52	489	103	12234	0.0364	332	340	
SCM-20_10.1i	Leucogranite	15.9	163	228	43	325	55	8491	0.1143	70	152	
SCM-20_11.1c	Leucogranite	60.4	609	782	142	1000	159	8591	0.0606	528	1569	
SCM-20_11.2e	Leucogranite	8.0	94	162	34	276	50	10291	0.1064	134	220	
SCM-20_12.1c	Leucogranite	6.8	76	135	29	233	44	10616	0.0714	137	170	
SCM-20_12.2e	Leucogranite	5.5	77	214	55	508	103	12441	0.1453	309	322	
SCM-38_1.1i	Leucogranite	3.3	44	111	28	265	55	11685	0.1148	198	243	
SCM-38_12.1i	Leucogranite	3.3	48	138	36	359	78	11306	0.1061	203	192	
SCM-38_2.1i	Leucogranite	6.1	72	144	33	288	54	10747	0.0909	192	246	
SCM-38_3.1c	Leucogranite	79.4	756	895	155	1073	169	7965	0.0769	568	2481	
SCM-38_4.1e	Leucogranite	10.2	115	224	50	426	79	11070	0.0923	170	262	
SCM-38_5.1e	Leucogranite	57.3	561	709	123	885	142	8193	0.1000	193	587	
SCM-38_6.1e	Leucogranite	6.1	79	205	50	449	93	12375	0.1000	245	291	
SCM-38_7.1c	Leucogranite	17.3	188	316	64	493	84	10310	0.1290	165	254	
SCM-38_8.1c	Leucogranite	6.4	68	112	23	192	35	9245	0.2500	71	125	
SCM-38_8.2e	Leucogranite	3.5	47	119	30	292	61	11368	0.1098	217	279	
SCM-38_9.1c	Leucogranite	6.9	92	253	64	633	131	11763	0.1122	339	415	
SCM-38_10.2e	Leucogranite	5.0	72	196	49	458	92	12328	0.2945	323	403	
SCM-38_11.1c	Leucogranite	8.5	101	210	48	417	78	11027	0.0693	338	549	
SCM-38_13.1c	Leucogranite	5.6	68	142	32	280	55	10461	0.2921	196	260	
SCM-38_14.1c	Leucogranite	5.0	66	164	40	359	72	13089	0.0769	163	172	
SCM-38_15.1c	Leucogranite	40.3	404	534	95	681	109	8596	0.0435	157	355	
Average	**Leucogranite**	**20.554**	**217.657**	**338.221**	**68.255**	**544.398**	**97.422**	**10543.079**	**0.111**	**289.623**	**633.171**	
SCM6-1.1E	Moss	5.5	54	85	17	147	26	8690	0.4167	41	66	
SCM6-1.2I	Moss	4.1	43	70	14	125	23	9148	0.0000	33	46	
SCM6-2.1I	Moss	6.2	75	163	38	341	68	10756	0.0000	241	281	
SCM6-3.1I	Moss	15.4	150	222	44	341	61	8455	0.2564	124	257	
SCM6-4.1I	Moss	12.9	123	173	33	269	45	8986	0.0000	71	150	

Appendix D: Zircon SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

Sample Name	Unit	Tb	Dy	Er	Tm	Yb	Lu	Hf	Pb7/6	U	Th	
		ppm	ppm	ppm	ppm	ppm	ppm	ppm	Est,	ppm	ppm	
						176=	176=	177=				Chon. Abun.[1]
						0.127	0.0259	0.1861				
		158.93	162.5	167.26	168.93	173.04	174.97	178.49				Atomic #
SCM6-5.1I	Moss	11.8	112	154	30	242	43	9332	0.0000	62	129	
SCM6-6.1I	Moss	4.9	51	82	18	147	27	8824	0.6897	42	61	
SCM6-7.1e	Moss	4.7	51	83	17	144	27	9159	0.0000	49	68	
SCM6-7.2c	Moss	7.5	87	171	39	340	63	12069	0.0000	160	201	
SCM6-8.1i	Moss	4.7	50	85	18	151	29	9320	0.0000	53	70	
SCM6-9.1c	Moss	54.6	584	786	141	983	148	9205	0.0290	570	1174	
SCM6-10.1c	Moss	53.3	572	787	142	1005	149	9236	0.0000	629	1244	
SCM6-11.1c	Moss	17.2	177	282	57	460	79	9197	0.0000	110	211	
SCM6-12.1e	Moss	3.4	37	65	14	124	23	9799	0.0000	47	57	
SCM6-12.2c	Moss	9.3	96	166	35	291	54	8835	0.0000	87	138	
SCM6-13.1e	Moss	4.2	45	77	16	137	25	9557	0.0000	53	67	
SCM6-14.1e	Moss	3.4	36	63	14	113	21	9185	0.0000	34	42	
SCM6-14.2c	Moss	3.8	44	96	23	217	46	11022	0.3279	163	170	
SCM6-15.1i	Moss	13.4	124	167	33	260	44	9109	0.0000	69	139	
SCM6-15.2i	Moss	3.8	40	68	14	118	22	9653	0.0000	40	50	
SCM6-16.1c	Moss	16.4	159	233	46	352	60	10002	0.0000	131	278	
SCM6-17.1c	Moss	13.9	134	196	38	290	52	8583	0.0000	91	193	
SCM6-18.1c	Moss	76.6	791	1021	176	1218	183	8944	0.0000	357	895	
MP1-1.1c	Moss	18.6	191	280	57	447	78	9089	0.0962	156	313	
MP1-1.2e	Moss	6.3	69	117	25	215	40	9370	0.2128	88	122	
MP1-2.1i	Moss	9.0	85	116	23	179	33	7634	0.6667	16	38	
MP1-3.1e	Moss	4.9	51	87	19	157	29	8888	0.0000	42	56	
MP1-3.2c	Moss	11.2	111	164	34	269	48	9286	0.0000	71	130	
MP1-4.1e	Moss	4.6	49	79	17	140	25	8959	0.0000	36	52	
MP1-4.2c	Moss	16.9	169	255	49	385	66	9489	0.0000	129	241	
MP1-5.1c	Moss	10.4	104	152	30	240	44	8926	0.0000	56	109	
MP1-5.2e	Moss	4.6	49	84	17	153	27	9033	0.0000	40	53	
MP1-6.1c	Moss	10.5	101	141	28	223	40	9251	0.0000	92	142	
MP1-7.1e	Moss	4.1	46	74	16	131	24	8896	0.0000	39	53	
MP1-8.1e	Moss	3.4	36	65	14	118	22	9634	0.5263	43	52	
MP1-9.1e	Moss	4.6	51	87	18	154	28	9023	0.0000	43	61	
MP1-9.2c	Moss	13.0	130	186	37	294	52	9187	0.0000	70	138	
MP1-10.1c	Moss	14.2	171	380	85	761	141	11366	0.0000	380	611	
MP1-11.1i	Moss	7.5	74	111	22	173	30	9215	0.0000	39	64	
MP1-12.1e	Moss	5.7	62	103	23	189	35	8693	0.0000	60	82	
MP1-13.1e	Moss	4.7	49	79	17	137	25	8927	0.0000	48	66	
MP1-13.2c	Moss	17.6	170	246	49	390	68	8820	0.2703	98	209	
MP1-14.1c	Moss	21.9	210	298	59	455	78	8459	0.0000	94	219	
MP1-14.2e	Moss	5.1	56	89	19	160	29	9581	0.3509	66	94	
MPe1-En-10C	Moss Enclave	14.2	134	206	42	328	57	9053	0.2857	80	168	
MPe1-En-10E	Moss Enclave	3.9	42	70	16	128	23	9556	0.2000	50	69	
MPe1-En-11C	Moss Enclave	5.9	62	101	22	182	35	8746	0.2000	48	63	
MPe1-En-14C	Moss Enclave	9.6	96	144	29	239	43	8573	0.3448	61	107	
MPe1-En-15C	Moss Enclave	10.6	107	178	36	305	53	8833	0.0000	93	177	
MPe1-En-16E	Moss Enclave	3.2	35	64	14	119	23	9857	0.0000	42	50	
MPe1-En-19E	Moss Enclave	3.9	42	72	15	125	23	9208	0.0000	42	56	
MPe1-En-1E	Moss Enclave	5.2	56	95	20	170	31	9686	0.1111	70	95	
MPe1-En-20E	Moss Enclave	3.3	35	61	13	111	21	9242	0.0000	38	46	
MPe1-En-25C	Moss Enclave	16.9	160	243	49	369	65	9178	0.4878	98	207	

Appendix D: Zircon SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

Sample Name	Unit	Tb	Dy	Er	Tm	Yb	Lu	Hf	Pb7/6	U	Th	
		ppm	ppm	ppm	ppm	ppm	ppm	ppm	Est,	ppm	ppm	
						176=	176=	177=				Chon. Abun.[1]
						0.127	0.0259	0.1861				
		158.93	162.5	167.26	168.93	173.04	174.97	178.49				Atomic #
MPe1-En-25E	Moss Enclave	6.0	58	95	20	168	31	8120	0.0000	48	69	
MPe1-En-2C	Moss Enclave	11.7	113	163	32	251	44	9071	0.2273	51	94	
MPe1-En-2E	Moss Enclave	7.2	73	113	23	196	34	8742	0.0000	62	99	
MPe1-En-3C	Moss Enclave	16.2	159	235	46	372	65	9409	0.0000	108	230	
MPe1-En-4C	Moss Enclave	4.6	52	84	18	158	28	9779	0.0000	36	41	
MPe1-En-4E	Moss Enclave	3.5	38	65	15	126	22	9709	0.0000	45	53	
MPe1-En-5C	Moss Enclave	47.5	515	754	136	955	145	9055	0.0301	399	655	
MPe1-En-5S	Moss Enclave	8.2	80	127	26	209	39	9396	0.0000	52	85	
MPe1-En-6E	Moss Enclave	3.6	40	65	14	122	22	9074	0.2632	40	53	
MPe1-En-7C	Moss Enclave	18.6	190	284	57	437	76	9285	0.1087	141	301	
MPe1-En-7E	Moss Enclave	3.6	38	66	15	122	22	9633	0.6250	45	55	
MPe1-En-8C	Moss Enclave	3.0	32	55	12	101	19	9871	1.5385	30	34	
MPe1-En-8E	Moss Enclave	3.5	38	64	15	125	22	9591	0.9524	43	54	
MPe1-En-9C	Moss Enclave	6.8	70	119	24	205	39	9056	0.0000	64	89	
MPe1-NonEn-10C	Moss Enclave	16.6	163	235	46	380	68	9008	0.0000	167	390	
MPe1-NonEn-11C	Moss Enclave	15.5	163	246	50	395	71	8959	0.0000	114	222	
MPe1-NonEn-11E	Moss Enclave	2.8	32	58	12	108	20	9908	0.2632	41	48	
MPe1-NonEn-1C	Moss Enclave	4.3	46	81	17	146	26	9819	0.3226	53	67	
MPe1-NonEn-1E	Moss Enclave	4.5	49	82	18	151	28	9479	0.1724	57	74	
MPe1-NonEn-2C	Moss Enclave	8.1	87	155	33	262	50	11054	0.1408	158	206	
MPe1-NonEn-2E	Moss Enclave	6.2	66	102	20	170	32	9652	0.1786	69	108	
MPe1-NonEn-3C	Moss Enclave	7.1	71	111	21	177	33	9251	1.0000	42	65	
MPe1-NonEn-4C	Moss Enclave	1.8	20	38	8	73	14	8989	0.0000	19	22	
MPe1-NonEn-5E	Moss Enclave	4.2	44	72	16	131	25	9395	0.1515	48	66	
MPe1-NonEn-6C	Moss Enclave	34.1	331	487	96	766	129	9246	0.0775	258	619	
MPe1-NonEn-6E	Moss Enclave	3.9	42	72	16	133	25	9704	0.2381	46	55	
MPe1-NonEn-7E	Moss Enclave	5.0	56	97	20	176	32	10361	0.0000	79	109	
MPe1-NonEn-8C	Moss Enclave	4.3	45	76	16	142	27	8619	0.3125	27	37	
MPe1-NonEn-8E	Moss Enclave	4.5	49	83	18	155	28	9846	0.0000	65	84	
MPe1-NonEn-9C	Moss Enclave	5.1	55	101	22	188	36	9124	0.0000	51	66	
Average	**Moss**	**10.7**	**110.1**	**167.9**	**33.5**	**266.3**	**46.5**	**9320.5**	**0.1**	**95.7**	**167.6**	
SCM-5a_1.1e	Felsic Porphyry Dike	20.7	234	394	79	611	105	10158	0.1268	201	370	
SCM-5a_2.1c	Felsic Porphyry Dike	14.0	172	331	73	596	105	12415	0.0836	932	1253	
SCM-5a_2.2e	Felsic Porphyry Dike	6.3	90	256	65	625	125	15321	0.0578	1254	1333	
SCM-5a_3.1e	Felsic Porphyry Dike	10.4	120	221	48	405	76	10317	0.2500	111	193	
SCM-5a_3.2c	Felsic Porphyry Dike	16.2	198	382	84	688	123	11786	0.0725	750	1126	
SCM-5a_4.2e	Felsic Porphyry Dike	5.6	82	254	67	653	131	15925	0.0616	1291	1272	
SCM-5a_5.1c	Felsic Porphyry Dike	17.1	211	424	94	782	141	11110	0.1239	344	466	
SCM-5a_5.2e	Felsic Porphyry Dike	13.2	153	255	53	425	75	9855	0.1452	189	349	
SCM-5a_6.1i	Felsic Porphyry Dike	14.8	188	385	83	701	126	12674	0.0349	1308	1907	
SCM-5a_7.1e	Felsic Porphyry Dike	13.0	175	456	114	1024	199	14265	0.0912	1052	1311	
SCM-5a_8.2i	Felsic Porphyry Dike	5.7	83	230	58	554	111	13140	0.0500	537	787	
SCM-5a_9.1e	Felsic Porphyry Dike	5.6	80	216	54	506	102	14585	0.0385	864	876	
BCD_1.1i	Felsic Porphyry Dike	2.6	30	65	14	132	26	10828	0.4000	54	54	
BCD_2.1c	Felsic Porphyry Dike	18.3	227	482	109	940	170	12512	0.0459	948	1092	
BCD_3.1e	Felsic Porphyry Dike	10.7	147	369	91	831	156	13971	0.0481	1429	1790	
BCD_4.1e	Felsic Porphyry Dike	7.1	102	273	68	623	123	12928	0.0558	772	663	
BCD_5.1c	Felsic Porphyry Dike	115.3	1297	2113	412	3128	499	9886	0.0668	1798	7743	

Appendix D: Zircon SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

Sample Name	Unit	Tb	Dy	Er	Tm	Yb	Lu	Hf	Pb7/6	U	Th	
		ppm	ppm	ppm	ppm	ppm	ppm	ppm	Est,	ppm	ppm	
						176=	176=	177=				Chon. Abun.^{1}
						0.127	0.0259	0.1861				
		158.93	162.5	167.26	168.93	173.04	174.97	178.49				Atomic #
BCD_5.2e	Felsic Porphyry Dike	39.5	424	609	118	878	143	9371	0.0526	704	2787	
BCD_6.1c	Felsic Porphyry Dike	14.7	167	294	63	545	99	10562	0.1538	253	408	
BCD_7.1i	Felsic Porphyry Dike	7.6	100	243	59	528	100	13929	0.0498	691	734	
BCD_7.2c	Felsic Porphyry Dike	11.3	135	278	62	521	93	12865	0.0617	678	836	
BCD_8.1i	Felsic Porphyry Dike	18.4	209	372	80	671	119	11679	0.0686	334	510	
BCD_9.2e	Felsic Porphyry Dike	9.4	121	326	81	734	142	14533	0.0545	1491	1904	
Average	**Felsic Porphyry Dike**	**17.286**	**206.292**	**401.194**	**88.313**	**743.469**	**134.323**	**12374.554**	**0.095**	**781.843**	**1293.996**	
TIP1-1.1c	Times Granite	74.4	717	943	173	1273	210	8002	0.0000	220	718	
TIP1-1.2e	Times Granite	6.3	62	94	19	153	28	7258	1.3333	22	45	
TIP1-2.1c	Times Granite	51.4	510	647	117	826	131	9063	0.0000	194	471	
TIP1-2.2e	Times Granite	4.2	53	140	34	325	65	12858	0.0000	225	262	
TIP1-3.1c	Times Granite	14.2	172	391	89	772	145	12003	0.0549	348	616	
TIP1-3.2e	Times Granite	3.4	50	164	48	516	119	14003	0.0867	560	644	
TIP1-4.1i	Times Granite	6.0	83	232	57	560	113	12066	0.0474	340	356	
TIP1-6.1e	Times Granite	15.1	166	244	47	349	58	9532	0.0000	96	147	
TIP1-7.1esz	Times Granite	3.7	49	138	36	351	73	12358	0.0730	186	173	
TIP1-7.2c	Times Granite	10.1	132	339	80	729	142	12700	0.0810	371	599	
TIP1-8.1ci	Times Granite	10.2	123	265	60	539	100	11056	0.1449	197	320	
TIP1-9.1i	Times Granite	12.6	126	188	38	308	56	8720	0.0000	77	147	
TIP1-10.1i	Times Granite	10.8	134	296	67	559	105	11984	0.0000	194	310	
TIP1-11.1e	Times Granite	8.8	110	234	53	444	79	11304	0.2703	228	331	
TIP1-12.1e	Times Granite	9.8	116	212	47	385	72	10691	0.0000	147	173	
TIP1-13.1e	Times Granite	6.4	66	109	22	182	33	7999	0.0000	33	64	
TIP1-14.1c	Times Granite	50.4	522	728	135	999	160	9217	0.0256	588	1792	
TIP1-15.1i	Times Granite	3.9	54	146	38	363	74	11838	0.1786	213	206	
TIP1-16.1i	Times Granite	116.7	1148	1394	238	1667	255	8196	0.0820	406	1333	
TIP1-17.1e	Times Granite	5.3	71	175	43	399	78	12480	0.1053	312	445	
TIP1-18.1e	Times Granite	31.9	325	464	88	668	110	8693	0.0685	459	1810	
TIP1-19.1i	Times Granite	8.0	82	119	23	186	33	8546	0.0000	32	63	
TIP1-20.1i	Times Granite	66.1	633	791	141	1034	165	8388	0.0769	177	556	
TIP1-21.1c	Times Granite	66.6	673	872	159	1139	177	8637	0.0424	719	2609	
SCM-37_1.1c	Times Granite	16.0	204	550	143	1413	290	11977	0.0618	923	1846	
SCM-37_1.2i	Times Granite	4.4	63	163	41	385	79	12004	0.0588	424	679	
SCM-37_10.1e	Times Granite	5.2	71	175	42	395	78	12568	0.1383	271	333	
SCM-37_11.1c	Times Granite	11.2	130	253	56	483	92	10770	0.1364	249	430	
SCM-37_12.1c	Times Granite	43.5	452	572	101	722	116	8408	0.1228	268	622	
SCM-37_12.1i	Times Granite	46.0	463	652	120	868	137	9104	0.0576	655	2407	
SCM-37_2.1c	Times Granite	99.2	1018	1233	199	1285	185	8835	0.0351	398	1101	
SCM-37_3.1c	Times Granite	15.7	170	276	55	432	76	11389	0.0943	161	303	
SCM-37_3.2i	Times Granite	2.1	29	73	18	180	37	12602	0.2593	110	105	
SCM-37_4.1e	Times Granite	4.3	55	158	39	394	81	12586	0.0741	302	392	
SCM-37_5.1i	Times Granite	62.6	664	932	174	1223	198	8984	0.0415	785	2410	
SCM-37_6.1c	Times Granite	34.7	380	611	117	897	152	9737	0.0833	283	697	
SCM-37_6.2i	Times Granite	4.3	58	155	39	390	82	12014	0.2464	220	218	
SCM-37_6.3e	Times Granite	5.5	74	186	47	419	84	12403	0.0532	277	338	
SCM-37_7.1c	Times Granite	106.8	1070	1368	243	1709	271	8460	0.0446	467	1428	
SCM-37_8.1c	Times Granite	9.4	123	308	76	696	141	11867	0.0625	338	554	
SCM-37_9.1e	Times Granite	7.0	94	231	56	501	95	12437	0.0777	441	713	

Sample Name	Unit	Tb	Dy	Er	Tm	Yb	Lu	Hf	Pb7/6	U	Th	
		ppm	ppm	ppm	ppm	ppm	ppm	ppm	Est,	ppm	ppm	
						176=	176=	177=				Chon. Abun.[1]
						0.127	0.0259	0.1861				
		158.93	162.5	167.26	168.93	173.04	174.97	178.49				Atomic #
SCM27B-10I	Times Enclave	4.4	59	154	39	368	74	13045	0.0000	286	360	
SCM27B-12E	Times Enclave	5.5	71	149	35	312	58	12086	0.0000	210	295	
SCM27B-13E	Times Enclave	4.4	63	174	43	389	79	13311	0.0847	261	301	
SCM27B-14E	Times Enclave	16.9	187	295	58	441	73	10293	0.2290	245	593	
SCM27B-1C	Times Enclave	83.4	842	1034	179	1228	187	8488	0.0870	284	770	
SCM27B-2C	Times Enclave	3.1	35	65	14	120	21	10775	0.3448	51	57	
SCM27B-3E	Times Enclave	4.7	62	142	34	309	61	13122	0.0775	252	285	
SCM27B-4C	Times Enclave	11.8	138	293	64	564	105	11246	0.1190	197	310	
SCM27B-5E	Times Enclave	18.4	197	306	62	488	84	9247	0.0442	261	744	
SCM27B-6E	Times Enclave	6.7	83	180	42	367	69	12476	0.0357	287	315	
SCM27B-7I	Times Enclave	28.0	321	523	104	810	137	9913	0.0948	509	1181	
SCM27B-8E	Times Enclave	3.9	53	137	35	336	66	13452	0.0654	271	332	
SCM27B-9C	Times Enclave	39.0	408	549	98	675	108	8700	0.0000	201	336	
SCM27B-15C	Times Enclave	62.3	704	1030	187	1334	196	9231	0.0342	689	1539	
Average	**Times Granite**	**24.9**	**264.0**	**404.5**	**80.3**	**633.8**	**110.8**	**10711.3**	**0.1**	**307.6**	**657.9**	
SIT-1B-10C	Post-PST Lava Enclave	7.0	77	136	30	256	47	9764	0.0735	151	216	
SIT-1B-10E	Post-PST Lava Enclave	3.4	38	72	16	141	26	9968	0.4688	59	68	
SIT-1B-12C	Post-PST Lava Enclave	18.3	179	270	52	398	71	8536	0.0000	60	131	
SIT-1B-12E	Post-PST Lava Enclave	3.0	35	69	16	149	27	9856	0.1563	68	79	
SIT-1B-13C	Post-PST Lava Enclave	13.4	139	229	48	408	72	9126	0.0000	128	244	
SIT-1B-13E	Post-PST Lava Enclave	4.6	52	102	23	197	38	10370	0.1000	107	156	
SIT-1B-14E	Post-PST Lava Enclave	4.3	50	92	20	179	35	9823	0.3125	65	81	
SIT-1B-15C	Post-PST Lava Enclave	14.2	145	226	45	348	62	10261	0.0943	102	170	
SIT-1B-16C	Post-PST Lava Enclave	14.9	169	293	62	491	88	9304	0.1875	185	384	
SIT-1B-17E	Post-PST Lava Enclave	10.5	111	200	43	370	69	9118	0.0952	233	406	
SIT-1B-1C	Post-PST Lava Enclave	5.8	84	254	67	647	133	12279	0.0617	420	401	
SIT-1B-1E	Post-PST Lava Enclave	3.1	38	73	16	144	27	10587	0.0000	65	74	
SIT-1B-20C	Post-PST Lava Enclave	34.0	316	404	73	537	90	8048	0.3571	69	214	
SIT-1B-20E	Post-PST Lava Enclave	3.6	41	76	17	147	27	9523	0.1923	56	69	
SIT-1B-2E	Post-PST Lava Enclave	2.9	34	65	14	129	25	9911	0.2381	47	49	
SIT-1B-3E	Post-PST Lava Enclave	2.1	26	50	12	103	20	10052	0.2778	37	35	
SIT-1B-4E	Post-PST Lava Enclave	2.5	30	57	13	114	22	9918	0.2083	47	50	
SIT-1B-5C	Post-PST Lava Enclave	6.5	67	116	25	205	37	9699	0.1389	54	75	
SIT-1B-5E	Post-PST Lava Enclave	5.0	61	116	26	231	45	9700	0.0000	81	91	
SIT-1B-6C	Post-PST Lava Enclave	9.9	100	159	32	261	47	7800	0.0000	46	100	
SIT-1B-7E	Post-PST Lava Enclave	5.3	61	109	25	210	41	9654	0.1190	96	122	
SIT-1B-8C	Post-PST Lava Enclave	11.3	138	284	62	544	101	11480	0.2027	335	501	
SIT-1B-8E	Post-PST Lava Enclave	5.0	54	96	22	176	33	9491	0.2273	71	93	
SIT-1B-9C	Post-PST Lava Enclave	77.7	768	982	176	1258	195	9060	0.0360	296	866	
SIT-1B-9E	Post-PST Lava Enclave	5.1	56	101	22	192	36	9503	0.1471	81	99	
SIT-1-11C	Post-PST Lava	3.6	40	82	18	159	30	10266	0.1786	62	72	
SIT-1-12E	Post-PST Lava	5.2	61	114	26	220	41	10071	0.0000	74	106	
SIT-1-13C	Post-PST Lava	6.1	69	126	28	234	44	10178	0.1471	75	107	
SIT-1-14E	Post-PST Lava	5.2	57	101	22	188	34	9300	0.0000	59	76	
SIT-1-15E	Post-PST Lava	7.7	85	154	35	297	55	9770	0.1485	162	239	
SIT-1-16C	Post-PST Lava	43.0	427	612	117	878	147	8692	0.0625	186	501	
SIT-1-16E	Post-PST Lava	8.2	89	156	32	257	47	9437	0.1042	103	204	
SIT-1-1C	Post-PST Lava	45.1	479	765	152	1173	194	9816	0.0451	1130	4498	

Appendix D: Zircon SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

Sample Name	Unit	Tb	Dy	Er	Tm	Yb	Lu	Hf	Pb7/6	U	Th	
		ppm	ppm	ppm	ppm	ppm	ppm	ppm	Est,	ppm	ppm	
						176=	176=	177=				Chon. Abun.[1]
						0.127	0.0259	0.1861				
		158.93	162.5	167.26	168.93	173.04	174.97	178.49				Atomic #
SIT-1-1E	Post-PST Lava	4.8	53	101	23	197	37	10415	0.0000	106	147	
SIT-1-2C	Post-PST Lava	5.1	67	175	45	429	90	12453	0.1163	238	261	
SIT-1-2E	Post-PST Lava	6.8	79	159	37	319	59	11764	0.1111	210	212	
SIT-1-3C	Post-PST Lava	16.2	178	275	53	414	71	10218	0.0000	82	161	
SIT-1-3E	Post-PST Lava	4.3	53	118	29	263	50	12573	0.2083	179	243	
SIT-1-4C	Post-PST Lava	17.6	182	306	66	558	98	9794	0.0332	616	2469	
SIT-1-5E	Post-PST Lava	5.5	60	108	24	203	39	9203	0.2273	81	106	
SIT-1-6C	Post-PST Lava	5.5	63	116	26	228	45	8955	0.3704	66	78	
SIT-1-8E	Post-PST Lava	7.7	84	147	33	266	49	9889	0.1316	80	127	
SIT-1-9E	Post-PST Lava	4.1	50	104	25	216	41	10938	0.0000	83	91	
SIT-1-9S	Post-PST Lava	11.2	116	193	40	330	60	9888	0.2778	93	167	
Average	**Post-PST Felsic Lava**	**11.1**	**117.3**	**194.1**	**40.7**	**333.3**	**60.1**	**9919.3**	**0.1**	**151.0**	**332.7**	
SIT-2_1.1i	Post-PST Lava	3.6	44	119	32	343	78	12183		748	1643	
SIT-2_10.1i	Post-PST Lava	2.9	37	90	23	223	50	11748		211	227	
SIT-2_12.1c	Post-PST Lava	1.0	13	35	9	101	23	12630		106	75	
SIT-2_2.1c	Post-PST Lava	7.2	100	266	65	593	117	12644		584	599	
SIT-2_3.1i	Post-PST Lava	12.2	140	249	53	451	87	10332		512	1151	
SIT-2_6.1c	Post-PST Lava	6.2	85	226	57	517	100	14487		935	1108	
SIT-2_7.1c	Post-PST Lava	12.5	147	268	57	489	92	8476		159	219	
SIT-2_8.1c	Post-PST Lava	24.2	283	531	115	979	175	10981		1615	4860	
SIT-2_9.1c	Post-PST Lava	21.5	228	386	80	658	115	9147		161	294	
SIT-2_11.2e	Post-PST Lava	22.0	251	422	85	690	120	9713		487	1281	
SIT-2_12.2e	Post-PST Lava	2.6	34	86	22	218	48	11368		124	114	
SIT-2_2.2e	Post-PST Lava	5.4	67	142	34	312	63	10937		219	266	
SIT-2_4.1e	Post-PST Lava	2.2	28	71	19	187	42	11804		180	187	
SIT-2_5.1e	Post-PST Lava	17.3	208	430	95	787	144	10231		383	628	
SIT-2_7.2e	Post-PST Lava	5.9	65	132	29	262	51	10329		151	191	
Average	**Post-PST Intermediate Lava**	**9.786**	**115.356**	**230.168**	**51.718**	**454.044**	**87.102**	**11134.030**	**#DIV/0!**	**438.246**	**856.217**	
SCM-34_1.2e	Pre-PST Trachyte	5.2	47	71	14	115	22	7890	0.6250	11	23	
SCM-34_2.2i	Pre-PST Trachyte	15.7	131	166	33	243	44	7547	0.1667	24	79	
SCM-34_3.1c	Pre-PST Trachyte	8.8	99	212	49	421	84	10516	0.1043	347	511	
SCM-34_3.2e	Pre-PST Trachyte	2.5	26	40	9	72	14	8200	0.1111	11	19	
SCM-34_4.1c	Pre-PST Trachyte	21.3	208	289	54	409	70	8747	0.1194	184	587	
SCM-34_5.1c	Pre-PST Trachyte	39.7	392	515	88	632	100	9378	0.0612	170	365	
SCM-34_5.2i	Pre-PST Trachyte	7.9	72	105	21	175	33	8387	0.2000	23	48	
SCM-34_5.3e	Pre-PST Trachyte	4.8	48	72	15	120	23	8278	0.2222	21	40	
SCM-34_6.1e	Pre-PST Trachyte	10.4	104	147	29	212	37	8942	0.1176	69	122	
SCM-34_6.2c	Pre-PST Trachyte	12.3	145	261	54	441	78	10563	0.0385	240	342	
SCM-34_7.1e	Pre-PST Trachyte	5.9	52	74	15	119	22	8195	0.5556	18	38	
SCM-34_7.2i	Pre-PST Trachyte	6.0	62	94	19	147	28	9417	0.1053	39	59	
SCM-34_7.3c	Pre-PST Trachyte	10.8	118	189	37	294	51	9843	0.1538	90	99	
SCM-34_8.1c	Pre-PST Trachyte	5.0	45	67	13	110	21	7558	1.0000	11	25	
SCM-34_9.1i	Pre-PST Trachyte	6.0	54	79	15	134	25	7780	0.5000	17	37	
SCM-41-11C	Pre-PST Trachyte	85.6	750	960	179	1322	217	8184	0.1058	498	2085	
SCM-41-11E	Pre-PST Trachyte	4.5	48	78	16	136	25	9297	0.4839	47	65	
SCM-41-13C	Pre-PST Trachyte	3.8	40	70	15	127	23	9810	0.2083	48	61	
SCM-41-14E	Pre-PST Trachyte	4.0	42	75	17	139	26	9899	0.3846	49	62	

Appendix D: Zircon SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

Sample Name	**Unit**	**Tb**	**Dy**	**Er**	**Tm**	**Yb**	**Lu**	**Hf**	**Pb7/6**	**U**	**Th**	
		ppm	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**Est,**	**ppm**	**ppm**	
						176=	**176=**	**177=**				**Chon. Abun.[1]**
						0.127	**0.0259**	**0.1861**				
		158.93	**162.5**	**167.26**	**168.93**	**173.04**	**174.97**	**178.49**				**Atomic #**
SCM-41-15E	Pre-PST Trachyte	2.4	27	48	11	86	16	9453	0.2273	30	34	
SCM-41-1E	Pre-PST Trachyte	2.6	28	54	12	106	20	10219	0.1923	41	43	
SCM-41-2E	Pre-PST Trachyte	2.6	30	55	12	105	20	10002	0.2941	34	36	
SCM-41-3E	Pre-PST Trachyte	4.8	49	83	18	149	28	9582	0.2381	58	76	
SCM-41-4C	Pre-PST Trachyte	44.3	425	500	82	538	77	9100	0.0962	119	260	
SCM-41-4E	Pre-PST Trachyte	4.3	47	81	18	149	28	9481	0.2174	47	59	
SCM-41-5C	Pre-PST Trachyte	24.1	232	339	68	523	89	9539	0.3788	172	372	
SCM-41-5E	Pre-PST Trachyte	3.9	42	72	16	134	24	9605	0.1923	45	56	
SCM-41-6C	Pre-PST Trachyte	5.7	62	115	25	215	39	9995	0.0000	66	75	
SCM-41-6E	Pre-PST Trachyte	2.6	29	51	12	95	18	9325	0.2381	31	36	
SCM-41-7C	Pre-PST Trachyte	16.7	158	208	39	291	51	9062	0.2381	41	96	
SCM-41-7S	Pre-PST Trachyte	9.2	90	134	27	214	38	9146	0.2174	46	81	
SCM-41-8C	Pre-PST Trachyte	3.7	39	68	15	122	23	9308	1.1538	31	33	
SCM-41-9E	Pre-PST Trachyte	4.2	48	82	17	151	28	9820	0.0000	62	77	
Average	**Pre-PST Trachyte**	**11.9**	**114.9**	**165.2**	**32.2**	**249.9**	**43.7**	**9153.6**	**0.3**	**83.0**	**181.8**	

[1] Anders & Grevesse (1989) * 1.3596 Korotev Wed Site Wash. U

Appendix D: Zircon SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

Sample Name	Unit	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm
		0.319	1	0.121	0.615	0.2	0.076	0.267	0.0493	0.33	0.0755	0.216	0.0329
		57	58	59	60	62	63	64	65	66	67	68	69
		La Ch	Ce Ch	Pr Ch Calc	Nd Ch	Sm Ch	Eu Ch	Gd Ch	Tb Ch	Dy Ch	Ho Ch	Er Ch	Tm Ch
SCM1B-1.1I	Feldspar Porphyry Dike	0.02	66	0.25	0.85	5.90	3.63	36.13	81.26	168.76	348.34	651.09	1071.56
SCM1B-2.1E	Feldspar Porphyry Dike	0.05	52	0.23	0.50	5.27	2.91	32.30	70.30	137.61	264.40	453.34	695.25
SCM1B-2.2C	Feldspar Porphyry Dike	0.07	131	0.48	1.28	7.41	3.14	58.06	132.54	282.14	621.86	1213.95	2000.59
SCM1B-3.1C	Feldspar Porphyry Dike	0.10	384	1.63	6.65	47.25	32.87	314.16	594.77	994.94	1670.47	2538.83	3417.13
SCM1B-4.1C	Feldspar Porphyry Dike	0.37	85	4.19	14.09	68.86	73.57	321.84	514.15	783.68	1230.52	1806.17	2382.11
SCM1B-5.1I	Feldspar Porphyry Dike	0.05	91	0.60	2.17	14.64	5.61	89.65	190.01	358.49	721.10	1339.82	2105.12
SCM1B-6.1E	Feldspar Porphyry Dike	0.05	65	0.36	1.01	7.74	4.66	54.21	111.03	203.37	382.66	645.59	988.92
SCM1B-6.2C	Feldspar Porphyry Dike	0.05	96	0.53	1.75	12.64	4.69	82.62	166.16	345.51	710.43	1372.65	2181.73
SCM1B-7.1E	Feldspar Porphyry Dike	0.31	84	0.89	1.51	10.96	6.01	67.37	144.65	245.87	462.93	770.69	1155.35
SCM1B-7.2C	Feldspar Porphyry Dike	0.02	94	0.41	1.79	12.66	7.26	78.83	171.71	320.62	625.79	1189.66	1914.17
SCM1B-8.1C	Feldspar Porphyry Dike	0.11	85	0.59	1.33	10.44	4.60	73.55	153.49	282.22	563.88	970.87	1470.04
SCM1B-10.1C	Feldspar Porphyry Dike	0.04	122	0.78	3.53	18.57	5.72	108.20	232.30	469.31	994.43	1877.38	2997.45
SCM1B-10.2E	Feldspar Porphyry Dike	0.01	73	0.20	0.99	7.96	4.94	60.71	123.91	230.71	438.12	755.78	1156.14
SCM1B-11.1C	Feldspar Porphyry Dike	0.04	109	0.74	3.41	17.41	5.54	107.03	224.17	452.52	890.81	1689.95	2665.54
SCM1B-11.2E	Feldspar Porphyry Dike	0.03	80	0.33	1.16	9.53	5.19	63.98	135.85	243.25	445.42	763.30	1137.40
SCM1B-12.1C	Feldspar Porphyry Dike	0.65	147	3.89	9.49	45.08	42.32	250.65	445.62	729.61	1242.32	1979.36	2787.58
SCM1B-13.1C	Feldspar Porphyry Dike	0.16	79	0.55	1.01	8.50	4.55	67.02	149.94	300.18	569.27	1112.34	1710.35
SCM1B-14.1SZ	Feldspar Porphyry Dike	0.04	50	0.22	0.53	5.40	3.26	40.74	85.72	169.64	337.73	594.36	923.45
SCM1B-14.2I	Feldspar Porphyry Dike	0.04	96	0.67	2.73	17.20	6.20	104.92	207.85	384.02	778.93	1346.88	1973.95
SCM1B-14.3E	Feldspar Porphyry Dike	0.03	88	0.34	1.19	10.71	5.26	69.69	141.35	259.17	480.38	812.19	1214.00
SCM1B-15.1I	Feldspar Porphyry Dike	0.03	53	0.13	0.30	2.72	1.40	20.39	44.31	97.11	209.20	416.09	735.93
SCM1B-15.2E	Feldspar Porphyry Dike	0.04	80	0.37	1.08	9.62	5.71	64.39	137.94	247.69	478.06	815.05	1236.20
SCM1B-16.1I	Feldspar Porphyry Dike	0.06	75	0.93	3.76	19.52	20.22	114.11	188.12	308.90	528.47	804.91	1086.88
SCM1B-17.1C	Feldspar Porphyry Dike	0.26	338	4.45	18.59	125.86	53.84	771.20	1393.85	2164.36	3323.59	4419.63	5067.05
SCM-13_1.1I	Feldspar Porphyry Dike	0.79	84	0.77	0.75	4.57	1.78	31.01	68.11	135.15	283.87	538.69	882.90
SCM-13_11.1c	Feldspar Porphyry Dike	0.05	82	0.83	3.32	22.80	24.35	128.12	228.57	374.90	563.75	876.66	1128.52
SCM-13_2.1e	Feldspar Porphyry Dike	0.06	81	0.40	1.03	9.27	5.55	58.13	119.10	222.53	415.80	695.60	1032.54
SCM-13_3.1c	Feldspar Porphyry Dike	0.37	100	4.62	16.34	68.89	83.66	270.51	397.85	541.25	764.67	1036.50	1357.92
SCM-13_3.2e	Feldspar Porphyry Dike	0.00	77	0.00	1.18	9.45	5.42	65.26	138.30	254.94	470.31	811.37	1200.13
SCM-13_4.1i	Feldspar Porphyry Dike	0.03	111	0.26	0.82	6.05	2.88	43.32	96.93	194.17	418.34	780.85	1263.46
SCM-13_5.1c	Feldspar Porphyry Dike	0.21	311	2.95	11.07	51.92	55.65	292.92	486.27	763.59	1197.04	1779.99	2389.85
SCM-13_5.2e	Feldspar Porphyry Dike	0.23	59	0.46	0.65	5.51	2.56	38.23	79.35	149.47	273.18	492.32	691.72
SCM-13_6.1c	Feldspar Porphyry Dike	0.16	632	3.25	14.61	131.71	53.54	858.19	1469.18	2154.75	3128.76	3902.92	4621.63
SCM-13_6.2i	Feldspar Porphyry Dike	0.03	130	0.61	2.72	19.48	11.11	106.30	213.12	358.30	608.88	923.68	1235.47
SCM-13_7.1c	Feldspar Porphyry Dike	0.10	81	1.08	3.64	17.28	12.25	81.87	159.55	284.97	558.73	1041.15	1681.38
SCM-13_7.2e	Feldspar Porphyry Dike	0.04	101	0.35	0.98	6.29	3.56	42.86	91.49	179.66	360.17	693.04	1133.28
SCM-13_8.1c	Feldspar Porphyry Dike	0.00	156	0.21	1.43	10.07	3.78	64.45	151.88	304.39	659.30	1286.56	2112.07
SCM-13_8.1i	Feldspar Porphyry Dike	0.03	83	0.32	1.01	8.67	4.55	64.86	132.16	244.51	452.32	773.21	1141.50
SCM-13_9.1e	Feldspar Porphyry Dike	0.01	109	0.21	1.04	6.41	2.19	44.19	100.84	207.28	438.70	864.89	1408.97
SCM-13_10.1i	Feldspar Porphyry Dike	0.39	85	0.69	0.93	4.74	1.71	31.06	71.24	135.46	282.20	533.06	898.94
SCM-30_1.1c	Feldspar Porphyry Dike	0.27	134	3.88	14.77	67.02	67.54	357.07	577.44	833.13	1253.18	1753.97	2195.14
SCM-30_1.2e	Feldspar Porphyry Dike	0.01	68	0.16	0.58	5.25	3.34	37.29	84.35	162.25	315.40	557.42	819.92
SCM-30_10.1e	Feldspar Porphyry Dike	0.05	64	0.47	1.50	9.79	8.34	55.22	112.83	193.88	342.35	596.93	900.50
SCM-30_10.2c	Feldspar Porphyry Dike	0.28	818	4.82	20.15	169.56	68.47	990.13	1772.30	2494.68	3801.21	5026.69	5842.12
SCM-30_11.1c	Feldspar Porphyry Dike	0.55	232	7.07	25.45	139.26	101.97	612.17	912.30	1169.55	1717.88	2267.31	2696.47
SCM-30_11.2e	Feldspar Porphyry Dike	0.02	83	0.27	0.91	8.33	3.73	53.62	110.73	213.72	407.41	706.75	1081.17
SCM-30_2.1c	Feldspar Porphyry Dike	0.52	1463	12.71	62.95	456.96	178.06	2205.58	3620.96	4974.13	6713.82	8388.29	9233.51
SCM-30_3.1c	Feldspar Porphyry Dike	0.66	161	8.33	29.58	126.82	151.84	448.20	649.65	868.08	1222.12	1735.03	2158.71

Appendix D: Zircon SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

Sample Name	**Unit**	**La**	**Ce**	**Pr**	**Nd**	**Sm**	**Eu**	**Gd**	**Tb**	**Dy**	**Ho**	**Er**	**Tm**
		0.319	**1**	**0.121**	**0.615**	**0.2**	**0.076**	**0.267**	**0.0493**	**0.33**	**0.0755**	**0.216**	**0.0329**
		57	**58**	**59**	**60**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**
SCM-30_4.1i	Feldspar Porphyry Dike	0.06	125	0.78	2.83	23.09	12.26	140.79	244.47	381.85	618.02	869.46	1116.87
SCM-30_5.1e	Feldspar Porphyry Dike	0.01	47	0.07	0.20	1.80	0.95	14.24	33.45	72.38	157.41	316.70	573.96
SCM-30_6.1i	Feldspar Porphyry Dike	0.07	143	1.11	4.56	28.33	21.26	147.74	263.83	392.70	600.20	830.34	1025.73
SCM-30_7.1c	Feldspar Porphyry Dike	0.13	78	0.49	0.95	6.56	2.73	45.48	103.94	212.34	430.80	860.74	1417.11
SCM-30_8.1c	Feldspar Porphyry Dike	2.14	731	12.12	28.85	224.89	42.33	1414.96	2649.67	4085.46	6304.26	8399.24	9276.61
SCM-30_9.1c	Feldspar Porphyry Dike	0.47	255	5.98	21.39	129.23	93.51	653.94	956.05	1291.10	1931.18	2546.99	3016.51
SCM-30_9.2e	Feldspar Porphyry Dike	0.02	93	0.60	2.98	17.70	15.99	91.49	147.49	219.21	342.07	483.83	622.81
Averages	**Feldspar Porphyry Dike**	**0.19**	**170.94**	**1.81**	**6.54**	**41.81**	**24.73**	**228.02**	**401.53**	**622.72**	**1006.41**	**1503.82**	**2004.21**
SCM-20_1.1c	Leucogranite	0.54	381	7.46	27.61	185.03	98.28	1010.19	1603.10	2302.05	3351.67	4201.49	4739.25
SCM-20_1.2e	Leucogranite	0.31	153	1.06	1.96	14.97	6.10	101.90	216.91	392.62	682.16	1160.99	1673.31
SCM-20_2.1e	Leucogranite	0.27	246	4.30	17.07	112.96	55.69	591.39	961.10	1442.47	2214.84	2856.44	3406.84
SCM-20_3.1e	Leucogranite	0.10	176	0.78	2.13	15.49	6.92	112.89	237.16	417.13	726.96	1226.19	1721.43
SCM-20_4.2e	Leucogranite	0.32	285	1.57	3.46	26.11	12.08	195.86	390.93	673.30	1112.67	1743.18	2363.29
SCM-20_5.1i	Leucogranite	0.20	632	2.71	9.88	91.04	36.91	596.53	1121.05	1797.88	2875.39	4052.32	5005.45
SCM-20_6.1c	Leucogranite	0.12	126	0.54	1.15	6.32	3.87	41.93	97.31	194.68	436.54	879.94	1530.70
SCM-20_6.2e	Leucogranite	0.09	167	1.05	3.63	31.16	15.98	211.33	386.54	632.83	1050.61	1485.85	1914.16
SCM-20_8.1e	Leucogranite	1.69	126	1.58	1.53	8.99	4.11	66.16	143.30	272.21	512.97	892.20	1378.99
SCM-20_8.2c	Leucogranite	0.13	399	2.00	7.97	80.80	34.46	538.71	973.81	1498.49	2220.94	2962.40	3560.83
SCM-20_9.1c	Leucogranite	0.19	114	1.63	4.75	19.97	10.75	104.12	206.61	404.74	822.26	1539.55	2437.76
SCM-20_9.2e	Leucogranite	0.16	99	0.51	0.93	5.32	2.03	44.00	99.98	221.29	491.72	932.13	1590.78
SCM-20_10.1i	Leucogranite	0.09	153	1.25	4.71	31.93	18.43	177.86	321.90	494.44	748.13	1057.62	1292.38
SCM-20_11.1c	Leucogranite	0.25	522	3.04	10.58	106.46	45.14	675.86	1225.77	1845.22	2802.59	3619.83	4306.37
SCM-20_11.2e	Leucogranite	0.11	103	0.66	1.65	12.97	6.05	85.36	162.60	284.11	483.79	749.81	1025.33
SCM-20_12.1c	Leucogranite	0.11	82	0.69	1.77	11.56	9.43	72.85	138.19	229.74	396.22	626.48	895.81
SCM-20_12.2e	Leucogranite	0.10	110	0.48	1.06	6.83	2.31	45.61	111.95	232.37	495.67	990.53	1669.10
SCM-38_1.1i	Leucogranite	0.06	84	0.36	0.87	5.78	3.76	33.35	67.59	134.31	263.58	515.47	838.15
SCM-38_12.1i	Leucogranite	0.11	77	0.40	0.76	4.43	2.75	31.20	66.26	146.24	327.87	638.05	1086.69
SCM-38_2.1i	Leucogranite	1.32	95	1.53	1.65	10.90	7.89	65.82	124.08	217.61	409.42	664.69	1000.87
SCM-38_3.1c	Leucogranite	0.26	615	5.05	22.08	174.56	81.22	941.15	1610.13	2289.97	3334.64	4143.97	4721.36
SCM-38_4.1e	Leucogranite	0.07	84	0.87	3.02	20.32	14.06	111.78	207.80	349.72	619.94	1034.90	1522.43
SCM-38_5.1e	Leucogranite	0.27	297	4.52	18.35	126.30	64.03	682.39	1162.23	1699.08	2486.50	3280.73	3752.31
SCM-38_6.1e	Leucogranite	0.02	85	0.32	1.26	8.55	3.72	53.08	124.74	240.54	501.11	948.10	1517.91
SCM-38_7.1c	Leucogranite	0.03	99	0.85	4.27	30.86	18.77	180.50	349.99	568.78	945.47	1463.80	1943.58
SCM-38_8.1c	Leucogranite	0.05	64	0.65	2.40	15.90	15.03	77.57	130.43	206.75	328.03	516.42	685.19
SCM-38_8.2e	Leucogranite	0.03	94	0.31	1.10	5.55	4.13	33.98	71.93	141.36	289.59	551.42	917.95
SCM-38_9.1c	Leucogranite	0.03	108	0.50	2.18	11.22	5.90	62.63	139.31	278.56	574.85	1170.41	1957.26
SCM-38_10.2e	Leucogranite	0.32	127	0.79	1.25	6.89	2.35	43.10	100.49	219.23	471.21	906.34	1482.97
SCM-38_11.1c	Leucogranite	0.02	125	0.43	2.15	14.37	8.86	87.99	172.50	305.86	566.52	970.34	1446.25
SCM-38_13.1c	Leucogranite	0.32	95	1.21	2.33	11.70	7.62	58.68	113.10	206.20	385.56	659.61	980.57
SCM-38_14.1c	Leucogranite	0.06	78	0.33	0.74	5.76	2.32	45.09	101.82	201.10	407.75	760.57	1201.13
SCM-38_15.1c	Leucogranite	0.18	198	2.86	11.55	85.22	33.70	451.83	817.43	1224.78	1818.69	2470.89	2896.24
Average	**Leucogranite**	**0.24**	**187.86**	**1.58**	**5.39**	**39.58**	**19.53**	**231.29**	**416.91**	**659.57**	**1065.33**	**1565.84**	**2074.63**
SCM6-1.1E	Moss	0.06	36	0.78	2.71	14.51	11.15	68.74	112.18	164.86	259.78	392.45	529.96
SCM6-1.2I	Moss	0.05	30	0.48	1.48	9.50	8.40	50.75	83.85	129.01	216.89	325.25	437.67
SCM6-2.1I	Moss	0.05	77	0.64	2.17	11.62	8.52	63.90	125.99	228.39	425.68	756.92	1156.69
SCM6-3.1I	Moss	0.65	57	4.93	13.56	47.91	31.37	196.36	311.66	454.59	685.71	1028.43	1330.66
SCM6-4.1I	Moss	0.14	60	2.53	10.72	46.04	30.86	184.37	262.48	373.91	571.89	799.42	1013.72

Appendix D: Zircon SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

Sample Name	**Unit**	**La**	**Ce**	**Pr**	**Nd**	**Sm**	**Eu**	**Gd**	**Tb**	**Dy**	**Ho**	**Er**	**Tm**
		0.319	**1**	**0.121**	**0.615**	**0.2**	**0.076**	**0.267**	**0.0493**	**0.33**	**0.0755**	**0.216**	**0.0329**
		57	**58**	**59**	**60**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**
SCM6-5.1I	Moss	0.14	54	2.23	8.98	38.78	24.51	159.67	240.00	338.07	487.97	715.04	920.47
SCM6-6.1I	Moss	0.04	41	0.51	1.80	10.33	12.57	57.01	98.62	155.45	248.26	377.60	535.83
SCM6-7.1e	Moss	0.04	45	0.50	1.73	10.76	12.15	58.93	95.57	153.35	249.70	383.51	506.98
SCM6-7.2c	Moss	0.07	63	0.48	1.24	11.23	14.97	82.36	151.55	265.12	451.63	790.80	1173.16
SCM6-8.1i	Moss	0.10	52	0.68	1.83	11.06	11.53	60.69	94.82	152.87	256.42	392.82	552.68
SCM6-9.1c	Moss	0.10	387	1.85	7.98	80.70	25.39	592.88	1107.90	1768.48	2708.59	3640.99	4292.50
SCM6-10.1c	Moss	0.12	389	1.83	7.20	74.79	25.05	554.44	1080.35	1734.24	2653.64	3642.59	4327.02
SCM6-11.1c	Moss	0.10	82	2.06	9.37	48.26	53.26	217.06	349.65	537.10	882.87	1307.67	1719.48
SCM6-12.1e	Moss	0.05	47	0.37	1.04	6.89	5.68	37.53	69.51	111.47	189.78	302.54	431.30
SCM6-12.2c	Moss	0.11	93	1.28	4.27	23.52	24.96	111.70	187.83	290.60	484.91	769.18	1064.54
SCM6-13.1e	Moss	0.04	52	0.41	1.39	8.77	8.32	48.24	85.50	136.18	228.13	354.27	486.05
SCM6-14.1e	Moss	0.04	34	0.34	1.00	7.55	7.91	38.71	68.13	109.92	188.01	291.68	412.19
SCM6-14.2c	Moss	0.17	63	0.46	0.74	5.96	6.36	37.92	76.20	134.64	257.73	443.43	688.18
SCM6-15.1i	Moss	0.20	57	3.31	13.34	49.53	30.81	192.12	270.83	374.72	542.52	771.14	991.31
SCM6-15.2i	Moss	0.04	34	0.43	1.47	8.82	6.52	46.13	77.57	121.10	199.89	313.68	435.34
SCM6-16.1c	Moss	0.26	90	3.03	10.27	49.08	24.00	217.23	333.26	480.47	741.41	1080.04	1383.46
SCM6-17.1c	Moss	0.43	59	4.42	14.24	49.17	30.51	191.23	282.08	405.59	621.26	907.52	1150.94
SCM6-18.1c	Moss	0.17	294	3.91	18.69	138.95	52.73	862.93	1554.67	2397.96	3512.43	4728.82	5357.50
MP1-1.1c	Moss	0.12	136	2.33	10.30	53.14	37.76	242.03	377.67	578.48	883.72	1298.34	1728.04
MP1-1.2e	Moss	0.06	61	0.63	2.05	12.70	8.99	75.64	128.27	208.63	352.54	541.96	771.10
MP1-2.1i	Moss	0.27	36	3.24	11.27	37.68	71.37	137.04	182.56	256.26	389.81	535.69	705.28
MP1-3.1e	Moss	0.12	40	0.76	1.92	10.56	11.17	57.78	100.10	155.93	255.39	403.55	567.47
MP1-3.2c	Moss	0.06	58	1.03	4.44	27.72	29.64	150.61	228.10	336.52	519.84	761.01	1019.72
MP1-4.1e	Moss	0.05	38	0.50	1.63	10.21	12.04	55.12	92.31	147.20	240.41	364.16	519.66
MP1-4.2c	Moss	0.10	94	2.05	9.38	50.10	39.71	224.73	341.94	512.24	815.18	1179.00	1496.78
MP1-5.1c	Moss	0.06	46	1.17	5.40	30.86	32.89	140.20	210.31	313.81	491.17	701.97	913.06
MP1-5.2e	Moss	0.04	40	0.44	1.55	10.17	10.28	53.53	92.57	148.78	240.50	387.77	521.87
MP1-6.1c	Moss	0.21	52	2.56	8.85	37.43	29.51	149.30	212.43	305.45	455.85	653.83	851.22
MP1-7.1e	Moss	0.02	39	0.37	1.49	9.67	11.95	50.32	83.48	138.06	224.99	340.88	482.13
MP1-8.1e	Moss	0.03	46	0.33	1.04	6.87	5.80	38.80	68.92	109.58	190.84	298.91	429.51
MP1-9.1e	Moss	0.06	42	0.56	1.72	9.95	11.44	55.40	93.69	155.23	257.78	400.70	540.48
MP1-9.2c	Moss	0.10	62	1.88	8.19	39.37	36.43	171.99	263.04	392.87	608.68	861.60	1117.46
MP1-10.1c	Moss	0.06	128	1.17	5.01	25.50	13.07	143.97	287.64	519.55	1040.37	1760.01	2589.46
MP1-11.1i	Moss	0.08	47	1.00	3.59	22.50	23.30	103.59	152.90	223.77	373.78	516.17	669.01
MP1-12.1e	Moss	0.07	48	0.77	2.58	14.47	14.64	73.56	115.59	186.70	309.17	478.76	687.99
MP1-13.1e	Moss	0.03	45	0.41	1.44	10.92	11.57	57.60	95.99	148.25	239.67	365.32	501.79
MP1-13.2c	Moss	0.19	76	2.81	10.73	50.49	51.17	233.08	357.20	514.52	800.82	1138.02	1478.64
MP1-14.1c	Moss	0.37	77	4.20	14.20	60.37	65.74	287.88	443.70	637.73	985.26	1380.73	1781.31
MP1-14.2e	Moss	0.04	60	0.49	1.78	11.89	8.09	60.77	103.20	168.59	269.86	413.52	591.39
MPe1-En-10C	Moss Enclave	0.31	59	2.90	8.91	42.18	39.57	186.90	288.92	405.16	659.11	955.62	1275.86
MPe1-En-10E	Moss Enclave	0.04	42	0.45	1.48	8.76	7.38	44.75	79.67	128.02	207.13	325.70	474.73
MPe1-En-11C	Moss Enclave	0.18	36	1.04	2.49	14.08	15.13	72.71	120.15	187.69	311.53	467.93	666.35
MPe1-En-14C	Moss Enclave	0.24	45	1.94	5.48	25.83	26.89	120.74	194.45	289.98	443.63	666.52	874.47
MPe1-En-15C	Moss Enclave	0.20	59	1.77	5.34	27.32	26.28	130.48	214.73	325.50	531.20	822.14	1105.53
MPe1-En-16E	Moss Enclave	0.02	41	0.27	0.88	5.77	5.55	33.05	65.49	105.37	188.54	294.16	439.97
MPe1-En-19E	Moss Enclave	0.06	37	0.40	1.06	9.06	9.88	47.54	79.56	128.09	208.03	333.64	465.09
MPe1-En-1E	Moss Enclave	0.06	57	0.62	1.91	12.80	11.64	63.48	105.83	170.90	277.25	439.66	618.22
MPe1-En-20E	Moss Enclave	0.03	36	0.29	0.87	6.65	6.74	38.64	66.78	107.42	172.04	282.56	385.99
MPe1-En-25C	Moss Enclave	0.34	73	3.42	10.90	51.78	49.42	244.19	343.39	483.58	770.43	1124.12	1477.60

Appendix D: Zircon SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

Sample Name	**Unit**	**La**	**Ce**	**Pr**	**Nd**	**Sm**	**Eu**	**Gd**	**Tb**	**Dy**	**Ho**	**Er**	**Tm**
		0.319	**1**	**0.121**	**0.615**	**0.2**	**0.076**	**0.267**	**0.0493**	**0.33**	**0.0755**	**0.216**	**0.0329**
		57	**58**	**59**	**60**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**
MPe1-En-25E	Moss Enclave	0.07	49	0.70	2.13	13.87	10.57	73.22	120.78	176.34	325.29	440.10	598.76
MPe1-En-2C	Moss Enclave	0.33	49	3.06	9.26	38.59	37.54	166.47	237.10	342.24	542.88	753.61	964.53
MPe1-En-2E	Moss Enclave	0.10	54	1.10	3.63	20.16	13.48	92.62	146.63	221.65	350.99	522.31	709.14
MPe1-En-3C	Moss Enclave	0.65	76	4.10	10.30	46.89	42.14	209.40	328.61	481.92	750.47	1087.06	1410.48
MPe1-En-4C	Moss Enclave	0.13	30	0.68	1.57	10.23	10.85	50.70	94.17	156.98	258.30	389.44	558.59
MPe1-En-4E	Moss Enclave	0.05	42	0.38	1.06	7.68	7.34	38.38	70.92	115.67	198.87	300.60	445.65
MPe1-En-5C	Moss Enclave	0.31	242	2.04	5.26	57.80	18.62	479.42	962.88	1560.46	2501.04	3492.18	4119.37
MPe1-En-5S	Moss Enclave	0.04	45	0.70	2.91	18.53	19.13	94.23	165.75	241.73	398.91	587.30	800.10
MPe1-En-6E	Moss Enclave	0.08	39	0.43	0.98	7.52	8.17	45.05	72.24	120.17	198.67	299.68	430.02
MPe1-En-7C	Moss Enclave	0.52	77	4.03	11.28	51.79	47.56	248.78	376.89	574.92	898.38	1314.64	1726.31
MPe1-En-7E	Moss Enclave	0.05	41	0.41	1.19	6.56	7.97	42.68	73.52	115.79	197.35	306.82	441.98
MPe1-En-8C	Moss Enclave	0.04	31	0.28	0.72	6.07	6.44	36.26	60.93	96.02	171.93	256.93	368.56
MPe1-En-8E	Moss Enclave	0.05	38	0.40	1.14	8.46	7.93	44.43	71.49	115.54	195.45	296.67	444.14
MPe1-En-9C	Moss Enclave	0.15	42	1.10	2.96	16.49	15.83	85.67	138.01	212.71	341.35	549.47	734.76
MPe1-NonEn-10C	Moss Enclave	0.11	82	1.96	8.36	41.73	41.59	208.31	336.22	493.40	725.62	1088.79	1411.07
MPe1-NonEn-11C	Moss Enclave	0.37	80	3.20	9.43	44.80	41.65	208.92	315.26	492.81	771.36	1137.41	1516.84
MPe1-NonEn-11E	Moss Enclave	0.22	39	0.58	0.94	5.70	5.36	34.85	57.51	97.70	168.21	266.25	371.23
MPe1-NonEn-1C	Moss Enclave	0.05	46	0.45	1.36	8.68	9.17	50.84	88.15	140.03	242.72	374.68	525.33
MPe1-NonEn-1E	Moss Enclave	0.07	50	0.66	2.03	10.30	9.80	53.83	92.21	147.29	238.43	380.47	540.92
MPe1-NonEn-2C	Moss Enclave	0.09	77	0.75	2.23	18.27	12.50	100.37	164.77	264.83	495.98	715.59	994.59
MPe1-NonEn-2E	Moss Enclave	10.76	81	5.27	3.69	18.00	12.94	84.13	124.77	198.97	313.44	470.97	612.00
MPe1-NonEn-3C	Moss Enclave	0.10	35	1.17	3.99	19.20	20.20	95.17	143.94	213.81	348.66	513.67	645.38
MPe1-NonEn-4C	Moss Enclave	0.02	17	0.17	0.47	3.24	5.25	21.98	35.76	59.21	102.60	175.07	248.46
MPe1-NonEn-5E	Moss Enclave	0.08	42	0.61	1.75	10.72	10.29	52.91	84.90	134.18	221.79	331.68	479.72
MPe1-NonEn-6C	Moss Enclave	0.67	307	5.93	17.61	93.00	100.34	441.36	691.26	1004.37	1551.16	2254.00	2904.97
MPe1-NonEn-6E	Moss Enclave	0.11	44	0.54	1.20	8.36	8.50	45.28	79.39	127.16	217.72	331.77	471.56
MPe1-NonEn-7E	Moss Enclave	0.06	69	0.52	1.50	10.44	6.41	60.24	101.56	168.28	279.55	450.95	606.75
MPe1-NonEn-8C	Moss Enclave	0.10	32	0.68	1.80	10.69	14.62	52.35	87.83	136.26	228.67	353.66	496.59
MPe1-NonEn-8E	Moss Enclave	0.07	58	0.55	1.53	9.14	6.83	56.23	92.28	148.21	250.92	384.30	538.00
MPe1-NonEn-9C	Moss Enclave	0.07	34	0.66	2.00	10.32	12.42	61.04	103.35	165.93	283.23	468.37	659.31
Average	**Moss**	**0.27**	**70.32**	**1.46**	**4.75**	**25.52**	**21.12**	**131.09**	**217.02**	**333.72**	**530.35**	**777.43**	**1016.90**
SCM-5a_1.1e	Felsic Porphyry Dike	0.16	116	1.49	4.52	35.77	24.10	215.80	419.55	709.29	1236.09	1826.02	2393.69
SCM-5a_2.1c	Felsic Porphyry Dike	0.13	129	0.75	1.82	17.87	7.68	128.28	284.91	521.02	928.43	1531.34	2208.48
SCM-5a_2.2e	Felsic Porphyry Dike	0.10	110	0.48	1.04	6.63	2.20	54.19	126.95	272.23	593.88	1183.91	1983.68
SCM-5a_3.1e	Felsic Porphyry Dike	0.11	84	0.88	2.50	20.53	14.66	113.62	211.46	362.53	646.55	1024.42	1468.38
SCM-5a_3.2c	Felsic Porphyry Dike	0.11	149	0.86	2.38	22.90	12.00	161.64	328.88	600.18	1080.39	1766.77	2548.81
SCM-5a_4.2e	Felsic Porphyry Dike	0.15	105	0.48	0.85	5.72	1.65	44.22	113.57	249.36	557.79	1176.03	2031.91
SCM-5a_5.1c	Felsic Porphyry Dike	0.14	145	1.18	3.38	25.40	14.44	169.00	347.24	638.59	1196.87	1961.22	2843.28
SCM-5a_5.2e	Felsic Porphyry Dike	0.15	156	1.09	2.96	21.13	19.20	135.53	267.83	462.35	784.70	1182.53	1625.51
SCM-5a_6.1i	Felsic Porphyry Dike	0.11	155	0.81	2.23	18.32	7.96	141.53	300.08	568.57	1056.06	1782.13	2528.26
SCM-5a_7.1e	Felsic Porphyry Dike	0.20	118	1.13	2.71	19.06	6.62	123.37	263.46	531.27	1148.55	2112.10	3458.27
SCM-5a_8.2i	Felsic Porphyry Dike	0.10	132	0.44	0.94	6.96	3.94	49.25	116.20	251.58	526.92	1063.97	1750.10
SCM-5a_9.1e	Felsic Porphyry Dike	0.11	88	0.42	0.80	6.67	2.04	49.12	112.81	243.25	522.00	1000.49	1655.70
BCD_1.1i	Felsic Porphyry Dike	0.03	32	0.19	0.50	3.90	3.39	28.27	52.29	91.53	172.11	299.66	435.25
BCD_2.1c	Felsic Porphyry Dike	0.04	126	0.67	2.68	23.79	9.38	168.54	371.74	688.20	1276.72	2229.69	3321.33
BCD_3.1e	Felsic Porphyry Dike	0.02	161	0.39	1.61	12.19	4.00	92.16	216.97	446.94	905.88	1708.36	2772.12
BCD_4.1e	Felsic Porphyry Dike	0.01	68	0.14	0.58	7.20	2.91	62.78	144.33	309.93	640.90	1266.09	2070.82
BCD_5.1c	Felsic Porphyry Dike	0.68	1339	8.42	29.67	205.13	57.77	1215.83	2339.64	3929.18	6521.75	9780.90	12537.24

Appendix D: Zircon SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

Sample Name	**Unit**	**La**	**Ce**	**Pr**	**Nd**	**Sm**	**Eu**	**Gd**	**Tb**	**Dy**	**Ho**	**Er**	**Tm**
		0.319	**1**	**0.121**	**0.615**	**0.2**	**0.076**	**0.267**	**0.0493**	**0.33**	**0.0755**	**0.216**	**0.0329**
		57	**58**	**59**	**60**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**
BCD_5.2e	Felsic Porphyry Dike	0.07	450	1.82	8.97	75.42	55.85	453.25	801.53	1284.15	1942.65	2819.06	3577.90
BCD_6.1c	Felsic Porphyry Dike	0.14	89	1.66	5.76	31.14	20.90	166.73	298.43	506.44	834.66	1360.15	1928.57
BCD_7.1i	Felsic Porphyry Dike	0.05	103	0.40	1.10	7.86	3.95	66.38	154.51	303.46	615.25	1127.15	1797.06
BCD_7.2c	Felsic Porphyry Dike	0.90	116	1.48	1.90	14.00	7.53	108.36	228.65	407.69	767.49	1286.82	1892.78
BCD_8.1i	Felsic Porphyry Dike	0.02	98	0.75	4.40	32.99	20.25	194.61	373.19	633.92	1088.77	1720.73	2442.68
BCD_9.2e	Felsic Porphyry Dike	0.05	139	0.50	1.54	9.37	4.38	81.72	190.26	366.27	783.19	1510.21	2466.44
Average	**Felsic Porphyry Dike**	**0.16**	**182.93**	**1.15**	**3.69**	**27.39**	**13.34**	**174.96**	**350.63**	**625.13**	**1122.94**	**1857.38**	**2684.27**
TIP1-1.1c	Times Granite	0.61	422	8.22	30.28	190.28	156.57	957.57	1509.70	2171.71	3258.04	4365.21	5260.36
TIP1-1.2e	Times Granite	0.07	74	1.09	4.18	19.61	24.32	87.14	127.18	188.98	295.90	434.23	564.05
TIP1-2.1c	Times Granite	0.15	232	3.34	15.62	109.49	47.47	603.53	1043.21	1545.24	2265.17	2995.32	3570.65
TIP1-2.2e	Times Granite	0.06	94	0.35	0.83	5.69	2.50	38.93	84.85	161.19	336.09	646.93	1046.46
TIP1-3.1c	Times Granite	0.07	124	1.05	4.16	23.66	9.03	139.79	288.74	521.11	1042.66	1809.30	2706.03
TIP1-3.2e	Times Granite	0.06	110	0.31	0.72	4.97	2.79	32.34	69.90	152.40	348.55	759.64	1465.37
TIP1-4.1i	Times Granite	0.02	123	0.30	1.11	7.04	2.66	47.07	121.10	250.37	535.60	1074.73	1737.84
TIP1-6.1e	Times Granite	0.06	129	0.88	3.40	26.17	13.56	166.37	306.07	502.13	809.87	1127.45	1433.45
TIP1-7.1esz	Times Granite	0.03	68	0.22	0.57	4.18	2.15	33.70	74.89	148.58	324.09	640.28	1092.87
TIP1-7.2c	Times Granite	0.14	115	1.08	3.00	16.71	4.82	95.80	205.52	400.32	853.26	1568.95	2434.34
TIP1-8.1ci	Times Granite	0.05	82	0.78	3.18	16.67	11.57	104.27	207.28	372.64	667.63	1226.10	1832.42
TIP1-9.1i	Times Granite	0.07	81	1.37	5.98	31.92	38.16	150.79	256.47	383.16	551.00	870.75	1154.35
TIP1-10.1i	Times Granite	0.06	89	0.67	2.29	15.49	6.80	102.52	218.52	407.28	791.67	1370.27	2037.40
TIP1-11.1e	Times Granite	1.43	136	1.57	1.65	12.19	4.85	78.51	177.95	334.74	649.77	1082.26	1605.20
TIP1-12.1e	Times Granite	0.04	100	0.49	1.65	13.81	6.74	99.18	198.90	351.15	624.38	982.33	1422.14
TIP1-13.1e	Times Granite	0.07	80	0.82	2.73	15.58	18.77	76.18	130.63	201.12	328.23	503.02	669.67
TIP1-14.1c	Times Granite	0.27	527	2.88	9.51	85.22	37.88	564.26	1022.76	1581.26	2423.17	3369.64	4108.57
TIP1-15.1i	Times Granite	0.06	76	0.27	0.60	4.38	1.95	35.53	78.59	163.64	361.87	677.49	1153.90
TIP1-16.1i	Times Granite	0.56	644	8.86	35.16	255.06	119.20	1402.48	2367.02	3477.32	5091.00	6455.07	7248.01
TIP1-17.1e	Times Granite	0.04	119	0.38	1.21	7.68	3.84	51.77	108.38	214.60	427.98	808.78	1309.12
TIP1-18.1e	Times Granite	0.10	380	1.88	8.33	57.96	45.40	367.60	647.55	983.63	1491.50	2148.32	2666.26
TIP1-19.1i	Times Granite	0.23	90	1.37	3.34	19.92	17.22	101.11	162.32	247.69	386.62	550.93	704.86
TIP1-20.1i	Times Granite	0.40	340	6.27	24.91	159.59	82.73	827.88	1340.68	1916.90	2732.35	3661.97	4294.72
TIP1-21.1c	Times Granite	0.16	627	3.17	14.23	124.45	50.69	774.30	1351.87	2040.12	3100.50	4037.64	4835.09
SCM-37_1.1c	Times Granite	0.26	237	2.40	7.37	34.13	18.92	163.10	324.18	617.81	1252.95	2546.33	4360.13
SCM-37_1.2i	Times Granite	0.07	127	0.55	1.50	7.44	4.23	45.24	89.19	191.06	399.00	754.52	1241.18
SCM-37_10.1e	Times Granite	0.03	111	0.31	0.94	6.32	2.15	45.62	105.70	215.21	431.80	809.10	1276.00
SCM-37_11.1c	Times Granite	0.30	109	1.73	4.18	25.73	16.55	129.76	226.54	393.89	720.40	1169.56	1695.65
SCM-37_12.1c	Times Granite	0.13	337	2.17	8.79	78.42	41.19	484.95	883.34	1369.76	2030.75	2646.27	3072.61
SCM-37_12.1i	Times Granite	0.14	486	2.26	9.02	75.51	35.25	511.60	933.81	1404.44	2199.06	3018.82	3644.10
SCM-37_2.1c	Times Granite	0.22	513	4.02	17.22	154.23	34.52	1010.39	2011.30	3085.66	4297.18	5706.07	6062.28
SCM-37_3.1c	Times Granite	0.87	103	2.28	3.69	30.34	19.49	172.88	319.14	515.56	807.29	1277.57	1663.37
SCM-37_3.2i	Times Granite	0.03	52	0.16	0.36	3.25	1.87	19.14	43.45	89.39	180.37	339.44	560.44
SCM-37_4.1e	Times Granite	0.01	115	0.28	1.24	6.43	3.40	37.19	87.36	165.24	370.96	729.95	1188.79
SCM-37_5.1i	Times Granite	0.10	626	2.29	10.76	98.23	40.37	675.71	1269.77	2011.55	3160.32	4315.99	5288.18
SCM-37_6.1c	Times Granite	0.35	265	3.55	11.32	67.30	36.98	389.69	703.61	1152.40	1901.79	2826.43	3554.17
SCM-37_6.2i	Times Granite	0.87	92	1.38	1.73	6.50	3.39	44.71	86.36	174.34	363.97	716.57	1197.42
SCM-37_6.3e	Times Granite	0.06	117	0.42	1.10	7.17	2.20	46.43	110.78	223.24	464.92	861.43	1429.42
SCM-37_7.1c	Times Granite	0.42	559	7.38	31.05	228.27	86.17	1236.06	2166.85	3242.72	4682.97	6332.63	7384.33
SCM-37_8.1c	Times Granite	0.07	102	1.04	3.91	18.96	10.73	97.39	189.94	372.18	774.67	1427.28	2300.26
SCM-37_9.1e	Times Granite	1.44	155	2.11	2.56	9.25	3.21	64.37	142.41	285.69	583.63	1069.85	1695.31

Appendix D: Zircon SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

Sample Name	**Unit**	**La**	**Ce**	**Pr**	**Nd**	**Sm**	**Eu**	**Gd**	**Tb**	**Dy**	**Ho**	**Er**	**Tm**
		0.319	**1**	**0.121**	**0.615**	**0.2**	**0.076**	**0.267**	**0.0493**	**0.33**	**0.0755**	**0.216**	**0.0329**
		57	**58**	**59**	**60**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**
SCM27B-10I	Times Enclave	0.02	98	0.24	0.80	5.49	2.51	40.02	88.87	177.90	372.85	713.96	1181.77
SCM27B-12E	Times Enclave	0.05	93	0.38	1.05	8.11	3.55	55.53	112.08	215.43	398.38	688.10	1057.36
SCM27B-13E	Times Enclave	0.07	102	0.40	0.95	5.75	1.95	42.64	89.26	191.20	405.64	804.03	1311.09
SCM27B-14E	Times Enclave	0.06	166	0.85	3.14	23.87	10.85	171.46	343.12	567.25	912.88	1366.93	1776.20
SCM27B-1C	Times Enclave	0.62	375	6.81	22.67	172.97	74.30	982.97	1692.37	2552.67	3788.84	4786.88	5444.91
SCM27B-2C	Times Enclave	0.43	52	0.58	0.67	4.84	4.11	32.14	62.71	107.30	192.08	300.45	413.20
SCM27B-3E	Times Enclave	0.04	83	0.28	0.79	6.21	3.27	41.26	94.98	186.50	363.88	655.36	1024.95
SCM27B-4C	Times Enclave	0.29	88	1.82	4.54	24.30	14.11	122.65	240.32	416.68	800.59	1355.88	1950.99
SCM27B-5E	Times Enclave	0.11	237	1.31	4.56	32.34	25.22	196.87	374.01	597.90	984.24	1414.53	1888.79
SCM27B-6E	Times Enclave	0.03	88	0.34	1.19	8.82	5.06	63.16	136.60	251.86	474.74	832.12	1288.34
SCM27B-7I	Times Enclave	0.22	352	1.77	4.96	40.93	18.70	294.04	568.04	972.26	1645.63	2419.03	3155.38
SCM27B-8E	Times Enclave	0.01	87	0.20	0.74	5.48	2.55	39.62	79.39	160.86	329.83	632.14	1050.71
SCM27B-9C	Times Enclave	0.16	204	2.16	8.00	67.78	25.94	473.48	790.40	1235.01	2049.22	2540.24	2970.50
SCM27B-15C	Times Enclave	0.24	571	2.65	8.87	80.42	16.92	614.14	1264.17	2134.54	3384.17	4766.23	5689.28
Average	**Times Granite**	**0.23**	**210.27**	**1.85**	**6.52**	**46.77**	**23.30**	**277.87**	**504.18**	**799.90**	**1280.40**	**1872.55**	**2439.46**
SIT-1B-10C	Post-PST Lava Enclave	0.11	72	0.88	2.52	14.28	9.11	71.59	142.34	233.19	393.17	628.56	910.55
SIT-1B-10E	Post-PST Lava Enclave	0.03	34	0.30	0.94	6.04	5.29	40.43	68.88	114.30	201.42	333.14	486.89
SIT-1B-12C	Post-PST Lava Enclave	0.10	104	2.01	9.09	49.37	53.02	237.26	370.22	543.94	884.05	1249.60	1575.45
SIT-1B-12E	Post-PST Lava Enclave	0.02	23	0.19	0.55	4.46	3.75	30.27	60.76	104.91	184.41	317.74	491.80
SIT-1B-13C	Post-PST Lava Enclave	0.15	65	1.56	5.02	31.73	20.72	170.83	271.51	422.65	697.36	1061.61	1473.95
SIT-1B-13E	Post-PST Lava Enclave	0.09	57	0.48	1.10	8.34	5.59	50.30	93.09	157.45	283.07	470.47	699.41
SIT-1B-14E	Post-PST Lava Enclave	0.03	40	0.32	1.05	7.67	6.89	49.14	86.67	151.01	263.38	424.65	617.16
SIT-1B-15C	Post-PST Lava Enclave	0.05	91	0.91	4.08	31.16	24.05	181.41	288.49	440.72	726.80	1044.74	1357.10
SIT-1B-16C	Post-PST Lava Enclave	0.10	221	1.23	4.34	26.03	26.28	163.23	302.72	510.82	880.28	1356.26	1892.52
SIT-1B-17E	Post-PST Lava Enclave	0.12	87	1.38	4.61	23.27	20.34	125.64	213.84	334.90	581.76	927.65	1319.54
SIT-1B-1C	Post-PST Lava Enclave	0.07	121	0.41	1.00	5.94	2.17	48.34	117.36	253.59	577.46	1178.20	2032.18
SIT-1B-1E	Post-PST Lava Enclave	0.06	36	0.32	0.73	5.68	4.29	34.17	62.67	115.70	200.58	335.71	495.22
SIT-1B-20C	Post-PST Lava Enclave	0.76	123	6.14	17.43	88.60	67.16	480.36	690.28	958.51	1469.22	1868.37	2222.83
SIT-1B-20E	Post-PST Lava Enclave	0.07	37	0.42	1.01	6.70	6.15	37.26	74.00	124.68	208.51	352.03	524.26
SIT-1B-2E	Post-PST Lava Enclave	0.04	31	0.27	0.72	4.62	4.43	27.85	59.53	102.09	178.33	301.02	435.69
SIT-1B-3E	Post-PST Lava Enclave	0.02	26	0.16	0.50	3.72	3.00	22.31	42.48	78.66	143.56	233.12	355.52
SIT-1B-4E	Post-PST Lava Enclave	0.02	32	0.17	0.47	4.49	3.83	26.33	49.78	91.54	165.48	266.02	392.43
SIT-1B-5C	Post-PST Lava Enclave	0.12	41	1.08	3.28	17.24	14.92	89.20	132.50	204.29	381.14	535.77	768.57
SIT-1B-5E	Post-PST Lava Enclave	0.03	42	0.43	1.61	10.10	8.43	59.06	101.79	184.56	324.17	537.22	802.04
SIT-1B-6C	Post-PST Lava Enclave	0.19	120	1.71	5.13	28.02	32.20	131.49	201.36	303.24	513.39	734.78	982.78
SIT-1B-7E	Post-PST Lava Enclave	0.04	51	0.47	1.65	11.32	10.14	61.70	108.18	184.39	318.12	505.40	756.77
SIT-1B-8C	Post-PST Lava Enclave	0.05	185	0.62	2.25	14.02	7.25	113.28	229.46	418.38	785.36	1315.91	1898.01
SIT-1B-8E	Post-PST Lava Enclave	0.05	45	0.48	1.52	9.83	10.17	60.46	100.47	163.85	273.59	444.32	662.80
SIT-1B-9C	Post-PST Lava Enclave	0.95	376	7.62	21.60	156.75	64.72	930.72	1576.89	2327.17	3437.41	4546.62	5360.24
SIT-1B-9E	Post-PST Lava Enclave	0.04	46	0.47	1.67	11.28	9.78	60.08	103.79	169.38	296.29	469.38	681.55
SIT-1-11C	Post-PST Lava	0.04	36	0.30	0.87	6.49	5.64	36.10	72.25	122.48	225.58	378.29	534.51
SIT-1-12E	Post-PST Lava	0.08	42	0.55	1.40	11.08	7.31	62.62	106.29	185.09	332.52	526.27	779.77
SIT-1-13C	Post-PST Lava	0.03	47	0.41	1.53	13.03	8.60	70.85	124.51	209.93	370.59	584.78	840.52
SIT-1-14E	Post-PST Lava	0.05	41	0.44	1.30	8.31	7.68	49.09	106.41	174.12	284.59	465.47	662.20
SIT-1-15E	Post-PST Lava	0.09	69	0.81	2.41	15.17	12.35	81.45	155.98	258.52	435.29	713.24	1051.30
SIT-1-16C	Post-PST Lava	0.62	236	6.03	18.71	105.20	103.68	523.58	871.57	1294.43	1968.04	2833.71	3554.20
SIT-1-16E	Post-PST Lava	0.04	110	0.61	2.29	15.75	15.23	91.61	165.45	269.57	465.29	721.32	958.31
SIT-1-1C	Post-PST Lava	0.51	660	3.64	9.70	75.27	33.22	489.02	914.00	1451.41	2471.30	3542.59	4633.97

Appendix D: Zircon SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

Sample Name	**Unit**	**La**	**Ce**	**Pr**	**Nd**	**Sm**	**Eu**	**Gd**	**Tb**	**Dy**	**Ho**	**Er**	**Tm**
		0.319	**1**	**0.121**	**0.615**	**0.2**	**0.076**	**0.267**	**0.0493**	**0.33**	**0.0755**	**0.216**	**0.0329**
		57	**58**	**59**	**60**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**
SIT-1-1E	Post-PST Lava	0.02	55	0.32	1.45	9.48	5.78	53.52	97.45	159.24	301.07	469.35	705.40
SIT-1-2C	Post-PST Lava	0.01	103	0.19	0.99	6.80	5.17	46.93	103.87	202.30	433.74	808.10	1367.31
SIT-1-2E	Post-PST Lava	0.05	74	0.41	1.20	10.59	5.22	66.00	136.97	240.54	445.07	736.38	1122.30
SIT-1-3C	Post-PST Lava	0.12	79	1.43	4.90	30.73	18.47	177.73	328.63	539.92	803.77	1271.56	1625.81
SIT-1-3E	Post-PST Lava	0.04	75	0.26	0.68	4.92	3.20	38.23	86.24	160.31	305.20	545.96	868.76
SIT-1-4C	Post-PST Lava	0.26	190	1.91	5.13	32.48	19.08	190.30	357.83	552.84	884.39	1418.60	1998.19
SIT-1-5E	Post-PST Lava	0.02	41	0.44	1.97	10.91	9.24	60.75	112.07	182.07	301.43	498.96	733.64
SIT-1-6C	Post-PST Lava	0.09	41	0.72	2.04	11.66	11.20	70.35	112.20	189.93	350.99	538.09	793.12
SIT-1-8E	Post-PST Lava	0.09	42	0.82	2.42	14.12	11.77	88.95	155.96	254.49	433.68	680.21	989.30
SIT-1-9E	Post-PST Lava	0.04	45	0.36	1.02	6.99	5.38	43.62	84.15	152.24	287.83	479.44	744.71
SIT-1-9S	Post-PST Lava	0.16	53	1.62	5.14	29.65	22.90	147.09	228.01	352.96	603.50	891.45	1219.21
Average	**Post-PST Felsic Lava**	**0.13**	**94.21**	**1.17**	**3.61**	**22.71**	**16.70**	**129.33**	**224.29**	**355.60**	**592.55**	**898.68**	**1235.86**
SIT-2_1.1i	Post-PST Lava	0.01	100	0.21	0.83	5.18	7.50	34.13	72.89	134.54	273.93	551.79	976.00
SIT-2_10.1i	Post-PST Lava	0.02	59	0.23	0.83	4.49	5.15	28.86	58.17	110.75	222.29	417.23	693.74
SIT-2_12.1c	Post-PST Lava	0.06	28	0.12	0.18	0.99	1.25	8.09	19.34	39.48	81.32	163.70	280.15
SIT-2_2.1c	Post-PST Lava	0.06	73	0.37	0.92	7.62	4.28	67.20	146.90	303.98	652.57	1230.21	1965.64
SIT-2_3.1i	Post-PST Lava	0.03	178	0.62	2.73	19.43	21.40	133.71	248.12	424.56	721.25	1152.48	1596.67
SIT-2_6.1c	Post-PST Lava	0.16	100	0.54	1.00	7.06	2.60	57.71	124.96	257.60	550.68	1045.87	1730.54
SIT-2_7.1c	Post-PST Lava	0.05	69	0.81	3.30	22.53	20.91	136.69	253.36	445.32	773.08	1242.10	1745.24
SIT-2_8.1c	Post-PST Lava	0.17	424	1.45	4.19	39.04	38.07	257.31	491.58	858.27	1490.44	2459.20	3505.40
SIT-2_9.1c	Post-PST Lava	0.58	88	3.34	8.02	43.16	49.00	249.91	436.48	692.09	1170.65	1785.63	2439.44
SIT-2_11.2e	Post-PST Lava	0.54	278	2.79	6.34	41.94	41.52	263.05	447.02	759.94	1248.12	1952.59	2574.62
SIT-2_12.2e	Post-PST Lava	0.02	43	0.14	0.39	3.66	4.67	23.98	52.93	102.57	206.42	396.16	680.29
SIT-2_2.2e	Post-PST Lava	0.45	79	0.90	1.28	9.09	10.36	57.96	110.11	204.14	377.08	656.18	1036.42
SIT-2_4.1e	Post-PST Lava	0.03	47	0.17	0.40	2.92	3.84	22.24	45.43	84.77	173.03	330.07	573.47
SIT-2_5.1e	Post-PST Lava	0.36	240	1.59	3.32	22.93	25.54	173.02	351.51	629.01	1177.11	1989.80	2895.56
SIT-2_7.2e	Post-PST Lava	0.02	73	0.32	1.36	9.56	10.70	62.79	118.72	196.44	364.40	610.91	886.44
Average	**Post-PST Intermediate Lava**	**0.17**	**125.22**	**0.91**	**2.34**	**15.97**	**16.45**	**105.11**	**198.50**	**349.56**	**632.16**	**1065.59**	**1571.97**
SCM-34_1.2e	Pre-PST Trachyte	0.19	46	1.10	2.63	15.86	25.06	70.45	105.26	142.29	225.99	326.99	429.46
SCM-34_2.2i	Pre-PST Trachyte	0.42	96	5.71	21.05	71.23	92.01	254.23	317.62	396.96	596.67	767.12	991.14
SCM-34_3.1c	Pre-PST Trachyte	0.07	138	0.85	2.94	17.58	13.89	94.72	178.34	299.37	571.19	980.18	1489.06
SCM-34_3.2e	Pre-PST Trachyte	0.13	43	0.66	1.48	6.88	11.66	35.68	50.78	79.32	127.44	185.83	258.75
SCM-34_4.1c	Pre-PST Trachyte	0.17	242	2.40	8.93	54.36	43.63	271.72	432.81	631.34	951.26	1337.36	1636.15
SCM-34_5.1c	Pre-PST Trachyte	0.15	149	2.81	12.23	84.75	45.49	476.46	804.29	1189.10	1787.30	2382.00	2675.52
SCM-34_5.2i	Pre-PST Trachyte	0.15	95	1.39	4.30	24.67	26.76	103.27	160.02	216.76	339.68	487.35	648.46
SCM-34_5.3e	Pre-PST Trachyte	0.04	63	0.62	2.38	13.96	20.09	62.94	98.29	144.16	224.88	331.14	441.80
SCM-34_6.1e	Pre-PST Trachyte	0.02	111	0.59	3.00	21.68	17.23	126.51	210.73	316.36	492.03	680.70	869.12
SCM-34_6.2c	Pre-PST Trachyte	0.10	171	0.89	2.59	19.13	11.11	123.77	250.42	440.78	778.27	1207.79	1654.72
SCM-34_7.1e	Pre-PST Trachyte	0.05	70	0.87	3.47	17.92	25.33	75.53	118.78	158.42	237.19	343.59	447.18
SCM-34_7.2i	Pre-PST Trachyte	0.03	88	0.50	2.01	14.62	12.32	76.30	122.41	186.68	297.28	435.33	568.27
SCM-34_7.3c	Pre-PST Trachyte	0.10	81	0.71	1.92	18.50	11.44	116.64	219.97	358.65	599.28	876.41	1132.36
SCM-34_8.1c	Pre-PST Trachyte	0.06	42	0.94	3.82	17.01	30.84	75.04	101.26	137.33	216.96	312.12	405.54
SCM-34_9.1i	Pre-PST Trachyte	0.07	64	1.15	4.77	21.06	35.21	86.86	122.07	164.98	255.79	366.39	451.40
SCM-41-11C	Pre-PST Trachyte	2.51	471	20.66	59.27	308.24	256.29	1178.85	1735.45	2272.34	3308.39	4446.14	5430.41
SCM-41-11E	Pre-PST Trachyte	0.07	42	0.61	1.76	10.95	11.48	55.28	91.89	145.59	238.99	360.07	490.57
SCM-41-13C	Pre-PST Trachyte	0.05	45	0.35	0.87	7.12	8.64	43.22	76.66	120.55	210.60	322.29	458.13
SCM-41-14E	Pre-PST Trachyte	0.09	43	0.50	1.14	8.00	8.15	44.88	81.46	127.35	225.03	346.71	516.70

Appendix D: Zircon SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

Sample Name	**Unit**	**La**	**Ce**	**Pr**	**Nd**	**Sm**	**Eu**	**Gd**	**Tb**	**Dy**	**Ho**	**Er**	**Tm**
		0.319	**1**	**0.121**	**0.615**	**0.2**	**0.076**	**0.267**	**0.0493**	**0.33**	**0.0755**	**0.216**	**0.0329**
		57	**58**	**59**	**60**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**
SCM-41-15E	Pre-PST Trachyte	2.07	30	1.56	1.35	5.04	5.95	30.71	49.66	81.06	142.38	221.35	319.38
SCM-41-1E	Pre-PST Trachyte	0.01	38	0.15	0.65	4.38	4.33	27.81	52.26	86.23	155.42	251.51	373.51
SCM-41-2E	Pre-PST Trachyte	0.02	35	0.21	0.80	5.09	5.38	31.33	51.80	90.65	158.66	253.93	376.53
SCM-41-3E	Pre-PST Trachyte	0.02	53	0.34	1.30	10.01	10.08	57.93	96.44	149.49	249.02	383.14	544.65
SCM-41-4C	Pre-PST Trachyte	0.36	157	3.81	12.47	99.70	33.43	534.46	899.56	1288.01	1946.16	2315.41	2492.67
SCM-41-4E	Pre-PST Trachyte	0.06	44	0.49	1.41	10.15	9.93	50.35	87.25	142.48	250.50	377.13	532.58
SCM-41-5C	Pre-PST Trachyte	0.57	110		13.78	64.71	59.53	311.58	489.00	702.73	1131.14	1567.22	2062.28
SCM-41-5E	Pre-PST Trachyte	0.02	43	0.34	1.30	8.87	8.84	47.58	79.77	126.83	225.01	332.61	483.63
SCM-41-6C	Pre-PST Trachyte	0.05	55	0.38	1.10	10.13	12.16	65.40	114.83	189.06	346.65	534.62	767.17
SCM-41-6E	Pre-PST Trachyte	0.04	31	0.30	0.83	5.63	6.23	30.12	53.54	87.48	149.00	236.21	356.44
SCM-41-7C	Pre-PST Trachyte	0.10	109	1.76	7.37	44.70	31.89	222.37	338.03	479.24	723.00	961.48	1185.42
SCM-41-7S	Pre-PST Trachyte	0.16	46	1.58	4.95	24.99	27.11	120.99	186.75	271.38	442.98	620.28	821.28
SCM-41-8C	Pre-PST Trachyte	0.06	29	0.46	1.29	7.43	8.79	43.21	75.71	117.88	197.18	316.15	449.06
SCM-41-9E	Pre-PST Trachyte	0.04	57	0.39	1.25	9.05	8.62	52.25	85.88	145.36	248.38	379.46	528.74
Average	**Pre-PST Trachyte**	**0.24**	**88.91**	**1.72**	**5.77**	**32.22**	**28.45**	**151.47**	**240.57**	**348.07**	**546.96**	**765.03**	**978.43**

[1] Anders & Grevesse (1989) * 1.3596 Korotev Wed Site Wash. U

Appendix D: Zircon SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

Sample Name	Unit	Yb 0.221	Lu 0.033	Si Activity	Ferry Temp TiO2 Activity 0.3	Ferry Temp TiO2 Activity 0.4	Ferry Temp TiO2 Activity 0.5	Ferry Temp TiO2 Activity 0.6	Ferry Temp TiO2 Activity 0.7
		70	71						
		Yb Ch	Lu Ch						
SCM1B-1.1I	Feldspar Porphyry Dike	1474.81	2008.50	1	824	793	771	753	739
SCM1B-2.1E	Feldspar Porphyry Dike	956.33	1186.40	1	854	822	798	780	765
SCM1B-2.2C	Feldspar Porphyry Dike	2915.24	3883.68	1	850	818	794	776	761
SCM1B-3.1C	Feldspar Porphyry Dike	4111.12	4532.29	1	934	897	870	849	832
SCM1B-4.1C	Feldspar Porphyry Dike	2814.24	3340.04	1	980	940	911	889	870
SCM1B-5.1I	Feldspar Porphyry Dike	2912.16	3828.65	1	815	785	763	745	731
SCM1B-6.1E	Feldspar Porphyry Dike	1347.36	1655.85	1	851	819	795	777	762
SCM1B-6.2C	Feldspar Porphyry Dike	2902.78	3756.93	1	833	802	779	761	746
SCM1B-7.1E	Feldspar Porphyry Dike	1469.29	1819.17	1	884	851	826	806	790
SCM1B-7.2C	Feldspar Porphyry Dike	2716.31	3532.34	1	823	793	770	753	738
SCM1B-8.1C	Feldspar Porphyry Dike	1911.30	2417.88	1	818	788	766	748	734
SCM1B-10.1C	Feldspar Porphyry Dike	3975.48	5130.77	1	820	790	767	750	735
SCM1B-10.2E	Feldspar Porphyry Dike	1470.56	1785.70	1	847	815	792	773	758
SCM1B-11.1C	Feldspar Porphyry Dike	3605.58	4558.92	1	824	794	771	754	739
SCM1B-11.2E	Feldspar Porphyry Dike	1442.51	1785.65	1	869	836	812	793	777
SCM1B-12.1C	Feldspar Porphyry Dike	3360.45	4056.47	1	899	864	838	818	802
SCM1B-13.1C	Feldspar Porphyry Dike	2307.90	2994.32	1	840	808	785	767	752
SCM1B-14.1SZ	Feldspar Porphyry Dike	1258.09	1644.93	1	820	790	767	750	735
SCM1B-14.2I	Feldspar Porphyry Dike	2592.91	3299.90	1	827	797	774	756	742
SCM1B-14.3E	Feldspar Porphyry Dike	1550.72	1872.83	1	863	830	806	787	772
SCM1B-15.1I	Feldspar Porphyry Dike	1051.33	1512.36	1	809	779	757	740	726
SCM1B-15.2E	Feldspar Porphyry Dike	1563.70	1928.96	1	850	818	795	776	761
SCM1B-16.1I	Feldspar Porphyry Dike	1326.52	1613.68	1	990	950	920	897	878
SCM1B-17.1C	Feldspar Porphyry Dike	5293.31	5370.63	1	901	866	840	820	804
SCM-13_1.1I	Feldspar Porphyry Dike	1232.98	1729.98	1	824	793	771	753	739
SCM-13_11.1c	Feldspar Porphyry Dike	1322.58	1580.00	1	939	902	875	853	836
SCM-13_2.1e	Feldspar Porphyry Dike	1328.28	1676.39	1	860	828	804	785	770
SCM-13_3.1c	Feldspar Porphyry Dike	1540.79	1877.67	1	1059	1014	981	956	935
SCM-13_3.2e	Feldspar Porphyry Dike	1532.05	1831.68	1	854	822	798	780	764
SCM-13_4.1i	Feldspar Porphyry Dike	1723.42	2259.77	1	838	806	783	765	750
SCM-13_5.1c	Feldspar Porphyry Dike	2783.16	3333.42	1	1017	975	945	921	901
SCM-13_5.2e	Feldspar Porphyry Dike	952.75	1212.39	1	856	824	800	781	766
SCM-13_6.1c	Feldspar Porphyry Dike	4692.40	4859.74	1	1000	959	930	906	887
SCM-13_6.2i	Feldspar Porphyry Dike	1495.78	1824.12	1	904	869	844	824	807
SCM-13_7.1c	Feldspar Porphyry Dike	2315.07	3185.34	1	852	820	796	778	763
SCM-13_7.2e	Feldspar Porphyry Dike	1627.24	2236.26	1	836	805	782	764	749
SCM-13_8.1c	Feldspar Porphyry Dike	2977.27	3954.14	1	856	824	800	782	766
SCM-13_8.1i	Feldspar Porphyry Dike	1467.71	1765.82	1	852	820	796	777	762
SCM-13_9.1e	Feldspar Porphyry Dike	1949.22	2599.79	1	830	799	776	759	744
SCM-13_10.1i	Feldspar Porphyry Dike	1278.98	1815.35	1	846	814	791	773	758
SCM-30_1.1c	Feldspar Porphyry Dike	2524.70	2903.32	1	973	934	905	883	864
SCM-30_1.2e	Feldspar Porphyry Dike	1156.66	1490.60	1	833	802	779	761	746
SCM-30_10.1e	Feldspar Porphyry Dike	1178.08	1493.05	1	921	885	859	838	821
SCM-30_10.2c	Feldspar Porphyry Dike	6147.08	6444.35	1	995	955	925	902	883
SCM-30_11.1c	Feldspar Porphyry Dike	2995.09	3356.51	1	1021	979	948	924	904
SCM-30_11.2e	Feldspar Porphyry Dike	1404.15	1801.95	1	833	802	780	762	747
SCM-30_2.1c	Feldspar Porphyry Dike	9411.17	9256.58	1	1032	989	958	933	913
SCM-30_3.1c	Feldspar Porphyry Dike	2520.82	2977.34	1	997	956	926	903	884

Appendix D: Zircon SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

Sample Name	Unit	Yb 0.221 70	Lu 0.033 71	Si Activity	Ferry Temp TiO2 Activity 0.3	Ferry Temp TiO2 Activity 0.4	Ferry Temp TiO2 Activity 0.5	Ferry Temp TiO2 Activity 0.6	Ferry Temp TiO2 Activity 0.7
SCM-30_4.1i	Feldspar Porphyry Dike	1233.94	1408.32	1	942	904	877	856	838
SCM-30_5.1e	Feldspar Porphyry Dike	821.91	1195.75	1	816	786	764	747	732
SCM-30_6.1i	Feldspar Porphyry Dike	1206.26	1381.42	1	1005	964	934	910	891
SCM-30_7.1c	Feldspar Porphyry Dike	1933.58	2572.80	1	821	791	768	751	736
SCM-30_8.1c	Feldspar Porphyry Dike	9472.78	9117.94	1	923	887	860	840	823
SCM-30_9.1c	Feldspar Porphyry Dike	3319.50	3734.28	1	1006	965	935	911	892
SCM-30_9.2e	Feldspar Porphyry Dike	761.33	935.74	1	994	954	924	901	882
Averages	**Feldspar Porphyry Dike**	**2411.58**	**2860.52**	**1**	**890**	**856**	**831**	**811**	**795**
SCM-20_1.1c	Leucogranite	5010.87	5330.71	1	887	853	828	809	792
SCM-20_1.2e	Leucogranite	2087.28	2500.77	1	870	837	813	794	778
SCM-20_2.1e	Leucogranite	3603.81	3973.67	1	914	878	852	832	815
SCM-20_3.1e	Leucogranite	2251.37	2644.85	1	886	852	827	807	791
SCM-20_4.2e	Leucogranite	2811.80	3233.31	1	910	874	848	828	811
SCM-20_5.1i	Leucogranite	5339.65	5735.28	1	975	936	907	884	866
SCM-20_6.1c	Leucogranite	2205.20	3202.44	1	848	817	793	775	760
SCM-20_6.2e	Leucogranite	2073.25	2361.38	1	927	890	864	843	826
SCM-20_8.1e	Leucogranite	1837.95	2377.73	1	887	853	828	809	792
SCM-20_8.2c	Leucogranite	3780.14	3959.26	1	942	905	877	856	838
SCM-20_9.1c	Leucogranite	3316.44	4437.39	1	832	801	778	760	746
SCM-20_9.2e	Leucogranite	2213.36	3113.48	1	843	811	788	770	755
SCM-20_10.1i	Leucogranite	1470.67	1671.71	1	976	937	908	886	867
SCM-20_11.1c	Leucogranite	4523.41	4814.88	1	924	887	861	840	823
SCM-20_11.2e	Leucogranite	1249.90	1523.84	1	878	845	820	801	785
SCM-20_12.1c	Leucogranite	1054.09	1346.90	1	923	887	860	839	822
SCM-20_12.2e	Leucogranite	2298.55	3124.15	1	841	809	786	768	753
SCM-38_1.1i	Leucogranite	1200.44	1651.58	1	852	820	796	778	762
SCM-38_12.1i	Leucogranite	1625.92	2351.47	1	845	814	790	772	757
SCM-38_2.1i	Leucogranite	1301.35	1640.15	1	888	854	829	809	793
SCM-38_3.1c	Leucogranite	4857.01	5136.27	1	1028	985	954	930	910
SCM-38_4.1e	Leucogranite	1926.09	2407.67	1	868	835	811	792	776
SCM-38_5.1e	Leucogranite	4003.81	4304.15	1	973	934	905	883	865
SCM-38_6.1e	Leucogranite	2033.93	2814.75	1	824	794	771	753	739
SCM-38_7.1c	Leucogranite	2231.62	2556.67	1	893	858	833	813	797
SCM-38_8.1c	Leucogranite	868.38	1070.38	1	1026	983	952	928	908
SCM-38_8.2e	Leucogranite	1319.21	1857.45	1	855	823	799	781	766
SCM-38_9.1c	Leucogranite	2863.55	3976.74	1	842	810	787	769	754
SCM-38_10.2e	Leucogranite	2073.27	2782.10	1	836	805	782	764	749
SCM-38_11.1c	Leucogranite	1886.53	2364.93	1	885	851	826	807	791
SCM-38_13.1c	Leucogranite	1264.88	1680.87	1	912	876	850	830	813
SCM-38_14.1c	Leucogranite	1623.57	2167.83	1	833	802	780	762	747
SCM-38_15.1c	Leucogranite	3082.84	3307.66	1	929	893	866	845	828
Average	**Leucogranite**	**2463.34**	**2952.19**	**1**	**895**	**861**	**835**	**816**	**799**
SCM6-1.1E	Moss	667.11	801.09	1	1092	1045	1011	984	963
SCM6-1.2I	Moss	563.53	694.47	1	1063	1018	985	959	939
SCM6-2.1I	Moss	1544.52	2072.67	1	951	913	885	864	846
SCM6-3.1I	Moss	1544.86	1854.70	1	1130	1081	1045	1017	994
SCM6-4.1I	Moss	1215.40	1359.06	1	1089	1043	1009	982	960

Appendix D: Zircon SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

Sample Name	Unit	Yb	Lu	Si Activity	Ferry Temp TiO2 Activity	Ferry Temp TiO2 Activity	Ferry Temp TiO2 Activity	Ferry Temp TiO2 Activity	Ferry Temp TiO2 Activity
		0.221	0.033		0.3	0.4	0.5	0.6	0.7
		70	71						
SCM6-5.1l	Moss	1096.07	1298.91	1	1076	1031	997	971	950
SCM6-6.1l	Moss	663.27	812.81	1	1042	999	967	942	922
SCM6-7.1e	Moss	653.60	829.73	1	1020	978	947	923	904
SCM6-7.2c	Moss	1538.50	1917.06	1	914	878	852	831	815
SCM6-8.1i	Moss	681.08	864.64	1	1014	973	942	918	899
SCM6-9.1c	Moss	4449.50	4492.81	1	988	947	918	895	876
SCM6-10.1c	Moss	4547.17	4516.31	1	965	927	898	876	858
SCM6-11.1c	Moss	2081.32	2406.99	1	977	938	909	886	868
SCM6-12.1e	Moss	558.83	692.85	1	1018	976	945	921	902
SCM6-12.2c	Moss	1314.93	1635.04	1	975	936	907	885	866
SCM6-13.1e	Moss	617.83	757.10	1	1001	960	930	907	887
SCM6-14.1e	Moss	512.20	646.40	1	1020	978	947	923	903
SCM6-14.2c	Moss	983.38	1392.63	1	859	827	803	784	769
SCM6-15.1i	Moss	1175.37	1322.38	1	1104	1056	1021	994	972
SCM6-15.2i	Moss	535.61	658.99	1	1069	1024	990	965	944
SCM6-16.1c	Moss	1592.02	1813.42	1	1018	976	945	921	902
SCM6-17.1c	Moss	1314.07	1572.91	1	1125	1076	1040	1012	990
SCM6-18.1c	Moss	5512.09	5557.40	1	868	835	811	792	776
MP1-1.1c	Moss	2024.50	2361.30	1	947	909	882	860	843
MP1-1.2e	Moss	974.74	1208.80	1	994	953	924	901	882
MP1-2.1i	Moss	811.56	1009.63	1	1102	1054	1020	993	971
MP1-3.1e	Moss	712.64	883.00	1	1007	966	936	912	893
MP1-3.2c	Moss	1218.07	1460.48	1	1000	960	930	906	887
MP1-4.1e	Moss	633.72	766.23	1	1022	979	949	924	905
MP1-4.2c	Moss	1744.03	1997.28	1	945	908	880	859	841
MP1-5.1c	Moss	1086.89	1319.05	1	1019	977	946	922	902
MP1-5.2e	Moss	691.01	826.27	1	1024	982	951	927	907
MP1-6.1c	Moss	1010.11	1205.28	1	1039	996	964	940	920
MP1-7.1e	Moss	592.41	732.64	1	1030	987	956	932	912
MP1-8.1e	Moss	535.22	675.94	1	1012	970	940	916	897
MP1-9.1e	Moss	696.66	834.36	1	1012	971	940	916	897
MP1-9.2c	Moss	1329.58	1561.81	1	999	958	928	905	886
MP1-10.1c	Moss	3444.56	4283.83	1	819	789	766	749	734
MP1-11.1i	Moss	782.05	911.49	1	1017	975	944	920	901
MP1-12.1e	Moss	854.30	1052.62	1	1025	982	951	927	907
MP1-13.1e	Moss	620.27	761.32	1	1041	998	966	941	921
MP1-13.2c	Moss	1763.57	2060.94	1	1007	966	936	912	893
MP1-14.1c	Moss	2060.20	2354.38	1	1047	1003	971	946	926
MP1-14.2e	Moss	725.86	891.71	1	1031	988	957	932	912
MPe1-En-10C	Moss Enclave	1481.98	1714.25	1	1047	1003	971	946	925
MPe1-En-10E	Moss Enclave	577.17	711.57	1	1020	977	947	923	903
MPe1-En-11C	Moss Enclave	825.34	1053.92	1	1042	999	967	942	922
MPe1-En-14C	Moss Enclave	1082.21	1310.82	1	1042	998	967	942	922
MPe1-En-15C	Moss Enclave	1379.50	1611.21	1	1032	989	958	933	913
MPe1-En-16E	Moss Enclave	539.26	684.67	1	990	950	921	898	879
MPe1-En-19E	Moss Enclave	567.44	695.60	1	1037	993	962	937	917
MPe1-En-1E	Moss Enclave	768.10	943.48	1	1007	966	935	912	893
MPe1-En-20E	Moss Enclave	501.37	627.01	1	1015	974	943	919	900
MPe1-En-25C	Moss Enclave	1671.30	1962.26	1	1011	970	939	916	896

Sample Name	Unit	Yb	Lu	Si Activity	Ferry Temp TiO2 Activity 0.3	Ferry Temp TiO2 Activity 0.4	Ferry Temp TiO2 Activity 0.5	Ferry Temp TiO2 Activity 0.6	Ferry Temp TiO2 Activity 0.7
		0.221	**0.033**						
		70	**71**						
MPe1-En-25E	Moss Enclave	759.20	941.60	1	1038	994	963	938	918
MPe1-En-2C	Moss Enclave	1137.87	1335.75	1	1041	998	966	941	921
MPe1-En-2E	Moss Enclave	884.67	1042.71	1	1071	1026	993	967	946
MPe1-En-3C	Moss Enclave	1682.32	1974.51	1	1018	976	945	921	902
MPe1-En-4C	Moss Enclave	716.48	853.02	1	1023	981	950	926	906
MPe1-En-4E	Moss Enclave	569.76	679.24	1	1013	971	941	917	897
MPe1-En-5C	Moss Enclave	4319.55	4379.69	1	978	939	910	887	869
MPe1-En-5S	Moss Enclave	947.09	1180.32	1	989	949	920	897	878
MPe1-En-6E	Moss Enclave	550.84	653.49	1	1013	971	941	917	898
MPe1-En-7C	Moss Enclave	1976.98	2296.65	1	1006	965	934	911	892
MPe1-En-7E	Moss Enclave	550.95	681.64	1	1013	971	940	917	897
MPe1-En-8C	Moss Enclave	459.26	581.49	1	989	949	920	897	878
MPe1-En-8E	Moss Enclave	566.86	659.27	1	1010	968	938	914	895
MPe1-En-9C	Moss Enclave	929.02	1181.21	1	1024	982	951	927	907
MPe1-NonEn-10C	Moss Enclave	1721.65	2068.09	1	987	947	917	894	876
MPe1-NonEn-11C	Moss Enclave	1787.40	2146.30	1	1027	985	954	929	910
MPe1-NonEn-11E	Moss Enclave	489.08	601.10	1	1007	966	936	912	893
MPe1-NonEn-1C	Moss Enclave	661.89	787.02	1	989	949	920	897	878
MPe1-NonEn-1E	Moss Enclave	682.36	841.53	1	1018	976	945	921	901
MPe1-NonEn-2C	Moss Enclave	1185.16	1502.78	1	896	862	836	816	800
MPe1-NonEn-2E	Moss Enclave	767.30	959.54	1	981	942	913	890	871
MPe1-NonEn-3C	Moss Enclave	802.96	1001.24	1	1054	1010	978	952	932
MPe1-NonEn-4C	Moss Enclave	332.36	424.99	1	989	949	919	896	878
MPe1-NonEn-5E	Moss Enclave	591.57	746.19	1	1025	983	952	928	908
MPe1-NonEn-6C	Moss Enclave	3467.95	3902.38	1	1002	961	931	908	889
MPe1-NonEn-6E	Moss Enclave	603.17	764.19	1	996	956	926	903	884
MPe1-NonEn-7E	Moss Enclave	796.65	966.78	1	1002	961	931	908	888
MPe1-NonEn-8C	Moss Enclave	642.27	829.32	1	996	955	926	902	883
MPe1-NonEn-8E	Moss Enclave	699.72	855.09	1	1034	991	960	935	915
MPe1-NonEn-9C	Moss Enclave	852.77	1093.38	1	1024	982	951	926	907
Average	**Moss**	**1204.80**	**1409.21**	**1**	**1012**	**970**	**940**	**916**	**897**
SCM-5a_1.1e	Felsic Porphyry Dike	2762.80	3170.48	1	845	814	790	772	757
SCM-5a_2.1c	Felsic Porphyry Dike	2698.43	3167.12	1	825	794	772	754	740
SCM-5a_2.2e	Felsic Porphyry Dike	2827.90	3779.54	1	755	728	708	692	680
SCM-5a_3.1e	Felsic Porphyry Dike	1830.54	2293.28	1	845	814	790	772	757
SCM-5a_3.2c	Felsic Porphyry Dike	3112.03	3737.24	1	864	831	807	788	773
SCM-5a_4.2e	Felsic Porphyry Dike	2956.61	3957.29	1	766	738	718	702	689
SCM-5a_5.1c	Felsic Porphyry Dike	3536.41	4282.23	1	833	802	779	761	746
SCM-5a_5.2e	Felsic Porphyry Dike	1922.93	2276.96	1	910	875	849	828	812
SCM-5a_6.1i	Felsic Porphyry Dike	3173.80	3806.69	1	823	793	770	753	738
SCM-5a_7.1e	Felsic Porphyry Dike	4631.26	6032.33	1	767	740	719	703	690
SCM-5a_8.2i	Felsic Porphyry Dike	2505.17	3377.83	1	798	769	747	731	717
SCM-5a_9.1e	Felsic Porphyry Dike	2291.65	3104.62	1	773	746	725	709	696
BCD_1.1i	Felsic Porphyry Dike	595.24	782.15	1	931	894	868	846	829
BCD_2.1c	Felsic Porphyry Dike	4253.90	5162.39	1	800	771	750	733	719
BCD_3.1e	Felsic Porphyry Dike	3760.94	4741.81	1	807	778	756	739	725
BCD_4.1e	Felsic Porphyry Dike	2817.47	3722.69	1	780	752	731	715	701
BCD_5.1c	Felsic Porphyry Dike	14153.65	15117.35	1	956	918	890	868	850

Appendix D: Zircon SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

Sample Name	Unit	Yb 0.221 70	Lu 0.033 71	Si Activity	Ferry Temp TiO2 Activity 0.3	Ferry Temp TiO2 Activity 0.4	Ferry Temp TiO2 Activity 0.5	Ferry Temp TiO2 Activity 0.6	Ferry Temp TiO2 Activity 0.7
BCD_5.2e	Felsic Porphyry Dike	3971.71	4342.44	1	979	940	911	888	870
BCD_6.1c	Felsic Porphyry Dike	2467.98	3005.26	1	905	870	844	824	807
BCD_7.1i	Felsic Porphyry Dike	2388.44	3039.84	1	796	767	746	729	715
BCD_7.2c	Felsic Porphyry Dike	2358.30	2804.25	1	853	821	798	779	764
BCD_8.1i	Felsic Porphyry Dike	3037.93	3604.50	1	847	815	792	774	759
BCD_9.2e	Felsic Porphyry Dike	3319.55	4310.65	1	793	765	743	727	713
Average	**Felsic Porphyry Dike**	**3364.11**	**4070.39**	**1**	**837**	**806**	**783**	**765**	**750**
TIP1-1.1c	Times Granite	5761.09	6362.02	1	959	920	892	870	852
TIP1-1.2e	Times Granite	693.69	860.22	1	1065	1020	987	961	940
TIP1-2.1c	Times Granite	3736.85	3956.09	1	930	893	867	846	828
TIP1-2.2e	Times Granite	1471.54	1978.29	1	827	796	773	756	741
TIP1-3.1c	Times Granite	3493.05	4390.79	1	829	798	775	757	743
TIP1-3.2e	Times Granite	2334.33	3598.92	1	815	785	762	745	731
TIP1-4.1i	Times Granite	2533.99	3426.62	1	846	815	791	773	758
TIP1-6.1e	Times Granite	1579.79	1750.44	1	930	893	867	846	828
TIP1-7.1esz	Times Granite	1586.72	2216.66	1	828	797	775	757	742
TIP1-7.2c	Times Granite	3297.28	4294.01	1	812	782	760	743	729
TIP1-8.1ci	Times Granite	2437.81	3032.38	1	853	821	798	779	764
TIP1-9.1i	Times Granite	1395.89	1709.77	1	996	956	926	903	884
TIP1-10.1i	Times Granite	2530.71	3173.00	1	823	793	770	753	738
TIP1-11.1e	Times Granite	2010.22	2405.20	1	855	823	799	780	765
TIP1-12.1e	Times Granite	1744.21	2169.06	1	862	829	805	786	771
TIP1-13.1e	Times Granite	821.89	1014.76	1	984	944	915	892	873
TIP1-14.1c	Times Granite	4520.18	4859.06	1	987	947	918	895	876
TIP1-15.1i	Times Granite	1642.24	2243.64	1	819	789	767	749	735
TIP1-16.1i	Times Granite	7543.66	7716.84	1	966	927	899	877	859
TIP1-17.1e	Times Granite	1804.64	2374.56	1	843	812	789	770	755
TIP1-18.1e	Times Granite	3023.48	3334.32	1	985	945	916	893	874
TIP1-19.1i	Times Granite	840.20	1000.39	1	1011	969	939	915	896
TIP1-20.1i	Times Granite	4677.68	4997.48	1	964	926	897	875	857
TIP1-21.1c	Times Granite	5154.85	5356.26	1	995	954	924	901	882
SCM-37_1.1c	Times Granite	6393.90	8788.11	1	831	800	778	760	745
SCM-37_1.2i	Times Granite	1742.88	2406.46	1	834	803	780	762	747
SCM-37_10.1e	Times Granite	1788.86	2371.42	1	840	809	786	767	753
SCM-37_11.1c	Times Granite	2186.99	2785.16	1	881	848	823	803	787
SCM-37_12.1c	Times Granite	3267.61	3518.57	1	998	957	927	904	885
SCM-37_12.1i	Times Granite	3928.66	4147.88	1	979	940	911	888	869
SCM-37_2.1c	Times Granite	5813.69	5591.49	1	1009	967	937	913	894
SCM-37_3.1c	Times Granite	1954.98	2297.92	1	897	862	837	817	800
SCM-37_3.2i	Times Granite	813.11	1106.98	1	828	798	775	757	743
SCM-37_4.1e	Times Granite	1783.88	2448.66	1	843	812	788	770	755
SCM-37_5.1i	Times Granite	5536.07	5988.26	1	988	948	918	895	877
SCM-37_6.1c	Times Granite	4059.79	4609.62	1	927	891	864	843	826
SCM-37_6.2i	Times Granite	1766.04	2489.48	1	860	828	804	785	770
SCM-37_6.3e	Times Granite	1893.91	2541.67	1	836	805	782	764	749
SCM-37_7.1c	Times Granite	7731.51	8201.09	1	925	889	862	841	824
SCM-37_8.1c	Times Granite	3147.67	4284.59	1	827	796	774	756	741
SCM-37_9.1e	Times Granite	2266.61	2888.20	1	838	807	784	765	751

Appendix D: Zircon SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

Sample Name	Unit	Yb	Lu	Si Activity	Ferry Temp TiO2 Activity	Ferry Temp TiO2 Activity	Ferry Temp TiO2 Activity	Ferry Temp TiO2 Activity	Ferry Temp TiO2 Activity
		0.221	**0.033**		**0.3**	**0.4**	**0.5**	**0.6**	**0.7**
		70	**71**						
SCM27B-10I	Times Enclave	1663.91	2227.43	1	823	793	770	753	738
SCM27B-12E	Times Enclave	1410.23	1761.26	1	843	812	788	770	755
SCM27B-13E	Times Enclave	1758.80	2385.08	1	833	803	780	762	747
SCM27B-14E	Times Enclave	1995.60	2222.70	1	903	868	843	822	806
SCM27B-1C	Times Enclave	5555.13	5667.11	1	930	894	867	846	829
SCM27B-2C	Times Enclave	544.65	646.55	1	926	890	863	842	825
SCM27B-3E	Times Enclave	1397.92	1835.17	1	837	806	783	765	750
SCM27B-4C	Times Enclave	2551.90	3178.45	1	859	827	803	784	769
SCM27B-5E	Times Enclave	2208.45	2556.16	1	940	903	876	855	837
SCM27B-6E	Times Enclave	1662.11	2092.96	1	839	808	785	767	752
SCM27B-7I	Times Enclave	3666.54	4154.84	1	920	884	858	837	820
SCM27B-8E	Times Enclave	1520.93	2004.71	1	823	793	770	753	738
SCM27B-9C	Times Enclave	3052.98	3258.39	1	913	877	851	831	814
SCM27B-15C	Times Enclave	6034.60	5941.11	1	973	934	905	883	865
Average	**Times Granite**	**2867.93**	**3356.70**	**1**	**896**	**862**	**836**	**816**	**800**
SIT-1B-10C	Post-PST Lava Enclave	1159.71	1423.20	1	989	949	919	896	878
SIT-1B-10E	Post-PST Lava Enclave	636.65	797.27	1	973	934	905	883	865
SIT-1B-12C	Post-PST Lava Enclave	1802.12	2149.99	1	983	943	914	891	872
SIT-1B-12E	Post-PST Lava Enclave	675.29	831.48	1	967	929	900	878	860
SIT-1B-13C	Post-PST Lava Enclave	1847.09	2178.52	1	958	920	892	870	852
SIT-1B-13E	Post-PST Lava Enclave	892.61	1138.44	1	950	913	885	863	845
SIT-1B-14E	Post-PST Lava Enclave	811.18	1058.55	1	958	920	892	870	852
SIT-1B-15C	Post-PST Lava Enclave	1574.05	1865.77	1	919	883	857	836	819
SIT-1B-16C	Post-PST Lava Enclave	2221.91	2675.04	1	914	878	852	832	815
SIT-1B-17E	Post-PST Lava Enclave	1674.71	2103.17	1	1011	970	939	916	896
SIT-1B-1C	Post-PST Lava Enclave	2929.33	4039.80	1	856	823	800	781	766
SIT-1B-1E	Post-PST Lava Enclave	650.32	830.66	1	966	927	899	877	858
SIT-1B-20C	Post-PST Lava Enclave	2430.48	2730.94	1	996	955	926	902	883
SIT-1B-20E	Post-PST Lava Enclave	663.61	830.08	1	984	944	915	892	873
SIT-1B-2E	Post-PST Lava Enclave	583.85	751.51	1	966	927	899	876	858
SIT-1B-3E	Post-PST Lava Enclave	468.28	596.26	1	955	917	889	868	850
SIT-1B-4E	Post-PST Lava Enclave	514.59	660.26	1	956	918	890	868	850
SIT-1B-5C	Post-PST Lava Enclave	928.62	1116.28	1	989	949	920	897	878
SIT-1B-5E	Post-PST Lava Enclave	1043.53	1352.10	1	951	914	886	864	846
SIT-1B-6C	Post-PST Lava Enclave	1181.15	1412.82	1	1004	963	933	909	890
SIT-1B-7E	Post-PST Lava Enclave	951.69	1235.72	1	976	936	908	885	867
SIT-1B-8C	Post-PST Lava Enclave	2462.46	3046.53	1	865	833	809	790	774
SIT-1B-8E	Post-PST Lava Enclave	795.31	997.44	1	1003	962	932	908	889
SIT-1B-9C	Post-PST Lava Enclave	5691.11	5918.83	1	1001	960	930	907	887
SIT-1B-9E	Post-PST Lava Enclave	869.69	1086.47	1	963	925	896	874	856
SIT-1-11C	Post-PST Lava	718.24	911.82	1	948	910	883	861	844
SIT-1-12E	Post-PST Lava	994.92	1250.81	1	944	906	879	857	840
SIT-1-13C	Post-PST Lava	1059.17	1325.22	1	961	923	894	872	854
SIT-1-14E	Post-PST Lava	851.62	1035.96	1	995	954	924	901	882
SIT-1-15E	Post-PST Lava	1343.43	1667.74	1	973	933	905	882	864
SIT-1-16C	Post-PST Lava	3973.53	4451.83	1	927	891	864	843	826
SIT-1-16E	Post-PST Lava	1162.31	1409.57	1	905	870	844	824	807
SIT-1-1C	Post-PST Lava	5306.56	5880.12	1	994	954	924	901	882

Appendix D: Zircon SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

Sample Name	Unit	Yb	Lu	Si Activity	Ferry Temp TiO2 Activity	Ferry Temp TiO2 Activity	Ferry Temp TiO2 Activity	Ferry Temp TiO2 Activity	Ferry Temp TiO2 Activity
		0.221	**0.033**		**0.3**	**0.4**	**0.5**	**0.6**	**0.7**
		70	**71**						
SIT-1-1E	Post-PST Lava	891.22	1130.20	1	960	922	894	872	854
SIT-1-2C	Post-PST Lava	1943.15	2729.61	1	852	820	797	778	763
SIT-1-2E	Post-PST Lava	1442.63	1783.59	1	871	838	814	795	779
SIT-1-3C	Post-PST Lava	1874.76	2146.76	1	887	853	828	809	793
SIT-1-3E	Post-PST Lava	1190.29	1519.99	1	856	823	800	781	766
SIT-1-4C	Post-PST Lava	2526.68	2965.36	1	989	949	920	897	878
SIT-1-5E	Post-PST Lava	916.60	1196.43	1	992	951	922	899	880
SIT-1-6C	Post-PST Lava	1032.51	1369.65	1	994	953	924	901	882
SIT-1-8E	Post-PST Lava	1204.60	1491.21	1	963	924	896	874	856
SIT-1-9E	Post-PST Lava	979.46	1229.06	1	917	881	855	835	818
SIT-1-9S	Post-PST Lava	1494.67	1807.73	1	982	942	913	890	872
Average	**Post-PST Felsic Lava**	**1508.31**	**1821.13**	**1**	**954**	**916**	**888**	**866**	**848**
SIT-2_1.1i	Post-PST Lava	1554.00	2378.14	1	801	772	750	733	719
SIT-2_10.1i	Post-PST Lava	1008.33	1529.54	1	791	762	741	724	710
SIT-2_12.1c	Post-PST Lava	458.26	709.35	1	762	735	715	699	686
SIT-2_2.1c	Post-PST Lava	2681.70	3534.35	1	780	752	731	715	701
SIT-2_3.1i	Post-PST Lava	2042.88	2636.70	1	845	814	791	772	757
SIT-2_6.1c	Post-PST Lava	2338.56	3033.12	1	789	760	739	723	709
SIT-2_7.1c	Post-PST Lava	2211.14	2784.45	1	988	948	918	895	877
SIT-2_8.1c	Post-PST Lava	4428.44	5306.30	1	823	793	770	753	738
SIT-2_9.1c	Post-PST Lava	2979.31	3476.01	1	885	851	826	807	791
SIT-2_11.2e	Post-PST Lava	3123.44	3622.37	1	940	903	875	854	837
SIT-2_12.2e	Post-PST Lava	986.13	1450.06	1	779	751	730	714	701
SIT-2_2.2e	Post-PST Lava	1412.75	1922.15	1	836	805	782	764	749
SIT-2_4.1e	Post-PST Lava	846.81	1284.68	1	796	767	746	729	715
SIT-2_5.1e	Post-PST Lava	3560.39	4365.76	1	898	863	838	818	802
SIT-2_7.2e	Post-PST Lava	1185.34	1559.03	1	870	837	813	794	778
Average	**Post-PST Intermediate Lava**	**2054.50**	**2639.47**	**1**	**839**	**807**	**784**	**766**	**751**
SCM-34_1.2e	Pre-PST Trachyte	520.78	662.91	1	1051	1007	975	950	929
SCM-34_2.2i	Pre-PST Trachyte	1100.10	1336.19	1	1059	1014	981	956	935
SCM-34_3.1c	Pre-PST Trachyte	1903.01	2543.15	1	975	936	907	884	866
SCM-34_3.2e	Pre-PST Trachyte	327.94	418.42	1	1048	1004	972	947	926
SCM-34_4.1c	Pre-PST Trachyte	1848.49	2126.56	1	1018	976	945	921	902
SCM-34_5.1c	Pre-PST Trachyte	2858.57	3020.39	1	925	888	862	841	824
SCM-34_5.2i	Pre-PST Trachyte	789.98	986.06	1	1032	989	957	933	913
SCM-34_5.3e	Pre-PST Trachyte	542.11	688.15	1	1033	990	959	934	914
SCM-34_6.1e	Pre-PST Trachyte	957.03	1116.96	1	982	942	913	890	871
SCM-34_6.2c	Pre-PST Trachyte	1995.68	2371.22	1	863	830	806	787	772
SCM-34_7.1e	Pre-PST Trachyte	539.16	672.75	1	1049	1005	973	948	928
SCM-34_7.2i	Pre-PST Trachyte	666.45	836.70	1	978	939	910	887	869
SCM-34_7.3c	Pre-PST Trachyte	1330.42	1544.66	1	905	870	844	824	808
SCM-34_8.1c	Pre-PST Trachyte	497.66	626.44	1	1054	1010	978	952	932
SCM-34_9.1i	Pre-PST Trachyte	605.69	753.47	1	1084	1038	1004	977	956
SCM-41-11C	Pre-PST Trachyte	5981.07	6583.55	1	1068	1023	990	964	943
SCM-41-11E	Pre-PST Trachyte	613.58	766.09	1	1036	993	961	937	917
SCM-41-13C	Pre-PST Trachyte	572.64	696.87	1	994	954	924	901	882
SCM-41-14E	Pre-PST Trachyte	629.09	797.02	1	992	952	922	899	880

Appendix D: Zircon SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

Sample Name	**Unit**	**Yb**	**Lu**	**Si Activity**	**Ferry Temp TiO2 Activity**	**Ferry Temp TiO2 Activity**	**Ferry Temp TiO2 Activity**	**Ferry Temp TiO2 Activity**	**Ferry Temp TiO2 Activity**
		0.221	**0.033**		**0.3**	**0.4**	**0.5**	**0.6**	**0.7**
		70	**71**						
SCM-41-15E	Pre-PST Trachyte	388.26	493.86	1	1016	974	943	919	900
SCM-41-1E	Pre-PST Trachyte	478.07	600.28	1	982	942	913	890	872
SCM-41-2E	Pre-PST Trachyte	477.02	612.31	1	988	948	918	895	877
SCM-41-3E	Pre-PST Trachyte	672.80	843.67	1	999	958	928	905	886
SCM-41-4C	Pre-PST Trachyte	2436.09	2332.26	1	987	947	917	895	876
SCM-41-4E	Pre-PST Trachyte	675.01	849.24	1	1002	961	931	907	888
SCM-41-5C	Pre-PST Trachyte	2366.82	2688.91	1	983	943	914	891	873
SCM-41-5E	Pre-PST Trachyte	604.64	719.74	1	1016	974	943	919	900
SCM-41-6C	Pre-PST Trachyte	974.89	1196.29	1	907	872	846	826	809
SCM-41-6E	Pre-PST Trachyte	429.36	546.62	1	1025	983	952	927	908
SCM-41-7C	Pre-PST Trachyte	1317.57	1539.73	1	984	944	915	892	874
SCM-41-7S	Pre-PST Trachyte	969.52	1149.08	1	1032	989	958	933	913
SCM-41-8C	Pre-PST Trachyte	553.74	706.00	1	1023	981	950	926	906
SCM-41-9E	Pre-PST Trachyte	685.49	834.04	1	993	952	923	900	881
Average	**Pre-PST Trachyte**	**1130.57**	**1323.02**	**1**	**1002**	**961**	**931**	**908**	**889**

[1] Anders & Grevesse (1989) * 1.3596 Korotev Wed Site Wash. U

Sample Name	Unit	Ferry Temp TiO2 Activity 0.8	Ferry Temp TiO2 Activity 0.9	Ferry Temp TiO2 Activity 1
SCM1B-1.1I	Feldspar Porphyry Dike	726	716	707
SCM1B-2.1E	Feldspar Porphyry Dike	752	741	731
SCM1B-2.2C	Feldspar Porphyry Dike	748	737	727
SCM1B-3.1C	Feldspar Porphyry Dike	817	805	794
SCM1B-4.1C	Feldspar Porphyry Dike	855	841	830
SCM1B-5.1I	Feldspar Porphyry Dike	719	709	700
SCM1B-6.1E	Feldspar Porphyry Dike	749	738	728
SCM1B-6.2C	Feldspar Porphyry Dike	734	723	714
SCM1B-7.1E	Feldspar Porphyry Dike	777	765	755
SCM1B-7.2C	Feldspar Porphyry Dike	726	716	706
SCM1B-8.1C	Feldspar Porphyry Dike	722	711	702
SCM1B-10.1C	Feldspar Porphyry Dike	723	713	704
SCM1B-10.2E	Feldspar Porphyry Dike	746	735	725
SCM1B-11.1C	Feldspar Porphyry Dike	727	716	707
SCM1B-11.2E	Feldspar Porphyry Dike	764	753	743
SCM1B-12.1C	Feldspar Porphyry Dike	788	776	766
SCM1B-13.1C	Feldspar Porphyry Dike	740	729	719
SCM1B-14.1SZ	Feldspar Porphyry Dike	723	713	704
SCM1B-14.2I	Feldspar Porphyry Dike	729	719	709
SCM1B-14.3E	Feldspar Porphyry Dike	759	748	738
SCM1B-15.1I	Feldspar Porphyry Dike	714	704	695
SCM1B-15.2E	Feldspar Porphyry Dike	748	737	728
SCM1B-16.1I	Feldspar Porphyry Dike	863	849	837
SCM1B-17.1C	Feldspar Porphyry Dike	790	778	768
SCM-13_1.1I	Feldspar Porphyry Dike	727	716	707
SCM-13_11.1c	Feldspar Porphyry Dike	821	809	798
SCM-13_2.1e	Feldspar Porphyry Dike	757	746	736
SCM-13_3.1c	Feldspar Porphyry Dike	918	903	890
SCM-13_3.2e	Feldspar Porphyry Dike	751	740	731
SCM-13_4.1i	Feldspar Porphyry Dike	738	727	718
SCM-13_5.1c	Feldspar Porphyry Dike	885	871	858
SCM-13_5.2e	Feldspar Porphyry Dike	753	742	732
SCM-13_6.1c	Feldspar Porphyry Dike	871	857	845
SCM-13_6.2i	Feldspar Porphyry Dike	793	781	771
SCM-13_7.1c	Feldspar Porphyry Dike	750	739	729
SCM-13_7.2e	Feldspar Porphyry Dike	737	726	717
SCM-13_8.1c	Feldspar Porphyry Dike	754	742	733
SCM-13_8.1i	Feldspar Porphyry Dike	750	739	729
SCM-13_9.1e	Feldspar Porphyry Dike	732	721	712
SCM-13_10.1i	Feldspar Porphyry Dike	745	734	725
SCM-30_1.1c	Feldspar Porphyry Dike	849	836	824
SCM-30_1.2e	Feldspar Porphyry Dike	734	723	714
SCM-30_10.1e	Feldspar Porphyry Dike	807	795	784
SCM-30_10.2c	Feldspar Porphyry Dike	867	853	841
SCM-30_11.1c	Feldspar Porphyry Dike	888	874	861
SCM-30_11.2e	Feldspar Porphyry Dike	734	724	714
SCM-30_2.1c	Feldspar Porphyry Dike	897	882	870
SCM-30_3.1c	Feldspar Porphyry Dike	868	854	842

Appendix D: Zircon SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

Sample Name	Unit	Ferry Temp TiO2 Activity 0.8	Ferry Temp TiO2 Activity 0.9	Ferry Temp TiO2 Activity 1
SCM-30_4.1i	Feldspar Porphyry Dike	823	811	800
SCM-30_5.1e	Feldspar Porphyry Dike	720	710	701
SCM-30_6.1i	Feldspar Porphyry Dike	875	861	849
SCM-30_7.1c	Feldspar Porphyry Dike	724	714	704
SCM-30_8.1c	Feldspar Porphyry Dike	808	796	785
SCM-30_9.1c	Feldspar Porphyry Dike	876	862	850
SCM-30_9.2e	Feldspar Porphyry Dike	866	852	840
Averages	**Feldspar Porphyry Dike**	**781**	**769**	**759**
SCM-20_1.1c	Leucogranite	779	767	757
SCM-20_1.2e	Leucogranite	765	754	744
SCM-20_2.1e	Leucogranite	801	789	778
SCM-20_3.1e	Leucogranite	778	766	756
SCM-20_4.2e	Leucogranite	797	785	775
SCM-20_5.1i	Leucogranite	850	837	826
SCM-20_6.1c	Leucogranite	747	736	726
SCM-20_6.2e	Leucogranite	811	799	788
SCM-20_8.1e	Leucogranite	779	767	757
SCM-20_8.2c	Leucogranite	824	811	800
SCM-20_9.1c	Leucogranite	733	723	713
SCM-20_9.2e	Leucogranite	742	731	722
SCM-20_10.1i	Leucogranite	852	838	827
SCM-20_11.1c	Leucogranite	809	796	786
SCM-20_11.2e	Leucogranite	771	760	750
SCM-20_12.1c	Leucogranite	808	796	785
SCM-20_12.2e	Leucogranite	740	730	720
SCM-38_1.1i	Leucogranite	750	739	729
SCM-38_12.1i	Leucogranite	744	733	724
SCM-38_2.1i	Leucogranite	779	768	758
SCM-38_3.1c	Leucogranite	893	879	867
SCM-38_4.1e	Leucogranite	763	752	742
SCM-38_5.1e	Leucogranite	849	836	824
SCM-38_6.1e	Leucogranite	727	716	707
SCM-38_7.1c	Leucogranite	783	772	761
SCM-38_8.1c	Leucogranite	891	877	865
SCM-38_8.2e	Leucogranite	753	742	732
SCM-38_9.1c	Leucogranite	741	731	721
SCM-38_10.2e	Leucogranite	737	726	716
SCM-38_11.1c	Leucogranite	777	766	755
SCM-38_13.1c	Leucogranite	799	787	776
SCM-38_14.1c	Leucogranite	734	724	714
SCM-38_15.1c	Leucogranite	813	801	790
Average	**Leucogranite**	**786**	**774**	**763**
SCM6-1.1E	Moss	944	929	915
SCM6-1.2I	Moss	921	906	893
SCM6-2.1I	Moss	831	818	807
SCM6-3.1I	Moss	975	958	944
SCM6-4.1I	Moss	942	927	913

Appendix D: Zircon SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

Sample Name	Unit	Ferry Temp TiO2 Activity 0.8	Ferry Temp TiO2 Activity 0.9	Ferry Temp TiO2 Activity 1
SCM6-5.1I	Moss	932	917	904
SCM6-6.1I	Moss	905	890	878
SCM6-7.1e	Moss	887	873	861
SCM6-7.2c	Moss	801	788	778
SCM6-8.1i	Moss	882	868	856
SCM6-9.1c	Moss	861	847	835
SCM6-10.1c	Moss	843	830	818
SCM6-11.1c	Moss	852	839	827
SCM6-12.1e	Moss	885	871	859
SCM6-12.2c	Moss	851	837	826
SCM6-13.1e	Moss	871	858	846
SCM6-14.1e	Moss	887	873	860
SCM6-14.2c	Moss	756	744	735
SCM6-15.1i	Moss	954	938	924
SCM6-15.2i	Moss	926	911	898
SCM6-16.1c	Moss	885	871	859
SCM6-17.1c	Moss	971	954	940
SCM6-18.1c	Moss	763	752	742
MP1-1.1c	Moss	828	815	804
MP1-1.2e	Moss	866	852	840
MP1-2.1i	Moss	952	937	923
MP1-3.1e	Moss	877	863	851
MP1-3.2c	Moss	871	857	845
MP1-4.1e	Moss	888	874	862
MP1-4.2c	Moss	826	813	802
MP1-5.1c	Moss	886	872	859
MP1-5.2e	Moss	890	876	864
MP1-6.1c	Moss	903	888	875
MP1-7.1e	Moss	895	881	868
MP1-8.1e	Moss	881	867	854
MP1-9.1e	Moss	881	867	854
MP1-9.2c	Moss	870	856	844
MP1-10.1c	Moss	722	712	703
MP1-11.1i	Moss	884	870	858
MP1-12.1e	Moss	891	876	864
MP1-13.1e	Moss	904	889	877
MP1-13.2c	Moss	877	863	851
MP1-14.1c	Moss	909	894	881
MP1-14.2e	Moss	896	881	869
MPe1-En-10C	Moss Enclave	908	894	881
MPe1-En-10E	Moss Enclave	887	872	860
MPe1-En-11C	Moss Enclave	905	890	878
MPe1-En-14C	Moss Enclave	905	890	877
MPe1-En-15C	Moss Enclave	897	882	870
MPe1-En-16E	Moss Enclave	863	850	838
MPe1-En-19E	Moss Enclave	900	886	873
MPe1-En-1E	Moss Enclave	876	862	850
MPe1-En-20E	Moss Enclave	883	869	857
MPe1-En-25C	Moss Enclave	880	866	854

Appendix D: Zircon SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

Sample Name	**Unit**	**Ferry Temp TiO2 Activity 0.8**	**Ferry Temp TiO2 Activity 0.9**	**Ferry Temp TiO2 Activity 1**
MPe1-En-25E	Moss Enclave	901	887	874
MPe1-En-2C	Moss Enclave	904	889	877
MPe1-En-2E	Moss Enclave	928	913	900
MPe1-En-3C	Moss Enclave	885	871	859
MPe1-En-4C	Moss Enclave	889	875	863
MPe1-En-4E	Moss Enclave	881	867	855
MPe1-En-5C	Moss Enclave	853	840	828
MPe1-En-5S	Moss Enclave	862	849	837
MPe1-En-6E	Moss Enclave	881	867	855
MPe1-En-7C	Moss Enclave	875	862	849
MPe1-En-7E	Moss Enclave	881	867	855
MPe1-En-8C	Moss Enclave	862	848	837
MPe1-En-8E	Moss Enclave	879	865	853
MPe1-En-9C	Moss Enclave	890	876	864
MPe1-NonEn-10C	Moss Enclave	860	846	835
MPe1-NonEn-11C	Moss Enclave	893	879	866
MPe1-NonEn-11E	Moss Enclave	877	863	850
MPe1-NonEn-1C	Moss Enclave	862	849	837
MPe1-NonEn-1E	Moss Enclave	885	871	858
MPe1-NonEn-2C	Moss Enclave	786	775	764
MPe1-NonEn-2E	Moss Enclave	856	842	831
MPe1-NonEn-3C	Moss Enclave	914	900	887
MPe1-NonEn-4C	Moss Enclave	862	848	836
MPe1-NonEn-5E	Moss Enclave	891	877	864
MPe1-NonEn-6C	Moss Enclave	873	859	847
MPe1-NonEn-6E	Moss Enclave	868	854	842
MPe1-NonEn-7E	Moss Enclave	872	859	846
MPe1-NonEn-8C	Moss Enclave	868	854	842
MPe1-NonEn-8E	Moss Enclave	898	884	871
MPe1-NonEn-9C	Moss Enclave	890	876	863
Average	**Moss**	**880**	**866**	**854**
SCM-5a_1.1e	Felsic Porphyry Dike	744	734	724
SCM-5a_2.1c	Felsic Porphyry Dike	727	717	708
SCM-5a_2.2e	Felsic Porphyry Dike	669	659	651
SCM-5a_3.1e	Felsic Porphyry Dike	744	733	724
SCM-5a_3.2c	Felsic Porphyry Dike	760	748	739
SCM-5a_4.2e	Felsic Porphyry Dike	678	668	660
SCM-5a_5.1c	Felsic Porphyry Dike	734	723	714
SCM-5a_5.2e	Felsic Porphyry Dike	798	786	775
SCM-5a_6.1i	Felsic Porphyry Dike	726	715	706
SCM-5a_7.1e	Felsic Porphyry Dike	679	669	661
SCM-5a_8.2i	Felsic Porphyry Dike	705	695	686
SCM-5a_9.1e	Felsic Porphyry Dike	684	675	666
BCD_1.1i	Felsic Porphyry Dike	815	802	791
BCD_2.1c	Felsic Porphyry Dike	707	697	688
BCD_3.1e	Felsic Porphyry Dike	713	703	694
BCD_4.1e	Felsic Porphyry Dike	690	680	672
BCD_5.1c	Felsic Porphyry Dike	835	822	811

Sample Name	**Unit**	**Ferry Temp TiO2 Activity 0.8**	**Ferry Temp TiO2 Activity 0.9**	**Ferry Temp TiO2 Activity 1**
BCD_5.2e	Felsic Porphyry Dike	854	841	829
BCD_6.1c	Felsic Porphyry Dike	793	781	771
BCD_7.1i	Felsic Porphyry Dike	703	693	684
BCD_7.2c	Felsic Porphyry Dike	751	740	730
BCD_8.1i	Felsic Porphyry Dike	746	735	725
BCD_9.2e	Felsic Porphyry Dike	701	691	682
Average	**Felsic Porphyry Dike**	**737**	**726**	**717**
TIP1-1.1c	Times Granite	837	824	813
TIP1-1.2e	Times Granite	923	908	894
TIP1-2.1c	Times Granite	814	801	791
TIP1-2.2e	Times Granite	729	718	709
TIP1-3.1c	Times Granite	730	720	711
TIP1-3.2e	Times Granite	719	708	699
TIP1-4.1i	Times Granite	745	734	725
TIP1-6.1e	Times Granite	814	802	791
TIP1-7.1esz	Times Granite	730	719	710
TIP1-7.2c	Times Granite	717	706	697
TIP1-8.1ci	Times Granite	751	740	730
TIP1-9.1i	Times Granite	868	854	842
TIP1-10.1i	Times Granite	726	715	706
TIP1-11.1e	Times Granite	752	741	731
TIP1-12.1e	Times Granite	758	747	737
TIP1-13.1e	Times Granite	858	844	833
TIP1-14.1c	Times Granite	860	847	835
TIP1-15.1i	Times Granite	723	712	703
TIP1-16.1i	Times Granite	843	830	819
TIP1-17.1e	Times Granite	743	732	722
TIP1-18.1e	Times Granite	859	845	833
TIP1-19.1i	Times Granite	880	866	853
TIP1-20.1i	Times Granite	842	829	817
TIP1-21.1c	Times Granite	866	853	841
SCM-37_1.1c	Times Granite	733	722	713
SCM-37_1.2i	Times Granite	735	724	715
SCM-37_10.1e	Times Granite	740	729	720
SCM-37_11.1c	Times Granite	774	762	752
SCM-37_12.1c	Times Granite	869	855	843
SCM-37_12.1i	Times Granite	854	841	829
SCM-37_2.1c	Times Granite	878	864	852
SCM-37_3.1c	Times Granite	787	775	764
SCM-37_3.2i	Times Granite	730	720	710
SCM-37_4.1e	Times Granite	743	732	722
SCM-37_5.1i	Times Granite	861	847	835
SCM-37_6.1c	Times Granite	812	799	788
SCM-37_6.2i	Times Granite	757	746	736
SCM-37_6.3e	Times Granite	737	726	717
SCM-37_7.1c	Times Granite	810	797	787
SCM-37_8.1c	Times Granite	729	718	709
SCM-37_9.1e	Times Granite	738	727	718

Appendix D: Zircon SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

Sample Name	**Unit**	**Ferry Temp TiO2 Activity 0.8**	**Ferry Temp TiO2 Activity 0.9**	**Ferry Temp TiO2 Activity 1**
SCM27B-10I	Times Enclave	726	716	706
SCM27B-12E	Times Enclave	743	732	722
SCM27B-13E	Times Enclave	735	724	714
SCM27B-14E	Times Enclave	792	780	770
SCM27B-1C	Times Enclave	814	802	791
SCM27B-2C	Times Enclave	811	799	788
SCM27B-3E	Times Enclave	738	727	717
SCM27B-4C	Times Enclave	756	745	735
SCM27B-5E	Times Enclave	822	810	799
SCM27B-6E	Times Enclave	739	729	719
SCM27B-7I	Times Enclave	806	794	783
SCM27B-8E	Times Enclave	726	715	706
SCM27B-9C	Times Enclave	800	788	777
SCM27B-15C	Times Enclave	849	836	824
Average	**Times Granite**	**786**	**774**	**764**
SIT-1B-10C	Post-PST Lava Enclave	862	848	837
SIT-1B-10E	Post-PST Lava Enclave	849	836	824
SIT-1B-12C	Post-PST Lava Enclave	857	843	832
SIT-1B-12E	Post-PST Lava Enclave	844	831	820
SIT-1B-13C	Post-PST Lava Enclave	837	824	813
SIT-1B-13E	Post-PST Lava Enclave	830	818	806
SIT-1B-14E	Post-PST Lava Enclave	837	824	812
SIT-1B-15C	Post-PST Lava Enclave	805	793	782
SIT-1B-16C	Post-PST Lava Enclave	801	789	778
SIT-1B-17E	Post-PST Lava Enclave	880	866	854
SIT-1B-1C	Post-PST Lava Enclave	753	742	732
SIT-1B-1E	Post-PST Lava Enclave	843	830	819
SIT-1B-20C	Post-PST Lava Enclave	867	854	842
SIT-1B-20E	Post-PST Lava Enclave	858	844	832
SIT-1B-2E	Post-PST Lava Enclave	843	830	818
SIT-1B-3E	Post-PST Lava Enclave	835	822	810
SIT-1B-4E	Post-PST Lava Enclave	835	822	811
SIT-1B-5C	Post-PST Lava Enclave	862	848	837
SIT-1B-5E	Post-PST Lava Enclave	831	819	807
SIT-1B-6C	Post-PST Lava Enclave	874	860	848
SIT-1B-7E	Post-PST Lava Enclave	851	838	826
SIT-1B-8C	Post-PST Lava Enclave	761	750	740
SIT-1B-8E	Post-PST Lava Enclave	873	859	847
SIT-1B-9C	Post-PST Lava Enclave	871	858	846
SIT-1B-9E	Post-PST Lava Enclave	841	828	817
SIT-1-11C	Post-PST Lava	829	816	805
SIT-1-12E	Post-PST Lava	825	812	801
SIT-1-13C	Post-PST Lava	839	826	815
SIT-1-14E	Post-PST Lava	866	853	841
SIT-1-15E	Post-PST Lava	849	835	824
SIT-1-16C	Post-PST Lava	811	799	788
SIT-1-16E	Post-PST Lava	793	781	771
SIT-1-1C	Post-PST Lava	866	852	840

Sample Name	Unit	Ferry Temp TiO2 Activity 0.8	Ferry Temp TiO2 Activity 0.9	Ferry Temp TiO2 Activity 1
SIT-1-1E	Post-PST Lava	838	825	814
SIT-1-2C	Post-PST Lava	750	739	729
SIT-1-2E	Post-PST Lava	766	754	744
SIT-1-3C	Post-PST Lava	779	767	757
SIT-1-3E	Post-PST Lava	753	742	732
SIT-1-4C	Post-PST Lava	862	848	837
SIT-1-5E	Post-PST Lava	864	850	838
SIT-1-6C	Post-PST Lava	866	852	840
SIT-1-8E	Post-PST Lava	841	827	816
SIT-1-9E	Post-PST Lava	804	791	781
SIT-1-9S	Post-PST Lava	856	843	831
Average	**Post-PST Felsic Lava**	**833**	**820**	**809**
SIT-2_1.1i	Post-PST Lava	707	697	688
SIT-2_10.1i	Post-PST Lava	699	689	680
SIT-2_12.1c	Post-PST Lava	675	665	657
SIT-2_2.1c	Post-PST Lava	690	680	672
SIT-2_3.1i	Post-PST Lava	744	734	724
SIT-2_6.1c	Post-PST Lava	697	688	679
SIT-2_7.1c	Post-PST Lava	861	847	835
SIT-2_8.1c	Post-PST Lava	726	715	706
SIT-2_9.1c	Post-PST Lava	777	765	755
SIT-2_11.2e	Post-PST Lava	822	809	798
SIT-2_12.2e	Post-PST Lava	689	679	671
SIT-2_2.2e	Post-PST Lava	737	726	716
SIT-2_4.1e	Post-PST Lava	703	693	684
SIT-2_5.1e	Post-PST Lava	788	776	765
SIT-2_7.2e	Post-PST Lava	765	754	744
Average	**Post-PST Intermediate Lava**	**739**	**728**	**718**
SCM-34_1.2e	Pre-PST Trachyte	912	897	884
SCM-34_2.2i	Pre-PST Trachyte	918	903	890
SCM-34_3.1c	Pre-PST Trachyte	851	837	826
SCM-34_3.2e	Pre-PST Trachyte	909	894	881
SCM-34_4.1c	Pre-PST Trachyte	885	871	859
SCM-34_5.1c	Pre-PST Trachyte	810	797	786
SCM-34_5.2i	Pre-PST Trachyte	896	882	869
SCM-34_5.3e	Pre-PST Trachyte	898	883	871
SCM-34_6.1e	Pre-PST Trachyte	856	842	831
SCM-34_6.2c	Pre-PST Trachyte	759	748	738
SCM-34_7.1e	Pre-PST Trachyte	910	896	883
SCM-34_7.2i	Pre-PST Trachyte	853	840	828
SCM-34_7.3c	Pre-PST Trachyte	794	782	771
SCM-34_8.1c	Pre-PST Trachyte	914	900	887
SCM-34_9.1i	Pre-PST Trachyte	938	923	909
SCM-41-11C	Pre-PST Trachyte	926	910	897
SCM-41-11E	Pre-PST Trachyte	900	885	873
SCM-41-13C	Pre-PST Trachyte	866	852	840
SCM-41-14E	Pre-PST Trachyte	864	851	839

Appendix D: Zircon SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

Sample Name	Unit	Ferry Temp TiO2 Activity 0.8	Ferry Temp TiO2 Activity 0.9	Ferry Temp TiO2 Activity 1
SCM-41-15E	Pre-PST Trachyte	884	869	857
SCM-41-1E	Pre-PST Trachyte	856	843	831
SCM-41-2E	Pre-PST Trachyte	861	847	835
SCM-41-3E	Pre-PST Trachyte	870	856	844
SCM-41-4C	Pre-PST Trachyte	860	847	835
SCM-41-4E	Pre-PST Trachyte	872	858	846
SCM-41-5C	Pre-PST Trachyte	857	844	832
SCM-41-5E	Pre-PST Trachyte	884	869	857
SCM-41-6C	Pre-PST Trachyte	795	783	773
SCM-41-6E	Pre-PST Trachyte	891	877	864
SCM-41-7C	Pre-PST Trachyte	858	844	833
SCM-41-7S	Pre-PST Trachyte	896	882	869
SCM-41-8C	Pre-PST Trachyte	889	875	863
SCM-41-9E	Pre-PST Trachyte	865	851	839
Average	**Pre-PST Trachyte**	**873**	**859**	**847**

[1] Anders & Grevesse (1989) * 1.3596 Korotev Wed Site Wash. U

Appendix E: Whole Rock Elemental Geochemistry, Southern Black Mountains Volcanic Center

Sample Name	**SCM-34**	**SCM-41**	**WSE-3a**	**MLPT-7b**	**PSK-6a**	**MIL PSK-7**	**MIL PSK-14**	**MP1**	**MPe1**	**TIP-1**	**SCM-38**
Unit number	**1**	**2**	**3**	**3**	**4**	**4**	**4**	**7**	**8**	**9**	**9**
Type	Volcanic	Volcanic	Volcanic	Volcanic	Volcanic	Volcanic	Volcanic	Intrusion (Stock)	Magmatic Enclave	Intrusion (Stock)	Intrusion (Stock)
Unnormalized Major Element											
SiO2	63.48	62.04	64.02	62.72	64.26	56.14	56.52	64.11	57.05	73.14	75.46
TiO2	0.79	0.89	0.736	0.729	0.653	1.000	1.279	0.663	1.082	0.291	0.163
Al2O3	15.88	15.99	15.54	15.69	16.69	17.66	16.32	14.31	15.73	12.96	11.94
Fe2O3	4.47	4.57	3.69	3.87	3.46	6.21	7.27	4.1	6.78	2.1	1.45
MnO	0.068	0.089	0.066	0.058	0.047	0.081	0.075	0.062	0.081	0.043	0.043
MgO	1.49	1.17	0.97	1.32	0.62	2.92	2.80	1.43	3.13	0.26	0.14
CaO	3.04	4.08	2.27	1.67	2.22	5.31	4.66	2.53	4.76	0.79	0.34
Na2O	3.56	3.5	3.39	1.97	4.12	4.12	3.76	3.81	4.01	3.75	3.32
K2O	5.55	4.63	5.99	5.22	5.28	3.27	3.22	4.72	3.54	5.31	4.97
P2O5	0.32	0.33	0.19	0.13	0.285	0.487	0.488	0.2	0.42	0.02	< 0.01
Sum	98.65	97.29	96.86	93.37	97.63	97.20	96.40	95.94	96.58	98.66	97.83
Normalized Major Element											
SiO2	64.35	63.769	66.09	67.45	66.05	58.13	59.08	66.83	59.07	74.13	77.14
TiO2	0.80	0.915	0.76	0.78	0.671	1.035	1.337	0.69	1.12	0.29	0.17
Al2O3	16.10	16.436	16.04	16.87	17.15	18.29	17.06	14.92	16.29	13.14	12.21
Fe2O3	4.53	4.697	3.81	3.74	3.20	5.78	6.84	4.27	7.02	2.13	1.48
MnO	0.07	0.091	0.07	0.06	0.049	0.084	0.078	0.06	0.08	0.04	0.04
MgO	1.51	1.203	1.00	1.42	0.64	3.03	2.92	1.49	3.24	0.26	0.14
CaO	3.08	4.194	2.34	1.80	2.28	5.50	4.87	2.64	4.93	0.80	0.35
Na2O	3.61	3.598	3.50	2.12	4.23	4.27	3.93	3.97	4.15	3.80	3.39
K2O	5.63	4.759	6.18	5.61	5.43	3.38	3.36	4.92	3.67	5.38	5.08
P2O5	0.32	0.339	0.20	0.14	0.293	0.504	0.510	0.21	0.43	0.02	0
Total	100.00	100.000	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100
Ni	14	16	4	4	3	29	51	15	33	2	2
Cr	33.8	24.8	< 0.5	12	2	12	40	19.7	52	6.9	< 0.5
Sc	8.47	8.39	5.45	6.5	4	12	15	7.61	12.5	3.83	2.08
V	60	81	48	44	19	134	123	62	121	14	8
Ba	2226	1391	1637	1369	1917	1422	1160	1175	1287	309	42
Rb	135	126	148	171	132	85	104	158	107	142	183
Sr	590	602	551	398	717	1273	974	391	712	92	39
Zr	570	360	507	497	376	271	335	261	279	257	135
Y	27	27	24	25	27	23	26	19	21	29	21
Nb	19.4	22.5	36.4	26.6	27.6	15.6	23.9	17.2	21.4	27.5	31.8
Ga	21	21	21	21	22	22	22	20	20	20	17
Cu	12	25	36	8	2	28	20	14	14	4	4
Zn	91	72	58	69	123	86	82	57	48	55	37
Pb	29	24	23	22	25	19	21	19	15	24	27
La	115	87.1	103	97.7	91	84	86	75.8	74.1	84.9	48
Ce	223	172	179	170	173	165	172	146	146	157	87.8
Th	17.1	19.2	27.5	28.7	13	12	19	16.7	13	26.1	33.7
Nd	86.7	66.2	76.1	70.7	67	70	74	53.4	56.6	49.4	22.1
U	2.75	3.47	4.95	4.33	2	3	3	2.64	2.38	3.52	4.78
Nb+Y	46	50	60	52	55	39	50	36	42	57	53
La	115	87.1	103	97.7	93.59	90.72	93.50	75.8	74.1	84.9	48
Ce	223	172	198	170	188.55	179.07	187.82	146	146	157	87.8
Pr	24.1	18.5	22	20.1	20.62	19.90	21.35	15.6	15.9	15.8	7.64

Appendix E: Whole Rock Elemental Geochemistry, Southern Black Mountains Volcanic Center

Sample Name	**SCM-34**	**SCM-41**	**WSE-3a**	**MLPT-7b**	**PSK-6a**	**MIL PSK-7**	**MIL PSK-14**	**MP1**	**MPe1**	**TIP-1**	**SCM-38**
Unit number	**1**	**2**	**3**	**3**	**4**	**4**	**4**	**7**	**8**	**9**	**9**
Type	Volcanic	Volcanic	Volcanic	Volcanic	Volcanic	Volcanic	Volcanic	Intrusion (Stock)	Magmatic Enclave	Intrusion (Stock)	Intrusion (Stock)
Nd	86.7	66.2	76.1	70.7	73.62	71.95	76.67	53.4	56.6	49.4	22.1
(Pm)											
Sm	12.7	10.3	11.5	11	11.54	11.19	12.45	8.39	9.27	8.06	3.49
Eu	2.95	2.14	2.18	1.88	2.75	2.60	2.75	1.57	2.17	0.885	0.22
Gd	9.29	7.86	7.6	7.68	7.70	7.28	8.34	5.8	6.69	5.94	3.25
Tb	1.1	1	0.96	0.93	1.04	0.95	1.09	0.77	0.94	0.9	0.51
Dy	5.75	5.36	5.02	4.91	5.49	4.96	5.70	4.03	4.79	5.1	2.97
Ho	1.05	1	0.94	0.91	1.03	0.92	1.02	0.78	0.89	1.05	0.7
Er	2.95	2.84	2.54	2.59	2.66	2.32	2.55	2.14	2.43	3.07	2.27
Tm	0.437	0.402	0.368	0.37	0.37	0.32	0.35	0.309	0.347	0.466	0.381
Yb	2.81	2.57	2.44	2.39	2.28	1.94	2.08	2.01	2.2	3.13	2.67
Lu	0.459	0.412	0.383	0.391	0.35	0.30	0.31	0.313	0.343	0.501	0.442
Fe#	0.7	0.8	0.8	0.7	0.8	0.7	0.7	0.7	0.7	0.9	0.9
Agpaitic	0.7	0.7	0.8	0.6	0.7	0.6	0.6	0.8	0.7	0.9	0.9
A/CNK	0.9	0.9	1.0	1.3	1.0	0.9	0.9	0.9	0.8	1.0	1.0
MALI	6.1	4.1	7.1	5.5	7.2	2.1	2.3	6.0	2.8	8.3	8.0
Na2O + Ka2O	9.2	8.4	9.7	7.7	9.7	7.6	7.3	8.9	7.8	9.2	8.5

Appendix E: Whole Rock Elemental Geochemistry, Southern Black Mountains Volcanic Center

Sample Name	**SCM-27b**	**SCM-1**	**SCM-30**	**SIT-1**	**SIT-1b**	**SCM-5a**	**SCM-42**	**SCM-26**	**SIT-2**
Unit number	**10**	**11**	**11**	**12**	**13**	**14**	**14**	**15**	**16**
Type	Magmatic Enclave	Crosscutting Dike	Crosscutting Dike	Volcanic	Magmatic Enclave	Crosscutting Dike	Crosscutting Dike	Crosscutting Dike	Volcanic
Unnormalized Major Element									
SiO2	66.48	64.7	56.58	69.03	55.34	79.85	72.56	53.17	63.84
TiO2	0.591	0.598	0.79	0.44	1.12	0.09	0.32	1.088	0.57
Al2O3	15.01	14.27	13.77	14.01	16.77	10.02	13.80	14.4	15.85
Fe2O3	3.85	3.7	5.45	2.56	6.97	1.11	1.63	8.37	4.42
MnO	0.073	0.068	0.09	0.05	0.09	0.02	0.02	0.118	0.09
MgO	0.99	1.16	4.80	0.80	3.83	0.21	0.72	5.88	0.66
CaO	1.59	2.66	5.01	2.22	6.83	0.21	0.57	6.08	3.07
Na2O	4.61	3.02	2.79	3.44	3.51	0.33	1.91	3.47	3.91
K2O	4.27	5.16	3.20	4.57	2.89	8.06	6.45	3.16	4.33
P2O5	0.19	0.18	0.26	0.12	0.48	< 0.01	0.04	0.45	0.28
Sum	97.65	95.52	92.74	97.23	97.83	99.90	98.02	96.19	97.02
Normalized Major Element									
SiO2	68.08	67.74	61.01	71.00	56.57	79.93	74.02	55.28	65.80
TiO2	0.61	0.63	0.85	0.45	1.14	0.09	0.33	1.13	0.59
Al2O3	15.37	14.94	14.85	14.41	17.14	10.03	14.08	14.97	16.34
Fe2O3	3.94	3.87	5.88	2.63	7.12	1.11	1.66	8.70	4.56
MnO	0.07	0.07	0.09	0.05	0.09	0.02	0.02	0.12	0.09
MgO	1.01	1.21	5.18	0.82	3.91	0.21	0.73	6.11	0.68
CaO	1.63	2.78	5.40	2.28	6.98	0.21	0.58	6.32	3.16
Na2O	4.72	3.16	3.01	3.54	3.59	0.33	1.95	3.61	4.03
K2O	4.37	5.40	3.45	4.70	2.95	8.07	6.58	3.29	4.46
P2O5	0.19	0.19	0.28	0.12	0.49	0.00	0.04	0.47	0.29
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Ni	1	9	84.00	9	55	3	4	96	5.00
Cr	3.9	10.9	231.00	7	54.2	5.3	30.5	205	6.40
Sc	5.26	7.16	13.90	4.68	15.4	1.58	3.13	19.8	5.42
V	35	51	108.00	36	154	8	15	150	56
Ba	1324	1059	823.00	674	1511	423	469	1167	1789
Rb	142	156	80.00	156	74	337	202	80	94
Sr	286	372	504.00	291	1106	65	71	827	1498
Zr	431	298	200.00	210	273	67	251	248	375
Y	21	26	17.00	22	25	13	25	24	18
Nb	21.1	23.9	14.60	22.1	15.2	27.7	28.9	14.4	16
Ga	20	20	18.00	18	23	10	17	20	22
Cu	4	6	71.00	6	35	6	7	46	13
Zn	71	74	70.00	40	84	11	39	76	75
Pb	28	30	16.00	25	10	13	26	13	33
La	73.9	79.3	55.30	66.1	117	29.3	74.4	73.5	128
Ce	132	153	110.00	126	184	50.9	144	149	247
Th	15.2	19.3	11.90	28.5	18.8	32.7	29.1	11.5	25.7
Nd	43.7	53.4	42.10	42.3	86.9	11.6	49	63.2	91.4
U	2.24	3.35	1.86	4.64	2.11	5.72	4.13	1.99	3.25
Nb+Y	42	50	32	44	40	41	54	38	34
La	73.9	79.3	55.30	66.1	117	29.3	74.4	73.5	128.00
Ce	132	153	110.00	126	184	50.9	144	149	247.00
Pr	13.2	16.1	11.50	12.5	24.1	4.23	14.7	17	25.60

Appendix E: Whole Rock Elemental Geochemistry, Southern Black Mountains Volcanic Center

Sample Name	**SCM-27b**	**SCM-1**	**SCM-30**	**SIT-1**	**SIT-1b**	**SCM-5a**	**SCM-42**	**SCM-26**	**SIT-2**
Unit number	**10**	**11**	**11**	**12**	**13**	**14**	**14**	**15**	**16**
Type	Magmatic Enclave	Crosscutting Dike	Crosscutting Dike	Volcanic	Magmatic Enclave	Crosscutting Dike	Crosscutting Dike	Crosscutting Dike	Volcanic
Nd	43.7	53.4	42.10	42.3	86.9	11.6	49	63.2	91.40
(Pm)									
Sm	6.6	8.63	6.94	6.67	13.5	1.73	7.77	10.6	13.40
Eu	1.37	1.45	1.55	1.18	2.66	0.157	0.974	2.38	2.99
Gd	4.82	6.42	5.54	5.49	9.65	1.64	5.64	7.65	9.08
Tb	0.69	0.96	0.68	0.74	1.17	0.26	0.8	1.04	0.91
Dy	3.79	5.18	3.45	3.84	5.43	1.63	4.68	5.3	4.03
Ho	0.75	1.04	0.65	0.78	0.94	0.38	0.95	1	0.68
Er	2.19	2.89	1.86	2.27	2.71	1.36	2.78	2.69	1.93
Tm	0.333	0.432	0.27	0.353	0.359	0.269	0.461	0.376	0.27
Yb	2.26	2.88	1.70	2.4	2.18	2	3	2.32	1.74
Lu	0.37	0.451	0.27	0.399	0.338	0.358	0.496	0.359	0.27
Fe#	0.8	0.7	0.5	0.7	0.6	0.8	0.7	0.6	0.9
Agpaitic	0.8	0.7	0.6	0.8	0.5	0.9	0.7	0.6	0.7
A/CNK	1.0	0.9	0.8	1.0	0.8	1.0	1.2	0.7	0.9
MALI	7.3	5.5	1.0	5.8	-0.4	8.2	7.8	0.6	5.2
Na2O + Ka2O	9.1	8.6	6.5	8.2	6.5	8.4	8.5	6.9	8.5

Appendix F: Whole Rock Isotope Geochemistry, Southern Black Mountains Volcanic Center

					Pb[a]					Nd[b]				
Sample Name	**Unit Number**	**Unit**	**^{206}Pb/^{204}Pb**	**±**	**^{207}Pb/^{204}Pb**	**±**	**^{208}Pb/^{204}Pb**	**±**	**^{143}Nd/^{144}Nd**	**±**	**εNd[c]**	**2SE**	**^{176}Hf/^{177}Hf**	**±**
SIT-2	16	Post-PST	18.4259	0.0038	15.6134	0.0032	39.1487	0.0075	0.512104	7	-10.4	0.1	0.282414	1
SCM-26	15	Mafic Dike	18.4916	0.0023	15.6248	0.0022	39.2864	0.0053	0.512104	13	-10.4	0.3	0.282450	3
SCM-5a	14	Felsic Dike	18.3573	0.0039	15.6065	0.0033	39.2777	0.0077	0.512171	7	-9.1	0.1	0.282510	2
SCM-42	14	Felsic Dike	18.3134	0.0023	15.6104	0.0022	39.1214	0.0054	0.512155	13	-9.4	0.3	0.282479	3
SIT-1b	13	Felsic Lava Enclave	18.3176	0.0023	15.6029	0.0022	38.9525	0.0054	0.512157	13	-9.4	0.3	0.282501	2
SIT-1	12	Felsic Lava	18.2477	0.0027	15.6033	0.0026	39.1237	0.0061	0.512155	14	-9.4	0.3	0.282498	1
SCM-1	11	Feldspar Porphyry Dike	18.2755	0.0027	15.6019	0.0026	39.0810	0.0061	0.512143	14	-9.6	0.3	0.282487	2
SCM-30	11	Feldspar Porphyry Dike	18.2449	0.0023	15.5986	0.0022	39.0085	0.0054	0.512194	12	-8.7	0.2	0.282536	2
SCM-27b	10	Times Enclave	18.3021	0.0038	15.6048	0.0032	39.0608	0.0077	0.512208	7	-8.4	0.1	0.282535	1
TIP-1	9	Times Porphyry	18.2894	0.0038	15.6087	0.0032	39.1201	0.0075	0.512134	7	-9.8	0.1	0.282456	1
SCM-38	9	Times Porphyry	18.2842	0.0039	15.6049	0.0032	39.0954	0.0077	0.512126	7	-10.0	0.1	0.282450	2
MPe1	8	Moss Enclave	18.2864	0.0039	15.6064	0.0033	39.1196	0.0078	0.512197	7	-8.6	0.1	0.282511	2
MP1	7	Moss Porphyry	18.2692	0.0038	15.6062	0.0032	39.1173	0.0076	0.512104	15	-10.4	0.3	0.282446	2
PSK14	4	Pre-PST Lava	18.4513	0.0028	15.6173	0.0026	39.1675	0.0062	0.512212	14	-8.3	0.3	0.282552	1
PSK 7	4	Pre-PST Lava	18.4072	0.0028	15.6157	0.0026	39.1719	0.0062	0.512083	14	-10.8	0.3	0.282415	2
PST 11	4	Pre-PST Lava	18.3476	0.0022	15.6089	0.0022	39.0053	0.0051	0.512193	14	-8.7	0.3	0.282502	2
WSE3a	3	Cook Canyon Tuff	18.2833	0.0038	15.6050	0.0033	39.0605	0.0081	0.512122	6	-10.1	0.1	0.282465	1
SCM-41	2	Gold Road Trachyte	18.3754	0.0038	15.6149	0.0032	39.1828	0.0075	0.512127	7	-10.0	0.1	0.282461	1
SCM-34	1	Alcyone Trachyte	18.1867	0.0028	15.5984	0.0027	39.0465	0.0066	0.512041	7	-11.6	0.1	0.282390	1

[a] *Mass bias corrected; normalized to standard*

[b] *Mass bias and interference corrected; normalized to standard*

[c] $\varepsilon Nd = ([^{143}Nd/^{144}Nd_{sample}]/[^{143}Nd/^{144}Nd_{CHUR}]-1) * 10000$; *CHUR = 0.512638*

[d] *Normalized to standard*

[e] $\varepsilon Hf = ([^{176}Hf/^{177}Hf_{sample}]/[^{176}Hf/^{177}Hf_{CHUR}]-1) * 10000$; *CHUR = 0.282785*

[f] *Ratios with interference correction normalized to standard*

Appendix F: Whole Rock Isotope Geochemistry, Southern Black Mountains Volcanic Center

			Hf^{d}									
Sample Name	**Unit Number**	**Unit**	**εHf^{e}**	**2SE**	**^{87}Sr/^{86}Sr^{f}**	**±**	**Rb (ppm)**	**^{87}Rb (ppm)**	**Sr(ppm)**	**^{86}Sr (ppm)**	**1/Sr**	**^{87}Rb/^{86}Sr**
SIT-2	16	Post-PST	-13.1	0.035714286	0.709818	8	94	26.16	1498	147.70	0.0007	0.177146
SCM-26	15	Mafic Dike	-11.8	0.107142857	0.710188	10	80	22.27	827	81.54	0.0012	0.273086
SCM-5a	14	Felsic Dike	-9.7	0.071428571	0.715932	8	337	93.80	65	6.41	0.0154	14.636285
SCM-42	14	Felsic Dike	-10.8	0.107142857	0.713239	8	202	56.23	71	7.00	0.0141	8.031697
SIT-1b	13	Felsic Lava Enclave	-10.0	0.071428571	0.709176	8	74	20.60	1106	109.05	0.0009	0.188882
SIT-1	12	Felsic Lava	-10.2	0.035714286	0.710537	16	156	43.42	291	28.69	0.0034	1.513373
SCM-1	11	Feldspar Porphyry Dike	-10.5	0.071428571	0.710462	8	156	43.42	372	36.68	0.0027	1.183848
SCM-30	11	Feldspar Porphyry Dike	-8.8	0.071428571	0.709579	10	80	22.27	504	49.69	0.0020	0.448099
SCM-27b	10	Times Enclave	-8.8	0.035714286	0.710034	8	142	39.53	286	28.20	0.0035	1.401640
TIP-1	9	Times Porphyry	-11.6	0.035714286	0.711322	8	142	39.53	92	9.07	0.0109	4.357274
SCM-38	9	Times Porphyry	-11.8	0.071428571	0.715925	8	183	50.94	39	3.85	0.0256	13.246489
MPe1	8	Moss Enclave	-9.7	0.071428571	0.710422	6	107	29.78	712	70.20	0.0014	0.424246
MP1	7	Moss Porphyry	-12.0	0.071428571	0.711181	6	158	43.98	391	38.55	0.0026	1.140761
PSK14	4	Pre-PST Lava	-8.2	0.035714286	0.709334	10	103.5	28.81	973.7	96.01	0.0010	0.300075
PSK 7	4	Pre-PST Lava	-13.1	0.071428571	0.710075	10	84.8	23.60	1272.8	125.50	0.0008	0.188083
PST 11	4	Pre-PST Lava	-10.0	0.071428571	0.709442	14	132.3	36.83	716.7	70.67	0.0014	0.521119
WSE3a	3	Cook Canyon Tuff	-11.3	0.035714286	0.710378	10	148	41.20	551	54.33	0.0018	0.758271
SCM-41	2	Gold Road Trachyte	-11.5	0.035714286	0.710524	8	126	35.07	602	59.36	0.0017	0.590865
SCM-34	1	Alcyone Trachyte	-14.0	0.035714286	0.711154	8	135	37.58	590	58.17	0.0017	0.645946

[a] *Mass bias corrected; normalized to standard*

[b] *Mass bias and interference corrected; normalized to standard*

[c] $\varepsilon Nd = ([^{143}Nd/^{144}Nd_{sample}]/[^{143}Nd/^{144}Nd_{CHUR}]-1) * 10000$; *CHUR = 0.512638*

[d] *Normalized to standard*

[e] $\varepsilon Hf = ([^{176}Hf/^{177}Hf_{sample}]/[^{176}Hf/^{177}Hf_{CHUR}]-1) * 10000$; *CHUR = 0.282785*

[f] *Ratios with interference correction normalized to standard*

Appendix F: Whole Rock Isotope Geochemistry, Southern Black Mountains Volcanic Center

Sample Name	Unit Number	Unit	$^{87}Sr/^{86}Sr_{Initial}$	SiO2 (wt%)
SIT-2	16	Post-PST	0.709771	65.80
SCM-26	15	Mafic Dike	0.710115	55.28
SCM-5a	14	Felsic Dike	0.712024	79.93
SCM-42	14	Felsic Dike	0.711095	74.02
SIT-1b	13	Felsic Lava Enclave	0.709126	56.57
SIT-1	12	Felsic Lava	0.710133	71.00
SCM-1	11	Feldspar Porphyry Dike	0.710146	67.74
SCM-30	11	Feldspar Porphyry Dike	0.709460	61.01
SCM-27b	10	Times Enclave	0.709660	68.08
TIP-1	9	Times Porphyry	0.710158	74.13
SCM-38	9	Times Porphyry	0.712388	77.13
MPe1	8	Moss Enclave	0.710309	59.07
MP1	7	Moss Porphyry	0.710876	66.83
PSK14	4	Pre-PST Lava	0.709254	59.08
PSK 7	4	Pre-PST Lava	0.710025	58.13
PST 11	4	Pre-PST Lava	0.709303	66.05
WSE3a	3	Cook Canyon Tuff	0.710175	66.09
SCM-41	2	Gold Road Trachyte	0.710367	63.77
SCM-34	1	Alcyone Trachyte	0.710982	64.35

[a] *Mass bias corrected; normalized to standard*

[b] *Mass bias and interference corrected; normalized to standard*

[c] $\varepsilon Nd = ([^{143}Nd/^{144}Nd_{sample}]/[^{143}Nd/^{144}Nd_{CHUR}]-1) * 10000$; *CHUR = 0.512638*

[d] *Normalized to standard*

[e] $\varepsilon Hf = ([^{176}Hf/^{177}Hf_{sample}]/[^{176}Hf/^{177}Hf_{CHUR}]-1) * 10000$; *CHUR = 0.282785*

[f] *Ratios with interference correction normalized to standard*

Appendix G: Zircon Oxygen Isotope Analyses, Southern Black Mountains Volcanic Center

Sample Name	**^{16}O/^{16}O**	**^{16}O/^{16}O Error (1 sigma)**	**^{18}O/^{18}O**	**^{18}O/^{18}O Error (1 sigma)**	**^{18}O/^{16}O**	**^{18}O/^{16}O Error (1 sigma)**	**Corrected ^{18}O/^{16}O**	**Error Corrected**
SCM-34 (Pre-PST Trachyte - Alcyone)								
SCM-34@1.ais	2.93E+09	1.21E+06	5.91E+06	2.27E+03	2.01E-03	1.08E-07	**0.002016**	1.08E-07
SCM-34@2.ais	2.95E+09	6.79E+05	5.95E+06	1.50E+03	2.01E-03	1.20E-07	**0.002015**	1.20E-07
SCM-34@3.ais	2.94E+09	1.55E+06	5.93E+06	3.37E+03	2.01E-03	1.20E-07	**0.002016**	1.20E-07
SCM-34@4.ais	2.98E+09	2.88E+05	5.99E+06	7.53E+02	2.01E-03	9.78E-08	**0.002016**	9.79E-08
SCM-34@5.ais	2.97E+09	1.08E+06	5.99E+06	2.27E+03	2.01E-03	1.03E-07	**0.002015**	1.03E-07
SCM-34@6.ais	2.96E+09	3.70E+06	5.96E+06	7.36E+03	2.02E-03	1.59E-07	**0.002017**	1.59E-07
SCM-34@7.ais	3.01E+09	1.68E+06	6.06E+06	3.34E+03	2.01E-03	1.41E-07	**0.002016**	1.41E-07
SCM-34@8.ais	3.03E+09	1.57E+06	6.10E+06	3.27E+03	2.01E-03	9.23E-08	**0.002016**	9.23E-08
SCM-34@9.ais	3.02E+09	2.23E+06	6.09E+06	4.42E+03	2.01E-03	8.58E-08	**0.002016**	8.59E-08
SCM-34@10.ais	3.06E+09	1.09E+06	6.16E+06	2.30E+03	2.01E-03	1.79E-07	**0.002016**	1.79E-07
SCM-34@11.ais	2.32E+09	1.71E+06	4.68E+06	3.52E+03	2.02E-03	1.49E-07	**0.002017**	1.49E-07
SCM-34@12.ais	2.34E+09	3.02E+06	4.71E+06	6.20E+03	2.02E-03	9.28E-08	**0.002017**	9.28E-08
SCM-34@13.ais	2.40E+09	1.22E+06	4.84E+06	2.54E+03	2.02E-03	1.60E-07	**0.002016**	1.60E-07
SCM-34@14.ais	2.34E+09	4.52E+06	4.71E+06	8.91E+03	2.02E-03	1.76E-07	**0.002017**	1.76E-07
SCM-34@15.ais	2.27E+09	3.41E+06	4.57E+06	6.97E+03	2.02E-03	1.39E-07	**0.002016**	1.39E-07
SCM-34@16.ais	2.14E+09	1.01E+06	4.33E+06	2.21E+03	2.02E-03	1.72E-07	**0.002017**	1.72E-07
SCM-34@17.ais	2.14E+09	8.99E+05	4.31E+06	1.70E+03	2.02E-03	1.65E-07	**0.002016**	1.65E-07
SCM-34@18.ais	2.12E+09	2.95E+05	4.27E+06	7.78E+02	2.01E-03	1.25E-07	**0.002015**	1.25E-07
SCM-34@19.ais	2.11E+09	4.24E+05	4.25E+06	9.27E+02	2.02E-03	1.82E-07	**0.002016**	1.82E-07
SCM-34@20.ais	2.08E+09	6.77E+05	4.19E+06	1.49E+03	2.02E-03	1.68E-07	**0.002016**	1.68E-07
SCM-41 (Pre-PST Trachyte - Gold Road)								
SCM-41@1.ais	2.19E+09	7.60E+05	4.40E+06	1.75E+03	2.01E-03	1.84E-07	**0.002014**	1.84E-07
SCM-41@2.ais	2.16E+09	1.67E+06	4.35E+06	3.60E+03	2.01E-03	2.24E-07	**0.002014**	2.24E-07
SCM-41@3.ais	2.19E+09	1.33E+06	4.42E+06	2.73E+03	2.02E-03	1.63E-07	**0.002018**	1.63E-07
SCM-41@4.ais	2.28E+09	2.55E+06	4.58E+06	5.32E+03	2.01E-03	1.66E-07	**0.002013**	1.66E-07
SCM-41@5.ais	2.19E+09	8.40E+05	4.41E+06	1.63E+03	2.01E-03	1.79E-07	**0.002015**	1.79E-07
SCM-41@6.ais	2.21E+09	1.27E+06	4.45E+06	2.59E+03	2.01E-03	1.36E-07	**0.002014**	1.36E-07
SCM-41@7.ais	2.20E+09	1.53E+06	4.43E+06	3.20E+03	2.01E-03	1.48E-07	**0.002015**	1.48E-07
SCM-41@8.ais	2.22E+09	2.14E+06	4.48E+06	4.31E+03	2.01E-03	7.10E-08	**0.002015**	7.10E-08
SCM-41@9.ais	2.18E+09	1.07E+06	4.39E+06	2.18E+03	2.01E-03	1.89E-07	**0.002014**	1.89E-07
SCM-41@10.ais	2.23E+09	1.84E+06	4.49E+06	3.83E+03	2.01E-03	9.84E-08	**0.002014**	9.85E-08
SCM-41@11.ais	2.39E+09	1.18E+06	4.81E+06	2.30E+03	2.01E-03	1.45E-07	**0.002015**	1.45E-07
SCM-41@12.ais	2.39E+09	1.39E+06	4.82E+06	2.97E+03	2.01E-03	1.18E-07	**0.002016**	1.18E-07
SCM-41@13.ais	2.39E+09	1.45E+06	4.81E+06	2.97E+03	2.01E-03	1.10E-07	**0.002014**	1.10E-07
SCM-41@14.ais	2.40E+09	7.06E+05	4.83E+06	1.67E+03	2.01E-03	1.68E-07	**0.002015**	1.68E-07
SCM-41@15.ais	2.40E+09	1.09E+06	4.83E+06	2.45E+03	2.01E-03	2.02E-07	**0.002013**	2.03E-07
SCM-41@16.ais	2.40E+09	1.92E+06	4.84E+06	4.01E+03	2.01E-03	1.42E-07	**0.002014**	1.42E-07
SCM-41@17.ais	2.40E+09	1.44E+06	4.85E+06	3.04E+03	2.02E-03	1.15E-07	**0.002016**	1.15E-07
SCM-41@18.ais	2.41E+09	2.02E+06	4.85E+06	4.16E+03	2.01E-03	1.40E-07	**0.002016**	1.40E-07
SCM-41@19.ais	2.41E+09	1.97E+06	4.86E+06	4.08E+03	2.02E-03	1.11E-07	**0.002017**	1.11E-07
SCM-41@20.ais	2.40E+09	1.61E+06	4.85E+06	3.00E+03	2.02E-03	1.60E-07	**0.002020**	1.60E-07
Cook Canyon Tuff								
7A@1.ais	3.14E+09	1.83E+06	6.33E+06	3.62E+03	2.02E-03	1.24E-07	**0.00201743**	1.245E-07
7A@2.ais	2.85E+09	6.99E+06	5.75E+06	1.41E+04	2.02E-03	1.25E-07	**0.00201922**	1.256E-07
7A@3.ais	3.16E+09	1.53E+06	6.37E+06	3.02E+03	2.02E-03	1.13E-07	**0.00201763**	1.131E-07
7A@4.ais	2.93E+09	3.87E+06	5.91E+06	7.98E+03	2.02E-03	1.25E-07	**0.00201839**	1.249E-07
7A@5.ais	3.14E+09	1.93E+06	6.34E+06	3.89E+03	2.02E-03	1.45E-07	**0.00201754**	1.449E-07
7A@6.ais	3.06E+09	1.85E+06	6.17E+06	3.91E+03	2.02E-03	1.26E-07	**0.00201790**	1.259E-07
7A@7.ais	3.14E+09	3.02E+06	6.34E+06	6.06E+03	2.02E-03	9.63E-08	**0.00201763**	9.641E-08
7A@8.ais	3.11E+09	4.70E+06	6.28E+06	9.52E+03	2.02E-03	1.27E-07	**0.00201838**	1.276E-07
7A@9.ais	3.08E+09	3.96E+06	6.22E+06	7.74E+03	2.02E-03	1.45E-07	**0.00201828**	1.450E-07
7A@10.ais	3.13E+09	2.18E+06	6.32E+06	4.43E+03	2.02E-03	1.01E-07	**0.00201829**	1.010E-07
7A@11.ais	2.98E+09	8.46E+06	6.01E+06	1.67E+04	2.02E-03	1.84E-07	**0.00201816**	1.840E-07

Appendix G: Zircon Oxygen Isotope Analyses, Southern Black Mountains Volcanic Center

Sample Name	**^{16}O/^{16}O**	**^{16}O/^{16}O Error (1 sigma)**	**^{18}O/^{18}O**	**^{18}O/^{18}O Error (1 sigma)**	**^{18}O/^{16}O**	**^{18}O/^{16}O Error (1 sigma)**	**Corrected ^{18}O/^{16}O**	**Error Corrected**
7A@12.ais	3.14E+09	1.59E+06	6.34E+06	3.28E+03	2.02E-03	9.43E-08	**0.00201732**	9.440E-08
7A@13.ais	2.91E+09	4.46E+06	5.87E+06	8.83E+03	2.02E-03	1.37E-07	**0.00201720**	1.370E-07
7A@14.ais	3.13E+09	1.38E+06	6.32E+06	2.73E+03	2.02E-03	9.87E-08	**0.00201779**	9.875E-08
7A@15.ais	3.12E+09	1.90E+06	6.30E+06	3.86E+03	2.02E-03	8.69E-08	**0.00201835**	8.697E-08
7A@16.ais	3.10E+09	2.54E+06	6.26E+06	4.81E+03	2.02E-03	1.34E-07	**0.00201875**	1.343E-07
7B@1.ais	3.19E+09	2.05E+06	6.42E+06	3.99E+03	2.02E-03	1.16E-07	**0.00201796**	1.159E-07
7B@2.ais	3.19E+09	2.25E+06	6.42E+06	4.43E+03	2.02E-03	1.46E-07	**0.00201758**	1.458E-07
7B@3.ais	3.14E+09	6.00E+06	6.33E+06	1.19E+04	2.02E-03	1.87E-07	**0.00201796**	1.867E-07
7B@4.ais	3.15E+09	2.39E+06	6.36E+06	4.69E+03	2.02E-03	1.13E-07	**0.00201815**	1.134E-07
7B@5.ais	3.19E+09	1.62E+06	6.44E+06	3.08E+03	2.02E-03	1.22E-07	**0.00201815**	1.217E-07
7B@6.ais	3.18E+09	2.27E+06	6.41E+06	4.55E+03	2.02E-03	1.25E-07	**0.00201776**	1.255E-07
7B@7.ais	3.19E+09	1.95E+06	6.43E+06	4.07E+03	2.02E-03	9.03E-08	**0.00201817**	9.030E-08
7B@8.ais	3.17E+09	2.29E+06	6.39E+06	4.66E+03	2.02E-03	1.43E-07	**0.00201773**	1.435E-07
7B@9.ais	3.20E+09	2.16E+06	6.45E+06	4.20E+03	2.02E-03	1.24E-07	**0.00201793**	1.245E-07
7B@10.ais	3.17E+09	8.18E+06	6.40E+06	1.64E+04	2.02E-03	1.83E-07	**0.00201643**	1.827E-07
7B@11.ais	3.08E+09	6.53E+06	6.21E+06	1.32E+04	2.02E-03	9.99E-08	**0.00201763**	9.996E-08
7B@12.ais	3.18E+09	2.46E+06	6.42E+06	5.08E+03	2.02E-03	1.20E-07	**0.00201805**	1.202E-07
7B@13.ais	3.12E+09	5.89E+06	6.30E+06	1.16E+04	2.02E-03	1.54E-07	**0.00201875**	1.542E-07
7B@14.ais	3.16E+09	2.33E+06	6.38E+06	4.78E+03	2.02E-03	9.55E-08	**0.00201830**	9.556E-08
7B@15.ais	3.17E+09	2.58E+06	6.39E+06	5.26E+03	2.02E-03	1.73E-07	**0.00201745**	1.734E-07
7B@16.ais	3.10E+09	6.29E+06	6.26E+06	1.28E+04	2.02E-03	9.39E-08	**0.00201856**	9.394E-08
7B@17.ais	3.09E+09	2.25E+06	6.23E+06	4.51E+03	2.02E-03	1.12E-07	**0.00201796**	1.118E-07
7B@18.ais	3.15E+09	1.93E+06	6.36E+06	3.97E+03	2.02E-03	1.02E-07	**0.00201823**	1.024E-07
7B@19.ais	3.06E+09	3.39E+06	6.17E+06	6.76E+03	2.02E-03	1.21E-07	**0.00201946**	1.214E-07
7B@20.ais	3.17E+09	2.34E+06	6.40E+06	4.78E+03	2.02E-03	7.71E-08	**0.00201774**	7.712E-08
Pre-PST Lavas								
11-1@1.ais	3.02E+09	6.53E+06	6.10E+06	1.32E+04	2.02E-03	1.08E-07	**0.00201688**	1.078E-07
11-1@2.ais	3.06E+09	5.04E+06	6.16E+06	9.94E+03	2.02E-03	1.65E-07	**0.00201637**	1.653E-07
11-1@3.ais	1.77E+09	1.49E+06	3.56E+06	3.00E+03	2.01E-03	2.15E-07	**0.00201367**	2.149E-07
11-1@4.ais	3.07E+09	1.17E+07	6.19E+06	2.35E+04	2.02E-03	1.19E-07	**0.00201683**	1.190E-07
11-1@5.ais	3.08E+09	8.28E+06	6.20E+06	1.67E+04	2.02E-03	7.86E-08	**0.00201781**	7.866E-08
11-1@6.ais	3.13E+09	2.66E+06	6.31E+06	5.13E+03	2.02E-03	1.27E-07	**0.00201740**	1.270E-07
11-1@7.ais	3.11E+09	2.10E+06	6.27E+06	4.22E+03	2.02E-03	1.04E-07	**0.00202171**	1.044E-07
11-1@8.ais	3.10E+09	2.19E+06	6.26E+06	4.42E+03	2.02E-03	1.61E-07	**0.00202116**	1.614E-07
11-1@9.ais	2.09E+09	3.05E+06	4.21E+06	6.00E+03	2.01E-03	1.44E-07	**0.00201604**	1.444E-07
11-1@10.ais	3.13E+09	1.54E+06	6.31E+06	3.21E+03	2.02E-03	1.02E-07	**0.00201754**	1.023E-07
11-1@11.ais	3.05E+09	7.67E+06	6.15E+06	1.53E+04	2.02E-03	1.51E-07	**0.00201780**	1.507E-07
11-1@12.ais	3.13E+09	2.13E+06	6.30E+06	4.25E+03	2.01E-03	1.01E-07	**0.00201601**	1.012E-07
11-1@13.ais	2.38E+09	2.87E+06	4.80E+06	5.65E+03	2.01E-03	1.50E-07	**0.00201626**	1.503E-07
11-1@14.ais	3.02E+09	5.87E+06	6.10E+06	1.17E+04	2.02E-03	1.31E-07	**0.00201783**	1.313E-07
11-1@15.ais	2.85E+09	2.01E+06	5.74E+06	4.06E+03	2.01E-03	5.63E-08	**0.00201635**	5.637E-08
11-1@16.ais	3.09E+09	2.61E+06	6.22E+06	5.31E+03	2.02E-03	1.25E-07	**0.00201707**	1.252E-07
11-1@17.ais	2.71E+09	9.45E+05	5.46E+06	2.03E+03	2.02E-03	1.53E-07	**0.00201741**	1.531E-07
PST (Trachyte)								
5D@1.ais	3.20E+09	1.06E+06	6.45E+06	2.23E+03	2.02E-03	7.32E-08	**0.00201843**	7.327E-08
5D@2.ais	3.19E+09	1.90E+06	6.44E+06	3.91E+03	2.02E-03	1.43E-07	**0.00201868**	1.429E-07
5D@3.ais	3.19E+09	1.87E+06	6.44E+06	3.86E+03	2.02E-03	1.27E-07	**0.00201730**	1.275E-07
5D@4.ais	3.20E+09	1.38E+06	6.46E+06	2.71E+03	2.02E-03	9.13E-08	**0.00201780**	9.132E-08
5D@5.ais	3.20E+09	2.53E+06	6.46E+06	5.24E+03	2.02E-03	9.57E-08	**0.00201810**	9.575E-08
5D@6.ais	3.18E+09	1.86E+06	6.43E+06	3.85E+03	2.02E-03	9.14E-08	**0.00201860**	9.145E-08
5D@7.ais	3.18E+09	1.79E+06	6.41E+06	3.71E+03	2.02E-03	1.04E-07	**0.00201850**	1.039E-07
5D@8.ais	3.19E+09	2.19E+06	6.43E+06	4.40E+03	2.02E-03	1.12E-07	**0.00201865**	1.118E-07
5D@9.ais	3.18E+09	1.97E+06	6.41E+06	4.17E+03	2.02E-03	8.99E-08	**0.00201736**	8.995E-08
5D@10.ais	3.18E+09	2.10E+06	6.41E+06	4.11E+03	2.02E-03	1.21E-07	**0.00201867**	1.207E-07

Appendix G: Zircon Oxygen Isotope Analyses, Southern Black Mountains Volcanic Center

Sample Name	^{16}O/^{16}O	^{16}O/^{16}O Error (1 sigma)	^{18}O/^{18}O	^{18}O/^{18}O Error (1 sigma)	^{18}O/^{16}O	^{18}O/^{16}O Error (1 sigma)	Corrected ^{18}O/^{16}O	Error Corrected
5D@11.ais	3.17E+09	2.53E+06	6.40E+06	4.98E+03	2.02E-03	1.35E-07	**0.00201902**	1.353E-07
5D@12.ais	3.19E+09	1.71E+06	6.44E+06	3.43E+03	2.02E-03	9.82E-08	**0.00201949**	9.831E-08
5D@13.ais	3.19E+09	2.22E+06	6.43E+06	4.54E+03	2.02E-03	1.35E-07	**0.00201891**	1.347E-07
5D@14.ais	3.18E+09	1.86E+06	6.42E+06	3.86E+03	2.02E-03	1.19E-07	**0.00201886**	1.192E-07
5D@15.ais	3.19E+09	2.29E+06	6.43E+06	4.66E+03	2.02E-03	1.19E-07	**0.00201925**	1.195E-07
5D@16.ais	3.18E+09	1.35E+06	6.43E+06	2.83E+03	2.02E-03	8.39E-08	**0.00201884**	8.400E-08
5D@17.ais	3.16E+09	2.50E+06	6.37E+06	5.26E+03	2.02E-03	1.04E-07	**0.00201959**	1.039E-07
5D@18.ais	3.16E+09	1.30E+06	6.38E+06	2.72E+03	2.02E-03	1.45E-07	**0.00201943**	1.451E-07
5D@19.ais	3.18E+09	1.66E+06	6.43E+06	3.39E+03	2.02E-03	1.28E-07	**0.00201877**	1.276E-07
PST (Rhyolite)								
3B@1.ais	3.17E+09	5.18E+06	6.40E+06	1.07E+04	2.02E-03	1.08E-07	**0.00201816**	1.078E-07
3B@2.ais	3.06E+09	1.86E+07	6.18E+06	3.76E+04	2.02E-03	2.30E-07	**0.00201832**	2.304E-07
3B@3.ais	3.17E+09	2.26E+06	6.40E+06	4.52E+03	2.02E-03	1.48E-07	**0.00201752**	1.482E-07
3B@4.ais	3.17E+09	1.26E+06	6.40E+06	2.49E+03	2.02E-03	1.02E-07	**0.00201779**	1.025E-07
3B@5.ais	3.16E+09	9.21E+06	6.38E+06	1.82E+04	2.02E-03	1.79E-07	**0.00201775**	1.792E-07
3B@6.ais	3.18E+09	1.94E+06	6.41E+06	3.93E+03	2.02E-03	1.17E-07	**0.00201839**	1.167E-07
3B@7.ais	3.07E+09	2.09E+06	6.20E+06	4.46E+03	2.02E-03	1.25E-07	**0.00201690**	1.246E-07
3B@8.ais	3.17E+09	1.64E+06	6.40E+06	3.41E+03	2.02E-03	1.08E-07	**0.00201930**	1.077E-07
3B@9.ais	3.17E+09	4.79E+06	6.40E+06	9.46E+03	2.02E-03	1.30E-07	**0.00201781**	1.306E-07
3B@10.ais	3.18E+09	1.74E+06	6.41E+06	3.61E+03	2.02E-03	1.12E-07	**0.00201846**	1.125E-07
3B@11.ais	3.20E+09	1.88E+06	6.44E+06	3.73E+03	2.02E-03	1.17E-07	**0.00201778**	1.174E-07
3B@12.ais	3.20E+09	2.89E+06	6.46E+06	5.77E+03	2.02E-03	8.61E-08	**0.00201752**	8.613E-08
3B@13.ais	2.81E+09	1.57E+06	5.66E+06	3.07E+03	2.01E-03	1.82E-07	**0.00201430**	1.822E-07
3B@14.ais	3.18E+09	1.82E+06	6.41E+06	3.81E+03	2.02E-03	1.21E-07	**0.00201788**	1.212E-07
3B@15.ais	3.18E+09	1.04E+06	6.42E+06	2.27E+03	2.02E-03	1.33E-07	**0.00201777**	1.333E-07
3B@16.ais	3.17E+09	1.53E+06	6.39E+06	3.11E+03	2.02E-03	1.38E-07	**0.00201742**	1.380E-07
3B@17.ais	3.19E+09	1.64E+06	6.43E+06	3.39E+03	2.02E-03	1.45E-07	**0.00201848**	1.447E-07
3B@18.ais	3.15E+09	1.34E+06	6.36E+06	2.70E+03	2.02E-03	8.53E-08	**0.00201790**	8.535E-08
2H@1.ais	3.11E+09	1.12E+06	6.28E+06	2.30E+03	2.02E-03	1.19E-07	**0.00201871**	1.194E-07
2H@2.ais	3.08E+09	1.59E+06	6.21E+06	3.22E+03	2.02E-03	1.21E-07	**0.00201805**	1.214E-07
2H@3.ais	3.06E+09	1.81E+06	6.18E+06	3.82E+03	2.02E-03	1.31E-07	**0.00201813**	1.310E-07
2H@4.ais	3.06E+09	2.35E+06	6.18E+06	4.97E+03	2.02E-03	1.61E-07	**0.00201804**	1.613E-07
2H@5.ais	3.09E+09	1.90E+06	6.24E+06	3.75E+03	2.02E-03	1.09E-07	**0.00201776**	1.089E-07
2H@6.ais	3.10E+09	2.00E+06	6.26E+06	3.99E+03	2.02E-03	1.47E-07	**0.00201798**	1.472E-07
2H@7.ais	3.10E+09	1.70E+06	6.25E+06	3.44E+03	2.02E-03	1.41E-07	**0.00201871**	1.411E-07
2H@8.ais	3.10E+09	2.25E+06	6.25E+06	4.48E+03	2.02E-03	1.00E-07	**0.00201727**	1.001E-07
2H@9.ais	3.01E+09	2.51E+06	6.07E+06	5.16E+03	2.02E-03	1.86E-07	**0.00201726**	1.864E-07
2H@10.ais	3.08E+09	2.73E+06	6.21E+06	5.58E+03	2.02E-03	8.47E-08	**0.00201758**	8.473E-08
2H@11.ais	3.13E+09	2.11E+06	6.31E+06	4.49E+03	2.02E-03	1.10E-07	**0.00201740**	1.098E-07
2H@12.ais	3.08E+09	1.94E+06	6.20E+06	3.79E+03	2.02E-03	1.27E-07	**0.00201735**	1.270E-07
2H@13.ais	2.45E+09	2.07E+06	4.95E+06	4.23E+03	2.02E-03	1.01E-07	**0.00201652**	1.014E-07
2H@14.ais	3.12E+09	2.48E+06	6.29E+06	5.07E+03	2.02E-03	1.49E-07	**0.00201786**	1.488E-07
2H@15.ais	3.13E+09	1.99E+06	6.31E+06	4.11E+03	2.02E-03	7.67E-08	**0.00201828**	7.676E-08
2H@16.ais	3.12E+09	2.24E+06	6.29E+06	4.38E+03	2.02E-03	1.36E-07	**0.00201666**	1.361E-07
2H@17.ais	2.92E+09	3.51E+06	5.88E+06	6.87E+03	2.02E-03	1.49E-07	**0.00201710**	1.495E-07
2H@18.ais	3.11E+09	1.86E+06	6.28E+06	3.86E+03	2.02E-03	1.35E-07	**0.00201803**	1.348E-07
2H@19.ais	3.11E+09	2.48E+06	6.27E+06	4.90E+03	2.02E-03	1.24E-07	**0.00201783**	1.236E-07
2H@20.ais	3.10E+09	2.22E+06	6.26E+06	4.48E+03	2.02E-03	1.51E-07	**0.00201757**	1.513E-07
2H@21.ais	2.76E+09	9.73E+06	5.56E+06	1.92E+04	2.02E-03	2.01E-07	**0.00201760**	2.006E-07
2H@22.ais	3.03E+09	4.86E+06	6.12E+06	9.73E+03	2.02E-03	1.47E-07	**0.00201770**	1.475E-07
2H@23.ais	3.06E+09	5.54E+06	6.18E+06	1.11E+04	2.02E-03	1.12E-07	**0.00201902**	1.116E-07
2H@24.ais	3.10E+09	3.75E+06	6.25E+06	7.59E+03	2.02E-03	1.18E-07	**0.00201849**	1.182E-07
2H@25.ais	3.03E+09	4.85E+06	6.10E+06	9.72E+03	2.02E-03	1.45E-07	**0.00201834**	1.452E-07
2H@26.ais	3.06E+09	1.88E+06	6.18E+06	3.63E+03	2.02E-03	1.07E-07	**0.00201866**	1.069E-07

Appendix G: Zircon Oxygen Isotope Analyses, Southern Black Mountains Volcanic Center

Sample Name	**$^{16}O/^{16}O$**	**$^{16}O/^{16}O$ Error (1 sigma)**	**$^{18}O/^{18}O$**	**$^{18}O/^{18}O$ Error (1 sigma)**	**$^{18}O/^{16}O$**	**$^{18}O/^{16}O$ Error (1 sigma)**	**Corrected $^{18}O/^{16}O$**	**Error Corrected**
2H@27.ais	2.99E+09	1.50E+06	6.03E+06	2.86E+03	2.02E-03	1.31E-07	**0.00201820**	1.309E-07
2H@28.ais	3.08E+09	1.75E+06	6.21E+06	3.42E+03	2.02E-03	8.58E-08	**0.00201814**	8.586E-08
2H@29.ais	3.10E+09	1.74E+06	6.25E+06	3.56E+03	2.02E-03	1.24E-07	**0.00201934**	1.245E-07
2H@30.ais	2.97E+09	6.24E+06	5.99E+06	1.26E+04	2.02E-03	1.16E-07	**0.00201852**	1.157E-07
2H@31.ais	3.07E+09	2.16E+06	6.20E+06	4.37E+03	2.02E-03	1.07E-07	**0.00201903**	1.067E-07
Moss Porphyry								
SCM-6@1.ais	2.12E+09	1.78E+06	4.27E+06	3.62E+03	2.02E-03	1.55E-07	**0.00201767**	1.551E-07
SCM-6@2.ais	2.15E+09	1.44E+06	4.34E+06	2.93E+03	2.02E-03	1.68E-07	**0.00201816**	1.683E-07
SCM-6@3.ais	2.14E+09	1.67E+06	4.32E+06	3.27E+03	2.02E-03	9.69E-08	**0.00201838**	9.699E-08
SCM-6@4.ais	2.13E+09	2.79E+06	4.30E+06	5.60E+03	2.02E-03	1.58E-07	**0.00201727**	1.578E-07
SCM-6@5.ais	2.15E+09	1.75E+06	4.34E+06	3.50E+03	2.01E-03	5.66E-08	**0.00201604**	5.668E-08
SCM-6@6.ais	2.13E+09	1.55E+06	4.30E+06	3.24E+03	2.02E-03	2.11E-07	**0.00201731**	2.112E-07
SCM-6@7.ais	2.13E+09	1.21E+06	4.30E+06	2.38E+03	2.02E-03	1.47E-07	**0.00201723**	1.467E-07
SCM-6@8.ais	2.14E+09	1.35E+06	4.32E+06	2.81E+03	2.02E-03	2.14E-07	**0.00201774**	2.139E-07
SCM-6@9.ais	2.13E+09	2.10E+06	4.30E+06	4.32E+03	2.02E-03	1.51E-07	**0.00201853**	1.511E-07
SCM-6@10.ais	2.13E+09	1.23E+06	4.29E+06	2.57E+03	2.02E-03	1.85E-07	**0.00201802**	1.849E-07
SCM-6@11.ais	2.14E+09	1.40E+06	4.33E+06	2.94E+03	2.02E-03	1.75E-07	**0.00201834**	1.755E-07
SCM-6@12.ais	2.14E+09	1.91E+06	4.31E+06	3.78E+03	2.02E-03	1.80E-07	**0.00201897**	1.805E-07
SCM-6@13.ais	2.14E+09	1.34E+06	4.32E+06	2.72E+03	2.02E-03	1.87E-07	**0.00201732**	1.874E-07
SCM-6@14.ais	2.16E+09	3.01E+06	4.36E+06	6.35E+03	2.01E-03	2.42E-07	**0.00201440**	2.420E-07
SCM-6@15.ais	2.14E+09	1.31E+06	4.30E+06	2.49E+03	2.02E-03	1.18E-07	**0.00201704**	1.180E-07
SCM-6@16.ais	2.14E+09	9.88E+05	4.32E+06	1.78E+03	2.02E-03	1.90E-07	**0.00201658**	1.903E-07
SCM-6@17.ais	2.14E+09	1.41E+06	4.31E+06	2.80E+03	2.02E-03	1.39E-07	**0.00201739**	1.386E-07
SCM-6@18.ais	2.13E+09	9.44E+05	4.30E+06	1.92E+03	2.02E-03	1.20E-07	**0.00201716**	1.200E-07
SCM-6@19.ais	2.14E+09	1.68E+06	4.31E+06	3.38E+03	2.02E-03	1.90E-07	**0.00201798**	1.898E-07
SCM-6@20.ais	2.02E+09	7.52E+05	4.08E+06	1.56E+03	2.02E-03	1.55E-07	**0.00202075**	1.548E-07
SCM-6@21.ais	2.15E+09	2.02E+06	4.34E+06	4.02E+03	2.02E-03	1.35E-07	**0.00201691**	1.355E-07
SCM-6@22.ais	2.14E+09	1.44E+06	4.31E+06	2.90E+03	2.02E-03	1.41E-07	**0.00201765**	1.408E-07
SCM-6@23.ais	2.14E+09	1.81E+06	4.31E+06	3.65E+03	2.02E-03	1.45E-07	**0.00201795**	1.452E-07
SCM-6@24.ais	2.13E+09	1.62E+06	4.29E+06	3.48E+03	2.02E-03	1.90E-07	**0.00201755**	1.901E-07
SCM-6@25.ais	2.14E+09	1.44E+06	4.31E+06	3.14E+03	2.02E-03	1.86E-07	**0.00201747**	1.858E-07
MP-1@1.ais	2.13E+09	1.41E+06	4.30E+06	2.79E+03	2.02E-03	1.82E-07	**0.00201950**	1.825E-07
MP-1@2.ais	2.13E+09	3.28E+06	4.30E+06	6.52E+03	2.02E-03	1.59E-07	**0.00201832**	1.595E-07
MP-1@3.ais	2.13E+09	1.75E+06	4.29E+06	3.57E+03	2.02E-03	1.99E-07	**0.00201786**	1.993E-07
MP-1@4.ais	2.15E+09	1.48E+06	4.33E+06	3.10E+03	2.02E-03	1.42E-07	**0.00201703**	1.416E-07
MP-1@5.ais	2.14E+09	1.29E+06	4.32E+06	2.71E+03	2.02E-03	1.74E-07	**0.00201744**	1.743E-07
MP-1@6.ais	2.14E+09	1.34E+06	4.32E+06	2.74E+03	2.02E-03	1.15E-07	**0.00201782**	1.149E-07
MP-1@7.ais	2.16E+09	1.12E+06	4.35E+06	2.30E+03	2.02E-03	1.40E-07	**0.00201873**	1.396E-07
MP-1@8.ais	2.15E+09	9.70E+05	4.34E+06	2.05E+03	2.02E-03	1.95E-07	**0.00201930**	1.952E-07
MP-1@9.ais	2.16E+09	8.50E+05	4.35E+06	1.64E+03	2.02E-03	1.87E-07	**0.00201898**	1.871E-07
MP-1@10.ais	2.15E+09	1.25E+06	4.34E+06	2.44E+03	2.02E-03	1.51E-07	**0.00201785**	1.513E-07
MP-1@11.ais	2.15E+09	8.55E+05	4.34E+06	1.74E+03	2.02E-03	1.47E-07	**0.00201664**	1.474E-07
MP-1@12.ais	2.14E+09	1.17E+06	4.33E+06	2.37E+03	2.02E-03	1.47E-07	**0.00202038**	1.469E-07
MP-1@13.ais	2.15E+09	1.25E+06	4.33E+06	2.55E+03	2.02E-03	1.58E-07	**0.00201741**	1.578E-07
MP-1@14.ais	2.16E+09	1.26E+06	4.35E+06	2.50E+03	2.02E-03	1.71E-07	**0.00201696**	1.712E-07
MP-1@15.ais	2.15E+09	1.29E+06	4.33E+06	2.73E+03	2.02E-03	1.27E-07	**0.00201794**	1.266E-07
MP-1@16.ais	2.15E+09	1.55E+06	4.33E+06	3.27E+03	2.02E-03	1.39E-07	**0.00201760**	1.389E-07
MP-1@17.ais	2.16E+09	2.10E+06	4.36E+06	4.19E+03	2.02E-03	1.16E-07	**0.00201958**	1.161E-07
MP-1@18.ais	2.17E+09	1.79E+06	4.38E+06	3.66E+03	2.02E-03	1.34E-07	**0.00201675**	1.343E-07
MP-1@19.ais	2.18E+09	1.61E+06	4.39E+06	3.22E+03	2.02E-03	1.63E-07	**0.00201638**	1.634E-07
MP-1@20.ais	2.18E+09	1.89E+06	4.40E+06	3.77E+03	2.02E-03	1.32E-07	**0.00201892**	1.323E-07
MP-1@21.ais	2.18E+09	1.44E+06	4.41E+06	2.89E+03	2.02E-03	1.86E-07	**0.00201830**	1.861E-07
MP-1@22.ais	2.19E+09	1.32E+06	4.42E+06	2.58E+03	2.02E-03	2.30E-07	**0.00201751**	2.302E-07
MP-1@23.ais	2.19E+09	1.35E+06	4.42E+06	2.85E+03	2.02E-03	3.01E-07	**0.00201809**	3.015E-07

Appendix G: Zircon Oxygen Isotope Analyses, Southern Black Mountains Volcanic Center

Sample Name	**$^{16}O/^{16}O$**	**$^{16}O/^{16}O$ Error (1 sigma)**	**$^{18}O/^{18}O$**	**$^{18}O/^{18}O$ Error (1 sigma)**	**$^{18}O/^{16}O$**	**$^{18}O/^{16}O$ Error (1 sigma)**	**Corrected $^{18}O/^{16}O$**	**Error Corrected**
MPe-1nonenclave@1.ais	2.04E+09	5.16E+05	4.12E+06	9.69E+02	2.01E-03	1.80E-07	**0.002015**	1.80E-07
MPe-1nonenclave@2.ais	2.03E+09	7.04E+05	4.09E+06	1.30E+03	2.02E-03	1.77E-07	**0.002016**	1.77E-07
MPe-1nonenclave@3.ais	2.02E+09	4.65E+05	4.07E+06	1.01E+03	2.02E-03	1.72E-07	**0.002017**	1.72E-07
MPe-1nonenclave@4.ais	2.01E+09	9.57E+05	4.05E+06	1.95E+03	2.01E-03	1.94E-07	**0.002014**	1.94E-07
MPe-1nonenclave@5.ais	2.01E+09	9.68E+05	4.04E+06	2.03E+03	2.02E-03	1.19E-07	**0.002016**	1.19E-07
MPe-1nonenclave@6.ais	2.00E+09	1.01E+06	4.02E+06	2.05E+03	2.01E-03	1.63E-07	**0.002014**	1.63E-07
MPe-1nonenclave@7.ais	1.56E+09	8.10E+05	3.14E+06	1.72E+03	2.01E-03	3.69E-07	**0.002013**	3.69E-07
MPe-1nonenclave@8.ais	1.84E+09	8.72E+05	3.71E+06	1.82E+03	2.01E-03	1.48E-07	**0.002012**	1.48E-07
MPe-1nonenclave@10.ais	1.99E+09	1.79E+06	4.01E+06	3.65E+03	2.01E-03	1.93E-07	**0.002015**	1.93E-07
MPe-1nonenclave@11.ais	2.39E+09	3.63E+06	4.81E+06	7.39E+03	2.01E-03	1.20E-07	**0.002015**	1.20E-07
MPe-1nonenclave@12.ais	2.29E+09	1.84E+06	4.62E+06	3.67E+03	2.01E-03	1.39E-07	**0.002016**	1.39E-07
MPe-1nonenclave@13.ais	2.24E+09	2.06E+06	4.52E+06	4.12E+03	2.01E-03	1.81E-07	**0.002016**	1.81E-07
MPe-1nonenclave@14.ais	2.16E+09	5.76E+06	4.36E+06	1.19E+04	2.01E-03	3.53E-07	**0.002014**	3.53E-07
MPe-1nonenclave@15.ais	2.16E+09	1.57E+06	4.36E+06	3.32E+03	2.01E-03	1.40E-07	**0.002015**	1.40E-07
MPe-1nonenclave@16.ais	2.10E+09	7.08E+05	4.22E+06	1.58E+03	2.01E-03	1.56E-07	**0.002015**	1.56E-07
MPe-1nonenclave@17.ais	2.08E+09	5.43E+05	4.20E+06	1.30E+03	2.01E-03	2.37E-07	**0.002015**	2.37E-07
MPe-1nonenclave@18.ais	2.07E+09	9.21E+05	4.16E+06	1.80E+03	2.01E-03	1.38E-07	**0.002014**	1.38E-07
MPe-1nonenclave@19.ais	2.06E+09	8.73E+05	4.16E+06	1.93E+03	2.01E-03	1.86E-07	**0.002015**	1.86E-07
MPe-1nonenclave@20.ais	2.05E+09	1.46E+06	4.13E+06	3.07E+03	2.01E-03	1.55E-07	**0.002016**	1.55E-07
MPe-1nonenclave@21.ais	2.05E+09	6.23E+05	4.12E+06	1.37E+03	2.01E-03	1.78E-07	**0.002015**	1.78E-07
MPe-1nonenclave@22.ais	2.04E+09	1.14E+06	4.10E+06	2.41E+03	2.01E-03	1.31E-07	**0.002014**	1.31E-07
MPe-1nonenclave@23.ais	2.04E+09	1.05E+06	4.10E+06	2.25E+03	2.01E-03	1.59E-07	**0.002014**	1.59E-07
MPe-1nonenclave@24.ais	2.03E+09	1.38E+06	4.09E+06	2.90E+03	2.01E-03	1.58E-07	**0.002015**	1.59E-07
MPe-1nonenclave@25.ais	2.03E+09	1.04E+06	4.09E+06	2.29E+03	2.01E-03	2.28E-07	**0.002015**	2.28E-07
Moss Porphyry Enclave								
MPe-1@11.ais	3.39E+09	8.52E+06	6.82E+06	1.71E+04	2.01E-03	1.34E-07	**0.002015**	1.34E-07
MPe-1@12.ais	3.53E+09	7.12E+06	7.11E+06	1.44E+04	2.01E-03	7.78E-08	**0.002015**	7.78E-08
MPe-1@13.ais	3.65E+09	7.26E+06	7.34E+06	1.45E+04	2.01E-03	1.11E-07	**0.002015**	1.11E-07
MPe-1@14.ais	3.43E+09	3.04E+07	6.91E+06	6.11E+04	2.01E-03	9.33E-08	**0.002015**	9.34E-08
MPe-1@15.ais	2.92E+09	1.61E+07	5.89E+06	3.25E+04	2.01E-03	1.40E-07	**0.002016**	1.40E-07
MPe-1@16.ais	2.43E+09	2.68E+06	4.90E+06	5.52E+03	2.01E-03	1.23E-07	**0.002016**	1.23E-07
MPe-1@17.ais	2.39E+09	1.49E+06	4.81E+06	3.07E+03	2.01E-03	1.50E-07	**0.002015**	1.50E-07
MPe-1@18.ais	2.40E+09	1.22E+06	4.85E+06	2.65E+03	2.01E-03	1.60E-07	**0.002016**	1.60E-07
MPe-1@19.ais	2.41E+09	1.20E+06	4.86E+06	2.34E+03	2.02E-03	1.19E-07	**0.002020**	1.19E-07
MPe-1@20.ais	2.31E+09	1.73E+06	4.66E+06	3.34E+03	2.02E-03	1.45E-07	**0.002019**	1.45E-07
Times Porphyry								
TIP-1@1.ais	2.20E+09	1.73E+06	4.43E+06	3.65E+03	2.02E-03	1.74E-07	**0.00201682**	1.737E-07
TIP-1@2.ais	2.19E+09	1.14E+06	4.41E+06	2.32E+03	2.02E-03	1.82E-07	**0.00201728**	1.821E-07
TIP-1@3.ais	2.19E+09	1.18E+06	4.42E+06	2.37E+03	2.02E-03	1.23E-07	**0.00201631**	1.229E-07
TIP-1@4.ais	2.20E+09	1.47E+06	4.43E+06	2.95E+03	2.02E-03	1.23E-07	**0.00201762**	1.229E-07
TIP-1@5.ais	2.20E+09	1.25E+06	4.44E+06	2.95E+03	2.02E-03	1.77E-07	**0.00201756**	1.773E-07
TIP-1@6.ais	2.20E+09	1.70E+06	4.43E+06	2.95E+03	2.02E-03	1.82E-07	**0.00201722**	1.821E-07
TIP-1@7.ais	2.20E+09	1.12E+06	4.44E+06	2.95E+03	2.02E-03	7.58E-08	**0.00201727**	7.588E-08
TIP-1@8.ais	2.19E+09	1.59E+06	4.42E+06	2.95E+03	2.02E-03	2.02E-07	**0.00201614**	2.019E-07
TIP-1@9.ais	2.20E+09	1.15E+06	4.44E+06	2.95E+03	2.02E-03	1.24E-07	**0.00201764**	1.238E-07
TIP-1@10.ais	2.21E+09	1.20E+06	4.45E+06	2.95E+03	2.02E-03	1.16E-07	**0.00201699**	1.163E-07
TIP-1@11.ais	2.20E+09	9.37E+05	4.44E+06	2.95E+03	2.02E-03	1.46E-07	**0.00201659**	1.458E-07
TIP-1@12.ais	2.21E+09	1.16E+06	4.46E+06	2.95E+03	2.02E-03	2.09E-07	**0.00201707**	2.087E-07
TIP-1@13.ais	2.21E+09	1.73E+06	4.45E+06	2.95E+03	2.02E-03	1.51E-07	**0.00201746**	1.513E-07
TIP-1@14.ais	2.00E+09	9.12E+05	4.04E+06	2.95E+03	2.02E-03	1.74E-07	**0.00202272**	1.741E-07
TIP-1@15.ais	2.20E+09	1.66E+06	4.43E+06	2.95E+03	2.01E-03	1.51E-07	**0.00201562**	1.516E-07
TIP-1@16.ais	2.20E+09	1.03E+06	4.44E+06	2.95E+03	2.02E-03	1.35E-07	**0.00201664**	1.353E-07
TIP-1@17.ais	2.20E+09	1.28E+06	4.44E+06	2.95E+03	2.02E-03	1.21E-07	**0.00201693**	1.210E-07
TIP-1@18.ais	2.21E+09	1.35E+06	4.45E+06	2.95E+03	2.02E-03	1.15E-07	**0.00201597**	1.152E-07

Appendix G: Zircon Oxygen Isotope Analyses, Southern Black Mountains Volcanic Center

Sample Name	**$^{16}O/^{16}O$**	**$^{16}O/^{16}O$ Error (1 sigma)**	**$^{18}O/^{18}O$**	**$^{18}O/^{18}O$ Error (1 sigma)**	**$^{18}O/^{16}O$**	**$^{18}O/^{16}O$ Error (1 sigma)**	**Corrected $^{18}O/^{16}O$**	**Error Corrected**
TIP-1@19.ais	2.20E+09	1.02E+06	4.43E+06	2.95E+03	2.02E-03	1.72E-07	**0.00201685**	1.721E-07
TIP-1@20.ais	2.21E+09	1.20E+06	4.45E+06	2.95E+03	2.02E-03	1.67E-07	**0.00201718**	1.669E-07
TIP-1@21.ais	2.21E+09	1.33E+06	4.45E+06	2.95E+03	2.02E-03	1.32E-07	**0.00201681**	1.323E-07
TIP-1@22.ais	2.20E+09	1.38E+06	4.44E+06	2.95E+03	2.02E-03	1.48E-07	**0.00201667**	1.483E-07
TIP-1@23.ais	2.20E+09	1.13E+06	4.44E+06	2.95E+03	2.02E-03	1.61E-07	**0.00201623**	1.609E-07
TIP-1@24.ais	2.20E+09	1.37E+06	4.43E+06	2.95E+03	2.02E-03	1.62E-07	**0.00201690**	1.620E-07
TIP-1@25.ais	2.20E+09	1.53E+06	4.44E+06	2.95E+03	2.02E-03	2.29E-07	**0.00201739**	2.287E-07
TIP-1@26.ais	2.20E+09	2.29E+06	4.43E+06	2.95E+03	2.02E-03	1.84E-07	**0.00201652**	1.838E-07
TIP-1@27.ais	2.20E+09	1.09E+06	4.43E+06	2.95E+03	2.02E-03	1.26E-07	**0.00201756**	1.258E-07
TIP-1@28.ais	2.20E+09	1.05E+06	4.44E+06	2.95E+03	2.02E-03	1.15E-07	**0.00201701**	1.150E-07
TIP-1@29.ais	2.21E+09	1.16E+06	4.46E+06	2.95E+03	2.02E-03	1.63E-07	**0.00201766**	1.632E-07
TIP-1@30.ais	2.19E+09	1.46E+06	4.42E+06	2.95E+03	2.02E-03	9.32E-08	**0.00201736**	9.322E-08
TIP-1@31.ais	2.19E+09	9.20E+05	4.41E+06	2.95E+03	2.02E-03	1.61E-07	**0.00201647**	1.615E-07
TIP-1@32.ais	2.19E+09	2.37E+06	4.41E+06	2.95E+03	2.02E-03	1.78E-07	**0.00201708**	1.786E-07
SCM-20@1.ais	2.20E+09	1.25E+06	4.44E+06	2.95E+03	2.02E-03	1.83E-07	**0.00201774**	1.829E-07
SCM-20@2.ais	2.20E+09	1.64E+06	4.44E+06	2.95E+03	2.02E-03	2.03E-07	**0.00201758**	2.035E-07
SCM-20@3.ais	2.20E+09	1.17E+06	4.43E+06	2.95E+03	2.02E-03	8.63E-08	**0.00201713**	8.632E-08
SCM-20@4.ais	2.20E+09	1.45E+06	4.44E+06	2.95E+03	2.02E-03	1.78E-07	**0.00201704**	1.782E-07
SCM-20@5.ais	2.21E+09	1.55E+06	4.45E+06	2.95E+03	2.02E-03	1.94E-07	**0.00201825**	1.942E-07
SCM-20@6.ais	2.20E+09	9.95E+05	4.43E+06	2.95E+03	2.02E-03	2.29E-07	**0.00201855**	2.291E-07
SCM-20@7.ais	2.21E+09	1.55E+06	4.46E+06	2.95E+03	2.02E-03	1.20E-07	**0.00201803**	1.204E-07
SCM-20@8.ais	2.20E+09	2.13E+06	4.44E+06	2.95E+03	2.01E-03	1.78E-07	**0.00201620**	1.781E-07
SCM-20@9.ais	2.21E+09	1.64E+06	4.45E+06	2.95E+03	2.02E-03	1.46E-07	**0.00201721**	1.462E-07
SCM-20@10.ais	2.21E+09	1.70E+06	4.45E+06	2.95E+03	2.02E-03	1.40E-07	**0.00201779**	1.403E-07
SCM-20@11.ais	2.20E+09	1.12E+06	4.44E+06	2.95E+03	2.02E-03	1.09E-07	**0.00201730**	1.095E-07
SCM-20@12.ais	2.22E+09	1.41E+06	4.47E+06	2.95E+03	2.02E-03	1.59E-07	**0.00201715**	1.588E-07
SCM-20@13.ais	2.20E+09	1.65E+06	4.44E+06	2.95E+03	2.02E-03	2.31E-07	**0.00201822**	2.315E-07
SCM-20@14.ais	2.21E+09	2.83E+06	4.45E+06	2.95E+03	2.02E-03	1.51E-07	**0.00201732**	1.511E-07
SCM-20@15.ais	2.21E+09	1.45E+06	4.45E+06	2.95E+03	2.02E-03	1.23E-07	**0.00201882**	1.230E-07
SCM-20@16.ais	2.22E+09	7.32E+05	4.47E+06	2.95E+03	2.02E-03	1.15E-07	**0.00201725**	1.148E-07
SCM-20@17.ais	2.20E+09	1.57E+06	4.44E+06	2.95E+03	2.02E-03	1.50E-07	**0.00201739**	1.504E-07
SCM-20@18.ais	2.21E+09	1.29E+06	4.45E+06	2.95E+03	2.02E-03	1.36E-07	**0.00201756**	1.364E-07
SCM-20@19.ais	2.20E+09	1.28E+06	4.43E+06	2.95E+03	2.02E-03	1.08E-07	**0.00201828**	1.083E-07
SCM-20@20.ais	2.20E+09	1.82E+06	4.43E+06	2.95E+03	2.02E-03	1.80E-07	**0.00201814**	1.800E-07
SCM-20@21.ais	2.20E+09	1.17E+06	4.43E+06	2.95E+03	2.02E-03	1.77E-07	**0.00201755**	1.767E-07
SCM-20@22.ais	2.21E+09	1.69E+06	4.45E+06	2.95E+03	2.02E-03	2.02E-07	**0.00201789**	2.024E-07
SCM-20@23.ais	2.20E+09	8.92E+05	4.44E+06	2.95E+03	2.02E-03	1.68E-07	**0.00201697**	1.682E-07
SCM-20@24.ais	2.21E+09	1.49E+06	4.45E+06	2.95E+03	2.02E-03	1.54E-07	**0.00201657**	1.541E-07
SCM-20@25.ais	2.22E+09	7.04E+05	4.46E+06	2.95E+03	2.02E-03	1.76E-07	**0.00201630**	1.764E-07
SCM-20@26.ais	2.20E+09	1.00E+06	4.44E+06	2.95E+03	2.02E-03	1.37E-07	**0.00201660**	1.371E-07
SCM-20@27.ais	2.21E+09	1.01E+06	4.45E+06	2.95E+03	2.02E-03	1.86E-07	**0.00201653**	1.858E-07
SCM-20@28.ais	2.20E+09	8.70E+05	4.44E+06	2.95E+03	2.02E-03	1.96E-07	**0.00201737**	1.962E-07
SCM-20@29.ais	2.20E+09	1.41E+06	4.44E+06	2.95E+03	2.02E-03	1.31E-07	**0.00201773**	1.309E-07
SCM-38@1.ais	2.48E+09	4.82E+05	4.98E+06	1.11E+03	2.01E-03	1.26E-07	**0.002015**	1.26E-07
SCM-38@2.ais	2.48E+09	1.07E+06	4.99E+06	2.21E+03	2.01E-03	1.32E-07	**0.002015**	1.32E-07
SCM-38@3.ais	2.51E+09	3.43E+06	5.04E+06	6.64E+03	2.01E-03	1.65E-07	**0.002014**	1.65E-07
SCM-38@4.ais	2.46E+09	6.99E+06	4.95E+06	1.42E+04	2.01E-03	1.57E-07	**0.002014**	1.58E-07
SCM-38@5.ais	2.51E+09	6.59E+05	5.04E+06	1.42E+03	2.01E-03	1.48E-07	**0.002015**	1.48E-07
SCM-38@6.ais	2.55E+09	7.24E+05	5.13E+06	1.32E+03	2.01E-03	1.82E-07	**0.002015**	1.83E-07
SCM-38@7.ais	2.57E+09	1.36E+06	5.16E+06	2.64E+03	2.01E-03	7.89E-08	**0.002015**	7.90E-08
SCM-38@8.ais	2.58E+09	1.45E+06	5.19E+06	3.06E+03	2.01E-03	1.06E-07	**0.002015**	1.06E-07
SCM-38@9.ais	2.59E+09	6.03E+05	5.20E+06	1.15E+03	2.01E-03	1.30E-07	**0.002015**	1.30E-07
SCM-38@10.ais	2.59E+09	9.80E+05	5.22E+06	2.05E+03	2.01E-03	1.53E-07	**0.002016**	1.53E-07
SCM-37@1.ais	3.95E+09	1.91E+06	7.95E+06	3.75E+03	2.01E-03	7.13E-08	**0.002014**	7.14E-08

Appendix G: Zircon Oxygen Isotope Analyses, Southern Black Mountains Volcanic Center

Sample Name	**$^{16}O/^{16}O$**	**$^{16}O/^{16}O$ Error (1 sigma)**	**$^{18}O/^{18}O$**	**$^{18}O/^{18}O$ Error (1 sigma)**	**$^{18}O/^{16}O$**	**$^{18}O/^{16}O$ Error (1 sigma)**	**Corrected $^{18}O/^{16}O$**	**Error Corrected**
SCM-37@2.ais	2.96E+09	3.23E+06	5.96E+06	6.53E+03	2.01E-03	1.24E-07	**0.002014**	1.24E-07
SCM-37@3.ais	3.80E+09	7.95E+05	7.64E+06	1.66E+03	2.01E-03	9.98E-08	**0.002014**	9.99E-08
SCM-37@4.ais	3.72E+09	5.87E+05	7.48E+06	1.29E+03	2.01E-03	9.84E-08	**0.002014**	9.84E-08
SCM-37@5.ais	3.70E+09	5.26E+05	7.44E+06	1.47E+03	2.01E-03	1.66E-07	**0.002014**	1.66E-07
SCM-37@6.ais	3.58E+09	1.06E+06	7.20E+06	2.16E+03	2.01E-03	6.32E-08	**0.002013**	6.33E-08
SCM-37@7.ais	3.61E+09	2.05E+06	7.27E+06	4.27E+03	2.01E-03	8.44E-08	**0.002014**	8.45E-08
SCM-37@8.ais	3.58E+09	1.92E+06	7.19E+06	3.89E+03	2.01E-03	1.16E-07	**0.002014**	1.16E-07
SCM-37@9.ais	3.57E+09	1.62E+06	7.18E+06	3.16E+03	2.01E-03	7.65E-08	**0.002013**	7.65E-08
SCM-37@10.ais	3.59E+09	6.36E+06	7.22E+06	1.27E+04	2.01E-03	1.06E-07	**0.002013**	1.06E-07
SCM-37@11.ais	2.16E+09	6.51E+05	4.35E+06	1.39E+03	2.01E-03	1.43E-07	**0.002014**	1.43E-07
SCM-37@12.ais	2.15E+09	1.47E+06	4.33E+06	3.05E+03	2.01E-03	1.60E-07	**0.002014**	1.60E-07
SCM-37@13.ais	1.91E+09	2.17E+06	3.84E+06	4.30E+03	2.01E-03	1.33E-07	**0.002013**	1.33E-07
SCM-37@14.ais	2.14E+09	1.78E+06	4.30E+06	3.64E+03	2.01E-03	1.46E-07	**0.002012**	1.46E-07
SCM-37@15.ais	2.09E+09	3.60E+06	4.21E+06	7.44E+03	2.01E-03	2.05E-07	**0.002013**	2.05E-07
SCM-37@16.ais	2.17E+09	1.93E+06	4.36E+06	3.98E+03	2.01E-03	1.47E-07	**0.002013**	1.47E-07
SCM-37@17.ais	2.17E+09	1.68E+06	4.36E+06	3.47E+03	2.01E-03	1.16E-07	**0.002012**	1.16E-07
SCM-37@18.ais	2.16E+09	1.58E+06	4.34E+06	3.29E+03	2.01E-03	1.25E-07	**0.002012**	1.25E-07
SCM-37@19.ais	2.15E+09	1.21E+06	4.32E+06	2.57E+03	2.01E-03	2.19E-07	**0.002012**	2.19E-07
SCM-37@20.ais	2.14E+09	1.74E+06	4.31E+06	3.76E+03	2.01E-03	1.97E-07	**0.002013**	1.97E-07
SCM-38@11.ais	1.99E+09	5.23E+05	4.01E+06	1.08E+03	2.01E-03	2.25E-07	**0.002015**	2.25E-07
SCM-38@12.ais	2.05E+09	8.56E+05	4.12E+06	1.70E+03	2.01E-03	1.60E-07	**0.002014**	1.60E-07
SCM-38@13.ais	2.04E+09	7.43E+05	4.10E+06	1.45E+03	2.02E-03	1.64E-07	**0.002016**	1.64E-07
SCM-38@14.ais	2.01E+09	9.44E+05	4.04E+06	1.90E+03	2.02E-03	1.71E-07	**0.002016**	1.71E-07
SCM-38@15.ais	2.02E+09	1.18E+06	4.06E+06	2.57E+03	2.01E-03	1.83E-07	**0.002014**	1.83E-07
SCM-38@16.ais	1.75E+09	9.16E+05	3.52E+06	1.92E+03	2.01E-03	1.83E-07	**0.002012**	1.83E-07
SCM-38@17.ais	2.00E+09	8.04E+05	4.04E+06	1.76E+03	2.01E-03	1.41E-07	**0.002013**	1.41E-07
SCM-38@18.ais	2.00E+09	1.08E+06	4.03E+06	2.33E+03	2.01E-03	1.59E-07	**0.002014**	1.59E-07
SCM-38@19.ais	2.00E+09	9.60E+05	4.03E+06	1.95E+03	2.01E-03	1.52E-07	**0.002015**	1.52E-07
SCM-38@20.ais	2.01E+09	1.74E+06	4.04E+06	3.55E+03	2.01E-03	1.65E-07	**0.002014**	1.65E-07
Times Enclave								
SCM27b@1.ais	1.99E+09	1.66E+06	4.01E+06	3.39E+03	2.01E-03	2.32E-07	**0.002014**	2.32E-07
SCM27b@2.ais	2.01E+09	1.98E+06	4.04E+06	3.85E+03	2.01E-03	2.59E-07	**0.002014**	2.59E-07
SCM27b@3.ais	2.01E+09	1.79E+06	4.06E+06	3.51E+03	2.01E-03	1.68E-07	**0.002014**	1.68E-07
SCM27b@4.ais	2.02E+09	1.48E+06	4.07E+06	3.08E+03	2.01E-03	1.48E-07	**0.002014**	1.48E-07
SCM27b@5.ais	2.13E+09	9.21E+06	4.28E+06	1.87E+04	2.01E-03	1.77E-07	**0.002014**	1.77E-07
SCM27b@6.ais	2.44E+09	5.91E+06	4.91E+06	1.18E+04	2.01E-03	1.78E-07	**0.002014**	1.79E-07
SCM27b@7.ais	2.53E+09	5.96E+06	5.10E+06	1.21E+04	2.01E-03	9.58E-08	**0.002014**	9.58E-08
SCM27b@8.ais	2.63E+09	7.38E+06	5.29E+06	1.49E+04	2.01E-03	9.02E-08	**0.002015**	9.02E-08
SCM27b@9.ais	2.75E+09	7.43E+06	5.54E+06	1.50E+04	2.01E-03	1.52E-07	**0.002015**	1.52E-07
SCM27b@10.ais	2.86E+09	6.05E+06	5.76E+06	1.24E+04	2.02E-03	1.76E-07	**0.002016**	1.76E-07
SCM-27b@11.ais	2.40E+09	4.39E+05	4.83E+06	1.05E+03	2.01E-03	1.69E-07	**0.002015**	1.69E-07
SCM-27b@12.ais	2.39E+09	1.26E+06	4.82E+06	2.52E+03	2.02E-03	1.86E-07	**0.002016**	1.86E-07
SCM-27b@13.ais	2.39E+09	2.26E+06	4.82E+06	4.61E+03	2.02E-03	1.02E-07	**0.002017**	1.02E-07
SCM-27b@14.ais	2.40E+09	1.37E+06	4.84E+06	2.65E+03	2.02E-03	1.29E-07	**0.002016**	1.29E-07
SCM-27b@15.ais	2.42E+09	1.53E+06	4.88E+06	2.87E+03	2.01E-03	1.97E-07	**0.002015**	1.97E-07
SCM-27b@16.ais	2.43E+09	1.60E+06	4.89E+06	3.21E+03	2.01E-03	1.99E-07	**0.002015**	1.99E-07
SCM-27b@17.ais	2.44E+09	1.27E+06	4.91E+06	2.49E+03	2.01E-03	1.20E-07	**0.002015**	1.20E-07
SCM-27b@18.ais	2.42E+09	1.48E+06	4.87E+06	3.02E+03	2.01E-03	1.24E-07	**0.002015**	1.24E-07
SCM-27b@19.ais	2.43E+09	1.03E+06	4.90E+06	2.08E+03	2.01E-03	1.79E-07	**0.002015**	1.79E-07
SCM-27b@20.ais	2.43E+09	1.53E+06	4.89E+06	2.97E+03	2.01E-03	1.56E-07	**0.002016**	1.56E-07
Feldspar Porphyry Dike								
SCM1b@1.ais	2.20E+09	1.34E+06	4.43E+06	2.95E+03	2.02E-03	1.14E-07	**0.00201692**	1.139E-07
SCM1b@2.ais	2.20E+09	1.25E+06	4.44E+06	2.95E+03	2.02E-03	1.65E-07	**0.00201790**	1.650E-07
SCM1b@3.ais	2.21E+09	1.13E+06	4.46E+06	2.95E+03	2.02E-03	1.71E-07	**0.00201683**	1.707E-07

Appendix G: Zircon Oxygen Isotope Analyses, Southern Black Mountains Volcanic Center

Sample Name	$^{16}O/^{16}O$	$^{16}O/^{16}O$ Error (1 sigma)	$^{18}O/^{18}O$	$^{18}O/^{18}O$ Error (1 sigma)	$^{18}O/^{16}O$	$^{18}O/^{16}O$ Error (1 sigma)	Corrected $^{18}O/^{16}O$	Error Corrected
SCM1b@4.ais	2.21E+09	1.14E+06	4.46E+06	2.95E+03	2.02E-03	1.48E-07	**0.00201871**	1.482E-07
SCM1b@5.ais	2.19E+09	1.21E+06	4.42E+06	2.95E+03	2.02E-03	1.49E-07	**0.00201667**	1.490E-07
SCM1b@6.ais	2.20E+09	1.43E+06	4.44E+06	2.95E+03	2.02E-03	1.51E-07	**0.00201739**	1.513E-07
SCM1b@7.ais	2.20E+09	9.46E+05	4.43E+06	2.95E+03	2.02E-03	1.80E-07	**0.00201650**	1.801E-07
SCM1b@8.ais	2.20E+09	5.96E+05	4.44E+06	2.95E+03	2.02E-03	1.61E-07	**0.00201722**	1.606E-07
SCM1b@9.ais	2.21E+09	8.08E+05	4.45E+06	2.95E+03	2.01E-03	1.62E-07	**0.00201627**	1.619E-07
SCM1b@10.ais	2.21E+09	1.20E+06	4.45E+06	2.95E+03	2.02E-03	1.96E-07	**0.00201817**	1.963E-07
SCM1b@11.ais	2.21E+09	1.24E+06	4.45E+06	2.95E+03	2.02E-03	2.22E-07	**0.00201845**	2.222E-07
SCM1b@12.ais	2.21E+09	9.95E+05	4.45E+06	2.95E+03	2.02E-03	1.91E-07	**0.00201729**	1.915E-07
SCM1b@13.ais	2.21E+09	1.53E+06	4.47E+06	2.95E+03	2.02E-03	1.92E-07	**0.00201808**	1.916E-07
SCM1b@14.ais	2.20E+09	1.07E+06	4.43E+06	2.95E+03	2.02E-03	1.83E-07	**0.00201717**	1.835E-07
SCM1b@15.ais	2.21E+09	1.22E+06	4.46E+06	2.95E+03	2.02E-03	1.39E-07	**0.00201795**	1.395E-07
SCM1b@16.ais	2.20E+09	1.07E+06	4.44E+06	2.95E+03	2.02E-03	1.40E-07	**0.00201692**	1.398E-07
SCM1b@17.ais	2.21E+09	1.38E+06	4.46E+06	2.95E+03	2.02E-03	1.56E-07	**0.00201664**	1.558E-07
SCM1b@18.ais	2.20E+09	1.38E+06	4.44E+06	2.95E+03	2.02E-03	2.06E-07	**0.00201829**	2.061E-07
SCM1b@19.ais	2.21E+09	1.54E+06	4.44E+06	2.95E+03	2.01E-03	1.46E-07	**0.00201629**	1.464E-07
SCM1b@20.ais	2.20E+09	1.77E+06	4.43E+06	2.95E+03	2.02E-03	1.97E-07	**0.00201833**	1.968E-07
SCM1b@21.ais	2.21E+09	1.79E+06	4.46E+06	2.95E+03	2.02E-03	1.25E-07	**0.00201740**	1.246E-07
SCM1b@22.ais	2.21E+09	1.58E+06	4.45E+06	2.95E+03	2.02E-03	1.18E-07	**0.00201764**	1.176E-07
SCM1b@23.ais	2.21E+09	1.61E+06	4.45E+06	2.95E+03	2.02E-03	1.66E-07	**0.00201769**	1.664E-07
SCM1b@24.ais	2.21E+09	1.44E+06	4.46E+06	2.95E+03	2.02E-03	1.43E-07	**0.00201724**	1.430E-07
SCM1b@25.ais	2.20E+09	1.28E+06	4.44E+06	2.95E+03	2.02E-03	1.07E-07	**0.00201813**	1.073E-07
SCM1b@26.ais	2.20E+09	1.06E+06	4.44E+06	2.95E+03	2.02E-03	2.01E-07	**0.00201775**	2.010E-07
SCM1b@27.ais	2.21E+09	1.62E+06	4.45E+06	2.95E+03	2.01E-03	1.76E-07	**0.00201596**	1.759E-07
SCM-30@1.ais	3.10E+09	1.63E+06	6.24E+06	3.48E+03	2.01E-03	1.52E-07	**0.002014**	1.52E-07
SCM-30@2.ais	3.10E+09	1.28E+06	6.24E+06	2.59E+03	2.01E-03	1.16E-07	**0.002014**	1.16E-07
SCM-30@3.ais	3.11E+09	1.01E+06	6.26E+06	2.10E+03	2.01E-03	1.40E-07	**0.002014**	1.40E-07
SCM-30@4.ais	3.12E+09	7.06E+05	6.27E+06	1.43E+03	2.01E-03	1.34E-07	**0.002015**	1.34E-07
SCM-30@5.ais	3.13E+09	2.02E+06	6.30E+06	4.23E+03	2.01E-03	1.01E-07	**0.002015**	1.01E-07
SCM-30@6.ais	3.18E+09	8.52E+05	6.40E+06	1.78E+03	2.01E-03	1.31E-07	**0.002014**	1.31E-07
SCM-30@7.ais	3.19E+09	1.64E+06	6.41E+06	3.31E+03	2.01E-03	7.05E-08	**0.002014**	7.06E-08
SCM-30@8.ais	3.21E+09	1.28E+06	6.45E+06	2.75E+03	2.01E-03	9.15E-08	**0.002014**	9.16E-08
SCM-30@9.ais	3.22E+09	2.07E+06	6.47E+06	4.18E+03	2.01E-03	8.43E-08	**0.002014**	8.44E-08
SCM-30@10.ais	3.21E+09	8.68E+05	6.47E+06	1.91E+03	2.01E-03	1.47E-07	**0.002014**	1.47E-07
SCM-13@1.ais	3.29E+09	6.39E+06	6.62E+06	1.27E+04	2.01E-03	1.63E-07	**0.002013**	1.63E-07
SCM-13@2.ais	3.17E+09	6.38E+06	6.38E+06	1.26E+04	2.01E-03	1.59E-07	**0.002011**	1.59E-07
SCM-13@3.ais	3.34E+09	3.29E+06	6.72E+06	6.45E+03	2.01E-03	8.89E-08	**0.002014**	8.90E-08
SCM-13@4.ais	3.41E+09	1.95E+06	6.86E+06	3.95E+03	2.01E-03	1.78E-07	**0.002014**	1.78E-07
SCM-13@5.ais	3.46E+09	2.01E+06	6.96E+06	4.07E+03	2.01E-03	8.60E-08	**0.002015**	8.61E-08
SCM-13@6.ais	3.51E+09	1.12E+06	7.07E+06	2.17E+03	2.01E-03	8.27E-08	**0.002014**	8.27E-08
SCM-13@7.ais	3.63E+09	5.14E+06	7.31E+06	1.05E+04	2.01E-03	8.60E-08	**0.002014**	8.60E-08
SCM-13@8.ais	3.73E+09	4.33E+06	7.50E+06	8.77E+03	2.01E-03	9.69E-08	**0.002014**	9.69E-08
SCM-13@9.ais	3.73E+09	1.21E+06	7.51E+06	2.46E+03	2.01E-03	9.03E-08	**0.002014**	9.04E-08
SCM-13@10.ais	3.80E+09	2.42E+06	7.64E+06	4.73E+03	2.01E-03	8.56E-08	**0.002014**	8.57E-08
SCM-13@11.ais	1.98E+09	2.89E+06	4.00E+06	6.02E+03	2.01E-03	2.25E-07	**0.002014**	2.25E-07
SCM-13@12.ais	2.16E+09	1.84E+06	4.36E+06	3.78E+03	2.01E-03	1.51E-07	**0.002014**	1.51E-07
SCM-13@13.ais	2.16E+09	9.03E+05	4.35E+06	1.82E+03	2.01E-03	1.39E-07	**0.002014**	1.39E-07
SCM-13@14.ais	2.14E+09	1.42E+06	4.31E+06	2.67E+03	2.01E-03	2.47E-07	**0.002013**	2.47E-07
SCM-13@15.ais	2.14E+09	2.41E+06	4.31E+06	4.98E+03	2.01E-03	1.62E-07	**0.002014**	1.62E-07
SCM-13@16.ais	2.12E+09	1.23E+06	4.26E+06	2.69E+03	2.01E-03	1.98E-07	**0.002013**	1.98E-07
SCM-13@17.ais	2.11E+09	1.79E+06	4.26E+06	3.87E+03	2.01E-03	1.97E-07	**0.002013**	1.97E-07
SCM-13@18.ais	2.11E+09	1.67E+06	4.26E+06	3.40E+03	2.01E-03	1.22E-07	**0.002014**	1.22E-07
SCM-13@19.ais	2.12E+09	2.05E+06	4.27E+06	4.21E+03	2.01E-03	1.27E-07	**0.002013**	1.27E-07
SCM-13@20.ais	2.10E+09	2.09E+06	4.24E+06	4.33E+03	2.02E-03	1.38E-07	**0.002016**	1.38E-07

Appendix G: Zircon Oxygen Isotope Analyses, Southern Black Mountains Volcanic Center

Sample Name	**$^{16}O/^{16}O$**	**$^{16}O/^{16}O$ Error (1 sigma)**	**$^{18}O/^{18}O$**	**$^{18}O/^{18}O$ Error (1 sigma)**	**$^{18}O/^{16}O$**	**$^{18}O/^{16}O$ Error (1 sigma)**	**Corrected $^{18}O/^{16}O$**	**Error Corrected**
SCM-30@11.ais	2.17E+09	1.69E+06	4.37E+06	3.48E+03	2.01E-03	1.45E-07	**0.002013**	1.45E-07
SCM-30@12.ais	2.16E+09	3.69E+06	4.35E+06	7.18E+03	2.01E-03	1.67E-07	**0.002013**	1.67E-07
SCM-30@13.ais	2.18E+09	1.80E+06	4.38E+06	3.80E+03	2.01E-03	1.20E-07	**0.002014**	1.20E-07
SCM-30@14.ais	2.18E+09	2.34E+06	4.38E+06	5.07E+03	2.01E-03	2.71E-07	**0.002014**	2.71E-07
SCM-30@15.ais	2.18E+09	6.34E+05	4.40E+06	1.24E+03	2.01E-03	1.90E-07	**0.002015**	1.90E-07
SCM-30@16.ais	2.14E+09	7.69E+05	4.31E+06	1.75E+03	2.01E-03	1.85E-07	**0.002014**	1.85E-07
SCM-30@17.ais	2.11E+09	1.26E+06	4.26E+06	2.63E+03	2.01E-03	1.41E-07	**0.002014**	1.41E-07
SCM-30@18.ais	2.12E+09	2.27E+06	4.27E+06	4.61E+03	2.01E-03	1.40E-07	**0.002014**	1.40E-07
SCM-30@19.ais	2.14E+09	2.08E+06	4.31E+06	4.30E+03	2.01E-03	1.83E-07	**0.002014**	1.83E-07
SCM-30@20.ais	2.15E+09	1.88E+06	4.32E+06	3.75E+03	2.01E-03	1.25E-07	**0.002014**	1.25E-07
Felsic Porphyry Dike								
SCM-5A@1.ais	2.12E+09	1.60E+06	4.28E+06	3.22E+03	2.02E-03	1.81E-07	**0.00201721**	1.810E-07
SCM-5A@2.ais	2.13E+09	1.79E+06	4.29E+06	3.62E+03	2.02E-03	1.94E-07	**0.00201816**	1.946E-07
SCM-5A@3.ais	2.13E+09	1.76E+06	4.28E+06	3.57E+03	2.02E-03	1.21E-07	**0.00201656**	1.211E-07
SCM-5A@4.ais	2.12E+09	1.73E+06	4.28E+06	3.62E+03	2.02E-03	2.02E-07	**0.00201749**	2.017E-07
SCM-5A@5.ais	2.13E+09	1.36E+06	4.29E+06	2.69E+03	2.02E-03	1.33E-07	**0.00201792**	1.327E-07
SCM-5A@6.ais	1.97E+09	1.50E+06	3.99E+06	2.97E+03	2.03E-03	2.03E-07	**0.00202956**	2.033E-07
SCM-5A@7.ais	2.13E+09	1.19E+06	4.29E+06	2.46E+03	2.01E-03	1.31E-07	**0.00201639**	1.315E-07
SCM-5A@8.ais	2.13E+09	2.03E+06	4.30E+06	4.06E+03	2.01E-03	1.25E-07	**0.00201599**	1.256E-07
SCM-5A@9.ais	2.13E+09	9.08E+05	4.29E+06	1.92E+03	2.02E-03	1.35E-07	**0.00201702**	1.350E-07
SCM-5A@10.ais	2.13E+09	1.45E+06	4.29E+06	3.08E+03	2.01E-03	1.60E-07	**0.00201599**	1.598E-07
SCM-5A@11.ais	2.13E+09	1.24E+06	4.29E+06	2.56E+03	2.02E-03	1.70E-07	**0.00201735**	1.701E-07
SCM-5A@12.ais	2.13E+09	1.13E+06	4.29E+06	2.59E+03	2.02E-03	2.00E-07	**0.00201657**	2.004E-07
SCM-5A@13.ais	2.13E+09	1.37E+06	4.29E+06	2.83E+03	2.02E-03	1.63E-07	**0.00201772**	1.635E-07
SCM-5A@14.ais	2.14E+09	1.13E+06	4.30E+06	2.22E+03	2.01E-03	1.36E-07	**0.00201559**	1.362E-07
SCM-5A@15.ais	2.13E+09	1.23E+06	4.29E+06	2.51E+03	2.02E-03	1.39E-07	**0.00201675**	1.388E-07
SCM-5A@16.ais	2.13E+09	1.56E+06	4.30E+06	3.26E+03	2.02E-03	1.89E-07	**0.00201694**	1.892E-07
SCM-5A@17.ais	2.12E+09	1.13E+06	4.28E+06	2.27E+03	2.02E-03	1.86E-07	**0.00201706**	1.864E-07
SCM-5A@18.ais	2.13E+09	1.13E+06	4.28E+06	2.44E+03	2.01E-03	1.91E-07	**0.00201573**	1.909E-07
SCM-5A@19.ais	2.13E+09	1.39E+06	4.29E+06	2.62E+03	2.02E-03	2.27E-07	**0.00201706**	2.270E-07
SCM-5A@20.ais	2.12E+09	1.02E+06	4.28E+06	2.34E+03	2.01E-03	1.95E-07	**0.00201601**	1.954E-07
SCM-5A-21.ais	2.14E+09	1.29E+06	4.31E+06	2.63E+03	2.02E-03	1.70E-07	**0.00201795**	1.703E-07
SCM-5A-21@1.ais	2.13E+09	1.10E+06	4.29E+06	2.19E+03	2.01E-03	1.65E-07	**0.00201605**	1.652E-07
SCM-5A-21@2.ais	2.13E+09	1.49E+06	4.29E+06	3.16E+03	2.02E-03	1.37E-07	**0.00201718**	1.373E-07
BCD@1.ais	3.84E+09	3.22E+06	7.74E+06	6.57E+03	2.01E-03	1.07E-07	**0.002015**	1.07E-07
BCD@2.ais	3.86E+09	6.40E+05	7.76E+06	1.37E+03	2.01E-03	1.10E-07	**0.002014**	1.10E-07
BCD@3.ais	3.88E+09	1.27E+07	7.81E+06	2.56E+04	2.01E-03	7.21E-08	**0.002013**	7.22E-08
BCD@4.ais	4.21E+09	1.46E+07	8.46E+06	2.96E+04	2.01E-03	9.44E-08	**0.002013**	9.45E-08
BCD@5.ais	4.49E+09	1.31E+07	9.03E+06	2.63E+04	2.01E-03	7.01E-08	**0.002014**	7.01E-08
BCD@6.ais	5.44E+09	6.17E+06	1.10E+07	1.28E+04	2.01E-03	1.33E-07	**0.002015**	1.33E-07
BCD@7.ais	4.88E+09	3.23E+07	9.81E+06	6.47E+04	2.01E-03	1.04E-07	**0.002014**	1.04E-07
BCD@8.ais	4.41E+09	1.23E+07	8.89E+06	2.47E+04	2.01E-03	8.54E-08	**0.002015**	8.55E-08
BCD@9.ais	4.20E+09	7.43E+06	8.46E+06	1.51E+04	2.01E-03	1.09E-07	**0.002014**	1.09E-07
BCD@10.ais	4.05E+09	5.86E+06	8.16E+06	1.17E+04	2.01E-03	1.06E-07	**0.002014**	1.06E-07
BCD@11.ais	2.13E+09	1.85E+06	4.29E+06	3.75E+03	2.01E-03	1.66E-07	**0.002013**	1.66E-07
BCD@12.ais	2.13E+09	2.06E+06	4.30E+06	4.11E+03	2.01E-03	2.07E-07	**0.002013**	2.07E-07
BCD@13.ais	2.14E+09	1.01E+06	4.31E+06	2.06E+03	2.01E-03	1.15E-07	**0.002012**	1.15E-07
BCD@14.ais	2.15E+09	1.78E+06	4.32E+06	3.66E+03	2.01E-03	1.49E-07	**0.002013**	1.49E-07
BCD@15.ais	2.13E+09	1.05E+06	4.28E+06	2.23E+03	2.01E-03	2.18E-07	**0.002012**	2.18E-07
BCD@16.ais	2.13E+09	2.05E+06	4.28E+06	4.41E+03	2.01E-03	2.34E-07	**0.002012**	2.34E-07
BCD@17.ais	2.13E+09	1.84E+06	4.28E+06	3.86E+03	2.01E-03	1.62E-07	**0.002012**	1.62E-07
BCD@18.ais	2.09E+09	9.79E+05	4.21E+06	2.08E+03	2.01E-03	1.69E-07	**0.002012**	1.69E-07
BCD@19.ais	2.14E+09	1.76E+06	4.30E+06	3.48E+03	2.01E-03	1.76E-07	**0.002013**	1.76E-07
BCD@20.ais	2.13E+09	1.59E+06	4.29E+06	3.29E+03	2.01E-03	2.17E-07	**0.002013**	2.17E-07

Appendix G: Zircon Oxygen Isotope Analyses, Southern Black Mountains Volcanic Center

Sample Name	**^{16}O/^{16}O**	**^{16}O/^{16}O Error (1 sigma)**	**^{18}O/^{18}O**	**^{18}O/^{18}O Error (1 sigma)**	**^{18}O/^{16}O**	**^{18}O/^{16}O Error (1 sigma)**	**Corrected ^{18}O/^{16}O**	**Error Corrected**
Post-PST Felsic Lava Enclave								
SIT-1b@1.ais	2.16E+09	9.87E+05	4.35E+06	2.04E+03	2.01E-03	1.67E-07	**0.002015**	1.67E-07
SIT-1b@2.ais	2.18E+09	1.29E+06	4.38E+06	2.73E+03	2.01E-03	1.77E-07	**0.002014**	1.77E-07
SIT-1b@3.ais	2.17E+09	1.18E+06	4.36E+06	2.44E+03	2.01E-03	1.68E-07	**0.002015**	1.69E-07
SIT-1b@4.ais	2.13E+09	1.11E+06	4.29E+06	2.08E+03	2.01E-03	1.97E-07	**0.002014**	1.97E-07
SIT-1b@5.ais	2.17E+09	1.34E+06	4.36E+06	2.78E+03	2.01E-03	1.97E-07	**0.002015**	1.97E-07
SIT-1b@6.ais	2.18E+09	1.20E+06	4.38E+06	2.29E+03	2.01E-03	1.23E-07	**0.002015**	1.23E-07
SIT-1b@7.ais	2.18E+09	1.29E+06	4.39E+06	2.68E+03	2.01E-03	9.88E-08	**0.002015**	9.89E-08
SIT-1b@8.ais	2.18E+09	1.27E+06	4.39E+06	2.49E+03	2.01E-03	1.72E-07	**0.002014**	1.72E-07
SIT-1b@9.ais	2.17E+09	3.05E+06	4.36E+06	6.16E+03	2.01E-03	1.60E-07	**0.002014**	1.61E-07
SIT-1b@10.ais	2.19E+09	8.27E+05	4.41E+06	1.67E+03	2.01E-03	1.32E-07	**0.002015**	1.32E-07
SIT-1b@11.ais	3.05E+09	1.06E+07	6.15E+06	2.16E+04	2.01E-03	1.61E-07	**0.002013**	1.61E-07
SIT-1b@12.ais	2.95E+09	6.60E+06	5.94E+06	1.32E+04	2.01E-03	1.52E-07	**0.002014**	1.52E-07
SIT-1b@13.ais	2.69E+09	1.20E+07	5.42E+06	2.41E+04	2.01E-03	1.29E-07	**0.002015**	1.29E-07
SIT-1b@14.ais	2.44E+09	6.31E+06	4.92E+06	1.27E+04	2.01E-03	7.61E-08	**0.002016**	7.62E-08
SIT-1b@15.ais	2.42E+09	5.81E+05	4.87E+06	9.88E+02	2.01E-03	1.78E-07	**0.002014**	1.78E-07
SIT-1b@16.ais	2.36E+09	9.80E+06	4.76E+06	1.99E+04	2.01E-03	1.84E-07	**0.002013**	1.84E-07
SIT-1b@17.ais	2.71E+09	9.45E+06	5.45E+06	1.91E+04	2.01E-03	1.32E-07	**0.002015**	1.32E-07
SIT-1b@18.ais	2.86E+09	8.60E+06	5.76E+06	1.73E+04	2.01E-03	1.36E-07	**0.002015**	1.36E-07
SIT-1b@19.ais	2.98E+09	7.83E+06	5.99E+06	1.57E+04	2.01E-03	1.23E-07	**0.002014**	1.23E-07
SIT-1b@20.ais	3.09E+09	7.23E+06	6.23E+06	1.46E+04	2.01E-03	7.60E-08	**0.002014**	7.60E-08
Post-PST Felsic Lava								
SIT-1@1.ais	2.26E+09	2.10E+06	4.56E+06	4.24E+03	2.01E-03	1.65E-07	**0.002015**	1.65E-07
SIT-1@2.ais	2.21E+09	2.19E+06	4.45E+06	4.20E+03	2.01E-03	1.79E-07	**0.002015**	1.79E-07
SIT-1@3.ais	2.28E+09	1.75E+06	4.58E+06	3.59E+03	2.01E-03	1.65E-07	**0.002014**	1.65E-07
SIT-1@4.ais	2.31E+09	4.27E+06	4.65E+06	8.63E+03	2.01E-03	2.04E-07	**0.002014**	2.04E-07
SIT-1@5.ais	2.33E+09	2.02E+06	4.69E+06	4.28E+03	2.01E-03	1.53E-07	**0.002015**	1.53E-07
SIT-1@6.ais	2.38E+09	2.91E+06	4.78E+06	6.14E+03	2.01E-03	1.80E-07	**0.002014**	1.80E-07
SIT-1@7.ais	2.39E+09	2.25E+06	4.82E+06	4.46E+03	2.01E-03	1.49E-07	**0.002015**	1.49E-07
SIT-1@8.ais	2.36E+09	3.25E+06	4.75E+06	6.29E+03	2.01E-03	1.53E-07	**0.002014**	1.53E-07
SIT-1@9.ais	2.26E+09	3.17E+06	4.55E+06	6.55E+03	2.01E-03	1.85E-07	**0.002015**	1.85E-07
SIT-1@10.ais	2.17E+09	2.00E+06	4.37E+06	3.76E+03	2.01E-03	2.37E-07	**0.002015**	2.37E-07
SIT-1@11.ais	2.42E+09	1.53E+06	4.87E+06	3.03E+03	2.01E-03	1.52E-07	**0.002015**	1.52E-07
SIT-1@12.ais	2.41E+09	1.52E+06	4.85E+06	2.97E+03	2.01E-03	9.97E-08	**0.002015**	9.97E-08
SIT-1@13.ais	2.42E+09	1.22E+06	4.87E+06	2.68E+03	2.01E-03	1.52E-07	**0.002016**	1.52E-07
SIT-1@14.ais	2.31E+09	6.53E+05	4.66E+06	1.23E+03	2.01E-03	1.33E-07	**0.002016**	1.33E-07
SIT-1@15.ais	2.42E+09	1.31E+06	4.87E+06	2.73E+03	2.01E-03	1.82E-07	**0.002016**	1.82E-07
SIT-1@16.ais	2.42E+09	1.73E+06	4.87E+06	3.42E+03	2.01E-03	1.37E-07	**0.002015**	1.37E-07
SIT-1@17.ais	2.33E+09	2.47E+06	4.69E+06	5.00E+03	2.01E-03	1.29E-07	**0.002016**	1.29E-07
SIT-1@18.ais	2.33E+09	8.12E+05	4.70E+06	1.86E+03	2.01E-03	2.14E-07	**0.002015**	2.14E-07
SIT-1@19.ais	2.41E+09	9.44E+05	4.86E+06	1.94E+03	2.01E-03	2.08E-07	**0.002015**	2.08E-07
SIT-1@20.ais	2.41E+09	2.66E+06	4.86E+06	5.30E+03	2.02E-03	1.30E-07	**0.002016**	1.30E-07
Post-PST Intermediate Lava								
SIT-2@1.ais	2.72E+09	3.37E+06	5.47E+06	6.80E+03	2.01E-03	9.91E-08	**0.002014**	9.92E-08
SIT-2@2.ais	2.73E+09	2.24E+06	5.49E+06	4.63E+03	2.01E-03	1.25E-07	**0.002014**	1.26E-07
SIT-2@3.ais	2.74E+09	1.50E+06	5.51E+06	2.97E+03	2.01E-03	1.33E-07	**0.002014**	1.33E-07
SIT-2@4.ais	2.79E+09	9.32E+05	5.62E+06	1.90E+03	2.01E-03	1.13E-07	**0.002014**	1.13E-07
SIT-2@5.ais	2.80E+09	1.04E+06	5.63E+06	2.14E+03	2.01E-03	1.13E-07	**0.002014**	1.13E-07
SIT-2@6.ais	2.83E+09	1.04E+06	5.69E+06	2.09E+03	2.01E-03	6.29E-08	**0.002015**	6.29E-08
SIT-2@7.ais	2.86E+09	7.75E+05	5.76E+06	1.74E+03	2.01E-03	1.01E-07	**0.002014**	1.01E-07
SIT-2@6B.ais	2.91E+09	2.35E+06	5.85E+06	4.79E+03	2.01E-03	7.24E-08	**0.002014**	7.25E-08
SIT-2@7B.ais	2.93E+09	3.62E+06	5.89E+06	7.79E+03	2.01E-03	2.19E-07	**0.002015**	2.19E-07
SIT-2@8.ais	2.90E+09	7.58E+05	5.84E+06	1.59E+03	2.01E-03	1.16E-07	**0.002016**	1.16E-07
SIT-2@9.ais	2.93E+09	5.00E+05	5.89E+06	1.21E+03	2.01E-03	1.35E-07	**0.002014**	1.35E-07

Appendix G: Zircon Oxygen Isotope Analyses, Southern Black Mountains Volcanic Center

Sample Name	^{16}O/^{16}O	^{16}O/^{16}O Error (1 sigma)	^{18}O/^{18}O	^{18}O/^{18}O Error (1 sigma)	^{18}O/^{16}O	^{18}O/^{16}O Error (1 sigma)	Corrected ^{18}O/^{16}O	Error Corrected
SIT-2@10.ais	2.91E+09	1.38E+06	5.86E+06	2.90E+03	2.01E-03	1.61E-07	**0.002015**	1.61E-07
SIT-2@11.ais	2.15E+09	1.60E+06	4.34E+06	3.21E+03	2.02E-03	1.69E-07	**0.002014**	1.69E-07
SIT-2@12.ais	2.16E+09	1.57E+06	4.36E+06	3.11E+03	2.02E-03	2.05E-07	**0.002015**	2.05E-07
SIT-2@13.ais	2.18E+09	1.84E+06	4.39E+06	3.73E+03	2.02E-03	1.22E-07	**0.002015**	1.22E-07
SIT-2@14.ais	2.16E+09	1.88E+06	4.35E+06	3.95E+03	2.02E-03	1.28E-07	**0.002014**	1.28E-07
SIT-2@15.ais	2.17E+09	1.26E+06	4.38E+06	2.74E+03	2.01E-03	1.69E-07	**0.002014**	1.69E-07
SIT-2@16.ais	2.17E+09	2.03E+06	4.37E+06	4.15E+03	2.01E-03	1.10E-07	**2.01E-03**	1.10E-07
SIT-2@17.ais	2.20E+09	1.92E+06	4.43E+06	3.96E+03	2.01E-03	1.70E-07	**2.01E-03**	1.70E-07
SIT-2@18.ais	2.21E+09	2.26E+06	4.45E+06	4.43E+03	2.01E-03	2.00E-07	**2.01E-03**	2.00E-07
SIT-2@19.ais	2.22E+09	1.58E+06	4.47E+06	3.32E+03	2.01E-03	2.10E-07	**2.01E-03**	2.10E-07
SIT-2@20.ais	2.23E+09	2.63E+06	4.48E+06	5.35E+03	2.01E-03	1.21E-07	**2.01E-03**	1.21E-07

Appendix G: Zircon Oxygen Isotope Analyses, Southern Black Mountains Volcanic Center

Sample Name	Corrected δ^{18}O	δ^{18}O Error (Internal) (1 sigma)	δ^{18}O Error (External) (1 sigma)	Average ^{18}O	Standard Deviation (1 sigma)	Number of Samples (n)
SCM-34 (Pre-PST Trachyte - Alcyone)				**6.77**	**0.29**	**20**
SCM-34@1.ais	**6.82**	0.05	0.14			
SCM-34@2.ais	**6.43**	0.06	0.14			
SCM-34@3.ais	**6.77**	0.06	0.14			
SCM-34@4.ais	**6.56**	0.05	0.14			
SCM-34@5.ais	**6.43**	0.05	0.14			
SCM-34@6.ais	**7.14**	0.08	0.09			
SCM-34@7.ais	**6.85**	0.07	0.09			
SCM-34@8.ais	**6.57**	0.05	0.09			
SCM-34@9.ais	**6.56**	0.04	0.09			
SCM-34@10.ais	**6.51**	0.09	0.09			
SCM-34@11.ais	**7.17**	0.07	0.25			
SCM-34@12.ais	**7.03**	0.05	0.25			
SCM-34@13.ais	**6.75**	0.08	0.25			
SCM-34@14.ais	**7.25**	0.09	0.25			
SCM-34@15.ais	**6.78**	0.07	0.25			
SCM-34@16.ais	**7.31**	0.09	0.10			
SCM-34@17.ais	**6.92**	0.08	0.10			
SCM-34@18.ais	**6.31**	0.06	0.10			
SCM-34@19.ais	**6.76**	0.09	0.10			
SCM-34@20.ais	**6.56**	0.08	0.10			
SCM-41 (Pre-PST Trachyte - Gold Road)				**6.28**	**0.895265357**	**20**
SCM-41@1.ais	**5.91**	0.09	0.21			
SCM-41@2.ais	**5.72**	0.11	0.21			
SCM-41@3.ais	**7.87**	0.08	0.21			
SCM-41@4.ais	**5.07**	0.08	0.21			
SCM-41@5.ais	**6.39**	0.09	0.21			
SCM-41@6.ais	**5.70**	0.07	0.21			
SCM-41@7.ais	**6.35**	0.07	0.21			
SCM-41@8.ais	**6.13**	0.04	0.21			
SCM-41@9.ais	**5.55**	0.09	0.21			
SCM-41@10.ais	**5.69**	0.05	0.21			
SCM-41@11.ais	**6.38**	0.07	0.25			
SCM-41@12.ais	**6.57**	0.06	0.25			
SCM-41@13.ais	**5.83**	0.05	0.25			
SCM-41@14.ais	**6.15**	0.08	0.25			
SCM-41@15.ais	**5.10**	0.10	0.25			
SCM-41@16.ais	**5.97**	0.07	0.25			
SCM-41@17.ais	**6.77**	0.06	0.25			
SCM-41@18.ais	**6.50**	0.07	0.25			
SCM-41@19.ais	**7.08**	0.06	0.25			
SCM-41@20.ais	**8.89**	0.08	0.25			
Cook Canyon Tuff				**6.39**	**0.28**	**36**
7A@1.ais	**6.10**	0.06	0.21			
7A@2.ais	**6.99**	0.06	0.21			
7A@3.ais	**6.20**	0.06	0.21			
7A@4.ais	**6.58**	0.06	0.16			
7A@5.ais	**6.15**	0.07	0.16			
7A@6.ais	**6.33**	0.06	0.16			
7A@7.ais	**6.20**	0.05	0.16			
7A@8.ais	**6.57**	0.06	0.16			
7A@9.ais	**6.53**	0.07	0.16			
7A@10.ais	**6.53**	0.05	0.16			
7A@11.ais	**6.46**	0.09	0.16			

Appendix G: Zircon Oxygen Isotope Analyses, Southern Black Mountains Volcanic Center

Sample Name	Corrected δ^{18}O	δ^{18}O Error (Internal) (1 sigma)	δ^{18}O Error (External) (1 sigma)	Average ^{18}O	Standard Deviation (1 sigma)	Number of Samples (n)
7A@12.ais	6.05	0.05	0.16			
7A@13.ais	5.98	0.07	0.16			
7A@14.ais	6.28	0.05	0.14			
7A@15.ais	6.56	0.04	0.14			
7A@16.ais	6.76	0.07	0.14			
7B@1.ais	6.36	0.06	0.24			
7B@2.ais	6.18	0.07	0.24			
7B@3.ais	6.36	0.09	0.24			
7B@4.ais	6.46	0.06	0.24			
7B@5.ais	6.46	0.06	0.24			
7B@6.ais	6.27	0.06	0.24			
7B@7.ais	6.47	0.04	0.24			
7B@8.ais	6.25	0.07	0.24			
7B@9.ais	6.35	0.06	0.24			
7B@10.ais	5.60	0.09	0.24			
7B@11.ais	6.20	0.05	0.20			
7B@12.ais	6.41	0.06	0.20			
7B@13.ais	6.76	0.08	0.20			
7B@14.ais	6.53	0.05	0.20			
7B@15.ais	6.11	0.09	0.20			
7B@16.ais	6.66	0.05	0.20			
7B@17.ais	6.36	0.06	0.20			
7B@18.ais	6.50	0.05	0.20			
7B@19.ais	7.11	0.06	0.20			
7B@20.ais	6.25	0.04	0.20			
Pre-PST Lavas				6.04	0.92	17
11-1@1.ais	5.82	0.05	0.17			
11-1@2.ais	5.57	0.08	0.17			
11-1@3.ais	4.22	0.11	0.17			
11-1@4.ais	5.80	0.06	0.17			
11-1@5.ais	6.29	0.04	0.17			
11-1@6.ais	6.08	0.06	0.17			
11-1@7.ais	8.23	0.05	0.17			
11-1@8.ais	7.96	0.08	0.17			
11-1@9.ais	5.41	0.07	0.17			
11-1@10.ais	6.15	0.05	0.17			
11-1@11.ais	6.29	0.07	0.21			
11-1@12.ais	5.39	0.05	0.21			
11-1@13.ais	5.52	0.07	0.21			
11-1@14.ais	6.30	0.07	0.21			
11-1@15.ais	5.56	0.03	0.21			
11-1@16.ais	5.92	0.06	0.21			
11-1@17.ais	6.09	0.08	0.21			
PST (Trachyte)				6.70	0.32	19
5D@1.ais	6.60	0.04	0.32			
5D@2.ais	6.72	0.07	0.32			
5D@3.ais	6.03	0.06	0.32			
5D@4.ais	6.29	0.05	0.32			
5D@5.ais	6.44	0.05	0.32			
5D@6.ais	6.68	0.05	0.32			
5D@7.ais	6.64	0.05	0.32			
5D@8.ais	6.71	0.06	0.32			
5D@9.ais	6.06	0.04	0.32			
5D@10.ais	6.72	0.06	0.37			

Appendix G: Zircon Oxygen Isotope Analyses, Southern Black Mountains Volcanic Center

Sample Name	**Corrected δ^{18}O**	**δ^{18}O Error (Internal) (1 sigma)**	**δ^{18}O Error (External) (1 sigma)**	**Average ^{18}O**	**Standard Deviation (1 sigma)**	**Number of Samples (n)**
5D@11.ais	**6.89**	0.07	0.37			
5D@12.ais	**7.13**	0.05	0.37			
5D@13.ais	**6.84**	0.07	0.37			
5D@14.ais	**6.81**	0.06	0.37			
5D@15.ais	**7.01**	0.06	0.37			
5D@16.ais	**6.80**	0.04	0.37			
5D@17.ais	**7.17**	0.05	0.37			
5D@18.ais	**7.09**	0.07	0.37			
5D@19.ais	**6.77**	0.06	0.37			
PST (Rhyolite)				**6.33**	**0.40**	**49**
3B@1.ais	**6.46**	0.05	0.14			
3B@2.ais	**6.54**	0.11	0.14			
3B@3.ais	**6.15**	0.07	0.14			
3B@4.ais	**6.28**	0.05	0.14			
3B@5.ais	**6.26**	0.09	0.14			
3B@6.ais	**6.58**	0.06	0.14			
3B@7.ais	**5.83**	0.06	0.14			
3B@8.ais	**7.03**	0.05	0.27			
3B@9.ais	**6.29**	0.06	0.27			
3B@10.ais	**6.61**	0.06	0.27			
3B@11.ais	**6.27**	0.06	0.27			
3B@12.ais	**6.14**	0.04	0.27			
3B@13.ais	**4.54**	0.09	0.27			
3B@14.ais	**6.32**	0.06	0.27			
3B@15.ais	**6.27**	0.07	0.27			
3B@16.ais	**6.09**	0.07	0.27			
3B@17.ais	**6.62**	0.07	0.27			
3B@18.ais	**6.34**	0.04	0.32			
2H@1.ais	**6.74**	0.06	0.33			
2H@2.ais	**6.41**	0.06	0.33			
2H@3.ais	**6.45**	0.06	0.33			
2H@4.ais	**6.41**	0.08	0.33			
2H@5.ais	**6.26**	0.05	0.33			
2H@6.ais	**6.37**	0.07	0.33			
2H@7.ais	**6.74**	0.07	0.33			
2H@8.ais	**6.02**	0.05	0.33			
2H@9.ais	**6.01**	0.09	0.33			
2H@10.ais	**6.18**	0.04	0.33			
2H@11.ais	**6.09**	0.05	0.33			
2H@12.ais	**6.06**	0.06	0.31			
2H@13.ais	**5.64**	0.05	0.31			
2H@14.ais	**6.31**	0.07	0.31			
2H@15.ais	**6.52**	0.04	0.31			
2H@16.ais	**5.71**	0.07	0.31			
2H@17.ais	**5.93**	0.07	0.31			
2H@18.ais	**6.40**	0.07	0.31			
2H@19.ais	**6.30**	0.06	0.31			
2H@20.ais	**6.17**	0.07	0.31			
2H@21.ais	**6.18**	0.10	0.31			
2H@22.ais	**6.24**	0.07	0.17			
2H@23.ais	**6.89**	0.06	0.17			
2H@24.ais	**6.63**	0.06	0.17			
2H@25.ais	**6.55**	0.07	0.17			
2H@26.ais	**6.71**	0.05	0.17			

Appendix G: Zircon Oxygen Isotope Analyses, Southern Black Mountains Volcanic Center

Sample Name	**Corrected δ^{18}O**	**δ^{18}O Error (Internal) (1 sigma)**	**δ^{18}O Error (External) (1 sigma)**	**Average ^{18}O**	**Standard Deviation (1 sigma)**	**Number of Samples (n)**
2H@27.ais	**6.48**	0.06	0.17			
2H@28.ais	**6.45**	0.04	0.17			
2H@29.ais	**7.05**	0.06	0.17			
2H@30.ais	**6.64**	0.06	0.17			
2H@31.ais	**6.90**	0.05	0.17			
Moss Porphyry				**6.25**	**0.53**	**72**
SCM-6@1.ais	**6.22**	0.08	0.29			
SCM-6@2.ais	**6.46**	0.08	0.29			
SCM-6@3.ais	**6.57**	0.05	0.29			
SCM-6@4.ais	**6.02**	0.08	0.29			
SCM-6@5.ais	**5.41**	0.03	0.29			
SCM-6@6.ais	**6.04**	0.10	0.29			
SCM-6@7.ais	**6.00**	0.07	0.29			
SCM-6@8.ais	**6.25**	0.11	0.28			
SCM-6@9.ais	**6.65**	0.07	0.28			
SCM-6@10.ais	**6.39**	0.09	0.28			
SCM-6@11.ais	**6.55**	0.09	0.28			
SCM-6@12.ais	**6.87**	0.09	0.28			
SCM-6@13.ais	**6.04**	0.09	0.28			
SCM-6@14.ais	**4.59**	0.12	0.28			
SCM-6@15.ais	**5.91**	0.06	0.28			
SCM-6@16.ais	**5.68**	0.09	0.28			
SCM-6@17.ais	**6.08**	0.07	0.28			
SCM-6@18.ais	**5.97**	0.06	0.28			
SCM-6@19.ais	**6.37**	0.09	0.28			
SCM-6@20.ais	**7.76**	0.08	0.28			
SCM-6@21.ais	**5.84**	0.07	0.28			
SCM-6@22.ais	**6.21**	0.07	0.28			
SCM-6@23.ais	**6.36**	0.07	0.28			
SCM-6@24.ais	**6.16**	0.09	0.28			
SCM-6@25.ais	**6.12**	0.09	0.28			
MP-1@1.ais	**7.13**	0.09	0.28			
MP-1@2.ais	**6.54**	0.08	0.28			
MP-1@3.ais	**6.31**	0.10	0.28			
MP-1@4.ais	**5.90**	0.07	0.28			
MP-1@5.ais	**6.11**	0.09	0.28			
MP-1@6.ais	**6.29**	0.06	0.28			
MP-1@7.ais	**6.75**	0.07	0.28			
MP-1@8.ais	**7.03**	0.10	0.28			
MP-1@9.ais	**6.87**	0.09	0.28			
MP-1@10.ais	**6.31**	0.07	0.28			
MP-1@11.ais	**5.71**	0.07	0.28			
MP-1@12.ais	**7.57**	0.07	0.28			
MP-1@13.ais	**6.09**	0.08	0.28			
MP-1@14.ais	**5.87**	0.08	0.28			
MP-1@15.ais	**6.35**	0.06	0.28			
MP-1@16.ais	**6.18**	0.07	0.28			
MP-1@17.ais	**7.17**	0.06	0.28			
MP-1@18.ais	**5.76**	0.07	0.28			
MP-1@19.ais	**5.57**	0.08	0.28			
MP-1@20.ais	**6.84**	0.07	0.28			
MP-1@21.ais	**6.53**	0.09	0.28			
MP-1@22.ais	**6.14**	0.11	0.28			
MP-1@23.ais	**6.43**	0.15	0.37			

Appendix G: Zircon Oxygen Isotope Analyses, Southern Black Mountains Volcanic Center

Sample Name	**Corrected δ^{18}O**	**δ^{18}O Error (Internal) (1 sigma)**	**δ^{18}O Error (External) (1 sigma)**	**Average ^{18}O**	**Standard Deviation (1 sigma)**	**Number of Samples (n)**
MPe-1nonenclave@1.ais	**6.46**	0.09	0.21			
MPe-1nonenclave@2.ais	**6.57**	0.09	0.21			
MPe-1nonenclave@3.ais	**7.01**	0.09	0.21			
MPe-1nonenclave@4.ais	**5.94**	0.10	0.21			
MPe-1nonenclave@5.ais	**6.57**	0.06	0.21			
MPe-1nonenclave@6.ais	**5.82**	0.08	0.21			
MPe-1nonenclave@7.ais	**5.20**	0.18	0.21			
MPe-1nonenclave@8.ais	**4.65**	0.07	0.21			
MPe-1nonenclave@10.ais	**6.17**	0.10	0.21			
MPe-1nonenclave@11.ais	**6.34**	0.06	0.21			
MPe-1nonenclave@12.ais	**6.50**	0.07	0.21			
MPe-1nonenclave@13.ais	**6.50**	0.09	0.21			
MPe-1nonenclave@14.ais	**5.97**	0.18	0.21			
MPe-1nonenclave@15.ais	**6.44**	0.07	0.21			
MPe-1nonenclave@16.ais	**6.23**	0.08	0.21			
MPe-1nonenclave@17.ais	**6.45**	0.12	0.21			
MPe-1nonenclave@18.ais	**5.97**	0.07	0.21			
MPe-1nonenclave@19.ais	**6.33**	0.09	0.21			
MPe-1nonenclave@20.ais	**6.52**	0.08	0.21			
MPe-1nonenclave@21.ais	**6.15**	0.09	0.21			
MPe-1nonenclave@22.ais	**5.90**	0.07	0.21			
MPe-1nonenclave@23.ais	**5.85**	0.08	0.21			
MPe-1nonenclave@24.ais	**6.49**	0.08	0.21			
MPe-1nonenclave@25.ais	**6.18**	0.11	0.21			
Moss Porphyry Enclave				**6.74**	**0.95**	**10**
MPe-1@11.ais	**6.02**	0.07	0.25			
MPe-1@12.ais	**6.18**	0.04	0.25			
MPe-1@13.ais	**6.01**	0.06	0.25			
MPe-1@14.ais	**6.22**	0.05	0.25			
MPe-1@15.ais	**6.66**	0.07	0.25			
MPe-1@16.ais	**6.65**	0.06	0.25			
MPe-1@17.ais	**6.08**	0.07	0.25			
MPe-1@18.ais	**6.65**	0.08	0.25			
MPe-1@19.ais	**8.75**	0.06	0.25			
MPe-1@20.ais	**8.13**	0.07	0.25			
Times Porphyry				**5.89**	**0.51**	**101**
TIP-1@1.ais	**5.79**	0.09	0.37			
TIP-1@2.ais	**6.03**	0.09	0.37			
TIP-1@3.ais	**5.54**	0.06	0.37			
TIP-1@4.ais	**6.20**	0.06	0.37			
TIP-1@5.ais	**6.16**	0.09	0.37			
TIP-1@6.ais	**5.99**	0.09	0.37			
TIP-1@7.ais	**6.02**	0.04	0.37			
TIP-1@8.ais	**5.45**	0.10	0.37			
TIP-1@9.ais	**6.20**	0.06	0.37			
TIP-1@10.ais	**5.88**	0.06	0.37			
TIP-1@11.ais	**5.68**	0.07	0.37			
TIP-1@12.ais	**5.92**	0.10	0.37			
TIP-1@13.ais	**6.12**	0.08	0.37			
TIP-1@14.ais	**8.74**	0.09	0.37			
TIP-1@15.ais	**5.20**	0.08	0.37			
TIP-1@16.ais	**5.71**	0.07	0.37			
TIP-1@17.ais	**5.85**	0.06	0.37			
TIP-1@18.ais	**5.37**	0.06	0.37			

Appendix G: Zircon Oxygen Isotope Analyses, Southern Black Mountains Volcanic Center

Sample Name	Corrected δ^{18}O	δ^{18}O Error (Internal) (1 sigma)	δ^{18}O Error (External) (1 sigma)	Average ^{18}O	Standard Deviation (1 sigma)	Number of Samples (n)
TIP-1@19.ais	**5.81**	0.09	0.37			
TIP-1@20.ais	**5.97**	0.08	0.37			
TIP-1@21.ais	**5.79**	0.07	0.37			
TIP-1@22.ais	**5.72**	0.07	0.37			
TIP-1@23.ais	**5.50**	0.08	0.37			
TIP-1@24.ais	**5.83**	0.08	0.37			
TIP-1@25.ais	**6.08**	0.11	0.37			
TIP-1@26.ais	**5.64**	0.09	0.37			
TIP-1@27.ais	**6.16**	0.06	0.37			
TIP-1@28.ais	**5.89**	0.06	0.37			
TIP-1@29.ais	**6.22**	0.08	0.37			
TIP-1@30.ais	**6.06**	0.05	0.21			
TIP-1@31.ais	**5.62**	0.08	0.21			
TIP-1@32.ais	**5.92**	0.09	0.21			
SCM-20@1.ais	**6.25**	0.09	0.17			
SCM-20@2.ais	**6.17**	0.10	0.17			
SCM-20@3.ais	**5.95**	0.04	0.17			
SCM-20@4.ais	**5.91**	0.09	0.17			
SCM-20@5.ais	**6.51**	0.10	0.17			
SCM-20@6.ais	**6.66**	0.11	0.17			
SCM-20@7.ais	**6.40**	0.06	0.17			
SCM-20@8.ais	**5.49**	0.09	0.17			
SCM-20@9.ais	**5.99**	0.07	0.17			
SCM-20@10.ais	**6.28**	0.07	0.17			
SCM-20@11.ais	**6.04**	0.05	0.17			
SCM-20@12.ais	**5.96**	0.08	0.17			
SCM-20@13.ais	**6.49**	0.11	0.17			
SCM-20@14.ais	**6.04**	0.07	0.17			
SCM-20@15.ais	**6.79**	0.06	0.17			
SCM-20@16.ais	**6.01**	0.06	0.17			
SCM-20@17.ais	**6.08**	0.07	0.17			
SCM-20@18.ais	**6.16**	0.07	0.17			
SCM-20@19.ais	**6.52**	0.05	0.17			
SCM-20@20.ais	**6.45**	0.09	0.17			
SCM-20@21.ais	**6.16**	0.09	0.17			
SCM-20@22.ais	**6.33**	0.10	0.21			
SCM-20@23.ais	**5.87**	0.08	0.21			
SCM-20@24.ais	**5.67**	0.08	0.21			
SCM-20@25.ais	**5.54**	0.09	0.21			
SCM-20@26.ais	**5.69**	0.07	0.21			
SCM-20@27.ais	**5.65**	0.09	0.21			
SCM-20@28.ais	**6.07**	0.10	0.21			
SCM-20@29.ais	**6.25**	0.06	0.21			
SCM-38@1.ais	**6.19**	0.06	0.13			
SCM-38@2.ais	**6.25**	0.07	0.13			
SCM-38@3.ais	**5.58**	0.08	0.13			
SCM-38@4.ais	**5.80**	0.08	0.13			
SCM-38@5.ais	**6.09**	0.07	0.13			
SCM-38@6.ais	**6.33**	0.09	0.13			
SCM-38@7.ais	**6.21**	0.04	0.13			
SCM-38@8.ais	**6.23**	0.05	0.13			
SCM-38@9.ais	**6.27**	0.06	0.13			
SCM-38@10.ais	**6.71**	0.08	0.13			
SCM-37@1.ais	**5.82**	0.04	0.09			

Appendix G: Zircon Oxygen Isotope Analyses, Southern Black Mountains Volcanic Center

Sample Name	Corrected δ^{18}O	δ^{18}O Error (Internal) (1 sigma)	δ^{18}O Error (External) (1 sigma)	Average ^{18}O	Standard Deviation (1 sigma)	Number of Samples (n)
SCM-37@2.ais	5.54	0.06	0.09			
SCM-37@3.ais	5.75	0.05	0.09			
SCM-37@4.ais	5.75	0.05	0.09			
SCM-37@5.ais	5.76	0.08	0.09			
SCM-37@6.ais	5.33	0.03	0.09			
SCM-37@7.ais	5.64	0.04	0.09			
SCM-37@8.ais	5.59	0.06	0.09			
SCM-37@9.ais	5.36	0.04	0.09			
SCM-37@10.ais	5.36	0.05	0.09			
SCM-37@11.ais	5.63	0.07	0.39			
SCM-37@12.ais	5.79	0.08	0.39			
SCM-37@13.ais	5.08	0.07	0.39			
SCM-37@14.ais	4.92	0.07	0.39			
SCM-37@15.ais	5.30	0.10	0.39			
SCM-37@16.ais	5.26	0.07	0.39			
SCM-37@17.ais	4.98	0.06	0.39			
SCM-37@18.ais	4.74	0.06	0.39			
SCM-37@19.ais	4.85	0.11	0.39			
SCM-37@20.ais	5.19	0.10	0.39			
SCM-38@11.ais	6.00	0.11	0.09			
SCM-38@12.ais	5.70	0.08	0.09			
SCM-38@13.ais	6.51	0.08	0.09			
SCM-38@14.ais	6.64	0.08	0.09			
SCM-38@15.ais	5.94	0.09	0.09			
SCM-38@16.ais	4.92	0.09	0.09			
SCM-38@17.ais	5.36	0.07	0.09			
SCM-38@18.ais	5.80	0.08	0.09			
SCM-38@19.ais	6.06	0.08	0.09			
SCM-38@20.ais	5.52	0.08	0.09			
Times Enclave				6.27	0.42	20
SCM27b@1.ais	5.79	0.12	0.21			
SCM27b@2.ais	5.98	0.13	0.21			
SCM27b@3.ais	5.84	0.08	0.21			
SCM27b@4.ais	5.86	0.07	0.21			
SCM27b@5.ais	5.93	0.09	0.21			
SCM27b@6.ais	5.78	0.09	0.21			
SCM27b@7.ais	5.86	0.05	0.21			
SCM27b@8.ais	6.13	0.04	0.21			
SCM27b@9.ais	6.35	0.08	0.21			
SCM27b@10.ais	6.95	0.09	0.21			
SCM-27b@11.ais	6.30	0.08	0.25			
SCM-27b@12.ais	6.74	0.09	0.25			
SCM-27b@13.ais	7.19	0.05	0.25			
SCM-27b@14.ais	6.89	0.06	0.25			
SCM-27b@15.ais	6.48	0.10	0.25			
SCM-27b@16.ais	6.13	0.10	0.25			
SCM-27b@17.ais	6.12	0.06	0.25			
SCM-27b@18.ais	6.33	0.06	0.25			
SCM-27b@19.ais	6.14	0.09	0.25			
SCM-27b@20.ais	6.67	0.08	0.25			
Feldspar Porphyry Dike				5.86	0.40	67
SCM1b@1.ais	5.85	0.06	0.21			
SCM1b@2.ais	6.33	0.08	0.21			
SCM1b@3.ais	5.80	0.08	0.21			

Appendix G: Zircon Oxygen Isotope Analyses, Southern Black Mountains Volcanic Center

Sample Name	Corrected δ^{18}O	δ^{18}O Error (Internal) (1 sigma)	δ^{18}O Error (External) (1 sigma)	Average ^{18}O	Standard Deviation (1 sigma)	Number of Samples (n)
SCM1b@4.ais	**6.74**	0.07	0.21			
SCM1b@5.ais	**5.72**	0.07	0.21			
SCM1b@6.ais	**6.08**	0.08	0.21			
SCM1b@7.ais	**5.64**	0.09	0.21			
SCM1b@8.ais	**6.00**	0.08	0.29			
SCM1b@9.ais	**5.52**	0.08	0.29			
SCM1b@10.ais	**6.47**	0.10	0.29			
SCM1b@11.ais	**6.61**	0.11	0.29			
SCM1b@12.ais	**6.03**	0.09	0.29			
SCM1b@13.ais	**6.42**	0.09	0.29			
SCM1b@14.ais	**5.97**	0.09	0.29			
SCM1b@15.ais	**6.36**	0.07	0.29			
SCM1b@16.ais	**5.84**	0.07	0.29			
SCM1b@17.ais	**5.70**	0.08	0.29			
SCM1b@18.ais	**6.53**	0.10	0.28			
SCM1b@19.ais	**5.53**	0.07	0.28			
SCM1b@20.ais	**6.55**	0.10	0.28			
SCM1b@21.ais	**6.08**	0.06	0.28			
SCM1b@22.ais	**6.20**	0.06	0.28			
SCM1b@23.ais	**6.23**	0.08	0.28			
SCM1b@24.ais	**6.00**	0.07	0.28			
SCM1b@25.ais	**6.45**	0.05	0.28			
SCM1b@26.ais	**6.26**	0.10	0.28			
SCM1b@27.ais	**5.36**	0.09	0.28			
SCM-30@1.ais	**5.93**	0.08	0.09			
SCM-30@2.ais	**5.62**	0.06	0.09			
SCM-30@3.ais	**5.68**	0.07	0.09			
SCM-30@4.ais	**6.12**	0.07	0.09			
SCM-30@5.ais	**6.13**	0.05	0.09			
SCM-30@6.ais	**5.78**	0.07	0.09			
SCM-30@7.ais	**5.76**	0.04	0.09			
SCM-30@8.ais	**5.68**	0.05	0.09			
SCM-30@9.ais	**5.79**	0.04	0.09			
SCM-30@10.ais	**5.98**	0.07	0.09			
SCM-13@1.ais	**5.24**	0.08	0.09			
SCM-13@2.ais	**4.48**	0.08	0.09			
SCM-13@3.ais	**5.83**	0.04	0.09			
SCM-13@4.ais	**5.91**	0.09	0.09			
SCM-13@5.ais	**6.03**	0.04	0.09			
SCM-13@6.ais	**5.65**	0.04	0.09			
SCM-13@7.ais	**5.73**	0.04	0.09			
SCM-13@8.ais	**5.71**	0.05	0.09			
SCM-13@9.ais	**5.90**	0.04	0.09			
SCM-13@10.ais	**5.67**	0.04	0.09			
SCM-13@11.ais	**5.98**	0.11	0.39			
SCM-13@12.ais	**5.64**	0.08	0.39			
SCM-13@13.ais	**5.77**	0.07	0.39			
SCM-13@14.ais	**5.44**	0.12	0.39			
SCM-13@15.ais	**5.86**	0.08	0.39			
SCM-13@16.ais	**5.35**	0.10	0.39			
SCM-13@17.ais	**5.48**	0.10	0.39			
SCM-13@18.ais	**5.60**	0.06	0.39			
SCM-13@19.ais	**5.26**	0.06	0.39			
SCM-13@20.ais	**6.62**	0.07	0.39			

Appendix G: Zircon Oxygen Isotope Analyses, Southern Black Mountains Volcanic Center

Sample Name	Corrected δ^{18}O	δ^{18}O Error (Internal) (1 sigma)	δ^{18}O Error (External) (1 sigma)	Average ^{18}O	Standard Deviation (1 sigma)	Number of Samples (n)
SCM-30@11.ais	**5.40**	0.07	0.39			
SCM-30@12.ais	**5.16**	0.08	0.39			
SCM-30@13.ais	**5.66**	0.06	0.39			
SCM-30@14.ais	**5.58**	0.13	0.39			
SCM-30@15.ais	**6.18**	0.09	0.39			
SCM-30@16.ais	**5.75**	0.09	0.39			
SCM-30@17.ais	**5.88**	0.07	0.39			
SCM-30@18.ais	**5.86**	0.07	0.39			
SCM-30@19.ais	**5.92**	0.09	0.39			
SCM-30@20.ais	**5.65**	0.06	0.39			
Felsic Porphyry Dike				**5.57**	**0.50**	**42**
SCM-5A@1.ais	**5.99**	0.09	0.20			
SCM-5A@2.ais	**6.46**	0.10	0.20			
SCM-5A@3.ais	**5.67**	0.06	0.20			
SCM-5A@4.ais	**6.13**	0.10	0.20			
SCM-5A@5.ais	**6.34**	0.07	0.20			
SCM-5A@6.ais	**12.15**	0.10	0.20			
SCM-5A@7.ais	**5.58**	0.07	0.20			
SCM-5A@8.ais	**5.38**	0.06	0.20			
SCM-5A@9.ais	**5.89**	0.07	0.20			
SCM-5A@10.ais	**5.38**	0.08	0.20			
SCM-5A@11.ais	**6.06**	0.08	0.29			
SCM-5A@12.ais	**5.67**	0.10	0.29			
SCM-5A@13.ais	**6.25**	0.08	0.29			
SCM-5A@14.ais	**5.18**	0.07	0.29			
SCM-5A@15.ais	**5.76**	0.07	0.29			
SCM-5A@16.ais	**5.85**	0.09	0.29			
SCM-5A@17.ais	**5.92**	0.09	0.29			
SCM-5A@18.ais	**5.25**	0.09	0.29			
SCM-5A@19.ais	**5.91**	0.11	0.29			
SCM-5A@20.ais	**5.39**	0.10	0.29			
SCM-5A-21.ais	**6.36**	0.08	0.29			
SCM-5A-21@1.ais	**5.41**	0.08	0.29			
SCM-5A-21@2.ais	**5.97**	0.07	0.29			
BCD@1.ais	**6.09**	0.05	0.09			
BCD@2.ais	**5.49**	0.05	0.09			
BCD@3.ais	**5.49**	0.04	0.09			
BCD@4.ais	**5.39**	0.05	0.09			
BCD@5.ais	**5.50**	0.03	0.09			
BCD@6.ais	**6.01**	0.07	0.09			
BCD@7.ais	**5.78**	0.05	0.09			
BCD@8.ais	**6.01**	0.04	0.09			
BCD@9.ais	**5.60**	0.05	0.09			
BCD@10.ais	**5.70**	0.05	0.09			
BCD@11.ais	**5.35**	0.08	0.39			
BCD@12.ais	**5.15**	0.10	0.39			
BCD@13.ais	**4.64**	0.06	0.39			
BCD@14.ais	**5.04**	0.07	0.39			
BCD@15.ais	**4.69**	0.11	0.39			
BCD@16.ais	**4.76**	0.12	0.39			
BCD@17.ais	**4.53**	0.08	0.39			
BCD@18.ais	**4.61**	0.08	0.39			
BCD@19.ais	**5.12**	0.09	0.39			
BCD@20.ais	**5.24**	0.11	0.39			

Appendix G: Zircon Oxygen Isotope Analyses, Southern Black Mountains Volcanic Center

Sample Name	Corrected δ^{18}O	δ^{18}O Error (Internal) (1 sigma)	δ^{18}O Error (External) (1 sigma)	Average ^{18}O	Standard Deviation (1 sigma)	Number of Samples (n)
Post-PST Felsic Lava Enclave				**5.95**	**0.30**	**20**
SIT-1b@1.ais	**6.14**	0.08	0.15			
SIT-1b@2.ais	**5.69**	0.09	0.15			
SIT-1b@3.ais	**6.15**	0.08	0.15			
SIT-1b@4.ais	**5.60**	0.10	0.15			
SIT-1b@5.ais	**6.08**	0.10	0.15			
SIT-1b@6.ais	**6.03**	0.06	0.15			
SIT-1b@7.ais	**6.02**	0.05	0.15			
SIT-1b@8.ais	**5.72**	0.09	0.15			
SIT-1b@9.ais	**5.77**	0.08	0.15			
SIT-1b@10.ais	**6.28**	0.07	0.15			
SIT-1b@11.ais	**5.43**	0.08	0.25			
SIT-1b@12.ais	**5.92**	0.08	0.25			
SIT-1b@13.ais	**6.21**	0.06	0.25			
SIT-1b@14.ais	**6.50**	0.04	0.25			
SIT-1b@15.ais	**5.78**	0.09	0.25			
SIT-1b@16.ais	**5.47**	0.09	0.25			
SIT-1b@17.ais	**6.44**	0.07	0.25			
SIT-1b@18.ais	**6.07**	0.07	0.25			
SIT-1b@19.ais	**5.76**	0.06	0.25			
SIT-1b@20.ais	**5.99**	0.04	0.25			
Post-PST Felsic Lava				**6.22**	**0.33**	**20**
SIT-1@1.ais	**6.13**	0.08	0.21			
SIT-1@2.ais	**6.21**	0.09	0.21			
SIT-1@3.ais	**5.67**	0.08	0.21			
SIT-1@4.ais	**5.67**	0.10	0.21			
SIT-1@5.ais	**6.04**	0.08	0.21			
SIT-1@6.ais	**5.93**	0.09	0.21			
SIT-1@7.ais	**6.05**	0.07	0.21			
SIT-1@8.ais	**5.72**	0.08	0.21			
SIT-1@9.ais	**6.14**	0.09	0.21			
SIT-1@10.ais	**6.09**	0.12	0.21			
SIT-1@11.ais	**6.40**	0.08	0.25			
SIT-1@12.ais	**6.37**	0.05	0.25			
SIT-1@13.ais	**6.67**	0.08	0.25			
SIT-1@14.ais	**6.50**	0.07	0.25			
SIT-1@15.ais	**6.51**	0.09	0.25			
SIT-1@16.ais	**6.12**	0.07	0.25			
SIT-1@17.ais	**6.72**	0.06	0.25			
SIT-1@18.ais	**6.31**	0.11	0.25			
SIT-1@19.ais	**6.34**	0.10	0.25			
SIT-1@20.ais	**6.76**	0.06	0.25			
Post-PST Intermediate Lava				**5.92**	**0.25**	**22**
SIT-2@1.ais	**5.98**	0.05	0.38			
SIT-2@2.ais	**5.92**	0.06	0.38			
SIT-2@3.ais	**5.64**	0.07	0.38			
SIT-2@4.ais	**5.69**	0.06	0.38			
SIT-2@5.ais	**5.76**	0.06	0.38			
SIT-2@6.ais	**6.16**	0.03	0.38			
SIT-2@7.ais	**5.93**	0.05	0.38			
SIT-2@6B.ais	**5.86**	0.04	0.38			
SIT-2@7B.ais	**6.07**	0.11	0.38			
SIT-2@8.ais	**6.52**	0.06	0.38			
SIT-2@9.ais	**5.91**	0.07	0.38			

Appendix G: Zircon Oxygen Isotope Analyses, Southern Black Mountains Volcanic Center

Sample Name	Corrected $\delta^{18}O$	$\delta^{18}O$ Error (Internal) (1 sigma)	$\delta^{18}O$ Error (External) (1 sigma)	Average ^{18}O	Standard Deviation (1 sigma)	Number of Samples (n)
SIT-2@10.ais	**6.37**	0.08	0.38			
SIT-2@11.ais	**5.78**	0.08	0.20			
SIT-2@12.ais	**6.31**	0.10	0.20			
SIT-2@13.ais	**6.08**	0.06	0.20			
SIT-2@14.ais	**5.82**	0.06	0.20			
SIT-2@15.ais	**5.67**	0.08	0.20			
SIT-2@16.ais	**5.99**	0.05	0.43			
SIT-2@17.ais	**5.90**	0.08	0.43			
SIT-2@18.ais	**5.63**	0.10	0.43			
SIT-2@19.ais	**5.73**	0.10	0.43			
SIT-2@20.ais	**5.63**	0.06	0.43			

Appendix H: Zircon Hafnium Isotope Analyses, Southern Black Mountains Volcanic Center

	^{176}Hf/^{177}Hf	2SE	^{176}Lu/^{177}Hf	2SE	^{176}Yb/^{177}Hf	2SE	^{178}Hf/^{177}Hf	2SE	^{180}Hf/^{177}Hf	2SE	Total Hf (V)	εHf^{a}	Average εHf
Pre-PST Trachyte - Alcyone													**-13.9**
SCM34_1	0.282437	0.000042	0.0015	0.00017	0.0382	0.0045	1.467172	0.000056	1.886990	0.000120	5.8	-12.3	
SCM34_2	0.282393	0.000033	0.0004	0.00001	0.0091	0.0002	1.467152	0.000048	1.886860	0.000130	5.8	-13.9	
SCM34_3	0.282407	0.000045	0.0011	0.00003	0.0273	0.0009	1.467177	0.000042	1.886980	0.000120	5.5	-13.4	
SCM34_4	0.282379	0.000044	0.0004	0.00002	0.0101	0.0004	1.467242	0.000049	1.887080	0.000120	5.6	-14.4	
SCM34_5	0.282376	0.000034	0.0009	0.00006	0.0238	0.0015	1.467209	0.000049	1.887050	0.000110	6.3	-14.5	
SCM34_8	0.282404	0.000034	0.0005	0.00001	0.0125	0.0002	1.467261	0.000042	1.887163	0.000093	5.9	-13.5	
SCM34_9	0.282356	0.000055	0.0004	0.00001	0.0092	0.0002	1.467191	0.000052	1.887180	0.000190	5.3	-15.2	
SCM34_10	0.282390	0.000033	0.0004	0.00001	0.0090	0.0002	1.467194	0.000049	1.887050	0.000140	6.8	-14.0	
SCM34_11	0.282413	0.000038	0.0005	0.00000	0.0115	0.0001	1.467240	0.000056	1.887030	0.000120	6.0	-13.2	
SCM34_14	0.282345	0.000050	0.0005	0.00001	0.0137	0.0002	1.467180	0.000051	1.887130	0.000170	6.6	-15.6	
SCM34_15	0.282405	0.000032	0.0004	0.00001	0.0091	0.0001	1.467234	0.000043	1.887090	0.000110	6.2	-13.4	
Pre-PST Trachyte - Gold Road													**-11.6**
SCM41_1	0.282485	0.000027	0.0010	0.00004	0.0247	0.0010	1.467253	0.000044	1.886970	0.000100	7.7	-10.6	
SCM41_2	0.282482	0.000033	0.0005	0.00000	0.0127	0.0001	1.467166	0.000033	1.886981	0.000079	9.2	-10.7	
SCM41_3	0.282461	0.000052	0.0005	0.00002	0.0128	0.0005	1.467205	0.000048	1.887030	0.000130	9.2	-11.5	
SCM41_4	0.281944	0.000042	0.0009	0.00003	0.0221	0.0008	1.467149	0.000068	1.887170	0.000200	9.3	-29.7	
SCM41_5	0.281946	0.000043	0.0014	0.00011	0.0345	0.0029	1.467164	0.000055	1.887080	0.000170	9.6	-29.7	
SCM41_8	0.282409	0.000032	0.0030	0.00041	0.0920	0.0130	1.467211	0.000046	1.886930	0.000110	8.1	-13.3	
SCM41_9	0.282488	0.000031	0.0005	0.00001	0.0120	0.0002	1.467215	0.000054	1.886950	0.000100	8.7	-10.5	
SCM41_10	0.282400	0.000033	0.0006	0.00004	0.0150	0.0008	1.467193	0.000046	1.886983	0.000099	8.1	-13.6	
SCM41_11	0.282483	0.000038	0.0004	0.00000	0.0084	0.0001	1.467227	0.000037	1.887020	0.000110	9.1	-10.7	
SCM41_12	0.282442	0.000026	0.0013	0.00004	0.0330	0.0008	1.467212	0.000038	1.886886	0.000098	8.6	-12.1	
SCM41_13	0.282467	0.000032	0.0004	0.00001	0.0087	0.0003	1.467179	0.000040	1.886980	0.000100	7.7	-11.2	
Cook Canyon													**-11.9**
7A_1	0.282457	0.000035	0.0011	0.00006	0.0293	0.0016	1.467194	0.000031	1.887070	0.000130	9.5	-11.6	
7A_4	0.282457	0.000035	0.0008	0.00002	0.0204	0.0005	1.467200	0.000050	1.887110	0.000130	8.7	-11.6	
7B_1	0.282463	0.000053	0.0005	0.00001	0.0118	0.0004	1.467134	0.000062	1.887010	0.000110	9.3	-11.4	
7B_2	0.282408	0.000043	0.0008	0.00001	0.0210	0.0003	1.467128	0.000054	1.887130	0.000130	7.2	-13.3	
7B_3	0.282499	0.000039	0.0009	0.00002	0.0232	0.0006	1.467213	0.000071	1.887070	0.000160	10.1	-10.1	
7B_4	0.282442	0.000066	0.0006	0.00001	0.0142	0.0003	1.467085	0.000065	1.887250	0.000220	7.7	-12.1	
7B_5	0.282357	0.000061	0.0006	0.00003	0.0140	0.0007	1.467163	0.000051	1.887350	0.000160	8.0	-15.1	
7B_7	0.282451	0.000030	0.0004	0.00000	0.0102	0.0001	1.467194	0.000063	1.886940	0.000130	9.2	-11.8	
7B_9	0.282503	0.000028	0.0007	0.00002	0.0164	0.0004	1.467181	0.000039	1.886967	0.000091	8.4	-10.0	
PST - Rhyolite													**-13.7**
3B_1	0.282400	0.000035	0.0016	0.00005	0.0368	0.0013	1.467199	0.000037	1.887040	0.000100	11.6	-13.6	
3B_2	0.282429	0.000050	0.0046	0.00013	0.1406	0.0041	1.467163	0.000050	1.887010	0.000160	9.7	-12.6	
3B_3	0.282381	0.000048	0.0033	0.00023	0.0983	0.0076	1.467126	0.000044	1.887130	0.000120	9.3	-14.3	
3B_4	0.282386	0.000052	0.0013	0.00004	0.0314	0.0010	1.467151	0.000046	1.887120	0.000150	8.3	-14.1	
3B_5	0.282391	0.000041	0.0015	0.00009	0.0420	0.0024	1.467141	0.000057	1.887060	0.000120	11.2	-13.9	
3B_7	0.282415	0.000029	0.0011	0.00010	0.0278	0.0026	1.467150	0.000043	1.886987	0.000098	9.6	-13.1	
3B_8	0.282367	0.000043	0.0009	0.00002	0.0207	0.0004	1.467210	0.000045	1.887230	0.000140	11.3	-14.8	
3B_9	0.282398	0.000040	0.0011	0.00003	0.0265	0.0006	1.467188	0.000042	1.887060	0.000160	10.5	-13.7	
3B_10	0.282375	0.000039	0.0010	0.00001	0.0234	0.0003	1.467197	0.000049	1.887060	0.000140	9.0	-14.5	
3B_12	0.282444	0.000057	0.0010	0.00001	0.0237	0.0002	1.467201	0.000049	1.887020	0.000160	13.7	-12.1	
MLPT2H_1	0.282425	0.000050	0.0010	0.00001	0.0223	0.0003	1.467193	0.000071	1.886930	0.000150	12.9	-12.7	
MLPT2H_2	0.282257	0.000033	0.0007	0.00004	0.0147	0.0009	1.467160	0.000037	1.887010	0.000130	13.2	-18.7	
MLPT2H_3	0.282402	0.000022	0.0009	0.00001	0.0206	0.0002	1.467188	0.000036	1.886979	0.000099	11.7	-13.5	
MLPT2H_4	0.282419	0.000035	0.0011	0.00004	0.0291	0.0011	1.467160	0.000037	1.886980	0.000100	11.0	-12.9	
MLPT2H_6	0.282376	0.000044	0.0014	0.00004	0.0317	0.0010	1.467194	0.000046	1.887030	0.000140	11.0	-14.5	
2H_7	0.282340	0.000058	0.0009	0.00001	0.0203	0.0001	1.467182	0.000066	1.887170	0.000200	10.5	-15.7	
2H_8	0.282407	0.000030	0.0011	0.00004	0.0255	0.0008	1.467247	0.000040	1.887020	0.000110	10.3	-13.4	
2H_9	0.282405	0.000043	0.0010	0.00001	0.0235	0.0002	1.467178	0.000059	1.886980	0.000120	11.8	-13.4	
2H_10	0.282368	0.000052	0.0010	0.00005	0.0239	0.0010	1.467185	0.000045	1.887060	0.000180	10.2	-14.7	
2H_11	0.282413	0.000041	0.0010	0.00002	0.0259	0.0004	1.467201	0.000060	1.887050	0.000180	9.7	-13.2	
PST - Trachyte													**-13.9**

Appendix H: Zircon Hafnium Isotope Analyses, Southern Black Mountains Volcanic Center

	^{176}Hf/^{177}Hf	2SE	^{176}Lu/^{177}Hf	2SE	^{176}Yb/^{177}Hf	2SE	^{178}Hf/^{177}Hf	2SE	^{180}Hf/^{177}Hf	2SE	Total Hf (V)	εHf^{a}	Average εHf
MLPT_5D_2	0.282408	0.000021	0.0011	0.00008	0.0272	0.0022	1.467173	0.000029	1.886869	0.000092	11.3	-13.3	
MLPT_5D_3	0.282340	0.000038	0.0006	0.00001	0.0153	0.0002	1.467117	0.000040	1.886980	0.000110	9.1	-15.7	
MLPT_5D_4	0.282398	0.000035	0.0018	0.00018	0.0502	0.0050	1.467196	0.000037	1.886920	0.000100	11.2	-13.7	
MLPT_5D_5	0.282388	0.000029	0.0024	0.00009	0.0710	0.0027	1.467232	0.000037	1.886992	0.000099	9.4	-14.0	
MLPT5D_6	0.282399	0.000028	0.0011	0.00001	0.0283	0.0002	1.467141	0.000028	1.886936	0.000079	10.6	-13.7	
MLPT5D_7	0.282412	0.000042	0.0014	0.00016	0.0360	0.0041	1.467185	0.000052	1.886870	0.000110	10.1	-13.2	
MLPT5D_8	0.282377	0.000043	0.0016	0.00020	0.0421	0.0054	1.467176	0.000049	1.886940	0.000140	10.2	-14.4	
MLPT5D_9	0.282385	0.000032	0.0009	0.00006	0.0222	0.0017	1.467166	0.000034	1.886960	0.000130	9.1	-14.1	
MLPT5D_10	0.282394	0.000030	0.0015	0.00022	0.0398	0.0061	1.467179	0.000044	1.886927	0.000099	9.8	-13.8	
MLPT5D_11	0.281853	0.000026	0.0012	0.00002	0.0276	0.0005	1.467193	0.000030	1.886939	0.000084	12.6	-33.0	
MLPT5D_12	0.282296	0.000043	0.0005	0.00002	0.0131	0.0006	1.467124	0.000055	1.887120	0.000140	7.8	-17.3	
MLPT5D_14	0.282394	0.000029	0.0009	0.00004	0.0233	0.0012	1.467174	0.000041	1.886961	0.000099	10.0	-13.8	
MLPT5D_15	0.282404	0.000029	0.0016	0.00002	0.0457	0.0006	1.467200	0.000033	1.886957	0.000083	10.5	-13.5	
Moss Porphyry													**-12.1**
SCM6-1	0.282410	0.000043	0.0006	0.00000	0.0149	0.0001	1.467167	0.000054	1.886840	0.000110	8.6	-13.3	
SCM6_2	0.282425	0.000058	0.0011	0.00010	0.0310	0.0032	1.467212	0.000057	1.886950	0.000180	8.5	-12.7	
SCM6_5	0.282438	0.000031	0.0007	0.00002	0.0158	0.0004	1.467200	0.000050	1.886860	0.000120	9.5	-12.3	
SCM6_6	0.282387	0.000049	0.0005	0.00001	0.0129	0.0002	1.467195	0.000049	1.886990	0.000180	10.4	-14.1	
SCM6_7	0.281842	0.000025	0.0006	0.00001	0.0131	0.0002	1.467214	0.000046	1.886980	0.000110	12.4	-33.4	
SCM6_10	0.281935	0.000031	0.0005	0.00001	0.0122	0.0002	1.467209	0.000041	1.886940	0.000110	11.3	-30.1	
MP1_1	0.282356	0.000029	0.0005	0.00001	0.0131	0.0002	1.467166	0.000050	1.887060	0.000110	9.0	-15.2	
MP1_2	0.282433	0.000045	0.0012	0.00002	0.0301	0.0005	1.467216	0.000056	1.886920	0.000190	9.5	-12.4	
MP1_9	0.282488	0.000028	0.0004	0.00001	0.0099	0.0002	1.467176	0.000038	1.887030	0.000110	9.2	-10.5	
MP1_10	0.282383	0.000029	0.0022	0.00010	0.0638	0.0031	1.467156	0.000039	1.887033	0.000089	9.1	-14.2	
MP1_11	0.282488	0.000046	0.0004	0.00001	0.0103	0.0003	1.467136	0.000049	1.886850	0.000120	9.6	-10.5	
MP1_15	0.282465	0.000030	0.0004	0.00002	0.0098	0.0004	1.467153	0.000057	1.887060	0.000130	7.5	-11.3	
MP1_16	0.282517	0.000044	0.0006	0.00002	0.0143	0.0003	1.467158	0.000070	1.886830	0.000160	8.2	-9.5	
MP1_18	0.281850	0.000048	0.0006	0.00000	0.0154	0.0001	1.467217	0.000064	1.887010	0.000180	9.6	-33.1	
MP1_19	0.282412	0.000032	0.0006	0.00001	0.0151	0.0002	1.467194	0.000053	1.887000	0.000110	7.1	-13.2	
MPe1Ne_1	0.282502	0.000027	0.0007	0.00003	0.0170	0.0008	1.467227	0.000045	1.886975	0.000087	8.4	-10.0	
MPe1Ne_2	0.282450	0.000035	0.0005	0.00001	0.0113	0.0002	1.467168	0.000046	1.887040	0.000110	9.1	-11.8	
MPe1Ne_5	0.282413	0.000028	0.0011	0.00008	0.0265	0.0019	1.467161	0.000027	1.886900	0.000100	10.1	-13.2	
MPe1Ne_7	0.282431	0.000037	0.0007	0.00005	0.0177	0.0015	1.467179	0.000059	1.886970	0.000140	9.2	-12.5	
MPe1Ne_11	0.282469	0.000042	0.0007	0.00004	0.0168	0.0010	1.467182	0.000068	1.886970	0.000160	9.9	-11.2	
MPe1Ne_12	0.281824	0.000029	0.0006	0.00003	0.0139	0.0006	1.467196	0.000038	1.887061	0.000085	10.4	-34.0	
MPe1ne_14	0.282474	0.000055	0.0006	0.00000	0.0134	0.0001	1.467221	0.000057	1.887090	0.000190	7.8	-11.0	
MPe1ne_15	0.282466	0.000045	0.0005	0.00003	0.0129	0.0008	1.467168	0.000060	1.886960	0.000150	7.4	-11.3	
MPe1ne_16	0.282413	0.000039	0.0005	0.00003	0.0130	0.0008	1.467170	0.000064	1.887240	0.000130	7.6	-13.2	
MPe1ne_17	0.282423	0.000049	0.0005	0.00001	0.0113	0.0003	1.467184	0.000052	1.887120	0.000150	7.0	-12.8	
MPe1ne_18	0.282475	0.000038	0.0005	0.00001	0.0115	0.0003	1.467226	0.000049	1.886920	0.000150	8.0	-11.0	
Moss Enclave													**-11.9**
MPe1_1	0.282484	0.000037	0.0017	0.00023	0.0493	0.0073	1.467220	0.000048	1.886920	0.000110	8.8	-10.6	
MPe1_4	0.282479	0.000044	0.0012	0.00006	0.0294	0.0014	1.467202	0.000055	1.887086	0.000089	8.5	-10.8	
MPe1_6	0.282504	0.000045	0.0008	0.00009	0.0196	0.0019	1.467205	0.000046	1.886910	0.000190	8.7	-9.9	
MPe1_9	0.282452	0.000034	0.0004	0.00001	0.0090	0.0001	1.467207	0.000050	1.887030	0.000130	9.5	-11.8	
MPe1_10	0.282392	0.000048	0.0008	0.00004	0.0181	0.0010	1.467144	0.000064	1.887020	0.000150	9.3	-13.9	
MPe1_11	0.282392	0.000036	0.0018	0.00017	0.0506	0.0049	1.467184	0.000044	1.886990	0.000120	8.5	-13.9	
MPe1_14	0.281843	0.000048	0.0007	0.00001	0.0174	0.0002	1.467207	0.000058	1.887000	0.000140	12.0	-33.3	
MPe1_15	0.282441	0.000036	0.0005	0.00001	0.0112	0.0002	1.467144	0.000039	1.887041	0.000090	8.8	-12.2	
MPe1_16	0.282440	0.000055	0.0005	0.00001	0.0116	0.0002	1.467159	0.000056	1.887130	0.000170	9.2	-12.2	
MPe1_18	0.282242	0.000064	0.0010	0.00001	0.0246	0.0004	1.467130	0.000058	1.887520	0.000230	5.7	-19.2	
Times Granite													**-10.8**
SCM20_1	0.282490	0.000037	0.0009	0.00002	0.0235	0.0004	1.467161	0.000037	1.886860	0.000140	9.3	-10.4	
SCM20_2	0.282509	0.000051	0.0020	0.00016	0.0533	0.0049	1.467240	0.000059	1.886990	0.000190	8.4	-9.8	
SCM20_3	0.282461	0.000052	0.0019	0.00009	0.0529	0.0026	1.467212	0.000055	1.886960	0.000160	8.6	-11.5	
SCM20_4	0.282544	0.000053	0.0039	0.00016	0.1104	0.0044	1.467186	0.000057	1.887010	0.000170	8.2	-8.5	

Appendix H: Zircon Hafnium Isotope Analyses, Southern Black Mountains Volcanic Center

	^{176}Hf/^{177}Hf	2SE	^{176}Lu/^{177}Hf	2SE	^{176}Yb/^{177}Hf	2SE	^{178}Hf/^{177}Hf	2SE	^{180}Hf/^{177}Hf	2SE	Total Hf (V)	εHf[a]	Average εHf
SCM20_5	0.282472	0.000040	0.0041	0.00036	0.1170	0.0110	1.467181	0.000042	1.886920	0.000120	8.0	-11.1	
SCM20_6	0.282453	0.000041	0.0018	0.00021	0.0479	0.0059	1.467156	0.000053	1.887030	0.000140	6.8	-11.7	
SCM20_7	0.282445	0.000047	0.0012	0.00002	0.0260	0.0005	1.467204	0.000047	1.887090	0.000160	12.2	-12.0	
SCM20_8	0.282496	0.000039	0.0035	0.00021	0.0972	0.0061	1.467180	0.000041	1.886880	0.000110	8.6	-10.2	
SCM20_9	0.282505	0.000033	0.0029	0.00011	0.0790	0.0031	1.467207	0.000046	1.886970	0.000110	9.3	-9.9	
SCM20_10	0.282463	0.000051	0.0011	0.00005	0.0288	0.0013	1.467086	0.000062	1.886880	0.000140	9.1	-11.4	
SCM20_12	0.282489	0.000040	0.0028	0.00014	0.0799	0.0044	1.467183	0.000043	1.886910	0.000110	7.6	-10.5	
SCM20_13	0.282460	0.000042	0.0019	0.00008	0.0521	0.0022	1.467199	0.000040	1.887150	0.000140	8.8	-11.5	
TIP1_1	0.282485	0.000041	0.0007	0.00002	0.0169	0.0006	1.467169	0.000069	1.887000	0.000170	7.3	-10.6	
TIP1_2	0.282521	0.000040	0.0014	0.00008	0.0360	0.0024	1.467198	0.000044	1.886860	0.000120	7.8	-9.3	
TIP1_3	0.282503	0.000029	0.0008	0.00006	0.0203	0.0016	1.467192	0.000044	1.887020	0.000140	8.1	-10.0	
TIP1_4	0.282505	0.000029	0.0005	0.00001	0.0130	0.0003	1.467171	0.000050	1.886896	0.000094	7.2	-9.9	
TIP1_5	0.282438	0.000052	0.0010	0.00006	0.0260	0.0016	1.467289	0.000045	1.887140	0.000190	7.6	-12.3	
TIP1_6	0.282378	0.000057	0.0005	0.00001	0.0126	0.0003	1.467129	0.000063	1.887010	0.000180	7.3	-14.4	
TIP1_8	0.282443	0.000038	0.0022	0.00008	0.0576	0.0023	1.467143	0.000060	1.886990	0.000120	7.2	-12.1	
TIP1_10	0.282443	0.000049	0.0036	0.00013	0.0991	0.0035	1.467199	0.000045	1.887170	0.000140	6.9	-12.1	
TIP1_11	0.282514	0.000028	0.0009	0.00003	0.0240	0.0008	1.467258	0.000044	1.887010	0.000089	7.8	-9.6	
TIP1_12	0.282485	0.000036	0.0008	0.00005	0.0216	0.0015	1.467153	0.000047	1.886970	0.000130	7.5	-10.6	
TIP1_14	0.282524	0.000057	0.0019	0.00005	0.0494	0.0016	1.467207	0.000065	1.886820	0.000120	8.2	-9.2	
TIP1_15	0.282475	0.000028	0.0004	0.00000	0.0099	0.0001	1.467166	0.000054	1.887000	0.000150	5.9	-11.0	
TIP1_16	0.282465	0.000041	0.0018	0.00013	0.0487	0.0040	1.467187	0.000053	1.887030	0.000130	7.2	-11.3	
SCM20-14	0.282491	0.000038	0.0007	0.00002	0.0188	0.0005	1.467190	0.000041	1.887010	0.000120	6.7	-10.4	
SCM20-16	0.282485	0.000045	0.0029	0.00026	0.0835	0.0077	1.467220	0.000069	1.886950	0.000160	7.2	-10.6	
SCM20-17	0.282435	0.000034	0.0009	0.00000	0.0202	0.0001	1.467157	0.000045	1.886990	0.000120	9.1	-12.4	
SCM37_1	0.282459	0.000040	0.0024	0.00025	0.0665	0.0073	1.467217	0.000069	1.887060	0.000150	8.1	-11.5	
SCM37_3	0.282469	0.000035	0.0012	0.00004	0.0298	0.0008	1.467226	0.000038	1.886940	0.000140	8.4	-11.2	
SCM37_4	0.282429	0.000032	0.0009	0.00006	0.0214	0.0011	1.467209	0.000049	1.887000	0.000120	8.5	-12.6	
SCM37_5	0.282536	0.000041	0.0037	0.00010	0.1076	0.0032	1.467192	0.000051	1.886917	0.000095	7.2	-8.8	
SCM37_7	0.282442	0.000034	0.0018	0.00008	0.0482	0.0022	1.467223	0.000057	1.886970	0.000120	7.5	-12.1	
SCM37_8	0.282541	0.000051	0.0045	0.00024	0.1334	0.0078	1.467180	0.000054	1.886980	0.000130	7.1	-8.6	
SCM37_13	0.282457	0.000032	0.0012	0.00004	0.0274	0.0015	1.467203	0.000055	1.886910	0.000130	9.3	-11.6	
SCM37_15	0.282506	0.000050	0.0021	0.00006	0.0550	0.0014	1.467228	0.000058	1.887030	0.000130	7.4	-9.9	
SCM37_16	0.282509	0.000031	0.0016	0.00008	0.0425	0.0024	1.467189	0.000036	1.886960	0.000110	7.7	-9.8	
Times Enclave													**-11.2**
SCM27B_1	0.282477	0.000029	0.0013	0.00002	0.0339	0.0006	1.467201	0.000046	1.886987	0.000090	9.0	-10.9	
SCM27B_2	0.282486	0.000027	0.0013	0.00009	0.0300	0.0018	1.467196	0.000043	1.886765	0.000092	11.1	-10.6	
SCM27B_3	0.282422	0.000039	0.0010	0.00001	0.0223	0.0003	1.467122	0.000050	1.887040	0.000130	12.1	-12.8	
SCM27B_4	0.282485	0.000033	0.0014	0.00008	0.0351	0.0019	1.467223	0.000040	1.887003	0.000094	8.8	-10.6	
SCM27B_5	0.282471	0.000026	0.0012	0.00011	0.0271	0.0022	1.467262	0.000052	1.887020	0.000100	10.4	-11.1	
SCM27B_6	0.282394	0.000058	0.0009	0.00001	0.0215	0.0004	1.467186	0.000044	1.887220	0.000160	10.5	-13.8	
SCM27B_7	0.282435	0.000044	0.0008	0.00002	0.0189	0.0004	1.467146	0.000048	1.886980	0.000140	13.0	-12.4	
SCM27B_8	0.282497	0.000044	0.0030	0.00029	0.0867	0.0093	1.467177	0.000050	1.886900	0.000160	9.7	-10.2	
SCM27B_9	0.282498	0.000028	0.0008	0.00002	0.0203	0.0004	1.467181	0.000035	1.886950	0.000100	7.5	-10.2	
SCM27B_10	0.282533	0.000036	0.0008	0.00002	0.0196	0.0005	1.467174	0.000040	1.886990	0.000100	7.5	-8.9	
SCM27B_11	0.282505	0.000045	0.0015	0.00002	0.0391	0.0005	1.467224	0.000055	1.887030	0.000150	8.3	-9.9	
SCM27B_12	0.282411	0.000057	0.0010	0.00002	0.0237	0.0006	1.467123	0.000063	1.887220	0.000190	11.3	-13.2	
Feldspar Porphyry Dike													**-10.6**
SCMIB_1	0.282536	0.000033	0.0012	0.00005	0.0315	0.0012	1.467233	0.000044	1.886859	0.000083	7.8	-8.8	
SCM1B_2	0.282418	0.000050	0.0007	0.00001	0.0167	0.0002	1.467155	0.000051	1.887160	0.000170	10.0	-13.0	
SCM1B_3	0.282453	0.000050	0.0021	0.00011	0.0554	0.0029	1.467170	0.000056	1.886960	0.000130	7.9	-11.7	
SCM1B_4	0.282476	0.000043	0.0012	0.00005	0.0311	0.0014	1.467211	0.000034	1.886870	0.000130	7.0	-10.9	
SCM1B_5	0.282435	0.000040	0.0009	0.00002	0.0209	0.0007	1.467148	0.000036	1.887100	0.000160	10.0	-12.4	
SCM1B_7	0.282410	0.000043	0.0014	0.00003	0.0302	0.0004	1.467131	0.000055	1.887110	0.000170	10.5	-13.3	
SCM1B_8	0.282381	0.000057	0.0007	0.00001	0.0177	0.0004	1.467190	0.000068	1.887420	0.000190	8.9	-14.3	
SCM1B_9	0.282517	0.000037	0.0014	0.00004	0.0336	0.0011	1.467170	0.000043	1.887020	0.000110	8.2	-9.5	
SCM1b_10	0.282508	0.000037	0.0022	0.00006	0.0593	0.0016	1.467141	0.000039	1.886811	0.000097	7.4	-9.8	

Appendix H: Zircon Hafnium Isotope Analyses, Southern Black Mountains Volcanic Center

	^{176}Hf/^{177}Hf	2SE	^{176}Lu/^{177}Hf	2SE	^{176}Yb/^{177}Hf	2SE	^{178}Hf/^{177}Hf	2SE	^{180}Hf/^{177}Hf	2SE	Total Hf (V)	εHf[a]	Average εHf
SCM1b_11	0.282491	0.000038	0.0017	0.00008	0.0439	0.0021	1.467216	0.000061	1.886860	0.000120	7.2	-10.4	
SCM1b-13	0.282451	0.000033	0.0008	0.00002	0.0182	0.0004	1.467208	0.000042	1.887120	0.000100	8.7	-11.8	
SCM1b-14	0.282478	0.000030	0.0007	0.00001	0.0169	0.0002	1.467221	0.000052	1.886950	0.000130	6.2	-10.9	
SCM1b-16	0.282512	0.000057	0.0011	0.00002	0.0269	0.0005	1.467138	0.000065	1.886980	0.000160	6.9	-9.7	
SCM1b-17	0.282505	0.000043	0.0006	0.00001	0.0149	0.0002	1.467219	0.000060	1.886950	0.000130	9.3	-9.9	
SCM13_2	0.282503	0.000034	0.0017	0.00014	0.0452	0.0039	1.467158	0.000044	1.886880	0.000130	7.7	-10.0	
SCM13_3	0.282503	0.000039	0.0011	0.00002	0.0273	0.0004	1.467159	0.000034	1.886970	0.000140	8.2	-10.0	
SCM13_4	0.282480	0.000040	0.0009	0.00002	0.0231	0.0005	1.467210	0.000037	1.886980	0.000130	10.0	-10.8	
SCM13_5	0.282464	0.000043	0.0036	0.00022	0.1025	0.0066	1.467196	0.000065	1.886830	0.000160	7.3	-11.4	
SCM13_6	0.282486	0.000030	0.0026	0.00014	0.0724	0.0039	1.467231	0.000052	1.886900	0.000120	7.7	-10.6	
SCM13_7	0.282520	0.000043	0.0009	0.00001	0.0207	0.0002	1.467201	0.000061	1.887040	0.000160	10.0	-9.4	
SCM13_8	0.282459	0.000046	0.0020	0.00032	0.0556	0.0092	1.467222	0.000048	1.886960	0.000130	7.1	-11.5	
SCM13_11	0.282516	0.000052	0.0010	0.00003	0.0248	0.0007	1.467192	0.000044	1.886820	0.000230	8.5	-9.5	
SCM13_12	0.282626	0.000029	0.0016	0.00010	0.0398	0.0026	1.467214	0.000039	1.886900	0.000120	6.9	-5.6	
SCM13_13	0.282554	0.000052	0.0010	0.00007	0.0263	0.0018	1.467261	0.000080	1.887090	0.000170	6.0	-8.2	
SCM13_14	0.282529	0.000065	0.0009	0.00003	0.0218	0.0008	1.467193	0.000062	1.886970	0.000210	7.9	-9.1	
SCM13_15	0.282426	0.000050	0.0020	0.00010	0.0501	0.0033	1.467130	0.000076	1.886900	0.000150	9.4	-12.7	
SCM13_16	0.282525	0.000046	0.0015	0.00006	0.0375	0.0013	1.467249	0.000049	1.887020	0.000110	5.8	-9.2	
SCM30_9	0.282469	0.000060	0.0007	0.00001	0.0182	0.0003	1.467248	0.000055	1.886950	0.000190	6.8	-11.2	
SCM30_10	0.282475	0.000044	0.0025	0.00011	0.0703	0.0030	1.467206	0.000052	1.887010	0.000130	6.0	-11.0	
SCM30_11	0.282488	0.000042	0.0028	0.00018	0.0745	0.0052	1.467237	0.000047	1.886960	0.000110	5.6	-10.5	
SCM30_12	0.282481	0.000027	0.0008	0.00001	0.0185	0.0002	1.467181	0.000042	1.886980	0.000100	8.1	-10.8	
SCM30_14	0.282494	0.000039	0.0012	0.00002	0.0295	0.0006	1.467166	0.000055	1.886870	0.000160	5.5	-10.3	
SCM30_15	0.282464	0.000044	0.0009	0.00001	0.0232	0.0001	1.467230	0.000046	1.886990	0.000160	6.2	-11.4	
SCM30_16	0.282503	0.000024	0.0010	0.00005	0.0244	0.0016	1.467174	0.000039	1.886989	0.000099	7.8	-10.0	
SCM30_19	0.282508	0.000037	0.0016	0.00008	0.0396	0.0020	1.467214	0.000045	1.886940	0.000130	9.5	-9.8	
SCM30_20	0.282506	0.000036	0.0010	0.00002	0.0251	0.0004	1.467248	0.000038	1.887140	0.000120	7.1	-9.9	
SCM30_21	0.282452	0.000048	0.0010	0.00001	0.0282	0.0002	1.467198	0.000054	1.887050	0.000130	7.1	-11.8	
SCM30_22	0.281851	0.000040	0.0009	0.00008	0.0212	0.0019	1.467175	0.000039	1.887000	0.000110	8.5	-33.0	
SCM30_23	0.282421	0.000027	0.0008	0.00001	0.0170	0.0004	1.467190	0.000043	1.886982	0.000086	8.9	-12.9	
Felsic Porphyry Dike													**-9.8**
SCM5A_1	0.282460	0.000042	0.0013	0.00004	0.0310	0.0010	1.467169	0.000044	1.887170	0.000130	10.8	-11.5	
SCM5A_4	0.282528	0.000039	0.0015	0.00002	0.0365	0.0006	1.467217	0.000057	1.887080	0.000140	13.9	-9.1	
SCM5A_5	0.282421	0.000084	0.0021	0.00010	0.0499	0.0028	1.467159	0.000075	1.887290	0.000180	11.7	-12.9	
SCM5A_6	0.282552	0.000046	0.0015	0.00004	0.0358	0.0007	1.467253	0.000059	1.886850	0.000130	14.4	-8.2	
SCM5A_7	0.282527	0.000021	0.0017	0.00004	0.0389	0.0006	1.467209	0.000035	1.886929	0.000087	14.7	-9.1	
SCM5A_8	0.282540	0.000033	0.0019	0.00015	0.0441	0.0028	1.467225	0.000042	1.886880	0.000170	12.1	-8.7	
SCM5A_9	0.282504	0.000028	0.0017	0.00005	0.0437	0.0014	1.467134	0.000033	1.886959	0.000088	11.2	-9.9	
SCM5a__11	0.282530	0.000040	0.0014	0.00001	0.0332	0.0003	1.467222	0.000048	1.886940	0.000110	13.7	-9.0	
SCM5a_12	0.282525	0.000049	0.0014	0.00010	0.0318	0.0022	1.467179	0.000045	1.887080	0.000170	8.9	-9.2	
SCM5a_13	0.282509	0.000037	0.0019	0.00004	0.0434	0.0009	1.467180	0.000049	1.886940	0.000130	15.3	-9.8	
SCM5a_14	0.282515	0.000046	0.0014	0.00007	0.0368	0.0015	1.467175	0.000041	1.887110	0.000150	9.6	-9.5	
SCM5a_15	0.282481	0.000061	0.0014	0.00007	0.0361	0.0019	1.467180	0.000050	1.886970	0.000190	7.4	-10.8	
BCD_1	0.282524	0.000031	0.0013	0.00005	0.0306	0.0012	1.467215	0.000043	1.886954	0.000094	7.7	-9.2	
BCD_2	0.282459	0.000053	0.0013	0.00002	0.0330	0.0010	1.467217	0.000052	1.887180	0.000180	8.5	-11.5	
BCD_3	0.282527	0.000038	0.0016	0.00006	0.0406	0.0016	1.467199	0.000054	1.886970	0.000100	9.1	-9.1	
BCD_4	0.282499	0.000041	0.0018	0.00001	0.0432	0.0003	1.467164	0.000039	1.887230	0.000160	8.6	-10.1	
BCD_5	0.282466	0.000042	0.0037	0.00037	0.1100	0.0120	1.467194	0.000039	1.886970	0.000130	7.2	-11.3	
BCD_7	0.282525	0.000042	0.0007	0.00002	0.0193	0.0007	1.467181	0.000047	1.886990	0.000110	8.8	-9.2	
BCD_8	0.282543	0.000055	0.0018	0.00002	0.0422	0.0008	1.467255	0.000077	1.886890	0.000190	11.2	-8.6	
BCD_10	0.282561	0.000060	0.0046	0.00068	0.1280	0.0190	1.467255	0.000077	1.886830	0.000170	8.0	-7.9	
BCD_11	0.282476	0.000047	0.0012	0.00002	0.0298	0.0007	1.467082	0.000065	1.887230	0.000210	8.1	-10.9	
BCD_12	0.282530	0.000046	0.0009	0.00002	0.0215	0.0005	1.467211	0.000055	1.886980	0.000160	7.9	-9.0	
Post-PST Felsic Lava													**-10.5**
SIT1_1	0.282481	0.000044	0.0019	0.00022	0.0490	0.0062	1.467198	0.000055	1.886869	0.000098	10.8	-10.8	
SIT1_2	0.282451	0.000034	0.0009	0.00002	0.0206	0.0005	1.467173	0.000036	1.887110	0.000110	9.8	-11.8	

Appendix H: Zircon Hafnium Isotope Analyses, Southern Black Mountains Volcanic Center

	^{176}Hf/^{177}Hf	2SE	^{176}Lu/^{177}Hf	2SE	^{176}Yb/^{177}Hf	2SE	^{178}Hf/^{177}Hf	2SE	^{180}Hf/^{177}Hf	2SE	Total Hf (V)	εHf[a]	Average εHf
SIT1_3	0.282481	0.000034	0.0007	0.00002	0.0163	0.0005	1.467219	0.000038	1.887110	0.000170	8.3	-10.8	
SIT1_4	0.282484	0.000029	0.0011	0.00009	0.0272	0.0022	1.467195	0.000036	1.886940	0.000110	9.3	-10.6	
SIT1_5	0.282521	0.000035	0.0005	0.00001	0.0116	0.0002	1.467188	0.000037	1.886959	0.000097	9.0	-9.3	
SIT1_6	0.282504	0.000038	0.0012	0.00004	0.0306	0.0010	1.467204	0.000044	1.887017	0.000096	8.0	-9.9	
SIT1_7	0.282489	0.000032	0.0009	0.00001	0.0224	0.0001	1.467183	0.000036	1.886949	0.000090	8.9	-10.5	
SIT1_8	0.282481	0.000036	0.0011	0.00005	0.0256	0.0009	1.467174	0.000036	1.887045	0.000079	9.4	-10.8	
SIT1_9	0.282465	0.000032	0.0007	0.00001	0.0158	0.0003	1.467137	0.000043	1.886990	0.000094	8.7	-11.3	
SIT1_10	0.282518	0.000031	0.0007	0.00002	0.0167	0.0005	1.467203	0.000033	1.886847	0.000096	8.8	-9.4	
SIT1_11	0.282505	0.000033	0.0006	0.00001	0.0143	0.0002	1.467158	0.000042	1.886924	0.000097	8.6	-9.9	
SIT1_12	0.282512	0.000029	0.0008	0.00001	0.0205	0.0003	1.467199	0.000037	1.887036	0.000093	8.6	-9.7	
SIT1_13	0.282458	0.000042	0.0012	0.00002	0.0258	0.0004	1.467215	0.000050	1.886980	0.000140	11.4	-11.6	
Post-PST Felsic Lava Enclave													**-10.2**
SIT1B_1	0.282440	0.000024	0.0013	0.00004	0.0290	0.0008	1.467227	0.000035	1.886986	0.000094	10.7	-12.2	
SIT1B_2	0.282534	0.000030	0.0006	0.00001	0.0139	0.0003	1.467189	0.000053	1.886990	0.000120	8.9	-8.9	
SIT1B_3	0.282517	0.000040	0.0013	0.00016	0.0322	0.0040	1.467220	0.000033	1.887010	0.000093	8.9	-9.5	
SIT1B_4	0.282528	0.000025	0.0007	0.00001	0.0176	0.0002	1.467212	0.000039	1.886948	0.000083	8.5	-9.1	
SIT1B_8	0.282512	0.000038	0.0012	0.00007	0.0300	0.0018	1.467231	0.000050	1.886910	0.000130	7.3	-9.7	
SIT1B_9	0.282477	0.000037	0.0006	0.00001	0.0139	0.0002	1.467202	0.000048	1.887126	0.000098	9.3	-10.9	
SIT1B_10	0.282502	0.000030	0.0006	0.00001	0.0137	0.0003	1.467172	0.000047	1.887112	0.000098	8.9	-10.0	
SIT1B_11	0.282437	0.000030	0.0009	0.00003	0.0215	0.0009	1.467187	0.000042	1.887008	0.000095	8.4	-12.3	
SIT1B_12	0.282449	0.000030	0.0007	0.00001	0.0168	0.0004	1.467143	0.000044	1.886950	0.000110	9.7	-11.9	
SIT1b_13	0.282542	0.000029	0.0006	0.00000	0.0139	0.0001	1.467180	0.000035	1.886950	0.000110	7.6	-8.6	
SIT1b_14	0.282496	0.000041	0.0005	0.00000	0.0112	0.0001	1.467208	0.000051	1.887050	0.000110	7.8	-10.2	
SIT1b_15	0.282522	0.000035	0.0008	0.00002	0.0180	0.0005	1.467228	0.000048	1.886980	0.000120	7.7	-9.3	
SIT1b_16	0.282506	0.000040	0.0006	0.00001	0.0133	0.0002	1.467119	0.000041	1.887010	0.000100	7.3	-9.9	
SIT1b_17	0.282498	0.000052	0.0010	0.00002	0.0242	0.0004	1.467161	0.000048	1.887140	0.000190	8.2	-10.2	
Post-PST Intermediate Lava													**-10.0**
SIT2_1	0.282506	0.000056	0.0016	0.00007	0.0352	0.0019	1.467141	0.000053	1.886870	0.000140	8.1	-9.9	
SIT2_2	0.282476	0.000030	0.0016	0.00014	0.0365	0.0037	1.467172	0.000048	1.886940	0.000110	9.2	-10.9	
SIT2_3	0.282477	0.000039	0.0009	0.00003	0.0161	0.0005	1.467146	0.000053	1.886980	0.000110	9.5	-10.9	
SIT2_4	0.282415	0.000033	0.0019	0.00012	0.0407	0.0037	1.467178	0.000053	1.886910	0.000110	8.2	-13.1	
SIT2_5	0.282516	0.000039	0.0023	0.00040	0.0570	0.0110	1.467181	0.000051	1.886930	0.000170	7.0	-9.5	
SIT2_6	0.282551	0.000045	0.0024	0.00023	0.0619	0.0061	1.467245	0.000056	1.886870	0.000140	6.8	-8.3	
SIT2_7	0.282474	0.000041	0.0010	0.00001	0.0227	0.0004	1.467172	0.000046	1.887030	0.000140	8.8	-11.0	
SIT2_8	0.282548	0.000036	0.0015	0.00003	0.0357	0.0006	1.467213	0.000047	1.887050	0.000130	7.6	-8.4	
SIT2_9	0.282614	0.000048	0.0039	0.00058	0.1000	0.0160	1.467255	0.000065	1.886930	0.000110	8.0	-6.0	
SIT2_10	0.282468	0.000041	0.0012	0.00007	0.0297	0.0018	1.467158	0.000057	1.886900	0.000140	8.8	-11.2	
SIT2_11	0.282541	0.000044	0.0018	0.00013	0.0450	0.0036	1.467275	0.000054	1.886910	0.000130	7.0	-8.6	
SIT2_12	0.282495	0.000041	0.0015	0.00008	0.0382	0.0021	1.467205	0.000036	1.886870	0.000130	8.1	-10.3	
SIT2_13	0.282493	0.000045	0.0026	0.00025	0.0658	0.0064	1.467177	0.000053	1.886850	0.000120	6.2	-10.3	
SIT2_14	0.282477	0.000046	0.0009	0.00003	0.0196	0.0009	1.467145	0.000057	1.886900	0.000150	7.9	-10.9	
Total													

[a] Reported εHf values are calculated using the present day CHUR values of Bouvier et al. (2007) ^{176}Hf/^{177}Hf = 0.282785

[b] Magnitude of ^{176}Lu and ^{176}Yb, expressed in εHf units

Appendix H: Zircon Hafnium Isotope Analyses, Southern Black Mountains Volcanic Center

	2SD	n	Number of outliers	interf.corr εHf[b]
Pre-PST Trachyte - Alcyone	**1.9**	**11**	**0**	
SCM34_1				1418
SCM34_2				339
SCM34_3				1013
SCM34_4				377
SCM34_5				883
SCM34_8				465
SCM34_9				342
SCM34_10				334
SCM34_11				428
SCM34_14				509
SCM34_15				338
Pre-PST Trachyte - Gold Road	**2.4**	**11**	**2**	
SCM41_1				917
SCM41_2				473
SCM41_3				474
SCM41_4				823
SCM41_5				1281
SCM41_8				3393
SCM41_9				445
SCM41_10				557
SCM41_11				312
SCM41_12				1224
SCM41_13				323
Cook Canyon	**3.2**	**9**	**0**	
7A_1				1087
7A_4				757
7B_1				438
7B_2				778
7B_3				860
7B_4				527
7B_5				520
7B_7				379
7B_9				611
PST - Rhyolite	**1.8**	**20**	**1**	
3B_1				1371
3B_2				5184
3B_3				3627
3B_4				1167
3B_5				1554
3B_7				1031
3B_8				769
3B_9				987
3B_10				870
3B_12				883
MLPT2H_1				832
MLPT2H_2				549
MLPT2H_3				768
MLPT2H_4				1080
MLPT2H_6				1180
2H_7				754
2H_8				949
2H_9				875
2H_10				890
2H_11				959
PST - Trachyte	**1.4**	**13**	**2**	

	2SD	n	Number of outliers	interf.corr εHf[b]
MLPT_5D_2				1009
MLPT_5D_3				568
MLPT_5D_4				1859
MLPT_5D_5				2623
MLPT5D_6				1048
MLPT5D_7				1336
MLPT5D_8				1562
MLPT5D_9				824
MLPT5D_10				1474
MLPT5D_11				1025
MLPT5D_12				488
MLPT5D_14				863
MLPT5D_15				1690
Moss Porphyry	**2.9**	**26**	**4**	
SCM6-1				554
SCM6_2				1148
SCM6_5				587
SCM6_6				480
SCM6_7				488
SCM6_10				455
MP1_1				485
MP1_2				1116
MP1_9				369
MP1_10				2358
MP1_11				384
MP1_15				366
MP1_16				532
MP1_18				574
MP1_19				559
MPe1Ne_1				630
MPe1Ne_2				422
MPe1Ne_5				987
MPe1Ne_7				658
MPe1Ne_11				622
MPe1Ne_12				518
MPe1ne_14				498
MPe1ne_15				481
MPe1ne_16				481
MPe1ne_17				419
MPe1ne_18				429
Moss Enclave	**2.9**	**9**	**2**	
MPe1_1				1822
MPe1_4				1092
MPe1_6				730
MPe1_9				336
MPe1_10				673
MPe1_11				1871
MPe1_14				647
MPe1_15				417
MPe1_16				432
MPe1_18				917
Times Granite	**2.5**	**37**	**0**	
SCM20_1				874
SCM20_2				1974
SCM20_3				1959
SCM20_4				4083

Appendix H: Zircon Hafnium Isotope Analyses, Southern Black Mountains Volcanic Center

	2SD	n	Number of outliers	interf.corr εHf[b]
SCM20_5				4325
SCM20_6				1775
SCM20_7				970
SCM20_8				3598
SCM20_9				2926
SCM20_10				1069
SCM20_12				2954
SCM20_13				1930
TIP1_1				628
TIP1_2				1336
TIP1_3				753
TIP1_4				484
TIP1_5				964
TIP1_6				470
TIP1_8				2135
TIP1_10				3666
TIP1_11				890
TIP1_12				801
TIP1_14				1831
TIP1_15				367
TIP1_16				1803
SCM20-14				695
SCM20-16				3085
SCM20-17				755
SCM37_1				2461
SCM37_3				1108
SCM37_4				797
SCM37_5				3976
SCM37_7				1786
SCM37_8				4925
SCM37_13				1020
SCM37_15				2038
SCM37_16				1574
Times Enclave	**3.0**	**12**	**0**	
SCM27B_1				1257
SCM27B_2				1118
SCM27B_3				830
SCM27B_4				1304
SCM27B_5				1010
SCM27B_6				799
SCM27B_7				704
SCM27B_8				3205
SCM27B_9				753
SCM27B_10				730
SCM27B_11				1449
SCM27B_12				881
Feldspar Porphyry Dike	**3.2**	**39**	**1**	
SCMIB_1				1168
SCM1B_2				622
SCM1B_3				2053
SCM1B_4				1154
SCM1B_5				778
SCM1B_7				1125
SCM1B_8				656
SCM1B_9				1248
SCM1b_10				2197

	2SD	n	Number of outliers	interf.corr εHf[b]
SCM1b_11				1629
SCM1b-13				678
SCM1b-14				629
SCM1b-16				999
SCM1b-17				554
SCM13_2				1675
SCM13_3				1014
SCM13_4				858
SCM13_5				3789
SCM13_6				2678
SCM13_7				770
SCM13_8				2058
SCM13_11				920
SCM13_12				1477
SCM13_13				976
SCM13_14				807
SCM13_15				1860
SCM13_16				1392
SCM30_9				673
SCM30_10				2601
SCM30_11				2759
SCM30_12				688
SCM30_14				1096
SCM30_15				860
SCM30_16				906
SCM30_19				1471
SCM30_20				935
SCM30_21				1043
SCM30_22				789
SCM30_23				633
Felsic Porphyry Dike	**2.5**	**22**	**0**	
SCM5A_1				1152
SCM5A_4				1359
SCM5A_5				1858
SCM5A_6				1330
SCM5A_7				1448
SCM5A_8				1641
SCM5A_9				1622
SCM5a__11				1237
SCM5a_12				1184
SCM5a_13				1620
SCM5a_14				1366
SCM5a_15				1340
BCD_1				1138
BCD_2				1224
BCD_3				1507
BCD_4				1608
BCD_5				4061
BCD_7				715
BCD_8				1573
BCD_10				4737
BCD_11				1107
BCD_12				801
Post-PST Felsic Lava	**1.6**	**13**	**0**	
SIT1_1				1819
SIT1_2				765

Appendix H: Zircon Hafnium Isotope Analyses, Southern Black Mountains Volcanic Center

	2SD	**n**	**Number of outliers**	**interf.corr εHf[b]**
SIT1_3				606
SIT1_4				1012
SIT1_5				430
SIT1_6				1138
SIT1_7				833
SIT1_8				953
SIT1_9				588
SIT1_10				620
SIT1_11				532
SIT1_12				762
SIT1_13				962
Post-PST Felsic Lava Enclave	**2.4**	**14**	**0**	
SIT1B_1				1083
SIT1B_2				517
SIT1B_3				1197
SIT1B_4				654
SIT1B_8				1114
SIT1B_9				517
SIT1B_10				511
SIT1B_11				798
SIT1B_12				626
SIT1b_13				519
SIT1b_14				416
SIT1b_15				672
SIT1b_16				494
SIT1b_17				901
Post-PST Intermediate Lava	**3.4**	**14**	**0**	
SIT2_1				1315
SIT2_2				1360
SIT2_3				604
SIT2_4				1520
SIT2_5				2118
SIT2_6				2298
SIT2_7				844
SIT2_8				1328
SIT2_9				3711
SIT2_10				1105
SIT2_11				1671
SIT2_12				1419
SIT2_13				2443
SIT2_14				732
Total				

[a] Reported εHf values are calculated using the present day CHUR values of Bouvier et al. (2007) ^{176}Hf/^{177}Hf = 0.282785

[b] Magnitude of ^{176}Lu and ^{176}Yb, expressed in εHf units

Appendix I: Paired Zircon O and Hf Isotope Analyses, Southern Black Mountains Volcanic Center

O Analysis Number	δ18O	Hf Analysis Number	εHf
SCM-34-19	6.76	SCM-34-2	-13.9
SCM-34-20	6.56	SCM-34-1	-12.3
SCM-34-18	6.31	SCM-34-3	-13.4
SCM-34-11	7.17	SCM-34-5	-14.5
SCM-41-1	5.91	SCM-41-1	-10.6
SCM-41-3	7.87	SCM-41-5	-29.7
SCM-41-6	5.7	SCM-41-9	-10.5
SCM-41-7	6.35	SCM-41-8	-13.3
SCM-41-10	5.69	SCM-41-10	-13.6
SCM-41-11	6.38	SCM-41-13	-11.2
SCM-41-12	6.57	SCM-41-12	-12.1
MLPT-7A-10	6.53	MLPT-7A-1	-11.6
MLPT-7A-3	6.2	MLPT-7A-4	-11.6
MLPT-7B-20	6.25	MLPT-7B-1	-11.4
MLPT-7B-18	6.5	MLPT-7B-2	-13.3
MLPT-7B-15	6.11	MLPT-7B-4	-12.1
MLPT-7B-9	6.35	MLPT-7B-7	-11.8
MLPT-7B-1	6.36	MLPT-7B-9	-10
MLPT-5D-19	6.77	MLPT-5D-3	-15.7
MLPT-5D-18	7.09	MLPT-5D-2	-13.3
MLPT-5D-16	6.8	MLPT-5D-5	-14
MLPT-5D-15	7.01	MLPT-5D-6	-13.7
MLPT-5D-11	6.89	MLPT-5D-9	-14.1
MLPT-5D-10	6.72	MLPT-5D-10	-13.8
MLPT-5D-9	6.06	MLPT-5D-14	-13.8
MLPT-5D-8	6.71	MLPT-5D-15	-13.5
MLPT-2H-23	6.89	MLPT-2H-4	-12.9
MLPT-2H-14	6.31	MLPT-2H-6	-14.5
MLPT-2H-7	6.74	MLPT-2H-9	-13.4
MLPT-3B-13	4.54	MLPT-3B-4	-14.1
MLPT-3B-2	6.54	MLPT-3B-9	-13.7
MPe-1non-21	6.15	MPe-1non-7	-12.5
MPe-1non-17	6.45	MPe-1non-5	-13.2
MPe-1non-16	6.23	MPe-1non-17	-12.8
MPe-1non-12	6.5	MPe-1non-18	-11
MPe-1non-2	6.57	MPe-1non-2	-11.8
MPe-1non-1	6.46	MPe-1non-1	-10
MP1-16	6.18	MP1-11	-10.5
MP1-13	6.09	MP1-9	-10.5
MP1-1	7.13	MP1-1	-15.2
SCM-6-19	6.37	SCM-6-10	-30.1
SCM-6-15	5.91	SCM-6-9	-12.7
SCM-6-12	6.87	SCM-6-7	-33.4
SCM-6-1	6.22	SCM-6-1	-13.3
SCM-37-1	5.82	SCM-37-13	-11.6
SCM-37-11	5.63	SCM-37-15	-9.9
SCM-37-14	4.92	SCM-37-8	-8.6
SCM-37-18	4.74	SCM-37-5	-8.8
SCM-37-20	5.19	SCM-37-4	-12.6
SCM-20-28	6.07	SCM-20-12	-10.5
SCM-20-20	6.45	SCM-20-10	-11.4
SCM-20-19	6.52	SCM-20-9	-9.9
SCM-20-16	6.01	SCM-20-8	-10.2
SCM-20-15	6.79	SCM-20-7	-12
SCM-20-14	6.04	SCM-20-6	-11.7
SCM-20-7	6.4	SCM-20-4	-8.5
SCM-20-4	5.91	SCM-20-3	-11.5
SCM-20-3	5.95	SCM-20-2	-9.8
SCM-20-1	6.25	SCM-20-1.b	-10.4
TIP-1-28	5.89	TIP-1-12	-10.6
TIP-1-27	6.16	TIP-1-10	-12.1
TIP-1-13	6.12	TIP-1-8	-12.1
TIP-1-5	6.16	TIP-1-6	-14.4
TIP-1-3	5.54	TIP-1-5	-12.3
TIP-1-1	5.79	TIP-1-3	-10
SCM-27b-2	5.98	SCM-27b-2	-10.6
SCM-27b-11	6.3	SCM-27b-6	-13.8
SCM-27b-12	6.74	SCM-27b-5	-11.1
SCM-27b-17	6.12	SCM-27b-9	-10.2
SCM-27b-18	6.33	SCM-27b-10	-8.9
SCM-13-9	5.9	SCM-13-11	-9.5
SCM-13-12	5.64	SCM-13-8	-11.5
SCM-13-13	5.77	SCM-13-7	-9.4
SCM-13-14	5.44	SCM-13-6	-10.6
SCM-13-18	5.6	SCM-13-2	-10
SCM-30-16	5.75	SCM-30-19	-9.8
SCM-30-18	5.86	SCM-30-21	-11.8
SCM1b-21	6.08	SCM1b-10	-9.8
SCM1b-18	6.53	SCM1b-8	-14.3
SCM1b-3	5.8	SCM1b-4	-10.9

Appendix I: Paired Zircon O and Hf Isotope Analyses, Southern Black Mountains Volcanic Center

O Analysis Number	**δ18O**	**Hf Analysis Number**	**εHf**
SCM1b-2	6.33	SCM1b-3	-11.7
SCM1b-1	5.85	SCM1b-1	-8.8
SIT-1-10	6.09	SIT-1-8	-10.8
SIT-1-9	6.14	SIT-1-6	-9.9
SIT-1-8	5.72	SIT-1-4	-10.6
SIT-1-2	6.21	SIT-1-3	-10.8
SIT-1-1	6.13	SIT-1-2	-11.8
SIT-1b-2	5.69	SIT-1b-1	-12.2
SIT-1b-3	6.15	SIT-1b-3	-9.5
SIT-1b-5	6.08	SIT-1b-4	-9.1
SIT-1b-10	6.28	SIT-1b-16	-9.9
SIT-1b-12	5.92	SIT-1b-17	-10.2
SIT-1b-13	6.21	SIT-1b-8	-9.7
SIT-1b-18	6.07	SIT-1b-12	-11.9
SIT-1b-17	6.44	SIT-1b-11	-12.3
BCD-1	6.09	BCD-12	-9
BCD-4	5.39	BCD-10	-7.9
BCD-9	5.6	BCD-7	-9.2
BCD-11	5.35	BCD-5	-11.3
BCD-13	4.64	BCD-4	-10.1
BCD-14	5.04	BCD-3	-9.1
BCD-19	5.12	BCD-2	-11.5
BCD-20	5.24	BCD-1	-9.2
SCM-5a-17	5.92	SCM-5a-8	-9.9
SCM-5a-14	5.18	SCM-5a-7	-9.1
SCM-5a-12	5.67	SCM-5a-6	-8.2
SCM-5a-11	6.06	SCM-5a-5	-12.9
SCM-5a-9	5.89	SCM-5a-4	-9.1
SIT-2-10	6.37	SIT-2-8	-8.4
SIT-2-11	5.78	SIT-2-9	-6
SIT-2-12	6.31	SIT-2-10	-11.2
SIT-2-13	6.08	SIT-2-11	-8.6
SIT-2-14	5.82	SIT-2-12	-10.3
SIT-2-15	5.67	SIT-2-13	-10.3
SIT-2-16	5.99	SIT-2-14	-10.9

Appendix J: Whole Rock Elemental Geochemistry, Camaquã and Itajaí Igneous Units

	Plutons							
	Camaquã Region							Itajaí Region
Sample	**CAM-1**	**CAM-2**	**CAM-4**	**CAM-9**	**CAM-11**	**CAM-15**	**CAM-19a**	**ITA-4a**
Latitude	*30.30036 °S*	*30.27808 °S*	*30.42140°S*	*30.95361 °S*	*30.83082°S*	*30.79184 °S*	*30.52914 °S*	*27.10233°S*
Longitude	*53.68418 °W*	*53.68518 °W*	*53.84789 °W*	*54.55153 °W*	*53.90015 °W*	*53.88954 °W*	*53.44581 °W*	*49.46939 °W*
Unnormalized Major Element[1]								
SiO_2	76.68	72.57	72.29	62.51	70.18	70.73	76.08	72.26
Al_2O_3	12.2	13.6	13.19	14.29	16.15	14.73	12.58	13.27
Fe_2O_3	1.78	2.25	2.15	5.99	2.16	3.07	0.89	2.94
MnO	0.022	0.033	0.04	0.224	0.028	0.042	0.011	0.063
MgO	0.15	0.45	0.26	0.9	0.48	0.64	0.05	0.15
CaO	0.57	1.63	0.77	1.55	1.76	1.77	0.64	0.77
Na_2O	3.6	3.82	3.77	4.81	5.12	4.4	3.16	4.29
K_2O	5.08	3.96	4.7	4.99	3.7	4.38	5.23	5.35
TiO_2	0.166	0.26	0.204	0.936	0.276	0.365	0.068	0.237
P_2O_5	0.02	0.06	0.04	0.24	0.07	0.08	0.02	0.04
LOI	0.55	0.64	0.67	2.01	1.02	0.72	0.25	0.53
Total	100.8	99.28	98.09	98.44	100.9	100.9	98.97	99.9
Normalized Major Element								
SiO_2	76.48	73.58	74.21	64.82	70.23	70.58	77.06	72.72
Al_2O_3	12.17	13.79	13.54	14.82	16.16	14.70	12.74	13.35
Fe_2O_3	1.78	2.28	2.21	6.21	2.16	3.06	0.90	2.96
MnO	0.02	0.03	0.04	0.23	0.03	0.04	0.01	0.06
MgO	0.15	0.46	0.27	0.93	0.48	0.64	0.05	0.15
CaO	0.57	1.65	0.79	1.61	1.76	1.77	0.65	0.77
Na_2O	3.59	3.87	3.87	4.99	5.12	4.39	3.20	4.32
K_2O	5.07	4.01	4.82	5.17	3.70	4.37	5.30	5.38
TiO_2	0.17	0.26	0.21	0.97	0.28	0.36	0.07	0.24
P_2O_5	0.02	0.06	0.04	0.25	0.07	0.08	0.02	0.04
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Ni[2]	5	8	4	5	8	9	3	3
Cr[3]	4.4	10.3	5.9	4	7.9	6.7	5.5	4
Sc[3]	16.5	2.11	2.89	1.21	3.74	0.08	35.8	< 0.01
V[1]	6	18	8	27	15	21	< 5	6
Ba[1]	299	1472	821	1689	1404	716	266	467
Rb[4]	229	73	123	52	97	174	92	108
Sr[1]	48	260	96	205	918	521	88	54
Zr[4]	165	176	214	523	162	328	60	570
Y[1]	49	17	36	41	12	31	9	60
Nb[4]	21.1	11.7	12.6	27	14.1	34.6	5.6	37
Ga[4]	20	16	16	21	20	24	12	23
Cu[2]	6	4	4	5	9	4	2	3
Zn[2]	39	39	39	128	33	54	10	89
Pb[2]	41	25	19	10	14	15	39	23
La[4]	56	54.2	66	93.5	29.1	69.9	8.67	152
Ce[4]	106	93.7	122	189	50.8	123	27.8	303
Th[4]	25.5	5.67	12	5.03	8.94	23.5	8.78	15.2
Nd[4]	36.7	28.8	43	73	18.5	45.9	9.08	112

	Plutons							
	Camaquã Region							**Itajaí Region**
Sample	**CAM-1**	**CAM-2**	**CAM-4**	**CAM-9**	**CAM-11**	**CAM-15**	**CAM-19a**	**ITA-4a**
U[4]	4.24	1.19	2.54	0.8	3.32	5.82	1	2.77
Nb+Y	70.1	28.7	48.6	68	26.1	65.6	14.6	97
Rare Earth Elements[4]								
La	56	54.2	66	93.5	29.1	69.9	8.67	152
Ce	106	93.7	122	189	50.8	123	27.8	303
Pr	11	8.79	12.6	19.7	5.27	13.2	2.52	31.9
Nd	36.7	28.8	43	73	18.5	45.9	9.08	112
(Pm)								
Sm	7.44	4.52	7.61	12.2	3.23	8.3	2.05	19.3
Eu	0.422	1.12	0.793	3.2	0.699	0.896	0.501	0.67
Gd	7.39	3.89	6.79	9.79	2.5	6.96	1.51	15.4
Tb	1.37	0.57	1.05	1.47	0.39	1.11	0.24	2.3
Dy	8.46	3.09	6.02	7.64	1.97	5.65	1.3	12.4
Ho	1.78	0.6	1.21	1.48	0.35	1.01	0.26	2.38
Er	5.57	1.69	3.51	4.29	0.99	2.88	0.82	6.74
Tm	0.915	0.254	0.535	0.64	0.142	0.408	0.133	1.01
Yb	6.21	1.81	3.63	4.14	0.93	2.48	1	6.96
Lu	0.935	0.307	0.582	0.669	0.145	0.377	0.181	1.09
Fe#	0.9	0.8	0.9	0.9	0.8	0.8	0.9	0.9
Agpaitic Index	0.9	0.8	0.9	0.9	0.8	0.8	0.9	1.0
A/CNK	1.0	1.0	1.0	0.9	1.0	1.0	1.0	0.9
Total Mol	1.78	1.78	1.78	1.79	1.81	1.79	1.78	1.79
M	1.42	1.45	1.39	1.87	1.50	1.57	1.32	1.58
Zircon saturation temperature, °C[5]	786	790	812	858	780	838	712	892
Zircon saturation temperature, °C[6]	739	743	771	807	729	794	656	858

Appendix J: Whole Rock Elemental Geochemistry, Camaquã and Itajaí Igneous Units

	Volcanics						
	Camaquã Region						Itajaí Region
Sample	**LRA-303**	**RAM-01A**	**CAM-8**	**CAM-10b**	**CAM-16**	**CAM-18**	**ITA-8**
Latitude	/	*30.36717 ° S*	*30.98762 ° S*	*30.95361 ° S*	*30.76781 ° S*	*30.47742 ° S*	*27.05215 ° S*
Longitude	/	*53.94772 ° W*	*54.59605 ° W*	*54.55153 ° W*	*53.81007 ° W*	*53.58580 ° W*	*49.35892 ° W*
Unnormalized Major Element[1]							
SiO_2	76.46	75.51	72.72	70.82	55.12	75.89	66.99
Al_2O_3	12.41	11.37	11.8	13.06	18.6	12.26	14.83
Fe_2O_3	2.03	2.48	6.28	4.28	6.12	2.52	3.82
MnO	0.015	0.051	0.099	0.184	0.1	0.024	0.112
MgO	0.15	0.07	0.09	0.24	1.94	0.15	0.21
CaO	0.12	0.04	0.46	0.39	4.92	0.41	1.27
Na_2O	2.97	2.98	3.65	4.24	4.67	2.97	4.79
K_2O	5.26	5.46	5.19	5.2	2.91	5.35	4.27
TiO_2	0.132	0.17	0.322	0.257	0.934	0.135	0.239
P_2O_5	0.02	0.01	0.04	0.02	0.4	0.01	0.04
LOI	1.02	0.88	0.16	1.23	2.36	1.07	2.1
Total	100.6	99.03	100.8	99.91	98.07	100.8	98.68
Normalized Major Element							
SiO_2	76.79	76.94	72.25	71.76	57.59	76.10	69.37
Al_2O_3	12.46	11.59	11.72	13.23	19.43	12.29	15.36
Fe_2O_3	2.04	2.53	6.24	4.34	6.39	2.53	3.96
MnO	0.02	0.05	0.10	0.19	0.10	0.02	0.12
MgO	0.15	0.07	0.09	0.24	2.03	0.15	0.22
CaO	0.12	0.04	0.46	0.40	5.14	0.41	1.32
Na_2O	2.98	3.04	3.63	4.30	4.88	2.98	4.96
K_2O	5.28	5.56	5.16	5.27	3.04	5.37	4.42
TiO_2	0.13	0.17	0.32	0.26	0.98	0.14	0.25
P_2O_5	0.02	0.01	0.04	0.02	0.42	0.01	0.04
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Ni[2]	4	4	9	4	12	4	3
Cr[3]	34.7	33.4	66	32.8	29.5	20.1	34.2
Sc[3]	2	0.62	6.41	3.38	13.3	2.1	7.31
V[1]	< 5	7	8	< 5	128	< 5	< 5
Ba[1]	423	88	209	35	1730	355	3744
Rb[4]	160	131	106	100	69	172	64
Sr[1]	59	17	23	5	1604	52	119
Zr[4]	263	506	742	1170	177	304	541
Y[1]	60	72	67	69	15	59	39
Nb[4]	22	30.3	35.3	46.4	9.7	23.6	27.7
Ga[4]	19	24	22	24	24	20	22
Cu[2]	8	24	251	65	119	77	81
Zn[2]	45	111	63	126	66	45	84
Pb[2]	17	14	19	13	24	25	27
La[4]	126	103	149	210	46.7	113	151
Ce[4]	157	216	293	420	98	179	276
Th[4]	14	11.7	14.7	12.4	10.2	13.6	8.6
Nd[4]	114	86.1	106	148	41.2	92.3	88.4

Appendix J: Whole Rock Elemental Geochemistry, Camaquã and Itajaí Igneous Units

	Volcanics						
	Camaquã Region						**Itajaí Region**
Sample	**LRA-303**	**RAM-01A**	**CAM-8**	**CAM-10b**	**CAM-16**	**CAM-18**	**ITA-8**
U^4	1.09	2.25	1.53	1.62	3.66	1.12	1.49
Nb+Y	82	102.3	102.3	115.4	24.7	82.6	66.7
Rare Earth Elements^4							
La	126	103	149	210	46.7	113	151
Ce	157	216	293	420	98	179	276
Pr	30.3	23.1	30.5	42.6	10.5	24.6	26.3
Nd	114	86.1	106	148	41.2	92.3	88.4
(Pm)							
Sm	20.1	17	17.5	22.4	7.43	16.5	12.4
Eu	1.03	0.48	1.02	1	2.12	0.878	2.54
Gd	15.9	14.8	13.5	16.5	5.28	14.1	9.21
Tb	2.46	2.4	2.15	2.42	0.68	2.16	1.33
Dy	12.6	13.8	12.4	13.2	3.41	11.5	7.45
Ho	2.28	2.69	2.54	2.54	0.62	2.14	1.46
Er	6.26	8.13	7.57	7.65	1.67	5.85	4.48
Tm	0.899	1.21	1.13	1.15	0.221	0.821	0.673
Yb	5.8	7.74	7.77	7.46	1.4	5.24	4.54
Lu	0.876	1.25	1.18	1.15	0.207	0.783	0.726
Fe#	0.9	1.0	1.0	0.9	0.7	0.9	0.9
Agpaitic Index	0.9	1.0	1.0	1.0	0.6	0.9	0.8
A/CNK	1.1	1.0	0.9	1.0	0.9	1.1	1.0
Total Mol	1.77	1.76	1.76	1.78	1.80	1.76	1.80
M	1.20	1.32	1.54	1.52	2.00	1.30	1.55
Zircon saturation temperature, °C^5	847	903	924	980	751	853	889
Zircon saturation temperature, °C^6	818	883	900	969	682	822	856

[1] *FUS-ICP*

[2] *TD-ICP*

[3] *INAA*

[4] *FUS-MS*

[5] *Watson & Harrison, 198*

[6] *Boehnke et al., 2013*

Appendix K: LA-ICPMS U-Pb Zircon Isotopic Data, Camaquã and Itajaí Igneous Units

	Isotope Ratios								
Sample	**Pb207/Pb206**	**1 sigma**	**Pb207/U235**	**1 sigma**	**Pb206/U238**	**1 sigma**	**Rho***	**Pb208/Th232**	**1 sigma**
CAM-1 (n = 5)									
028_2011Nov2_Mt2_CAM1_Z46	0.07341	0.00534	0.97752	0.13728	0.08968	0.00204	0.16197685	0.03388	0.00179
002_2012Dec4_Mt1_CAM1_Z001_011-003	0.0875	0.01577	0.75785	0.21751	0.08259	0.00438	0.184778174	0.03063	0.00295
002_2012Dec4_Mt1_CAM1_Z001_011-007	0.09264	0.01192	1.10837	0.26761	0.08148	0.00317	0.16113529	0.03036	0.00271
002_2012Dec4_Mt1_CAM1_Z001_011-011	0.06519	0.00765	0.88503	0.20443	0.08824	0.00311	0.152583739	0.02858	0.00278
002_2012Dec6_Mt1_CAM1_Z047_053-005	0.06243	0.00727	0.76359	0.16567	0.08714	0.00281	0.148629537	0.02739	0.00235
CAM-2 (n = 43)									
014_Mt2_CAM2_Z2	0.06199	0.00532	0.72035	0.13546	0.08286	0.00206	0.132207101	0.02358	0.00166
015_Mt2_CAM2_Z3	0.05971	0.00698	0.83353	0.19015	0.09011	0.00283	0.137669695	0.02661	0.00219
017_Mt2_CAM2_Z5	0.05556	0.0062	0.65346	0.14419	0.0784	0.00236	0.136420553	0.02271	0.00185
018_Mt2_CAM2_Z6	0.05961	0.01584	0.64044	0.26721	0.09767	0.00594	0.145764242	0.02147	0.003
020_Mt2_CAM2_Z8	0.06663	0.00781	0.7701	0.18058	0.09595	0.0031	0.137782541	0.03095	0.00271
021_Mt2_CAM2_Z9	0.06357	0.01673	0.57852	0.23085	0.0944	0.00559	0.14839809	0.03512	0.00467
022_Mt2_CAM2_Z10	0.04314	0.01278	0.98985	0.51027	0.09373	0.00518	0.107206346	0.03064	0.00405
029_2012Apr21_Mt2_CAM2_Z16	0.05288	0.01312	0.80129	0.3396	0.09264	0.00522	0.132951732	0.03457	0.00447
015_2012Apr20_Mt2_CAM2_Z20	0.06961	0.00678	0.83546	0.16528	0.08789	0.00236	0.13573064	0.03263	0.00253
016_2012Apr20_Mt2_CAM2_Z21	0.09082	0.01096	1.22282	0.29099	0.09355	0.00323	0.14509191	0.02866	0.00249
017_2012Apr20_Mt2_CAM2_Z22	0.05821	0.00683	0.8348	0.18746	0.09175	0.00277	0.134445888	0.03305	0.00293
018_2012Apr20_Mt2_CAM2_Z23	0.10787	0.01782	0.81493	0.22895	0.084	0.00532	0.225430152	0.0474	0.00519
019_2012Apr20_Mt2_CAM2_Z24	0.06284	0.00729	0.7375	0.16542	0.09248	0.00283	0.136430862	0.03034	0.00264
020_2012Apr20_Mt2_CAM2_Z25	0.06694	0.00756	0.7889	0.17621	0.09245	0.00279	0.135110373	0.03025	0.00264
021_2012Apr20_Mt2_CAM2_Z26	0.05177	0.01024	0.70711	0.22769	0.09941	0.0042	0.131208581	0.03295	0.00349
028_2012Apr20_Mt2_CAM2_Z30	0.06545	0.0082	0.85659	0.21659	0.09479	0.00305	0.127254138	0.03235	0.00324
032_2012Apr20_Mt2_CAM2_Z34	0.05419	0.01625	1.15416	0.59943	0.0949	0.00536	0.108749213	0.0308	0.00462
033_2012Apr20_Mt2_CAM2_Z345	0.04905	0.0168	0.56763	0.28582	0.09179	0.00606	0.131114276	0.03325	0.00564
002_2012Nov30_Mt1_CAM2_Z2_12-002	0.06023	0.00694	0.80782	0.1352	0.08968	0.00241	0.160568131	0.02649	0.00124
002_2012Nov30_Mt1_CAM2_Z2_12-006	0.06861	0.00942	0.75532	0.14179	0.08083	0.00252	0.166078473	0.02554	0.00158
002_2012Nov30_Mt1_CAM2_Z2_12-007	0.07047	0.01609	0.7869	0.23413	0.08394	0.00382	0.152952605	0.0281	0.00329
002_2012Nov30_Mt1_CAM2_Z2_12-010	0.0613	0.00445	0.71386	0.07709	0.08404	0.00173	0.190622895	0.02687	0.00123
003_2012Nov30_Mt1_CAM2_Z13_22-001	0.09854	0.01529	0.86182	0.21452	0.08292	0.00333	0.161336905	0.02898	0.00305

Appendix K: LA-ICPMS U-Pb Zircon Isotopic Data, Camaquã and Itajaí Igneous Units

	Isotope Ratios								
Sample	**Pb207/Pb206**	**1 sigma**	**Pb207/U235**	**1 sigma**	**Pb206/U238**	**1 sigma**	**Rho***	**Pb208/Th232**	**1 sigma**
003_2012Nov30_Mt1_CAM2_Z13_22-002	0.06216	0.00815	0.66684	0.14881	0.07847	0.0025	0.142766358	0.02356	0.00215
003_2012Nov30_Mt1_CAM2_Z13_22-003	0.08072	0.00995	0.85057	0.18819	0.07651	0.00242	0.14295873	0.01958	0.00181
003_2012Nov30_Mt1_CAM2_Z13_22-004	0.0679	0.01276	0.67751	0.19947	0.08514	0.00388	0.154787613	0.02946	0.00351
003_2012Nov30_Mt1_CAM2_Z13_22-005	0.07232	0.01169	0.7237	0.19452	0.09188	0.00361	0.146177499	0.02969	0.00313
003_2012Nov30_Mt1_CAM2_Z13_22-007	0.0477	0.01554	0.66237	0.30377	0.08683	0.00488	0.122547878	0.02391	0.00389
003_2012Nov30_Mt1_CAM2_Z13_22-008	0.09216	0.01205	1.00952	0.25405	0.08157	0.00282	0.137377109	0.03135	0.00326
004_2012Nov30_Mt1_CAM2_Z23_33-006	0.05793	0.01013	0.65732	0.1881	0.08393	0.00343	0.142812081	0.02566	0.00278
004_2012Nov30_Mt1_CAM2_Z23_33-007	0.05999	0.00933	0.7865	0.21478	0.09274	0.00348	0.137409589	0.02456	0.00251
004_2012Nov30_Mt1_CAM2_Z23_33-009	0.08747	0.01067	1.15843	0.29275	0.08296	0.00262	0.124969905	0.02989	0.00267
004_2012Nov30_Mt1_CAM2_Z23_33-011	0.06305	0.0119	0.71399	0.23488	0.07493	0.00344	0.139556092	0.01603	0.00168
002_2012Dec3_CAM2_Z034_044-001	0.06674	0.00819	0.88941	0.18397	0.09334	0.00263	0.136220651	0.03334	0.00335
002_2012Dec3_CAM2_Z034_044-002	0.08847	0.01532	1.11514	0.31301	0.08907	0.00379	0.151592927	0.03154	0.00383
002_2012Dec3_CAM2_Z034_044-003	0.08917	0.01228	1.08858	0.25308	0.08927	0.00297	0.143104549	0.03439	0.00336
002_2012Dec3_CAM2_Z034_044-004	0.06703	0.01195	0.75909	0.20398	0.08809	0.00329	0.138987253	0.02862	0.00343
002_2012Dec3_CAM2_Z034_044-005	0.06873	0.01111	0.83131	0.21538	0.08851	0.0032	0.139545318	0.02861	0.00319
002_2012Dec3_CAM2_Z034_044-008	0.06233	0.01026	0.91849	0.24907	0.09037	0.00329	0.134253194	0.02864	0.00324
002_2012Dec3_CAM2_Z034_044-009	0.07193	0.01099	1.00033	0.25901	0.09046	0.0031	0.132352416	0.02794	0.00325
002_2012Dec3_CAM2_Z034_044-010	0.06167	0.01011	0.83521	0.22646	0.09535	0.00337	0.130350705	0.02868	0.00356
003_2012Dec3_CAM2_Z045_055-006	0.07512	0.00728	0.99857	0.1628	0.08854	0.00237	0.164184798	0.0345	0.00218
003_2012Dec3_CAM2_Z045_055-007	0.05411	0.00723	0.79295	0.16163	0.09272	0.00294	0.15555993	0.02803	0.00196
CAM-4 (n = 25)									
052_2011Oct26_Mt2_CAM4_Z12	0.06778	0.00637	0.77317	0.13111	0.08325	0.00238	0.168590032	0.02761	0.00184
025_2011Oct27_Mt2_CAM4_Z26	0.06087	0.00448	0.71868	0.09316	0.08836	0.00202	0.176360671	0.02682	0.00135
010_2012June15_CAM4_Mt1_Z10	0.07985	0.00854	0.8119	0.16314	0.08187	0.00263	0.159872233	0.02765	0.00183
018_2012June15_CAM4_Mt1_Z3	0.06862	0.00689	0.86541	0.18838	0.09831	0.00296	0.138318774	0.03181	0.00246
020_2012June15_CAM4_Mt1_Z5	0.07837	0.01007	0.76029	0.19465	0.07639	0.0029	0.148281291	0.02258	0.00204
021_2012June15_CAM4_Mt1_Z6	0.07696	0.01502	0.90213	0.31517	0.07957	0.0043	0.154683272	0.03141	0.00368
022_2012June15_CAM4_Mt1_Z7	0.06391	0.01324	1.08481	0.41653	0.09543	0.00519	0.141641275	0.02907	0.00343
024_2012June15_CAM4_Mt1_Z9	0.08677	0.01554	1.14715	0.40429	0.0815	0.00431	0.150053756	0.03136	0.00323
016_2012June18_CAM4_Mt1_Z12	0.04981	0.00863	0.5189	0.1539	0.09116	0.00395	0.146095833	0.02754	0.00246

Appendix K: LA-ICPMS U-Pb Zircon Isotopic Data, Camaquã and Itajaí Igneous Units

	Isotope Ratios								
Sample	**Pb207/Pb206**	**1 sigma**	**Pb207/U235**	**1 sigma**	**Pb206/U238**	**1 sigma**	**Rho***	**Pb208/Th232**	**1 sigma**
019_2012June18_CAM4_Mt1_Z15	0.0856	0.01265	1.05969	0.31743	0.08732	0.00382	0.146042918	0.02746	0.0027
020_2012June18_CAM4_Mt1_Z16	0.06833	0.00925	0.81399	0.22797	0.08909	0.00339	0.135866413	0.02794	0.00252
021_2012June18_CAM4_Mt1_Z17	0.07446	0.01085	0.85963	0.25562	0.08412	0.00351	0.140321619	0.02892	0.00281
024_2012June18_CAM4_Mt1_Z20	0.05891	0.01015	0.67517	0.2256	0.08851	0.0041	0.13863266	0.02654	0.00292
033_2012June18_CAM4_Mt1_Z23	0.08004	0.01	0.77274	0.15459	0.08445	0.00295	0.174612109	0.02348	0.0017
039_2012June18_CAM4_Mt1_Z29	0.06552	0.40	0.88966	0.17297	0.08738	0.00248	0.145979852	0.02623	0.00172
040_2012June18_CAM4_Mt1_Z30	0.05128	0.46	0.84977	0.20001	0.08976	0.00305	0.144366584	0.02673	0.00195
042_2012June18_CAM4_Mt1_Z32	0.07609	0.01	1.09927	0.29846	0.08985	0.00378	0.154950135	0.03116	0.00256
043_2012June18_CAM4_Mt1_Z33	0.06003	0.01	1.20672	0.42436	0.09156	0.00455	0.141311557	0.02659	0.00274
015_2012June20_CAM4_Mt1_Z36	0.06166	0.00972	0.55126	0.15176	0.08375	0.00353	0.153104887	0.02674	0.00239
016_2012June20_CAM4_Mt1_Z37	0.06934	0.01166	0.85301	0.26215	0.08815	0.00405	0.149498545	0.03258	0.00341
018_2012June20_CAM4_Mt1_Z39	0.06764	0.01028	0.64604	0.18333	0.08876	0.00374	0.148484178	0.02531	0.00262
021_2012June20_CAM4_Mt1_Z42	0.07436	0.01147	0.98233	0.30641	0.07758	0.00335	0.138436147	0.02674	0.00266
022_2012June20_CAM4_Mt1_Z43	0.06367	0.01019	0.85646	0.2721	0.09012	0.00394	0.137611136	0.02809	0.00295
023_2012June20_CAM4_Mt1_Z44	0.07937	0.01376	0.76037	0.25436	0.08843	0.00431	0.145698071	0.02584	0.00283
025_2012June20_CAM4_Mt1_Z46	0.06366	0.00977	0.61039	0.19452	0.08693	0.00366	0.132115738	0.02881	0.00312
CAM-11 (n = 52)									
015_2011Nov4_Mt2_CAM11_Z1	0.05943	0.0033	0.72777	0.07234	0.09659	0.00179	0.18643889	0.02813	0.00125
016_2011Nov4_Mt2_CAM11_Z2	0.06149	0.00293	0.7074	0.06372	0.08943	0.00153	0.189931714	0.02838	0.00109
017_2011Nov4_Mt2_CAM11_Z3	0.05919	0.00273	0.71782	0.06395	0.09555	0.00161	0.189134254	0.03085	0.00113
018_2011Nov4_Mt2_CAM11_Z4	0.05706	0.00312	0.73577	0.07397	0.09806	0.00181	0.183600197	0.03019	0.00126
020_2011Nov4_Mt2_CAM11_Z6	0.06197	0.00371	0.78299	0.08559	0.09703	0.00192	0.181020761	0.02857	0.00136
021_2011Nov4_Mt2_CAM11_Z7	0.05829	0.00399	0.82471	0.1007	0.09583	0.00204	0.174341376	0.02909	0.00159
024_2011Nov4_Mt2_CAM11_Z10	0.06078	0.00364	0.76744	0.08589	0.09287	0.00184	0.177028914	0.02905	0.0014
026_2011Nov4_Mt2_CAM11_Z12	0.05805	0.00377	0.78661	0.09472	0.09768	0.00203	0.172587032	0.03981	0.002
015_2011Nov10_Mt2_CAM11_Z13	0.05988	0.00359	0.82839	0.09309	0.0925	0.00186	0.178938185	0.0302	0.00146
016_2011Nov10_Mt2_CAM11_Z14	0.05972	0.00355	0.81892	0.09243	0.09474	0.00189	0.176748993	0.03029	0.00143
017_2011Nov10_Mt2_CAM11_Z15	0.05849	0.00389	0.74686	0.09085	0.09235	0.00197	0.175365273	0.02923	0.0015
018_2011Nov10_Mt2_CAM11_Z16	0.06078	0.00388	0.80605	0.09689	0.0946	0.00197	0.173243966	0.03107	0.00154
019_2011Nov10_Mt2_CAM11_Z17	0.0666	0.00458	0.90329	0.11574	0.0932	0.00206	0.172502357	0.03177	0.00168

Appendix K: LA-ICPMS U-Pb Zircon Isotopic Data, Camaquã and Itajaí Igneous Units

	Isotope Ratios								
Sample	**Pb207/Pb206**	**1 sigma**	**Pb207/U235**	**1 sigma**	**Pb206/U238**	**1 sigma**	**Rho***	**Pb208/Th232**	**1 sigma**
023_2011Nov10_Mt2_CAM11_Z21	0.06339	0.00483	0.9316	0.13284	0.0948	0.00223	0.164967024	0.03154	0.00184
024_2011Nov10_Mt2_CAM11_Z22	0.05843	0.00491	0.73719	0.11146	0.09153	0.00229	0.16547501	0.0276	0.00159
031_2011Nov10_Mt2_CAM11_Z23	0.06169	0.00319	0.94333	0.08894	0.09596	0.00172	0.190109898	0.03131	0.00126
032_2011Nov10_Mt2_CAM11_Z24	0.06311	0.0035	0.8987	0.08867	0.09589	0.00179	0.189198525	0.03031	0.00128
034_2011Nov10_Mt2_CAM11_Z26	0.05981	0.00344	0.90186	0.09186	0.09722	0.00184	0.185812485	0.03119	0.00139
035_2011Nov10_Mt2_CAM11_Z27	0.06123	0.00314	0.85306	0.07994	0.09411	0.00168	0.190497352	0.02821	0.0011
038_2011Nov10_Mt2_CAM11_Z30	0.06812	0.00395	0.85111	0.08781	0.09152	0.00178	0.188514911	0.02976	0.00138
039_2011Nov10_Mt2_CAM11_Z31	0.0632	0.00344	0.87059	0.08649	0.09235	0.00173	0.188563218	0.02944	0.00128
048_2011Nov10_Mt2_CAM11_Z33	0.06093	0.0037	0.79018	0.08742	0.09306	0.00189	0.18357519	0.02964	0.00142
049_2011Nov10_Mt2_CAM11_Z34	0.06101	0.00375	0.78793	0.08838	0.09438	0.00194	0.183254816	0.0297	0.00147
050_2011Nov10_Mt2_CAM11_Z35	0.0605	0.00366	0.76718	0.0854	0.09151	0.00186	0.18259286	0.02801	0.00135
052_2011Nov10_Mt2_CAM11_Z37	0.05922	0.00384	0.75486	0.08865	0.09229	0.00197	0.181760393	0.02907	0.00149
053_2011Nov10_Mt2_CAM11_Z38	0.06157	0.0043	0.71124	0.08793	0.08763	0.00197	0.181841295	0.02793	0.00155
054_2011Nov10_Mt2_CAM11_Z39	0.06511	0.00552	0.78604	0.11389	0.09071	0.00236	0.179562602	0.03853	0.00249
055_2011Nov10_Mt2_CAM11_Z40	0.05825	0.00402	0.78763	0.09791	0.09682	0.00217	0.180297562	0.03065	0.00169
056_2011Nov10_Mt2_CAM11_Z41	0.05858	0.00412	0.74809	0.09417	0.09274	0.0021	0.179884392	0.02957	0.00166
016_2011Nov11_Mt2_CAM11_Z44	0.06558	0.00451	0.89106	0.10535	0.09213	0.00202	0.185448236	0.03157	0.00157
017_2011Nov11_Mt2_CAM11_Z45	0.06429	0.00359	0.84093	0.08489	0.09565	0.00183	0.189526275	0.03119	0.00138
018_2011Nov11_Mt2_CAM11_Z46	0.05885	0.00341	0.83393	0.08692	0.09491	0.00185	0.187012069	0.02826	0.00128
020_2011Nov11_Mt2_CAM11_Z48	0.06124	0.00414	0.83429	0.0981	0.09598	0.00207	0.183416174	0.03047	0.00156
021_2011Nov11_Mt2_CAM11_Z49	0.06405	0.0039	0.89096	0.09767	0.09544	0.00195	0.186380812	0.02847	0.0014
022_2011Nov11_Mt2_CAM11_Z50	0.05936	0.00362	0.76455	0.08334	0.09497	0.00193	0.186433206	0.0301	0.00141
026_2011Nov11_Mt2_CAM11_Z52	0.05996	0.00478	0.81966	0.1112	0.09722	0.00237	0.179689079	0.02916	0.00185
027_2011Nov11_Mt2_CAM11_Z53	0.0636	0.00413	0.80076	0.09318	0.08935	0.00192	0.184665743	0.02801	0.00145
015_2011Nov15_Mt2_CAM11_Z55	0.06149	0.0035	0.80922	0.08388	0.09503	0.00182	0.184764633	0.02935	0.00131
016_2011Nov15_Mt2_CAM11_Z56	0.06467	0.00346	0.80172	0.0801	0.09179	0.00171	0.186462259	0.03285	0.00142
017_2011Nov15_Mt2_CAM11_Z57	0.06536	0.00457	0.81185	0.09893	0.09181	0.00203	0.18144869	0.03131	0.00165
020_2011Nov15_Mt2_CAM11_Z60	0.06091	0.00333	0.77743	0.08162	0.09274	0.00176	0.180763308	0.02938	0.00131
021_2011Nov15_Mt2_CAM11_Z61	0.05768	0.00393	0.73927	0.08999	0.09714	0.00209	0.176749021	0.03116	0.00163
022_2011Nov15_Mt2_CAM11_Z62	0.05997	0.00358	0.71237	0.08004	0.0935	0.00187	0.178003498	0.0301	0.00145
023_2011Nov15_Mt2_CAM11_Z63	0.06233	0.00457	0.79229	0.10369	0.08919	0.00204	0.174767753	0.03083	0.00166

Appendix K: LA-ICPMS U-Pb Zircon Isotopic Data, Camaquã and Itajaí Igneous Units

	Isotope Ratios								
Sample	**Pb207/Pb206**	**1 sigma**	**Pb207/U235**	**1 sigma**	**Pb206/U238**	**1 sigma**	**Rho***	**Pb208/Th232**	**1 sigma**
018_2011Nov17_Mt2_CAM11_Z68	0.06661	0.00368	0.82327	0.08074	0.08834	0.00169	0.195066573	0.03106	0.00138
019_2011Nov17_Mt2_CAM11_Z69	0.06121	0.00371	0.83574	0.08877	0.09827	0.00198	0.189692082	0.03075	0.00147
020_2011Nov17_Mt2_CAM11_Z70	0.06017	0.00306	0.8059	0.07504	0.09388	0.0017	0.194475175	0.03005	0.00118
021_2011Nov17_Mt2_CAM11_Z71	0.06523	0.0032	0.87648	0.08034	0.09778	0.00176	0.19636895	0.03172	0.00129
022_2011Nov17_Mt2_CAM11_Z72	0.07572	0.00427	0.93132	0.09537	0.09379	0.00187	0.194702809	0.04627	0.00208
029_2011Nov17_Mt2_CAM11_Z74	0.05969	0.00373	0.78217	0.08752	0.09701	0.00204	0.187934931	0.0294	0.00151
031_2011Nov17_Mt2_CAM11_Z76	0.05534	0.00326	0.67154	0.07178	0.09753	0.00198	0.1899308	0.02971	0.00141
032_2011Nov17_Mt2_CAM11_Z77	0.05872	0.00339	0.70033	0.07444	0.09448	0.00192	0.191186715	0.02861	0.00133
ITA-4a (n = 62)									
014_2012May7_Mt2_ITA4a_Z1	0.05474	0.0119	0.8081	0.27673	0.0851	0.00428	0.146866611	0.02376	0.00299
015_2012May7_Mt2_ITA4a_Z2	0.06147	0.00974	0.72979	0.19506	0.08806	0.00357	0.151676823	0.02778	0.0026
016_2012May7_Mt2_ITA4a_Z4	0.06065	0.00738	0.71877	0.16623	0.0836	0.00284	0.146890125	0.02278	0.00193
020_2012May7_Mt2_TA4a_Z5	0.05394	0.01137	1.1813	0.45921	0.08883	0.00453	0.131185975	0.02491	0.00316
024_2012May7_Mt2_ITA4a_Z10	0.09161	0.01258	1.09878	0.30499	0.08464	0.00342	0.145571245	0.0268	0.00263
025_2012May7_Mt2_ITA4a_Z11	0.06149	0.00893	0.86796	0.24841	0.088	0.00354	0.140556594	0.02629	0.00281
026_2012May7_Mt2_ITA4a_Z12	0.0973	0.01674	1.16134	0.38543	0.08185	0.00427	0.157189329	0.0231	0.00293
027_2012May7_Mt2_ITA4a_Z13	0.06006	0.00895	0.84797	0.25133	0.08238	0.00343	0.140478056	0.02428	0.00253
033_2012May7_Mt2_ITA4a_Z15	0.07738	0.01871	0.60404	0.21081	0.0791	0.00518	0.187641012	0.02828	0.00405
034_2012May7_Mt2_ITA4a_Z16	0.05995	0.00819	0.84138	0.19646	0.09424	0.00349	0.15860183	0.02264	0.00209
036_2012May7_Mt2_ITA4a_Z18	0.0928	0.01861	1.05503	0.35427	0.08247	0.00462	0.166830869	0.0257	0.00236
037_2012May7_Mt2_ITA4a_Z19	0.05341	0.00949	0.50909	0.13747	0.07949	0.00345	0.160728626	0.02957	0.00277
038_2012May7_Mt2_ITA4a_Z20	0.05465	0.00768	0.61972	0.14702	0.08212	0.00311	0.159635892	0.02735	0.00238
039_2012May7_Mt2_ITA4a_Z21	0.06249	0.00736	0.66317	0.14203	0.08138	0.00279	0.160077872	0.02697	0.00242
040_2012May7_Mt2_ITA4a_Z23	0.04399	0.008	0.50052	0.14137	0.08656	0.00371	0.151747254	0.02788	0.00262
041_2012May7_Mt2_ITA4a_Z24	0.05835	0.0086	0.69105	0.17803	0.08126	0.00331	0.158112955	0.02613	0.0026
047_2012May7_Mt2_ITA4a_Z26	0.06179	0.00869	0.62813	0.14665	0.084	0.00317	0.16163948	0.02588	0.0019
048_2012May7_Mt2_ITA4a_Z27	0.07072	0.00919	0.79424	0.18375	0.08335	0.00312	0.161798093	0.02681	0.00217
049_2012May7_Mt2_ITA4a_Z28	0.0487	0.01122	0.57632	0.19952	0.08673	0.0043	0.143210996	0.02851	0.00297
052_2012May7_Mt2_ITA4a_Z31	0.06884	0.01012	0.63786	0.16161	0.07865	0.00324	0.16259359	0.02702	0.00218
053_2012May7_Mt2_ITA4a_Z32	0.06686	0.01273	1.21913	0.43866	0.0869	0.00445	0.142318782	0.03089	0.00337

Appendix K: LA-ICPMS U-Pb Zircon Isotopic Data, Camaquã and Itajaí Igneous Units

	Isotope Ratios								
Sample	**Pb207/Pb206**	**1 sigma**	**Pb207/U235**	**1 sigma**	**Pb206/U238**	**1 sigma**	**Rho***	**Pb208/Th232**	**1 sigma**
054_2012May7_Mt2_ITA4a_Z33	0.06135	0.01335	0.52353	0.17609	0.08314	0.00472	0.168786947	0.02731	0.00356
055_2012May7_Mt2_ITA4a_Z34	0.0494	0.00773	0.51881	0.13925	0.08291	0.00329	0.14784346	0.02748	0.00254
056_2012May7_Mt2_ITA4a_Z35	0.09268	0.02679	0.75734	0.3401	0.0866	0.0072	0.185139407	0.03376	0.00472
015_2012May8_Mt2_ITA4a_Z36	0.06866	0.01073	0.86609	0.24045	0.08646	0.00374	0.155809744	0.02766	0.00263
016_2012May8_Mt2_ITA4a_Z37	0.05954	0.0087	0.83394	0.22139	0.08744	0.00345	0.148622907	0.02647	0.00264
017_2012May8_Mt2_ITA4a_Z38	0.0666	0.01127	0.8589	0.2578	0.08819	0.00394	0.148845795	0.02607	0.00275
018_2012May8_Mt2_ITA4a_Z39	0.06342	0.01719	0.60957	0.24406	0.08535	0.00562	0.164459804	0.02887	0.00366
019_2012May8_Mt2_ITA4a_Z40	0.06573	0.01172	0.93597	0.30274	0.08414	0.00381	0.139995666	0.02702	0.00278
021_2012May8_Mt2_ITA4a_Z42	0.04669	0.00865	0.76048	0.25225	0.08242	0.00372	0.136071431	0.02742	0.00295
022_2012May8_Mt2_ITA4a_Z43	0.06071	0.00991	1.1404	0.36939	0.08123	0.00349	0.132641996	0.02624	0.0025
023_2012May8_Mt2_ITA4a_Z44	0.05713	0.00865	0.79572	0.2467	0.08777	0.00361	0.132663737	0.02487	0.00251
030_2012May8_Mt2_ITA4a_Z48	0.06127	0.0104	0.81534	0.21105	0.08083	0.0035	0.167281864	0.02703	0.0023
031_2012May8_Mt2_ITA4a_Z49	0.07051	0.01001	0.93593	0.21376	0.0869	0.00336	0.169291997	0.02848	0.00227
032_2012May8_Mt2_ITA4a_Z50	0.06648	0.01272	0.76856	0.21946	0.08099	0.00384	0.166043633	0.02768	0.00294
034_2012May8_Mt2_ITA4a_Z52	0.05988	0.00971	0.73014	0.17912	0.08389	0.00333	0.161806551	0.02766	0.00267
035_2012May8_Mt2_ITA4a_Z53	0.07535	0.01575	1.14787	0.39381	0.08388	0.00462	0.160542314	0.02495	0.00336
036_2012May8_Mt2_ITA4a_Z54	0.05465	0.01185	0.67175	0.21298	0.08605	0.00438	0.160543264	0.02676	0.00309
003_2012Dec6_Mt1_ITA4a_Z001_Z011-001	0.05617	0.00862	0.63396	0.13685	0.08354	0.00287	0.159149208	0.02153	0.00178
003_2012Dec6_Mt1_ITA4a_Z001_Z011-003	0.06726	0.00758	0.67179	0.11508	0.07997	0.00234	0.170813599	0.02646	0.00156
003_2012Dec6_Mt1_ITA4a_Z001_Z011-004	0.05509	0.01146	0.55364	0.15513	0.08383	0.00359	0.152836347	0.02622	0.00231
003_2012Dec6_Mt1_ITA4a_Z001_Z011-005	0.08325	0.0202	0.61207	0.19434	0.07791	0.00413	0.166953582	0.02214	0.00269
003_2012Dec6_Mt1_ITA4a_Z001_Z011-006	0.06413	0.01184	0.68342	0.17804	0.0837	0.00347	0.15913808	0.02527	0.00199
003_2012Dec6_Mt1_ITA4a_Z001_Z011-008	0.04963	0.012	0.63524	0.21227	0.07849	0.00335	0.127726113	0.02889	0.00254
003_2012Dec6_Mt1_ITA4a_Z001_Z011-009	0.05324	0.00846	0.63337	0.14813	0.08429	0.00288	0.146093502	0.02841	0.00239
003_2012Dec6_Mt1_ITA4a_Z001_Z011-010	0.0727	0.00895	0.82367	0.17256	0.07799	0.00257	0.157292248	0.03508	0.00295
003_2012Dec6_Mt1_ITA4a_Z001_Z011-011	0.06656	0.01092	0.83807	0.21947	0.08805	0.00345	0.149621797	0.02767	0.003
004_2012Dec6_Mt1_ITA4a_Z012_Z022-001	0.06124	0.01101	0.71863	0.18421	0.08053	0.00314	0.152112215	0.02877	0.00272
004_2012Dec6_Mt1_ITA4a_Z012_Z022-002	0.05117	0.00975	0.67803	0.18804	0.08727	0.00371	0.153287803	0.02929	0.00216
004_2012Dec6_Mt1_ITA4a_Z012_Z022-003	0.05035	0.00799	0.83602	0.19461	0.08522	0.0028	0.141145818	0.02541	0.00213
004_2012Dec6_Mt1_ITA4a_Z012_Z022-004	0.06279	0.00891	0.92971	0.20982	0.08406	0.00296	0.156028145	0.02797	0.00217
004_2012Dec6_Mt1_ITA4a_Z012_Z022-005	0.05867	0.00717	0.9425	0.18998	0.0846	0.00256	0.150121563	0.0241	0.00166

	Isotope Ratios								
Sample	**Pb207/Pb206**	**1 sigma**	**Pb207/U235**	**1 sigma**	**Pb206/U238**	**1 sigma**	**Rho***	**Pb208/Th232**	**1 sigma**
004_2012Dec6_Mt1_ITA4a_Z012_Z022-006	0.06405	0.01083	0.81818	0.21205	0.08397	0.00325	0.149337814	0.02793	0.00244
004_2012Dec6_Mt1_ITA4a_Z012_Z022-007	0.03746	0.00849	0.53661	0.15586	0.085	0.00296	0.119893841	0.02432	0.00218
004_2012Dec6_Mt1_ITA4a_Z012_Z022-008	0.03977	0.00826	0.58952	0.16593	0.09086	0.00329	0.128646151	0.02745	0.0025
005_2012Dec6_Mt1_ITA4a_Z023_Z033-001	0.05588	0.00809	0.66061	0.13757	0.07802	0.00258	0.158794394	0.02294	0.00187
005_2012Dec6_Mt1_ITA4a_Z023_Z033-002	0.04927	0.01045	0.64369	0.1884	0.08523	0.00376	0.150727057	0.03175	0.0032
005_2012Dec6_Mt1_ITA4a_Z023_Z033-005	0.0736	0.01107	1.32792	0.35274	0.08268	0.00338	0.153898162	0.02199	0.00209
005_2012Dec6_Mt1_ITA4a_Z023_Z033-006	0.05499	0.00657	0.59827	0.11441	0.08306	0.00256	0.161168914	0.01875	0.00168
005_2012Dec6_Mt1_ITA4a_Z023_Z033-007	0.0587	0.00901	0.88272	0.21224	0.08661	0.00307	0.147423279	0.02551	0.00248
005_2012Dec6_Mt1_ITA4a_Z023_Z033-010	0.06638	0.00967	0.96796	0.2385	0.08436	0.00324	0.155875359	0.03148	0.00307
005_2012Dec6_Mt1_ITA4a_Z023_Z033-011	0.07615	0.01857	1.05634	0.40041	0.08224	0.00471	0.151090311	0.03204	0.0044

Appendix K: LA-ICPMS U-Pb Zircon Isotopic Data, Camaquã and Itajaí Igneous Units

	Isotope Ratios								
Sample	**Pb207/Pb206**	**1 sigma**	**Pb207/U235**	**1 sigma**	**Pb206/U238**	**1 sigma**	**Rho***	**Pb208/Th232**	**1 sigma**
CAM-10b (n = 17)									
017_2012Oct12_CAM10b_Z3	0.06326	0.01705	1.04315	0.40451	0.08652	0.0049	0.146048489	0.03088	0.00301
018_2012Oct12_CAM10b_Z4	0.07351	0.02139	0.71113	0.27261	0.08172	0.00533	0.170139859	0.02518	0.00291
019_2012Oct12_CAM10b_Z5	0.05548	0.01503	0.64354	0.21986	0.08996	0.0043	0.139909863	0.02942	0.00248
021_2012Oct12_CAM10b_Z7	0.11623	0.02636	0.97187	0.32983	0.08605	0.00595	0.203743664	0.03372	0.00329
022_2012Oct12_CAM10b_Z8	0.07969	0.01657	1.53102	0.54455	0.09023	0.00463	0.144269038	0.02322	0.00229
023_2012Oct12_CAM10b_Z9	0.07019	0.01263	1.03941	0.28943	0.08705	0.00366	0.150992597	0.02562	0.00216
024_2012Oct12_CAM10b_Z10	0.12901	0.0255	1.34591	0.43792	0.07884	0.00494	0.192575739	0.02355	0.0022
031_2012Oct12_CAM10b_Z11	0.0614	0.03809	0.803	0.64611	0.08731	0.00892	0.126972581	0.02938	0.00305
032_2012Oct12_CAM10b_Z12	0.05312	0.01723	0.88761	0.39186	0.08707	0.00521	0.1355378	0.02968	0.00285
034_2012Oct12_CAM10b_Z14	0.06241	0.02132	0.91187	0.42332	0.09187	0.00584	0.13693147	0.02658	0.00264
035_2012Oct12_CAM10b_Z15	0.0747	0.01202	1.27965	0.33745	0.09118	0.00368	0.153048825	0.02898	0.002
037_2012Oct12_Auto_Stds_CAM10b_Z17_23-002	0.09541	0.02225	1.27299	0.43063	0.09409	0.00516	0.162116397	0.03149	0.00296
037_2012Oct12_Auto_Stds_CAM10b_Z17_23-003	0.10196	0.02119	1.41925	0.48877	0.09494	0.00465	0.142219153	0.02812	0.00263
037_2012Oct12_Auto_Stds_CAM10b_Z17_23-012	0.07635	0.02542	0.5744	0.24407	0.08408	0.00656	0.183616272	0.02641	0.00309
050_2012Oct12_CAM10b_Z24	0.07112	0.03186	0.75018	0.4353	0.07962	0.00656	0.141990236	0.0308	0.00346
054_2012Oct12_Stds_CAM10b_Z28_31-003	0.06529	0.01754	0.62433	0.2176	0.08145	0.00455	0.16027863	0.02467	0.00236
037_2012Oct12_Auto_Stds_CAM10b_Z17_23-004	0.07978	0.02815	1.03383	0.53023	0.08827	0.00758	0.167432944	0.02802	0.00354
LRA303 (n = 45)									
002_15Oct2012_NIST12_LRA303_Z1-10-004	0.04663	0.00998	0.58157	0.17046	0.08976	0.00389	0.147858491	0.02896	0.00297
002_15Oct2012_NIST12_LRA303_Z1-10-005	0.07132	0.00947	0.95571	0.20281	0.09766	0.00333	0.160680909	0.03021	0.00236
002_15Oct2012_NIST12_LRA303_Z1-10-006	0.08577	0.0095	1.16265	0.22503	0.09683	0.00313	0.167010194	0.03196	0.00221
002_15Oct2012_NIST12_LRA303_Z1-10-011	0.07929	0.00822	1.01701	0.18664	0.0922	0.00276	0.163116787	0.02853	0.00208
002_15Oct2012_NIST12_LRA303_Z1-10-013	0.06638	0.00641	0.82678	0.14292	0.09214	0.00251	0.157587755	0.02899	0.00197
003_15Oct2012_Stds_LRA303_Z11_17-007	0.06606	0.00603	0.83908	0.12021	0.08631	0.00215	0.17387619	0.03039	0.00166
003_15Oct2012_Stds_LRA303_Z11_17-008	0.06114	0.00794	0.82432	0.16488	0.09065	0.00308	0.169867684	0.03096	0.00221
003_15Oct2012_Stds_LRA303_Z11_17-009	0.06225	0.00694	0.75397	0.12705	0.08922	0.00259	0.172272891	0.0306	0.00193
003_15Oct2012_Stds_LRA303_Z11_17-010	0.06926	0.00576	0.86577	0.11723	0.08796	0.00209	0.175478872	0.02587	0.00139
003_15Oct2012_Stds_LRA303_Z11_17-012	0.06089	0.00517	0.83448	0.1155	0.08841	0.00207	0.169162036	0.02643	0.0014
003_15Oct2012_Stds_LRA303_Z11_17-014	0.05241	0.00658	0.69189	0.12676	0.08543	0.0024	0.15334007	0.02806	0.00199

Appendix K: LA-ICPMS U-Pb Zircon Isotopic Data, Camaquã and Itajaí Igneous Units

	Isotope Ratios								
Sample	**Pb207/Pb206**	**1 sigma**	**Pb207/U235**	**1 sigma**	**Pb206/U238**	**1 sigma**	**Rho***	**Pb208/Th232**	**1 sigma**
004_15Oct2012_Stds_LRA303_Z19_26-011	0.05871	0.0052	0.90284	0.12695	0.0879	0.00211	0.170714994	0.02556	0.00137
004_15Oct2012_Stds_LRA303_Z19_26-012	0.06738	0.01112	0.89039	0.21864	0.09242	0.00384	0.169206061	0.02486	0.00223
004_15Oct2012_Stds_LRA303_Z19_26-013	0.07503	0.00963	0.87603	0.17276	0.08138	0.00292	0.181945345	0.02563	0.00206
002_16Oct2012_LRA303Small_Z27_37-001	0.07604	0.01064	0.81536	0.17493	0.08269	0.0032	0.180377387	0.02954	0.0024
002_16Oct2012_LRA303Small_Z27_37-005	0.05897	0.00866	0.65939	0.14109	0.08427	0.00296	0.164159054	0.02699	0.00229
002_16Oct2012_LRA303Small_Z27_37-006	0.09446	0.01491	1.10225	0.27796	0.09495	0.00419	0.174991462	0.03009	0.00292
002_16Oct2012_LRA303Small_Z27_37-011	0.07915	0.00961	1.06073	0.21346	0.08665	0.00292	0.16745674	0.03212	0.00265
003_16Oct2012_LRA303Small_Z38_49-001	0.08256	0.00969	0.94488	0.16609	0.08445	0.00256	0.172454084	0.03031	0.00209
003_16Oct2012_LRA303Small_Z38_49-006	0.04848	0.00866	0.47475	0.11473	0.08475	0.00338	0.165030788	0.02383	0.00216
003_16Oct2012_LRA303Small_Z38_49-009	0.1073	0.01648	0.90852	0.21756	0.0842	0.00398	0.19739058	0.02583	0.00254
003_16Oct2012_LRA303Small_Z38_49-010	0.07451	0.00903	0.77158	0.14517	0.0877	0.00285	0.172722674	0.02686	0.00208
003_16Oct2012_LRA303Small_Z38_49-011	0.05137	0.00718	0.59294	0.12193	0.07899	0.00258	0.158835571	0.02296	0.00179
003_16Oct2012_LRA303Small_Z38_49-012	0.07529	0.01195	0.90115	0.22272	0.07782	0.00321	0.166898209	0.02806	0.00246
004_16Oct2012_LRA303Small_Z50_61-001	0.07549	0.01168	0.8011	0.17753	0.08061	0.0031	0.173535268	0.02413	0.002
004_16Oct2012_LRA303Small_Z50_61-004	0.10199	0.01419	1.16679	0.26466	0.0931	0.00402	0.190362221	0.03104	0.00235
004_16Oct2012_LRA303Small_Z50_61-005	0.07664	0.00817	0.91617	0.15505	0.08809	0.00264	0.177084934	0.02443	0.00168
004_16Oct2012_LRA303Small_Z50_61-006	0.06987	0.00766	0.91543	0.15785	0.08938	0.00253	0.164157498	0.02404	0.00159
004_16Oct2012_LRA303Small_Z50_61-007	0.06131	0.00689	0.7049	0.11464	0.0841	0.00224	0.163773396	0.02746	0.00184
004_16Oct2012_LRA303Small_Z50_61-011	0.06585	0.00757	0.94667	0.17744	0.08987	0.00281	0.166816369	0.03197	0.00216
004_16Oct2012_LRA303Small_Z50_61-012	0.08083	0.01058	0.92391	0.19681	0.08447	0.00318	0.17672872	0.02615	0.002
002_25Oct2012_LRA303Large_Z1_11-001	0.05565	0.00616	0.64299	0.09736	0.08762	0.00209	0.15753124	0.02862	0.00169
002_25Oct2012_LRA303Large_Z1_11-002	0.05517	0.00568	0.53438	0.08088	0.08385	0.00226	0.178079704	0.02458	0.00152
002_25Oct2012_LRA303Large_Z1_11-003	0.05369	0.01092	0.56043	0.14724	0.08418	0.0034	0.153732455	0.02665	0.00255
002_25Oct2012_LRA303Large_Z1_11-006	0.05879	0.00797	0.72574	0.15027	0.08485	0.00298	0.16961849	0.02857	0.00217
002_25Oct2012_LRA303Large_Z1_11-009	0.05595	0.00522	0.57247	0.08377	0.08496	0.00218	0.175350176	0.02867	0.00175
003_25Oct2012_LRA303Large_Z12_23-003	0.07247	0.01333	0.91365	0.24297	0.08326	0.00347	0.156718502	0.03418	0.00343
003_25Oct2012_LRA303Large_Z12_23-006	0.05372	0.00415	0.59088	0.07901	0.07683	0.00171	0.166449504	0.0257	0.00129
003_25Oct2012_LRA303Large_Z12_23-007	0.05384	0.00615	0.71862	0.13175	0.08868	0.00262	0.161147764	0.02843	0.00188
003_25Oct2012_LRA303Large_Z12_23-008	0.05551	0.00574	0.68373	0.11623	0.08267	0.00229	0.162949842	0.02509	0.00163
003_25Oct2012_LRA303Large_Z12_23-009	0.06339	0.00431	0.71547	0.0941	0.08372	0.00176	0.15983992	0.0281	0.00142
003_25Oct2012_LRA303Large_Z12_23-010	0.05386	0.00678	0.62533	0.11827	0.08362	0.00242	0.153017066	0.0264	0.00182

Appendix K: LA-ICPMS U-Pb Zircon Isotopic Data, Camaquã and Itajaí Igneous Units

	Isotope Ratios								
Sample	**Pb207/Pb206**	**1 sigma**	**Pb207/U235**	**1 sigma**	**Pb206/U238**	**1 sigma**	**Rho***	**Pb208/Th232**	**1 sigma**
003_25Oct2012_LRA303Large_Z12_23-011	0.0679	0.00598	0.96	0.15817	0.08619	0.00225	0.15844289	0.02657	0.00161
004_25Oct2012_LRA303Large_Z23_30-002	0.0603	0.00593	0.76175	0.11255	0.08478	0.00212	0.169242492	0.02718	0.00164
004_25Oct2012_LRA303Large_Z23_30-006	0.05341	0.00446	0.7249	0.09956	0.08597	0.00206	0.174467085	0.02705	0.00153
CAM-18 (n = 27)									
015_2012Oct5_CAM18Large_Z1	0.05863	0.00757	0.78077	0.14574	0.08788	0.00277	0.168862834	0.02544	0.0019
016_2012Oct5_CAM18Large_Z2	0.05835	0.00636	0.87269	0.1452	0.08714	0.00244	0.168292846	0.02569	0.00165
019_2012Oct5_CAM18Large_Z5	0.05576	0.00597	0.88869	0.14532	0.09091	0.00243	0.163463021	0.02901	0.00191
022_2012Oct5_CAM18Large_Z8	0.06566	0.00658	0.72034	0.10769	0.08603	0.00232	0.180384915	0.02732	0.00183
028_2012Oct5_CAM18Large_Z11	0.05769	0.00587	0.70176	0.10833	0.08772	0.00234	0.172805317	0.02704	0.00171
029_2012Oct5_CAM18Large_Z12	0.06317	0.00795	0.71634	0.13424	0.08493	0.00278	0.17467105	0.02446	0.00194
031_2012Oct5_CAM18Large_Z14	0.04797	0.00784	0.59157	0.13287	0.08645	0.00302	0.1555325	0.02554	0.0022
017_2012Oct8_CAM18Small_Z2	0.06778	0.01117	0.86238	0.2125	0.08931	0.00385	0.174944536	0.02714	0.00257
018_2012Oct8_CAM18Small_Z3	0.07765	0.01188	0.96345	0.22769	0.07969	0.00341	0.181065528	0.02651	0.00241
024_2012Oct8_CAM18Small_Z9	0.05023	0.02059	0.50324	0.25904	0.09101	0.00734	0.156680615	0.03755	0.00525
017_2012Oct9_CAM18Small_Z14	0.05124	0.01081	0.98317	0.3266	0.09545	0.00457	0.144129442	0.02772	0.00314
018_2012Oct9_CAM18Small_Z15	0.05401	0.00812	0.6061	0.13266	0.08299	0.00304	0.167360171	0.02586	0.00226
020_2012Oct9_CAM18Small_Z18	0.07161	0.00885	1.02984	0.21113	0.09349	0.00322	0.168000479	0.03234	0.00245
022_2012Oct9_CAM18Small_Z20	0.06245	0.0063	0.80688	0.13262	0.08774	0.00236	0.163649356	0.02626	0.00184
024_2012Oct9_CAM18Small_Z22	0.0645	0.00692	0.91286	0.16371	0.08478	0.00249	0.163770209	0.0275	0.00196
025_2012Oct9_CAM18Small_Z23	0.06911	0.00912	0.99787	0.21979	0.08359	0.00302	0.164028251	0.02735	0.00221
002_2012Oct11_Auto_CAM18Small_Z27_36-002	0.05471	0.00625	0.61012	0.09542	0.08041	0.00217	0.172554195	0.02505	0.00148
002_2012Oct11_Auto_CAM18Small_Z27_36-003	0.06683	0.01038	1.16266	0.29174	0.09558	0.00363	0.151354853	0.02846	0.00236
002_2012Oct11_Auto_CAM18Small_Z27_36-004	0.06179	0.00565	0.72583	0.09484	0.08215	0.00192	0.178869804	0.02543	0.00119
002_2012Oct11_Auto_CAM18Small_Z27_36-005	0.0669	0.01074	0.88379	0.21421	0.08385	0.00334	0.164343579	0.02854	0.00274
002_2012Oct11_Auto_CAM18Small_Z27_36-007	0.05176	0.01002	0.9858	0.30059	0.09218	0.0041	0.145868474	0.02922	0.00278
002_2012Oct11_Auto_CAM18Small_Z27_36-008	0.06551	0.00653	0.68135	0.09617	0.08689	0.00234	0.190799268	0.02951	0.00156
002_2012Oct11_Auto_CAM18Small_Z27_36-010	0.06943	0.0058	0.82112	0.10299	0.08351	0.00199	0.189987997	0.02692	0.00135
004_2012Oct11_Auto_CAM18Small_Z37_47-003	0.05335	0.0073	0.51932	0.10052	0.08169	0.00271	0.171389007	0.02578	0.00194
004_2012Oct11_Auto_CAM18Small_Z37_47-004	0.05099	0.00886	0.73313	0.19114	0.09825	0.00396	0.154593787	0.02881	0.00261
004_2012Oct11_Auto_CAM18Small_Z37_47-005	0.07723	0.00842	0.87979	0.15753	0.0794	0.00252	0.177253895	0.02823	0.00181

Appendix K: LA-ICPMS U-Pb Zircon Isotopic Data, Camaquã and Itajaí Igneous Units

	Isotope Ratios								
Sample	**Pb207/Pb206**	**1 sigma**	**Pb207/U235**	**1 sigma**	**Pb206/U238**	**1 sigma**	**Rho***	**Pb208/Th232**	**1 sigma**
004_2012Oct11_Auto_CAM18Small_Z37_47-011	0.052	0.0067	0.55752	0.10525	0.09103	0.00284	0.165261673	0.02894	0.00203
RAM01a (n = 15)									
002_17Oct2012_RAM01ASmalls_Z1_11-002	0.02683	0.0415	0.32661	0.52222	0.08493	0.00539	0.039692058	0.0207	0.00614
002_17Oct2012_RAM01ASmalls_Z1_11-003	0.06997	0.0112	0.88538	0.21286	0.08004	0.00294	0.152783305	0.02579	0.0024
002_17Oct2012_RAM01ASmalls_Z1_11-004	0.06099	0.00783	0.73067	0.14208	0.08369	0.00258	0.158538398	0.02678	0.00219
002_17Oct2012_RAM01ASmalls_Z1_11-005	0.0669	0.00705	0.83644	0.14416	0.08225	0.00231	0.162954401	0.02829	0.00216
002_17Oct2012_RAM01ASmalls_Z1_11-006	0.06593	0.01275	0.81771	0.22632	0.08917	0.00379	0.153566617	0.02549	0.00289
002_17Oct2012_RAM01ASmalls_Z1_11-008	0.06093	0.02178	0.66184	0.28424	0.07988	0.00411	0.119804073	0.02693	0.00371
002_17Oct2012_RAM01ASmalls_Z1_11-010	0.06844	0.00912	0.69073	0.14618	0.08507	0.0031	0.172189087	0.03002	0.00283
003_17Oct2012_RAM01ASmalls_Z12_22-002	0.06205	0.00429	0.68225	0.07696	0.07993	0.00162	0.179673359	0.02433	0.00114
003_17Oct2012_RAM01ASmalls_Z12_22-004	0.06667	0.01226	0.79611	0.20432	0.07794	0.00297	0.14847668	0.02785	0.00254
003_17Oct2012_RAM01ASmalls_Z12_22-008	0.07166	0.00922	0.95646	0.19716	0.08559	0.003	0.170038095	0.02437	0.00192
003_17Oct2012_RAM01ASmalls_Z12_22-011	0.05946	0.00564	0.57789	0.08686	0.07813	0.00206	0.17541824	0.02337	0.00144
002_26Oct2012_RMA01Large_Z1_8-001	0.05625	0.00712	0.75958	0.13729	0.08949	0.00266	0.164452979	0.02865	0.00185
002_26Oct2012_RMA01Large_Z1_8-003	0.06708	0.00699	0.75486	0.11752	0.09085	0.0026	0.183824353	0.02822	0.00135
002_26Oct2012_RMA01Large_Z1_8-005	0.0613	0.00791	0.91082	0.18623	0.0868	0.00293	0.165093818	0.02817	0.00193
002_26Oct2012_RMA01Large_Z1_8-007	0.05648	0.00447	0.66816	0.07625	0.08909	0.00186	0.182946713	0.02433	0.00121
ITA-8 (n = 38)									
002_18Oct2012_ITA-8_Z1_11-001	0.04523	0.0157	0.50326	0.1986	0.08297	0.00326	0.099565683	0.02672	0.00231
002_18Oct2012_ITA-8_Z1_11-002	0.07001	0.01363	0.73284	0.18324	0.07838	0.00294	0.150013711	0.02518	0.00211
002_18Oct2012_ITA-8_Z1_11-003	0.03918	0.01666	0.48591	0.23435	0.0816	0.00377	0.09579483	0.02717	0.00269
002_18Oct2012_ITA-8_Z1_11-007	0.05276	0.02883	0.55735	0.36495	0.07433	0.00589	0.121016838	0.02206	0.0056
002_18Oct2012_ITA-8_Z1_11-008	0.09561	0.01481	1.26988	0.32941	0.08713	0.00348	0.15397047	0.02466	0.00247
002_18Oct2012_ITA-8_Z1_11-009	0.06332	0.01602	0.644	0.21577	0.08868	0.00454	0.15280057	0.02785	0.00324
002_18Oct2012_ITA-8_Z1_11-010	0.06424	0.01705	0.80684	0.29418	0.07544	0.00413	0.150149071	0.02174	0.00274
002_18Oct2012_ITA-8_Z1_11-011	0.09196	0.02186	1.0366	0.37734	0.08967	0.00516	0.158081443	0.03542	0.00438
003_18Oct2012_ITA-8_Z12_22-003	0.06537	0.01936	0.51845	0.19703	0.08189	0.00495	0.159055558	0.02782	0.00352
003_18Oct2012_ITA-8_Z12_22-004	0.06532	0.01812	0.69643	0.25732	0.0824	0.00432	0.141892834	0.02601	0.00266
003_18Oct2012_ITA-8_Z12_22-006	0.04172	0.01531	1.1284	0.6442	0.08655	0.00372	0.075286694	0.0258	0.00253

Appendix K: LA-ICPMS U-Pb Zircon Isotopic Data, Camaquã and Itajaí Igneous Units

	Isotope Ratios								
Sample	**Pb207/Pb206**	**1 sigma**	**Pb207/U235**	**1 sigma**	**Pb206/U238**	**1 sigma**	**Rho***	**Pb208/Th232**	**1 sigma**
003_18Oct2012_ITA-8_Z12_22-007	0.06555	0.02468	0.7169	0.35839	0.08238	0.00565	0.13719218	0.02169	0.00399
003_18Oct2012_ITA-8_Z12_22-008	0.07898	0.03295	0.57104	0.30077	0.07634	0.007	0.174091633	0.02949	0.005
003_18Oct2012_ITA-8_Z12_22-011	0.07435	0.02035	0.85545	0.33471	0.07479	0.00393	0.134299674	0.02678	0.0034
004_18Oct2012_ITA-8_Z23_30-002	0.0337	0.0295	0.25551	0.23486	0.07621	0.00603	0.086080384	0.02226	0.00388
004_18Oct2012_ITA-8_Z23_30-003	0.06461	0.02021	0.66646	0.25121	0.08094	0.004	0.131109438	0.02404	0.00296
004_18Oct2012_ITA-8_Z23_30-006	0.064	0.02249	0.76833	0.38467	0.081	0.00579	0.142775279	0.02694	0.00428
002_24Oct2012_ITA8Large_Z1_11-001	0.08334	0.02195	1.06294	0.42494	0.08245	0.00467	0.141679612	0.03092	0.00398
002_24Oct2012_ITA8Large_Z1_11-002	0.06813	0.01535	0.86256	0.26792	0.08326	0.0036	0.139203538	0.0324	0.00327
002_24Oct2012_ITA8Large_Z1_11-003	0.06194	0.02288	0.56755	0.25256	0.0918	0.0057	0.13953133	0.02993	0.0055
002_24Oct2012_ITA8Large_Z1_11-004	0.09081	0.02118	1.32793	0.48583	0.08506	0.00454	0.14588859	0.0433	0.00483
002_24Oct2012_ITA8Large_Z1_11-007	0.04566	0.02268	0.57872	0.329	0.08556	0.00491	0.100944651	0.02287	0.00646
002_24Oct2012_ITA8Large_Z1_11-008	0.06539	0.02473	0.87467	0.46833	0.08526	0.00618	0.135374043	0.02725	0.0065
002_24Oct2012_ITA8Large_Z1_11-009	0.05378	0.00903	0.73698	0.18825	0.08978	0.00329	0.143462044	0.02957	0.00303
002_24Oct2012_ITA8Large_Z1_11-010	0.03954	0.01447	0.46403	0.20148	0.08554	0.00411	0.110658988	0.02463	0.00375
002_24Oct2012_ITA8Large_Z1_11-011	0.04888	0.01867	0.64325	0.31072	0.08848	0.00543	0.12704726	0.03221	0.00443
003_24Oct2012_ITA8Large_Z12_23-002	0.05799	0.01403	0.67844	0.22596	0.09109	0.00449	0.147997888	0.0219	0.00312
003_24Oct2012_ITA8Large_Z12_23-007	0.0862	0.02282	1.44655	0.65882	0.0918	0.00576	0.137767405	0.02325	0.00384
003_24Oct2012_ITA8Large_Z12_23-008	0.02737	0.01833	0.38918	0.29398	0.08062	0.00524	0.086044125	0.02638	0.00358
003_24Oct2012_ITA8Large_Z12_23-009	0.08021	0.02446	0.72073	0.292	0.07551	0.00466	0.152325003	0.03706	0.00492
004_24Oct2012_ITA8Large_Z24_35-001	0.05074	0.01142	0.47313	0.12964	0.0801	0.00274	0.124841653	0.02602	0.00189
004_24Oct2012_ITA8Large_Z24_35-002	0.07728	0.01411	0.89568	0.2429	0.07813	0.00301	0.142060727	0.0297	0.00275
004_24Oct2012_ITA8Large_Z24_35-003	0.07082	0.01507	0.9039	0.28172	0.09258	0.00395	0.136893436	0.025	0.00283
004_24Oct2012_ITA8Large_Z24_35-005	0.02981	0.02232	0.33931	0.27839	0.07508	0.00566	0.091883006	0.02548	0.00459
004_24Oct2012_ITA8Large_Z24_35-006	0.06293	0.02609	0.51256	0.24746	0.08051	0.00524	0.134809706	0.02363	0.00444
004_24Oct2012_ITA8Large_Z24_35-009	0.03374	0.02652	0.29918	0.25514	0.07768	0.00665	0.100384448	0.02217	0.00423
004_24Oct2012_ITA8Large_Z24_35-010	0.07147	0.02049	1.304	0.5849	0.093	0.00565	0.13544453	0.02964	0.00384
004_24Oct2012_ITA8Large_Z24_35-011	0.1013	0.02067	1.20244	0.38626	0.08455	0.00413	0.152061797	0.04382	0.0048

Appendix K: LA-ICPMS U-Pb Zircon Isotopic Data, Camaquã and Itajaí Igneous Units

	Age Estimates (Ma)							
Sample	**Pb207/Pb206**	**1 sigma**	**Pb207/U235**	**1 sigma**	**Pb206/U238**	**1 sigma**	**Pb208/Th232**	**1 sigma**
CAM-1 (n = 5)								
028_2011Nov2_Mt2_CAM1_Z46	1025.3	140.63	692.3	70.49	553.6	12.06	673.5	35.07
002_2012Dec4_Mt1_CAM1_Z001_011-003	1371.5	312.23	572.8	125.64	511.6	26.09	609.8	57.76
002_2012Dec4_Mt1_CAM1_Z001_011-007	1480.3	226.24	757.4	128.88	504.9	18.91	604.5	53.11
002_2012Dec4_Mt1_CAM1_Z001_011-011	780.6	229.04	643.7	110.12	545.1	18.41	569.6	54.59
002_2012Dec6_Mt1_CAM1_Z047_053-005	688.9	230.64	576.1	95.39	538.6	16.64	546.1	46.31
CAM-2 (n = 43)								
014_Mt2_CAM2_Z2	673.6	173.56	550.9	79.95	513.1	12.26	471	32.84
015_Mt2_CAM2_Z3	593.4	234.81	615.6	105.3	556.2	16.73	530.9	43.2
017_Mt2_CAM2_Z5	434.5	231.4	510.6	88.55	486.6	14.13	453.9	36.58
018_Mt2_CAM2_Z6	589.6	491.09	502.6	165.4	600.7	34.9	429.4	59.32
020_Mt2_CAM2_Z8	826.2	227.11	579.8	103.59	590.6	18.24	616	53.22
021_Mt2_CAM2_Z9	727.3	477	463.5	148.49	581.5	32.93	697.6	91.24
022_Mt2_CAM2_Z10	0.1	448.71	698.6	260.38	577.6	30.54	609.9	79.37
029_2012Apr21_Mt2_CAM2_Z16	323.7	482.76	597.6	191.43	571.2	30.77	686.9	87.42
015_2012Apr20_Mt2_CAM2_Z20	916.8	188.54	616.6	91.43	543.1	13.99	648.9	49.48
016_2012Apr20_Mt2_CAM2_Z21	1442.8	214.14	811.1	132.92	576.5	19.07	571	48.98
017_2012Apr20_Mt2_CAM2_Z22	537.2	238.47	616.3	103.74	565.9	16.35	657.2	57.41
018_2012Apr20_Mt2_CAM2_Z23	1763.7	274.75	605.2	128.09	520	31.66	936	100.15
019_2012Apr20_Mt2_CAM2_Z24	702.7	229.5	560.9	96.67	570.2	16.68	604.1	51.74
020_2012Apr20_Mt2_CAM2_Z25	836	218.96	590.5	100.02	570	16.46	602.4	51.8
021_2012Apr20_Mt2_CAM2_Z26	275.4	399.31	543	135.43	611	24.65	655.2	68.38
028_2012Apr20_Mt2_CAM2_Z30	788.8	242.93	628.3	118.45	583.8	17.96	643.5	63.47
032_2012Apr20_Mt2_CAM2_Z34	378.7	562.34	779.2	282.55	584.4	31.57	613.1	90.52
033_2012Apr20_Mt2_CAM2_Z345	150	651.31	456.5	185.13	566.1	35.77	661.1	110.32
002_2012Nov30_Mt1_CAM2_Z2_12-002	611.7	231.35	601.2	75.94	553.7	14.23	528.4	24.48
002_2012Nov30_Mt1_CAM2_Z2_12-006	887.1	260.49	571.3	82.02	501.1	15.02	509.7	31.06
002_2012Nov30_Mt1_CAM2_Z2_12-007	942	408.55	589.4	133.04	519.6	22.74	560.1	64.68
002_2012Nov30_Mt1_CAM2_Z2_12-010	649.7	148.68	547	45.67	520.2	10.32	535.8	24.23
003_2012Nov30_Mt1_CAM2_Z13_22-001	1596.7	264.7	631.1	117	513.5	19.79	577.4	59.95

Appendix K: LA-ICPMS U-Pb Zircon Isotopic Data, Camaquã and Itajaí Igneous Units

	Age Estimates (Ma)							
Sample	**Pb207/Pb206**	**1 sigma**	**Pb207/U235**	**1 sigma**	**Pb206/U238**	**1 sigma**	**Pb208/Th232**	**1 sigma**
003_2012Nov30_Mt1_CAM2_Z13_22-002	679.7	257.92	518.8	90.65	487	14.96	470.6	42.48
003_2012Nov30_Mt1_CAM2_Z13_22-003	1214.5	224.89	625	103.26	475.2	14.49	391.9	35.86
003_2012Nov30_Mt1_CAM2_Z13_22-004	865.5	347.76	525.3	120.74	526.7	23.06	586.8	68.97
003_2012Nov30_Mt1_CAM2_Z13_22-005	995	297.8	552.8	114.58	566.6	21.31	591.3	61.47
003_2012Nov30_Mt1_CAM2_Z13_22-007	83.6	632.73	516.1	185.54	536.8	28.94	477.7	76.78
003_2012Nov30_Mt1_CAM2_Z13_22-008	1470.5	229.84	708.6	128.37	505.5	16.83	623.9	63.81
004_2012Nov30_Mt1_CAM2_Z23_33-006	526.7	343.68	513	115.24	519.6	20.41	512.2	54.7
004_2012Nov30_Mt1_CAM2_Z23_33-007	603.3	305.1	589.2	122.08	571.7	20.53	490.4	49.55
004_2012Nov30_Mt1_CAM2_Z23_33-009	1370.9	218.14	781.2	137.72	513.8	15.61	595.3	52.47
004_2012Nov30_Mt1_CAM2_Z23_33-011	709.9	357.21	547.1	139.14	465.8	20.6	321.5	33.37
002_2012Dec3_CAM2_Z034_044-001	829.7	236.94	646.1	98.87	575.2	15.52	662.8	65.48
002_2012Dec3_CAM2_Z034_044-002	1392.8	300.19	760.6	150.26	550	22.46	627.7	75.02
002_2012Dec3_CAM2_Z034_044-003	1407.8	243.02	747.8	123.04	551.2	17.55	683.3	65.6
002_2012Dec3_CAM2_Z034_044-004	838.8	332.81	573.5	117.74	544.2	19.5	570.4	67.36
002_2012Dec3_CAM2_Z034_044-005	890.7	302.47	614.3	119.42	546.7	18.96	570.2	62.77
002_2012Dec3_CAM2_Z034_044-008	685.5	317.01	661.6	131.82	557.7	19.46	570.7	63.68
002_2012Dec3_CAM2_Z034_044-009	984.1	283.34	704	131.47	558.3	18.32	557	63.96
002_2012Dec3_CAM2_Z034_044-010	662.7	316.92	616.5	125.3	587.1	19.83	571.5	69.86
003_2012Dec3_CAM2_Z045_055-006	1071.7	183.4	703.1	82.71	546.9	14.05	685.5	42.55
003_2012Dec3_CAM2_Z045_055-007	375.5	275.54	592.8	91.53	571.6	17.35	558.8	38.5
CAM-4 (n = 25)								
052_2011Oct26_Mt2_CAM4_Z12	861.9	183.81	581.6	75.08	515.5	14.15	550.5	36.1
025_2011Oct27_Mt2_CAM4_Z26	634.6	150.95	549.9	55.04	545.8	11.94	534.9	26.5
010_2012June15_CAM4_Mt1_Z10	1193.4	197.62	603.5	91.42	507.3	15.65	551.2	35.98
018_2012June15_CAM4_Mt1_Z3	887.4	194.87	633.1	102.54	604.5	17.4	632.9	48.16
020_2012June15_CAM4_Mt1_Z5	1156.3	235.79	574.2	112.28	474.5	17.39	451.3	40.27
021_2012June15_CAM4_Mt1_Z6	1120.2	346.77	652.9	168.24	493.6	25.66	625	72.18
022_2012June15_CAM4_Mt1_Z7	738.7	386.45	746	202.87	587.6	30.54	579.2	67.32
024_2012June15_CAM4_Mt1_Z9	1355.4	311.01	775.9	191.19	505.1	25.69	624.1	63.37
016_2012June18_CAM4_Mt1_Z12	186.3	360.23	424.4	102.88	562.4	23.34	549.1	48.43

Appendix K: LA-ICPMS U-Pb Zircon Isotopic Data, Camaquã and Itajaí Igneous Units

	Age Estimates (Ma)							
Sample	**Pb207/Pb206**	**1 sigma**	**Pb207/U235**	**1 sigma**	**Pb206/U238**	**1 sigma**	**Pb208/Th232**	**1 sigma**
019_2012June18_CAM4_Mt1_Z15	1329.1	262.03	733.7	156.49	539.7	22.66	547.5	53.19
020_2012June18_CAM4_Mt1_Z16	878.6	257.5	604.7	127.61	550.2	20.04	556.9	49.55
021_2012June18_CAM4_Mt1_Z17	1053.8	268.97	629.9	139.57	520.6	20.89	576.3	55.26
024_2012June18_CAM4_Mt1_Z20	563.8	336.73	523.9	136.75	546.7	24.31	529.4	57.51
033_2012June18_CAM4_Mt1_Z23	1197.9	215.67	581.3	88.55	522.6	17.51	469	33.52
039_2012June18_CAM4_Mt1_Z29	791.1	187.15	646.2	92.94	540	14.69	523.3	33.83
040_2012June18_CAM4_Mt1_Z30	253.6	267.47	624.5	109.79	554.1	18.05	533.1	38.37
042_2012June18_CAM4_Mt1_Z32	1097.3	260.83	753	144.36	554.7	22.33	620.2	50.17
043_2012June18_CAM4_Mt1_Z33	604.6	369.43	803.7	195.26	564.8	26.87	530.3	53.96
015_2012June20_CAM4_Mt1_Z36	662.3	306.06	445.8	99.33	518.5	21	533.3	46.98
016_2012June20_CAM4_Mt1_Z37	908.9	312.58	626.3	143.65	544.6	24	648	66.74
018_2012June20_CAM4_Mt1_Z39	857.7	287.15	506	113.09	548.2	22.14	505.2	51.69
021_2012June20_CAM4_Mt1_Z42	1051.2	283.04	694.8	156.95	481.7	20.03	533.3	52.29
022_2012June20_CAM4_Mt1_Z43	730.6	306.92	628.2	148.82	556.2	23.27	560	57.96
023_2012June20_CAM4_Mt1_Z44	1181.5	309.21	574.2	146.71	546.2	25.52	515.6	55.7
025_2012June20_CAM4_Mt1_Z46	730.5	295.36	483.8	122.65	537.3	21.71	574.1	61.2
CAM-11 (n = 52)								
015_2011Nov4_Mt2_CAM11_Z1	582.9	116.07	555.2	42.51	594.4	10.54	560.7	24.62
016_2011Nov4_Mt2_CAM11_Z2	656.5	98.98	543.2	37.89	552.2	9.07	565.7	21.45
017_2011Nov4_Mt2_CAM11_Z3	574.2	97.29	549.4	37.8	588.3	9.47	614.1	22.08
018_2011Nov4_Mt2_CAM11_Z4	493.2	116.79	559.9	43.27	603	10.6	601.2	24.65
020_2011Nov4_Mt2_CAM11_Z6	673	123.27	587.2	48.74	597	11.28	569.4	26.65
021_2011Nov4_Mt2_CAM11_Z7	540	143.58	610.7	56.04	589.9	12.03	579.5	31.27
024_2011Nov4_Mt2_CAM11_Z10	631.5	124.02	578.3	49.34	572.5	10.86	578.9	27.42
026_2011Nov4_Mt2_CAM11_Z12	531.3	136.71	589.2	53.83	600.8	11.94	789	38.94
015_2011Nov10_Mt2_CAM11_Z13	599.2	124.7	612.7	51.7	570.3	10.95	601.4	28.63
016_2011Nov10_Mt2_CAM11_Z14	593.6	123.83	607.4	51.6	583.5	11.14	603.1	28.06
017_2011Nov10_Mt2_CAM11_Z15	548.2	139.01	566.4	52.81	569.4	11.62	582.3	29.49
018_2011Nov10_Mt2_CAM11_Z16	631.6	131.67	600.2	54.47	582.7	11.63	618.5	30.2
019_2011Nov10_Mt2_CAM11_Z17	825.2	137.31	653.5	61.74	574.4	12.14	632.1	32.95

Appendix K: LA-ICPMS U-Pb Zircon Isotopic Data, Camaquã and Itajaí Igneous Units

	Age Estimates (Ma)							
Sample	**Pb207/Pb206**	**1 sigma**	**Pb207/U235**	**1 sigma**	**Pb206/U238**	**1 sigma**	**Pb208/Th232**	**1 sigma**
023_2011Nov10_Mt2_CAM11_Z21	721.3	153.93	668.5	69.83	583.9	13.15	627.7	36.02
024_2011Nov10_Mt2_CAM11_Z22	545.8	173.89	560.8	65.15	564.6	13.53	550.4	31.29
031_2011Nov10_Mt2_CAM11_Z23	663.2	107.24	674.6	46.47	590.7	10.09	623.2	24.78
032_2011Nov10_Mt2_CAM11_Z24	711.8	113.58	651	47.42	590.3	10.52	603.5	25.09
034_2011Nov10_Mt2_CAM11_Z26	596.7	119.8	652.7	49.05	598.1	10.84	620.8	27.19
035_2011Nov10_Mt2_CAM11_Z27	647.1	106.37	626.3	43.8	579.8	9.91	562.3	21.66
038_2011Nov10_Mt2_CAM11_Z30	872.2	115.59	625.3	48.17	564.5	10.54	592.7	27.16
039_2011Nov10_Mt2_CAM11_Z31	715.1	111.67	635.9	46.95	569.4	10.18	586.4	25.23
048_2011Nov10_Mt2_CAM11_Z33	636.6	125.43	591.3	49.59	573.6	11.12	590.3	27.82
049_2011Nov10_Mt2_CAM11_Z34	639.6	127.09	590	50.19	581.4	11.4	591.5	28.79
050_2011Nov10_Mt2_CAM11_Z35	621.4	125.56	578.1	49.07	564.5	11	558.3	26.49
052_2011Nov10_Mt2_CAM11_Z37	575.1	135.03	571	51.3	569.1	11.61	579.2	29.29
053_2011Nov10_Mt2_CAM11_Z38	659.1	142.9	545.5	52.17	541.5	11.66	556.8	30.4
054_2011Nov10_Mt2_CAM11_Z39	778	168.93	588.9	64.75	559.7	13.96	764.2	48.52
055_2011Nov10_Mt2_CAM11_Z40	538.6	144.91	589.8	55.62	595.7	12.73	610.2	33.23
056_2011Nov10_Mt2_CAM11_Z41	551.5	146.5	567.1	54.7	571.7	12.4	589	32.63
016_2011Nov11_Mt2_CAM11_Z44	793	138.01	646.9	56.57	568.1	11.91	628.2	30.73
017_2011Nov11_Mt2_CAM11_Z45	751.3	113.58	619.7	46.82	588.9	10.76	620.7	27.01
018_2011Nov11_Mt2_CAM11_Z46	561.4	121.58	615.8	48.12	584.5	10.89	563.2	25.13
020_2011Nov11_Mt2_CAM11_Z48	647.8	139.01	616	54.3	590.8	12.19	606.7	30.65
021_2011Nov11_Mt2_CAM11_Z49	743.3	123.82	646.9	52.44	587.6	11.45	567.4	27.5
022_2011Nov11_Mt2_CAM11_Z50	580.3	127.38	576.6	47.96	584.8	11.34	599.4	27.76
026_2011Nov11_Mt2_CAM11_Z52	602.2	163.67	607.9	62.05	598.1	13.94	580.9	36.4
027_2011Nov11_Mt2_CAM11_Z53	728.3	131.82	597.3	52.54	551.7	11.36	558.3	28.54
015_2011Nov15_Mt2_CAM11_Z55	656.5	117.7	602	47.08	585.2	10.73	584.7	25.67
016_2011Nov15_Mt2_CAM11_Z56	763.7	108.78	597.8	45.14	566.1	10.08	653.2	27.81
017_2011Nov15_Mt2_CAM11_Z57	786	140.38	603.5	55.44	566.2	12.01	623.2	32.36
020_2011Nov15_Mt2_CAM11_Z60	636	113.64	584	46.63	571.7	10.38	585.2	25.69
021_2011Nov15_Mt2_CAM11_Z61	517.5	143.29	562	52.54	597.6	12.28	620.2	31.99
022_2011Nov15_Mt2_CAM11_Z62	602.6	124.13	546.2	47.46	576.2	11.02	599.3	28.36
023_2011Nov15_Mt2_CAM11_Z63	685.3	149.29	592.5	58.74	550.7	12.1	613.7	32.47

Appendix K: LA-ICPMS U-Pb Zircon Isotopic Data, Camaquã and Itajaí Igneous Units

	Age Estimates (Ma)							
Sample	**Pb207/Pb206**	**1 sigma**	**Pb207/U235**	**1 sigma**	**Pb206/U238**	**1 sigma**	**Pb208/Th232**	**1 sigma**
018_2011Nov17_Mt2_CAM11_Z68	825.6	111.24	609.9	44.97	545.7	10.01	618.3	27.04
019_2011Nov17_Mt2_CAM11_Z69	646.6	125.26	616.8	49.1	604.2	11.6	612.2	28.8
020_2011Nov17_Mt2_CAM11_Z70	609.7	106.34	600.1	42.19	578.5	10.03	598.5	23.18
021_2011Nov17_Mt2_CAM11_Z71	781.8	99.93	639.1	43.47	601.4	10.32	631.2	25.35
022_2011Nov17_Mt2_CAM11_Z72	1087.7	109.06	668.3	50.14	577.9	11.02	914.3	40.23
029_2011Nov17_Mt2_CAM11_Z74	592.8	129.42	586.7	49.87	596.8	11.98	585.7	29.58
031_2011Nov17_Mt2_CAM11_Z76	425.8	126.35	521.6	43.6	599.9	11.63	591.8	27.76
032_2011Nov17_Mt2_CAM11_Z77	556.7	121.23	539	44.45	582	11.3	570.2	26.1
ITA-4a (n = 62)								
014_2012May7_Mt2_ITA4a_Z1	401.5	424.8	601.4	155.4	526.5	25.45	474.7	58.94
015_2012May7_Mt2_ITA4a_Z2	655.7	307.81	556.4	114.5	544	21.14	553.8	51.21
016_2012May7_Mt2_ITA4a_Z4	626.8	242.74	549.9	98.2	517.6	16.91	455.3	38.14
020_2012May7_Mt2_TA4a_Z5	368.3	416.11	791.9	213.76	548.6	26.84	497.4	62.27
024_2012May7_Mt2_ITA4a_Z10	1459.3	240.89	752.8	147.55	523.7	20.34	534.5	51.79
025_2012May7_Mt2_ITA4a_Z11	656.3	284.18	634.5	135.03	543.7	20.95	524.5	55.3
026_2012May7_Mt2_ITA4a_Z12	1573	291.7	782.6	181.07	507.1	25.46	461.5	57.93
027_2012May7_Mt2_ITA4a_Z13	605.7	293.16	623.5	138.1	510.3	20.4	484.8	50.01
033_2012May7_Mt2_ITA4a_Z15	1131.1	418.56	479.8	133.44	490.8	30.96	563.6	79.71
034_2012May7_Mt2_ITA4a_Z16	601.7	270.99	619.9	108.34	580.6	20.54	452.5	41.33
036_2012May7_Mt2_ITA4a_Z18	1483.6	338.79	731.4	175.04	510.8	27.54	512.9	46.45
037_2012May7_Mt2_ITA4a_Z19	346	358.57	417.8	92.5	493.1	20.62	589.1	54.29
038_2012May7_Mt2_ITA4a_Z20	398.1	287.65	489.7	92.16	508.8	18.51	545.5	46.73
039_2012May7_Mt2_ITA4a_Z21	690.9	233.07	516.5	86.71	504.3	16.63	537.8	47.55
040_2012May7_Mt2_ITA4a_Z23	0.1	285.12	412.1	95.67	535.1	22.04	555.8	51.57
041_2012May7_Mt2_ITA4a_Z24	543.1	293.2	533.4	106.9	503.6	19.73	521.4	51.29
047_2012May7_Mt2_ITA4a_Z26	666.7	275.41	494.9	91.46	520	18.83	516.4	37.52
048_2012May7_Mt2_ITA4a_Z27	949.4	245.4	593.6	103.99	516.1	18.59	534.8	42.68
049_2012May7_Mt2_ITA4a_Z28	133.3	467.37	462.1	128.52	536.2	25.51	568.1	58.36
052_2012May7_Mt2_ITA4a_Z31	894	277.06	501	100.19	488.1	19.37	538.9	42.93
053_2012May7_Mt2_ITA4a_Z32	833.4	353.43	809.4	200.71	537.2	26.38	614.9	66.12

Appendix K: LA-ICPMS U-Pb Zircon Isotopic Data, Camaquã and Itajaí Igneous Units

	Age Estimates (Ma)							
Sample	**Pb207/Pb206**	**1 sigma**	**Pb207/U235**	**1 sigma**	**Pb206/U238**	**1 sigma**	**Pb208/Th232**	**1 sigma**
054_2012May7_Mt2_ITA4a_Z33	651.7	408.76	427.5	117.36	514.9	28.09	544.6	70.12
055_2012May7_Mt2_ITA4a_Z34	166.6	329.09	424.4	93.09	513.4	19.61	547.9	49.88
056_2012May7_Mt2_ITA4a_Z35	1481.1	467.08	572.5	196.51	535.4	42.69	671.1	92.24
015_2012May8_Mt2_ITA4a_Z36	888.5	293.36	633.4	130.84	534.6	22.18	551.6	51.67
016_2012May8_Mt2_ITA4a_Z37	586.7	288.99	615.8	122.58	540.4	20.44	528.1	52.07
017_2012May8_Mt2_ITA4a_Z38	825.2	318.35	629.5	140.82	544.8	23.36	520.2	54.18
018_2012May8_Mt2_ITA4a_Z39	722.3	489.71	483.3	153.96	528	33.38	575.2	71.93
019_2012May8_Mt2_ITA4a_Z40	797.8	335.07	670.8	158.78	520.8	22.64	538.9	54.8
021_2012May8_Mt2_ITA4a_Z42	33.3	392.51	574.3	145.49	510.5	22.18	546.9	57.99
022_2012May8_Mt2_ITA4a_Z43	629	317.51	772.7	175.24	503.4	20.81	523.6	49.18
023_2012May8_Mt2_ITA4a_Z44	496.1	303.52	594.4	139.5	542.3	21.39	496.6	49.47
030_2012May8_Mt2_ITA4a_Z48	648.6	327.77	605.4	118.05	501.1	20.85	539	45.29
031_2012May8_Mt2_ITA4a_Z49	943.2	266.62	670.7	112.11	537.2	19.95	567.5	44.54
032_2012May8_Mt2_ITA4a_Z50	821.4	355.56	578.9	126	502.1	22.88	551.8	57.89
034_2012May8_Mt2_ITA4a_Z52	599.2	316.98	556.6	105.12	519.3	19.82	551.5	52.6
035_2012May8_Mt2_ITA4a_Z53	1077.9	370.75	776.2	186.17	519.3	27.5	498.1	66.17
036_2012May8_Mt2_ITA4a_Z54	398.1	424.03	521.8	129.36	532.1	26.01	533.7	60.88
003_2012Dec6_Mt1_ITA4a_Z001_Z011-001	458.6	308.74	498.6	85.04	517.2	17.06	430.5	35.22
003_2012Dec6_Mt1_ITA4a_Z001_Z011-003	845.9	218.45	521.8	69.89	496	13.98	527.8	30.72
003_2012Dec6_Mt1_ITA4a_Z001_Z011-004	415.7	407.82	447.4	101.38	518.9	21.37	523.1	45.44
003_2012Dec6_Mt1_ITA4a_Z001_Z011-005	1274.9	412.01	484.9	122.41	483.7	24.71	442.7	53.16
003_2012Dec6_Mt1_ITA4a_Z001_Z011-006	745.8	348.33	528.8	107.39	518.1	20.63	504.5	39.3
003_2012Dec6_Mt1_ITA4a_Z001_Z011-008	177.5	483.71	499.4	131.8	487.1	20.02	575.7	49.91
003_2012Dec6_Mt1_ITA4a_Z001_Z011-009	338.8	324.86	498.2	92.08	521.7	17.13	566.3	46.95
003_2012Dec6_Mt1_ITA4a_Z001_Z011-010	1005.5	231.59	610.1	96.08	484.1	15.34	697	57.64
003_2012Dec6_Mt1_ITA4a_Z001_Z011-011	824	309.68	618.1	121.24	544	20.45	551.7	59.06
004_2012Dec6_Mt1_ITA4a_Z012_Z022-001	647.6	345.43	549.9	108.83	499.3	18.72	573.3	53.35
004_2012Dec6_Mt1_ITA4a_Z012_Z022-002	248.7	387.98	525.6	113.78	539.3	21.99	583.6	42.5
004_2012Dec6_Mt1_ITA4a_Z012_Z022-003	211.1	330.8	616.9	107.63	527.2	16.66	507.3	41.94
004_2012Dec6_Mt1_ITA4a_Z012_Z022-004	701.1	276.33	667.5	110.4	520.3	17.61	557.6	42.57
004_2012Dec6_Mt1_ITA4a_Z012_Z022-005	554.8	246.5	674.2	99.31	523.5	15.24	481.4	32.76

	Age Estimates (Ma)							
Sample	**Pb207/Pb206**	**1 sigma**	**Pb207/U235**	**1 sigma**	**Pb206/U238**	**1 sigma**	**Pb208/Th232**	**1 sigma**
004_2012Dec6_Mt1_ITA4a_Z012_Z022-006	743.3	322.07	607	118.42	519.8	19.32	556.8	47.99
004_2012Dec6_Mt1_ITA4a_Z012_Z022-007	0.1	0	436.2	102.99	525.9	17.61	485.7	42.92
004_2012Dec6_Mt1_ITA4a_Z012_Z022-008	0.1	100.96	470.6	105.99	560.6	19.43	547.4	49.1
005_2012Dec6_Mt1_ITA4a_Z023_Z033-001	447.2	293.35	515	84.12	484.3	15.42	458.5	36.95
005_2012Dec6_Mt1_ITA4a_Z023_Z033-002	160.9	432.72	504.6	116.39	527.3	22.35	631.7	62.68
005_2012Dec6_Mt1_ITA4a_Z023_Z033-005	1030.4	277.3	858	153.86	512.1	20.14	439.6	41.34
005_2012Dec6_Mt1_ITA4a_Z023_Z033-006	411.9	247.16	476.1	72.68	514.4	15.25	375.4	33.26
005_2012Dec6_Mt1_ITA4a_Z023_Z033-007	555.9	303.69	642.5	114.46	535.5	18.22	509.2	48.97
005_2012Dec6_Mt1_ITA4a_Z023_Z033-010	818.4	277.99	687.4	123.06	522.1	19.24	626.6	60.19
005_2012Dec6_Mt1_ITA4a_Z023_Z033-011	1099.1	423.51	732	197.71	509.5	28.06	637.4	86.1

Appendix K: LA-ICPMS U-Pb Zircon Isotopic Data, Camaquã and Itajaí Igneous Units

	Age Estimates (Ma)							
Sample	**Pb207/Pb206**	**1 sigma**	**Pb207/U235**	**1 sigma**	**Pb206/U238**	**1 sigma**	**Pb208/Th232**	**1 sigma**
CAM-10b (n = 17)								
017_2012Oct12_CAM10b_Z3	717.1	487.72	725.5	201.03	534.9	29.1	614.8	59.09
018_2012Oct12_CAM10b_Z4	1028	498.12	545.4	161.76	506.4	31.75	502.7	57.28
019_2012Oct12_CAM10b_Z5	431.3	512.05	504.5	135.83	555.3	25.42	586.1	48.6
021_2012Oct12_CAM10b_Z7	1899	359.85	689.4	169.84	532.1	35.31	670.2	64.27
022_2012Oct12_CAM10b_Z8	1189.3	363.6	942.9	218.46	556.9	27.38	464	45.18
023_2012Oct12_CAM10b_Z9	933.9	331.15	723.6	144.1	538.1	21.73	511.4	42.49
024_2012Oct12_CAM10b_Z10	2084.5	311.88	865.8	189.55	489.2	29.51	470.4	43.46
031_2012Oct12_CAM10b_Z11	653.1	961.28	598.5	363.86	539.6	52.9	585.2	59.82
032_2012Oct12_CAM10b_Z12	333.9	604.75	645.1	210.79	538.2	30.9	591.2	56.02
034_2012Oct12_CAM10b_Z14	688.3	597.97	658	224.82	566.6	34.47	530.1	52.02
035_2012Oct12_CAM10b_Z15	1060.4	293.83	836.7	150.3	562.5	21.74	577.4	39.34
037_2012Oct12_Auto_Stds_CAM10b_Z17_23-002	1536.1	384.87	833.7	192.37	579.7	30.41	626.8	57.92
037_2012Oct12_Auto_Stds_CAM10b_Z17_23-003	1660.1	342.32	897	205.14	584.7	27.39	560.4	51.74
037_2012Oct12_Auto_Stds_CAM10b_Z17_23-012	1104.3	552.44	460.9	157.41	520.4	39.02	526.8	60.9
050_2012Oct12_CAM10b_Z24	960.9	717.7	568.3	252.54	493.9	39.16	613.1	67.82
054_2012Oct12_Stds_CAM10b_Z28_31-003	783.8	481.44	492.6	136.03	504.8	27.15	492.6	46.55
037_2012Oct12_Auto_Stds_CAM10b_Z17_23-004	1191.4	573.29	720.8	264.71	545.3	44.88	558.6	69.5
LRA303 (n = 45)								
002_15Oct2012_NIST12_LRA303_Z1-10-004	30.3	445.25	465.5	109.44	554.1	22.98	577.1	58.31
002_15Oct2012_NIST12_LRA303_Z1-10-005	966.7	249.74	681.1	105.29	600.7	19.54	601.5	46.32
002_15Oct2012_NIST12_LRA303_Z1-10-006	1333	200.4	783.2	105.65	595.8	18.41	635.8	43.2
002_15Oct2012_NIST12_LRA303_Z1-10-011	1179.5	192.27	712.4	93.96	568.6	16.29	568.5	40.86
002_15Oct2012_NIST12_LRA303_Z1-10-013	818.3	189.8	611.8	79.44	568.2	14.81	577.7	38.67
003_15Oct2012_Stds_LRA303_Z11_17-007	808.3	179.81	618.6	66.37	533.7	12.77	605.1	32.53
003_15Oct2012_Stds_LRA303_Z11_17-008	644	257.05	610.5	91.77	559.4	18.22	616.2	43.24
003_15Oct2012_Stds_LRA303_Z11_17-009	682.8	221.71	570.5	73.55	550.9	15.3	609.2	37.94
003_15Oct2012_Stds_LRA303_Z11_17-010	906.4	162.62	633.3	63.8	543.5	12.39	516.2	27.46
003_15Oct2012_Stds_LRA303_Z11_17-012	635.4	172.97	616.1	63.93	546.1	12.23	527.3	27.6
003_15Oct2012_Stds_LRA303_Z11_17-014	303.5	263.54	533.9	76.07	528.4	14.23	559.4	39.16

Appendix K: LA-ICPMS U-Pb Zircon Isotopic Data, Camaquã and Itajaí Igneous Units

	Age Estimates (Ma)							
Sample	**Pb207/Pb206**	**1 sigma**	**Pb207/U235**	**1 sigma**	**Pb206/U238**	**1 sigma**	**Pb208/Th232**	**1 sigma**
004_15Oct2012_Stds_LRA303_Z19_26-011	556.3	182.2	653.2	67.74	543.1	12.5	510.2	26.9
004_15Oct2012_Stds_LRA303_Z19_26-012	849.4	310.03	646.6	117.44	569.8	22.66	496.4	43.99
004_15Oct2012_Stds_LRA303_Z19_26-013	1069.3	238.47	638.8	93.5	504.4	17.42	511.5	40.61
002_16Oct2012_LRA303Small_Z27_37-001	1096	257.2	605.5	97.85	512.1	19.04	588.4	47.21
002_16Oct2012_LRA303Small_Z27_37-005	566	291.12	514.2	86.33	521.6	17.61	538.4	45.15
002_16Oct2012_LRA303Small_Z27_37-006	1517.3	271.51	754.4	134.25	584.7	24.65	599.1	57.39
002_16Oct2012_LRA303Small_Z27_37-011	1176	223.05	734.2	105.18	535.7	17.35	639	51.86
003_16Oct2012_LRA303Small_Z38_49-001	1258.8	213.62	675.4	86.71	522.6	15.21	603.5	41.08
003_16Oct2012_LRA303Small_Z38_49-006	122.8	373.51	394.5	78.99	524.4	20.11	476	42.56
003_16Oct2012_LRA303Small_Z38_49-009	1754.1	257.27	656.3	115.75	521.1	23.67	515.5	50.08
003_16Oct2012_LRA303Small_Z38_49-010	1055.1	226.68	580.7	83.2	541.9	16.87	535.6	41
003_16Oct2012_LRA303Small_Z38_49-011	257.4	292.81	472.7	77.72	490.1	15.39	458.8	35.31
003_16Oct2012_LRA303Small_Z38_49-012	1076.2	289.51	652.3	118.95	483.1	19.22	559.4	48.37
004_16Oct2012_LRA303Small_Z50_61-001	1081.6	282.77	597.4	100.08	499.8	18.51	482	39.53
004_16Oct2012_LRA303Small_Z50_61-004	1660.7	237.62	785.1	124.02	573.8	23.7	617.8	46
004_16Oct2012_LRA303Small_Z50_61-005	1111.8	199.34	660.3	82.16	544.2	15.65	487.9	33.05
004_16Oct2012_LRA303Small_Z50_61-006	924.5	210.11	659.9	83.68	551.9	14.98	480.2	31.3
004_16Oct2012_LRA303Small_Z50_61-007	650.1	224.43	541.7	68.28	520.6	13.35	547.5	36.25
004_16Oct2012_LRA303Small_Z50_61-011	801.7	223.89	676.4	92.55	554.8	16.6	636.1	42.35
004_16Oct2012_LRA303Small_Z50_61-012	1217.3	237.78	664.4	103.87	522.8	18.88	521.9	39.37
002_25Oct2012_LRA303Large_Z1_11-001	438.2	229.27	504.2	60.17	541.5	12.39	570.4	33.27
002_25Oct2012_LRA303Large_Z1_11-002	418.8	215.08	434.7	53.52	519.1	13.43	490.8	30.05
002_25Oct2012_LRA303Large_Z1_11-003	357.9	403.72	451.8	95.81	521	20.24	531.6	50.25
002_25Oct2012_LRA303Large_Z1_11-006	559.5	271.09	554.1	88.41	525	17.71	569.3	42.63
002_25Oct2012_LRA303Large_Z1_11-009	450	195.33	459.6	54.09	525.7	12.98	571.4	34.44
003_25Oct2012_LRA303Large_Z12_23-003	999.2	334.38	659	128.92	515.5	20.66	679.3	67.02
003_25Oct2012_LRA303Large_Z12_23-006	359	165.5	471.4	50.43	477.2	10.24	512.9	25.39
003_25Oct2012_LRA303Large_Z12_23-007	364.2	239.1	549.9	77.84	547.7	15.53	566.7	36.99
003_25Oct2012_LRA303Large_Z12_23-008	432.6	215.37	529	70.09	512	13.65	500.8	32.17
003_25Oct2012_LRA303Large_Z12_23-009	721.4	137.9	548	55.7	518.3	10.45	560.1	28
003_25Oct2012_LRA303Large_Z12_23-010	364.9	261.28	493.2	73.89	517.7	14.39	526.7	35.86

Appendix K: LA-ICPMS U-Pb Zircon Isotopic Data, Camaquã and Itajaí Igneous Units

	Age Estimates (Ma)							
Sample	**Pb207/Pb206**	**1 sigma**	**Pb207/U235**	**1 sigma**	**Pb206/U238**	**1 sigma**	**Pb208/Th232**	**1 sigma**
003_25Oct2012_LRA303Large_Z12_23-011	865.6	172.69	683.3	81.94	533	13.37	530.1	31.63
004_25Oct2012_LRA303Large_Z23_30-002	614.5	199.18	575	64.87	524.6	12.6	542	32.32
004_25Oct2012_LRA303Large_Z23_30-006	346.2	178.44	553.6	58.61	531.7	12.2	539.4	30.1
CAM-18 (n = 27)								
015_2012Oct5_CAM18Large_Z1	553.5	259.22	585.9	83.1	543	16.4	507.8	37.42
016_2012Oct5_CAM18Large_Z2	543.1	221.99	637	78.73	538.6	14.44	512.6	32.59
019_2012Oct5_CAM18Large_Z5	442.3	222.29	645.7	78.13	560.9	14.36	577.9	37.44
022_2012Oct5_CAM18Large_Z8	795.6	197.17	550.9	63.56	532	13.76	544.8	36.03
028_2012Oct5_CAM18Large_Z11	517.6	209.17	539.8	64.63	542	13.85	539.2	33.63
029_2012Oct5_CAM18Large_Z12	714	246.92	548.5	79.42	525.5	16.55	488.5	38.19
031_2012Oct5_CAM18Large_Z14	96.5	347.74	471.9	84.77	534.5	17.9	509.7	43.27
017_2012Oct8_CAM18Small_Z2	861.7	309.09	631.4	115.86	551.5	22.76	541.2	50.65
018_2012Oct8_CAM18Small_Z3	1138	277.6	685.1	117.75	494.2	20.38	528.8	47.49
024_2012Oct8_CAM18Small_Z9	205.8	746.47	413.9	174.97	561.5	43.34	745.1	102.26
017_2012Oct9_CAM18Small_Z14	251.8	424	695.2	167.22	587.7	26.89	552.6	61.67
018_2012Oct9_CAM18Small_Z15	371.2	307.33	481.1	83.87	514	18.12	516.1	44.54
020_2012Oct9_CAM18Small_Z18	974.8	233.45	718.8	105.61	576.1	18.96	643.3	47.92
022_2012Oct9_CAM18Small_Z20	689.7	201.53	600.7	74.53	542.1	13.99	523.9	36.33
024_2012Oct9_CAM18Small_Z22	758.1	211.47	658.6	86.9	524.6	14.77	548.4	38.54
025_2012Oct9_CAM18Small_Z23	901.9	250.7	702.7	111.71	517.5	17.99	545.4	43.48
002_2012Oct11_Auto_CAM18Small_Z27_36-002	400.1	237.71	483.6	60.18	498.6	12.97	500	29.28
002_2012Oct11_Auto_CAM18Small_Z27_36-003	832.4	294.17	783.2	136.97	588.4	21.35	567.2	46.32
002_2012Oct11_Auto_CAM18Small_Z27_36-004	666.7	184.57	554.1	55.8	509	11.45	507.6	23.55
002_2012Oct11_Auto_CAM18Small_Z27_36-005	834.5	302.95	643	115.46	519	19.87	568.8	53.86
002_2012Oct11_Auto_CAM18Small_Z27_36-007	274.9	391.7	696.6	153.7	568.4	24.21	582.1	54.53
002_2012Oct11_Auto_CAM18Small_Z27_36-008	790.7	196.53	527.6	58.08	537.1	13.85	587.8	30.57
002_2012Oct11_Auto_CAM18Small_Z27_36-010	911.5	163.22	608.7	57.42	517.1	11.85	536.8	26.57
004_2012Oct11_Auto_CAM18Small_Z37_47-003	343.5	283.17	424.7	67.18	506.2	16.15	514.4	38.26
004_2012Oct11_Auto_CAM18Small_Z37_47-004	240.2	357.66	558.4	111.99	604.2	23.24	574.2	51.27
004_2012Oct11_Auto_CAM18Small_Z37_47-005	1127.1	203.01	640.9	85.09	492.5	15.04	562.7	35.61

Appendix K: LA-ICPMS U-Pb Zircon Isotopic Data, Camaquã and Itajaí Igneous Units

	Age Estimates (Ma)							
Sample	**Pb207/Pb206**	**1 sigma**	**Pb207/U235**	**1 sigma**	**Pb206/U238**	**1 sigma**	**Pb208/Th232**	**1 sigma**
004_2012Oct11_Auto_CAM18Small_Z37_47-011	285.3	270.74	449.9	68.62	561.6	16.77	576.6	39.85
RAM01a (n = 15)								
002_17Oct2012_RAM01ASmalls_Z1_11-002	0.1	878.41	287	399.7	525.5	32	414.1	121.68
002_17Oct2012_RAM01ASmalls_Z1_11-003	927.5	298.17	643.9	114.64	496.4	17.55	514.7	47.25
002_17Oct2012_RAM01ASmalls_Z1_11-004	639	254.5	556.9	83.36	518.1	15.34	534.2	43.03
002_17Oct2012_RAM01ASmalls_Z1_11-005	834.6	205.46	617.2	79.71	509.5	13.74	563.9	42.5
002_17Oct2012_RAM01ASmalls_Z1_11-006	804	359.86	606.8	126.42	550.6	22.45	508.8	56.98
002_17Oct2012_RAM01ASmalls_Z1_11-008	636.7	625.62	515.7	173.67	495.4	24.54	537	73
002_17Oct2012_RAM01ASmalls_Z1_11-010	882	253.79	533.2	87.79	526.3	18.42	597.8	55.57
003_17Oct2012_RAM01ASmalls_Z12_22-002	676	141.19	528.1	46.45	495.7	9.66	485.9	22.44
003_17Oct2012_RAM01ASmalls_Z12_22-004	827.5	342.87	594.6	115.51	483.8	17.75	555.2	50.02
003_17Oct2012_RAM01ASmalls_Z12_22-008	976.2	242.13	681.5	102.32	529.4	17.81	486.6	37.93
003_17Oct2012_RAM01ASmalls_Z12_22-011	583.9	193.74	463.1	55.89	484.9	12.31	466.9	28.51
002_26Oct2012_RMA01Large_Z1_8-001	461.6	259.29	573.8	79.22	552.5	15.74	571	36.27
002_26Oct2012_RMA01Large_Z1_8-003	840.3	203.03	571	68	560.6	15.37	562.5	26.61
002_26Oct2012_RMA01Large_Z1_8-005	649.8	255.09	657.5	98.96	536.6	17.38	561.4	37.9
002_26Oct2012_RMA01Large_Z1_8-007	470.4	167.06	519.6	46.41	550.2	11	485.9	23.92
ITA-8 (n = 38)								
002_18Oct2012_ITA-8_Z1_11-001	0.1	636.48	413.9	134.14	513.8	19.42	532.9	45.46
002_18Oct2012_ITA-8_Z1_11-002	928.7	355.26	558.2	107.37	486.4	17.59	502.7	41.51
002_18Oct2012_ITA-8_Z1_11-003	0.1	445.69	402.1	160.14	505.7	22.46	541.9	52.93
002_18Oct2012_ITA-8_Z1_11-007	318.4	917.35	449.8	237.94	462.2	35.37	441	110.71
002_18Oct2012_ITA-8_Z1_11-008	1540.1	266.21	832.3	147.35	538.6	20.66	492.4	48.73
002_18Oct2012_ITA-8_Z1_11-009	719.1	461.55	504.8	133.26	547.7	26.9	555.2	63.76
002_18Oct2012_ITA-8_Z1_11-010	749.5	478.83	600.7	165.32	468.8	24.74	434.7	54.25
002_18Oct2012_ITA-8_Z1_11-011	1466.5	394.74	722.2	188.13	553.6	30.55	703.6	85.49
003_18Oct2012_ITA-8_Z12_22-003	786.3	522.97	424.1	131.76	507.4	29.49	554.6	69.21
003_18Oct2012_ITA-8_Z12_22-004	784.8	494.72	536.7	154.02	510.4	25.73	519	52.47
003_18Oct2012_ITA-8_Z12_22-006	0.1	492	767	307.32	535.1	22.08	514.9	49.92

Appendix K: LA-ICPMS U-Pb Zircon Isotopic Data, Camaquã and Itajaí Igneous Units

	Age Estimates (Ma)							
Sample	**Pb207/Pb206**	**1 sigma**	**Pb207/U235**	**1 sigma**	**Pb206/U238**	**1 sigma**	**Pb208/Th232**	**1 sigma**
003_18Oct2012_ITA-8_Z12_22-007	792.2	638.23	548.8	211.95	510.3	33.62	433.7	79.02
003_18Oct2012_ITA-8_Z12_22-008	1171.6	659.34	458.7	194.39	474.2	41.93	587.5	98.16
003_18Oct2012_ITA-8_Z12_22-011	1051	471.13	627.6	183.17	464.9	23.56	534.2	66.96
004_18Oct2012_ITA-8_Z23_30-002	0.1	714.9	231	189.94	473.5	36.12	444.9	76.75
004_18Oct2012_ITA-8_Z23_30-003	761.7	549.62	518.6	153.07	501.7	23.88	480.2	58.35
004_18Oct2012_ITA-8_Z23_30-006	741.8	607.39	578.8	220.88	502.1	34.52	537.3	84.22
002_24Oct2012_ITA8Large_Z1_11-001	1276.9	442.34	735.3	209.16	510.7	27.81	615.5	78.02
002_24Oct2012_ITA8Large_Z1_11-002	872.6	407.66	631.5	146.06	515.6	21.42	644.6	64.06
002_24Oct2012_ITA8Large_Z1_11-003	672.1	639.23	456.4	163.59	566.2	33.63	596	108
002_24Oct2012_ITA8Large_Z1_11-004	1442.5	389.37	858	211.91	526.2	26.95	856.8	93.64
002_24Oct2012_ITA8Large_Z1_11-007	0.1	878.81	463.6	211.6	529.2	29.16	457	127.66
002_24Oct2012_ITA8Large_Z1_11-008	786.9	641.16	638.1	253.66	527.4	36.73	543.3	127.81
002_24Oct2012_ITA8Large_Z1_11-009	361.6	340.01	560.6	110.05	554.2	19.48	589.1	59.49
002_24Oct2012_ITA8Large_Z1_11-010	0.1	371.17	387.1	139.74	529.1	24.41	491.8	73.92
002_24Oct2012_ITA8Large_Z1_11-011	141.9	712.89	504.3	192	546.5	32.17	640.9	86.75
003_24Oct2012_ITA8Large_Z12_23-002	529.2	457.47	525.8	136.69	562	26.53	437.9	61.8
003_24Oct2012_ITA8Large_Z12_23-007	1342.6	440.37	908.4	273.43	566.2	34.04	464.5	75.8
003_24Oct2012_ITA8Large_Z12_23-008	0.1	0	333.8	214.88	499.8	31.28	526.3	70.51
003_24Oct2012_ITA8Large_Z12_23-009	1202.1	506.45	551.1	172.3	469.3	27.95	735.5	95.86
004_24Oct2012_ITA8Large_Z24_35-001	229	450.51	393.3	89.35	496.7	16.37	519.2	37.16
004_24Oct2012_ITA8Large_Z24_35-002	1128.4	326.3	649.4	130.1	484.9	17.97	591.6	54
004_24Oct2012_ITA8Large_Z24_35-003	952.3	383.44	653.8	150.24	570.8	23.29	499.2	55.76
004_24Oct2012_ITA8Large_Z24_35-005	0.1	290.75	296.6	211.06	466.7	33.93	508.6	90.38
004_24Oct2012_ITA8Large_Z24_35-006	705.9	698.66	420.2	166.12	499.2	31.28	472	87.65
004_24Oct2012_ITA8Large_Z24_35-009	0.1	612.72	265.8	199.41	482.3	39.79	443.2	83.66
004_24Oct2012_ITA8Large_Z24_35-010	971	495.59	847.5	257.77	573.3	33.32	590.3	75.45
004_24Oct2012_ITA8Large_Z24_35-011	1648	337.2	801.7	178.08	523.2	24.54	866.8	92.88

Appendix L: Zircon LA-ICP-MS Elemental Analyses, Camaquã and Itajaí Igneous Units

	Trace Element Concentrations MDL Filtered											
Samples	**Si29**	**Ca42**	**Ti49**	**Fe56**	**Y89**	**Zr90**	**Nb93**	**Ce140**	**Pr141**	**Nd143**	**Sm147**	**Eu151**
CAM-1 (n=5)												
028_2011Nov2_Mt2_CAM1_Z46	153200	5396.61	<3.67	82.02	1428.66	475033.44	14.84	170.16	18.51	82.4	19.68	0.354
002_2012Dec4_Mt1_CAM1_Z001_011-003	153200	967.5	<6.26	226.71	4385.82	491783.31	11.27	84.6	3.56	29.32	18.24	2.2
002_2012Dec4_Mt1_CAM1_Z001_011-007	153200	<429.45	<7.99	123.47	3287.13	447409.81	13.77	49.79	4.46	35.56	28.49	2.25
002_2012Dec4_Mt1_CAM1_Z001_011-011	153200	715.12	8.52	79.04	1516.24	442788.5	15.55	44.67	3.42	12.23	7.08	0.23
002_2012Dec6_Mt1_CAM1_Z047_053-005	153200	828.01	29.15	811.1	5938.65	577037.44	91.14	65.93	5.86	31.12	24.15	1.24
Averages	**153200**	**1976.81**	**18.84**	**264.47**	**3311.30**	**486810.50**	**29.31**	**83.03**	**7.16**	**38.13**	**19.53**	**1.25**
CAM-2 (n = 43)												
014_Mt2_CAM2_Z2	153200	2767.43	91.89	133.63	6102.16	424475.56	93.9	1320.45	141.77	636.96	174.74	10.38
015_Mt2_CAM2_Z3	153200	1433.97	<34.09	223.12	2749.2	428022.81	13.85	93.39	20.64	49.57	22.04	1.97
017_Mt2_CAM2_Z5	153200	8205.11	<37.62	117.02	3417.33	494698.28	24.09	436.07	56.31	291.87	93.43	3.82
018_Mt2_CAM2_Z6	153200	674.06	<45.24	40.35	1550.63	533328.5	9.59	28.19	2	15.58	11.27	0.61
020_Mt2_CAM2_Z8	153200	461.05	112.02	911.38	2647.58	537772.63	21.53	288.36	33.5	236	69.16	6.57
021_Mt2_CAM2_Z9	153200	<484.70	<48.31	39.29	791.49	549024.44	11.15	22.72	0.16	2.7	9.05	0.62
022_Mt2_CAM2_Z10	153200	<441.50	<43.84	8.7	1217.57	600258.56	10.78	35.24	2.3	11.2	11.36	0.61
029_2012Apr21_Mt2_CAM2_Z16	153200	679.92	<28.68	<12.75	1016.75	345463.75	11.46	27.18	2.39	16.12	11.39	0.65
015_2012Apr20_Mt2_CAM2_Z20	153200	291.4	48.29	395.19	7715.14	477643	102.26	204.41	25.83	164.14	62.57	2.39
016_2012Apr20_Mt2_CAM2_Z21	153200	<379.51	90.51	480.04	4255.49	466320.72	105.82	648.44	75.16	530.43	256.48	13.85
017_2012Apr20_Mt2_CAM2_Z22	153200	940.46	<32.66	47.36	1422.36	470455.38	15.73	42.61	3.88	15.15	6.1	0.16
018_2012Apr20_Mt2_CAM2_Z23	153200	<2937.86	<137.51	<43.55	705	478076.94	8.22	44.73	5.24	13.75	12.09	<1.60
019_2012Apr20_Mt2_CAM2_Z24	153200	3854.68	29.97	103.69	4151.89	476262.72	36.59	148.83	20.05	109.33	49.67	2.62
020_2012Apr20_Mt2_CAM2_Z25	153200	566.5	<28.42	99.67	5109.8	469222.13	74.32	138.79	6.43	30.75	22.69	0.47
021_2012Apr20_Mt2_CAM2_Z26	153200	<362.56	<31.02	<5.91	1499.9	467146.44	6.99	21.74	0.632	7.17	12.33	0.19
028_2012Apr20_Mt2_CAM2_Z30	153200	682.56	<30.46	87.6	2295.8	433571.16	25.44	147.05	16.63	115.81	52.36	2.67
032_2012Apr20_Mt2_CAM2_Z34	153200	<328.04	<28.40	124.4	1161.71	424732.78	5.34	11.77	0.61	8.17	8.69	0.75
033_2012Apr20_Mt2_CAM2_Z345	153200	<313.15	<29.34	8.99	865.99	423062	8.57	18.94	0.072	1.71	3.62	0.18
002_2012Nov30_Mt1_CAM2_Z2_12-002	153200	<619.20	<11.89	74.42	2540.42	511597.25	13.55	63.71	2.09	14.78	15.11	1.02
002_2012Nov30_Mt1_CAM2_Z2_12-006	153200	<643.13	21.99	104.11	2330.2	507310.78	11.57	72.42	3.74	34.77	18.74	2.29
002_2012Nov30_Mt1_CAM2_Z2_12-007	153200	914.3	13.54	552.89	1201.19	513920.22	8.79	12.41	0.56	3.81	5.99	0.83
002_2012Nov30_Mt1_CAM2_Z2_12-010	153200	857.39	<10.33	151.7	2420.94	511781	16.95	103	11.73	75.21	30.72	2.01
003_2012Nov30_Mt1_CAM2_Z13_22-001	153200	3088.53	292.89	716.95	1267.84	528872.06	16.58	56.44	6.74	48.01	23.31	1.43
003_2012Nov30_Mt1_CAM2_Z13_22-002	153200	4847.66	46.21	61.42	2639.82	511243.41	14.83	119.51	16.94	127.52	52.94	2.74
003_2012Nov30_Mt1_CAM2_Z13_22-003	153200	1373.03	45.19	285.15	1975.86	491149.22	29.28	485.42	64.14	409.03	141.82	6.35
003_2012Nov30_Mt1_CAM2_Z13_22-004	153200	12549.11	375.56	446.34	1880.65	511645.03	15.66	106.31	13.79	94.94	41.66	1.77
003_2012Nov30_Mt1_CAM2_Z13_22-005	153200	<391.22	<9.43	16.29	2419.89	488669.22	15.08	97.73	15.31	55.26	34.99	1.49
003_2012Nov30_Mt1_CAM2_Z13_22-007	153200	9181.22	73.04	693.71	1480.7	508510.56	9.06	165.31	23.11	123.29	49.33	0.89
003_2012Nov30_Mt1_CAM2_Z13_22-008	153200	355.94	144.92	601.38	3850.06	516638.69	36.1	523.26	67.87	455.17	174.38	11.2
004_2012Nov30_Mt1_CAM2_Z23_33-006	153200	1912.82	43.82	125.08	2212.71	570014.63	24.36	328.04	74.3	201.17	69.11	4.75
004_2012Nov30_Mt1_CAM2_Z23_33-007	153200	2245.36	<9.08	124.49	2569.9	496144.44	16.24	123.81	16.71	92.94	31.45	1.55
004_2012Nov30_Mt1_CAM2_Z23_33-009	153200	<476.18	139.6	476.27	2122.8	497088.34	25.67	270.19	34.93	222.66	78.4	4.92
004_2012Nov30_Mt1_CAM2_Z23_33-011	153200	1045.38	86.05	246.93	4087.82	507890.28	22.8	132.76	16.08	112.55	62.18	6.2
002_2012Dec3_CAM2_Z034_044-001	153200	1500.17	<9.71	367	1684.46	477552.13	19.94	381	16.6	85.54	36.52	2.47
002_2012Dec3_CAM2_Z034_044-002	153200	834.99	386.78	231.64	2814.41	496822.81	18.5	45.53	5.14	37.22	25.85	2.04
002_2012Dec3_CAM2_Z034_044-003	153200	<329.85	397.42	557.36	4659.18	490604.47	33.64	191.95	15.16	110.59	72.44	6.02
002_2012Dec3_CAM2_Z034_044-004	153200	<362.36	28.1	86.57	1424.16	481642.19	7.58	24.76	2.34	20.24	13.84	0.84
002_2012Dec3_CAM2_Z034_044-005	153200	3556.99	75.55	55.18	2362.59	463179.41	17.65	120.2	14.43	103.02	52.79	3.78
002_2012Dec3_CAM2_Z034_044-008	153200	<284.34	7.53	29.98	3792.25	490147.41	10.18	41.43	1.07	13.99	17.84	1.67
002_2012Dec3_CAM2_Z034_044-009	153200	1258.93	<6.66	444.74	1858.09	432262.19	20.46	146.75	19.9	144.67	53.13	4.08
002_2012Dec3_CAM2_Z034_044-010	153200	465.42	14.14	42.17	1911.74	430824.41	17.71	61.6	7.18	53.45	32.25	1.57
003_2012Dec3_CAM2_Z045_055-006	153200	<378.08	116.67	704.28	2649.01	452713.59	17.11	283.48	48.19	347.54	109.29	5.83
003_2012Dec3_CAM2_Z045_055-007	153200	<330.35	36.17	213.19	2884.87	438146.03	15.49	131.26	13.49	92.74	45.53	3.31

Appendix L: Zircon LA-ICP-MS Elemental Analyses, Camaquã and Itajaí Igneous Units

	Trace Element Concentrations MDL Filtered											
Samples	**Si29**	**Ca42**	**Ti49**	**Fe56**	**Y89**	**Zr90**	**Nb93**	**Ce140**	**Pr141**	**Nd143**	**Sm147**	**Eu151**
Averages	**153200**	**2464.61**	**113.24**	**255.74**	**2551.57**	**484323.43**	**24.20**	**180.63**	**21.51**	**124.11**	**50.67**	**3.08**
CAM-4 (n = 25)												
052_2011Oct26_Mt2_CAM4_Z12	153200	682.77	<4.34	119.14	4536.55	422446.06	12.79	100.64	5.81	32.95	35.2	3.63
025_2011Oct27_Mt2_CAM4_Z26	153200	1681.27	12.88	54.49	2891.8	449935.66	21.27	155.84	14.99	84.83	28.1	0.73
010_2012June15_CAM4_Mt1_Z10	153200	<384.26	<17.98	446.63	3868.44	590007.31	16.29	151.06	9.33	44.51	32.05	1.99
018_2012June15_CAM4_Mt1_Z3	153200	1655.53	87.69	2117.33	4635.69	525983.88	46.25	205.81	19.73	91.49	42.32	2.49
020_2012June15_CAM4_Mt1_Z5	153200	7168.66	<19.77	1003.02	4712.27	570928.56	33.05	491.21	58.62	308.12	125.73	3.29
021_2012June15_CAM4_Mt1_Z6	153200	2808.95	23.75	907.88	2811.09	565045.19	23.51	130.15	13.51	61.58	30.26	0.85
022_2012June15_CAM4_Mt1_Z7	153200	2110.4	<19.10	486.94	2770.21	548180.56	10.2	96.25	9.41	52.17	25.61	0.82
024_2012June15_CAM4_Mt1_Z9	153200	30358.75	<16.19	612.28	4049.63	570996.5	12.26	868.73	120.97	650.74	178.13	6.33
016_2012June18_CAM4_Mt1_Z12	153200	490.64	21.48	37.42	5130.88	411681.59	10.54	51.42	2.73	25.31	34.33	3.72
019_2012June18_CAM4_Mt1_Z15	153200	22547.43	59.89	1315.27	3112.53	405265.78	18.63	684.45	96.99	516.86	138.73	2.27
020_2012June18_CAM4_Mt1_Z16	153200	502.75	<15.33	49.79	2561.71	416729.22	9.82	41.3	2.05	16.47	15.12	1.96
021_2012June18_CAM4_Mt1_Z17	153200	6436.86	125.15	1117.83	4696.13	419687.28	121.2	225.85	32.1	173.61	92.78	4.34
024_2012June18_CAM4_Mt1_Z20	153200	6623.71	21.11	292.11	4065.22	392217.13	15.45	308.01	39.26	197.57	62.6	1.42
033_2012June18_CAM4_Mt1_Z23	153200	<245.00	14.83	2205.74	3609.61	423620.31	23.03	149.54	16.71	91.51	71.97	3.13
039_2012June18_CAM4_Mt1_Z29	153200	4935.13	32.23	458.29	6429.77	414669.56	43.22	258.33	23.79	119.36	58.51	2.88
040_2012June18_CAM4_Mt1_Z30	153200	473.6	<14.32	37.62	3890.15	428658.91	17.77	139.85	10.22	54.41	28.09	0.77
042_2012June18_CAM4_Mt1_Z32	153200	13315.38	<14.97	299.6	3357.24	408352.56	11.64	449.95	62.54	307.72	90.79	2
043_2012June18_CAM4_Mt1_Z33	153200	480.87	<12.66	384.84	1457.8	416674.66	9.71	52.57	5.48	20.34	14	0.98
015_2012June20_CAM4_Mt1_Z36	153200	<305.35	<15.23	112.69	4127.15	485202.06	12.67	51.14	1.93	22.48	25.27	2.3
016_2012June20_CAM4_Mt1_Z37	153200	1046.91	132.48	1238.96	2919.84	419542.38	22.17	114.28	13.87	86.08	29.77	1.14
018_2012June20_CAM4_Mt1_Z39	153200	35544.45	17.49	1214.65	3456.7	462418.91	51.4	1181.57	172.85	884.86	260.65	5.03
021_2012June20_CAM4_Mt1_Z42	153200	7047.14	34.84	347.98	4144.06	461787.53	14.5	225.07	32.74	121.91	44.13	0.95
022_2012June20_CAM4_Mt1_Z43	153200	3782.66	<21.17	492.79	4093.95	442697.22	23.32	279.75	29.39	144.4	50.52	1.68
023_2012June20_CAM4_Mt1_Z44	153200	714.48	<18.98	501.76	2351.18	415286.19	11.51	181.14	22.13	71.44	26.11	1.25
025_2012June20_CAM4_Mt1_Z46	153200	4671.83	<23.42	476.44	2963.35	453021.5	33.5	205.11	23.96	141.28	52.6	1.46
Averages	**153200**	**7049.10**	**48.65**	**653.26**	**3705.72**	**460841.46**	**25.03**	**271.96**	**33.64**	**172.88**	**63.73**	**2.30**
CAM-11 (n=52)												
015_2011Nov4_Mt2_CAM11_Z1	153200	132.3	<1.80	<3.01	1186.27	428421.19	22.85	33.96	1.325	6.3	5.68	0.188
016_2011Nov4_Mt2_CAM11_Z2	153200	3222.42	4.91	562.08	1155.55	429425.56	12.13	71.63	8.56	46.69	26.85	4.48
017_2011Nov4_Mt2_CAM11_Z3	153200	1242.89	5.57	386.8	1745.77	441998.06	12.7	58.51	7.07	41.15	26.15	2.14
018_2011Nov4_Mt2_CAM11_Z4	153200	<139.94	15.76	445.09	1559.01	438535.31	24.05	44.1	1.83	11.59	10.16	0.368
020_2011Nov4_Mt2_CAM11_Z6	153200	7962.91	12.9	180.59	1494.38	451400	17.69	153.77	18.17	89.57	24.45	1.05
021_2011Nov4_Mt2_CAM11_Z7	153200	22616.55	38.34	1037.7	1718.54	460095.38	17.8	208.05	29.34	148.63	53.98	7.52
024_2011Nov4_Mt2_CAM11_Z10	153200	1160	<3.15	397.72	1154.15	457725.84	18.92	33.49	2.09	11.8	8.95	0.53
026_2011Nov4_Mt2_CAM11_Z12	153200	302.7	10.6	79.15	1836.92	514103.34	20.99	103.13	12.21	46.88	16.13	0.56
015_2011Nov10_Mt2_CAM11_Z13	153200	6177.25	<3.54	183.31	921.83	413062.66	19.04	126.8	14.94	65.39	16.74	0.557
016_2011Nov10_Mt2_CAM11_Z14	153200	1163.9	<3.66	26.25	1341.54	402052.03	23.12	85.28	7.31	32.7	13.23	0.433
017_2011Nov10_Mt2_CAM11_Z15	153200	<148.43	6.12	31.81	2780.85	445772.13	16.35	21.6	0.444	8.43	16.96	0.86
018_2011Nov10_Mt2_CAM11_Z16	153200	1965.11	<3.87	62.33	2027.76	412766.81	18.22	81.57	7.92	40.85	20.85	0.759
019_2011Nov10_Mt2_CAM11_Z17	153200	202.1	4.39	399.88	2770.08	410575.34	19.63	53.14	4.4	28.57	26.55	2.72
023_2011Nov10_Mt2_CAM11_Z21	153200	496.27	<2.67	32.31	2292.48	407915.94	19.19	39.99	2.22	16.25	16.73	0.39
024_2011Nov10_Mt2_CAM11_Z22	153200	731.32	13.54	243.7	2387.89	421042.53	21.53	140.21	8.14	52.02	40.42	2.5
031_2011Nov10_Mt2_CAM11_Z23	153200	209.76	<3.12	9.43	1452.27	432865.63	17.77	36.69	2.26	12.48	10.15	0.47
032_2011Nov10_Mt2_CAM11_Z24	153200	257.48	13.01	34.29	1990.12	429253.19	17.66	38.23	2	12.41	12.07	0.412
034_2011Nov10_Mt2_CAM11_Z26	153200	1307.43	8.06	19.11	1431.09	448097.22	19.57	87.05	5.85	25.57	12.07	0.344
035_2011Nov10_Mt2_CAM11_Z27	153200	2566.43	2.79	5.58	1991.92	426075.16	18.5	229.93	28.39	122.39	37.66	1.15
038_2011Nov10_Mt2_CAM11_Z30	153200	<149.34	11.78	115.09	1534.09	438182.63	14.92	47.1	3.83	19.44	16.58	1.21
039_2011Nov10_Mt2_CAM11_Z31	153200	6149.45	7.26	390.43	1046.1	440047.34	16	115	18.41	79.01	25.42	2.03

Appendix L: Zircon LA-ICP-MS Elemental Analyses, Camaquã and Itajaí Igneous Units

	Trace Element Concentrations MDL Filtered											
Samples	**Si29**	**Ca42**	**Ti49**	**Fe56**	**Y89**	**Zr90**	**Nb93**	**Ce140**	**Pr141**	**Nd143**	**Sm147**	**Eu151**
048_2011Nov10_Mt2_CAM11_Z33	153200	<142.87	<3.78	43.05	1739.17	464965.88	23.35	36.64	0.822	6.2	9.51	0.355
049_2011Nov10_Mt2_CAM11_Z34	153200	4355.93	<3.62	87.99	1094.58	460777.88	20.53	86.02	8.64	37.55	12.59	0.675
050_2011Nov10_Mt2_CAM11_Z35	153200	260.87	7.31	13.69	1950.43	468659.19	27.44	97.25	8.53	44.38	19.88	0.645
052_2011Nov10_Mt2_CAM11_Z37	153200	1273.87	6.86	31.23	1688.84	467315.38	24.65	66.48	4.95	26.82	16.71	1.16
053_2011Nov10_Mt2_CAM11_Z38	153200	1232.95	14.46	175.23	1763.4	450499.28	17.69	72.11	6.18	33.71	18.4	2.06
054_2011Nov10_Mt2_CAM11_Z39	153200	3943.44	<2.74	43.68	1139.16	496584.31	21.38	77.18	8.58	43.38	14.72	1.08
055_2011Nov10_Mt2_CAM11_Z40	153200	7044.19	<4.01	36.1	1921.99	481052.69	18.01	171.6	22.45	112.92	37.47	1.6
056_2011Nov10_Mt2_CAM11_Z41	153200	1781.35	4.96	75.22	1525.91	471849.22	23.3	263.29	29.42	128.31	34.31	0.89
016_2011Nov11_Mt2_CAM11_Z44	153200	1770.6	5.83	29.34	2969.37	400163.94	17.14	383.93	46.69	247.91	78.01	1.75
017_2011Nov11_Mt2_CAM11_Z45	153200	1003.4	6.73	6.63	1185.97	395770.34	23.37	100.46	10.75	52.45	17.51	0.542
018_2011Nov11_Mt2_CAM11_Z46	153200	3677.91	<3.65	40.26	1981	387663.47	16.32	55.81	4.84	27.54	16.2	1.04
020_2011Nov11_Mt2_CAM11_Z48	153200	396.56	<3.09	<3.50	1905.36	384341.88	18.01	31.68	2.21	13.35	13.08	0.597
021_2011Nov11_Mt2_CAM11_Z49	153200	657.71	<3.01	38.54	1030.52	417846.81	16.05	30.95	1.62	8.46	4.81	0.45
022_2011Nov11_Mt2_CAM11_Z50	153200	1614.88	<4.01	6.8	1440.83	393430.31	23.22	236.66	30.46	134.86	37.46	0.76
026_2011Nov11_Mt2_CAM11_Z52	153200	3815.6	6.46	456.31	803.91	391237.25	11.66	61.99	6.31	33.66	16.39	2.11
027_2011Nov11_Mt2_CAM11_Z53	153200	3421.15	<3.28	629.75	1206.7	434449.69	16.77	106.99	12.76	53.34	21.39	2.49
015_2011Nov15_Mt2_CAM11_Z55	153200	1889.55	<3.38	26.47	1709.29	425583.41	19.61	211.7	25.94	121.92	35.86	0.705
016_2011Nov15_Mt2_CAM11_Z56	153200	5521.71	8.19	529.01	1687.07	446813.88	19.44	122.36	15.43	85.73	33.86	6.73
017_2011Nov15_Mt2_CAM11_Z57	153200	1455.54	5.03	260.18	1093.46	425206.09	15.11	60.4	7.06	38.57	19.24	2.91
020_2011Nov15_Mt2_CAM11_Z60	153200	3459.06	<3.81	69.19	904.81	423367.97	20.87	93.87	10.15	43.34	11.69	0.46
021_2011Nov15_Mt2_CAM11_Z61	153200	371.35	<4.81	71.2	1765.91	434876.19	12.72	45.05	3.42	21.51	13.42	0.42
022_2011Nov15_Mt2_CAM11_Z62	153200	1420.85	<3.52	29.6	961.43	443756.78	19.09	46.67	4.24	20.75	7.88	0.296
023_2011Nov15_Mt2_CAM11_Z63	153200	8167.23	9.69	341.76	2794.05	444442	19.84	136.67	19.19	100.44	48.61	1.52
018_2011Nov17_Mt2_CAM11_Z68	153200	6874.13	36.37	452.48	1582.23	420250.5	15.51	161.31	23.94	131.04	60.51	8.19
019_2011Nov17_Mt2_CAM11_Z69	153200	1680.4	4.47	34.02	1122.21	422440.81	22.59	115.05	11.87	73.05	21.43	1.07
020_2011Nov17_Mt2_CAM11_Z70	153200	236.49	40.21	79.34	2887.11	419192.31	23.77	138.43	11.97	50.2	24.82	1.14
021_2011Nov17_Mt2_CAM11_Z71	153200	2492.17	<3.77	5.93	1051.6	417385.16	22.54	61.79	5	24.91	8.89	0.316
022_2011Nov17_Mt2_CAM11_Z72	153200	2267.14	<4.65	420.17	1074.75	405535.97	13.71	177.33	40.43	170.17	47.02	5
029_2011Nov17_Mt2_CAM11_Z74	153200	1749.56	10.51	226.4	1246.98	433871.56	26.01	113.98	12.76	56.75	21.26	0.72
031_2011Nov17_Mt2_CAM11_Z76	153200	562.66	6.59	14.56	1456.23	445253.44	22.93	72.02	6.13	30.93	14.08	0.514
032_2011Nov17_Mt2_CAM11_Z77	153200	50069.11	<4.12	410.17	1269.15	440230.41	13.07	995.04	147.12	688.17	168.67	8.5
Averages	**153200**	**3798.62**	**11.33**	**186.54**	**1611.00**	**433927.45**	**19.12**	**120.00**	**14.16**	**68.85**	**25.84**	**1.68**
ITA-4a (n=62)												
014_2012May7_Mt2_ITA4a_Z1	153200	606.7	<22.86	<6.88	1665.12	520120.97	12.08	63.01	4.8	22.38	12.27	<0.13
015_2012May7_Mt2_ITA4a_Z2	153200	<376.31	<22.54	8.12	1335.31	496557.81	12.55	28.82	1.1	7.86	7.55	<0.148
016_2012May7_Mt2_ITA4a_Z4	153200	<376.14	<23.21	<6.73	1844.09	489731.88	20.24	68.65	5.41	31.69	15.85	0.147
020_2012May7_Mt2_TA4a_Z5	153200	<361.20	31.88	30.49	1569.05	506699.44	14.9	322.75	31.5	123.57	15.64	0.19
024_2012May7_Mt2_ITA4a_Z10	153200	1655.57	<28.37	430.06	3157.58	511905.91	47.08	158.43	18.59	94.11	41.59	0.53
025_2012May7_Mt2_ITA4a_Z11	153200	2563.21	<22.66	14.03	1573.63	497867.41	24.11	212.49	25.41	128.36	35.95	0.29
026_2012May7_Mt2_ITA4a_Z12	153200	371.31	<22.13	14.92	1710.07	549793.06	19.42	105.92	10.03	53	15.64	0.24
027_2012May7_Mt2_ITA4a_Z13	153200	6361.75	43.04	191.04	3006.66	510741.84	24.02	747.85	98.96	484.34	133.81	0.94
033_2012May7_Mt2_ITA4a_Z15	153200	<362.23	<23.95	6.63	1564.57	522617.5	12.32	27.15	0.95	10.95	8.96	<0.121
034_2012May7_Mt2_ITA4a_Z16	153200	791.48	24.16	40.19	1579.59	494935.31	35.49	96.65	10.33	49.62	17.61	0.22
036_2012May7_Mt2_ITA4a_Z18	153200	447.16	54.15	61.11	960.96	503702.28	6.22	67.76	5.05	25.28	13.57	0.8
037_2012May7_Mt2_ITA4a_Z19	153200	518.23	<19.50	26.96	2974.56	521366	13.95	117.3	13.35	69.63	30.86	0.37
038_2012May7_Mt2_ITA4a_Z20	153200	1380.86	<20.29	115.59	2128.85	530160.06	30.97	104.68	9.96	49.95	23.73	0.27
039_2012May7_Mt2_ITA4a_Z21	153200	4116.94	<20.73	99.51	2323.32	506153.53	33.43	201.76	24.57	120.17	33.04	0.44
040_2012May7_Mt2_ITA4a_Z23	153200	<345.99	<22.20	<6.09	3195.21	499767.16	9.95	30.79	1.38	18.6	35.34	0.5
041_2012May7_Mt2_ITA4a_Z24	153200	<313.72	<19.88	<5.63	3619.65	511776.53	16.29	91.93	7.48	38.77	26.95	0.4
047_2012May7_Mt2_ITA4a_Z26	153200	<293.43	20.41	8.81	4019.66	540446.19	14.21	96.14	8.64	55.4	40.7	0.44
048_2012May7_Mt2_ITA4a_Z27	153200	6514.56	<20.10	172.27	2473.48	523712.28	17.16	587.69	73.34	344.98	103.94	0.71

Appendix L: Zircon LA-ICP-MS Elemental Analyses, Camaquã and Itajaí Igneous Units

Trace Element Concentrations MDL Filtered

Samples	**Si29**	**Ca42**	**Ti49**	**Fe56**	**Y89**	**Zr90**	**Nb93**	**Ce140**	**Pr141**	**Nd143**	**Sm147**	**Eu151**
049_2012May7_Mt2_ITA4a_Z28	153200	481.32	30.79	16.46	849.14	549865.63	8.43	22.25	0.263	2.87	4.47	<0.11
052_2012May7_Mt2_ITA4a_Z31	153200	595.75	<21.38	102.12	2126.52	486283.75	21.33	192.18	21.45	87.24	34.32	0.3
053_2012May7_Mt2_ITA4a_Z32	153200	581.38	<20.84	<5.78	1396.26	534889.75	11.18	67	4.08	26.97	10.38	<0.12
054_2012May7_Mt2_ITA4a_Z33	153200	2563.81	<22.33	22	1648.87	554966.06	14.74	65.38	5.87	31.92	15.54	0.34
055_2012May7_Mt2_ITA4a_Z34	153200	<367.76	<24.79	11.2	1618.25	523305.69	16.22	35.73	1.36	10.18	9.3	0.23
056_2012May7_Mt2_ITA4a_Z35	153200	841.61	<21.70	80.11	936.06	517535.84	6.8	74.56	6.29	32.18	14.07	0.79
015_2012May8_Mt2_ITA4a_Z36	153200	777.03	<17.78	<6.07	2673.58	565057.25	7.68	200.28	21.73	102.81	34.51	0.68
016_2012May8_Mt2_ITA4a_Z37	153200	408.33	<19.93	<6.26	1369.25	545270	16.02	59.6	5.45	28.61	11.8	<0.136
017_2012May8_Mt2_ITA4a_Z38	153200	<374.24	<19.27	<6.15	1132.09	552146.88	9.36	22.54	0.291	4.25	7.27	0.3
018_2012May8_Mt2_ITA4a_Z39	153200	4701.87	<19.50	148.96	2137.25	542445.94	10.19	372.18	47.64	224.36	90.3	0.94
019_2012May8_Mt2_ITA4a_Z40	153200	<346.30	<18.53	10.23	1845.64	547324.5	9.05	22.55	0.13	4.51	10.2	0.211
021_2012May8_Mt2_ITA4a_Z42	153200	1180.87	<16.64	30.4	2021.64	537591.75	12.42	90.52	7.63	60.4	17.4	0.153
022_2012May8_Mt2_ITA4a_Z43	153200	9953.92	24.98	90.45	1990.71	568663.31	16.24	172.38	18.37	103.76	35.86	1.22
023_2012May8_Mt2_ITA4a_Z44	153200	860.75	44.14	176.89	2968.57	548755.13	15.11	58.09	4.17	27.92	21.15	0.25
030_2012May8_Mt2_ITA4a_Z48	153200	968.76	32.18	15.53	3092.32	606933	15.9	133.45	14.42	68.14	29.14	0.32
031_2012May8_Mt2_ITA4a_Z49	153200	2064.98	25.03	12.04	2309.29	558837.63	12.66	254.78	33.59	164.55	54.89	0.71
032_2012May8_Mt2_ITA4a_Z50	153200	336.22	<19.72	8.47	1943.44	577533.75	10.15	63.36	5.5	26.65	15.78	0.101
034_2012May8_Mt2_ITA4a_Z52	153200	<388.40	<22.21	<6.65	1223.52	555503.31	17.38	26.39	1.04	6.27	4.54	<0.134
035_2012May8_Mt2_ITA4a_Z53	153200	987.56	<17.67	80.94	1335.94	573897.63	16.36	134.6	15.93	85.58	22.24	0.29
036_2012May8_Mt2_ITA4a_Z54	153200	3038.43	<18.28	12.55	2990.4	565849	18.2	233.56	28.9	150.7	42.98	0.57
003_2012Dec6_Mt1_ITA4a_Z001_Z011-001	153200	<332.47	<7.72	38.49	1535.28	586320.19	14.76	24.8	0.221	4.5	7.51	<0.194
003_2012Dec6_Mt1_ITA4a_Z001_Z011-003	153200	<310.62	7.6	<7.26	4321.8	541941.56	15.38	49.72	1.89	22.16	36.05	0.55
003_2012Dec6_Mt1_ITA4a_Z001_Z011-004	153200	6473.74	<8.56	91.09	2851.87	555685.69	9.66	1136.06	148.43	683.51	177.18	0.94
003_2012Dec6_Mt1_ITA4a_Z001_Z011-005	153200	<415.51	9.83	<9.15	1284.82	561573.94	6.52	23.72	0.362	7.42	8.29	0.53
003_2012Dec6_Mt1_ITA4a_Z001_Z011-006	153200	1069.01	<7.25	705.51	1661.15	515632.56	12.92	204.79	25.34	112.78	32.72	<0.17
003_2012Dec6_Mt1_ITA4a_Z001_Z011-008	153200	989.73	7.07	<7.08	1914.06	517255.63	17.03	175.32	21.88	103.66	29.22	0.63
003_2012Dec6_Mt1_ITA4a_Z001_Z011-009	153200	<370.70	<9.04	<8.19	2313.24	531115.19	15.78	39.17	0.611	4.72	9.73	<0.25
003_2012Dec6_Mt1_ITA4a_Z001_Z011-010	153200	2826.87	<9.84	277.73	2579.05	525643.19	22.4	288.38	36.78	174.14	53.68	0.48
003_2012Dec6_Mt1_ITA4a_Z001_Z011-011	153200	2239.43	<10.26	31.02	1875.25	546392.88	14.43	60.57	5.9	26.56	12.46	<0.26
004_2012Dec6_Mt1_ITA4a_Z012_Z022-001	153200	662.65	<13.05	20.16	2196.97	571064.44	19.66	79.96	8.66	43.63	19.44	<0.37
004_2012Dec6_Mt1_ITA4a_Z012_Z022-002	153200	<313.98	93.08	27.56	2393.64	541111.69	20	49.97	2.39	17.84	16.67	0.29
004_2012Dec6_Mt1_ITA4a_Z012_Z022-003	153200	1384.28	<8.39	24.09	1438.59	537076	16.71	155.51	19.04	91.68	27.49	0.34
004_2012Dec6_Mt1_ITA4a_Z012_Z022-004	153200	2996.42	21.7	112.94	2582.06	541235.31	31.15	118.98	12.54	53.26	25.77	0.42
004_2012Dec6_Mt1_ITA4a_Z012_Z022-005	153200	7120.01	17.42	693.13	3546.95	543798.25	19.96	295.25	39.05	207.49	74.01	0.52
004_2012Dec6_Mt1_ITA4a_Z012_Z022-006	153200	1727.7	<7.85	8.16	1937.36	530876.38	15.61	260.89	37.74	161.25	48.69	0.27
004_2012Dec6_Mt1_ITA4a_Z012_Z022-007	153200	<390.50	<8.35	<8.74	1626.32	537076.81	12.05	21.13	0.315	5.26	7.87	0.28
004_2012Dec6_Mt1_ITA4a_Z012_Z022-008	153200	<392.67	<9.14	<8.56	1372.21	531472.5	13.9	22.33	0.261	2.22	7.21	<0.20
005_2012Dec6_Mt1_ITA4a_Z023_Z033-001	153200	<283.43	<6.77	6.76	1829.47	545464.81	17.73	31.85	0.627	5.43	9.28	<0.19
005_2012Dec6_Mt1_ITA4a_Z023_Z033-002	153200	446.1	<7.31	252.32	2107.75	538801.06	12.74	61.81	4.69	20.91	11.69	0.31
005_2012Dec6_Mt1_ITA4a_Z023_Z033-005	153200	513.28	6.98	31.27	2661.5	505212.03	9.63	49.14	4.14	26.47	24.16	0.52
005_2012Dec6_Mt1_ITA4a_Z023_Z033-006	153200	<309.68	12.77	17.86	1793.76	537817.56	34.8	30.92	1.93	13.05	14.5	<0.17
005_2012Dec6_Mt1_ITA4a_Z023_Z033-007	153200	<334.44	<6.32	<7.21	2095.29	514927.78	9.83	23.92	0.126	1.78	6.65	<0.204
005_2012Dec6_Mt1_ITA4a_Z023_Z033-010	153200	679.69	<7.65	37.44	2036.89	517226.09	21.6	44.85	2.98	16.88	11.98	<0.25
005_2012Dec6_Mt1_ITA4a_Z023_Z033-011	153200	2741.01	52.18	1227.63	2025.65	512343.88	11.61	372.76	37.83	158.25	35.56	0.28
Averages	**153200**	**2135.13**	**29.44**	**122.64**	**2101.47**	**534480.26**	**16.54**	**146.02**	**16.27**	**79.73**	**29.14**	**0.45**
CAM-10b (n=17)												
017_2012Oct12_CAM10b_Z3	153200	<196.75	9.72	158.4	3208.01	456202.72	15.44	57.64	10.97	29.13	35.78	2.45
018_2012Oct12_CAM10b_Z4	153200	<234.56	14.96	26.06	3558.44	451988.91	8.45	39.67	2.24	33.82	38.45	2.87
019_2012Oct12_CAM10b_Z5	153200	<256.62	7.56	<7.20	2694.98	442451.38	6.15	43.35	2.91	34.68	36.73	2.38
021_2012Oct12_CAM10b_Z7	153200	<246.41	<4.71	230.41	3376.84	476627.69	14.92	53.05	1.6	21.83	27.65	3.4
022_2012Oct12_CAM10b_Z8	153200	<230.67	15.56	11.44	4038.9	471277.91	7.71	38.46	1.52	32.01	55.55	3.49

Appendix L: Zircon LA-ICP-MS Elemental Analyses, Camaquã and Itajaí Igneous Units

	Trace Element Concentrations MDL Filtered											
Samples	**Si29**	**Ca42**	**Ti49**	**Fe56**	**Y89**	**Zr90**	**Nb93**	**Ce140**	**Pr141**	**Nd143**	**Sm147**	**Eu151**
023_2012Oct12_CAM10b_Z9	153200	<229.07	<5.21	25.08	4199.55	464890.63	11.06	58.53	3.05	37.61	47.14	3.15
024_2012Oct12_CAM10b_Z10	153200	209.5	22.14	912.78	3377.81	403484.81	19.11	2461.31	283.42	1194.77	201	11.51
031_2012Oct12_CAM10b_Z11	153200	1299.34	9.7	1366.68	4300.17	472767.59	24.84	15065	1690.11	6581.48	1123.4	50.59
032_2012Oct12_CAM10b_Z12	153200	<220.28	7.54	109.51	3809.56	501262.25	9.72	77.98	5.71	50.47	48.69	3.01
034_2012Oct12_CAM10b_Z14	153200	<257.82	12.15	19.63	2679.69	511564.34	6.99	34.78	1.49	22.22	35.17	3.07
035_2012Oct12_CAM10b_Z15	153200	<242.89	19.77	39.93	2988.27	491179.72	14.62	58.95	1.44	21.17	27.61	1.72
037_2012Oct12_Auto_Stds_CAM10b_Z17_23-002	153200	<514.98	15.5	<15.16	2793.15	503980.94	7.23	137.35	39.13	72.65	42.9	3.59
037_2012Oct12_Auto_Stds_CAM10b_Z17_23-003	153200	<724.17	<22.98	186.13	2560.68	516389.44	20.4	49.46	1.52	15.51	23.42	1.28
037_2012Oct12_Auto_Stds_CAM10b_Z17_23-012	153200	<200.77	17.91	48.21	3283.79	577972.69	6.64	28.4	1.8	34.57	46.33	3.54
050_2012Oct12_CAM10b_Z24	153200	<269.74	13.12	210.92	2593.6	555019.5	5.2	24.33	1.93	32.31	38.98	3.45
054_2012Oct12_Stds_CAM10b_Z28_31-003	153200	<363.96	11.62	201.49	5267.19	597625.13	13.26	49.29	1.32	31.42	56.43	3.3
054_2012Oct12_Stds_CAM10b_Z28_31-004	153200	<2123.63	1686.96	6144.15	2343.03	711888.13	14.2	72.8	1.82	16.35	21.77	2.53
Averages	**153200**	**754.42**	**133.16**	**646.05**	**3357.27**	**506269.05**	**12.11**	**1079.43**	**120.70**	**486.00**	**112.18**	**6.20**
LRA303 (n=45)												
002_15Oct2012_NIST12_LRA303_Z1-10-004	153200	860.45	<8.07	164.86	1877.11	521855.19	7.05	67.21	6.8	42.28	15.46	1.2
002_15Oct2012_NIST12_LRA303_Z1-10-005	153200	<359.47	<8.17	488.5	1885.93	505935.94	6.66	83.14	0.91	7.86	11.23	1.07
002_15Oct2012_NIST12_LRA303_Z1-10-006	153200	<387.25	<9.16	360.75	2469.56	497192.69	12.37	253.74	1.85	33.07	14.15	1.3
002_15Oct2012_NIST12_LRA303_Z1-10-011	153200	<238.87	22.82	191.61	2047.5	531553.06	9.81	135.99	2.87	17.47	12.55	0.62
002_15Oct2012_NIST12_LRA303_Z1-10-013	153200	<203.08	16.27	329.23	2663.83	483618.94	11.46	127.72	2.03	12.82	16.01	0.76
003_15Oct2012_Stds_LRA303_Z11_17-007	153200	<263.81	14.77	211.87	2140.48	519607.78	9.64	111.66	3.05	16.63	13.31	0.9
003_15Oct2012_Stds_LRA303_Z11_17-008	153200	263.08	19.28	243.11	2798.41	510683.28	12.29	58.3	2.46	12.25	15.07	0.59
003_15Oct2012_Stds_LRA303_Z11_17-009	153200	<272.98	19.61	240.66	1708.01	528142.69	9.2	63.33	0.457	7.05	9.29	0.47
003_15Oct2012_Stds_LRA303_Z11_17-010	153200	<236.62	<5.04	86.02	3489.81	519286.78	9.3	147.63	2.2	22.68	26.52	1.25
003_15Oct2012_Stds_LRA303_Z11_17-012	153200	<228.52	16.64	44.05	2871.36	525791.44	12.77	86.99	0.665	11.02	13.95	0.97
003_15Oct2012_Stds_LRA303_Z11_17-014	153200	1311.56	<6.32	125.74	1502.01	537184.38	9.14	83.51	6.32	36.04	11.83	0.86
004_15Oct2012_Stds_LRA303_Z19_26-011	153200	<226.80	7.93	69.4	2545.72	518590.13	11.18	56.53	1.03	8.53	15.53	0.84
004_15Oct2012_Stds_LRA303_Z19_26-012	153200	<601.19	<14.91	199.67	3415.15	535125	10.52	271.4	3.54	27.94	27.51	0.74
004_15Oct2012_Stds_LRA303_Z19_26-013	153200	506.75	<4.76	111.16	2022.36	516845.38	10.49	54.71	1.31	11.33	10.82	1.28
002_16Oct2012_LRA303Small_Z27_37-001	153200	2885.61	9.18	411.33	3846.38	425763.81	10.91	367.37	27.91	120.44	45.16	1.83
002_16Oct2012_LRA303Small_Z27_37-005	153200	967.54	10.87	19.08	1545.01	413640.28	10.37	151.71	13.52	63.06	17.02	0.75
002_16Oct2012_LRA303Small_Z27_37-006	153200	<319.03	18.33	480.26	2552.5	406427.19	5.74	175.99	2.1	20.84	16.33	1.84
002_16Oct2012_LRA303Small_Z27_37-011	153200	769.83	16.11	105.75	4189.66	423284.5	11	232.81	13.02	71.94	46.67	2.8
003_16Oct2012_LRA303Small_Z38_49-001	153200	<575.53	255.53	124.64	2476.49	457352.41	16.71	77.11	2.13	24.1	12.98	<0.45
003_16Oct2012_LRA303Small_Z38_49-006	153200	<319.86	8.72	141.27	3251.66	446601.69	10.15	69.21	0.92	8.05	20.17	0.89
003_16Oct2012_LRA303Small_Z38_49-009	153200	<302.77	105.17	635.11	2798.31	412032.84	8.56	205.73	1.86	18.78	19.84	0.52
003_16Oct2012_LRA303Small_Z38_49-010	153200	<283.32	49.48	444.82	2586.45	401943.84	8.05	91.09	4.59	24.4	17.04	0.85
003_16Oct2012_LRA303Small_Z38_49-011	153200	246.64	<5.00	21.41	2693.97	441035.94	9.05	28.05	0.71	8.79	15.79	0.76
003_16Oct2012_LRA303Small_Z38_49-012	153200	314.14	13.65	253.1	2439.79	450963.34	9.18	121.34	1.28	12.34	13.23	1
004_16Oct2012_LRA303Small_Z50_61-001	153200	<820.44	45.97	255.54	3380.08	449329.34	9.79	292.47	2.75	23.12	23.59	1.57
004_16Oct2012_LRA303Small_Z50_61-004	153200	<476.34	23.59	835.46	3082.15	398535.63	8.03	489.74	3.61	21.39	20.96	2.26
004_16Oct2012_LRA303Small_Z50_61-005	153200	<351.00	18.3	53.38	2316.84	420950.19	10.1	137.18	1.62	11.27	14.72	0.9
004_16Oct2012_LRA303Small_Z50_61-006	153200	<392.29	<8.57	282.73	2400.82	416033.09	7.73	138.2	1.15	9.32	15.65	0.95
004_16Oct2012_LRA303Small_Z50_61-007	153200	682.81	<9.23	15.14	1166.26	407760.38	7.89	40.3	2.59	15.27	6.76	0.404
004_16Oct2012_LRA303Small_Z50_61-011	153200	631.02	38.6	304.82	1801.74	386143.44	8.15	129.71	5.62	34.81	16.65	0.92
004_16Oct2012_LRA303Small_Z50_61-012	153200	<299.72	16.69	115.93	3349.73	424760.53	10.91	232.05	2.26	21.55	22.06	1.19
002_25Oct2012_LRA303Large_Z1_11-001	153200	<319.18	<7.74	<9.29	3204.86	484120.72	10.48	23.09	0.459	6.38	13.54	0.547
002_25Oct2012_LRA303Large_Z1_11-002	153200	<299.29	15.47	12.18	3728.93	496102.5	38.95	66.53	0.82	6.11	15	0.5
002_25Oct2012_LRA303Large_Z1_11-003	153200	<275.82	7.73	<8.27	2262.82	498817.34	8.11	17.44	0.292	7.64	14.99	0.65
002_25Oct2012_LRA303Large_Z1_11-006	153200	<251.59	<6.13	15.84	2822.37	514075.13	8.2	34.51	0.78	8.05	16.14	0.85
002_25Oct2012_LRA303Large_Z1_11-009	153200	<207.33	<4.49	9.16	5343.4	478304.25	29.28	59.93	0.362	7.95	25.38	0.85
003_25Oct2012_LRA303Large_Z12_23-003	153200	<225.36	8.41	27.85	876.26	492206.31	8.39	19.22	0.417	3.93	5.73	0.234

Appendix L: Zircon LA-ICP-MS Elemental Analyses, Camaquã and Itajaí Igneous Units

	Trace Element Concentrations MDL Filtered											
Samples	**Si29**	**Ca42**	**Ti49**	**Fe56**	**Y89**	**Zr90**	**Nb93**	**Ce140**	**Pr141**	**Nd143**	**Sm147**	**Eu151**
003_25Oct2012_LRA303Large_Z12_23-006	153200	<125.66	7.12	179.37	6111.18	468459.13	59.17	120.12	5.38	30.33	40.18	1.37
003_25Oct2012_LRA303Large_Z12_23-007	153200	<170.51	<3.56	72.54	3118.53	454646.16	28.21	3195.76	364.08	1474.13	288.08	7.95
003_25Oct2012_LRA303Large_Z12_23-008	153200	<139.64	<2.62	<3.73	4540.55	490649.06	17.91	37.65	1.09	5.55	17.12	0.85
003_25Oct2012_LRA303Large_Z12_23-009	153200	196.93	7.51	293.47	4928.15	477129.13	65.29	247.16	20.74	95.89	47.13	1.73
003_25Oct2012_LRA303Large_Z12_23-010	153200	<156.38	4.62	<4.51	1530.77	488522.97	12.55	29.71	0.837	6.78	8.04	0.289
003_25Oct2012_LRA303Large_Z12_23-011	153200	<127.57	<2.79	362.34	4615.82	480602.69	51.76	90.73	2.37	19.2	21.97	0.65
004_25Oct2012_LRA303Large_Z23_30-002	153200	<171.63	<3.23	7.56	2337.54	487226.03	17.8	38.54	0.288	4.98	11.01	0.496
004_25Oct2012_LRA303Large_Z23_30-006	153200	<149.58	3.88	5.02	6621.62	468997.97	24.34	65.02	2.26	20.07	28.6	1.17
Averages	**153200**	**803.03**	**28.65**	**203.70**	**2919.06**	**471418.46**	**15.21**	**191.72**	**11.63**	**54.97**	**24.68**	**1.15**
CAM-18 (n=27)												
015_2012Oct5_CAM18Large_Z1	153200	5672.41	<2.72	71.71	1591.17	460781.78	7	195.25	19.41	107.24	24.04	1.14
016_2012Oct5_CAM18Large_Z2	153200	<110.97	<2.57	16.53	1968.66	457991.69	6.77	70.08	0.38	5.3	11.03	0.95
019_2012Oct5_CAM18Large_Z5	153200	<117.43	3.44	155.15	1335.18	436302.28	9.07	30.23	0.707	6.99	7.51	0.49
022_2012Oct5_CAM18Large_Z8	153200	1018.84	19.6	76.23	1113.91	452733.63	7.46	55.52	4.29	26.7	8.96	0.83
028_2012Oct5_CAM18Large_Z11	153200	<114.90	2.85	36.3	3088.91	437451.53	9.62	48.78	1.09	11.07	15.43	0.9
029_2012Oct5_CAM18Large_Z12	153200	433.61	6.81	30.13	2494.67	462900.16	8.49	36.32	1.72	12.48	15.4	0.92
031_2012Oct5_CAM18Large_Z14	153200	<98.81	5.45	2.74	1738.87	462122.97	7.32	26.02	0.325	6.57	10.31	1.13
017_2012Oct8_CAM18Small_Z2	153200	<93.89	2.7	217.16	2074.94	482989.81	8.54	101.67	0.58	5.76	11.59	0.87
018_2012Oct8_CAM18Small_Z3	153200	96.03	14.65	144.27	3061.58	547523.94	9.84	69.3	0.348	8.2	15.3	0.57
024_2012Oct8_CAM18Small_Z9	153200	2723.77	273.17	1296.93	4057.95	584990.13	11.01	171.57	3.18	29.29	21.85	1.92
017_2012Oct9_CAM18Small_Z14	153200	537.28	2.41	137.1	2588.17	495663.34	9.21	76.02	3.4	17.23	16.83	0.72
018_2012Oct9_CAM18Small_Z15	153200	<98.98	2.47	21.42	2329.39	489908.38	12.03	32.23	0.83	7.54	10.83	0.65
020_2012Oct9_CAM18Small_Z18	153200	167.96	2.71	282.6	3203.81	422701.66	11.83	162.88	0.72	9.07	16.83	1.2
022_2012Oct9_CAM18Small_Z20	153200	244.01	5.97	31.01	1494.63	473175.28	11.76	74.69	2.46	11.82	8.66	0.466
024_2012Oct9_CAM18Small_Z22	153200	270.67	9.34	112.54	3095.26	509900.66	13.58	72.49	2.68	21.37	19.33	0.66
025_2012Oct9_CAM18Small_Z23	153200	<103.28	9.71	307.44	3920.62	522932.34	16.44	181.16	47.88	67.2	25.61	1.02
002_2012Oct11_Auto_CAM18Small_Z27_36-002	153200	<227.30	<4.72	6.53	2211.56	571436.19	6.66	21.77	20.64	6.57	12.85	1
002_2012Oct11_Auto_CAM18Small_Z27_36-003	153200	<495.28	<11.59	246.37	3342.83	529239.31	9.17	60.24	1.62	12.14	22.9	1.4
002_2012Oct11_Auto_CAM18Small_Z27_36-004	153200	1356.89	<7.53	78.06	2487.88	555035.25	11.89	223.28	11.98	59.37	20.22	0.93
002_2012Oct11_Auto_CAM18Small_Z27_36-005	153200	<204.41	27.31	<5.77	1241.72	545387.56	8.03	31.14	0.1	3.78	5.77	0.63
002_2012Oct11_Auto_CAM18Small_Z27_36-007	153200	<225.46	29.84	609.89	2214.81	476621.59	7.34	158.27	1.04	12.16	12.46	0.62
002_2012Oct11_Auto_CAM18Small_Z27_36-008	153200	444.87	11.9	93.28	2961.87	527631.75	11.24	123.17	4.81	28.21	20.55	0.77
002_2012Oct11_Auto_CAM18Small_Z27_36-010	153200	2425.59	4.92	47.21	1746.02	515526.19	13.38	206.01	24.93	126.96	33.51	0.91
004_2012Oct11_Auto_CAM18Small_Z37_47-003	153200	<252.43	<6.47	100.12	2100.59	443092.19	7.07	99.7	0.46	5.69	10.91	0.95
004_2012Oct11_Auto_CAM18Small_Z37_47-004	153200	<244.91	<5.77	63.27	2550.93	427353.69	7.82	96.56	0.75	8.7	15.15	0.46
004_2012Oct11_Auto_CAM18Small_Z37_47-005	153200	<234.33	185.17	93.77	3862.78	428715.75	11.36	53.26	1.26	18.74	27.11	2.06
004_2012Oct11_Auto_CAM18Small_Z37_47-011	153200	<233.51	15.03	76.85	2773.95	418282.56	7.53	102.9	1.72	19.54	21.7	1.58
Averages	**153200**	**1282.66**	**31.77**	**167.49**	**2468.62**	**486607.10**	**9.68**	**95.57**	**5.90**	**24.28**	**16.39**	**0.95**
RAM01A (n=15)												
002_17Oct2012_RAM01ASmalls_Z1_11-002	153200	<567.34	<9.61	<18.12	946.95	444276.69	4.59	13.61	<0.210	5.42	6.81	<0.27
002_17Oct2012_RAM01ASmalls_Z1_11-003	153200	<402.30	14.93	<13.50	3099.71	470784.84	14.46	34.53	0.335	10.57	15.84	0.66
002_17Oct2012_RAM01ASmalls_Z1_11-004	153200	<500.67	<11.89	<15.23	4208.17	452918	19.21	75.72	5.6	34.52	25.48	0.71
002_17Oct2012_RAM01ASmalls_Z1_11-005	153200	<418.00	8.12	22.55	5284.01	428177.41	26.49	72.54	4.66	22.35	23.17	0.69
002_17Oct2012_RAM01ASmalls_Z1_11-006	153200	<405.70	37.01	78.35	1798.01	449276.75	5.83	125.26	1.92	12.5	11.84	1.22
002_17Oct2012_RAM01ASmalls_Z1_11-008	153200	<346.20	9.15	16.33	1220.91	450641.06	4.79	20.55	1.124	10.29	12.83	0.54
002_17Oct2012_RAM01ASmalls_Z1_11-010	153200	<282.27	9.76	137.81	5594.82	420087.44	29.96	74.1	2.52	15.32	28.61	0.61
003_17Oct2012_RAM01ASmalls_Z12_22-002	153200	<527.82	<13.66	<15.20	4968.91	462413.91	53.71	90.25	0.606	6.59	19.3	0.57
003_17Oct2012_RAM01ASmalls_Z12_22-004	153200	<404.09	10.41	22.29	1885.2	457667.97	11.57	24.67	0.168	3.87	10.85	0.43
003_17Oct2012_RAM01ASmalls_Z12_22-008	153200	<330.19	9.41	73.91	4940.34	487848.81	14.88	60.45	3.54	27.94	23.52	1.29
003_17Oct2012_RAM01ASmalls_Z12_22-011	153200	<238.82	<3.80	<6.98	7171.96	453894.94	26.53	86.73	4.68	30.19	33.01	1.18

Appendix L: Zircon LA-ICP-MS Elemental Analyses, Camaquã and Itajaí Igneous Units

	Trace Element Concentrations MDL Filtered											
Samples	**Si29**	**Ca42**	**Ti49**	**Fe56**	**Y89**	**Zr90**	**Nb93**	**Ce140**	**Pr141**	**Nd143**	**Sm147**	**Eu151**
002_26Oct2012_RMA01Large_Z1_8-001	153200	358.02	69.93	81.38	1840.48	467587.34	7	64.72	4.96	25.81	14.22	0.53
002_26Oct2012_RMA01Large_Z1_8-003	153200	342.75	11.59	318.39	2641.42	439987.63	7.72	76.92	9.12	41.9	22.72	1.97
002_26Oct2012_RMA01Large_Z1_8-005	153200	<204.41	24.19	494.69	2534.41	455227.63	10.49	72.14	0.53	7.27	13.06	1.45
002_26Oct2012_RMA01Large_Z1_8-007	153200	238.09	<4.44	16.9	1217.27	423193.19	8.61	44.48	3.02	16.75	8.76	0.444
Averages	**153200**	**312.95**	**20.45**	**126.26**	**3290.17**	**450932.24**	**16.39**	**62.44**	**3.06**	**18.09**	**18.00**	**0.88**
ITA-8 (n=38)												
002_18Oct2012_ITA-8_Z1_11-001	153200	<489.22	15.96	702.87	2358.09	456615.28	4.33	18.35	1.4	16.14	20.02	6.06
002_18Oct2012_ITA-8_Z1_11-002	153200	1322.62	14.92	46.63	2083.29	478299.03	5.83	79.24	8.51	40.41	21.04	4.67
002_18Oct2012_ITA-8_Z1_11-003	153200	4155.69	14.63	18.42	1943.62	480424.97	4.67	187.97	22.05	100.27	29.08	4.47
002_18Oct2012_ITA-8_Z1_11-007	153200	578.79	6.57	20.82	985.27	470688.25	4.48	17.52	1.4	8.21	5.45	2.22
002_18Oct2012_ITA-8_Z1_11-008	153200	1303.89	15	11.36	1536.53	461806.13	4.69	59.4	5.48	28.5	13.12	3.2
002_18Oct2012_ITA-8_Z1_11-009	153200	<319.98	10.15	<9.48	1295.51	469158.97	5.19	34.84	3.33	17.51	8.03	2.35
002_18Oct2012_ITA-8_Z1_11-010	153200	1940.8	17.55	12.68	2038.02	482599.78	5.91	66.84	8.32	35.53	19.42	3.37
002_18Oct2012_ITA-8_Z1_11-011	153200	21087.92	17.66	198.5	2053.82	461981.34	4.29	622.58	70.22	291.7	55.08	5.47
003_18Oct2012_ITA-8_Z12_22-003	153200	<467.29	<12.52	<14.78	1840.37	450893.69	3.6	11.52	0.734	11.09	14.46	4.25
003_18Oct2012_ITA-8_Z12_22-004	153200	1426.14	<9.83	25.35	1574.56	449604.75	4.56	56.96	5.37	27.7	13.32	3.22
003_18Oct2012_ITA-8_Z12_22-006	153200	1635.93	<9.32	22.55	2051.48	453094.91	4.83	91.45	9.56	51.6	21.25	4.37
003_18Oct2012_ITA-8_Z12_22-007	153200	<365.16	<8.33	<11.35	1397.16	463157.66	4.58	23.17	1.27	10.42	11.26	2.93
003_18Oct2012_ITA-8_Z12_22-008	153200	1836.18	<7.72	134.8	1676.67	474201.31	3.83	59.96	6.13	32.19	17.81	3.55
003_18Oct2012_ITA-8_Z12_22-011	153200	<469.38	18.83	620.56	1654.85	473980.22	6.05	25.36	1.67	10.29	10.72	2.86
004_18Oct2012_ITA-8_Z23_30-002	153200	4363.16	<11.22	<13.12	1822.68	498254.91	3.41	172.66	19.96	99.65	27.85	6.56
004_18Oct2012_ITA-8_Z23_30-003	153200	5592.61	<8.28	42.13	1485.82	466175.53	5.01	229.62	25.84	114.06	27.79	2.92
004_18Oct2012_ITA-8_Z23_30-006	153200	<387.07	14.32	<11.77	1675.8	506741.03	4.46	14.79	0.49	9.28	14.23	3.39
002_24Oct2012_ITA8Large_Z1_11-001	153200	1199.96	8.64	<7.28	1705.68	423416.38	8.04	46.44	4.74	29.01	14.97	4.09
002_24Oct2012_ITA8Large_Z1_11-002	153200	18350.71	33.48	133.48	2184.39	407788	10.8	831.09	98.53	424.56	79	5.07
002_24Oct2012_ITA8Large_Z1_11-003	153200	1406.5	14.72	32.11	766.06	414306.88	8.54	57.6	6.03	24.9	8.19	1.76
002_24Oct2012_ITA8Large_Z1_11-004	153200	82869.8	16.78	405.6	2411.28	394951	8.5	2592.66	315.48	1271.59	208.98	10.11
002_24Oct2012_ITA8Large_Z1_11-007	153200	<227.55	10.49	13.94	1040.09	420414.44	8.52	19.23	1.24	8.45	6.93	2.22
002_24Oct2012_ITA8Large_Z1_11-008	153200	2082.68	30.81	50.71	860.73	415627.97	10.54	130.01	14.3	57.9	12.94	0.96
002_24Oct2012_ITA8Large_Z1_11-009	153200	857.25	<3.15	5.28	2369.19	411117.59	11.45	74.46	7.59	40.65	17.45	2.48
002_24Oct2012_ITA8Large_Z1_11-010	153200	<221.99	10.63	25.82	1568.83	429621.16	10.05	15.86	0.589	8.41	8.35	2.49
002_24Oct2012_ITA8Large_Z1_11-011	153200	<203.04	11.27	<4.73	1760.79	440413.28	7.72	12.59	0.9	9.01	11.62	3.39
003_24Oct2012_ITA8Large_Z12_23-002	153200	<159.74	8.53	<3.75	1398.62	427625.22	8.77	15.48	0.322	7	8.36	2.67
003_24Oct2012_ITA8Large_Z12_23-007	153200	1051.22	11.62	52.5	1261.69	425895.25	7.41	47.23	4.74	26.83	11.33	2.75
003_24Oct2012_ITA8Large_Z12_23-008	153200	423.43	12.92	7.2	1686.48	444816.06	6.83	30.28	3.49	19.43	12.55	4.17
003_24Oct2012_ITA8Large_Z12_23-009	153200	<393.33	16.82	64.3	1973.09	450686.47	10.92	37.85	3.05	20.57	12.73	4.64
004_24Oct2012_ITA8Large_Z24_35-001	153200	<234.17	7.96	<5.59	2280.77	432004.59	8.23	30	2.03	14.59	16.67	4.19
004_24Oct2012_ITA8Large_Z24_35-002	153200	<257.46	<7.96	28.24	1328.21	440433.75	8.11	22.19	0.973	7.56	8.13	2.65
004_24Oct2012_ITA8Large_Z24_35-003	153200	6873.23	10.32	48.57	1776.95	432928.44	8.1	317.12	35.9	150.51	33.15	3.96
004_24Oct2012_ITA8Large_Z24_35-005	153200	<180.13	15.19	73.3	2134.46	451734.16	9.17	19.15	1.31	12.6	13.98	3.96
004_24Oct2012_ITA8Large_Z24_35-006	153200	6417.29	31.35	44.58	1333.31	459167.5	7.61	183.89	20.6	98.17	25.08	2.94
004_24Oct2012_ITA8Large_Z24_35-009	153200	983.51	53.13	71.34	2110.46	483455.25	9.05	46.26	5.36	31.17	21.02	4.96
004_24Oct2012_ITA8Large_Z24_35-010	153200	<179.23	10.68	13.47	1673.18	463405.94	7.43	15.6	0.79	10.06	13.39	2.97
004_24Oct2012_ITA8Large_Z24_35-011	153200	21702.41	11.96	260.39	1674.35	429870.22	9.47	962.8	113.83	474.65	87.9	4.13
Averages	**153200**	**8237.47**	**16.31**	**109.91**	**1704.53**	**449930.46**	**6.97**	**191.58**	**21.93**	**96.11**	**25.33**	**3.75**

Appendix L: Zircon LA-ICP-MS Elemental Analyses, Camaquã and Itajaí Igneous Units

Samples	**Gd155**	**Dy161**	**Yb173**	**Lu175**	**Hf178**	**Hg202**	**Tl203**	**Pb204**	**Tl205**	**Pb206**	**Pb207**	**Pb208**
CAM-1 (n=5)												
028_2011Nov2_Mt2_CAM1_Z46	37.69	127.47	440.49	81.46	10669.45	<0.00	<0.16	<2.17	<0.112	118.78	9.11	11.22
002_2012Dec4_Mt1_CAM1_Z001_011-003	108.45	433.62	1204.8	212.01	9253.39	<0.00	1.7	11.82	<0.72	112.58	8.8	22.24
002_2012Dec4_Mt1_CAM1_Z001_011-007	118.86	372.54	643.04	116.25	8991.52	<0.00	<1.57	<7.88	<1.05	89.36	9.84	11.29
002_2012Dec4_Mt1_CAM1_Z001_011-011	24.53	130.48	502.86	91.62	10935.2	<0.00	<1.24	<6.75	<0.75	149.59	11.87	10.58
002_2012Dec6_Mt1_CAM1_Z047_053-005	93.64	620.01	2093.84	321.93	12854.06	<0.00	<1.58	19.26	<1.00	401.19	28.56	36.85
Averages	**76.63**	**336.82**	**977.01**	**164.65**	**10540.72**	**#DIV/0!**	**1.70**	**15.54**	**#DIV/0!**	**174.30**	**13.64**	**18.44**
CAM-2 (n = 43)												
014_Mt2_CAM2_Z2	247.88	596.7	1672.4	312.18	17490.19	<0.00	<0.43	<5.13	<0.218	932.24	62.06	66.97
015_Mt2_CAM2_Z3	60.74	247.08	903.54	170.77	14397.81	<0.00	<0.37	<4.58	<0.190	277.56	17.1	25.46
017_Mt2_CAM2_Z5	134.32	350.41	1036.25	187.07	16613.48	<0.00	<0.44	<5.21	0.29	235.36	14.63	22.08
018_Mt2_CAM2_Z6	47.27	157.52	420.56	80.04	12958.67	<0.00	<0.48	8.79	<0.31	33.04	2.38	3.5
020_Mt2_CAM2_Z8	105.87	277.28	862.52	153.69	17198.85	<0.00	<0.50	19.4	<0.23	267.8	34.48	49.33
021_Mt2_CAM2_Z9	19.77	90.64	243.24	50.36	14940.11	<0.00	<0.63	<8.28	<0.36	32.99	2.69	3.4
022_Mt2_CAM2_Z10	40.69	128.41	374.67	68.85	15210.55	<0.00	0.41	<8.16	<0.27	46.51	12.4	14.87
029_2012Apr21_Mt2_CAM2_Z16	29.39	103.15	308.11	39.25	7047.06	<0.00	<0.57	<5.73	0.18	43.68	2.52	5.56
015_2012Apr20_Mt2_CAM2_Z20	199.99	837.62	1792.19	293.66	11005.08	<0.00	<0.219	4.71	<0.13	486	33.8	54.99
016_2012Apr20_Mt2_CAM2_Z21	289.13	508.56	924.64	166.44	10504.81	<0.00	<0.50	<5.05	<0.20	220.23	24.49	27.29
017_2012Apr20_Mt2_CAM2_Z22	22.82	119.35	473.59	91.39	11554.86	<0.00	<0.40	<5.19	<0.28	124.52	9.28	9.2
018_2012Apr20_Mt2_CAM2_Z23	22.23	69.2	194.84	37.63	8714.38	<0.00	0.3	<35.71	0.203	17.18	2.06	2.55
019_2012Apr20_Mt2_CAM2_Z24	135.04	441.02	904.88	159.06	10531.48	<0.00	0.42	3.68	<0.19	167.36	10.26	19.08
020_2012Apr20_Mt2_CAM2_Z25	113.17	534.21	1302.07	225.66	10206.22	<0.00	<0.33	7.89	<0.17	374.89	28.68	38.98
021_2012Apr20_Mt2_CAM2_Z26	49.66	159.11	371.59	72.72	8475.38	<0.00	<0.51	<4.05	<0.17	36.29	2.07	5.01
028_2012Apr20_Mt2_CAM2_Z30	82.97	214.26	684.27	124.98	11675.18	<0.00	<0.46	<4.03	<0.15	346.05	24.25	46.72
032_2012Apr20_Mt2_CAM2_Z34	30.38	119.82	286.39	57.38	7957.71	<0.00	<0.40	<4.02	<0.183	22.32	0.8	2.58
033_2012Apr20_Mt2_CAM2_Z345	21.73	84.29	244.07	44.02	9347.74	<0.00	<0.54	<4.25	<0.190	31.25	1.95	3.07
002_2012Nov30_Mt1_CAM2_Z2_12-002	49.78	223.7	740.09	130.24	10386.49	<0.00	<2.71	<13.39	<1.79	107.51	7.57	17.16
002_2012Nov30_Mt1_CAM2_Z2_12-006	59.22	204	701.87	139.2	8805.7	<0.00	<2.96	<12.67	<1.59	67.95	4.75	7.71
002_2012Nov30_Mt1_CAM2_Z2_12-007	24.92	104.93	356.55	70.29	8613.14	<0.00	<2.58	<10.97	<1.59	48.07	4.78	4.39
002_2012Nov30_Mt1_CAM2_Z2_12-010	65.64	198.23	809.12	154.19	12756.04	<0.00	<2.44	14.92	<1.31	282.04	19.22	21.53
003_2012Nov30_Mt1_CAM2_Z13_22-001	41.69	109.4	382.77	70.89	9651.79	<0.00	<2.30	<10.61	<1.44	61.56	6.23	7.27
003_2012Nov30_Mt1_CAM2_Z13_22-002	99.38	262.84	674.01	120.94	10295.08	<0.00	<1.47	<7.55	<0.98	109.2	7.21	12.91
003_2012Nov30_Mt1_CAM2_Z13_22-003	154.49	222.43	517.98	89.88	10639.88	<0.00	<1.58	<9.84	<1.05	108.99	9.19	10.88
003_2012Nov30_Mt1_CAM2_Z13_22-004	74.67	180.8	536.12	97.45	11209.66	<0.00	<3.12	21.59	<1.57	125.39	9.16	12.09
003_2012Nov30_Mt1_CAM2_Z13_22-005	77.93	268.88	572.24	99.35	9751.83	<0.00	<1.64	<8.27	<1.11	74.81	5.33	7.88
003_2012Nov30_Mt1_CAM2_Z13_22-007	64.93	139.84	422.54	69.36	9989.33	<0.00	<3.57	<18.66	2.8	73.41	3.55	5.66
003_2012Nov30_Mt1_CAM2_Z13_22-008	212.39	396.06	1027.86	190.66	12987.44	<0.00	<1.57	57.76	<0.93	374.28	83.94	86.27
004_2012Nov30_Mt1_CAM2_Z23_33-006	93.64	219.33	676.48	126.26	12555.73	<0.00	<2.80	17.12	<1.62	169.41	13.31	16.59
004_2012Nov30_Mt1_CAM2_Z23_33-007	80.62	249.83	686.42	129.78	11519.6	<0.00	<1.64	<8.11	<1.11	125.96	9.11	10.55
004_2012Nov30_Mt1_CAM2_Z23_33-009	116.05	210.58	633.16	112.42	10270.49	<0.00	<2.06	<12.19	<1.46	185.9	17.7	21.56
004_2012Nov30_Mt1_CAM2_Z23_33-011	167.38	448.56	1040.86	182.09	8985.37	<0.00	<1.98	<10.21	<1.48	120.54	9.02	23.99
002_2012Dec3_CAM2_Z034_044-001	47.11	134.87	621.22	123.27	12445.96	<-NaN	<1.95	<8.19	1.3	231.29	15.57	10.8
002_2012Dec3_CAM2_Z034_044-002	78.92	305.19	728.44	131	9412.35	<-NaN	3.27	7.84	<0.87	98.2	8.35	9.48
002_2012Dec3_CAM2_Z034_044-003	160.79	491.75	1220.64	231.57	9865.1	<-NaN	<1.43	22.56	<0.80	205.86	20.83	53.88
002_2012Dec3_CAM2_Z034_044-004	36.97	122.86	411.35	76.29	9847.43	<-NaN	<1.46	<7.05	<0.94	66.62	4.53	5.4
002_2012Dec3_CAM2_Z034_044-005	95.26	224.3	584.52	111.83	11325.24	<-NaN	<1.56	<6.76	<0.93	140.36	8.56	15.36
002_2012Dec3_CAM2_Z034_044-008	89.29	363.95	1038.87	178.81	9913.36	<-NaN	<1.19	9.78	<0.70	175.03	11.29	24.44
002_2012Dec3_CAM2_Z034_044-009	75.27	156.92	576.94	112	11072.86	<-NaN	<1.19	7.03	<0.78	218.01	16.45	17.97
002_2012Dec3_CAM2_Z034_044-010	55.93	174.46	531.53	100.62	10569.1	<-NaN	1.91	<9.21	<1.12	149.04	7.99	9.04
003_2012Dec3_CAM2_Z045_055-006	115.01	255.59	795.5	154.85	11324.15	<-NaN	<1.64	17.15	<1.06	281.38	20.6	28.78
003_2012Dec3_CAM2_Z045_055-007	107.2	310.51	743.71	130.2	10762.66	<-NaN	<1.49	<7.56	<0.91	117.72	6.82	13.11

Appendix L: Zircon LA-ICP-MS Elemental Analyses, Camaquã and Itajaí Igneous Units

Samples	Gd155	Dy161	Yb173	Lu175	Hf178	Hg202	Tl203	Pb204	Tl205	Pb206	Pb207	Pb208
Averages	**90.64**	**256.24**	**698.39**	**127.18**	**11181.05**	**#DIV/0!**	**1.26**	**15.73**	**0.95**	**172.41**	**14.35**	**19.89**
CAM-4 (n = 25)												
052_2011Oct26_Mt2_CAM4_Z12	131.48	465.2	1151.5	204.68	8333.86	<0.00	<0.29	<2.83	<0.171	95.4	6.81	18.92
025_2011Oct27_Mt2_CAM4_Z26	75.66	291.82	775.56	137.99	9611.94	<0.00	<0.23	<1.96	<0.091	165.97	11.25	19.37
010_2012June15_CAM4_Mt1_Z10	100.07	394.04	1044.24	190.06	9514.79	<0.00	0.57	<4.75	0.34	129.46	7.58	22.4
018_2012June15_CAM4_Mt1_Z3	96.4	400.45	1502.48	282.28	13329.01	<0.00	<0.50	<5.87	<0.20	741.35	57.28	62.53
020_2012June15_CAM4_Mt1_Z5	218.07	503.86	1286.54	220.19	12172.47	<0.00	<0.45	4.87	<0.17	270.49	23.22	30.89
021_2012June15_CAM4_Mt1_Z6	70.14	248.75	813.98	152.98	12004.57	<0.00	<0.39	<4.51	<0.22	162.25	13.59	18.29
022_2012June15_CAM4_Mt1_Z7	85.66	273.65	745.59	135.77	9005.28	<0.00	<0.55	<5.55	0.48	83.94	6.08	10.15
024_2012June15_CAM4_Mt1_Z9	243.28	482.32	924.2	162.05	8181.71	<0.00	<0.45	4.32	<0.19	63.3	5.87	14.96
016_2012June18_CAM4_Mt1_Z12	153.14	540.34	1141.96	209.51	8293.86	<0.00	<0.46	7.57	<0.22	69.54	4.93	13.13
019_2012June18_CAM4_Mt1_Z15	165.25	348.89	681.63	121.05	9703.15	<0.00	<0.217	<5.05	<0.19	85.86	7.12	10.27
020_2012June18_CAM4_Mt1_Z16	57.69	221.19	712.79	129.65	8229.28	<0.00	<0.33	<4.52	<0.171	53.43	3.63	9.61
021_2012June18_CAM4_Mt1_Z17	191.19	522.86	1203.82	209.56	12778.67	<0.00	<0.73	11.94	<0.21	211.17	19.14	22.04
024_2012June18_CAM4_Mt1_Z20	135.14	364.8	1039.97	190.29	11225.77	<0.00	<0.34	3.45	<0.12	180.71	11.68	20.89
033_2012June18_CAM4_Mt1_Z23	128.91	365	862.19	160.17	9601.63	<0.00	0.29	<3.22	0.21	121.84	13.1	16.58
039_2012June18_CAM4_Mt1_Z29	163.39	619.59	1730.22	318.31	10201.15	<0.00	<0.37	<3.77	0.16	353.5	26.7	49.09
040_2012June18_CAM4_Mt1_Z30	95.77	378.09	990.08	174.6	9952.16	<0.00	<0.35	6.58	<0.14	152.83	9.58	23.91
042_2012June18_CAM4_Mt1_Z32	156.64	361.23	795.74	133.61	8613.82	<0.00	0.36	5.72	<0.170	76.25	6.65	14.3
043_2012June18_CAM4_Mt1_Z33	39.19	132.6	399.28	72.42	9692.94	<0.00	<0.47	5	0.26	40.92	3.7	5.45
015_2012June20_CAM4_Mt1_Z36	114.54	416.46	1074.27	192.95	8992.26	<0.00	<0.45	<4.08	<0.197	113.84	7.54	16.11
016_2012June20_CAM4_Mt1_Z37	81.53	261.66	876.14	158.04	10274.61	<0.00	<0.95	<9.68	<0.295	181.48	14.29	19.71
018_2012June20_CAM4_Mt1_Z39	302.26	439.57	761.44	139.91	12994.37	<0.00	<0.34	15.34	<0.17	153.87	10.65	14.71
021_2012June20_CAM4_Mt1_Z42	109.23	396.06	1093.16	200.59	11859.97	<0.00	<0.73	18.98	<0.272	141.91	8.13	17.21
022_2012June20_CAM4_Mt1_Z43	103.87	404.98	1144.75	200.96	12018.84	<0.00	<0.46	<5.50	<0.24	233.12	18.25	23.15
023_2012June20_CAM4_Mt1_Z44	63.8	231.51	627.69	114.84	9393.46	<0.00	<0.41	<6.56	<0.17	76.51	6.56	10.08
025_2012June20_CAM4_Mt1_Z46	100.88	294.93	805.44	151.93	12874.39	<0.00	<0.61	<6.10	<0.25	222.62	15.35	17.31
Averages	**127.33**	**374.39**	**967.39**	**174.58**	**10354.16**	**#DIV/0!**	**0.41**	**8.38**	**0.29**	**167.26**	**12.75**	**20.04**
CAM-11 (n=52)												
015_2011Nov4_Mt2_CAM11_Z1	31.71	128.44	249.32	40.81	8498.63	<0.00	<0.147	<1.71	0.081	184.04	12.06	8.25
016_2011Nov4_Mt2_CAM11_Z2	44.34	129.13	300.14	55.73	11145.24	<0.00	<0.20	4.04	<0.096	333.32	22.54	16.23
017_2011Nov4_Mt2_CAM11_Z3	65.74	200.35	369.73	61.64	8604	<0.00	<0.19	<1.83	<0.086	234.1	16.1	12.97
018_2011Nov4_Mt2_CAM11_Z4	46.03	177.19	309.69	51.61	7556.27	<0.00	0.28	<1.91	<0.094	213.18	13.68	12.16
020_2011Nov4_Mt2_CAM11_Z6	48.09	158.92	348.83	61.59	10557.45	<0.00	<0.15	2.42	<0.090	268.11	18.96	13.22
021_2011Nov4_Mt2_CAM11_Z7	79.3	197.03	473.57	79.06	12085.07	<0.00	<0.33	<3.57	<0.19	442.49	31.7	22.29
024_2011Nov4_Mt2_CAM11_Z10	29.42	115.81	279.67	50.56	9533.25	<0.00	<0.15	2	<0.097	216.56	14.93	10.4
026_2011Nov4_Mt2_CAM11_Z12	58.09	198.85	379.74	64.2	9387.07	<0.00	<0.14	<1.96	<0.097	195.23	12.39	10.67
015_2011Nov10_Mt2_CAM11_Z13	28.18	83.8	274.07	49.25	12368.84	<0.00	<0.24	<2.25	<0.106	343.08	22.36	15.77
016_2011Nov10_Mt2_CAM11_Z14	42.13	147.62	287.51	48.75	9068.8	<0.00	<0.24	3.77	<0.109	255.39	16.66	14.02
017_2011Nov10_Mt2_CAM11_Z15	88	330.98	548.96	88.23	7203.75	<0.00	<0.23	<1.95	<0.118	216.53	13.49	13.1
018_2011Nov10_Mt2_CAM11_Z16	67.86	231.31	425.13	71.93	8755.3	<0.00	<0.22	<2.34	<0.133	244.41	15.94	15.51
019_2011Nov10_Mt2_CAM11_Z17	101.55	346.05	530.13	87.85	6815.63	<0.00	<0.27	<2.28	0.187	229.04	15.9	14.6
023_2011Nov10_Mt2_CAM11_Z21	69.47	253.65	467.17	75.55	8670.41	<0.00	<0.23	<2.28	<0.119	262.46	18.11	15.56
024_2011Nov10_Mt2_CAM11_Z22	111.97	312.99	543.1	96.2	8743.79	<0.00	0.32	<2.00	<0.112	336.92	21.15	37.72
031_2011Nov10_Mt2_CAM11_Z23	46.04	159.48	307.64	52.11	6835.43	<0.00	<0.20	<1.94	<0.105	170.8	11.25	8.78
032_2011Nov10_Mt2_CAM11_Z24	63.5	228.6	395.42	64.9	7451.33	<0.00	<0.24	<2.05	<0.103	200.87	13.34	11.63
034_2011Nov10_Mt2_CAM11_Z26	40.91	151.52	322.14	54.84	9378.7	<0.00	<0.192	<2.19	<0.098	209.83	13.76	10.54
035_2011Nov10_Mt2_CAM11_Z27	82.74	239.45	392.82	64.42	8640.57	<0.00	<0.201	<2.17	<0.081	234.43	15.75	15.61
038_2011Nov10_Mt2_CAM11_Z30	52.67	179.01	318.21	52.08	7291.88	<0.00	<0.24	<2.07	<0.109	153.87	11.06	7.55
039_2011Nov10_Mt2_CAM11_Z31	33.03	103.98	334.37	63.17	11698.38	<0.00	0.24	<2.21	<0.111	366.06	25.24	17.56

Appendix L: Zircon LA-ICP-MS Elemental Analyses, Camaquã and Itajaí Igneous Units

Samples	**Gd155**	**Dy161**	**Yb173**	**Lu175**	**Hf178**	**Hg202**	**Tl203**	**Pb204**	**Tl205**	**Pb206**	**Pb207**	**Pb208**
048_2011Nov10_Mt2_CAM11_Z33	55.42	197.52	327.13	54.9	7034.65	<0.00	<0.22	<2.11	<0.096	230.68	15.5	14.42
049_2011Nov10_Mt2_CAM11_Z34	33.24	112.62	252.18	45.63	10125.26	<0.00	<0.175	<2.02	<0.123	270.77	18.2	14.11
050_2011Nov10_Mt2_CAM11_Z35	67.47	224.54	370.78	59.67	6917.92	<0.00	<0.22	<2.16	<0.107	273	18.39	18.12
052_2011Nov10_Mt2_CAM11_Z37	56.16	194.75	335.66	56.34	8089.44	<0.00	<0.22	<2.03	<0.078	251.77	16.79	15.47
053_2011Nov10_Mt2_CAM11_Z38	48.25	175.99	433.23	75.68	11749.15	<0.00	<0.204	3.28	<0.079	320.87	22.17	17.64
054_2011Nov10_Mt2_CAM11_Z39	38.29	117.13	292.54	52.77	11231.48	<0.00	<0.14	2.22	<0.085	237.08	16.73	10.32
055_2011Nov10_Mt2_CAM11_Z40	73.85	213.07	393.59	67.52	9021.41	<0.00	<0.23	<2.17	<0.093	247.02	16.42	13.88
056_2011Nov10_Mt2_CAM11_Z41	62.01	174.18	301.75	48.49	8184.78	<0.00	<0.22	<2.02	<0.117	199.68	13.07	11.01
016_2011Nov11_Mt2_CAM11_Z44	146.42	370.82	549.18	90.48	6903.78	<0.00	<0.206	<1.87	<0.111	228.86	15.76	15.17
017_2011Nov11_Mt2_CAM11_Z45	39.88	128.65	249.44	40.73	8569.2	<0.00	<0.30	<1.97	<0.114	183.43	12.66	9.17
018_2011Nov11_Mt2_CAM11_Z46	60.88	212.99	450.81	79.88	9429.72	<0.00	<0.34	<2.17	<0.135	321.69	20.86	17.35
020_2011Nov11_Mt2_CAM11_Z48	61.69	213.93	376.01	62.83	6487.19	<0.00	<0.26	<2.35	<0.107	189.74	12.37	10.57
021_2011Nov11_Mt2_CAM11_Z49	16.25	80.61	335.83	65.45	11879.23	<0.00	<0.164	<1.76	<0.10	386.58	27.41	17.2
022_2011Nov11_Mt2_CAM11_Z50	64.88	164.11	276.04	47.12	7890.02	<0.00	<0.24	2.86	<0.119	213.52	13.79	11.75
026_2011Nov11_Mt2_CAM11_Z52	29.53	85.38	211.53	38.52	10731.07	<0.00	<0.28	3.83	<0.127	269.67	18.05	11.95
027_2011Nov11_Mt2_CAM11_Z53	39.7	119.26	343.58	63.59	12057.09	<0.00	<0.20	3.15	<0.127	372.38	25.93	17.79
015_2011Nov15_Mt2_CAM11_Z55	71.54	195.43	358.34	58.62	8445.25	<0.00	<0.22	<1.96	<0.110	199.35	13.1	10.92
016_2011Nov15_Mt2_CAM11_Z56	61.62	176.9	444.4	79.02	11236.01	<0.00	0.32	<2.35	<0.116	328.62	23.12	16.27
017_2011Nov15_Mt2_CAM11_Z57	41.03	117.88	272.31	49.49	12148.94	<0.00	<0.23	<2.63	<0.135	191.09	14.34	9.65
020_2011Nov15_Mt2_CAM11_Z60	24.81	86.5	247.32	43.68	12515.68	<0.00	<0.27	<2.32	0.12	281.23	17.92	11.77
021_2011Nov15_Mt2_CAM11_Z61	49.3	192.33	387.72	62.6	9468.21	<0.00	<0.17	<2.32	<0.140	203.78	13.24	10.59
022_2011Nov15_Mt2_CAM11_Z62	23.09	90.88	249.34	43.56	11654.46	<0.00	<0.178	<2.17	<0.122	208.23	13.53	9.55
023_2011Nov15_Mt2_CAM11_Z63	109.98	332.6	543.68	87.87	7496.41	<0.00	<0.189	<1.59	<0.085	234.55	15.84	16.7
018_2011Nov17_Mt2_CAM11_Z68	90.68	221.23	398.67	68.76	12639.66	<0.00	<0.16	5.31	<0.110	337.95	24.75	17.87
019_2011Nov17_Mt2_CAM11_Z69	41.82	115.16	264.54	47.47	10763.72	<0.00	<0.25	<2.44	<0.13	270.14	19.17	14.05
020_2011Nov17_Mt2_CAM11_Z70	106.73	343.69	551.28	89.28	6992.2	<0.00	<0.24	<2.02	<0.095	238.25	15.82	15.95
021_2011Nov17_Mt2_CAM11_Z71	29.09	111.33	253.51	42.42	10331.42	<0.00	<0.20	<2.18	<0.116	232.73	16.99	10.98
022_2011Nov17_Mt2_CAM11_Z72	49.89	119.93	290.1	51.46	10233.46	<0.00	<0.232	29.7	0.22	283	39.15	35.11
029_2011Nov17_Mt2_CAM11_Z74	44.07	142.24	262.58	46.2	9495.98	<0.00	<0.25	<2.24	<0.122	217.34	14.83	10.17
031_2011Nov17_Mt2_CAM11_Z76	46.51	165.92	302.13	48.99	7468.28	<0.00	<0.27	2.05	<0.138	182.89	11.28	9.72
032_2011Nov17_Mt2_CAM11_Z77	142.72	168.19	286.82	53.27	11247.98	<0.00	<0.22	4.55	<0.116	317.39	22.24	21.26
Averages	**58.80**	**181.54**	**355.18**	**60.71**	**9398.63**	**#DIV/0!**	**0.29**	**5.32**	**0.15**	**254.50**	**17.61**	**14.44**
ITA-4a (n=62)												
014_2012May7_Mt2_ITA4a_Z1	40.3	164.65	425.2	73.23	8328.38	<-NaN	<0.36	<4.56	<0.227	39.84	2.24	3.2
015_2012May7_Mt2_ITA4a_Z2	36.45	133.24	335.34	58.72	7383.64	<-NaN	<0.40	<4.63	0.17	35.42	2.42	4.11
016_2012May7_Mt2_ITA4a_Z4	46.26	191.01	477.79	82.23	8544.5	<-NaN	<0.32	<3.87	<0.159	65.01	4.42	6.41
020_2012May7_Mt2_TA4a_Z5	34.47	153.33	422.58	78.49	8842.42	<-NaN	<0.48	<4.96	<0.168	46.36	2.54	3.8
024_2012May7_Mt2_ITA4a_Z10	108.54	354.7	719.73	130.93	7341.68	<-NaN	<0.41	5.77	<0.172	61.1	6.7	9.44
025_2012May7_Mt2_ITA4a_Z11	55.84	164.63	405.04	75	9945.29	<-NaN	<0.42	<4.46	<0.186	68.26	4.61	5.06
026_2012May7_Mt2_ITA4a_Z12	45.17	175.86	460.41	84.7	9690.25	<-NaN	0.74	<3.85	<0.16	54.04	5.16	4.9
027_2012May7_Mt2_ITA4a_Z13	172.79	370.07	696.23	120.72	7589.93	<-NaN	<0.38	<3.16	0.16	86.55	5.96	13.06
033_2012May7_Mt2_ITA4a_Z15	34.56	148.59	387.18	67.28	8274.44	<-NaN	<0.44	6.42	<0.14	32.73	1.88	3.15
034_2012May7_Mt2_ITA4a_Z16	42.88	153.03	422.91	76.92	9284.94	<-NaN	<0.36	<4.48	<0.113	67.51	4.59	4.97
036_2012May7_Mt2_ITA4a_Z18	35.76	101.33	268.25	55.03	7058.85	<-NaN	<0.56	<4.84	<0.134	13.16	1.37	3.72
037_2012May7_Mt2_ITA4a_Z19	92.75	333.39	674.73	116.52	7243.45	<-NaN	0.38	<4.14	<0.15	36.22	2.31	5.06
038_2012May7_Mt2_ITA4a_Z20	65.39	220.7	582.08	105.01	10081.25	<-NaN	<0.25	<4.30	<0.160	91.21	5.71	13.4
039_2012May7_Mt2_ITA4a_Z21	69.21	231.54	607.29	109.46	10836.8	<-NaN	<0.39	<3.77	<0.152	101.06	7.27	8.25
040_2012May7_Mt2_ITA4a_Z23	130.47	377.47	772.17	142.33	6767.88	<-NaN	<0.42	<4.69	<0.177	39.82	1.88	8.36
041_2012May7_Mt2_ITA4a_Z24	114.05	393.78	837.24	147.52	7389.7	<-NaN	<0.45	<3.85	<0.18	70.97	4.7	8.99
047_2012May7_Mt2_ITA4a_Z26	147.83	473.02	975.7	177.47	7975.78	<-NaN	<0.35	<4.01	<0.136	57.33	4.26	10.71
048_2012May7_Mt2_ITA4a_Z27	127.63	295.53	591.89	109.19	9276.24	<-NaN	<0.27	<4.06	<0.173	57.07	5.03	6.65

Samples	Gd155	Dy161	Yb173	Lu175	Hf178	Hg202	Tl203	Pb204	Tl205	Pb206	Pb207	Pb208
049_2012May7_Mt2_ITA4a_Z28	22.97	78.66	229.8	45.6	8743.92	<-NaN	0.38	<3.91	<0.17	23.39	1.42	2.48
052_2012May7_Mt2_ITA4a_Z31	80.15	247.1	528.53	94.66	7601.29	<-NaN	<0.48	<3.95	<0.18	58.21	4.67	12.16
053_2012May7_Mt2_ITA4a_Z32	39.16	132.69	367.31	66.26	8160.79	<-NaN	<0.30	<4.11	<0.140	42.81	3.33	5.57
054_2012May7_Mt2_ITA4a_Z33	45.6	168.49	428.23	78.43	9756.61	<-NaN	<0.293	<3.80	<0.137	44.05	2.92	4.4
055_2012May7_Mt2_ITA4a_Z34	39.99	169.48	436.13	78.12	8850.37	<-NaN	<0.36	<4.53	<0.17	55.43	3.51	5.98
056_2012May7_Mt2_ITA4a_Z35	27.4	88.6	251.47	52.71	8417.58	<-NaN	<0.35	<4.65	<0.16	14.85	1.64	3.66
015_2012May8_Mt2_ITA4a_Z36	100.8	282.49	686.26	122.37	7621.03	<0.00	<0.44	<4.01	<0.16	48.17	3.55	6.66
016_2012May8_Mt2_ITA4a_Z37	36.26	135.21	362.22	66.66	9308.33	<0.00	<0.31	<4.74	<0.173	53.35	3.22	4.15
017_2012May8_Mt2_ITA4a_Z38	30.39	115.92	300.53	58.94	7597.9	<0.00	<0.213	<4.46	<0.158	31.33	2.32	3.28
018_2012May8_Mt2_ITA4a_Z39	113.89	253.08	518.74	90.68	9053.27	<0.00	<0.50	<4.85	<0.18	37.26	2.13	4.9
019_2012May8_Mt2_ITA4a_Z40	49.58	189.28	433	76.89	7440.12	<0.00	0.24	<4.05	<0.18	22.4	1.48	2.91
021_2012May8_Mt2_ITA4a_Z42	54.6	204.79	518.9	94.24	8884.28	<0.00	<0.37	<4.84	<0.16	54.56	3.01	5.92
022_2012May8_Mt2_ITA4a_Z43	76.75	212.45	502.75	90.95	8120.91	<0.00	0.36	<4.30	<0.21	44.35	2.94	14.44
023_2012May8_Mt2_ITA4a_Z44	94.39	314.71	712.62	127.38	7026.55	<0.00	<0.34	7.59	<0.14	58.73	4.62	8.37
030_2012May8_Mt2_ITA4a_Z48	99.84	327.14	786.25	139.51	9441.32	<0.00	<0.47	<5.20	<0.192	67.63	4.09	9.97
031_2012May8_Mt2_ITA4a_Z49	103.7	263.84	565.43	105.62	7212.99	<0.00	<0.46	<5.15	<0.156	51.88	3.84	8.25
032_2012May8_Mt2_ITA4a_Z50	51.89	201.52	471.11	81.91	8284.92	<0.00	<0.44	<6.13	<0.22	39.34	2.68	3.97
034_2012May8_Mt2_ITA4a_Z52	24.26	112.38	343.67	60.87	9487.95	<0.00	<0.49	<4.82	<0.25	47.05	2.96	4.39
035_2012May8_Mt2_ITA4a_Z53	41.07	147.25	351.62	65.91	9795.84	<0.00	<0.39	6.2	<0.201	49.77	3.65	4
036_2012May8_Mt2_ITA4a_Z54	100.84	317.82	739.53	136.03	8749.24	<0.00	<0.27	<4.19	0.15	61.67	2.48	7.29
003_2012Dec6_Mt1_ITA4a_Z001_Z011-001	37.75	151.12	397.9	75.37	8815.66	<0.00	<1.55	<6.67	<0.93	51.18	3.14	4.89
003_2012Dec6_Mt1_ITA4a_Z001_Z011-003	151.27	484.13	1036.83	186.73	7480.64	<0.00	<1.33	<7.19	0.83	71.47	5.46	12.97
003_2012Dec6_Mt1_ITA4a_Z001_Z011-004	205.49	359.9	602.94	102.67	8116.08	<0.00	<1.65	<7.58	<0.97	47.04	3.07	6.42
003_2012Dec6_Mt1_ITA4a_Z001_Z011-005	37.99	127.08	343.83	63.82	8023.67	<0.00	2.24	<8.80	<1.05	17.92	1.62	2.23
003_2012Dec6_Mt1_ITA4a_Z001_Z011-006	74.37	173.68	437.92	76.21	7152.04	<0.00	<1.44	<7.88	1.49	38.57	3.35	7.5
003_2012Dec6_Mt1_ITA4a_Z001_Z011-008	68.6	213.01	426.74	69.51	6917.45	<0.00	<1.50	<7.01	<0.80	33.24	1.85	4.73
003_2012Dec6_Mt1_ITA4a_Z001_Z011-009	58.46	242.28	523.74	91.18	7496.25	<0.00	<1.64	<7.56	<0.98	55.35	3.26	6.26
003_2012Dec6_Mt1_ITA4a_Z001_Z011-010	97.19	272.95	670.14	118.35	9353.84	<0.00	<1.74	<9.83	<1.03	96.88	8.05	10.76
003_2012Dec6_Mt1_ITA4a_Z001_Z011-011	43.18	182.25	491.12	87.12	9220.52	<0.00	<1.92	<8.81	<1.04	65.83	4.41	5.18
004_2012Dec6_Mt1_ITA4a_Z012_Z022-001	55.36	216.3	543.39	103.17	9191.99	<0.00	<2.79	<12.40	<1.55	58.98	4.07	6.33
004_2012Dec6_Mt1_ITA4a_Z012_Z022-002	83.46	246.72	571.35	109.9	7708.58	<0.00	<1.40	<7.26	<0.89	61.55	3.22	12.81
004_2012Dec6_Mt1_ITA4a_Z012_Z022-003	49.53	150.4	380.23	71.11	9247.49	<0.00	<1.44	<8.30	<0.91	61.25	3.17	5.05
004_2012Dec6_Mt1_ITA4a_Z012_Z022-004	72.17	265.86	663.05	118.78	8696.65	<0.00	<1.56	9.36	<1.03	89.4	5.96	10.49
004_2012Dec6_Mt1_ITA4a_Z012_Z022-005	152.78	406.43	803.36	146.99	8430.23	<0.00	<1.56	<7.94	<0.84	83.44	5.78	10.88
004_2012Dec6_Mt1_ITA4a_Z012_Z022-006	86.77	220.2	425.71	73.15	7191.1	<0.00	<1.64	<8.35	<0.89	35.1	2.45	4.34
004_2012Dec6_Mt1_ITA4a_Z012_Z022-007	40.31	160.63	433.77	80.72	8219.2	<0.00	<1.78	<8.43	<1.01	48.45	2.32	4.56
004_2012Dec6_Mt1_ITA4a_Z012_Z022-008	28.24	133.01	372.17	65.77	8541.97	<0.00	<1.54	<8.26	<1.04	50.49	2.09	4.39
005_2012Dec6_Mt1_ITA4a_Z023_Z033-001	48.87	191.63	421.53	74.74	7420.87	<0.00	<1.34	<6.20	<0.75	42.89	2.54	4.38
005_2012Dec6_Mt1_ITA4a_Z023_Z033-002	52.74	207.86	523.53	86.94	9227.33	<0.00	<1.68	<6.73	<0.89	59.91	3.45	6.22
005_2012Dec6_Mt1_ITA4a_Z023_Z033-005	88.29	278.35	644.33	118.02	6854.98	<0.00	<1.41	<6.24	<0.76	55.25	4.98	6.19
005_2012Dec6_Mt1_ITA4a_Z023_Z033-006	54.46	186.68	488.34	89.58	9762	<0.00	<1.50	<6.36	<0.78	93.08	5.99	5.33
005_2012Dec6_Mt1_ITA4a_Z023_Z033-007	48.83	212	518.15	89.16	8153.97	<0.00	<1.52	<7.53	<0.86	44.31	2.96	3.72
005_2012Dec6_Mt1_ITA4a_Z023_Z033-010	49.27	202.46	529.74	94.26	9312.96	<0.00	<1.76	<8.32	<0.90	76.41	5.24	8.47
005_2012Dec6_Mt1_ITA4a_Z023_Z033-011	75.58	214	465.29	80.86	7220.59	<0.00	<2.24	<11.06	<1.43	45.14	3.64	5.08
Averages	**70.88**	**224.16**	**521.14**	**93.85**	**8373.66**		**0.72**	**7.07**	**0.56**	**53.44**	**3.64**	**6.54**
CAM-10b (n=17)												
017_2012Oct12_CAM10b_Z3	138.76	391.23	724.26	123.52	6417.98	<0.00	<1.23	<3.68	<0.72	24.49	1.98	5.18
018_2012Oct12_CAM10b_Z4	149.21	405.27	838.64	146.52	5704.6	<0.00	2.02	<4.89	<0.74	27.42	1.75	5.26
019_2012Oct12_CAM10b_Z5	119.41	321.09	640.79	114.75	5412.45	<0.00	1.47	<5.24	<0.83	22.58	1.38	5.63
021_2012Oct12_CAM10b_Z7	131.98	409.88	760.88	131.35	6105.79	<0.00	<1.32	<4.79	<0.81	37.77	3.98	11.9
022_2012Oct12_CAM10b_Z8	178.22	494.65	940.75	164.6	5905.4	<0.00	<1.33	<4.48	<0.82	28.63	2.43	5.17

Samples	Gd155	Dy161	Yb173	Lu175	Hf178	Hg202	Tl203	Pb204	Tl205	Pb206	Pb207	Pb208
023_2012Oct12_CAM10b_Z9	175.4	508.74	919.83	163.28	5942.86	<0.00	<1.25	<4.47	<0.76	37.4	2.56	8.23
024_2012Oct12_CAM10b_Z10	223.82	432.64	750.34	125.74	5079.98	<0.00	<1.22	<4.66	<0.67	46.67	5.15	17.07
031_2012Oct12_CAM10b_Z11	721.89	573.57	943.5	159.55	5866.02	<0.00	<2.39	<10.36	<1.48	30.95	2	16.36
032_2012Oct12_CAM10b_Z12	158.16	475.41	881.91	153.21	6046.54	<0.00	<1.12	<4.59	<0.80	26.93	1.72	6.33
034_2012Oct12_CAM10b_Z14	117.23	319.33	634.73	117.58	5875.44	<0.00	<1.44	<5.48	<0.86	22.88	1.64	6.18
035_2012Oct12_CAM10b_Z15	119.53	358.87	666.27	116.86	6054.88	<0.00	<1.14	<5.00	<0.79	45.49	3.1	13.89
037_2012Oct12_Auto_Stds_CAM10b_Z17_23-002	129.04	336	681.63	121.76	5542.47	<0.00	<2.91	<12.83	<1.75	19.5	1.97	4.77
037_2012Oct12_Auto_Stds_CAM10b_Z17_23-003	84.25	284.63	558.73	91.89	6220.25	<0.00	<4.28	<16.33	<2.50	33.21	2.57	7.81
037_2012Oct12_Auto_Stds_CAM10b_Z17_23-012	163.06	391.91	811.83	147.12	6076.73	<0.00	<1.19	<4.94	<0.66	20.79	1.66	4.58
050_2012Oct12_CAM10b_Z24	124.4	297.15	641.46	120.82	5685.23	<0.00	<1.33	8.53	<0.88	13.54	1.08	3.98
054_2012Oct12_Stds_CAM10b_Z28_31-003	208.43	612.19	1110.86	192.85	6539.46	<0.00	3.08	<8.20	<1.16	37.99	2.77	7.44
054_2012Oct12_Stds_CAM10b_Z28_31-004	98.48	329.31	675.3	103.56	5824.69	<0.00	<12.24	45.25	13.4	35.5	16.35	13.4
Averages	**178.90**	**408.35**	**775.39**	**135.00**	**5900.05**		**2.19**	**26.89**	**13.40**	**30.10**	**3.18**	**8.42**
LRA303 (n=45)												
002_15Oct2012_NIST12_LRA303_Z1-10-004	48.41	179.51	487.97	90.71	8326.17	<0.00	<2.79	<6.99	<1.59	62.55	3	6
002_15Oct2012_NIST12_LRA303_Z1-10-005	51.42	190.32	478.88	85.9	8350.87	<0.00	<2.51	<6.13	<1.73	78.44	5.81	8.27
002_15Oct2012_NIST12_LRA303_Z1-10-006	61.35	238.14	589.28	107.43	9041.2	<0.00	<2.44	<6.77	<1.62	111.17	9.5	14.81
002_15Oct2012_NIST12_LRA303_Z1-10-011	49.44	204.48	541.07	97.02	9639.28	<0.00	<1.59	5.26	<0.96	90.69	7.54	8.89
002_15Oct2012_NIST12_LRA303_Z1-10-013	67.17	265.58	677.99	120.37	8322.41	<0.00	<1.41	<4.49	<0.83	108.55	7.18	11.06
003_15Oct2012_Stds_LRA303_Z11_17-007	53.72	211.86	534.92	98.01	9687.6	<0.00	<1.80	<6.49	<1.07	79.75	5.69	8.9
003_15Oct2012_Stds_LRA303_Z11_17-008	77.78	249.26	712.24	129.76	9427.54	<0.00	<1.62	<5.44	<0.98	117.19	7.99	12.91
003_15Oct2012_Stds_LRA303_Z11_17-009	39.89	160.83	439.86	87.55	10101.68	<0.00	<1.77	<5.90	<1.07	91.32	6.09	9.52
003_15Oct2012_Stds_LRA303_Z11_17-010	100.74	385.15	819.92	147.23	9838.56	<0.00	<1.64	<5.14	<1.01	101.98	7.81	10.43
003_15Oct2012_Stds_LRA303_Z11_17-012	77.54	298.65	732.53	132.89	9452.11	<0.00	<1.63	<5.20	<0.97	106.02	7.24	11.63
003_15Oct2012_Stds_LRA303_Z11_17-014	38.34	155.03	401.43	73.74	9989.26	<0.00	<1.85	<6.75	<1.19	70.17	4	5.72
004_15Oct2012_Stds_LRA303_Z19_26-011	60.5	254.63	668.44	119.94	9295.64	<0.00	<1.48	<4.77	<0.92	113.4	7.7	11.81
004_15Oct2012_Stds_LRA303_Z19_26-012	100.02	419.14	752.8	130.93	9944.04	<0.00	<4.05	19.15	<2.37	100.95	9.11	11.45
004_15Oct2012_Stds_LRA303_Z19_26-013	51.61	196.92	564.29	100.98	9816.83	<0.00	<1.35	<4.41	0.96	79.45	6.51	7.77
002_16Oct2012_LRA303Small_Z27_37-001	123.65	418.44	932.07	168.41	9361.99	<0.00	<1.80	8.53	<1.30	117.21	9.5	15.5
002_16Oct2012_LRA303Small_Z27_37-005	46.16	147.69	429.48	79.33	9610.31	<0.00	<1.73	<6.74	<1.13	78.07	4.91	7.5
002_16Oct2012_LRA303Small_Z27_37-006	71.77	281.62	639.45	109.72	8486.72	<0.00	<1.81	<7.79	<1.06	62.22	6.16	9.07
002_16Oct2012_LRA303Small_Z27_37-011	134.46	491.25	804.85	131.93	9662.57	<0.00	<1.97	9.02	<1.11	102.62	7.75	11.02
003_16Oct2012_LRA303Small_Z38_49-001	62.71	223.53	664.39	118.58	10731.52	<0.00	<3.06	<10.40	<1.40	100.17	8.7	10.37
003_16Oct2012_LRA303Small_Z38_49-006	81.06	314.14	871.82	163.67	10420.16	<0.00	2.2	<6.53	<1.07	121.44	6.76	11.22
003_16Oct2012_LRA303Small_Z38_49-009	64.42	309.19	720.96	130.24	10133.4	<0.00	<1.54	7.93	<0.94	81.65	9.6	9.91
003_16Oct2012_LRA303Small_Z38_49-010	70.52	257.56	707.13	123.83	9309.46	<0.00	<1.40	6.06	<1.03	92.75	7.5	8.89
003_16Oct2012_LRA303Small_Z38_49-011	71.15	276.89	717.79	130.2	9439.03	<0.00	<1.54	<6.02	<0.86	89.09	4.75	8.87
003_16Oct2012_LRA303Small_Z38_49-012	69.48	257.96	661.92	118.42	10481.01	<0.00	<1.75	9.58	<1.09	98.17	7.31	13.49
004_16Oct2012_LRA303Small_Z50_61-001	80.25	350.25	792.95	138.2	10507.16	<0.00	<3.84	24.77	<2.35	99.68	8.23	10.49
004_16Oct2012_LRA303Small_Z50_61-004	70.02	333.77	760.76	126.78	10001.74	<0.00	<1.78	<11.01	<1.42	88.14	15.08	23.02
004_16Oct2012_LRA303Small_Z50_61-005	58.92	241.02	623.01	114.95	10062.11	<0.00	<2.02	<7.85	<1.22	93.37	7.66	8.43
004_16Oct2012_LRA303Small_Z50_61-006	67.11	260.16	600.34	107.81	9855.87	<0.00	<1.77	<7.89	<1.20	77.89	5.84	7.04
004_16Oct2012_LRA303Small_Z50_61-007	27.81	110.24	339	61.19	9430.56	<0.00	<1.61	<7.49	<0.96	60.07	4.04	4.98
004_16Oct2012_LRA303Small_Z50_61-011	51.05	186.11	519.39	89.4	9199.95	<0.00	<1.43	<5.54	<0.85	88.64	6.33	9.79
004_16Oct2012_LRA303Small_Z50_61-012	92.77	360.67	834.24	133.36	9708.32	<0.00	<1.42	<7.59	<0.92	84.98	8.16	10.71
002_25Oct2012_LRA303Large_Z1_11-001	86.4	341.07	737.39	127.12	8112.24	<0.00	<1.84	<5.98	<1.05	49.73	3.33	5.24
002_25Oct2012_LRA303Large_Z1_11-002	88.4	399.55	894.28	146.87	8607.35	<0.00	<1.64	<5.29	<0.93	115.91	7.74	11.54
002_25Oct2012_LRA303Large_Z1_11-003	66.7	258.76	546.62	96.27	7596.18	<0.00	<1.30	<6.15	<0.98	30.22	1.98	3.32
002_25Oct2012_LRA303Large_Z1_11-006	78.92	292.52	722.87	132.36	10298.16	<0.00	<1.06	<5.20	<0.90	87.51	6.9	9.18
002_25Oct2012_LRA303Large_Z1_11-009	126.46	580.75	1255.67	210.08	8635.08	<0.00	<0.90	<4.39	<0.53	114.2	7.51	11.85
003_25Oct2012_LRA303Large_Z12_23-003	25.46	91.56	242.28	46.12	7593.11	<0.00	<1.10	<4.60	<0.61	16.17	1.29	1.97

Samples	**Gd155**	**Dy161**	**Yb173**	**Lu175**	**Hf178**	**Hg202**	**Tl203**	**Pb204**	**Tl205**	**Pb206**	**Pb207**	**Pb208**
003_25Oct2012_LRA303Large_Z12_23-006	190.11	723.65	1460.1	232.41	8579.33	<0.00	<0.54	3.88	<0.34	184.96	12.23	23.55
003_25Oct2012_LRA303Large_Z12_23-007	267.54	381.8	709.71	120.66	8094.61	<0.00	<0.76	9.94	<0.38	100.41	14.72	19.53
003_25Oct2012_LRA303Large_Z12_23-008	111.73	489.14	1100.78	185.57	8872.78	<0.00	<0.50	<2.62	<0.37	89.95	6.04	8.52
003_25Oct2012_LRA303Large_Z12_23-009	145.47	566.2	1156.04	192.56	8734.15	<0.00	<0.61	4.08	<0.37	190.55	13.77	25.5
003_25Oct2012_LRA303Large_Z12_23-010	43.75	165.54	395.86	71.8	7717.07	<0.00	<0.64	<3.31	<0.45	35.25	2.22	3.82
003_25Oct2012_LRA303Large_Z12_23-011	113.37	519.74	1067.1	177.15	8898.17	<0.00	<0.51	3.2	<0.32	178.86	14.33	21.64
004_25Oct2012_LRA303Large_Z23_30-002	59.54	252.55	585.31	102.89	8127.96	<0.00	0.65	<3.57	<0.41	47.77	3.33	4.41
004_25Oct2012_LRA303Large_Z23_30-006	161.06	735.04	1555.12	261.42	8591.64	<0.00	<0.62	<3.23	<0.34	139.4	8.5	14.94
Averages	**81.91**	**311.73**	**721.12**	**126.04**	**9246.51**	**#DIV/0!**	**1.43**	**9.28**	**0.96**	**93.97**	**7.27**	**10.77**
CAM-18 (n=27)												
015_2012Oct5_CAM18Large_Z1	52.83	160.38	450.3	85.33	9368.63	<0.00	<0.72	5.71	<0.42	62	4.07	5.58
016_2012Oct5_CAM18Large_Z2	45.75	195.95	536.07	99.39	9503.79	<0.00	0.98	<2.24	<0.43	71.75	4.69	6.92
019_2012Oct5_CAM18Large_Z5	31.52	124.92	386.69	72.01	8684.1	<0.00	<0.72	<2.34	<0.45	67.5	4.19	5.64
022_2012Oct5_CAM18Large_Z8	25.52	104.62	348.84	66.86	9362.91	<0.00	<0.67	<2.39	<0.44	70.78	5.15	5.81
028_2012Oct5_CAM18Large_Z11	77.76	307.62	784.22	142.04	9347.51	<0.00	<0.76	6.95	<0.47	116.46	7.38	11.38
029_2012Oct5_CAM18Large_Z12	62.23	239.3	660.19	119.45	10122.71	<0.00	<0.64	2.42	<0.41	89.17	6.18	7.76
031_2012Oct5_CAM18Large_Z14	46.45	169.88	444.62	82.62	8558.03	<0.00	<0.62	3.04	<0.40	45.02	2.36	4.07
017_2012Oct8_CAM18Small_Z2	52.52	197.54	565.39	105.15	9251.73	<0.00	<0.57	<2.13	<0.35	69.38	5.03	6.61
018_2012Oct8_CAM18Small_Z3	78.07	314.42	814.9	145.91	10721.4	<0.00	<0.54	<2.21	<0.33	93.79	7.16	9.54
024_2012Oct8_CAM18Small_Z9	124.16	435.8	977.75	159.19	10414.61	<0.00	<2.60	<10.08	<1.68	107.9	5.78	17.98
017_2012Oct9_CAM18Small_Z14	70.46	266.65	665.34	125.1	10293.64	<0.00	<0.46	<2.35	<0.29	75.88	5.83	8.39
018_2012Oct9_CAM18Small_Z15	53.1	225.62	615.64	117.66	10228.6	<0.00	<0.56	3.25	<0.32	96.86	5.48	7.97
020_2012Oct9_CAM18Small_Z18	86.96	335.49	769.86	138.13	8187.83	<0.00	<0.67	5.28	<0.39	94.09	7.24	12.18
022_2012Oct9_CAM18Small_Z20	31.7	142.97	419.87	77.6	9625.82	<0.00	<0.82	<3.41	<0.47	78.27	5.32	6.53
024_2012Oct9_CAM18Small_Z22	81.44	320.24	813.49	147.2	9927.09	<0.00	<0.62	<2.72	<0.37	122.12	8.78	12.71
025_2012Oct9_CAM18Small_Z23	108.55	417.43	990.16	179.06	9434.5	<0.00	<0.64	<2.26	<0.34	161.24	11.95	18.92
002_2012Oct11_Auto_CAM18Small_Z27_36-002	54.11	214.84	594.41	113.17	9952.22	<0.00	<1.09	<5.21	<0.70	79.32	4.92	7.39
002_2012Oct11_Auto_CAM18Small_Z27_36-003	89.16	336.95	871.83	150.78	9451.57	<0.00	2.96	<11.03	<1.50	129.2	9.3	12.43
002_2012Oct11_Auto_CAM18Small_Z27_36-004	70.81	258.5	661.57	122.9	10253.93	<0.00	<1.54	<7.69	<0.97	100.85	7.05	10.6
002_2012Oct11_Auto_CAM18Small_Z27_36-005	28.53	110.73	364.88	68.93	9410.25	<0.00	1.18	<4.71	<0.74	51.37	4.12	4.26
002_2012Oct11_Auto_CAM18Small_Z27_36-007	56.18	233.29	605.3	116.58	9808.24	<0.00	<1.04	9.77	0.73	114.35	7.31	10.2
002_2012Oct11_Auto_CAM18Small_Z27_36-008	75.04	303.07	757.56	142.7	10086.22	<0.00	<1.37	6.41	<0.79	106.93	7.8	12.07
002_2012Oct11_Auto_CAM18Small_Z27_36-010	66.11	186.89	504.91	88.24	10705.58	<0.00	<1.03	5.41	<0.64	94.47	5.36	9.31
004_2012Oct11_Auto_CAM18Small_Z37_47-003	48.55	206.66	592.66	110.87	9898.98	<0.00	<1.20	<7.23	<0.75	97.01	5.84	8.87
004_2012Oct11_Auto_CAM18Small_Z37_47-004	69.75	273.33	688.71	121	9775.02	<0.00	<1.24	<5.33	<0.75	100.78	6.2	9.26
004_2012Oct11_Auto_CAM18Small_Z37_47-005	112.5	431.32	926.12	161.86	8790.02	<0.00	<1.34	<5.20	0.94	81.08	7.12	10.27
004_2012Oct11_Auto_CAM18Small_Z37_47-011	100.61	290.52	711.56	124.12	9908.83	<0.00	<1.12	<5.10	<0.68	89.41	4.99	8.57
Averages	**66.68**	**252.03**	**648.99**	**117.92**	**9669.40**		**1.71**	**5.36**	**0.84**	**91.37**	**6.17**	**9.30**
RAM01A (n=15)												
002_17Oct2012_RAM01ASmalls_Z1_11-002	33.06	101.05	250.14	49.77	7036.72	<0.00	<4.30	<13.83	<2.92	10.7	<1.33	0.91
002_17Oct2012_RAM01ASmalls_Z1_11-003	87.51	329.77	747.08	136.83	8540.8	<0.00	<2.68	<10.59	<1.71	51.73	2.55	5.35
002_17Oct2012_RAM01ASmalls_Z1_11-004	108.91	447.28	964.94	167.01	8474.61	<0.00	<3.14	<9.37	<1.84	84.03	5.48	9.28
002_17Oct2012_RAM01ASmalls_Z1_11-005	131.45	564.48	1193.4	208.1	8368.18	<0.00	2.08	<8.20	<1.66	114.12	8.2	13.64
002_17Oct2012_RAM01ASmalls_Z1_11-006	44.17	177.19	438.77	80.94	8939.05	<0.00	<2.76	<9.93	<1.76	60.95	3.71	5.23
002_17Oct2012_RAM01ASmalls_Z1_11-008	49.65	138.66	318.15	62.24	6914.92	<0.00	<2.01	<6.26	<1.28	13.04	0.93	1.67
002_17Oct2012_RAM01ASmalls_Z1_11-010	145.69	608.36	1258.19	212.32	8332.17	<0.00	<1.75	<5.71	<1.02	125.98	9.5	14.66
003_17Oct2012_RAM01ASmalls_Z12_22-002	116.6	542.89	1125.27	191.59	9237.07	<0.00	<3.08	<12.21	<1.95	168.61	11.44	19.07
003_17Oct2012_RAM01ASmalls_Z12_22-004	46.85	191.82	475.68	88.39	8506.32	<0.00	<2.29	<8.36	<1.47	32	2.32	3.39
003_17Oct2012_RAM01ASmalls_Z12_22-008	137.11	522.28	1175.96	197.22	9047.63	<0.00	<2.06	<8.51	<1.24	84.55	6.25	8.74
003_17Oct2012_RAM01ASmalls_Z12_22-011	178.35	815.43	1711.96	273.93	8959.08	<0.00	<1.40	<5.09	<0.85	133.55	8.77	14.61

Samples	**Gd155**	**Dy161**	**Yb173**	**Lu175**	**Hf178**	**Hg202**	**Tl203**	**Pb204**	**Tl205**	**Pb206**	**Pb207**	**Pb208**
002_26Oct2012_RMA01Large_Z1_8-001	47.75	182.37	503.35	89.89	9579.62	<-NaN	<2.24	<4.43	<1.13	73.65	4.73	7.06
002_26Oct2012_RMA01Large_Z1_8-003	78.64	266.95	692.37	125.83	9129.86	<-NaN	<1.36	<5.46	<1.05	111.48	8.54	17.38
002_26Oct2012_RMA01Large_Z1_8-005	62.57	249.49	693.71	121.63	9452.27	<-NaN	<1.11	<4.17	<0.59	92.98	6.52	9.68
002_26Oct2012_RMA01Large_Z1_8-007	28.26	121.45	371.24	69.92	9658.47	<-NaN	<0.95	<3.44	<0.58	77.98	5.04	5.52
Averages	**86.44**	**350.63**	**794.68**	**138.37**	**8678.45**		**2.08**	**#DIV/0!**	**#DIV/0!**	**82.36**	**6.00**	**9.08**
ITA-8 (n=38)												
002_18Oct2012_ITA-8_Z1_11-001	74.67	251.65	579.3	111.36	6946.72	<0.00	<2.99	<13.14	<1.99	21.09	1.08	3.57
002_18Oct2012_ITA-8_Z1_11-002	66.05	217.74	548.75	107.87	7500.53	<0.00	<3.02	<9.10	<1.94	26.66	2.3	4.12
002_18Oct2012_ITA-8_Z1_11-003	73.72	203	515.69	99.9	7472.12	<0.00	<2.81	<8.23	<1.66	20.66	0.95	3.21
002_18Oct2012_ITA-8_Z1_11-007	27.46	91.47	291.93	59.41	7164.02	<0.00	<2.11	<6.63	<1.29	12.22	<0.64	1.15
002_18Oct2012_ITA-8_Z1_11-008	43.52	152.93	452.37	85.61	6995.69	<0.00	<2.06	<7.70	<1.44	22.37	2.27	2.83
002_18Oct2012_ITA-8_Z1_11-009	33.39	124.4	394.82	78.53	7191.62	<0.00	<1.84	<7.49	<1.26	22.38	1.64	3
002_18Oct2012_ITA-8_Z1_11-010	62.87	208.95	569.99	109.24	7342.14	<0.00	<1.98	<6.96	<1.31	23.72	1.77	2.97
002_18Oct2012_ITA-8_Z1_11-011	81.4	247.59	496.77	100.04	6921.05	<0.00	<2.23	<8.28	<1.52	20.89	2.06	3.44
003_18Oct2012_ITA-8_Z12_22-003	59.26	200.96	487.84	94.12	6988.85	<0.00	<3.55	<11.58	<1.75	17.21	1.58	2.6
003_18Oct2012_ITA-8_Z12_22-004	51.82	168.82	430.2	82.19	7132.95	<0.00	<2.45	<8.41	<1.73	22.32	1.54	3.2
003_18Oct2012_ITA-8_Z12_22-006	68.96	221.11	569.02	110.05	7249.55	<0.00	<2.23	<8.12	<1.25	25.11	0.9	3
003_18Oct2012_ITA-8_Z12_22-007	41.17	140.42	407.26	79.77	7291.95	<0.00	<2.21	1017.98	<1.32	1087.5	1097.57	1091.34
003_18Oct2012_ITA-8_Z12_22-008	60.89	169.04	415.27	84.01	7414.6	<0.00	<1.93	<8.37	<1.21	16.98	1.93	2.76
003_18Oct2012_ITA-8_Z12_22-011	46.78	164.82	451.78	89.37	7135.32	<0.00	<2.85	<6.91	<1.56	22.59	1.84	2.89
004_18Oct2012_ITA-8_Z23_30-002	66.7	196.99	469.57	92.54	7767.03	<0.00	2.06	<13.33	<1.44	16.59	<0.97	2.27
004_18Oct2012_ITA-8_Z23_30-003	49.18	149.88	442.85	85.27	7314.71	<0.00	<2.08	<9.84	<1.59	20.66	1.25	2.14
004_18Oct2012_ITA-8_Z23_30-006	48.23	163.07	495.77	104.03	7835.2	<0.00	1.56	<8.90	<1.45	21.2	1.4	2.66
002_24Oct2012_ITA8Large_Z1_11-001	52.89	179.29	442.69	87.16	7262.13	<0.00	<1.95	<8.22	<1.37	17.09	1.64	2.49
002_24Oct2012_ITA8Large_Z1_11-002	97.09	239.21	569.38	108.61	7491.91	<0.00	<1.93	<7.20	<1.24	28.62	2.42	4.49
002_24Oct2012_ITA8Large_Z1_11-003	22.08	72.7	234.7	46.56	7412.68	<0.00	<1.42	<4.58	<1.08	14.86	1.09	1.52
002_24Oct2012_ITA8Large_Z1_11-004	200.6	306.15	518.89	95.98	7083.68	<0.00	<2.36	8.72	<1.20	23.02	2.49	5.04
002_24Oct2012_ITA8Large_Z1_11-007	28.27	97.87	334.68	65.42	7053.9	<0.00	<1.40	<4.02	<0.73	16.35	0.87	1.56
002_24Oct2012_ITA8Large_Z1_11-008	25.59	76.8	282.95	57.81	7789.45	<0.00	<1.24	<4.74	<0.72	15.93	1.24	1.36
002_24Oct2012_ITA8Large_Z1_11-009	69.21	251.04	629.97	119.28	8681.98	<0.00	<1.25	<4.85	<0.78	43.15	2.68	5.59
002_24Oct2012_ITA8Large_Z1_11-010	42.34	152.76	470.4	91.47	7416.78	<0.00	<1.20	<4.34	<0.73	22.38	1.12	2
002_24Oct2012_ITA8Large_Z1_11-011	58.78	183.34	471.3	89.61	7784.31	<0.00	<1.14	<3.85	<0.70	17.58	0.95	2.88
003_24Oct2012_ITA8Large_Z12_23-002	37	129.61	458.73	91.65	7536.41	<0.00	<0.85	<3.39	<0.55	26.42	1.97	2
003_24Oct2012_ITA8Large_Z12_23-007	38.47	131.7	368.18	74.57	7569.71	<0.00	<0.86	<3.95	<0.50	15.72	1.3	1.98
003_24Oct2012_ITA8Large_Z12_23-008	51.55	183.51	460.45	90.04	7965.3	<0.00	<0.71	<3.60	<0.47	17.69	0.7	2.58
003_24Oct2012_ITA8Large_Z12_23-009	52.2	206.37	502.82	90.96	7753	<0.00	<2.32	<9.00	<1.34	34.81	3.22	5.27
004_24Oct2012_ITA8Large_Z24_35-001	74.65	236.66	611.56	116.9	7757.29	<0.00	<1.27	<5.80	<0.72	29.98	1.67	5
004_24Oct2012_ITA8Large_Z24_35-002	31.06	125.48	397.45	79.02	7691.62	<0.00	<1.23	<6.18	<0.81	28.69	2.42	3.71
004_24Oct2012_ITA8Large_Z24_35-003	66.76	184.14	523.09	97.4	7753.71	<0.00	<1.39	<6.43	<0.73	27.68	2	2.83
004_24Oct2012_ITA8Large_Z24_35-005	64.16	223.99	570.55	107.33	8142.76	<0.00	<0.93	<4.23	<0.57	23.19	1.83	2.97
004_24Oct2012_ITA8Large_Z24_35-006	47.15	134.8	400.6	76.49	8012.97	<0.00	<1.20	<6.05	<0.77	18.02	1.18	1.85
004_24Oct2012_ITA8Large_Z24_35-009	66.7	225.04	552.84	103.89	8764.76	<0.00	<0.98	<5.11	<0.57	22.2	1.07	3.1
004_24Oct2012_ITA8Large_Z24_35-010	52.77	175.27	492.79	93.79	8139.27	<0.00	<0.97	<5.40	<0.55	22.4	1.72	3.18
004_24Oct2012_ITA8Large_Z24_35-011	89.21	181.53	510.27	97.47	7556.93	<0.00	<1.56	<8.31	<0.86	28.61	3.21	4.57
Averages	**58.54**	**178.16**	**469.04**	**90.91**	**7533.81**	**#DIV/0!**	**1.81**	**513.35**		**50.38**	**32.14**	**31.66**

Appendix L: Zircon LA-ICP-MS Elemental Analyses, Camaquã and Itajaí Igneous Units

				1 Sigma Error							
Samples	**Th232**	**U235**	**U238**	**Si29**	**Ca42**	**Ti49**	**Fe56**	**Y89**	**Zr90**	**Nb93**	**Ce140**
CAM-1 (n=5)											
028_2011Nov2_Mt2_CAM1_Z46	185.52	1057.43	341.07	5073.11	290.28	2.63	4.52	47.82	254662.38	0.61	6.03
002_2012Dec4_Mt1_CAM1_Z001_011-003	368.92	1164.06	336.57	6341.23	497.26	7.93	16.82	203.4	141152.22	1.1	4.75
002_2012Dec4_Mt1_CAM1_Z001_011-007	242.18	851.75	287.49	5911.91	360.13	7.12	12.05	148.36	128277.34	1.07	2.81
002_2012Dec4_Mt1_CAM1_Z001_011-011	200.82	1231.24	430.9	5172.74	213.4	4.93	6	65.34	126715.07	0.83	2.12
002_2012Dec6_Mt1_CAM1_Z047_053-005	714.57	3624.39	1158.46	5443.38	305.31	9.02	35.68	378.14	234906.02	6.67	4.72
Averages	**342.40**	**1585.77**	**510.90**	**5588.47**	**333.28**	**6.33**	**15.01**	**168.61**	**177142.61**	**2.06**	**4.09**
CAM-2 (n = 43)											
014_Mt2_CAM2_Z2	1486.55	8093.23	2873.2	5283.97	333.56	25.63	7.24	338.79	125037.98	4.6	87.04
015_Mt2_CAM2_Z3	461.04	1873.51	779.46	6099.54	467.01	35.16	13.96	162.44	132024.19	1.21	6.93
017_Mt2_CAM2_Z5	504.59	1969.5	769.08	5310.86	549.48	23.4	7.02	209.15	167439.92	1.44	32.2
018_Mt2_CAM2_Z6	86.61	290.68	91.04	5371.27	295.72	29.88	5.25	98.68	189887.78	0.73	2.32
020_Mt2_CAM2_Z8	727.51	2312.87	768.58	5242.86	237.16	27.31	36.81	181.43	213342.89	1.38	24.19
021_Mt2_CAM2_Z9	59.86	229.73	73.79	6190.5	444.03	47.32	8.78	58.38	231095.03	1.2	2.44
022_Mt2_CAM2_Z10	72	212.16	98.51	5098.46	215.32	21.39	3.51	90.84	268240.97	0.75	3.31
029_2012Apr21_Mt2_CAM2_Z16	95.34	281.98	127.1	5174.28	266.77	15.33	6.87	111.86	265103.84	1.09	3.88
015_2012Apr20_Mt2_CAM2_Z20	1125.48	4043.15	1502.56	6087.84	319.98	29.39	20.46	274.13	219806.14	4.45	7.83
016_2012Apr20_Mt2_CAM2_Z21	705.11	1969.87	739.23	6063.3	314.13	35.93	23.88	151.3	216478.48	4.55	23.35
017_2012Apr20_Mt2_CAM2_Z22	164.95	1040.69	362.81	5328.02	263.21	18.87	4.86	46.95	220303.63	0.78	1.62
018_2012Apr20_Mt2_CAM2_Z23	30.73	248.7	54.21	5804.14	923.82	45.34	13.71	24.54	226156.2	0.45	1.69
019_2012Apr20_Mt2_CAM2_Z24	366.46	1568.03	484.34	5644.95	445.16	23.72	7.54	141.78	227673.03	1.72	5.42
020_2012Apr20_Mt2_CAM2_Z25	674.15	3336.48	1077.82	5454.56	248.84	20.22	6.8	171.15	226708.91	2.94	4.89
021_2012Apr20_Mt2_CAM2_Z26	84.6	311.58	97.95	5214.26	189.57	17.16	3.34	49.19	228193.81	0.4	0.87
028_2012Apr20_Mt2_CAM2_Z30	849.43	2746.14	967.79	5653.99	303.62	23.38	7.16	80.07	230281.7	1.33	5.41
032_2012Apr20_Mt2_CAM2_Z34	45.77	116.13	59.82	5431.49	236.46	19.87	7.99	40.12	236773.52	0.42	0.64
033_2012Apr20_Mt2_CAM2_Z345	60.66	303.77	91.29	5663.24	238.8	21.61	4.43	30.88	238723.22	0.64	1
002_2012Nov30_Mt1_CAM2_Z2_12-002	325.86	983.13	301.13	5241.56	285.23	6.02	7.76	83.06	170622.45	0.69	2.4
002_2012Nov30_Mt1_CAM2_Z2_12-006	158.92	761.37	210.68	5836.3	402.73	10.43	11.54	81.49	169380.11	0.9	3.24
002_2012Nov30_Mt1_CAM2_Z2_12-007	80.48	417.17	141.45	5773.3	426.45	9.02	28.07	42.02	171564.13	0.74	0.91
002_2012Nov30_Mt1_CAM2_Z2_12-010	413.28	2830.88	833.53	5322.59	294.82	6.39	9.81	79.9	170709.31	0.86	3.8
003_2012Nov30_Mt1_CAM2_Z13_22-001	128.49	752.98	186.64	5336.32	385.27	23.26	31.86	42.07	176412.06	0.86	2.24
003_2012Nov30_Mt1_CAM2_Z13_22-002	289.62	987.86	348.87	5382.2	453.82	9.96	6.29	87.69	170550.02	0.82	4.44
003_2012Nov30_Mt1_CAM2_Z13_22-003	311.42	1177.7	371.56	5045.96	209.5	6.29	12.77	63.22	163750.61	1.08	15.95
003_2012Nov30_Mt1_CAM2_Z13_22-004	210.96	1403.21	372.11	5747.97	997.46	34.87	23.41	65.25	170798.31	1.04	4.37
003_2012Nov30_Mt1_CAM2_Z13_22-005	147.87	908.8	209.43	5271.86	198.95	5.18	4.99	79.42	162989.28	0.77	3.58
003_2012Nov30_Mt1_CAM2_Z13_22-007	129.41	607.55	218.14	5849.27	888.7	17.35	34.52	52.09	169781.48	0.79	6.56
003_2012Nov30_Mt1_CAM2_Z13_22-008	525.82	3236.59	956.49	5273.02	212.43	14.91	26.65	126.19	172315.78	1.49	17.76
004_2012Nov30_Mt1_CAM2_Z23_33-006	309.5	1782.03	537	5656.15	411.41	12.18	10.58	75.87	190238.47	1.34	11.98
004_2012Nov30_Mt1_CAM2_Z23_33-007	201.86	1217.84	341.91	5314.67	304.92	6.15	7.98	84.73	165495.11	0.84	4.5
004_2012Nov30_Mt1_CAM2_Z23_33-009	367.56	1727.15	568.74	5275.43	242.56	14.8	21.76	69.73	165796.39	1.13	9.33
004_2012Nov30_Mt1_CAM2_Z23_33-011	1005.9	1309.56	446.96	5400.01	294.07	13.09	13.37	135.84	169436.05	1.12	4.9
002_2012Dec3_CAM2_Z034_044-001	195.02	2134.25	651.09	5286.11	325.49	6.8	16.91	70.82	146185.8	1.15	18.48
002_2012Dec3_CAM2_Z034_044-002	171.17	925.11	276.3	5714.14	363.62	43.97	14.37	121.74	152222.05	1.29	2.66
002_2012Dec3_CAM2_Z034_044-003	849.14	1934.18	636.68	5500.94	271.48	41.53	25.03	198.34	150248.86	1.94	9.64
002_2012Dec3_CAM2_Z034_044-004	107.88	747.51	191.02	5206.95	238.1	7.01	6.95	59.57	147414.88	0.52	1.36
002_2012Dec3_CAM2_Z034_044-005	302.55	1311.07	400.57	5226.56	367.85	11.48	6.39	98.84	141771.47	1.02	5.94
002_2012Dec3_CAM2_Z034_044-008	459.35	1489	487.67	5307.51	226.4	5.17	5.69	159.4	150048.75	0.69	2.22
002_2012Dec3_CAM2_Z034_044-009	321.23	1989.25	613.24	5108.12	224.89	4.33	18.24	77.13	132278.59	1.09	7.11
002_2012Dec3_CAM2_Z034_044-010	162.54	1202.73	380.34	5445.94	324.49	7.72	7.81	81.26	131933.28	1.12	3.27
003_2012Dec3_CAM2_Z045_055-006	418.83	2354.99	830.61	5543.5	280.26	18.44	30.86	113.25	138663.47	1.14	14.12
003_2012Dec3_CAM2_Z045_055-007	242.07	973.62	321.42	5131.16	195.48	7.06	10.14	119.87	134085.08	0.87	6.39

Appendix L: Zircon LA-ICP-MS Elemental Analyses, Camaquã and Itajaí Igneous Units

					1 Sigma Error							
Samples	**Th232**	**U235**	**U238**		**Si29**	**Ca42**	**Ti49**	**Fe56**	**Y89**	**Zr90**	**Nb93**	**Ce140**
Averages	**359.01**	**1537.53**	**508.19**	**#DIV/0!**	**5472.44**	**351.61**	**19.17**	**13.57**	**105.36**	**182510.77**	**1.29**	**8.89**
CAM-4 (n = 25)												
052_2011Oct26_Mt2_CAM4_Z12	387.1	989.26	297.9		5147.54	155.54	3.32	5.83	152.6	118369.68	0.58	3.72
025_2011Oct27_Mt2_CAM4_Z26	397.42	1510.83	478.84		5193.6	198.75	4.4	4.13	97.39	126877.19	0.89	5.74
010_2012June15_CAM4_Mt1_Z10	478.03	1299.41	382.43		6064.91	355.92	17.49	27.08	149.19	477391.88	1.16	6.77
018_2012June15_CAM4_Mt1_Z3	1046.49	6407.11	1973.19		5912.08	428.56	27.8	120.68	181.21	468932.81	2.33	9.15
020_2012June15_CAM4_Mt1_Z5	746.35	3005.52	936.47		6206.6	787.4	20.43	61.36	190.43	523135.06	1.97	21.98
021_2012June15_CAM4_Mt1_Z6	345.15	1395.64	531.77		6469.98	598.94	23.03	57.73	116.96	525137.25	1.68	6.52
022_2012June15_CAM4_Mt1_Z7	189.17	570.42	230.52		6419.44	548.31	17.76	33.33	115.27	516816.38	0.98	4.98
024_2012June15_CAM4_Mt1_Z9	261.65	485.1	204.39		5877.5	1791.51	16.21	39.13	162.34	554214.5	0.91	38.34
016_2012June18_CAM4_Mt1_Z12	253.46	603.24	193.69		5718	314.14	16.16	6.31	206.05	185408.72	0.77	2.34
019_2012June18_CAM4_Mt1_Z15	215.18	671.61	251.93		6356.3	1632.96	28.13	75.67	133	187403.81	1.4	27.93
020_2012June18_CAM4_Mt1_Z16	184.81	447.37	164.37		5292.61	230.53	9.63	5.07	101.16	194281.48	0.57	1.72
021_2012June18_CAM4_Mt1_Z17	554.02	2110.13	766.26		6805.28	1033.29	46.49	68.6	208.69	197852.92	6	10.31
024_2012June18_CAM4_Mt1_Z20	404.52	1521.9	531.57		5962.27	698.4	17.26	19.54	171.64	190454.92	1.09	12.55
033_2012June18_CAM4_Mt1_Z23	325.97	1019.66	389.52		6194.17	291.92	16.32	135.54	162.03	227870.69	1.54	6.77
039_2012June18_CAM4_Mt1_Z29	1006.21	3031.42	1055.62		5628.39	511.78	15.77	30.46	287.47	239827.83	2.07	10.77
040_2012June18_CAM4_Mt1_Z30	478.09	1199.12	454.23		5459.86	243.91	11.29	5.01	173.34	250958.5	0.97	5.87
042_2012June18_CAM4_Mt1_Z32	243.53	633.64	218.59		5674.04	934.35	13.35	21.34	153.53	245065.97	0.81	18.83
043_2012June18_CAM4_Mt1_Z33	87.05	335.62	127.97		6997.66	431.55	17.67	31.31	73.39	253380.08	1.13	3.27
015_2012June20_CAM4_Mt1_Z36	337.46	1569.18	351.6		5965.35	262.14	14.05	9.22	161.52	367567.75	0.94	2.42
016_2012June20_CAM4_Mt1_Z37	309.93	1770.16	533.48		7166.31	686.54	47.74	66.52	127.46	318502.66	1.86	5.8
018_2012June20_CAM4_Mt1_Z39	305.28	1549.66	486.19		6289.73	2559.75	20.07	59.62	141.13	352798.69	2.73	45.83
021_2012June20_CAM4_Mt1_Z42	364.55	1126.82	462.99		6578.78	926.07	27.41	22.44	175.77	356808.53	1.25	9.77
022_2012June20_CAM4_Mt1_Z43	463.52	2024.75	701.02		5924.96	564.95	14.26	26.17	165.64	343729.78	1.39	11.02
023_2012June20_CAM4_Mt1_Z44	213.97	982.17	230.33		5696.21	293.97	11.72	25.65	94.18	324197.66	0.79	7.09
025_2012June20_CAM4_Mt1_Z46	348.63	3008.78	692.35		5672.9	559.87	15.11	24.88	119.98	357879.78	1.67	8
Averages	**397.90**	**1570.74**	**505.89**		**6026.98**	**681.64**	**18.91**	**39.30**	**152.85**	**316194.58**	**1.50**	**11.50**
CAM-11 (n=52)												
015_2011Nov4_Mt2_CAM11_Z1	160.31	1445.38	496.13		5085.97	101.79	1.71	2.2	39.78	135972.02	0.86	1.18
016_2011Nov4_Mt2_CAM11_Z2	306.54	2856.61	975.97		5159.93	249.88	3.15	23.46	39.19	138084.64	0.55	2.42
017_2011Nov4_Mt2_CAM11_Z3	227.86	1915.69	637.2		5439.73	224.53	4.22	17.93	61.06	144121.8	0.7	2.19
018_2011Nov4_Mt2_CAM11_Z4	219.46	1640.15	568.59		5106.99	99.89	3.97	18.87	52.88	144905.2	0.92	1.52
020_2011Nov4_Mt2_CAM11_Z6	257.83	2081.58	723.02		5308.51	487.49	5.02	9.31	52.15	153595.81	0.82	5.2
021_2011Nov4_Mt2_CAM11_Z7	442.91	3713.49	1317.88		5210.92	999.66	7.82	44.47	59.57	158900.58	0.77	6.85
024_2011Nov4_Mt2_CAM11_Z10	195.78	1739.08	605.29		5153.38	159.4	2.3	18.05	40.35	165665.02	0.78	1.21
026_2011Nov4_Mt2_CAM11_Z12	218.34	1748.17	595.52		5218.48	121.42	4.05	5.05	65.13	192227.45	0.89	3.51
015_2011Nov10_Mt2_CAM11_Z13	278.22	2674.31	914.93		5089.27	340.87	2.37	7.72	31.96	125018.41	0.81	4.58
016_2011Nov10_Mt2_CAM11_Z14	245.13	2010.55	666.65		5000.05	127.9	2.19	2.53	46.11	122455.95	0.91	3.06
017_2011Nov10_Mt2_CAM11_Z15	228.51	1937.66	585.61		5322.55	137.21	3.76	3.79	98.64	136770	0.82	0.96
018_2011Nov10_Mt2_CAM11_Z16	264.67	1963.29	634.68		5012.96	157.45	2.35	3.47	69.97	127449	0.75	2.95
019_2011Nov10_Mt2_CAM11_Z17	248.03	1798.25	604.65		5119.59	116.68	2.69	15.44	96.69	127708.03	0.85	2.01
023_2011Nov10_Mt2_CAM11_Z21	265.71	1928	676.03		5330.45	165.48	2.76	3.93	82.27	130880.8	0.95	1.65
024_2011Nov10_Mt2_CAM11_Z22	724.86	3019.55	902.32		5426.29	190.33	5.64	11.43	86.63	136219.75	1.08	5.42
031_2011Nov10_Mt2_CAM11_Z23	145.84	1266.42	437.55		4974.98	79.29	1.92	1.87	51.43	148855.98	0.73	1.38
032_2011Nov10_Mt2_CAM11_Z24	194.58	1578.26	524.66		4989.31	85.32	3.19	2.53	70.75	149017.89	0.74	1.45
034_2011Nov10_Mt2_CAM11_Z26	176.05	1624.35	540.88		5031.36	136.53	2.94	2.35	51.39	158598.5	0.84	3.28
035_2011Nov10_Mt2_CAM11_Z27	287.14	1922.1	618.03		4975.39	165.91	1.68	1.88	71.36	152282.59	0.77	8.52
038_2011Nov10_Mt2_CAM11_Z30	136.03	1335.36	412.51		4989	78.62	2.94	5.1	55.57	161411.98	0.65	1.81
039_2011Nov10_Mt2_CAM11_Z31	314.56	2925.49	980.06		5153.38	374.74	3.3	15.99	38.62	163808.5	0.77	4.47

				1 Sigma Error							
Samples	**Th232**	**U235**	**U238**	**Si29**	**Ca42**	**Ti49**	**Fe56**	**Y89**	**Zr90**	**Nb93**	**Ce140**
048_2011Nov10_Mt2_CAM11_Z33	254.07	1864.01	614.68	4998.13	77.92	1.86	2.82	65.33	190525.69	1.02	1.48
049_2011Nov10_Mt2_CAM11_Z34	250.05	2158.09	714.99	5010.04	254.82	1.59	4.39	41.34	190905.77	0.91	3.41
050_2011Nov10_Mt2_CAM11_Z35	341.28	2238.41	741.18	4974.33	78.65	2.57	1.9	73.69	196326.84	1.19	3.85
052_2011Nov10_Mt2_CAM11_Z37	290.21	2057.35	679.67	5002.11	123.37	2.73	2.48	64.47	200184.39	1.09	2.68
053_2011Nov10_Mt2_CAM11_Z38	338.28	2878.97	910.95	5305.25	195.03	5.38	8.91	69.23	195217.52	0.94	3.08
054_2011Nov10_Mt2_CAM11_Z39	186.96	2135.13	660.99	5250.13	313.61	2.94	3.65	44.76	217606.13	1.08	3.27
055_2011Nov10_Mt2_CAM11_Z40	249.39	1897.85	643.88	5022.17	378.38	2.35	2.73	74.38	213147.31	0.84	6.94
056_2011Nov10_Mt2_CAM11_Z41	193.81	1574.58	537.8	5026.93	158.26	2.52	4.07	59.33	211450.56	1.07	10.67
016_2011Nov11_Mt2_CAM11_Z44	256.18	1876.9	603.57	5153.45	186.08	3.27	3	96.36	112595.34	0.71	12.89
017_2011Nov11_Mt2_CAM11_Z45	144.9	1540.44	467.54	5002.12	121.19	2.64	2.09	37.94	112649.31	0.83	3.36
018_2011Nov11_Mt2_CAM11_Z46	299.46	2567.97	827.44	5042.02	240.4	1.82	3.06	63.69	111710.59	0.62	1.92
020_2011Nov11_Mt2_CAM11_Z48	180.83	1547.3	502.36	5057.3	103.92	1.7	2.12	61.54	113619.97	0.69	1.14
021_2011Nov11_Mt2_CAM11_Z49	293.91	3138.87	999.99	5427.75	174.29	2.04	4.12	34.86	125267.08	0.81	1.29
022_2011Nov11_Mt2_CAM11_Z50	193.16	1735.77	543.8	5032.02	153.18	2.48	2.31	46.56	119460.01	0.84	7.94
026_2011Nov11_Mt2_CAM11_Z52	194.88	1926.42	664.41	5075.15	266.21	2.79	20.99	26.33	125769.41	0.49	2.18
027_2011Nov11_Mt2_CAM11_Z53	313.23	3174.51	1039.19	5139.33	264.01	1.83	29.16	39.83	141763.83	0.69	3.76
015_2011Nov15_Mt2_CAM11_Z55	199.35	1619.91	541.72	4971.03	138.32	1.9	2.66	56.93	141451.94	0.69	6.95
016_2011Nov15_Mt2_CAM11_Z56	280.86	2839.56	921.13	5065.86	299.54	3.15	29.8	56.93	150462.75	0.74	4.13
017_2011Nov15_Mt2_CAM11_Z57	157.48	1564.51	508.47	5515.35	264.26	4.34	16.78	38.88	145230.16	0.81	2.36
020_2011Nov15_Mt2_CAM11_Z60	222.69	2192.7	766.1	5196.64	270.57	2.2	5.62	31.46	150847.69	0.86	3.31
021_2011Nov15_Mt2_CAM11_Z61	189.24	1710.11	535.72	5356.83	168.84	3.13	6.29	62.48	157329.78	0.66	1.75
022_2011Nov15_Mt2_CAM11_Z62	174.57	1843.37	572.43	5002.22	132.59	2.12	2.92	33.01	162942.41	0.7	1.62
023_2011Nov15_Mt2_CAM11_Z63	300.26	1969.01	676.72	5368.31	508.99	5.07	22.43	99.63	165848.7	0.92	4.95
018_2011Nov17_Mt2_CAM11_Z68	314.91	2917.39	990.77	5400.23	492.13	8.66	17.79	52.77	178512.91	0.81	6.07
019_2011Nov17_Mt2_CAM11_Z69	248.53	2077.86	710.17	5247.62	220.42	3.96	3.81	36.89	182767.41	0.99	4.29
020_2011Nov17_Mt2_CAM11_Z70	293.06	1902.57	670.2	5045.54	96.14	5.71	3.92	92.63	184792.47	0.93	4.99
021_2011Nov17_Mt2_CAM11_Z71	190.56	1852.85	623.25	4984.84	171.38	2.04	1.97	33.61	187573.09	0.85	2.24
022_2011Nov17_Mt2_CAM11_Z72	196.99	2357.19	723.44	5499.34	305.04	3.26	17.36	36.55	185952.67	0.78	6.85
029_2011Nov17_Mt2_CAM11_Z74	190.69	1699.16	586.76	5167.65	199.84	3.73	9.28	41.28	229658.16	1.11	4.39
031_2011Nov17_Mt2_CAM11_Z76	182.26	1541.84	493.6	5004.29	105.01	2.72	2.16	47.51	245845.95	0.91	2.76
032_2011Nov17_Mt2_CAM11_Z77	404.01	2696.4	881.31	5053.97	2352.94	2.1	15.06	41.74	248300.66	0.58	37.7
Averages	**251.24**	**2081.17**	**687.93**	**5144.16**	**257.99**	**3.16**	**9.10**	**56.22**	**160955.12**	**0.83**	**4.42**
ITA-4a (n=62)											
014_2012May7_Mt2_ITA4a_Z1	71.1	442.17	127.04	5542.32	292.06	17.61	5.16	64.84	280194.75	0.78	2.67
015_2012May7_Mt2_ITA4a_Z2	80.15	449.09	108.5	5148.99	200.25	11.84	3.74	50.3	267430.5	0.64	1.18
016_2012May7_Mt2_ITA4a_Z4	152.15	788.21	207.07	5113.76	191.79	12.05	3.5	69.2	263748.53	0.93	2.59
020_2012May7_Mt2_TA4a_Z5	86.15	378.68	146.3	5405.1	245.55	17.7	5.01	60.4	272939.78	0.85	12.14
024_2012May7_Mt2_ITA4a_Z10	208.31	806.89	191.38	5265.83	297.95	16.08	21.59	119.87	275717.16	2.08	5.96
025_2012May7_Mt2_ITA4a_Z11	106.05	714.25	205.5	5135.35	272.62	11.66	3.57	59.18	268133.59	1.09	7.77
026_2012May7_Mt2_ITA4a_Z12	114.94	658.95	169.89	5597.15	277.22	17.97	4.83	66.9	296188.31	1.13	4.32
027_2012May7_Mt2_ITA4a_Z13	288.91	883.42	267.43	5331.65	487.02	15.24	10.85	114.78	275103.25	1.19	27.56
033_2012May7_Mt2_ITA4a_Z15	61.38	571.76	106.35	5764.6	298.49	18.64	5.35	62.13	281584.56	0.88	1.42
034_2012May7_Mt2_ITA4a_Z16	124.68	645.78	190.92	5246.85	217.56	13.3	4.27	59.98	266575.03	1.61	3.7
036_2012May7_Mt2_ITA4a_Z18	82.68	153.64	41.91	5149.35	202.16	14.09	4.74	36.24	271278.38	0.38	2.58
037_2012May7_Mt2_ITA4a_Z19	98.75	501.19	120.23	5245.98	202.75	11.82	3.87	112.76	280808.94	0.74	4.45
038_2012May7_Mt2_ITA4a_Z20	283.05	1022.78	294.92	5289.44	248.18	13.37	7.42	81.05	285553.19	1.45	4.03
039_2012May7_Mt2_ITA4a_Z21	178.18	1202.39	323.68	5162.02	331.01	10.95	6.23	87.5	272600.84	1.48	7.42
040_2012May7_Mt2_ITA4a_Z23	174.5	396.24	117.52	5101.8	167.57	11.49	2.98	119.68	269150.69	0.51	1.22
041_2012May7_Mt2_ITA4a_Z24	204.27	739.17	228.29	5303.93	203.33	12.5	3.57	137.82	275655.38	0.86	3.57
047_2012May7_Mt2_ITA4a_Z26	244.55	812.07	182.61	5279.35	188.85	13.31	3.44	152.72	291090.91	0.77	3.71
048_2012May7_Mt2_ITA4a_Z27	152.76	653.31	184.15	5187.5	439.78	11.7	9.52	93.34	282061.28	0.84	21.37

Appendix L: Zircon LA-ICP-MS Elemental Analyses, Camaquã and Itajaí Igneous Units

				1 Sigma Error							
Samples	**Th232**	**U235**	**U238**	**Si29**	**Ca42**	**Ti49**	**Fe56**	**Y89**	**Zr90**	**Nb93**	**Ce140**
049_2012May7_Mt2_ITA4a_Z28	49.33	264.25	65.2	5553.47	262.35	17.78	4.59	33.28	296218.53	0.62	1.13
052_2012May7_Mt2_ITA4a_Z31	256.84	809.9	193.92	5380.35	239.95	13.42	7.13	81.59	261940.09	1.11	7.31
053_2012May7_Mt2_ITA4a_Z32	99.03	354.93	133.66	5548.44	266.89	16.25	4.25	54.46	288151.28	0.75	2.83
054_2012May7_Mt2_ITA4a_Z33	97.89	603.68	138.75	5348.7	313.94	13.6	4.14	63.15	298924.28	0.82	2.63
055_2012May7_Mt2_ITA4a_Z34	127.15	776.28	174.72	5383.45	244.96	16.35	4.16	62.17	281879.5	0.9	1.56
056_2012May7_Mt2_ITA4a_Z35	58.33	263.69	49.7	5608.25	310.46	15.41	7.12	36.83	278816.25	0.56	3.15
015_2012May8_Mt2_ITA4a_Z36	131.74	501.06	146.24	5263.84	234.43	11.53	3.69	86.8	248783.91	0.44	6.74
016_2012May8_Mt2_ITA4a_Z37	87.96	541.5	157.45	5126.19	186.25	10.24	3.15	43.84	240040.13	0.66	2.06
017_2012May8_Mt2_ITA4a_Z38	70.43	347.49	92.47	5262.35	223.63	11.59	3.62	36.89	243100.06	0.5	0.94
018_2012May8_Mt2_ITA4a_Z39	98.7	563.61	106.54	5762.93	534.64	17.94	9.59	73.5	238956.52	0.73	13.24
019_2012May8_Mt2_ITA4a_Z40	55.46	252.11	69.83	5134.35	182.38	9.23	3.3	59.1	240946.39	0.44	0.87
021_2012May8_Mt2_ITA4a_Z42	109.17	474.94	167.44	5226.99	238.71	9.77	3.89	65.42	236684.52	0.6	3.13
022_2012May8_Mt2_ITA4a_Z43	296.72	420.19	144.05	5306.03	567.84	12.66	5.75	65.01	250381.78	0.77	5.88
023_2012May8_Mt2_ITA4a_Z44	181.62	702.88	181.58	5556.63	280.93	16.29	9.29	99.57	241681.34	0.85	2.31
030_2012May8_Mt2_ITA4a_Z48	200.68	715.42	216.65	5664.93	316.37	17.7	4.74	104.96	267325.97	0.93	4.96
031_2012May8_Mt2_ITA4a_Z49	155.72	556.08	154.41	5236.16	273.05	13.16	3.69	74.77	246038.97	0.61	8.47
032_2012May8_Mt2_ITA4a_Z50	78.68	487.31	126.53	5400.11	228.02	12.36	3.92	64.17	254310.86	0.59	2.38
034_2012May8_Mt2_ITA4a_Z52	86.55	546.67	153.72	5244.12	211.87	11.22	3.66	39.76	244572.95	0.77	1.05
035_2012May8_Mt2_ITA4a_Z53	90.59	422.32	157.64	5765.45	327.98	15.21	6.92	46.16	252807.77	0.99	5.1
036_2012May8_Mt2_ITA4a_Z54	148.73	607.73	198.98	5765.42	435.91	13.73	4.8	102.65	249263.75	1.06	8.5
003_2012Dec6_Mt1_ITA4a_Z001_Z011-001	115.94	527.51	157.09	5126.19	178.11	4.37	4.59	98.69	235779.56	1.14	1.74
003_2012Dec6_Mt1_ITA4a_Z001_Z011-003	256.83	845.2	223.81	5133.14	173.35	3.99	3.86	277.7	217937.52	1.19	3.4
003_2012Dec6_Mt1_ITA4a_Z001_Z011-004	133.52	567.31	143.05	5273.72	465.71	5.25	6.93	184.01	223500.75	0.83	75.85
003_2012Dec6_Mt1_ITA4a_Z001_Z011-005	59.16	267.68	57.97	5153.03	201.71	4.56	4.55	82.67	225836.08	0.56	1.68
003_2012Dec6_Mt1_ITA4a_Z001_Z011-006	173.92	428.54	122.08	5494.35	295.26	5.26	31.15	107.97	207453.5	1.13	13.96
003_2012Dec6_Mt1_ITA4a_Z001_Z011-008	102.24	282.37	103.49	5418.33	266.36	5.31	4.85	124.09	208086.11	1.41	11.93
003_2012Dec6_Mt1_ITA4a_Z001_Z011-009	130.54	570.65	171.59	5088.79	173.08	4.06	3.8	148.49	213572.84	1.2	2.68
003_2012Dec6_Mt1_ITA4a_Z001_Z011-010	173.07	1046.16	313.29	5225.93	315.05	5.81	13.13	166.19	211407.66	1.73	19.33
003_2012Dec6_Mt1_ITA4a_Z001_Z011-011	108.54	644.55	188.99	5125.91	258.23	4.97	4.8	120.52	219724.63	1.12	4.12
004_2012Dec6_Mt1_ITA4a_Z012_Z022-001	121.45	636.82	193.12	5413.87	328.47	7.03	7.27	142.37	229720.25	1.59	5.54
004_2012Dec6_Mt1_ITA4a_Z012_Z022-002	261.09	630.08	184.54	5318.4	209.9	13.82	5.01	154.67	217652.66	1.59	3.5
004_2012Dec6_Mt1_ITA4a_Z012_Z022-003	112.96	504.25	182.17	5153.88	222.72	4.8	4.31	92.55	215986.27	1.29	10.44
004_2012Dec6_Mt1_ITA4a_Z012_Z022-004	212.97	756.55	265.82	5176.99	299.23	6.21	6.99	166.15	217664.67	2.34	8.02
004_2012Dec6_Mt1_ITA4a_Z012_Z022-005	246.93	714.13	263	5301.89	500.24	6.5	29.47	229.01	218728.63	1.58	19.85
004_2012Dec6_Mt1_ITA4a_Z012_Z022-006	83.96	366.81	107.82	5066.69	210.83	3.53	3.67	124.3	213471.3	1.18	17.37
004_2012Dec6_Mt1_ITA4a_Z012_Z022-007	92.69	415.99	143.37	5092.92	175.13	4.28	3.95	104.43	215970.72	0.94	1.48
004_2012Dec6_Mt1_ITA4a_Z012_Z022-008	84.09	470.34	142.61	5116.12	178.07	4.3	4.04	88.19	213723.55	1.08	1.57
005_2012Dec6_Mt1_ITA4a_Z023_Z033-001	94.24	489.03	144.36	5049.62	143.96	3.3	3.17	117.32	219332.8	1.33	2.18
005_2012Dec6_Mt1_ITA4a_Z023_Z033-002	100.36	618.2	180.66	5549.65	271.19	6.24	13.71	137.17	216786.84	1.14	4.4
005_2012Dec6_Mt1_ITA4a_Z023_Z033-005	145.57	446.93	171.23	5363.93	227.97	5.44	5.02	172.19	203228.55	0.85	3.47
005_2012Dec6_Mt1_ITA4a_Z023_Z033-006	154.47	1094.41	290.75	5102.13	160.24	4.85	3.76	115.21	216271.44	2.57	2.14
005_2012Dec6_Mt1_ITA4a_Z023_Z033-007	76.9	388.49	132.63	5040.07	149	2.99	3.25	134.32	207052.47	0.76	1.65
005_2012Dec6_Mt1_ITA4a_Z023_Z033-010	147.52	759.49	227.95	5098.23	189	3.74	4.35	130.8	207990.89	1.62	3.06
005_2012Dec6_Mt1_ITA4a_Z023_Z033-011	91.88	307.6	136.79	5176.81	298.88	9.18	49.52	130.37	206046.72	0.93	24.89
Averages	**136.69**	**577.60**	**165.99**	**5304.35**	**266.72**	**10.59**	**7.04**	**99.87**	**247089.78**	**1.03**	**7.20**
CAM-10b (n=17)											
017_2012Oct12_CAM10b_Z3	94.37	208.74	73.27	5169.11	141.76	4.33	8.52	105.37	163230.83	0.74	2.1
018_2012Oct12_CAM10b_Z4	110.45	324.02	80.09	5315.49	190.37	6.31	5.82	118.82	162611.52	0.57	1.65
019_2012Oct12_CAM10b_Z5	104.47	218.97	62.52	5078.59	142.29	3.5	4.18	87.82	159961.05	0.35	1.55
021_2012Oct12_CAM10b_Z7	194.27	416.3	104.46	5777.09	256.52	4.96	14.88	118.82	174395.09	1.08	2.5
022_2012Oct12_CAM10b_Z8	120.27	209.58	79.96	5169.84	152.34	5.65	4.68	133.21	173210.73	0.46	1.48

Appendix L: Zircon LA-ICP-MS Elemental Analyses, Camaquã and Itajaí Igneous Units

				1 Sigma Error							
Samples	**Th232**	**U235**	**U238**	**Si29**	**Ca42**	**Ti49**	**Fe56**	**Y89**	**Zr90**	**Nb93**	**Ce140**
023_2012Oct12_CAM10b_Z9	170.26	357.01	109.43	5033.5	135.76	3.36	4.01	136.64	171783.3	0.5	1.98
024_2012Oct12_CAM10b_Z10	358.97	457.05	137.37	5316.2	179.44	7.47	37.93	113.46	150015.83	0.97	79.44
031_2012Oct12_CAM10b_Z11	301.24	323.01	88.58	6269.51	534.48	10.89	65.39	160.58	183509.67	1.77	538.19
032_2012Oct12_CAM10b_Z12	114.44	187.6	83.52	5275.4	158.53	4.97	7.63	128.67	195464.63	0.6	2.86
034_2012Oct12_CAM10b_Z14	121.81	188.09	67.63	5230.2	172.07	5.89	5.16	90.44	202007.19	0.47	1.42
035_2012Oct12_CAM10b_Z15	260.64	302.79	127.9	5065.57	130.86	4.99	4.42	99.23	195166.06	0.64	2.04
037_2012Oct12_Auto_Stds_CAM10b_Z17_23-002	94.97	168.57	58.09	5151.3	203	5.39	6.01	94.08	204258.8	0.43	4.61
037_2012Oct12_Auto_Stds_CAM10b_Z17_23-003	145.41	231.85	93.66	5639.76	364.72	10.77	14.9	90.94	210830.77	1.22	2.23
037_2012Oct12_Auto_Stds_CAM10b_Z17_23-012	95	301.2	65.31	5511.24	171.64	7.87	6.43	116.86	251339.83	0.58	1.42
050_2012Oct12_CAM10b_Z24	68.33	167.53	43.83	5277.94	170.44	6.51	11.68	90.62	244888.72	0.41	1.11
054_2012Oct12_Stds_CAM10b_Z28_31-003	159.39	510.25	125.79	5424.03	237.66	7.73	12.6	188.77	276103.13	0.82	2.07
054_2012Oct12_Stds_CAM10b_Z28_31-004	87.87	<405.41	176.7	14799.23	2687.3	374.73	517.14	176.6	336495.78	3.98	9.71
Averages	**153.07**	**285.79**	**92.83**	**5912.00**	**354.66**	**27.96**	**43.02**	**120.64**	**203251.35**	**0.92**	**38.61**
LRA303 (n=45)											
002_15Oct2012_NIST12_LRA303_Z1-10-004	112.39	582.64	185.04	5478.67	267.38	6.18	11.58	69.15	273561.25	0.58	2.73
002_15Oct2012_NIST12_LRA303_Z1-10-005	152.55	637.41	211.21	5236.27	209.53	5.56	23.49	67.86	265163.63	0.46	3.01
002_15Oct2012_NIST12_LRA303_Z1-10-006	276.97	881.88	300.73	5398.42	247.16	5.61	19.19	90.14	260617.59	0.78	8.81
002_15Oct2012_NIST12_LRA303_Z1-10-011	178.73	812.65	260.48	5153.64	157.29	5.55	10.35	73.07	278569.75	0.54	4.62
002_15Oct2012_NIST12_LRA303_Z1-10-013	221.33	917.48	305.67	5136.9	141.81	4.86	15.84	94.85	253448.66	0.59	4.33
003_15Oct2012_Stds_LRA303_Z11_17-007	160.54	728.01	241.44	5039.59	134.05	4.11	10.49	75.54	272285.63	0.46	3.7
003_15Oct2012_Stds_LRA303_Z11_17-008	232.73	970.21	339.46	5472.7	195.9	7.65	14.04	102.81	267705.69	0.82	2.43
003_15Oct2012_Stds_LRA303_Z11_17-009	175.59	887.5	268.54	5134.62	147.28	5.17	12.23	60.87	276778.59	0.51	2.27
003_15Oct2012_Stds_LRA303_Z11_17-010	224.67	956.35	302.37	5036.78	126.91	3.06	5.56	123.05	272116.84	0.45	4.83
003_15Oct2012_Stds_LRA303_Z11_17-012	243.49	906.55	312.24	5033.01	115.5	4	4.23	101.23	275524.44	0.57	2.91
003_15Oct2012_Stds_LRA303_Z11_17-014	113.53	625.52	214.48	5057.31	192.23	3.75	7.36	53.14	281499.16	0.46	2.83
004_15Oct2012_Stds_LRA303_Z19_26-011	252.22	993.16	340.11	5068.58	118.45	3.53	5.13	90.07	271758.72	0.54	1.98
004_15Oct2012_Stds_LRA303_Z19_26-012	243.41	929.22	282.48	5555.1	339.04	7.96	14.95	126.3	280530.13	0.77	9.64
004_15Oct2012_Stds_LRA303_Z19_26-013	158.04	885.8	248.55	5386.46	198.76	4.36	8.18	73.81	270915.41	0.7	2.23
002_16Oct2012_LRA303Small_Z27_37-001	289.33	1293.26	367.46	5529.07	371.23	6.38	18.91	131.01	144590.25	0.77	13.15
002_16Oct2012_LRA303Small_Z27_37-005	152.61	783.08	240.35	5181.77	194.48	4.15	4.71	50.83	140378.42	0.57	5.29
002_16Oct2012_LRA303Small_Z27_37-006	159.24	581.88	178.53	5577.33	237.58	8	21.61	87.58	138041.73	0.55	6.65
002_16Oct2012_LRA303Small_Z27_37-011	203.36	772.14	292.46	5257.27	192.24	5.86	7.12	138.53	143671.06	0.63	8.1
003_16Oct2012_LRA303Small_Z38_49-001	195.58	976.33	302.91	5356.31	246.15	23.54	9.4	82.92	155257.36	0.9	2.99
003_16Oct2012_LRA303Small_Z38_49-006	249.6	1305.22	363.31	5654.15	207.63	5.63	10.14	112.35	151701.03	0.8	3.02
003_16Oct2012_LRA303Small_Z38_49-009	199.37	991.52	236.1	5604.94	222.53	17.6	27.31	96.25	139952.69	0.71	7.72
003_16Oct2012_LRA303Small_Z38_49-010	177.73	968.01	261.5	5203.73	157.03	8.43	17.86	85.13	136416.25	0.49	3.31
003_16Oct2012_LRA303Small_Z38_49-011	203.03	819.95	279.52	5173.13	145.54	3.35	4.37	88.36	149670.59	0.51	1.17
003_16Oct2012_LRA303Small_Z38_49-012	245.31	900.4	313.84	5569.26	236.13	8	13.75	83.66	153154.56	0.72	4.75
004_16Oct2012_LRA303Small_Z50_61-001	229.11	1053.03	309.72	5573.15	343.46	13.95	14.87	115.72	152598.42	0.74	10.64
004_16Oct2012_LRA303Small_Z50_61-004	257.71	743.01	217.83	5455.24	249.89	8.25	33.52	104.23	135327.8	0.61	17.15
004_16Oct2012_LRA303Small_Z50_61-005	180.6	816.51	270.97	5175.42	161.04	5.2	5.64	76.04	142856.42	0.55	4.8
004_16Oct2012_LRA303Small_Z50_61-006	157.62	655.71	218.58	5090.14	166.2	4.32	11.92	78.03	141165	0.42	4.73
004_16Oct2012_LRA303Small_Z50_61-007	95.67	568.73	179.04	4995.31	144.77	3.5	3.82	37.56	138333.89	0.36	1.43
004_16Oct2012_LRA303Small_Z50_61-011	163.79	664.38	249.56	5180.89	173.99	7.17	12.89	59.23	131049.76	0.49	4.57
004_16Oct2012_LRA303Small_Z50_61-012	217.29	764.25	254.45	5250.71	179.54	5.68	7.63	110.74	144170.02	0.63	8.06
002_25Oct2012_LRA303Large_Z1_11-001	99.43	455.42	152.24	4935.39	113.28	2.83	3.32	97.82	184426.66	0.39	0.85
002_25Oct2012_LRA303Large_Z1_11-002	252.58	1206.77	369.38	5124.52	139.54	4.36	4.02	116.4	189041.13	1.43	2.51
002_25Oct2012_LRA303Large_Z1_11-003	66.89	291.53	95.65	5074.98	123.29	3.24	3.65	70.28	190062.05	0.4	0.76
002_25Oct2012_LRA303Large_Z1_11-006	193.69	786.18	288.29	5244.45	141.52	3.93	4.27	89.43	195921.92	0.5	1.49
002_25Oct2012_LRA303Large_Z1_11-009	226.16	1114.66	358.07	5034.44	101.26	2.6	2.97	164.96	182236.95	1.06	2.2
003_25Oct2012_LRA303Large_Z12_23-003	26.71	125.41	49.57	4960.01	96.06	2.66	3.23	26.89	187513.39	0.34	0.74

Appendix L: Zircon LA-ICP-MS Elemental Analyses, Camaquã and Itajaí Igneous Units

					1 Sigma Error							
Samples	**Th232**	**U235**	**U238**		**Si29**	**Ca42**	**Ti49**	**Fe56**	**Y89**	**Zr90**	**Nb93**	**Ce140**
003_25Oct2012_LRA303Large_Z12_23-006	473.49	1702.35	599.43		5047.66	85.43	2.74	8.22	188.93	178489.98	2	4.3
003_25Oct2012_LRA303Large_Z12_23-007	189.44	797.57	269.38		4948.37	83.12	1.96	3.88	95.34	173202.66	0.95	109.35
003_25Oct2012_LRA303Large_Z12_23-008	181.57	801.46	279.88		5070.13	84.2	1.06	2.49	140.79	186949.38	0.72	1.46
003_25Oct2012_LRA303Large_Z12_23-009	480.13	1882.9	582.32		4971.83	76.32	2.45	12.18	151.03	181773.22	2.11	8.57
003_25Oct2012_LRA303Large_Z12_23-010	76.92	337.61	107.93		4940.73	73.7	1.83	2.08	46.79	186105.5	0.46	1.09
003_25Oct2012_LRA303Large_Z12_23-011	436.64	1482.24	536.95		5130.41	100.32	1.94	15.76	144.13	183138.03	1.85	3.37
004_25Oct2012_LRA303Large_Z23_30-002	88.24	415.55	144.28		4935.58	78.18	1.64	2.24	71.37	185610.08	0.62	1.38
004_25Oct2012_LRA303Large_Z23_30-006	297.92	1096.59	413.65		5010.21	88.73	2.17	2.52	203.81	178685.5	0.88	2.36
Averages	**204.73**	**863.73**	**279.91**	**#DIV/0!**	**5209.88**	**169.01**	**5.46**	**10.20**	**96.62**	**196043.72**	**0.72**	**6.76**
CAM-18 (n=27)												
015_2012Oct5_CAM18Large_Z1	113.74	523.76	177.9		5086.95	315.61	2.68	4.27	50.31	181532.45	0.41	6.55
016_2012Oct5_CAM18Large_Z2	139.83	537.1	207.61		5046.45	85.86	2.02	2.59	61.93	180908.05	0.37	2.45
019_2012Oct5_CAM18Large_Z5	100.82	467.29	187.15		5007.41	76.78	2.35	6.39	41.95	174038.7	0.43	1.13
022_2012Oct5_CAM18Large_Z8	110.26	701.72	207.3		5015.2	116.48	3.88	3.95	35.16	182834.27	0.38	1.97
028_2012Oct5_CAM18Large_Z11	218.41	1011.66	334.3		5093.62	86.9	2.44	3.2	98.8	182219.72	0.51	1.85
029_2012Oct5_CAM18Large_Z12	164.68	827.05	264.33		5203.32	122.79	3.94	3.41	80.96	193970.23	0.54	1.53
031_2012Oct5_CAM18Large_Z14	82.8	380.31	131.09		5056.77	79.77	2.69	2.13	55.68	195971.48	0.41	1.05
017_2012Oct8_CAM18Small_Z2	137.31	653.77	209.43		5511.44	135.03	4.25	10.9	70.87	224953.81	0.69	4.14
018_2012Oct8_CAM18Small_Z3	205.25	937.18	311.17		5313.18	114.8	5.34	7.48	102.22	256146.92	0.65	2.79
024_2012Oct8_CAM18Small_Z9	269.18	1249.52	323.39		7834.76	874.21	62.85	70.84	176.4	284105.22	1.7	9.8
017_2012Oct9_CAM18Small_Z14	154.36	805.24	241.76		5449.7	165.41	3.63	8.37	87.54	187163.41	0.68	3.01
018_2012Oct9_CAM18Small_Z15	174.53	992.2	288.89		5271.08	113.63	2.93	3.49	77.39	186930.22	0.69	1.38
020_2012Oct9_CAM18Small_Z18	195.96	782.26	256.77		5256.06	122.35	3.18	13.46	106.52	164907.88	0.68	5.59
022_2012Oct9_CAM18Small_Z20	132.22	680.48	225.84		4990.36	83.29	2.35	2.78	48.53	188854.8	0.49	2.46
024_2012Oct9_CAM18Small_Z22	247.13	998.72	363.7		5146.75	103.57	3.88	6.3	102.55	208527.98	0.67	2.57
025_2012Oct9_CAM18Small_Z23	367.54	1288.37	481.67		5546.58	140.54	5.5	16.26	135.73	216638.27	1.03	6.64
002_2012Oct11_Auto_CAM18Small_Z27_36-002	153.38	695.79	244.92		5097.97	128.15	3.39	3.59	77.36	271854.81	0.39	0.91
002_2012Oct11_Auto_CAM18Small_Z27_36-003	231.31	619.03	336.34		5995.35	386.89	9.42	17.33	127.39	249940.33	0.89	2.99
002_2012Oct11_Auto_CAM18Small_Z27_36-004	218.39	796.69	303.64		5087.16	194.7	4.2	5.66	87.2	259798.86	0.57	7.56
002_2012Oct11_Auto_CAM18Small_Z27_36-005	78.68	353.77	149.64		5304.34	160.35	7.77	4.45	44.7	253387.47	0.55	1.39
002_2012Oct11_Auto_CAM18Small_Z27_36-007	189.98	500.16	297.98		5906.42	255.08	12.14	28.67	84.53	218412.88	0.77	6.53
002_2012Oct11_Auto_CAM18Small_Z27_36-008	212.84	985.87	308		5214.45	171.1	5.36	6.48	105.88	239945.08	0.63	4.43
002_2012Oct11_Auto_CAM18Small_Z27_36-010	179.75	724.19	288.79		5199.91	245.09	3.96	4.86	62.71	231438.64	0.7	7.21
004_2012Oct11_Auto_CAM18Small_Z37_47-003	173.74	878.19	290.98		5283.64	153.02	4.32	6.99	79.59	185375.06	0.5	3.8
004_2012Oct11_Auto_CAM18Small_Z37_47-004	164.04	668	255.56		5495.55	188.73	4.75	6.81	98.69	178336.25	0.63	3.92
004_2012Oct11_Auto_CAM18Small_Z37_47-005	184.29	650.23	248.73		5186.45	145.13	24.29	6.2	145.96	178356.05	0.62	2.1
004_2012Oct11_Auto_CAM18Small_Z37_47-011	154.96	744.98	240.51		5188.83	130.35	5.46	5.55	107.3	171752.88	0.48	3.86
Averages	**176.13**	**757.54**	**265.83**		**5362.58**	**181.32**	**7.37**	**9.72**	**87.18**	**209196.36**	**0.63**	**3.69**
RAM01A (n=15)												
002_17Oct2012_RAM01ASmalls_Z1_11-002	24.59	102.72	32.01		5022.54	199.23	4.01	6.36	33.85	169683.61	0.28	0.57
002_17Oct2012_RAM01ASmalls_Z1_11-003	126.73	525.63	170.86		5377.46	203.49	6.44	6.56	114.15	179902.31	0.88	1.55
002_17Oct2012_RAM01ASmalls_Z1_11-004	185.38	754.72	248.64		4994.33	184.09	4.41	5.46	149.65	172976.84	0.81	2.56
002_17Oct2012_RAM01ASmalls_Z1_11-005	257.23	1026.44	341.17		4984.67	160.03	3.12	4.56	187.73	163527.3	1.07	2.45
002_17Oct2012_RAM01ASmalls_Z1_11-006	110.34	561.61	170.6		5281.05	217.21	8.31	7.74	65.76	171660.44	0.45	4.51
002_17Oct2012_RAM01ASmalls_Z1_11-008	32.84	133.88	40.63		4981.73	137.25	3.05	4.08	43.43	172104.94	0.26	0.77
002_17Oct2012_RAM01ASmalls_Z1_11-010	261.37	1381.67	357.95		5301.79	186.54	4.61	8.47	204.39	160517.81	1.44	2.83
003_17Oct2012_RAM01ASmalls_Z12_22-002	415.99	1657.7	527.28		4983.1	179.97	4.65	5.28	176.51	176600.02	2.06	3.01
003_17Oct2012_RAM01ASmalls_Z12_22-004	64.44	271.73	102.83		5057.26	158.32	3.67	4.78	67.5	174807.45	0.57	0.96
003_17Oct2012_RAM01ASmalls_Z12_22-008	180.37	698.52	251.22		5180.22	164.72	5.13	6.27	178.58	186366.52	0.78	2.25
003_17Oct2012_RAM01ASmalls_Z12_22-011	316.88	1414.73	435.43		5040.58	123.16	2.27	3.52	256.01	173362.88	1.12	2.97

Appendix L: Zircon LA-ICP-MS Elemental Analyses, Camaquã and Itajaí Igneous Units

				1 Sigma Error							
Samples	**Th232**	**U235**	**U238**	**Si29**	**Ca42**	**Ti49**	**Fe56**	**Y89**	**Zr90**	**Nb93**	**Ce140**
002_26Oct2012_RMA01Large_Z1_8-001	124.52	558.44	205.7	5163.78	174.02	10.66	6.04	60.02	222510.67	0.41	2.32
002_26Oct2012_RMA01Large_Z1_8-003	311.42	1010.61	306.84	5277.84	198.87	5.13	14.04	87.41	213116.39	0.5	2.83
002_26Oct2012_RMA01Large_Z1_8-005	174.05	636.1	268.02	5375.22	146.15	6.97	20.64	85.07	224761.91	0.65	2.78
002_26Oct2012_RMA01Large_Z1_8-007	115.09	667.54	219.08	4977.05	101.98	2.29	2.78	39.3	213166.91	0.38	1.51
Averages	**180.08**	**760.14**	**245.22**	**5133.24**	**169.00**	**4.98**	**7.11**	**116.62**	**185004.40**	**0.78**	**2.26**
ITA-8 (n=38)											
002_18Oct2012_ITA-8_Z1_11-001	69.78	203.49	62.99	5000.61	180.19	4.51	23.62	97.82	168646.55	0.26	0.7
002_18Oct2012_ITA-8_Z1_11-002	86.24	237.55	84.18	5048.77	234.72	4.23	5.98	86.72	176667.86	0.36	2.71
002_18Oct2012_ITA-8_Z1_11-003	61.98	159.39	61.32	5056.1	381.71	4.38	5.47	80.96	177455.08	0.31	6.22
002_18Oct2012_ITA-8_Z1_11-007	26.21	111.43	40.07	5198.18	199.61	4.25	5.54	41.55	173899.16	0.36	0.82
002_18Oct2012_ITA-8_Z1_11-008	58.88	145.85	63.32	4981.89	191.32	3.61	4.37	63.69	170559.27	0.27	2.01
002_18Oct2012_ITA-8_Z1_11-009	56.45	207.91	62.12	5117.9	163.45	4.56	4.64	54.25	173312.05	0.36	1.34
002_18Oct2012_ITA-8_Z1_11-010	71.91	178.65	77.2	5199.09	275.37	5.28	5.43	85.73	178298.95	0.43	2.46
002_18Oct2012_ITA-8_Z1_11-011	52.16	142.26	58.51	5105.91	1538.01	4.95	9.27	85.84	170657.48	0.31	20.34
003_18Oct2012_ITA-8_Z12_22-003	52.49	175.6	51.63	5037.92	175.94	4.73	5.48	76.56	166543.8	0.25	0.51
003_18Oct2012_ITA-8_Z12_22-004	62.59	118.5	61.81	5040.98	216.19	4.33	5.5	65.54	166068.7	0.3	1.98
003_18Oct2012_ITA-8_Z12_22-006	69.33	78.27	72.05	5048.54	233.11	4.3	4.84	85.4	167360.02	0.32	3.1
003_18Oct2012_ITA-8_Z12_22-007	44.58	284.48	105.4	5110.31	168.49	4.41	4.92	58.46	171093.33	0.33	0.95
003_18Oct2012_ITA-8_Z12_22-008	44.81	206.67	48.06	5567.23	339.71	5.19	9.99	72.45	175304.86	0.44	2.57
003_18Oct2012_ITA-8_Z12_22-011	53.55	202.34	75.03	5104.61	205.67	5.69	21.94	69.18	175088.02	0.39	1.01
004_18Oct2012_ITA-8_Z23_30-002	52.12	215.18	52.45	5408.43	486.28	6.79	6.6	77.83	184142.92	0.37	6.22
004_18Oct2012_ITA-8_Z23_30-003	48.79	197.64	61.54	5122.03	498.41	4.15	5.98	62.21	172210.25	0.35	7.66
004_18Oct2012_ITA-8_Z23_30-006	48.69	174.64	63.9	5387.98	198.92	5.95	6.33	71.48	187271.69	0.43	0.83
002_24Oct2012_ITA8Large_Z1_11-001	49.74	170.3	50.69	4986.46	153.86	3	2.9	53.32	128793.31	0.36	1.57
002_24Oct2012_ITA8Large_Z1_11-002	74.8	225.28	84.64	5117.8	750.4	6.1	6.78	69.35	124077.95	0.54	26.65
002_24Oct2012_ITA8Large_Z1_11-003	29.14	179.89	41.37	5060.09	168.75	4.17	3.53	24.26	126044.1	0.43	2
002_24Oct2012_ITA8Large_Z1_11-004	66.28	172.63	69.02	5084.2	2879.49	4.24	16.28	76.22	120163.26	0.44	82.3
002_24Oct2012_ITA8Large_Z1_11-007	30.07	128.24	46.6	5036.43	115.79	3.39	2.82	32.78	127895.16	0.41	0.76
002_24Oct2012_ITA8Large_Z1_11-008	28.19	148.05	49.46	5213.85	227.52	6.58	4.36	27.82	126491.84	0.59	4.49
002_24Oct2012_ITA8Large_Z1_11-009	106.71	363.1	119.87	5005.8	124.03	1.93	2.43	74.2	125058.84	0.49	2.48
002_24Oct2012_ITA8Large_Z1_11-010	47.97	214.16	66.51	5041.33	110.84	3.09	3.08	49.39	130696.86	0.47	0.65
002_24Oct2012_ITA8Large_Z1_11-011	52.85	180.19	50.75	5074.05	115.54	3.64	2.62	55.64	133989.3	0.41	0.57
003_24Oct2012_ITA8Large_Z12_23-002	49.27	299.04	69.34	5158.55	115.44	3.78	2.79	44.71	130125.09	0.49	0.72
003_24Oct2012_ITA8Large_Z12_23-007	36.11	84.56	42.49	5122.14	151.09	3.91	3.79	40.17	129588.06	0.42	1.73
003_24Oct2012_ITA8Large_Z12_23-008	50.08	132.93	54.33	5075.79	115.5	3.86	2.42	53.32	135329.3	0.38	1.15
003_24Oct2012_ITA8Large_Z12_23-009	76.61	420.67	120.06	5334.94	240.43	7.4	6.76	64.31	137192.58	0.66	1.6
004_24Oct2012_ITA8Large_Z24_35-001	101.3	354.29	96.65	4965.81	106.7	3.19	2.49	71.09	131399.53	0.35	1.04
004_24Oct2012_ITA8Large_Z24_35-002	66.48	280.49	96.47	5007.15	124.23	3.57	3.26	41.66	133975.13	0.38	0.83
004_24Oct2012_ITA8Large_Z24_35-003	60.91	246.25	77.69	5043.19	334.26	3.66	3.83	55.94	131703.14	0.4	10.17
004_24Oct2012_ITA8Large_Z24_35-005	63.27	350.98	90.9	5083.26	111.2	4.16	4.34	67.49	137435.73	0.46	0.79
004_24Oct2012_ITA8Large_Z24_35-006	42.14	268.28	56.86	5123.25	353.4	6.22	4.23	42.44	139708.3	0.43	6.09
004_24Oct2012_ITA8Large_Z24_35-009	68.08	289.49	74.26	5523.32	232.77	11.77	6.27	70.33	147229.64	0.69	2.05
004_24Oct2012_ITA8Large_Z24_35-010	57.73	160.14	63.92	5181	126.79	4.71	3.29	53.59	141016.25	0.45	0.74
004_24Oct2012_ITA8Large_Z24_35-011	55.62	284.46	89.06	5113.16	861.7	4.86	11.3	53.17	130793.09	0.49	30.81
Averages	**57.21**	**210.35**	**68.75**	**5128.63**	**347.55**	**4.70**	**6.20**	**62.02**	**150612.80**	**0.41**	**6.33**

Appendix L: Zircon LA-ICP-MS Elemental Analyses, Camaquã and Itajaí Igneous Units

Samples	Pr141	Nd143	Sm147	Eu151	Gd155	Dy161	Yb173	Lu175	Hf178	Hg202	Tl203	Pb204
CAM-1 (n=5)												
028_2011Nov2_Mt2_CAM1_Z46	0.67	3.58	1.16	0.077	1.82	4.64	15.51	2.7	481.5	<0.00	0.11	1.4
002_2012Dec4_Mt1_CAM1_Z001_011-003	0.53	4.47	3.22	0.65	8.79	22.61	55.29	9.89	347.57	<0.00	1.84	10.12
002_2012Dec4_Mt1_CAM1_Z001_011-007	0.5	4.19	3.39	0.55	7.99	18.17	29.58	5.4	320.81	<0.00	1.4	6.66
002_2012Dec4_Mt1_CAM1_Z001_011-011	0.26	1.38	0.94	0.13	1.86	5.93	19.93	3.73	355.04	<0.00	0.62	3.89
002_2012Dec6_Mt1_CAM1_Z047_053-005	0.56	3.32	2.73	0.32	6.83	41.27	131.37	18.81	742.01	<0.00	0.92	7.79
Averages	**0.50**	**3.39**	**2.29**	**0.35**	**5.46**	**18.52**	**50.34**	**8.11**	**449.39**	**#DIV/0!**	**0.98**	**5.97**
CAM-2 (n = 43)												
014_Mt2_CAM2_Z2	9.17	33.09	10.6	0.98	15.12	42.01	82.88	17.2	939.11	<0.00	0.2	2.69
015_Mt2_CAM2_Z3	1.73	5.41	3.16	0.53	6.11	20.26	50.92	10.46	827.38	<0.00	0.12	5.57
017_Mt2_CAM2_Z5	4.13	17.37	6.72	0.52	9.59	28.18	56.8	11.49	990.56	<0.00	0.29	3.3
018_Mt2_CAM2_Z6	0.26	1.98	1.56	0.23	4.21	13.74	24.86	5.25	805.76	<0.00	0.26	4.96
020_Mt2_CAM2_Z8	2.8	15.61	5.66	0.82	8.57	25.67	52.68	10.65	1161.36	<0.00	0.29	5.48
021_Mt2_CAM2_Z9	0.13	1.45	2.27	0.39	3.62	10.82	19.41	4.24	1086.39	<0.00	0.68	7.27
022_Mt2_CAM2_Z10	0.26	1.37	1.33	0.16	3.78	13.28	25.05	5.25	1129.96	<0.00	0.27	4.17
029_2012Apr21_Mt2_CAM2_Z16	0.39	2.43	1.97	0.23	4.43	17.24	31.24	4.69	827.76	<0.00	0.27	3.14
015_2012Apr20_Mt2_CAM2_Z20	1.38	9.49	4.87	0.49	10.56	36.93	69.8	11.58	492.28	<0.00	0.068	4.73
016_2012Apr20_Mt2_CAM2_Z21	3.2	22.97	12.96	1.21	13.77	23.47	37.74	6.81	473.27	<0.00	0.16	5.43
017_2012Apr20_Mt2_CAM2_Z22	0.27	1.46	0.84	0.12	1.74	5.64	17.71	3.43	498.58	<0.00	0.27	2.57
018_2012Apr20_Mt2_CAM2_Z23	0.36	4.3	1.02	0.5	1.49	3.47	7.99	1.54	391.07	<0.00	0.17	11.17
019_2012Apr20_Mt2_CAM2_Z24	0.99	6.05	3.5	0.4	6.81	19.57	34.71	6.17	474.57	<0.00	0.36	3.46
020_2012Apr20_Mt2_CAM2_Z25	0.4	2.42	1.92	0.17	5.48	22.75	47.51	8.36	459.18	<0.00	0.28	3.9
021_2012Apr20_Mt2_CAM2_Z26	0.087	0.87	1.08	0.11	2.58	7.09	13.88	2.73	380.02	<0.00	0.3	2.4
028_2012Apr20_Mt2_CAM2_Z30	0.87	6.33	3.69	0.41	4.87	10.96	27.64	5.11	585.44	<0.00	0.28	3.7
032_2012Apr20_Mt2_CAM2_Z34	0.11	1.16	1.13	0.19	2.26	6.46	12.21	2.45	416.24	<0.00	0.21	3.13
033_2012Apr20_Mt2_CAM2_Z345	0.056	0.71	0.87	0.15	2.19	5.3	11.48	2.08	500.78	<0.00	0.39	2.21
002_2012Nov30_Mt1_CAM2_Z2_12-002	0.2	1.63	1.59	0.26	3.18	9.65	30.17	4.66	400.8	<0.00	1.32	6.42
002_2012Nov30_Mt1_CAM2_Z2_12-006	0.44	4	2.72	0.54	5.17	11.14	32.51	5.7	359.81	<0.00	1.75	8.82
002_2012Nov30_Mt1_CAM2_Z2_12-007	0.18	1.37	1.53	0.39	3.1	6.77	18.07	3.15	349.98	<0.00	1.72	8.09
002_2012Nov30_Mt1_CAM2_Z2_12-010	0.63	4.48	2.46	0.35	4.07	9.03	33.42	5.57	495.3	<0.00	1.09	5.99
003_2012Nov30_Mt1_CAM2_Z13_22-001	0.44	3.44	2.14	0.34	3.1	5.66	16.91	2.77	375.96	<0.00	1.36	6.51
003_2012Nov30_Mt1_CAM2_Z13_22-002	0.85	6.71	3.67	0.43	5.67	11.77	28.62	4.53	402.62	<0.00	0.99	4.22
003_2012Nov30_Mt1_CAM2_Z13_22-003	2.19	14.24	5.95	0.43	6.35	8.83	20.53	3.1	403.37	<0.00	0.74	4.19
003_2012Nov30_Mt1_CAM2_Z13_22-004	0.89	6.72	3.95	0.46	5.69	9.91	25.29	4.11	452.75	<0.00	1.67	10.69
003_2012Nov30_Mt1_CAM2_Z13_22-005	0.74	3.57	2.58	0.3	4.43	11.52	23.98	3.67	377.66	<0.00	0.97	4.89
003_2012Nov30_Mt1_CAM2_Z13_22-007	1.3	8.22	4.49	0.42	5.48	8.47	21.09	3.18	407.65	<0.00	2.36	11.44
003_2012Nov30_Mt1_CAM2_Z13_22-008	2.5	17.31	8.13	0.83	9.54	16.28	41.59	6.74	502.11	<0.00	0.89	9.67
004_2012Nov30_Mt1_CAM2_Z23_33-006	3.03	10.59	5.1	0.7	6.33	11.12	30.39	5.03	502.29	<0.00	1.74	8.85
004_2012Nov30_Mt1_CAM2_Z23_33-007	0.81	5.17	2.53	0.33	4.7	11.01	28.68	4.75	447.37	<0.00	0.95	4.3
004_2012Nov30_Mt1_CAM2_Z23_33-009	1.4	9.5	4.41	0.53	5.9	9.32	26.31	4.11	397.67	<0.00	1.11	6.78
004_2012Nov30_Mt1_CAM2_Z23_33-011	0.82	6.21	4.11	0.65	8.37	18.83	43.01	6.62	352.37	<0.00	1.01	4.96
002_2012Dec3_CAM2_Z034_044-001	0.96	5.2	2.63	0.37	3.11	7.18	28.3	5.33	461.79	<0.00	1.16	5.71
002_2012Dec3_CAM2_Z034_044-002	0.51	3.92	2.92	0.48	5.71	16.37	35.43	6.09	365.36	<0.00	1.7	8.36
002_2012Dec3_CAM2_Z034_044-003	0.98	7.11	4.79	0.7	8.38	23.95	55.64	10.07	374.64	<0.00	0.99	8.55
002_2012Dec3_CAM2_Z034_044-004	0.22	1.87	1.39	0.22	2.49	6.43	18.93	3.34	363.13	<0.00	0.91	4.78
002_2012Dec3_CAM2_Z034_044-005	0.83	5.8	3.2	0.42	4.85	10.98	26.45	4.81	418.09	<0.00	0.94	4.8
002_2012Dec3_CAM2_Z034_044-008	0.16	1.7	1.76	0.32	4.92	17.47	46.45	7.65	369.28	<0.00	0.89	5.54
002_2012Dec3_CAM2_Z034_044-009	1.05	7.17	2.87	0.37	3.68	7.63	25.5	4.71	404.12	<0.00	0.69	4.2
002_2012Dec3_CAM2_Z034_044-010	0.55	4.18	2.77	0.35	3.96	9.47	25.28	4.55	398.83	<0.00	1.41	6.01
003_2012Dec3_CAM2_Z045_055-006	2.61	17.89	6.5	0.72	6.72	13.48	37.37	6.91	431.18	<0.00	1.35	8.82
003_2012Dec3_CAM2_Z045_055-007	0.75	5.02	2.63	0.35	4.93	14.43	32.72	5.47	393.74	<0.00	0.84	4.69

Samples	Pr141	Nd143	Sm147	Eu151	Gd155	Dy161	Yb173	Lu175	Hf178	Hg202	Tl203	Pb204
Averages	**1.20**	**6.92**	**3.53**	**0.44**	**5.51**	**13.94**	**32.03**	**5.72**	**526.69**	**#DIV/0!**	**0.82**	**5.73**
CAM-4 (n = 25)												
052_2011Oct26_Mt2_CAM4_Z12	0.29	1.86	1.95	0.29	5.4	18.07	41.58	7.56	315.52	<0.00	0.13	1.98
025_2011Oct27_Mt2_CAM4_Z26	0.64	3.99	1.7	0.14	3.91	12.33	30.45	5.66	391.76	<0.00	0.13	1.62
010_2012June15_CAM4_Mt1_Z10	0.72	4.67	3.32	0.45	6.72	22.44	46.45	7.83	415.23	<0.00	0.62	5.04
018_2012June15_CAM4_Mt1_Z3	1.15	7.48	3.67	0.47	6.2	23.64	66.2	11.3	598.91	<0.00	0.15	5.12
020_2012June15_CAM4_Mt1_Z5	2.96	21.49	8.24	0.62	12.14	30.69	59.77	9.37	566	<0.00	0.5	5.55
021_2012June15_CAM4_Mt1_Z6	1.04	6.68	3.74	0.37	6.12	17.05	40.81	7	572.24	<0.00	0.59	4.36
022_2012June15_CAM4_Mt1_Z7	0.82	5.92	3.35	0.38	6.81	18.5	37.64	6.26	432.18	<0.00	0.58	3.38
024_2012June15_CAM4_Mt1_Z9	5.49	42.53	9.78	0.76	12.21	29.63	43.09	6.82	384.27	<0.00	0.37	4.5
016_2012June18_CAM4_Mt1_Z12	0.3	2.74	2.99	0.52	8.28	26.39	53	8.69	347.35	<0.00	0.32	4.96
019_2012June18_CAM4_Mt1_Z15	4.68	27.09	9.39	0.55	10.56	19.8	35.98	5.8	432.13	<0.00	0.067	1.62
020_2012June18_CAM4_Mt1_Z16	0.19	1.59	1.39	0.27	3.31	10.93	32.62	5.23	338.77	<0.00	0.1	3.33
021_2012June18_CAM4_Mt1_Z17	2.04	12.81	7.94	0.88	12.87	29.93	63.69	10.07	591.41	<0.00	0.23	9.81
024_2012June18_CAM4_Mt1_Z20	2.04	11.67	4.91	0.37	8.28	19.85	51.84	8.41	495.34	<0.00	0.4	4.02
033_2012June18_CAM4_Mt1_Z23	1.15	7.36	5.9	0.6	8.72	21.59	47.05	7.66	454.29	<0.00	0.49	3.51
039_2012June18_CAM4_Mt1_Z29	1.31	7.49	4.26	0.44	9.06	34.53	91.24	14.27	483.92	<0.00	0.12	3.1
040_2012June18_CAM4_Mt1_Z30	0.64	3.93	2.38	0.2	5.6	21.33	52.62	7.87	470.77	<0.00	0.11	3.77
042_2012June18_CAM4_Mt1_Z32	3.14	16.75	6.02	0.38	8.98	21.29	44.13	6.33	419.21	<0.00	0.41	4.25
043_2012June18_CAM4_Mt1_Z33	0.71	3.88	2.91	0.44	5.15	11.14	27.5	4.43	514.3	<0.00	0.16	7.02
015_2012June20_CAM4_Mt1_Z36	0.28	2.88	2.8	0.47	7.98	18.4	54.33	7.54	381.53	<0.00	0.14	4.55
016_2012June20_CAM4_Mt1_Z37	1.2	8.88	4.45	0.5	8.34	15.97	51.15	7.55	482.06	<0.00	0.88	8.1
018_2012June20_CAM4_Mt1_Z39	7.13	44.98	14.74	0.79	18.87	20.65	41.85	5.98	574.45	<0.00	0.11	7.99
021_2012June20_CAM4_Mt1_Z42	1.88	9.83	4.79	0.39	9.14	20.05	61.75	8.64	547.93	<0.00	0.64	9.7
022_2012June20_CAM4_Mt1_Z43	1.48	9.43	4.18	0.4	7.6	18.11	61.54	7.87	533.42	<0.00	0.14	4.46
023_2012June20_CAM4_Mt1_Z44	1.11	5.26	2.53	0.29	4.95	10.72	34.36	4.53	414.43	<0.00	0.3	4.92
025_2012June20_CAM4_Mt1_Z46	1.17	8.74	3.89	0.33	7.07	13.14	44.46	5.86	576.35	<0.00	0.49	4.29
Averages	**1.74**	**11.20**	**4.85**	**0.45**	**8.17**	**20.25**	**48.60**	**7.54**	**469.35**	**#DIV/0!**	**0.33**	**4.84**
CAM-11 (n=52)												
015_2011Nov4_Mt2_CAM11_Z1	0.1	0.63	0.55	0.062	1.75	4.9	8.69	1.46	300.22	<0.00	0.069	1.14
016_2011Nov4_Mt2_CAM11_Z2	0.38	2.36	1.6	0.33	2.43	5.11	10.61	2.01	398.2	<0.00	0.15	2.01
017_2011Nov4_Mt2_CAM11_Z3	0.41	2.73	1.99	0.3	3.89	8.35	14	2.39	317.77	<0.00	0.14	1.91
018_2011Nov4_Mt2_CAM11_Z4	0.13	0.9	0.8	0.083	2.42	6.68	10.75	1.85	271.82	<0.00	0.18	1.44
020_2011Nov4_Mt2_CAM11_Z6	0.77	4.27	1.73	0.18	2.9	6.59	12.84	2.33	391.08	<0.00	0.11	2
021_2011Nov4_Mt2_CAM11_Z7	1.11	6.03	2.82	0.49	4.09	7.71	16.58	2.87	446.2	<0.00	0.18	2.34
024_2011Nov4_Mt2_CAM11_Z10	0.14	0.98	0.79	0.11	1.84	4.75	10.05	1.88	357.49	<0.00	0.14	1.42
026_2011Nov4_Mt2_CAM11_Z12	0.54	2.51	1.24	0.12	3.29	7.96	13.66	2.41	359.09	<0.00	0.12	1.45
015_2011Nov10_Mt2_CAM11_Z13	0.58	3.39	1.04	0.097	1.53	3.45	10.91	1.79	399.06	<0.00	0.13	1.11
016_2011Nov10_Mt2_CAM11_Z14	0.29	1.76	0.77	0.074	1.89	5.52	11.17	1.72	289.92	<0.00	0.13	1.34
017_2011Nov10_Mt2_CAM11_Z15	0.079	1.02	1.35	0.17	4.33	12.98	22.3	3.29	239.62	<0.00	0.23	1.58
018_2011Nov10_Mt2_CAM11_Z16	0.32	2.16	1.08	0.094	2.87	8.52	16.46	2.53	280.65	<0.00	0.14	1.19
019_2011Nov10_Mt2_CAM11_Z17	0.23	1.81	1.48	0.23	4.39	12.93	20.88	3.15	221.58	<0.00	0.12	1.32
023_2011Nov10_Mt2_CAM11_Z21	0.18	1.51	1.35	0.12	3.64	10.27	19.42	2.87	289.34	<0.00	0.2	1.34
024_2011Nov10_Mt2_CAM11_Z22	0.44	3.5	2.55	0.31	5.55	12.75	22.83	3.68	295.22	<0.00	0.27	1.75
031_2011Nov10_Mt2_CAM11_Z23	0.11	0.83	0.61	0.067	2.03	6.05	12.39	1.87	220.57	<0.00	0.1	0.92
032_2011Nov10_Mt2_CAM11_Z24	0.11	0.85	0.71	0.068	2.74	8.62	15.95	2.33	241.06	<0.00	0.13	1.14
034_2011Nov10_Mt2_CAM11_Z26	0.26	1.58	0.77	0.066	1.96	5.94	13.28	2.01	305.4	<0.00	0.082	1.24
035_2011Nov10_Mt2_CAM11_Z27	1.01	6.14	1.68	0.1	3.48	9.06	15.99	2.32	279.94	<0.00	0.096	1.01
038_2011Nov10_Mt2_CAM11_Z30	0.17	1.22	0.9	0.11	2.36	6.93	13.22	1.91	237.54	<0.00	0.14	1.17
039_2011Nov10_Mt2_CAM11_Z31	0.74	4.52	1.52	0.21	1.89	4.49	14.42	2.4	388.18	<0.00	0.19	1.53

Samples	Pr141	Nd143	Sm147	Eu151	Gd155	Dy161	Yb173	Lu175	Hf178	Hg202	Tl203	Pb204
048_2011Nov10_Mt2_CAM11_Z33	0.062	0.56	0.62	0.067	2.57	7.9	14.26	2.07	232.58	<0.00	0.1	1.16
049_2011Nov10_Mt2_CAM11_Z34	0.35	2.28	0.78	0.088	1.68	4.66	11.15	1.74	335.46	<0.00	0.093	1.11
050_2011Nov10_Mt2_CAM11_Z35	0.34	2.59	1.03	0.079	3.04	8.95	16.22	2.25	228.8	<0.00	0.11	1.08
052_2011Nov10_Mt2_CAM11_Z37	0.22	1.72	0.95	0.12	2.65	7.91	14.93	2.15	269.13	<0.00	0.14	1.07
053_2011Nov10_Mt2_CAM11_Z38	0.34	2.58	1.43	0.25	2.87	7.87	20.2	3.06	403.89	<0.00	0.066	2
054_2011Nov10_Mt2_CAM11_Z39	0.42	3.06	1.18	0.17	2.33	5.39	13.84	2.16	384.52	<0.00	0.15	1.62
055_2011Nov10_Mt2_CAM11_Z40	0.86	6.56	1.85	0.14	3.47	8.77	17.79	2.61	302.17	<0.00	0.12	1.1
056_2011Nov10_Mt2_CAM11_Z41	1.12	7.47	1.73	0.11	2.99	7.26	13.8	1.9	274.79	<0.00	0.14	1.04
016_2011Nov11_Mt2_CAM11_Z44	1.68	9.78	3.79	0.19	5.54	15.28	21.61	3.27	237.74	<0.00	0.092	1.32
017_2011Nov11_Mt2_CAM11_Z45	0.41	2.28	1	0.076	1.65	5.36	9.78	1.46	290.87	<0.00	0.14	1.12
018_2011Nov11_Mt2_CAM11_Z46	0.22	1.45	1	0.12	2.44	8.83	17.62	2.85	322.16	<0.00	0.16	1.21
020_2011Nov11_Mt2_CAM11_Z48	0.13	0.91	0.88	0.095	2.51	9	14.96	2.28	223.41	<0.00	0.13	1.16
021_2011Nov11_Mt2_CAM11_Z49	0.16	1.09	0.75	0.13	1.43	4.28	14.62	2.59	425	<0.00	0.051	1.43
022_2011Nov11_Mt2_CAM11_Z50	1.09	5.42	1.92	0.1	2.55	7.01	11.14	1.73	272.47	<0.00	0.15	1.43
026_2011Nov11_Mt2_CAM11_Z52	0.28	1.78	1.08	0.18	1.46	3.96	8.94	1.46	376.91	<0.00	0.13	1.71
027_2011Nov11_Mt2_CAM11_Z53	0.53	2.69	1.4	0.23	1.94	5.55	14.51	2.41	427.52	<0.00	0.16	1.61
015_2011Nov15_Mt2_CAM11_Z55	0.87	4.51	1.43	0.081	2.57	6.54	11.47	1.95	300.07	<0.00	0.1	0.97
016_2011Nov15_Mt2_CAM11_Z56	0.57	3.55	1.56	0.36	2.5	6.21	14.55	2.68	404.54	<0.00	0.18	1.38
017_2011Nov15_Mt2_CAM11_Z57	0.42	2.74	1.65	0.35	2.66	5.32	10.7	1.97	457.79	<0.00	0.25	2.78
020_2011Nov15_Mt2_CAM11_Z60	0.44	2.35	0.93	0.1	1.5	3.57	8.82	1.61	465.71	<0.00	0.18	1.56
021_2011Nov15_Mt2_CAM11_Z61	0.24	1.72	1.18	0.12	2.7	7.54	13.96	2.34	359.74	<0.00	0.16	1.8
022_2011Nov15_Mt2_CAM11_Z62	0.19	1.1	0.53	0.061	1.09	3.29	8.23	1.5	431.76	<0.00	0.077	1.16
023_2011Nov15_Mt2_CAM11_Z63	0.82	4.95	2.65	0.22	4.88	12.38	19.12	3.23	288.91	<0.00	0.06	1.09
018_2011Nov17_Mt2_CAM11_Z68	1.02	6.12	3.31	0.59	4.28	9.14	16.95	2.71	550.65	<0.00	0.18	2.56
019_2011Nov17_Mt2_CAM11_Z69	0.53	3.59	1.46	0.16	2.22	4.92	11.25	1.86	467.95	<0.00	0.17	1.91
020_2011Nov17_Mt2_CAM11_Z70	0.47	2.27	1.29	0.12	3.91	12.61	21.85	3.25	302.66	<0.00	0.12	1.28
021_2011Nov17_Mt2_CAM11_Z71	0.21	1.21	0.57	0.06	1.25	4.23	10.17	1.56	449	<0.00	0.13	1.12
022_2011Nov17_Mt2_CAM11_Z72	1.66	7.91	2.94	0.48	2.99	5.66	13.19	2.16	463.31	<0.00	0.074	5.09
029_2011Nov17_Mt2_CAM11_Z74	0.55	2.85	1.36	0.12	2.15	5.93	11.62	1.85	449.44	<0.00	0.15	1.5
031_2011Nov17_Mt2_CAM11_Z76	0.27	1.51	0.83	0.077	1.88	6.51	13.01	1.89	357.55	<0.00	0.14	1.16
032_2011Nov17_Mt2_CAM11_Z77	5.37	25.93	7	0.44	5.15	6.74	12.6	2.09	545.2	<0.00	0.14	1.58
Averages	**0.58**	**3.37**	**1.49**	**0.17**	**2.77**	**7.27**	**14.22**	**2.26**	**342.92**		**0.14**	**1.51**
ITA-4a (n=62)												
014_2012May7_Mt2_ITA4a_Z1	0.36	2.22	1.48	0.12	2.58	8.6	22.2	3.44	448.73	<0.00	0.11	3.16
015_2012May7_Mt2_ITA4a_Z2	0.11	0.85	0.76	0.075	1.98	6.31	16.6	2.59	390.64	<0.00	0.17	2.35
016_2012May7_Mt2_ITA4a_Z4	0.27	1.87	1.14	0.083	2.38	8.71	23.25	3.55	451.19	<0.00	0.18	2.15
020_2012May7_Mt2_TA4a_Z5	1.32	6.28	1.54	0.12	2.16	7.79	21.62	3.58	473.23	<0.00	0.33	2.85
024_2012May7_Mt2_ITA4a_Z10	0.8	4.71	2.54	0.15	5.41	16.15	35.31	5.7	390.57	<0.00	0.21	3.19
025_2012May7_Mt2_ITA4a_Z11	0.99	5.62	2.05	0.1	2.84	7.63	19.87	3.26	525.54	<0.00	0.21	2.06
026_2012May7_Mt2_ITA4a_Z12	0.6	3.85	1.76	0.15	2.88	9.25	24.12	3.97	523.14	<0.00	0.47	3.53
027_2012May7_Mt2_ITA4a_Z13	3.66	19.67	6.53	0.19	8.44	17.04	34.48	5.32	405.03	<0.00	0.24	2.53
033_2012May7_Mt2_ITA4a_Z15	0.17	1.76	1.46	0.075	2.52	8.4	21.1	3.32	450.67	<0.00	0.14	4.81
034_2012May7_Mt2_ITA4a_Z16	0.5	2.93	1.42	0.1	2.39	7.41	21.11	3.41	493.22	<0.00	0.23	2.2
036_2012May7_Mt2_ITA4a_Z18	0.27	1.7	1.09	0.14	1.95	4.95	13.43	2.43	373.51	<0.00	0.28	2.33
037_2012May7_Mt2_ITA4a_Z19	0.61	3.72	2.04	0.12	4.67	15.2	33.11	5.08	385.03	<0.00	0.28	2.45
038_2012May7_Mt2_ITA4a_Z20	0.5	3.04	1.79	0.12	3.48	10.45	28.86	4.63	536.46	<0.00	0.2	3.08
039_2012May7_Mt2_ITA4a_Z21	0.97	5.4	1.98	0.11	3.49	10.58	29.57	4.72	573.27	<0.00	0.15	2
040_2012May7_Mt2_ITA4a_Z23	0.11	1.3	1.96	0.12	6.17	16.64	37.14	6.05	357.34	<0.00	0.17	2.24
041_2012May7_Mt2_ITA4a_Z24	0.41	2.6	1.96	0.14	5.72	17.98	41.11	6.44	393.86	<0.00	0.24	2.68
047_2012May7_Mt2_ITA4a_Z26	0.45	3.24	2.54	0.14	7.23	21.33	47.62	7.68	424.5	<0.00	0.17	2.51
048_2012May7_Mt2_ITA4a_Z27	2.67	13.83	4.94	0.14	6.17	13.39	28.93	4.73	491.41	<0.00	0.16	2.21

Samples	**Pr141**	**Nd143**	**Sm147**	**Eu151**	**Gd155**	**Dy161**	**Yb173**	**Lu175**	**Hf178**	**Hg202**	**Tl203**	**Pb204**
049_2012May7_Mt2_ITA4a_Z28	0.087	0.82	0.89	0.11	1.74	4.77	12.76	2.25	471.3	<0.00	0.39	3.52
052_2012May7_Mt2_ITA4a_Z31	0.95	4.79	2.43	0.14	4.27	11.84	26.63	4.25	406.58	<0.00	0.22	1.87
053_2012May7_Mt2_ITA4a_Z32	0.33	2.48	1.36	0.12	2.54	7.21	19.43	3.15	439.9	<0.00	0.23	3.52
054_2012May7_Mt2_ITA4a_Z33	0.36	2.39	1.46	0.14	2.63	8.33	21.71	3.54	520.65	<0.00	0.091	2.22
055_2012May7_Mt2_ITA4a_Z34	0.16	1.29	1.15	0.12	2.4	8.45	22.2	3.55	473.18	<0.00	0.25	3.16
056_2012May7_Mt2_ITA4a_Z35	0.44	2.86	1.67	0.23	2.02	5.33	13.97	2.59	454.98	<0.00	0.35	2.79
015_2012May8_Mt2_ITA4a_Z36	0.86	5.07	2.06	0.16	5.1	10.84	25.58	4.12	255.18	<0.00	0.18	2.75
016_2012May8_Mt2_ITA4a_Z37	0.27	1.78	0.92	0.084	2.08	5.31	13.52	2.24	306.26	<0.00	0.17	2.29
017_2012May8_Mt2_ITA4a_Z38	0.07	0.77	0.85	0.12	2.07	5	11.9	2.1	254.36	<0.00	0.066	3.01
018_2012May8_Mt2_ITA4a_Z39	1.97	11.45	5.24	0.27	6.85	11.37	21.99	3.54	320.7	<0.00	0.42	4.77
019_2012May8_Mt2_ITA4a_Z40	0.042	0.65	0.85	0.084	2.66	7.2	16.03	2.57	245.3	<0.00	0.17	2.2
021_2012May8_Mt2_ITA4a_Z42	0.38	3.31	1.31	0.086	3.08	8.02	19.48	3.19	295.87	<0.00	0.19	2.41
022_2012May8_Mt2_ITA4a_Z43	0.77	5.23	2.19	0.21	4.19	8.53	19.28	3.16	273.14	<0.00	0.28	2.93
023_2012May8_Mt2_ITA4a_Z44	0.33	2.54	1.95	0.13	5.52	12.97	28.11	4.58	243.87	<0.00	0.11	4.15
030_2012May8_Mt2_ITA4a_Z48	0.76	4.68	2.49	0.17	6.01	13.79	31.4	5.09	330.59	<0.00	0.29	3.41
031_2012May8_Mt2_ITA4a_Z49	1.23	7.34	2.74	0.17	5.15	10.1	21.16	3.56	240.81	<0.00	0.24	2.7
032_2012May8_Mt2_ITA4a_Z50	0.35	2.22	1.48	0.09	3.31	8.42	18.59	2.95	281.72	<0.00	0.21	3.26
034_2012May8_Mt2_ITA4a_Z52	0.12	0.92	0.68	0.076	1.76	4.83	13.35	2.15	316.46	<0.00	0.19	2.95
035_2012May8_Mt2_ITA4a_Z53	0.86	5.7	2.27	0.18	3.43	7.43	15.78	2.7	346.79	<0.00	0.31	4.77
036_2012May8_Mt2_ITA4a_Z54	1.32	8.48	3.3	0.22	6.28	13.8	30.25	5.08	310.22	<0.00	0.3	3.66
003_2012Dec6_Mt1_ITA4a_Z001_Z011-001	0.067	0.79	0.99	0.092	2.55	10.2	25.99	4.48	478.96	<0.00	0.77	3.81
003_2012Dec6_Mt1_ITA4a_Z001_Z011-003	0.2	2.1	3.08	0.16	9.17	31.49	66.65	10.93	406.74	<0.00	0.78	4.02
003_2012Dec6_Mt1_ITA4a_Z001_Z011-004	10.17	46.4	13.36	0.24	12.56	23.92	39.55	6.15	444.09	<0.00	0.95	4.88
003_2012Dec6_Mt1_ITA4a_Z001_Z011-005	0.082	1.09	1.13	0.16	2.59	8.71	22.62	3.82	436.56	<0.00	0.98	4.64
003_2012Dec6_Mt1_ITA4a_Z001_Z011-006	1.91	9.1	3.46	0.12	5.2	12.49	29.77	4.75	395.83	<0.00	1.1	5.25
003_2012Dec6_Mt1_ITA4a_Z001_Z011-008	1.65	8.29	3.07	0.23	4.75	14.86	28.8	4.31	381.5	<0.00	0.7	4.98
003_2012Dec6_Mt1_ITA4a_Z001_Z011-009	0.096	0.76	1.12	0.12	3.71	15.93	33.86	5.37	406.72	<0.00	0.8	3.55
003_2012Dec6_Mt1_ITA4a_Z001_Z011-010	2.59	12.47	4.5	0.2	6.16	18.23	43.67	7.03	510.43	<0.00	0.86	5.38
003_2012Dec6_Mt1_ITA4a_Z001_Z011-011	0.47	2.37	1.34	0.14	2.86	12.18	31.9	5.16	500.87	<0.00	0.88	4.09
004_2012Dec6_Mt1_ITA4a_Z012_Z022-001	0.73	4.14	2.3	0.23	3.94	14.99	36.17	6.26	505.87	<0.00	1.37	7.58
004_2012Dec6_Mt1_ITA4a_Z012_Z022-002	0.27	2.14	1.95	0.17	5.49	16.78	37.71	6.6	422.8	<0.00	0.88	4.39
004_2012Dec6_Mt1_ITA4a_Z012_Z022-003	1.37	6.81	2.49	0.15	3.27	10.21	24.95	4.25	502.99	<0.00	0.73	4.24
004_2012Dec6_Mt1_ITA4a_Z012_Z022-004	0.94	4.31	2.42	0.14	4.63	17.65	43.04	7.02	473.61	<0.00	0.78	4.79
004_2012Dec6_Mt1_ITA4a_Z012_Z022-005	2.77	14.91	6.1	0.19	9.53	26.99	52.48	8.75	461.84	<0.00	0.89	3.91
004_2012Dec6_Mt1_ITA4a_Z012_Z022-006	2.6	11.18	3.85	0.13	5.32	14.47	27.56	4.32	389.79	<0.00	0.75	3.93
004_2012Dec6_Mt1_ITA4a_Z012_Z022-007	0.071	0.81	0.96	0.12	2.65	10.73	28.16	4.77	445.93	<0.00	0.81	4.04
004_2012Dec6_Mt1_ITA4a_Z012_Z022-008	0.064	0.64	0.94	0.11	1.98	9.02	24.32	3.92	463.91	<0.00	0.77	4.2
005_2012Dec6_Mt1_ITA4a_Z023_Z033-001	0.087	0.76	1.02	0.1	3.1	12.61	27.25	4.4	401.91	<0.00	0.6	3.34
005_2012Dec6_Mt1_ITA4a_Z023_Z033-002	0.49	2.73	1.82	0.19	3.99	14.84	35.47	5.41	511.23	<0.00	0.99	5.94
005_2012Dec6_Mt1_ITA4a_Z023_Z033-005	0.41	2.85	2.6	0.21	5.85	18.94	42.56	7.11	377.07	<0.00	1.09	4.17
005_2012Dec6_Mt1_ITA4a_Z023_Z033-006	0.19	1.42	1.47	0.11	3.49	12.42	31.67	5.29	529.69	<0.00	0.71	3.44
005_2012Dec6_Mt1_ITA4a_Z023_Z033-007	0.046	0.54	0.81	0.092	3.08	13.89	33.35	5.22	441.33	<0.00	0.64	3.47
005_2012Dec6_Mt1_ITA4a_Z023_Z033-010	0.26	1.68	1.27	0.12	3.19	13.41	34.28	5.55	505.27	<0.00	0.75	4.14
005_2012Dec6_Mt1_ITA4a_Z023_Z033-011	2.65	11.27	3.11	0.14	4.82	14.32	30.43	4.82	393.42	<0.00	0.98	5.7
Averages	**0.91**	**4.98**	**2.28**	**0.14**	**4.18**	**12.11**	**27.98**	**4.55**	**413.93**		**0.47**	**3.53**
CAM-10b (n=17)												
017_2012Oct12_CAM10b_Z3	0.53	2.21	2.37	0.31	6.24	15.52	26.16	4.21	234.71	<0.00	0.92	2.78
018_2012Oct12_CAM10b_Z4	0.24	2.83	2.87	0.41	7.26	16.78	31.19	5.14	212.76	<0.00	1.23	3.05
019_2012Oct12_CAM10b_Z5	0.2	2.14	2.14	0.27	5.14	12.56	22.73	3.82	196.96	<0.00	0.95	3
021_2012Oct12_CAM10b_Z7	0.28	3.1	3.25	0.63	8.37	19.25	31.93	5.23	240.76	<0.00	1.17	5.65
022_2012Oct12_CAM10b_Z8	0.16	2.33	3.18	0.38	7.66	19.48	33.69	5.53	218.45	<0.00	0.99	2.88

Appendix L: Zircon LA-ICP-MS Elemental Analyses, Camaquã and Itajaí Igneous Units

Samples	**Pr141**	**Nd143**	**Sm147**	**Eu151**	**Gd155**	**Dy161**	**Yb173**	**Lu175**	**Hf178**	**Hg202**	**Tl203**	**Pb204**
023_2012Oct12_CAM10b_Z9	0.19	2.08	2.4	0.28	6.89	19.32	31.93	5.3	217.06	<0.00	0.63	2.62
024_2012Oct12_CAM10b_Z10	9.43	42.51	9.25	0.87	10.01	18.01	28.35	4.48	192.35	<0.00	0.77	3.24
031_2012Oct12_CAM10b_Z11	61.18	250.44	50.85	3.47	34.36	28.62	42.67	6.84	249.35	<0.00	2.61	7.33
032_2012Oct12_CAM10b_Z12	0.39	3.45	3.23	0.4	7.5	19.8	33.01	5.33	232.72	<0.00	0.78	2.98
034_2012Oct12_CAM10b_Z14	0.18	2.05	2.52	0.39	5.8	13.67	24.11	4.12	226.66	<0.00	0.7	3.3
035_2012Oct12_CAM10b_Z15	0.13	1.56	1.76	0.23	5.19	14.49	24.13	3.9	230.44	<0.00	0.69	2.83
037_2012Oct12_Auto_Stds_CAM10b_Z17_23-002	1.44	3.82	2.64	0.37	5.91	14.1	25.36	4.16	215.25	<0.00	1.13	4.88
037_2012Oct12_Auto_Stds_CAM10b_Z17_23-003	0.25	2.35	2.72	0.44	5.82	14.06	24.02	3.7	253.95	<0.00	1.94	7.65
037_2012Oct12_Auto_Stds_CAM10b_Z17_23-012	0.25	3.36	3.76	0.54	8.84	18.51	33.29	5.49	253.96	<0.00	1.11	5.28
050_2012Oct12_CAM10b_Z24	0.21	2.65	2.84	0.43	6.39	13.68	25.51	4.32	234.71	<0.00	0.88	5.13
054_2012Oct12_Stds_CAM10b_Z28_31-003	0.2	2.97	4.05	0.49	10.38	28.09	44.6	6.94	280.23	<0.00	1.5	5.14
054_2012Oct12_Stds_CAM10b_Z28_31-004	1.3	11.35	12.22	2.49	25.15	46.57	79.47	12.14	491.78	<0.00	15.78	69.16
Averages	**4.50**	**20.07**	**6.59**	**0.73**	**9.82**	**19.56**	**33.07**	**5.33**	**246.01**	**#DIV/0!**	**1.99**	**8.05**
LRA303 (n=45)												
002_15Oct2012_NIST12_LRA303_Z1-10-004	0.51	3.62	1.93	0.31	3.78	9.5	20.25	3.7	341.64	<0.00	1.62	5.37
002_15Oct2012_NIST12_LRA303_Z1-10-005	0.13	1.16	1.3	0.23	3.23	9.1	18.46	3.29	335.44	<0.00	1.47	4.12
002_15Oct2012_NIST12_LRA303_Z1-10-006	0.23	2.98	1.72	0.3	4.13	11.7	23.35	4.22	368.08	<0.00	1.68	4.49
002_15Oct2012_NIST12_LRA303_Z1-10-011	0.23	1.6	1.24	0.16	2.91	9.4	20.12	3.59	384.17	<0.00	0.96	3.59
002_15Oct2012_NIST12_LRA303_Z1-10-013	0.18	1.32	1.38	0.17	3.54	11.86	24.74	4.38	331.46	<0.00	1.02	3
003_15Oct2012_Stds_LRA303_Z11_17-007	0.19	1.26	1.05	0.15	2.68	9.27	19.18	3.51	382.37	<0.00	0.92	3.02
003_15Oct2012_Stds_LRA303_Z11_17-008	0.29	1.87	1.9	0.23	5.09	12.48	28.27	5.1	386.19	<0.00	1.29	4.66
003_15Oct2012_Stds_LRA303_Z11_17-009	0.083	0.98	1.02	0.15	2.47	7.54	16.52	3.25	401.87	<0.00	1.04	3.03
003_15Oct2012_Stds_LRA303_Z11_17-010	0.16	1.51	1.58	0.18	4.38	16.32	28.87	5.19	388.22	<0.00	0.88	2.74
003_15Oct2012_Stds_LRA303_Z11_17-012	0.083	0.98	1.05	0.16	3.53	12.79	25.87	4.69	372.9	<0.00	0.82	2.95
003_15Oct2012_Stds_LRA303_Z11_17-014	0.32	2.1	1.02	0.16	2.15	7.01	14.72	2.69	394.82	<0.00	0.95	4.02
004_15Oct2012_Stds_LRA303_Z19_26-011	0.11	0.94	1.21	0.16	3.04	11.14	23.94	4.29	367.86	<0.00	0.8	2.73
004_15Oct2012_Stds_LRA303_Z19_26-012	0.37	3.05	2.76	0.3	6.19	19.91	30.12	5.21	409.76	<0.00	2.26	9.85
004_15Oct2012_Stds_LRA303_Z19_26-013	0.19	1.67	1.5	0.3	3.69	9.95	22.44	3.98	399.05	<0.00	1	3.13
002_16Oct2012_LRA303Small_Z27_37-001	1.36	7.33	3.69	0.39	7.27	19.46	37.01	6.99	393.3	<0.00	1.14	6.39
002_16Oct2012_LRA303Small_Z27_37-005	0.64	3.68	1.53	0.18	2.91	7.01	16.67	3.22	392.31	<0.00	1	3.27
002_16Oct2012_LRA303Small_Z27_37-006	0.28	2.69	2.15	0.41	5.19	13.99	26.68	4.76	358.36	<0.00	1.21	5.93
002_16Oct2012_LRA303Small_Z27_37-011	0.66	4.31	3.08	0.37	6.66	21.15	30.41	5.27	396.86	<0.00	1.08	4.25
003_16Oct2012_LRA303Small_Z38_49-001	0.25	2.38	1.6	0.23	4.08	10.7	26.05	4.87	443.96	<0.00	1.25	4.47
003_16Oct2012_LRA303Small_Z38_49-006	0.2	1.76	2.53	0.31	5.84	15.68	35.77	6.96	441.8	<0.00	1.49	3.64
003_16Oct2012_LRA303Small_Z38_49-009	0.27	2.59	2.44	0.27	4.92	15.26	29.86	5.59	428.04	<0.00	1.21	5.96
003_16Oct2012_LRA303Small_Z38_49-010	0.32	2.09	1.57	0.21	3.97	11.53	26.59	4.91	380.78	<0.00	0.8	3.93
003_16Oct2012_LRA303Small_Z38_49-011	0.11	1.16	1.46	0.19	3.89	12.18	26.75	5.12	385.09	<0.00	0.83	3.5
003_16Oct2012_LRA303Small_Z38_49-012	0.23	2.05	1.94	0.32	5.04	12.97	27.44	5.09	441.27	<0.00	0.96	6.65
004_16Oct2012_LRA303Small_Z50_61-001	0.34	2.75	2.6	0.38	5.52	16.77	32.18	5.85	442.38	<0.00	1.45	8.21
004_16Oct2012_LRA303Small_Z50_61-004	0.35	2.49	2.24	0.42	4.73	15.63	30.23	5.29	417.35	<0.00	0.94	6.76
004_16Oct2012_LRA303Small_Z50_61-005	0.17	1.33	1.41	0.2	3.39	10.74	23.42	4.55	410.44	<0.00	0.85	3.64
004_16Oct2012_LRA303Small_Z50_61-006	0.12	1.14	1.3	0.21	3.41	11.15	22.05	4.19	399.29	<0.00	0.77	3.46
004_16Oct2012_LRA303Small_Z50_61-007	0.16	1.11	0.67	0.098	1.57	4.84	12.4	2.37	379.19	<0.00	0.68	2.86
004_16Oct2012_LRA303Small_Z50_61-011	0.35	2.51	1.5	0.21	3.1	8.57	19.84	3.59	375.63	<0.00	0.85	3.71
004_16Oct2012_LRA303Small_Z50_61-012	0.23	2.08	1.95	0.25	5.01	15.87	31.4	5.32	398.52	<0.00	0.83	4.6
002_25Oct2012_LRA303Large_Z1_11-001	0.051	0.56	0.8	0.083	3.73	14.35	29.48	5.18	313.59	<0.00	0.64	2.13
002_25Oct2012_LRA303Large_Z1_11-002	0.1	0.84	1.27	0.15	4.53	17.58	36.93	6.17	338.28	<0.00	0.69	2.7
002_25Oct2012_LRA303Large_Z1_11-003	0.06	0.9	1.19	0.13	3.46	11.5	22.73	4.06	297.39	<0.00	0.62	2.64
002_25Oct2012_LRA303Large_Z1_11-006	0.12	1.16	1.56	0.19	4.54	13.57	30.81	5.7	408.59	<0.00	0.61	3.08
002_25Oct2012_LRA303Large_Z1_11-009	0.06	0.83	1.52	0.13	5.72	24.73	50.72	8.65	336.7	<0.00	0.49	2.19
003_25Oct2012_LRA303Large_Z12_23-003	0.051	0.45	0.5	0.068	1.4	4.14	10.05	1.93	294.21	<0.00	0.48	2.31

Samples	Pr141	Nd143	Sm147	Eu151	Gd155	Dy161	Yb173	Lu175	Hf178	Hg202	Tl203	Pb204
003_25Oct2012_LRA303Large_Z12_23-006	0.28	1.86	2.14	0.18	8.31	30.73	58.96	9.57	334.93	<0.00	0.28	2.07
003_25Oct2012_LRA303Large_Z12_23-007	12.21	51.81	10.51	0.41	10.91	16.1	28.49	4.94	313.29	<0.00	0.35	2.14
003_25Oct2012_LRA303Large_Z12_23-008	0.11	0.73	1.26	0.15	5.28	21.09	44.82	7.69	347.02	<0.00	0.27	1.58
003_25Oct2012_LRA303Large_Z12_23-009	0.77	3.97	2.14	0.17	6.22	23.83	46.3	7.86	338.69	<0.00	0.34	1.93
003_25Oct2012_LRA303Large_Z12_23-010	0.066	0.56	0.57	0.06	2.08	7.14	16.04	2.96	298.5	<0.00	0.31	1.61
003_25Oct2012_LRA303Large_Z12_23-011	0.19	1.61	1.62	0.16	5.58	22.64	43.91	7.42	349.86	<0.00	0.21	2.49
004_25Oct2012_LRA303Large_Z23_30-002	0.039	0.47	0.68	0.078	2.68	10.71	23.49	4.21	314.22	<0.00	0.31	1.59
004_25Oct2012_LRA303Large_Z23_30-006	0.15	1.33	1.58	0.15	7	31.01	62.42	10.7	334.3	<0.00	0.36	2.1
Averages	**0.52**	**3.01**	**1.81**	**0.22**	**4.42**	**14.01**	**28.37**	**5.07**	**372.62**	**#DIV/0!**	**0.89**	**3.74**
CAM-18 (n=27)												
015_2012Oct5_CAM18Large_Z1	0.83	4.96	1.81	0.19	3	7.29	17.66	3.29	298.51	<0.00	0.64	2.73
016_2012Oct5_CAM18Large_Z2	0.068	0.74	1.04	0.16	2.56	8.59	20.59	3.76	301.38	<0.00	0.6	1.73
019_2012Oct5_CAM18Large_Z5	0.083	0.78	0.77	0.11	1.86	5.68	15.1	2.77	274.82	<0.00	0.51	1.76
022_2012Oct5_CAM18Large_Z8	0.25	1.7	0.87	0.14	1.64	4.96	13.97	2.63	297.5	<0.00	0.51	1.83
028_2012Oct5_CAM18Large_Z11	0.13	1.2	1.41	0.17	4.18	14.45	32.08	5.73	302.47	<0.00	0.61	2.82
029_2012Oct5_CAM18Large_Z12	0.19	1.52	1.63	0.21	3.91	11.94	28.08	5	332.5	<0.00	0.7	2.7
031_2012Oct5_CAM18Large_Z14	0.062	0.84	1.04	0.18	2.74	8.4	18.84	3.44	276.97	<0.00	0.47	2.43
017_2012Oct8_CAM18Small_Z2	0.15	1.4	1.8	0.28	4.24	9.43	24.54	4.15	405.99	<0.00	0.82	1.99
018_2012Oct8_CAM18Small_Z3	0.096	1.39	1.75	0.19	4.72	12.54	32.55	5.27	466.53	<0.00	0.46	2.67
024_2012Oct8_CAM18Small_Z9	0.8	7.22	5.63	0.97	14.42	29.12	58.72	9.05	567.41	<0.00	4.2	14.11
017_2012Oct9_CAM18Small_Z14	0.34	2.25	2.02	0.24	4.74	13.38	26.83	4.68	390.73	<0.00	0.49	3
018_2012Oct9_CAM18Small_Z15	0.14	1.23	1.34	0.19	3.45	10.99	23.9	4.22	383.25	<0.00	0.37	3.16
020_2012Oct9_CAM18Small_Z18	0.13	1.33	1.68	0.25	4.75	15.81	29.44	4.88	309.86	<0.00	0.53	3.46
022_2012Oct9_CAM18Small_Z20	0.15	0.95	0.73	0.097	1.69	6.63	15.43	2.61	358.56	<0.00	0.5	2
024_2012Oct9_CAM18Small_Z22	0.22	1.82	1.58	0.16	4.14	15.16	30.64	5.06	379.62	<0.00	0.43	2.44
025_2012Oct9_CAM18Small_Z23	2.12	5.17	2.72	0.3	6.68	21.32	40.25	6.68	376.63	<0.00	0.68	3.46
002_2012Oct11_Auto_CAM18Small_Z27_36-002	0.89	0.91	1.17	0.19	2.93	9.02	26.8	4.14	385.14	<0.00	0.72	3.32
002_2012Oct11_Auto_CAM18Small_Z27_36-003	0.32	2.62	3.29	0.49	7.11	17.46	44.44	6.54	397.15	<0.00	2.42	7.1
002_2012Oct11_Auto_CAM18Small_Z27_36-004	0.57	3.24	1.48	0.19	3.51	10.64	29.84	4.48	398.34	<0.00	0.8	3.94
002_2012Oct11_Auto_CAM18Small_Z27_36-005	0.055	0.92	1.01	0.21	2.43	5.78	17.97	2.8	373.84	<0.00	0.91	3.3
002_2012Oct11_Auto_CAM18Small_Z27_36-007	0.25	2.48	2.29	0.31	5.28	12.95	32.13	5.18	412.84	<0.00	0.88	7.4
002_2012Oct11_Auto_CAM18Small_Z27_36-008	0.34	2.33	1.79	0.2	4.17	13.02	35.33	5.36	400.84	<0.00	0.84	4
002_2012Oct11_Auto_CAM18Small_Z27_36-010	1.13	6.42	2.36	0.2	3.78	8.48	24.14	3.42	427.58	<0.00	0.67	3.7
004_2012Oct11_Auto_CAM18Small_Z37_47-003	0.11	1.09	1.36	0.23	3.32	9.99	31	4.47	425.53	<0.00	0.81	3.74
004_2012Oct11_Auto_CAM18Small_Z37_47-004	0.16	1.63	1.96	0.23	4.89	13.64	37.06	5.09	428.93	<0.00	0.95	3.81
004_2012Oct11_Auto_CAM18Small_Z37_47-005	0.15	1.81	2.04	0.3	5.66	19.1	47.66	6.31	379.04	<0.00	0.65	2.94
004_2012Oct11_Auto_CAM18Small_Z37_47-011	0.18	1.86	1.8	0.26	5.26	13.55	38.35	4.99	440.41	<0.00	0.63	3.53
Averages	**0.37**	**2.22**	**1.79**	**0.25**	**4.34**	**12.20**	**29.38**	**4.67**	**377.50**		**0.84**	**3.67**
RAM01A (n=15)												
002_17Oct2012_RAM01ASmalls_Z1_11-002	0.08	0.71	0.82	0.11	1.75	4.02	9.29	1.77	237.96	<0.00	1.49	4.77
002_17Oct2012_RAM01ASmalls_Z1_11-003	0.098	1.6	1.84	0.2	5.06	13.45	28.74	5.08	300.85	<0.00	1.41	3.55
002_17Oct2012_RAM01ASmalls_Z1_11-004	0.26	1.85	1.38	0.13	4.25	15.47	33.33	5.59	285.42	<0.00	1.14	3.66
002_17Oct2012_RAM01ASmalls_Z1_11-005	0.23	1.34	1.29	0.13	4.97	19.34	41	6.92	281.56	<0.00	0.86	3.22
002_17Oct2012_RAM01ASmalls_Z1_11-006	0.21	1.54	1.39	0.25	3.03	7.68	17.28	3.06	311.22	<0.00	1.45	4.19
002_17Oct2012_RAM01ASmalls_Z1_11-008	0.095	0.82	0.88	0.11	2.23	5.15	11.4	2.14	232.75	<0.00	0.81	2.53
002_17Oct2012_RAM01ASmalls_Z1_11-010	0.25	1.83	2.34	0.19	6.95	22.72	46.06	7.54	291.06	<0.00	1.16	3.14
003_17Oct2012_RAM01ASmalls_Z12_22-002	0.076	0.65	1.12	0.15	4.46	18.58	38.65	6.37	310.59	<0.00	1.09	4.17
003_17Oct2012_RAM01ASmalls_Z12_22-004	0.054	0.7	0.98	0.12	2.42	7.25	17.21	3.08	288.65	<0.00	0.92	3.6
003_17Oct2012_RAM01ASmalls_Z12_22-008	0.26	2.18	1.81	0.24	6.1	19.06	42.12	6.85	311.35	<0.00	0.89	3.9
003_17Oct2012_RAM01ASmalls_Z12_22-011	0.26	1.86	1.84	0.17	6.84	28.08	59.13	9.18	303.38	<0.00	0.68	2.53

Samples	**Pr141**	**Nd143**	**Sm147**	**Eu151**	**Gd155**	**Dy161**	**Yb173**	**Lu175**	**Hf178**	**Hg202**	**Tl203**	**Pb204**
002_26Oct2012_RMA01Large_Z1_8-001	0.31	1.96	1.32	0.15	2.98	7.62	20.13	3.65	329.58	<0.00	0.88	2.58
002_26Oct2012_RMA01Large_Z1_8-003	0.52	3.01	1.96	0.31	4.71	11.21	28.16	5.2	320.18	<0.00	0.87	2.72
002_26Oct2012_RMA01Large_Z1_8-005	0.12	1.25	1.59	0.29	4.3	11.05	29.11	5.19	337.12	<0.00	0.78	2.28
002_26Oct2012_RMA01Large_Z1_8-007	0.17	1.09	0.67	0.082	1.64	4.84	14.66	2.83	331.95	<0.00	0.44	1.65
Averages	**0.20**	**1.49**	**1.42**	**0.18**	**4.11**	**13.03**	**29.08**	**4.96**	**298.24**		**0.99**	**3.23**
ITA-8 (n=38)												
002_18Oct2012_ITA-8_Z1_11-001	0.11	1.15	1.18	0.37	3.07	9.04	20.52	3.75	249.77	<0.00	1.13	4.55
002_18Oct2012_ITA-8_Z1_11-002	0.39	2.26	1.38	0.35	2.98	8.12	19.79	3.69	271	<0.00	1.14	3.83
002_18Oct2012_ITA-8_Z1_11-003	0.86	4.45	1.69	0.35	3.27	7.65	18.7	3.44	270.19	<0.00	1.05	3.29
002_18Oct2012_ITA-8_Z1_11-007	0.16	1.19	0.88	0.31	2.03	4.35	11.76	2.25	263.11	<0.00	1.15	3.92
002_18Oct2012_ITA-8_Z1_11-008	0.25	1.55	0.89	0.24	1.97	5.65	16.08	2.89	251.05	<0.00	0.83	2.7
002_18Oct2012_ITA-8_Z1_11-009	0.23	1.51	0.92	0.28	2.07	5.23	14.92	2.8	261.86	<0.00	0.98	3.75
002_18Oct2012_ITA-8_Z1_11-010	0.46	2.56	1.66	0.38	3.44	8.49	21.51	3.91	269.62	<0.00	1.13	3.78
002_18Oct2012_ITA-8_Z1_11-011	2.52	11.39	2.82	0.43	3.74	9.41	18.37	3.5	251.73	<0.00	1.1	3.78
003_18Oct2012_ITA-8_Z12_22-003	0.095	0.97	1.09	0.33	2.72	7.5	17.63	3.23	252.3	<0.00	1.24	4.21
003_18Oct2012_ITA-8_Z12_22-004	0.28	1.74	1.08	0.29	2.46	6.43	15.67	2.84	257.57	<0.00	0.95	3.61
003_18Oct2012_ITA-8_Z12_22-006	0.43	2.68	1.37	0.34	3.08	8.25	20.51	3.77	261.99	<0.00	0.87	3.67
003_18Oct2012_ITA-8_Z12_22-007	0.13	1.14	1.09	0.3	2.34	5.75	15.3	2.84	265.27	<0.00	0.95	43.75
003_18Oct2012_ITA-8_Z12_22-008	0.5	3.32	2.21	0.56	4.46	8.48	18.16	3.44	283.07	<0.00	1.33	4.87
003_18Oct2012_ITA-8_Z12_22-011	0.15	1.11	1.02	0.31	2.52	6.55	16.79	3.14	259.41	<0.00	1.22	3.57
004_18Oct2012_ITA-8_Z23_30-002	0.99	5.93	2.49	0.68	4.27	8.91	19.23	3.57	291.41	<0.00	1.21	6.68
004_18Oct2012_ITA-8_Z23_30-003	1.03	5.23	1.83	0.31	2.68	6.11	16.58	3.03	266.38	<0.00	0.93	4.26
004_18Oct2012_ITA-8_Z23_30-006	0.12	1.55	1.72	0.47	3.41	7.6	20.04	3.95	293.31	<0.00	0.97	4.51
002_24Oct2012_ITA8Large_Z1_11-001	0.23	1.6	1	0.29	2.32	6.2	15.99	2.79	249.24	<0.00	0.77	2.98
002_24Oct2012_ITA8Large_Z1_11-002	3.36	15.67	3.9	0.43	4.37	8.73	21.26	3.61	261.1	<0.00	0.85	3.22
002_24Oct2012_ITA8Large_Z1_11-003	0.31	1.69	0.84	0.22	1.48	3.13	9.2	1.62	256.61	<0.00	0.68	2.61
002_24Oct2012_ITA8Large_Z1_11-004	10.29	43.52	8.46	0.61	7.59	10.68	19.26	3.17	245.97	<0.00	0.95	3.44
002_24Oct2012_ITA8Large_Z1_11-007	0.11	0.86	0.72	0.23	1.65	3.86	12.57	2.18	243.59	<0.00	0.68	1.98
002_24Oct2012_ITA8Large_Z1_11-008	0.68	3.56	1.38	0.21	2.04	3.83	11.76	2.13	274.47	<0.00	0.83	3.39
002_24Oct2012_ITA8Large_Z1_11-009	0.34	2.11	1.15	0.23	2.96	8.55	22.62	3.79	298.47	<0.00	0.55	2.13
002_24Oct2012_ITA8Large_Z1_11-010	0.077	0.87	0.82	0.25	2.18	5.63	17.32	2.99	256.21	<0.00	0.59	2.49
002_24Oct2012_ITA8Large_Z1_11-011	0.1	0.99	1.05	0.32	2.89	6.76	17.57	2.97	269.87	<0.00	0.65	2.11
003_24Oct2012_ITA8Large_Z12_23-002	0.073	0.99	1.02	0.33	2.38	5.4	17.67	3.14	263.94	<0.00	0.6	2.11
003_24Oct2012_ITA8Large_Z12_23-007	0.29	1.98	1.13	0.31	2.33	5.33	14.27	2.56	263.98	<0.00	0.65	1.88
003_24Oct2012_ITA8Large_Z12_23-008	0.22	1.52	1.11	0.36	2.65	6.79	17.21	2.99	276.18	<0.00	0.56	2.49
003_24Oct2012_ITA8Large_Z12_23-009	0.29	2.2	1.57	0.54	3.47	8.62	20.25	3.3	276.92	<0.00	1.36	5.75
004_24Oct2012_ITA8Large_Z24_35-001	0.13	1	1.03	0.27	2.95	7.89	21.7	3.67	265.55	<0.00	0.57	2.64
004_24Oct2012_ITA8Large_Z24_35-002	0.094	0.79	0.76	0.24	1.67	4.61	14.56	2.56	264.58	<0.00	0.62	2.9
004_24Oct2012_ITA8Large_Z24_35-003	1.28	6.05	1.9	0.33	3.04	6.63	19.16	3.17	267.83	<0.00	0.7	3.34
004_24Oct2012_ITA8Large_Z24_35-005	0.13	1.21	1.19	0.35	3.12	8.11	21.1	3.53	282.54	<0.00	0.61	2.9
004_24Oct2012_ITA8Large_Z24_35-006	0.84	4.66	1.8	0.33	2.65	5.41	15.38	2.62	279.31	<0.00	0.76	3.78
004_24Oct2012_ITA8Large_Z24_35-009	0.46	3.23	2.41	0.66	4.7	10.16	23.36	3.96	319.48	<0.00	1.11	4.41
004_24Oct2012_ITA8Large_Z24_35-010	0.12	1.25	1.36	0.36	3.06	6.99	19.01	3.23	285.61	<0.00	0.65	3.79
004_24Oct2012_ITA8Large_Z24_35-011	3.85	17.3	4.21	0.38	4.07	6.86	19.15	3.25	263.19	<0.00	0.8	4.44
Averages	**0.84**	**4.28**	**1.69**	**0.36**	**3.00**	**6.94**	**17.68**	**3.14**	**267.99**	**#DIV/0!**	**0.89**	**4.57**

Appendix L: Zircon LA-ICP-MS Elemental Analyses, Camaquã and Itajaí Igneous Units

								Trace Element Concentrations Normalized to Chondrite			
Samples	**Tl205**	**Pb206**	**Pb207**	**Pb208**	**Th232**	**U235**	**U238**	**Si29**	**Ca42**	**Ti49**	**Fe56**
CAM-1 (n=5)											
028_2011Nov2_Mt2_CAM1_Z46	0.072	4.43	0.5	0.48	6.32	186.54	11.17	0.957	0.4	0	0.0003
002_2012Dec4_Mt1_CAM1_Z001_011-003	1.04	6.57	1.65	1.76	16.12	256.08	14.3	0.957	0.072	0	0.00082
002_2012Dec4_Mt1_CAM1_Z001_011-007	1.08	4.9	1.47	1.03	10.29	185.34	11.6	0.957	0	0	0.00044
002_2012Dec4_Mt1_CAM1_Z001_011-011	0.49	5.59	0.92	0.6	7.64	153.63	15.25	0.957	0.053	0.013	0.00028
002_2012Dec6_Mt1_CAM1_Z047_053-005	0.65	23.34	2.15	2.28	40.79	384.88	59.9	0.957	0.061	0.045	0.00292
Averages	**0.67**	**8.97**	**1.34**	**1.23**	**16.23**	**233.29**	**22.44**	**0.96**	**0.12**	**0.01**	**0.00**
CAM-2 (n = 43)											
014_Mt2_CAM2_Z2	0.094	44.57	4.21	4.81	109.91	862.56	162.17	0.957	0.205	0.141	0.00048
015_Mt2_CAM2_Z3	0.061	15.49	2.08	2.32	36.56	315.72	47.34	0.957	0.106	0	0.0008
017_Mt2_CAM2_Z5	0.18	12.6	1.39	1.88	42.6	272.79	48.3	0.957	0.608	0	0.00042
018_Mt2_CAM2_Z6	0.25	2.3	0.52	0.46	7.84	80.27	6.18	0.957	0.05	0	0.00015
020_Mt2_CAM2_Z8	0.15	15.56	3.01	4.49	71.33	349.17	54.44	0.957	0.034	0.171	0.00328
021_Mt2_CAM2_Z9	0.3	3.28	0.92	0.69	6.77	113.7	6.23	0.957	0	0	0.00014
022_Mt2_CAM2_Z10	0.15	3.09	1.26	1.52	7.99	55.51	7.74	0.957	0	0	0.00003
029_2012Apr21_Mt2_CAM2_Z16	0.13	4.11	0.59	0.91	17.74	95.7	15.21	0.957	0.05	0	0
015_2012Apr20_Mt2_CAM2_Z20	0.17	19.82	2.49	2.72	43.02	682.63	56.84	0.957	0.022	0.074	0.00142
016_2012Apr20_Mt2_CAM2_Z21	0.17	9.73	2.02	1.6	27.24	373.42	28.37	0.958	0	0.138	0.00173
017_2012Apr20_Mt2_CAM2_Z22	0.14	4.97	0.76	0.55	6.1	189.28	12.99	0.957	0.07	0	0.00017
018_2012Apr20_Mt2_CAM2_Z23	0.091	1.18	0.27	0.21	1.32	56.09	2.19	0.957	0	0	0
019_2012Apr20_Mt2_CAM2_Z24	0.19	7.09	1.02	1.08	13.91	301.09	18.1	0.958	0.286	0.046	0.00037
020_2012Apr20_Mt2_CAM2_Z25	0.14	14.32	1.68	1.73	24.75	590.34	39.03	0.957	0.042	0	0.00036
021_2012Apr20_Mt2_CAM2_Z26	0.1	1.7	0.33	0.35	3.22	72.65	3.67	0.957	0	0	0
028_2012Apr20_Mt2_CAM2_Z30	0.15	14.28	1.69	2.2	33.14	594.16	37.3	0.957	0.051	0	0.00032
032_2012Apr20_Mt2_CAM2_Z34	0.09	1.41	0.33	0.3	2.08	50.96	2.62	0.957	0	0	0.00045
033_2012Apr20_Mt2_CAM2_Z345	0.059	2.01	0.48	0.38	2.84	102.75	4.04	0.957	0	0	0.00003
002_2012Nov30_Mt1_CAM2_Z2_12-002	0.74	4.76	0.88	0.93	12.02	176.89	10.75	0.957	0	0	0.00027
002_2012Nov30_Mt1_CAM2_Z2_12-006	1.02	4.22	1.16	0.88	6.83	193.86	8.59	0.957	0	0.034	0.00037
002_2012Nov30_Mt1_CAM2_Z2_12-007	1.09	3.26	1.13	0.66	3.76	132.01	5.96	0.957	0.068	0.021	0.00199
002_2012Nov30_Mt1_CAM2_Z2_12-010	0.72	11.6	1.49	1.14	15.34	433.04	29.43	0.957	0.064	0	0.00055
003_2012Nov30_Mt1_CAM2_Z13_22-001	0.79	3.17	0.87	0.61	5.06	148.69	6.95	0.957	0.229	0.448	0.00258
003_2012Nov30_Mt1_CAM2_Z13_22-002	0.51	5.13	0.93	0.86	10.99	188.01	12.72	0.957	0.359	0.071	0.00022
003_2012Nov30_Mt1_CAM2_Z13_22-003	0.44	4.43	0.7	0.55	11.15	181.77	12.78	0.957	0.102	0.0691	0.00103
003_2012Nov30_Mt1_CAM2_Z13_22-004	0.96	6.47	1.36	1.03	8.68	278.71	14.32	0.957	0.93	0.574	0.00161
003_2012Nov30_Mt1_CAM2_Z13_22-005	0.62	3.59	0.76	0.59	5.69	169.16	7.66	0.957	0	0	0.00006
003_2012Nov30_Mt1_CAM2_Z13_22-007	1.37	4.47	1.13	0.82	5.7	180.09	8.86	0.957	0.68	0.112	0.0025
003_2012Nov30_Mt1_CAM2_Z13_22-008	0.56	15	3.94	3.36	19.29	482.62	33.52	0.957	0.026	0.222	0.00216
004_2012Nov30_Mt1_CAM2_Z23_33-006	1.05	8.04	1.55	1.18	12.21	327.5	20.04	0.957	0.142	0.067	0.00045
004_2012Nov30_Mt1_CAM2_Z23_33-007	0.64	5.64	0.99	0.72	7.7	213.39	12.34	0.957	0.166	0	0.00045
004_2012Nov30_Mt1_CAM2_Z23_33-009	0.74	7.83	1.36	1.1	13.6	280.83	20.1	0.957	0	0.213	0.00171
004_2012Nov30_Mt1_CAM2_Z23_33-011	0.8	5.6	1.07	1.29	37.06	235.84	16.18	0.957	0.077	0.132	0.00089
002_2012Dec3_CAM2_Z034_044-001	0.76	10.74	1.33	0.82	9.56	443.16	30.77	0.957	0.111	0	0.00132
002_2012Dec3_CAM2_Z034_044-002	0.79	5.68	1.28	0.97	8.89	241.4	13.82	0.957	0.062	0.591	0.00083
002_2012Dec3_CAM2_Z034_044-003	0.67	10.1	1.82	3.03	41.31	422.28	30.59	0.957	0	0.608	0.002
002_2012Dec3_CAM2_Z034_044-004	0.54	3.44	0.7	0.51	5.34	170.07	9.15	0.957	0	0.043	0.00031
002_2012Dec3_CAM2_Z034_044-005	0.62	6.68	0.92	0.99	14.61	280.87	18.95	0.957	0.263	0.116	0.0002
002_2012Dec3_CAM2_Z034_044-008	0.53	8.36	1.12	1.47	22.2	320.69	23.17	0.957	0	0.0115	0.00011
002_2012Dec3_CAM2_Z034_044-009	0.47	9.8	1.14	1.03	15.33	401.81	28.63	0.957	0.093	0	0.0016
002_2012Dec3_CAM2_Z034_044-010	0.71	7.47	1.11	0.82	8.18	277.21	18.36	0.957	0.034	0.022	0.00015
003_2012Dec3_CAM2_Z045_055-006	0.88	13.54	1.85	1.83	20.66	506.32	39.89	0.957	0	0.178	0.00253
003_2012Dec3_CAM2_Z045_055-007	0.5	5.53	0.72	0.82	11.62	208.7	15.12	0.957	0	0.055	0.00077

Appendix L: Zircon LA-ICP-MS Elemental Analyses, Camaquã and Itajaí Igneous Units

									Trace Element Concentrations Normalized to Chondrite			
Samples	**Tl205**	**Pb206**	**Pb207**	**Pb208**	**Th232**	**U235**	**U238**		**Si29**	**Ca42**	**Ti49**	**Fe56**
Averages	**0.49**	**8.19**	**1.31**	**1.31**	**18.40**	**280.32**	**23.29**	**#DIV/0!**	**0.96**	**0.11**	**0.10**	**0.00**
CAM-4 (n = 25)												
052_2011Oct26_Mt2_CAM4_Z12	0.071	3.91	0.48	0.82	16.71	93.63	12.22		0.957	0.051	0	0.00043
025_2011Oct27_Mt2_CAM4_Z26	0.073	7.71	0.77	1.02	16.46	137.89	19.14		0.958	0.125	0.0197	0.0002
010_2012June15_CAM4_Mt1_Z10	0.32	6.71	1.12	1.53	19.59	241.25	17.56		0.957	0	0	0.00161
018_2012June15_CAM4_Mt1_Z3	0.22	32.5	3.67	3.37	42.64	839.29	91.25		0.957	0.123	0.134	0.00762
020_2012June15_CAM4_Mt1_Z5	0.2	13.31	2.21	2.05	31.78	469.05	45.2		0.957	0.531	0	0.00361
021_2012June15_CAM4_Mt1_Z6	0.25	8.98	1.78	1.51	15.66	284.13	26.72		0.957	0.208	0.036	0.00327
022_2012June15_CAM4_Mt1_Z7	0.4	5.31	1.16	1.03	8.98	162.38	12.09		0.957	0.156	0	0.00175
024_2012June15_CAM4_Mt1_Z9	0.21	3.78	0.9	1.12	11.43	123.29	10.38		0.957	2.25	0	0.0022
016_2012June18_CAM4_Mt1_Z12	0.22	3.95	0.77	0.91	10.26	159.72	8.09		0.957	0.036	0.033	0.00013
019_2012June18_CAM4_Mt1_Z15	0.23	5.49	1.22	1	9.69	204.33	11.36		0.957	1.67	0.092	0.00473
020_2012June18_CAM4_Mt1_Z16	0.079	2.79	0.47	0.59	7.22	114.69	6.56		0.957	0.037	0	0.00018
021_2012June18_CAM4_Mt1_Z17	0.29	12.2	2.35	1.79	24.76	544.48	34.3		0.957	0.477	0.191	0.00402
024_2012June18_CAM4_Mt1_Z20	0.16	9.58	1.35	1.39	16.97	387.97	22.47		0.957	0.491	0.032	0.00105
033_2012June18_CAM4_Mt1_Z23	0.28	7.4	1.58	1.29	14.73	310.7	17.77		0.957	0	0.023	0.00793
039_2012June18_CAM4_Mt1_Z29	0.15	18.77	1.98	2.57	43.25	873.67	46.38		0.957	0.366	0.049	0.00165
040_2012June18_CAM4_Mt1_Z30	0.12	8.36	0.93	1.34	20.59	360.28	20.03		0.957	0.035	0	0.00014
042_2012June18_CAM4_Mt1_Z32	0.053	4.72	0.86	0.99	11.05	211.99	10.18		0.957	0.986	0	0.00108
043_2012June18_CAM4_Mt1_Z33	0.33	3.91	1.09	0.85	5.26	166.26	7.37		0.957	0.036	0	0.00138
015_2012June20_CAM4_Mt1_Z36	0.061	5.76	1.05	1.11	12.56	613.18	13.78		0.957	0	0	0.00041
016_2012June20_CAM4_Mt1_Z37	0.091	10.46	2.18	1.76	13.74	745.24	23.6		0.957	0.078	0.203	0.00446
018_2012June20_CAM4_Mt1_Z39	0.21	7.95	1.43	1.18	12.04	653.17	19.69		0.957	2.63	0.027	0.00437
021_2012June20_CAM4_Mt1_Z42	0.085	7.93	1.38	1.41	14.8	528.48	19.61		0.957	0.522	0.053	0.00125
022_2012June20_CAM4_Mt1_Z43	0.22	10.73	1.66	1.4	16.98	899.06	27.24		0.957	0.28	0	0.00177
023_2012June20_CAM4_Mt1_Z44	0.17	3.99	0.85	0.74	7.91	456.16	9.13		0.957	0.053	0	0.0018
025_2012June20_CAM4_Mt1_Z46	0.2	9.99	1.33	1.04	12.52	1406.36	26.51		0.957	0.346	0	0.00171
Averages	**0.19**	**8.65**	**1.38**	**1.35**	**16.70**	**439.47**	**22.35**		**0.96**	**0.46**	**0.04**	**0.00**
CAM-11 (n=52)												
015_2011Nov4_Mt2_CAM11_Z1	0.065	7.8	0.64	0.4	5.74	132.33	17.3		0.957	0.0098	0	0
016_2011Nov4_Mt2_CAM11_Z2	0.07	14.22	1.1	0.75	11.04	253.68	34.34		0.957	0.239	0.0075	0.00202
017_2011Nov4_Mt2_CAM11_Z3	0.082	10.53	1.05	0.72	8.6	199.41	23.25		0.957	0.092	0.0085	0.00139
018_2011Nov4_Mt2_CAM11_Z4	0.05	9.27	0.72	0.57	7.96	155.35	20.13		0.957	0	0.0241	0.0016
020_2011Nov4_Mt2_CAM11_Z6	0.078	12.12	1.09	0.69	9.68	211.87	26.35		0.957	0.59	0.0197	0.00065
021_2011Nov4_Mt2_CAM11_Z7	0.11	19.8	1.52	1.03	16.4	351.82	47.67		0.957	1.675	0.059	0.00373
024_2011Nov4_Mt2_CAM11_Z10	0.056	10.06	0.82	0.53	7.41	181.3	22.22		0.957	0.086	0	0.00143
026_2011Nov4_Mt2_CAM11_Z12	0.055	9.36	0.76	0.57	8.42	191.55	22.27		0.957	0.0224	0.0162	0.00028
015_2011Nov10_Mt2_CAM11_Z13	0.074	15.56	1.21	0.9	9.57	306.93	31.13		0.957	0.458	0	0.00066
016_2011Nov10_Mt2_CAM11_Z14	0.06	11.54	0.88	0.79	8.35	230.24	22.51		0.957	0.0862	0	0.00009
017_2011Nov10_Mt2_CAM11_Z15	0.073	10.23	0.94	0.83	8.16	240.72	20.54		0.957	0	0.0094	0.00011
018_2011Nov10_Mt2_CAM11_Z16	0.064	11.13	0.86	0.88	9.05	228.36	21.51		0.957	0.146	0	0.00022
019_2011Nov10_Mt2_CAM11_Z17	0.086	10.61	0.93	0.86	8.62	216.71	20.78		0.957	0.015	0.0067	0.00144
023_2011Nov10_Mt2_CAM11_Z21	0.085	12.59	1.18	0.99	9.55	248.47	23.9		0.957	0.037	0	0.00012
024_2011Nov10_Mt2_CAM11_Z22	0.099	16.28	1.4	2.26	26.02	383.5	32.2		0.957	0.054	0.0207	0.00088
031_2011Nov10_Mt2_CAM11_Z23	0.055	8.22	0.64	0.54	5.1	163.62	15.13		0.957	0.0155	0	0.00003
032_2011Nov10_Mt2_CAM11_Z24	0.06	9.73	0.75	0.71	6.82	204.93	18.2		0.957	0.0191	0.0199	0.00012
034_2011Nov10_Mt2_CAM11_Z26	0.049	10.31	0.81	0.66	6.24	216.57	18.94		0.957	0.097	0.0123	0.00007
035_2011Nov10_Mt2_CAM11_Z27	0.048	11.51	0.88	0.95	10.1	254.41	21.55		0.957	0.19	0.0043	0.00002
038_2011Nov10_Mt2_CAM11_Z30	0.055	7.73	0.66	0.49	4.86	184.2	14.54		0.957	0	0.018	0.00041
039_2011Nov10_Mt2_CAM11_Z31	0.063	18.61	1.5	1.14	11.41	407.57	35.11		0.957	0.456	0.0111	0.0014

Appendix L: Zircon LA-ICP-MS Elemental Analyses, Camaquã and Itajaí Igneous Units

								Trace Element Concentrations Normalized to Chondrite			
Samples	**Tl205**	**Pb206**	**Pb207**	**Pb208**	**Th232**	**U235**	**U238**	**Si29**	**Ca42**	**Ti49**	**Fe56**
048_2011Nov10_Mt2_CAM11_Z33	0.053	12.29	0.94	0.97	9.3	281.23	22.28	0.957	0	0	0.00015
049_2011Nov10_Mt2_CAM11_Z34	0.056	14.52	1.1	0.96	9.2	328.34	26.02	0.957	0.323	0	0.00032
050_2011Nov10_Mt2_CAM11_Z35	0.048	14.69	1.09	1.23	12.52	342.3	26.96	0.957	0.0193	0.0112	0.00005
052_2011Nov10_Mt2_CAM11_Z37	0.043	13.76	1.03	1.07	10.76	322.38	24.95	0.957	0.0944	0.0105	0.00011
053_2011Nov10_Mt2_CAM11_Z38	0.071	17.99	1.51	1.3	12.98	465.23	34.46	0.957	0.091	0.0221	0.00063
054_2011Nov10_Mt2_CAM11_Z39	0.055	13.38	1.17	0.79	7.22	350.45	25	0.957	0.292	0	0.00016
055_2011Nov10_Mt2_CAM11_Z40	0.056	13.78	1.04	0.99	9.37	307.44	23.92	0.957	0.522	0	0.00013
056_2011Nov10_Mt2_CAM11_Z41	0.062	11.24	0.85	0.8	7.32	258.78	20.07	0.957	0.132	0.0076	0.00027
016_2011Nov11_Mt2_CAM11_Z44	0.07	8.11	0.81	0.63	9.07	393.49	21.84	0.958	0.131	0.0089	0.00011
017_2011Nov11_Mt2_CAM11_Z45	0.047	6.34	0.58	0.37	5.07	324.58	16.73	0.958	0.0743	0.0103	0.00002
018_2011Nov11_Mt2_CAM11_Z46	0.059	11.11	0.9	0.66	10.5	547.38	29.79	0.957	0.272	0	0.00014
020_2011Nov11_Mt2_CAM11_Z48	0.067	6.68	0.61	0.44	6.43	342.86	18.29	0.958	0.0294	0	0
021_2011Nov11_Mt2_CAM11_Z49	0.11	14.24	1.46	0.81	10.91	711.59	37.75	0.957	0.049	0	0.00014
022_2011Nov11_Mt2_CAM11_Z50	0.066	7.49	0.64	0.47	6.88	395.55	19.92	0.957	0.12	0	0.00002
026_2011Nov11_Mt2_CAM11_Z52	0.068	9.6	0.84	0.49	7.1	470.03	24.9	0.957	0.283	0.0099	0.00164
027_2011Nov11_Mt2_CAM11_Z53	0.077	13.35	1.18	0.72	11.49	785.92	39.31	0.957	0.253	0	0.00227
015_2011Nov15_Mt2_CAM11_Z55	0.05	7.95	0.61	0.48	6.69	197.4	18.04	0.957	0.14	0	0.0001
016_2011Nov15_Mt2_CAM11_Z56	0.074	13.3	1.08	0.74	9.56	352.09	31.05	0.957	0.409	0.0125	0.0019
017_2011Nov15_Mt2_CAM11_Z57	0.094	8.44	1.01	0.6	5.83	223.76	18.17	0.957	0.108	0.0077	0.00094
020_2011Nov15_Mt2_CAM11_Z60	0.097	11.97	0.98	0.61	7.85	300.57	26.57	0.957	0.256	0	0.00025
021_2011Nov15_Mt2_CAM11_Z61	0.099	9.02	0.88	0.61	6.88	249.27	19.03	0.957	0.028	0	0.00026
022_2011Nov15_Mt2_CAM11_Z62	0.065	8.83	0.67	0.46	6.05	255.41	19.61	0.957	0.1052	0	0.00011
023_2011Nov15_Mt2_CAM11_Z63	0.084	10.51	1.01	0.89	10.89	293.98	24.2	0.957	0.605	0.0148	0.00123
018_2011Nov17_Mt2_CAM11_Z68	0.093	12.72	1.3	0.85	12.15	306.51	34.89	0.957	0.509	0.056	0.00163
019_2011Nov17_Mt2_CAM11_Z69	0.11	10.03	0.98	0.65	9.5	220.43	24.73	0.957	0.124	0.0068	0.00012
020_2011Nov17_Mt2_CAM11_Z70	0.055	8.6	0.71	0.65	10.99	193.55	22.9	0.957	0.0175	0.0615	0.00029
021_2011Nov17_Mt2_CAM11_Z71	0.06	8.34	0.69	0.45	7.15	187.33	21.22	0.957	0.185	0	0.00002
022_2011Nov17_Mt2_CAM11_Z72	0.15	11.05	1.92	1.56	7.92	270.64	26.11	0.957	0.168	0	0.00151
029_2011Nov17_Mt2_CAM11_Z74	0.082	8.36	0.77	0.49	7.68	202.29	21	0.957	0.13	0.0161	0.00081
031_2011Nov17_Mt2_CAM11_Z76	0.063	6.93	0.52	0.42	7.31	181.33	17.52	0.957	0.0417	0.0101	0.00005
032_2011Nov17_Mt2_CAM11_Z77	0.066	12.09	0.95	0.89	16.31	318.15	31.52	0.957	3.71	0	0.00148
Averages	**0.07**	**11.23**	**0.96**	**0.78**	**9.19**	**295.07**	**24.58**	**0.96**	**0.26**	**0.01**	**0.00**
ITA-4a (n=62)											
014_2012May7_Mt2_ITA4a_Z1	0.072	2.46	0.47	0.36	3.59	118.74	5.45	0.957	0.045	0	0
015_2012May7_Mt2_ITA4a_Z2	0.11	1.89	0.32	0.3	3.48	99.18	4.37	0.957	0	0	0.00003
016_2012May7_Mt2_ITA4a_Z4	0.087	3.23	0.4	0.4	6.29	159.35	8.14	0.957	0	0	0
020_2012May7_Mt2_TA4a_Z5	0.087	2.65	0.44	0.36	4.05	103.71	6.09	0.957	0	0.049	0.00011
024_2012May7_Mt2_ITA4a_Z10	0.074	3.2	0.63	0.6	8.75	172.4	7.7	0.957	0.123	0	0.00155
025_2012May7_Mt2_ITA4a_Z11	0.09	3.4	0.43	0.35	4.5	147.54	8.11	0.957	0.19	0	0.00005
026_2012May7_Mt2_ITA4a_Z12	0.11	3.2	0.69	0.47	5.48	163.35	7.23	0.957	0.028	0	0.00005
027_2012May7_Mt2_ITA4a_Z13	0.11	4.46	0.61	0.8	12.1	188.87	10.77	0.957	0.471	0.066	0.00069
033_2012May7_Mt2_ITA4a_Z15	0.13	2.29	0.5	0.4	3.43	156.19	4.82	0.957	0	0	0.00002
034_2012May7_Mt2_ITA4a_Z16	0.093	3.49	0.49	0.38	5.4	142.03	7.67	0.957	0.059	0.037	0.00014
036_2012May7_Mt2_ITA4a_Z18	0.084	0.86	0.25	0.28	3.59	45.34	1.79	0.957	0.033	0.083	0.00022
037_2012May7_Mt2_ITA4a_Z19	0.11	2.03	0.35	0.38	4.36	115.07	4.91	0.957	0.038	0	0.0001
038_2012May7_Mt2_ITA4a_Z20	0.05	4.63	0.58	0.8	11.79	212.34	11.78	0.957	0.102	0	0.00042
039_2012May7_Mt2_ITA4a_Z21	0.061	4.94	0.58	0.51	7.39	236.8	12.71	0.957	0.305	0	0.00036
040_2012May7_Mt2_ITA4a_Z23	0.093	2.06	0.27	0.49	7.15	87.05	4.68	0.957	0	0	0
041_2012May7_Mt2_ITA4a_Z24	0.13	3.71	0.53	0.59	8.66	161.78	9.2	0.957	0	0	0
047_2012May7_Mt2_ITA4a_Z26	0.087	3.05	0.5	0.67	10.23	173.41	7.38	0.957	0	0.031	0.00003
048_2012May7_Mt2_ITA4a_Z27	0.099	2.94	0.48	0.44	6.42	138.83	7.34	0.957	0.483	0	0.00062

Appendix L: Zircon LA-ICP-MS Elemental Analyses, Camaquã and Itajaí Igneous Units

								Trace Element Concentrations Normalized to Chondrite			
Samples	**Tl205**	**Pb206**	**Pb207**	**Pb208**	**Th232**	**U235**	**U238**	**Si29**	**Ca42**	**Ti49**	**Fe56**
049_2012May7_Mt2_ITA4a_Z28	0.11	1.66	0.39	0.31	2.7	90.13	2.99	0.957	0.036	0.047	0.00006
052_2012May7_Mt2_ITA4a_Z31	0.11	3.19	0.57	0.78	10.91	179.31	7.94	0.957	0.044	0	0.00037
053_2012May7_Mt2_ITA4a_Z32	0.1	2.62	0.55	0.5	4.76	104.22	5.73	0.957	0.043	0	0
054_2012May7_Mt2_ITA4a_Z33	0.099	2.49	0.43	0.38	4.46	140.24	5.74	0.957	0.19	0	0.00008
055_2012May7_Mt2_ITA4a_Z34	0.13	3.06	0.49	0.47	5.68	173.21	7.19	0.957	0	0	0.00004
056_2012May7_Mt2_ITA4a_Z35	0.11	1.25	0.42	0.4	3.14	87.29	2.4	0.957	0.062	0	0.00029
015_2012May8_Mt2_ITA4a_Z36	0.1	2.05	0.43	0.42	4.54	100.39	5.09	0.957	0.058	0	0
016_2012May8_Mt2_ITA4a_Z37	0.098	2.03	0.34	0.27	2.99	95.79	5.28	0.957	0.03	0	0
017_2012May8_Mt2_ITA4a_Z38	0.087	1.48	0.36	0.28	2.55	78.54	3.31	0.957	0	0	0
018_2012May8_Mt2_ITA4a_Z39	0.18	2.22	0.54	0.49	3.95	137.67	4.28	0.957	0.348	0	0.00054
019_2012May8_Mt2_ITA4a_Z40	0.12	1.04	0.26	0.22	1.96	58.05	2.45	0.957	0	0	0.00004
021_2012May8_Mt2_ITA4a_Z42	0.11	2.21	0.39	0.38	3.77	93.74	5.74	0.957	0.087	0	0.00011
022_2012May8_Mt2_ITA4a_Z43	0.14	1.98	0.43	0.73	9.95	90.41	5.06	0.957	0.737	0.038	0.00033
023_2012May8_Mt2_ITA4a_Z44	0.1	2.78	0.64	0.6	6.54	146.56	6.63	0.957	0.064	0.067	0.00064
030_2012May8_Mt2_ITA4a_Z48	0.06	3.23	0.65	0.71	7.32	156.05	7.97	0.957	0.072	0.049	0.00006
031_2012May8_Mt2_ITA4a_Z49	0.096	2.13	0.43	0.47	5.28	105.72	5.32	0.957	0.153	0.038	0.00004
032_2012May8_Mt2_ITA4a_Z50	0.12	1.92	0.45	0.35	2.94	107.45	4.59	0.957	0.025	0	0.00003
034_2012May8_Mt2_ITA4a_Z52	0.15	1.99	0.41	0.32	3.05	105.44	5.31	0.957	0	0	0
035_2012May8_Mt2_ITA4a_Z53	0.062	2.7	0.66	0.45	3.68	115.94	6.07	0.957	0.073	0	0.00029
036_2012May8_Mt2_ITA4a_Z54	0.18	3.14	0.56	0.62	5.68	145.87	7.51	0.957	0.225	0	0.00005
003_2012Dec6_Mt1_ITA4a_Z001_Z011-001	0.49	3.12	0.47	0.4	6.87	76.1	8.08	0.957	0	0	0.00014
003_2012Dec6_Mt1_ITA4a_Z001_Z011-003	0.46	4.25	0.6	0.8	14.89	102.26	11.44	0.957	0	0.0116	0
003_2012Dec6_Mt1_ITA4a_Z001_Z011-004	0.56	3.07	0.58	0.54	8.05	97.93	7.5	0.957	0.48	0	0.00033
003_2012Dec6_Mt1_ITA4a_Z001_Z011-005	0.53	1.32	0.41	0.29	3.66	57.84	3.1	0.957	0	0.015	0
003_2012Dec6_Mt1_ITA4a_Z001_Z011-006	0.7	2.85	0.71	0.7	10.68	97.6	6.64	0.957	0.079	0	0.00254
003_2012Dec6_Mt1_ITA4a_Z001_Z011-008	0.58	2.46	0.54	0.51	6.45	82.72	5.62	0.957	0.073	0.0108	0
003_2012Dec6_Mt1_ITA4a_Z001_Z011-009	0.47	3.31	0.47	0.45	7.65	76.06	8.77	0.957	0	0	0
003_2012Dec6_Mt1_ITA4a_Z001_Z011-010	0.55	5.76	0.83	0.74	10.25	132.12	16.07	0.957	0.209	0	0.001
003_2012Dec6_Mt1_ITA4a_Z001_Z011-011	0.5	3.92	0.57	0.42	6.44	89.53	9.68	0.957	0.166	0	0.00011
004_2012Dec6_Mt1_ITA4a_Z012_Z022-001	0.82	3.89	0.78	0.62	7.51	119.62	10.17	0.957	0.049	0	0.00007
004_2012Dec6_Mt1_ITA4a_Z012_Z022-002	0.5	3.93	0.57	0.88	15.42	107.45	9.65	0.957	0	0.142	0.0001
004_2012Dec6_Mt1_ITA4a_Z012_Z022-003	0.49	3.71	0.52	0.42	6.73	77.06	9.37	0.957	0.103	0	0.00009
004_2012Dec6_Mt1_ITA4a_Z012_Z022-004	0.54	5.29	0.69	0.7	12.46	102.54	13.61	0.957	0.222	0.0332	0.00041
004_2012Dec6_Mt1_ITA4a_Z012_Z022-005	0.47	5.12	0.77	0.78	14.59	112.38	13.62	0.957	0.527	0.0266	0.00249
004_2012Dec6_Mt1_ITA4a_Z012_Z022-006	0.4	2.17	0.39	0.35	4.98	60.47	5.54	0.957	0.128	0	0.00003
004_2012Dec6_Mt1_ITA4a_Z012_Z022-007	0.47	2.93	0.47	0.37	5.5	65.7	7.35	0.957	0	0	0
004_2012Dec6_Mt1_ITA4a_Z012_Z022-008	0.47	3.08	0.45	0.37	5.04	72.6	7.34	0.957	0	0	0
005_2012Dec6_Mt1_ITA4a_Z023_Z033-001	0.4	2.58	0.38	0.34	5.55	64.87	7.37	0.957	0	0	0.00002
005_2012Dec6_Mt1_ITA4a_Z023_Z033-002	0.6	4.12	0.74	0.64	6.49	124.73	9.69	0.957	0.033	0	0.00091
005_2012Dec6_Mt1_ITA4a_Z023_Z033-005	0.5	3.64	0.72	0.57	8.87	92.38	9.03	0.957	0.038	0.0107	0.00011
005_2012Dec6_Mt1_ITA4a_Z023_Z033-006	0.4	5.39	0.6	0.41	9.03	119.12	14.78	0.957	0	0.0195	0.00006
005_2012Dec6_Mt1_ITA4a_Z023_Z033-007	0.4	2.64	0.4	0.3	4.55	57.54	6.77	0.957	0	0	0
005_2012Dec6_Mt1_ITA4a_Z023_Z033-010	0.41	4.47	0.57	0.56	8.63	94.34	11.61	0.957	0.05	0	0.00013
005_2012Dec6_Mt1_ITA4a_Z023_Z033-011	0.61	2.85	0.58	0.44	5.55	66.38	7.09	0.957	0.203	0.08	0.00442
Averages	**0.26**	**2.99**	**0.51**	**0.49**	**6.59**	**114.25**	**7.37**	**0.96**	**0.10**	**0.01**	**0.00**
CAM-10b (n=17)											
017_2012Oct12_CAM10b_Z3	0.52	1.42	0.43	0.42	3.56	58.93	2.83	0.957	0	0.0149	0.00057
018_2012Oct12_CAM10b_Z4	0.64	1.74	0.51	0.5	4.3	89.57	3.23	0.957	0	0.0229	0.00009
019_2012Oct12_CAM10b_Z5	0.49	1.21	0.35	0.39	3.81	56.44	2.36	0.957	0	0.0116	0
021_2012Oct12_CAM10b_Z7	0.84	2.79	0.93	1.04	7.97	136.44	4.65	0.957	0	0	0.00083
022_2012Oct12_CAM10b_Z8	0.53	1.58	0.46	0.42	4.49	62.26	3.08	0.957	0	0.0238	0.00004

Appendix L: Zircon LA-ICP-MS Elemental Analyses, Camaquã and Itajaí Igneous Units

								Trace Element Concentrations Normalized to Chondrite			
Samples	**Tl205**	**Pb206**	**Pb207**	**Pb208**	**Th232**	**U235**	**U238**	**Si29**	**Ca42**	**Ti49**	**Fe56**
023_2012Oct12_CAM10b_Z9	0.43	1.67	0.38	0.45	6.05	80.56	3.95	0.957	0	0	0.00009
024_2012Oct12_CAM10b_Z10	0.59	2.5	0.73	0.98	13.17	117.4	5.31	0.957	0.016	0.034	0.00328
031_2012Oct12_CAM10b_Z11	1.48	3.02	1.12	1.52	13.03	154.21	4.59	0.957	0.096	0.015	0.00492
032_2012Oct12_CAM10b_Z12	0.62	1.67	0.46	0.52	4.5	63.51	3.39	0.957	0	0.0115	0.00039
034_2012Oct12_CAM10b_Z14	0.56	1.45	0.47	0.5	4.74	63.98	2.78	0.957	0	0.0186	0.00007
035_2012Oct12_CAM10b_Z15	0.43	2.05	0.42	0.68	9.51	78.34	4.77	0.957	0	0.0302	0.00014
037_2012Oct12_Auto_Stds_CAM10b_Z17_23-002	0.7	1.23	0.44	0.41	3.7	54.11	2.37	0.957	0	0.0237	0
037_2012Oct12_Auto_Stds_CAM10b_Z17_23-003	1.23	2.43	0.89	0.82	6.16	107.19	4.19	0.957	0	0	0.00067
037_2012Oct12_Auto_Stds_CAM10b_Z17_23-012	0.62	1.69	0.54	0.53	4.22	106.7	3.07	0.957	0	0.027	0.00017
050_2012Oct12_CAM10b_Z24	0.57	1.11	0.44	0.42	2.96	66.32	2.02	0.957	0	0.0201	0.00076
054_2012Oct12_Stds_CAM10b_Z28_31-003	0.78	2.39	0.7	0.65	6.78	161.57	5.46	0.957	0	0.018	0.00072
054_2012Oct12_Stds_CAM10b_Z28_31-004	11.12	10.69	8.22	4.98	11.7	647.49	19.11	0.957	0	2.58	0.0221
Averages	**1.30**	**2.39**	**1.03**	**0.90**	**6.51**	**123.82**	**4.54**	**0.96**	**0.01**	**0.17**	**0.00**
LRA303 (n=45)											
002_15Oct2012_NIST12_LRA303_Z1-10-004	0.96	3.46	0.69	1.81	4.56	121.19	6.95	0.957	0.064	0	0.00059
002_15Oct2012_NIST12_LRA303_Z1-10-005	0.98	3.65	0.76	1.64	5.65	106.58	7.45	0.957	0	0	0.00176
002_15Oct2012_NIST12_LRA303_Z1-10-006	1.07	5.23	1.1	2.59	10.27	148.43	10.76	0.957	0	0	0.0013
002_15Oct2012_NIST12_LRA303_Z1-10-011	0.63	3.96	0.73	1.5	6.45	116.23	8.95	0.957	0	0.0349	0.00069
002_15Oct2012_NIST12_LRA303_Z1-10-013	0.61	4.6	0.68	1.61	7.89	125.04	10.42	0.957	0	0.0249	0.00118
003_15Oct2012_Stds_LRA303_Z11_17-007	0.53	3.32	0.52	1.2	5.65	95.42	8.11	0.957	0	0.0226	0.00076
003_15Oct2012_Stds_LRA303_Z11_17-008	0.75	5.62	1.02	2.53	8.84	166.56	12.25	0.957	0.019	0.029	0.00087
003_15Oct2012_Stds_LRA303_Z11_17-009	0.6	3.95	0.64	1.49	6.31	122.65	9.18	0.957	0	0.03	0.00087
003_15Oct2012_Stds_LRA303_Z11_17-010	0.54	4.14	0.62	1.28	7.84	117.21	10.11	0.957	0	0	0.00031
003_15Oct2012_Stds_LRA303_Z11_17-012	0.5	4.29	0.58	1.35	8.47	111.76	10.42	0.957	0	0.0254	0.00016
003_15Oct2012_Stds_LRA303_Z11_17-014	0.59	3	0.48	1.04	4.07	88.49	7.26	0.957	0.097	0	0.00045
004_15Oct2012_Stds_LRA303_Z19_26-011	0.46	4.64	0.64	1.46	8.83	125.04	11.41	0.957	0	0.0121	0.00025
004_15Oct2012_Stds_LRA303_Z19_26-012	1.34	5.1	1.26	2.67	9.33	173.25	10.41	0.957	0	0	0.00072
004_15Oct2012_Stds_LRA303_Z19_26-013	0.7	3.98	0.85	1.83	6.07	149.49	8.98	0.957	0.038	0	0.0004
002_16Oct2012_LRA303Small_Z27_37-001	0.75	5.75	1.17	1.07	11.12	191.81	13.79	0.958	0.214	0.014	0.00148
002_16Oct2012_LRA303Small_Z27_37-005	0.56	3.56	0.63	0.52	5.67	106.91	8.65	0.958	0.072	0.0166	0.00007
002_16Oct2012_LRA303Small_Z27_37-006	0.77	3.6	1	0.8	6.45	125.17	7.08	0.958	0	0.028	0.00173
002_16Oct2012_LRA303Small_Z27_37-011	0.59	4.65	0.82	0.71	7.57	114.13	10.59	0.958	0.057	0.0246	0.00038
003_16Oct2012_LRA303Small_Z38_49-001	0.64	4.74	1.04	0.76	7.44	143.07	11.13	0.958	0	0.391	0.00045
003_16Oct2012_LRA303Small_Z38_49-006	0.74	6.18	1.07	0.93	9.89	206.89	13.91	0.958	0	0.0133	0.00051
003_16Oct2012_LRA303Small_Z38_49-009	0.67	4.45	1.23	0.85	7.96	170.83	9.21	0.958	0	0.161	0.00228
003_16Oct2012_LRA303Small_Z38_49-010	0.59	4.17	0.77	0.59	6.59	124.96	9.42	0.958	0	0.076	0.0016
003_16Oct2012_LRA303Small_Z38_49-011	0.47	3.97	0.59	0.57	7.43	108.98	9.99	0.958	0.018	0	0.00008
003_16Oct2012_LRA303Small_Z38_49-012	0.87	5.06	1.08	1	9.58	157.18	11.94	0.958	0.023	0.021	0.00091
004_16Oct2012_LRA303Small_Z50_61-001	1.09	5.11	1.21	0.87	8.98	172.02	11.79	0.958	0	0.07	0.00092
004_16Oct2012_LRA303Small_Z50_61-004	0.69	4.46	1.41	1.33	9.83	128.57	8.3	0.958	0	0.036	0.00301
004_16Oct2012_LRA303Small_Z50_61-005	0.57	4.13	0.76	0.55	6.64	108.55	9.69	0.958	0	0.028	0.00019
004_16Oct2012_LRA303Small_Z50_61-006	0.53	3.38	0.61	0.46	5.72	87.11	7.74	0.958	0	0	0.00102
004_16Oct2012_LRA303Small_Z50_61-007	0.39	2.52	0.42	0.32	3.44	65.41	6.24	0.958	0.051	0	0.00005
004_16Oct2012_LRA303Small_Z50_61-011	0.45	3.97	0.68	0.61	6.07	94.98	8.97	0.958	0.047	0.059	0.0011
004_16Oct2012_LRA303Small_Z50_61-012	0.54	3.95	0.85	0.69	8.06	114.61	9.25	0.958	0	0.0255	0.00042
002_25Oct2012_LRA303Large_Z1_11-001	0.36	2.32	0.36	0.32	4.02	41.78	6.55	0.957	0	0	0
002_25Oct2012_LRA303Large_Z1_11-002	0.43	5.58	0.74	0.7	10.4	117.07	16.12	0.957	0	0.0237	0.00004
002_25Oct2012_LRA303Large_Z1_11-003	0.41	1.69	0.38	0.31	2.87	47.06	4.28	0.957	0	0.0118	0
002_25Oct2012_LRA303Large_Z1_11-006	0.41	4.52	0.79	0.66	8.19	103.07	12.81	0.957	0	0	0.00006
002_25Oct2012_LRA303Large_Z1_11-009	0.26	5.33	0.62	0.65	9.21	96.1	15.48	0.957	0	0	0.00003
003_25Oct2012_LRA303Large_Z12_23-003	0.26	0.9	0.26	0.19	1.15	23.2	2.2	0.957	0	0.0129	0.0001

Appendix L: Zircon LA-ICP-MS Elemental Analyses, Camaquã and Itajaí Igneous Units

									Trace Element Concentrations Normalized to Chondrite			
Samples	**Tl205**	**Pb206**	**Pb207**	**Pb208**	**Th232**	**U235**	**U238**		**Si29**	**Ca42**	**Ti49**	**Fe56**
003_25Oct2012_LRA303Large_Z12_23-006	0.21	8.48	0.86	1.17	19.14	131.85	25.84		0.957	0	0.0109	0.00065
003_25Oct2012_LRA303Large_Z12_23-007	0.18	4.57	0.84	0.92	7.62	63.31	11.56		0.957	0	0	0.00026
003_25Oct2012_LRA303Large_Z12_23-008	0.22	4.33	0.57	0.53	7.47	82.61	12.18		0.957	0	0	0
003_25Oct2012_LRA303Large_Z12_23-009	0.21	8.57	0.83	1.2	19.24	126.27	24.94		0.957	0.0146	0.0115	0.00106
003_25Oct2012_LRA303Large_Z12_23-010	0.21	1.7	0.26	0.24	3.14	34.84	4.67		0.957	0	0.0071	0
003_25Oct2012_LRA303Large_Z12_23-011	0.22	8.38	1.06	1.15	17.83	133.73	23.34		0.957	0	0	0.0013
004_25Oct2012_LRA303Large_Z23_30-002	0.19	2.24	0.31	0.27	3.58	39.38	6.21		0.957	0	0	0.00003
004_25Oct2012_LRA303Large_Z23_30-006	0.21	6.4	0.63	0.77	12.04	90.93	17.81		0.957	0	0.0059	0.00002
Averages	**0.55**	**4.39**	**0.76**	**1.02**	**7.88**	**113.77**	**10.76**	**#DIV/0!**	**0.96**	**0.02**	**0.03**	**0.00**
CAM-18 (n=27)												
015_2012Oct5_CAM18Large_Z1	0.37	2.65	0.51	0.41	4.49	76.44	6.76		0.957	0.42	0	0.00026
016_2012Oct5_CAM18Large_Z2	0.33	2.91	0.49	0.43	5.44	73.65	7.83		0.957	0	0	0.00006
019_2012Oct5_CAM18Large_Z5	0.31	2.69	0.42	0.35	4	63.47	7.14		0.957	0	0.0053	0.00056
022_2012Oct5_CAM18Large_Z8	0.28	2.85	0.48	0.37	4.46	88.14	8.06		0.957	0.0755	0.03	0.00027
028_2012Oct5_CAM18Large_Z11	0.38	4.76	0.68	0.65	9.22	134.5	13.63		0.957	0	0.0044	0.00013
029_2012Oct5_CAM18Large_Z12	0.42	4.01	0.72	0.57	7.2	127.99	11.08		0.957	0.0321	0.0104	0.00011
031_2012Oct5_CAM18Large_Z14	0.31	2.08	0.37	0.33	3.67	64.56	5.56		0.957	0	0.0083	0.00001
017_2012Oct8_CAM18Small_Z2	0.48	3.84	0.85	0.65	5.62	131.07	8.55		0.957	0	0.0041	0.00078
018_2012Oct8_CAM18Small_Z3	0.35	4.45	0.85	0.7	7.8	140.92	12.09		0.957	0.0071	0.0224	0.00052
024_2012Oct8_CAM18Small_Z9	1.61	9.39	2.32	2.45	14.79	402.55	17.76		0.957	0.202	0.418	0.00467
017_2012Oct9_CAM18Small_Z14	0.41	3.79	0.86	0.7	5.67	132.32	8.69		0.957	0.04	0.0037	0.00049
018_2012Oct9_CAM18Small_Z15	0.36	4.19	0.7	0.59	6.06	124.82	9.92		0.957	0	0.0038	0.00008
020_2012Oct9_CAM18Small_Z18	0.33	4.07	0.79	0.76	6.74	107.36	8.86		0.957	0.0124	0.0041	0.00102
022_2012Oct9_CAM18Small_Z20	0.27	2.95	0.44	0.36	4.3	63.71	7.39		0.957	0.0181	0.0091	0.00011
024_2012Oct9_CAM18Small_Z22	0.29	4.83	0.76	0.71	8.21	106.87	12.21		0.957	0.02	0.0143	0.0004
025_2012Oct9_CAM18Small_Z23	0.39	7.18	1.32	1.23	12.99	182.7	17.16		0.957	0	0.0148	0.00111
002_2012Oct11_Auto_CAM18Small_Z27_36-002	0.42	3.85	0.57	0.49	6.66	118.83	8.67		0.957	0	0	0.00002
002_2012Oct11_Auto_CAM18Small_Z27_36-003	1.23	7.69	1.68	1.24	11.19	173.75	13.6		0.957	0	0	0.00089
002_2012Oct11_Auto_CAM18Small_Z27_36-004	0.47	4.79	0.7	0.62	9.45	133.55	10.7		0.957	0.101	0	0.00028
002_2012Oct11_Auto_CAM18Small_Z27_36-005	0.49	2.98	0.67	0.45	3.73	85.95	5.69		0.957	0	0.042	0
002_2012Oct11_Auto_CAM18Small_Z27_36-007	0.85	6.92	1.32	1.04	9.36	144.34	12.09		0.958	0	0.046	0.00219
002_2012Oct11_Auto_CAM18Small_Z27_36-008	0.48	5.37	0.84	0.77	9.52	172.78	11.17		0.957	0.033	0.0182	0.00034
002_2012Oct11_Auto_CAM18Small_Z27_36-010	0.47	4.82	0.68	0.63	8.14	135.04	10.5		0.957	0.18	0.0075	0.00017
004_2012Oct11_Auto_CAM18Small_Z37_47-003	0.51	5.44	0.78	0.68	8.66	181.67	11.16		0.957	0	0	0.00036
004_2012Oct11_Auto_CAM18Small_Z37_47-004	0.49	5.99	0.98	0.8	8.47	159.72	10.22		0.957	0	0	0.00023
004_2012Oct11_Auto_CAM18Small_Z37_47-005	0.49	4.54	0.78	0.69	9.18	137.97	9.49		0.957	0	0.283	0.00034
004_2012Oct11_Auto_CAM18Small_Z37_47-011	0.4	5.13	0.66	0.62	8.06	161.21	9.37		0.957	0	0.023	0.00028
Averages	**0.49**	**4.60**	**0.82**	**0.71**	**7.52**	**134.29**	**10.20**		**0.96**	**0.04**	**0.04**	**0.00**
RAM01A (n=15)												
002_17Oct2012_RAM01ASmalls_Z1_11-002	1.01	0.73	0.47	0.28	0.99	40.77	1.24		0.957	0	0	0
002_17Oct2012_RAM01ASmalls_Z1_11-003	0.88	2.76	0.64	0.54	4.96	100.3	6.48		0.957	0	0.0228	0
002_17Oct2012_RAM01ASmalls_Z1_11-004	0.68	3.2	0.54	0.48	6.47	68.76	8.55		0.957	0	0	0
002_17Oct2012_RAM01ASmalls_Z1_11-005	0.62	4.23	0.59	0.6	8.92	82.62	11.67		0.957	0	0.0124	0.00008
002_17Oct2012_RAM01ASmalls_Z1_11-006	0.92	2.94	0.72	0.49	4.26	93.12	6.33		0.957	0	0.057	0.00028
002_17Oct2012_RAM01ASmalls_Z1_11-008	0.51	0.7	0.29	0.19	1.24	27.64	1.5		0.957	0	0.014	0.00006
002_17Oct2012_RAM01ASmalls_Z1_11-010	0.68	5.35	0.96	0.87	9.62	152.68	12.91		0.957	0	0.0149	0.0005
003_17Oct2012_RAM01ASmalls_Z12_22-002	0.67	6.09	0.7	0.78	14.34	119.08	17.96		0.957	0	0	0
003_17Oct2012_RAM01ASmalls_Z12_22-004	0.57	1.52	0.42	0.3	2.41	48.71	3.7		0.957	0	0.0159	0.00008
003_17Oct2012_RAM01ASmalls_Z12_22-008	0.62	3.61	0.7	0.56	6.58	91.03	8.97		0.957	0	0.0144	0.00027
003_17Oct2012_RAM01ASmalls_Z12_22-011	0.41	5.03	0.66	0.67	11.07	114.37	15		0.957	0	0	0

Appendix L: Zircon LA-ICP-MS Elemental Analyses, Camaquã and Itajaí Igneous Units

								Trace Element Concentrations Normalized to Chondrite			
Samples	**Tl205**	**Pb206**	**Pb207**	**Pb208**	**Th232**	**U235**	**U238**	**Si29**	**Ca42**	**Ti49**	**Fe56**
002_26Oct2012_RMA01Large_Z1_8-001	0.5	3.25	0.61	0.49	4.8	84.18	7.07	0.957	0.027	0.107	0.00029
002_26Oct2012_RMA01Large_Z1_8-003	0.51	4.92	0.91	0.96	11.91	142.27	10.66	0.957	0.025	0.0177	0.00115
002_26Oct2012_RMA01Large_Z1_8-005	0.43	4.44	0.85	0.71	7.02	114.37	9.59	0.957	0	0.037	0.00178
002_26Oct2012_RMA01Large_Z1_8-007	0.27	3.13	0.43	0.31	4.37	78.03	7.29	0.957	0.0176	0	0.00006
Averages	**0.62**	**3.46**	**0.63**	**0.55**	**6.60**	**90.53**	**8.59**	**0.96**	**0.00**	**0.02**	**0.00**
ITA-8 (n=38)											
002_18Oct2012_ITA-8_Z1_11-001	0.73	1.03	0.38	0.29	3.1	36.05	2.82	0.957	0	0.0244	0.00253
002_18Oct2012_ITA-8_Z1_11-002	0.75	1.32	0.43	0.33	3.85	39.17	3.78	0.957	0.098	0.0228	0.00017
002_18Oct2012_ITA-8_Z1_11-003	0.68	1.11	0.39	0.3	2.81	36.22	2.8	0.957	0.308	0.0224	0.00007
002_18Oct2012_ITA-8_Z1_11-007	0.67	0.96	0.37	0.27	1.37	38.76	1.99	0.957	0.043	0.01	0.00007
002_18Oct2012_ITA-8_Z1_11-008	0.56	1.04	0.33	0.24	2.62	29.17	2.82	0.957	0.097	0.0229	0.00004
002_18Oct2012_ITA-8_Z1_11-009	0.63	1.25	0.39	0.31	2.63	42.71	2.89	0.957	0	0.0155	0
002_18Oct2012_ITA-8_Z1_11-010	0.66	1.42	0.45	0.34	3.37	43.24	3.61	0.957	0.144	0.0268	0.00005
002_18Oct2012_ITA-8_Z1_11-011	0.69	1.19	0.45	0.33	2.43	39.22	2.72	0.957	1.56	0.027	0.00071
003_18Oct2012_ITA-8_Z12_22-003	0.66	0.99	0.34	0.3	2.39	40.01	2.36	0.957	0	0	0
003_18Oct2012_ITA-8_Z12_22-004	0.66	1.17	0.41	0.31	2.82	36.01	2.8	0.957	0.106	0	0.00009
003_18Oct2012_ITA-8_Z12_22-006	0.51	1.25	0.39	0.29	3.12	35.94	3.25	0.957	0.121	0	0.00008
003_18Oct2012_ITA-8_Z12_22-007	0.56	38.89	37.83	37.02	2.11	53.54	4.76	0.957	0	0	0
003_18Oct2012_ITA-8_Z12_22-008	0.83	1.56	0.63	0.46	2.46	68.6	2.62	0.957	0.136	0	0.00048
003_18Oct2012_ITA-8_Z12_22-011	0.67	1.25	0.48	0.32	2.49	48.82	3.43	0.957	0	0.0288	0.00223
004_18Oct2012_ITA-8_Z23_30-002	0.69	1.36	0.54	0.4	2.67	61.4	2.7	0.957	0.323	0	0
004_18Oct2012_ITA-8_Z23_30-003	0.63	1.2	0.46	0.28	2.29	42.59	2.86	0.957	0.414	0	0.00015
004_18Oct2012_ITA-8_Z23_30-006	0.69	1.55	0.5	0.4	2.5	60.26	3.19	0.957	0	0.0219	0
002_24Oct2012_ITA8Large_Z1_11-001	0.51	0.88	0.36	0.27	1.73	39.72	1.76	0.957	0.089	0.0132	0
002_24Oct2012_ITA8Large_Z1_11-002	0.57	1.5	0.54	0.4	2.7	54.44	3.03	0.957	1.359	0.0512	0.00048
002_24Oct2012_ITA8Large_Z1_11-003	0.5	0.93	0.38	0.26	1.16	42.56	1.56	0.957	0.104	0.0225	0.00012
002_24Oct2012_ITA8Large_Z1_11-004	0.54	1.25	0.51	0.42	2.38	45.61	2.48	0.957	6.14	0.0257	0.00146
002_24Oct2012_ITA8Large_Z1_11-007	0.37	0.93	0.32	0.25	1.17	34.94	1.7	0.957	0	0.016	0.00005
002_24Oct2012_ITA8Large_Z1_11-008	0.51	1.18	0.47	0.31	1.3	53.63	2.02	0.957	0.154	0.047	0.00018
002_24Oct2012_ITA8Large_Z1_11-009	0.38	1.76	0.39	0.36	3.56	55.33	3.98	0.957	0.0635	0	0.00002
002_24Oct2012_ITA8Large_Z1_11-010	0.41	1.14	0.38	0.27	1.75	45.14	2.34	0.957	0	0.0162	0.00009
002_24Oct2012_ITA8Large_Z1_11-011	0.38	1.03	0.36	0.3	1.95	42.44	1.89	0.957	0	0.0172	0
003_24Oct2012_ITA8Large_Z12_23-002	0.33	1.49	0.45	0.3	1.94	65.33	2.6	0.957	0	0.013	0
003_24Oct2012_ITA8Large_Z12_23-007	0.37	1.03	0.37	0.28	1.46	35.21	1.68	0.957	0.078	0.0178	0.00019
003_24Oct2012_ITA8Large_Z12_23-008	0.34	1.04	0.32	0.28	1.86	38.87	2.01	0.957	0.0314	0.0198	0.00003
003_24Oct2012_ITA8Large_Z12_23-009	0.8	2.11	0.85	0.6	3.04	97.91	4.49	0.957	0	0.026	0.00023
004_24Oct2012_ITA8Large_Z24_35-001	0.34	1.25	0.35	0.32	3.32	50.13	3.19	0.957	0	0.0122	0
004_24Oct2012_ITA8Large_Z24_35-002	0.39	1.29	0.41	0.31	2.29	52.7	3.24	0.957	0	0	0.0001
004_24Oct2012_ITA8Large_Z24_35-003	0.38	1.33	0.42	0.31	2.16	53.57	2.7	0.957	0.509	0.0158	0.00017
004_24Oct2012_ITA8Large_Z24_35-005	0.36	1.25	0.43	0.31	2.29	63.23	3.19	0.957	0	0.0232	0.00026
004_24Oct2012_ITA8Large_Z24_35-006	0.47	1.14	0.45	0.32	1.66	58.27	2.14	0.957	0.475	0.0479	0.00016
004_24Oct2012_ITA8Large_Z24_35-009	0.5	1.85	0.64	0.52	3.01	92.62	3.24	0.957	0.073	0.081	0.00026
004_24Oct2012_ITA8Large_Z24_35-010	0.35	1.38	0.47	0.37	2.24	50.07	2.45	0.957	0	0.0163	0.00005
004_24Oct2012_ITA8Large_Z24_35-011	0.49	1.51	0.59	0.43	2.08	63.1	3.16	0.957	1.608	0.0183	0.00094
Averages	**0.54**	**2.26**	**1.43**	**1.30**	**2.37**	**49.65**	**2.80**	**0.96**	**0.37**	**0.02**	**0.00**

Appendix L: Zircon LA-ICP-MS Elemental Analyses, Camaquã and Itajaí Igneous Units

Samples	Zr90	Nb93	Ce	Pr	Nd	[Pm]	Sm	Eu	Gd	[Tb]	Dy	Y
CAM-1 (n=5)												
028_2011Nov2_Mt2_CAM1_Z46	85746.11	39.56	177.81	135.1	115.89		85.19	4.07	123.17		334.56	634.96
002_2012Dec4_Mt1_CAM1_Z001_011-003	88769.55	30.04	88.4	26	41.24		78.95	25.33	354.4		1138.11	1949.25
002_2012Dec4_Mt1_CAM1_Z001_011-007	80759.89	36.73	52.02	32.58	50.02		123.34	25.85	388.45		977.81	1460.95
002_2012Dec4_Mt1_CAM1_Z001_011-011	79925.72	41.47	46.67	24.94	17.2		30.67	2.62	80.15		342.47	673.89
002_2012Dec6_Mt1_CAM1_Z047_053-005	104158.38	243.03	68.9	42.79	43.77		104.56	14.28	306.03		1627.32	2639.4
Averages	**87871.93**	**78.17**	**86.76**	**52.28**	**53.62**		**84.54**	**14.43**	**250.44**		**884.05**	**1471.69**
CAM-2 (n = 43)												
014_Mt2_CAM2_Z2	76620.14	250.4	1379.79	1034.81	895.86		756.46	119.26	810.07		1566.15	2712.07
015_Mt2_CAM2_Z3	77260.44	36.93	97.58	150.63	69.72		95.41	22.59	198.49		648.5	1221.87
017_Mt2_CAM2_Z5	89295.72	64.25	455.66	411.03	410.5		404.44	43.88	438.95		919.72	1518.81
018_Mt2_CAM2_Z6	96268.68	25.59	29.46	14.64	21.92		48.8	7.04	154.47		413.44	689.17
020_Mt2_CAM2_Z8	97070.88	57.41	301.31	244.52	331.93		299.41	75.47	345.97		727.76	1176.7
021_Mt2_CAM2_Z9	99101.88	29.74	23.74	1.13	3.8		39.18	7.16	64.62		237.91	351.77
022_Mt2_CAM2_Z10	108349.92	28.75	36.83	16.81	15.76		49.19	6.98	132.98		337.03	541.14
029_2012Apr21_Mt2_CAM2_Z16	62358.08	30.55	28.4	17.46	22.68		49.3	7.5	96.03		270.73	451.89
015_2012Apr20_Mt2_CAM2_Z20	86217.15	272.7	213.6	188.57	230.86		270.86	27.4100	653.56		2198.49	3428.95
016_2012Apr20_Mt2_CAM2_Z21	84173.41	282.19	677.57	548.62	746.03		1110.29	159.2400	944.85		1334.8	1891.33
017_2012Apr20_Mt2_CAM2_Z22	84919.74	41.93	44.52	28.3	21.31		26.4	1.9000	74.57		313.25	632.16
018_2012Apr20_Mt2_CAM2_Z23	86295.48	21.92	46.74	38.23	19.33		52.35	0.0000	72.64		181.63	313.33
019_2012Apr20_Mt2_CAM2_Z24	85968	97.57	155.52	146.32	153.77		215.01	30.1300	441.3		1157.52	1845.28
020_2012Apr20_Mt2_CAM2_Z25	84697.13	198.19	145.03	46.9	43.25		98.23	5.3500	369.85		1402.13	2271.02
021_2012Apr20_Mt2_CAM2_Z26	84322.46	18.63	22.72	4.61	10.08		53.4	2.1400	162.3		417.6	666.62
028_2012Apr20_Mt2_CAM2_Z30	78261.95	67.84	153.65	121.42	162.89		226.65	30.6500	271.15		562.37	1020.36
032_2012Apr20_Mt2_CAM2_Z34	76666.57	14.24	12.3	4.43	11.49		37.61	8.5900	99.27		314.49	516.31
033_2012Apr20_Mt2_CAM2_Z345	76364.98	22.84	19.79	0.53	2.41		15.68	2.0200	71		221.22	384.89
002_2012Nov30_Mt1_CAM2_Z2_12-002	92346.08	36.13	66.58	15.22	20.79		65.39	11.71	162.67		587.14	1129.08
002_2012Nov30_Mt1_CAM2_Z2_12-006	91572.34	30.85	75.67	27.32	48.9		81.11	26.37	193.51		535.44	1035.64
002_2012Nov30_Mt1_CAM2_Z2_12-007	92765.38	23.43	12.96	4.06	5.36		25.92	9.53	81.45		275.4	533.86
002_2012Nov30_Mt1_CAM2_Z2_12-010	92379.24	45.21	107.63	85.61	105.79		133	23.11	214.52		520.29	1075.98
003_2012Nov30_Mt1_CAM2_Z13_22-001	95464.27	44.23	58.98	49.18	67.53		100.91	16.38	136.23		287.13	563.48
003_2012Nov30_Mt1_CAM2_Z13_22-002	92282.2	39.55	124.88	123.65	179.36		229.19	31.48	324.77		689.86	1173.25
003_2012Nov30_Mt1_CAM2_Z13_22-003	88655.09	78.07	507.23	468.17	575.29		613.96	72.99	504.87		583.81	878.16
003_2012Nov30_Mt1_CAM2_Z13_22-004	92354.7	41.76	111.09	100.69	133.53		180.36	20.4	244.02		474.55	835.84
003_2012Nov30_Mt1_CAM2_Z13_22-005	88207.44	40.2	102.12	111.72	77.72		151.46	17.17	254.67		705.71	1075.51
003_2012Nov30_Mt1_CAM2_Z13_22-007	91788.91	24.15	172.74	168.7	173.41		213.56	10.29	212.18		367.04	658.09
003_2012Nov30_Mt1_CAM2_Z13_22-008	93256.08	96.26	546.77	495.38	640.19		754.88	128.76	694.1		1039.52	1711.14
004_2012Nov30_Mt1_CAM2_Z23_33-006	102890.73	64.96	342.78	542.37	282.94		299.19	54.59	306.01		575.66	983.43
004_2012Nov30_Mt1_CAM2_Z23_33-007	89556.76	43.3	129.37	121.98	130.72		136.15	17.81	263.47		655.71	1142.18
004_2012Nov30_Mt1_CAM2_Z23_33-009	89727.14	68.46	282.33	254.99	313.16		339.4	56.56	379.24		552.71	943.47
004_2012Nov30_Mt1_CAM2_Z23_33-011	91676.95	60.79	138.73	117.38	158.29		269.17	71.27	546.98		1177.33	1816.81
002_2012Dec3_CAM2_Z034_044-001	86200.74	53.17	398.12	121.19	120.31		158.09	28.39	153.95		353.99	748.65
002_2012Dec3_CAM2_Z034_044-002	89679.21	49.32	47.57	37.5	52.35		111.89	23.5	257.92		801.02	1250.85
002_2012Dec3_CAM2_Z034_044-003	88556.77	89.71	200.58	110.64	155.54		313.57	69.16	525.44		1290.69	2070.74
002_2012Dec3_CAM2_Z034_044-004	86939.02	20.22	25.87	17.06	28.47		59.9	9.63	120.82		322.47	632.96
002_2012Dec3_CAM2_Z034_044-005	83606.39	47.08	125.6	105.29	144.9		228.52	43.5	311.32		588.72	1050.04
002_2012Dec3_CAM2_Z034_044-008	88474.26	27.15	43.29	7.8	19.67		77.24	19.23	291.78		955.26	1685.45
002_2012Dec3_CAM2_Z034_044-009	78025.66	54.57	153.35	145.28	203.47		229.99	46.87	245.99		411.87	825.82
002_2012Dec3_CAM2_Z034_044-010	77766.14	47.23	64.37	52.42	75.18		139.6	18.07	182.79		457.89	849.66
003_2012Dec3_CAM2_Z045_055-006	81717.26	45.62	296.21	351.78	488.81		473.13	67	375.85		670.84	1177.34
003_2012Dec3_CAM2_Z045_055-007	79087.73	41.32	137.15	98.44	130.44		197.1	38.08	350.31		814.99	1282.16

Appendix L: Zircon LA-ICP-MS Elemental Analyses, Camaquã and Itajaí Igneous Units

Samples	**Zr90**	**Nb93**	**Ce**	**Pr**	**Nd**	**[Pm]**	**Sm**	**Eu**	**Gd**	**[Tb]**	**Dy**	**Y**
Averages	**87423.00**	**64.52**	**188.75**	**157.04**	**174.55**		**219.33**	**34.63**	**296.21**		**672.55**	**1134.03**
CAM-4 (n = 25)												
052_2011Oct26_Mt2_CAM4_Z12	76253.8	34.1	105.17	42.44	46.35		152.4	41.7	429.67		1221.01	2016.24
025_2011Oct27_Mt2_CAM4_Z26	81215.82	56.71	162.85	109.41	119.31		121.66	8.39	247.25		765.92	1285.24
010_2012June15_CAM4_Mt1_Z10	106499.52	43.45	157.85	68.14	62.6		138.75	22.83	327.03		1034.22	1719.31
018_2012June15_CAM4_Mt1_Z3	94942.94	123.33	215.06	143.98	128.68		183.22	28.59	315.05		1051.05	2060.31
020_2012June15_CAM4_Mt1_Z5	103055.7	88.13	513.28	427.87	433.36		544.3	37.85	712.63		1322.48	2094.34
021_2012June15_CAM4_Mt1_Z6	101993.72	62.71	136	98.64	86.61		130.99	9.8	229.21		652.88	1249.37
022_2012June15_CAM4_Mt1_Z7	98949.56	27.2	100.58	68.7	73.38		110.87	9.45	279.95		718.23	1231.2
024_2012June15_CAM4_Mt1_Z9	103067.96	32.69	907.77	882.98	915.25		771.12	72.74	795.02		1265.94	1799.84
016_2012June18_CAM4_Mt1_Z12	74310.76	28.1	53.73	19.95	35.6		148.63	42.78	500.47		1418.2	2280.39
019_2012June18_CAM4_Mt1_Z15	73152.67	49.68	715.2	707.92	726.95		600.58	26.13	540.04		915.71	1383.34
020_2012June18_CAM4_Mt1_Z16	75221.88	26.2	43.15	14.95	23.16		65.45	22.48	188.54		580.56	1138.54
021_2012June18_CAM4_Mt1_Z17	75755.83	323.19	236	234.31	244.17		401.65	49.87	624.79		1372.33	2087.17
024_2012June18_CAM4_Mt1_Z20	70797.31	41.19	321.85	286.59	277.88		271	16.31	441.63		957.49	1806.76
033_2012June18_CAM4_Mt1_Z23	76465.76	61.41	156.25	121.94	128.7		311.56	35.95	421.28		958.01	1604.27
039_2012June18_CAM4_Mt1_Z29	74850.1	115.24	269.94	173.66	167.88		253.3	33.07	533.96		1626.22	2857.68
040_2012June18_CAM4_Mt1_Z30	77375.26	47.39	146.14	74.57	76.52		121.59	8.82	312.99		992.35	1728.96
042_2012June18_CAM4_Mt1_Z32	73709.85	31.03	470.17	456.52	432.8		393.01	22.96	511.89		948.11	1492.1
043_2012June18_CAM4_Mt1_Z33	75212.03	25.9	54.94	40.01	28.61		60.59	11.23	128.06		348.03	647.91
015_2012June20_CAM4_Mt1_Z36	87581.6	33.8	53.44	14.11	31.61		109.39	26.48	374.31		1093.08	1834.29
016_2012June20_CAM4_Mt1_Z37	75729.67	59.13	119.42	101.25	121.07		128.87	13.11	266.44		686.78	1297.71
018_2012June20_CAM4_Mt1_Z39	83469.12	137.07	1234.66	1261.72	1244.52		1128.37	57.82	987.79		1153.71	1536.31
021_2012June20_CAM4_Mt1_Z42	83355.15	38.67	235.18	239.01	171.46		191.05	10.94	356.96		1039.52	1841.81
022_2012June20_CAM4_Mt1_Z43	79909.24	62.18	292.32	214.54	203.09		218.72	19.26	339.45		1062.94	1819.53
023_2012June20_CAM4_Mt1_Z44	74961.41	30.69	189.28	161.56	100.48		113.02	14.41	208.51		607.64	1044.97
025_2012June20_CAM4_Mt1_Z46	81772.84	89.33	214.32	174.89	198.7		227.69	16.82	329.67		774.09	1317.05
Averages	**83184.38**	**66.74**	**284.18**	**245.59**	**243.15**		**275.91**	**26.39**	**416.10**		**982.66**	**1646.99**
CAM-11 (n=52)												
015_2011Nov4_Mt2_CAM11_Z1	77332.34	60.94	35.48	9.67	8.86		24.6	2.16	103.62		337.11	527.23
016_2011Nov4_Mt2_CAM11_Z2	77513.64	32.34	74.85	62.46	65.67		116.23	51.54	144.92		338.92	513.58
017_2011Nov4_Mt2_CAM11_Z3	79783.05	33.86	61.14	51.59	57.87		113.22	24.63	214.84		525.85	775.9
018_2011Nov4_Mt2_CAM11_Z4	79158	64.12	46.08	13.38	16.3		43.98	4.23	150.41		465.07	692.89
020_2011Nov4_Mt2_CAM11_Z6	81480.15	47.18	160.68	132.66	125.98		105.83	12.09	157.17		417.12	664.17
021_2011Nov4_Mt2_CAM11_Z7	83049.71	47.47	217.4	214.18	209.04		233.67	86.43	259.14		517.15	763.8
024_2011Nov4_Mt2_CAM11_Z10	82621.99	50.46	34.99	15.27	16.6		38.73	6.08	96.14		303.95	512.96
026_2011Nov4_Mt2_CAM11_Z12	92798.44	55.97	107.76	89.13	65.93		69.84	6.45	189.85		521.92	816.41
015_2011Nov10_Mt2_CAM11_Z13	74560.05	50.78	132.5	109.02	91.97		72.46	6.41	92.1		219.96	409.7
016_2011Nov10_Mt2_CAM11_Z14	72572.57	61.65	89.11	53.34	45.99		57.26	4.98	137.67		387.44	596.24
017_2011Nov10_Mt2_CAM11_Z15	80464.28	43.6	22.57	3.24	11.85		73.4	9.84	287.59		868.72	1235.93
018_2011Nov10_Mt2_CAM11_Z16	74506.65	48.58	85.24	57.83	57.46		90.26	8.72	221.75		607.1	901.23
019_2011Nov10_Mt2_CAM11_Z17	74111.07	52.34	55.53	32.13	40.18		114.95	31.29	331.87		908.28	1231.15
023_2011Nov10_Mt2_CAM11_Z21	73631.04	51.18	41.79	16.18	22.85		72.45	4.5	227.02		665.74	1018.88
024_2011Nov10_Mt2_CAM11_Z22	76000.46	57.42	146.51	59.4	73.17		174.96	28.71	365.92		821.49	1061.28
031_2011Nov10_Mt2_CAM11_Z23	78134.59	47.4	38.34	16.5	17.56		43.92	5.4	150.47		418.58	645.45
032_2011Nov10_Mt2_CAM11_Z24	77482.52	47.09	39.95	14.58	17.46		52.26	4.73	207.51		600	884.5
034_2011Nov10_Mt2_CAM11_Z26	80883.98	52.18	90.96	42.72	35.96		52.25	3.95	133.68		397.7	636.04
035_2011Nov10_Mt2_CAM11_Z27	76908.88	49.34	240.26	207.22	172.14		163.04	13.24	270.39		628.48	885.3
038_2011Nov10_Mt2_CAM11_Z30	79094.34	39.78	49.21	27.96	27.35		71.78	13.88	172.13		469.85	681.82
039_2011Nov10_Mt2_CAM11_Z31	79430.93	42.66	120.17	134.36	111.12		110.06	23.36	107.93		272.9	464.93

Samples	Zr90	Nb93	Ce	Pr	Nd	[Pm]	Sm	Eu	Gd	[Tb]	Dy	Y
048_2011Nov10_Mt2_CAM11_Z33	83928.86	62.26	38.29	6	8.73		41.18	4.08	181.12		518.43	772.97
049_2011Nov10_Mt2_CAM11_Z34	83172.9	54.73	89.88	63.08	52.81		54.52	7.76	108.62		295.6	486.48
050_2011Nov10_Mt2_CAM11_Z35	84595.52	73.16	101.62	62.23	62.42		86.08	7.41	220.48		589.34	866.86
052_2011Nov10_Mt2_CAM11_Z37	84352.95	65.74	69.46	36.14	37.72		72.36	13.35	183.54		511.17	750.6
053_2011Nov10_Mt2_CAM11_Z38	81317.56	47.16	75.35	45.1	47.41		79.65	23.68	157.69		461.92	783.74
054_2011Nov10_Mt2_CAM11_Z39	89636.16	57.02	80.64	62.6	61.01		63.7	12.37	125.13		307.43	506.29
055_2011Nov10_Mt2_CAM11_Z40	86832.62	48.04	179.31	163.86	158.82		162.21	18.38	241.35		559.23	854.22
056_2011Nov10_Mt2_CAM11_Z41	85171.34	62.14	275.12	214.77	180.46		148.53	10.19	202.64		457.17	678.18
016_2011Nov11_Mt2_CAM11_Z44	72231.76	45.71	401.18	340.84	348.67		337.73	20.1	478.5		973.29	1319.72
017_2011Nov11_Mt2_CAM11_Z45	71438.69	62.32	104.97	78.45	73.77		75.79	6.23	130.32		337.65	527.1
018_2011Nov11_Mt2_CAM11_Z46	69975.36	43.52	58.32	35.29	38.74		70.14	11.96	198.96		559.02	880.44
020_2011Nov11_Mt2_CAM11_Z48	69375.79	48.03	33.1	16.12	18.77		56.63	6.87	201.59		561.49	846.83
021_2011Nov11_Mt2_CAM11_Z49	75423.61	42.79	32.34	11.84	11.89		20.81	5.15	53.12		211.57	458.01
022_2011Nov11_Mt2_CAM11_Z50	71016.3	61.92	247.29	222.37	189.67		162.17	8.73	212.03		430.75	640.37
026_2011Nov11_Mt2_CAM11_Z52	70620.45	31.08	64.77	46.03	47.34		70.93	24.27	96.52		224.09	357.29
027_2011Nov11_Mt2_CAM11_Z53	78420.52	44.72	111.8	93.16	75.02		92.6	28.68	129.72		313.01	536.31
015_2011Nov15_Mt2_CAM11_Z55	76820.11	52.29	221.21	189.35	171.48		155.23	8.1	233.78		512.93	759.68
016_2011Nov15_Mt2_CAM11_Z56	80652.33	51.84	127.86	112.65	120.57		146.57	77.33	201.37		464.31	749.81
017_2011Nov15_Mt2_CAM11_Z57	76752	40.29	63.12	51.54	54.25		83.29	33.44	134.07		309.4	485.98
020_2011Nov15_Mt2_CAM11_Z60	76420.21	55.66	98.08	74.08	60.95		50.62	5.24	81.07		227.03	402.14
021_2011Nov15_Mt2_CAM11_Z61	78497.51	33.91	47.07	25	30.25		58.08	4.87	161.1		504.8	784.85
022_2011Nov15_Mt2_CAM11_Z62	80100.5	50.9	48.77	30.95	29.18		34.13	3.4	75.45		238.53	427.3
023_2011Nov15_Mt2_CAM11_Z63	80224.19	52.9	142.81	140.09	141.27		210.44	17.44	359.41		872.96	1241.8
018_2011Nov17_Mt2_CAM11_Z68	75857.49	41.37	168.56	174.76	184.3		261.95	94.12	296.32		580.66	703.22
019_2011Nov17_Mt2_CAM11_Z69	76252.85	60.24	120.22	86.62	102.75		92.77	12.25	136.65		302.27	498.76
020_2011Nov17_Mt2_CAM11_Z70	75666.48	63.39	144.64	87.37	70.6		107.44	13.16	348.78		902.08	1283.16
021_2011Nov17_Mt2_CAM11_Z71	75340.28	60.1	64.57	36.52	35.03		38.47	3.63	95.05		292.21	467.38
022_2011Nov17_Mt2_CAM11_Z72	73201.44	36.57	185.29	295.09	239.34		203.56	57.44	163.05		314.79	477.67
029_2011Nov17_Mt2_CAM11_Z74	78316.16	69.35	119.11	93.1	79.82		92.04	8.33	144.01		373.33	554.22
031_2011Nov17_Mt2_CAM11_Z76	80370.66	61.14	75.25	44.71	43.5		60.94	5.91	151.99		435.49	647.21
032_2011Nov17_Mt2_CAM11_Z77	79463.98	34.85	1039.75	1073.86	967.89		730.16	97.7	466.42		441.44	564.07
Averages	**78326.26**	**50.99**	**125.39**	**103.39**	**96.84**		**111.84**	**19.31**	**192.15**		**476.48**	**716.00**
ITA-4a (n=62)												
014_2012May7_Mt2_ITA4a_Z1	93884.65	32.22	65.85	35.06	31.48		53.11	0	131.69		432.14	740.06
015_2012May7_Mt2_ITA4a_Z2	89631.38	33.46	30.11	8.02	11.05		32.7	0	119.11		349.72	593.47
016_2012May7_Mt2_ITA4a_Z4	88399.26	53.99	71.73	39.5	44.57		68.63	1.68	151.16		501.33	819.59
020_2012May7_Mt2_TA4a_Z5	91461.99	39.73	337.25	229.96	173.8		67.72	2.24	112.66		402.44	697.36
024_2012May7_Mt2_ITA4a_Z10	92401.79	125.54	165.54	135.68	132.37		180.05	6.09	354.72		930.97	1403.37
025_2012May7_Mt2_ITA4a_Z11	89867.77	64.29	222.04	185.51	180.54		155.63	3.28	182.48		432.09	699.39
026_2012May7_Mt2_ITA4a_Z12	99240.63	51.79	110.68	73.2	74.54		67.69	2.82	147.6		461.57	760.03
027_2012May7_Mt2_ITA4a_Z13	92191.67	64.05	781.45	722.32	681.21		579.27	10.83	564.66		971.32	1336.29
033_2012May7_Mt2_ITA4a_Z15	94335.29	32.86	28.37	6.97	15.41		38.81	0	112.95		390.01	695.36
034_2012May7_Mt2_ITA4a_Z16	89338.51	94.64	100.99	75.4	69.79		76.22	2.55	140.13		401.65	702.04
036_2012May7_Mt2_ITA4a_Z18	90920.99	16.6	70.8	36.85	35.55		58.74	9.14	116.85		265.97	427.1
037_2012May7_Mt2_ITA4a_Z19	94109.39	37.2	122.57	97.47	97.93		133.58	4.25	303.1		875.05	1322.03
038_2012May7_Mt2_ITA4a_Z20	95696.77	82.59	109.39	72.69	70.25		102.74	3.12	213.71		579.27	946.16
039_2012May7_Mt2_ITA4a_Z21	91363.45	89.15	210.82	179.38	169.01		143.04	5.06	226.18		607.71	1032.59
040_2012May7_Mt2_ITA4a_Z23	90210.68	26.54	32.18	10.1	26.17		152.97	5.79	426.38		990.74	1420.09
041_2012May7_Mt2_ITA4a_Z24	92378.44	43.44	96.06	54.57	54.53		116.68	4.54	372.72		1033.53	1608.73
047_2012May7_Mt2_ITA4a_Z26	97553.46	37.9	100.46	63.09	77.92		176.18	5.08	483.11		1241.53	1786.51
048_2012May7_Mt2_ITA4a_Z27	94532.91	45.76	614.1	535.3	485.2		449.98	8.16	417.08		775.66	1099.32

Appendix L: Zircon LA-ICP-MS Elemental Analyses, Camaquã and Itajaí Igneous Units

Samples	Zr90	Nb93	Ce	Pr	Nd	[Pm]	Sm	Eu	Gd	[Tb]	Dy	Y
049_2012May7_Mt2_ITA4a_Z28	99253.73	22.49	23.25	1.92	4.04		19.36	0	75.05		206.46	377.39
052_2012May7_Mt2_ITA4a_Z31	87776.85	56.89	200.82	156.54	122.7		148.58	3.4	261.92		648.56	945.12
053_2012May7_Mt2_ITA4a_Z32	96550.5	29.81	70.01	29.81	37.93		44.94	0	127.98		348.26	620.56
054_2012May7_Mt2_ITA4a_Z33	100174.38	39.31	68.32	42.86	44.9		67.29	3.91	149.04		442.24	732.83
055_2012May7_Mt2_ITA4a_Z34	94459.51	43.25	37.33	9.91	14.32		40.25	2.63	130.7		444.83	719.22
056_2012May7_Mt2_ITA4a_Z35	93418.02	18.13	77.91	45.9	45.27		60.9	9.13	89.55		232.56	416.03
015_2012May8_Mt2_ITA4a_Z36	101995.89	20.47	209.28	158.63	144.6		149.41	7.86	329.4		741.44	1188.26
016_2012May8_Mt2_ITA4a_Z37	98424.19	42.72	62.28	39.76	40.24		51.07	0	118.51		354.88	608.55
017_2012May8_Mt2_ITA4a_Z38	99665.5	24.95	23.55	2.13	5.97		31.49	3.5	99.32		304.25	503.15
018_2012May8_Mt2_ITA4a_Z39	97914.43	27.19	388.91	347.75	315.56		390.9	10.82	372.2		664.25	949.89
019_2012May8_Mt2_ITA4a_Z40	98795.04	24.14	23.56	0.95	6.34		44.17	2.43	162.02		496.8	820.28
021_2012May8_Mt2_ITA4a_Z42	97038.23	33.13	94.58	55.71	84.95		75.31	1.76	178.42		537.5	898.51
022_2012May8_Mt2_ITA4a_Z43	102646.8	43.32	180.13	134.11	145.94		155.24	14	250.82		557.62	884.76
023_2012May8_Mt2_ITA4a_Z44	99053.27	40.3	60.7	30.45	39.27		91.54	2.82	308.48		826.01	1319.36
030_2012May8_Mt2_ITA4a_Z48	109554.7	42.4	139.45	105.24	95.84		126.15	3.69	326.28		858.63	1374.37
031_2012May8_Mt2_ITA4a_Z49	100873.22	33.77	266.23	245.19	231.43		237.63	8.2	338.87		692.5	1026.35
032_2012May8_Mt2_ITA4a_Z50	104247.97	27.06	66.2	40.14	37.48		68.31	1.16	169.59		528.92	863.75
034_2012May8_Mt2_ITA4a_Z52	100271.36	46.35	27.57	7.61	8.82		19.65	0	79.29		294.97	543.78
035_2012May8_Mt2_ITA4a_Z53	103591.63	43.64	140.65	116.26	120.37		96.29	3.34	134.23		386.48	593.75
036_2012May8_Mt2_ITA4a_Z54	102138.81	48.52	244.05	210.98	211.96		186.07	6.59	329.54		834.17	1329.07
003_2012Dec6_Mt1_ITA4a_Z001_Z011-001	105833.97	39.35	25.91	1.61	6.32		32.52	0	123.36		396.63	682.35
003_2012Dec6_Mt1_ITA4a_Z001_Z011-003	97823.39	41.01	51.96	13.77	31.17		156.07	6.28	494.35		1270.69	1920.8
003_2012Dec6_Mt1_ITA4a_Z001_Z011-004	100304.27	25.75	1187.1	1083.4	961.34		767.03	10.77	671.54		944.63	1267.5
003_2012Dec6_Mt1_ITA4a_Z001_Z011-005	101367.14	17.37	24.79	2.64	10.44		35.9	6.06	124.14		333.55	571.03
003_2012Dec6_Mt1_ITA4a_Z001_Z011-006	93074.47	34.45	213.99	184.93	158.63		141.67	0	243.03		455.84	738.29
003_2012Dec6_Mt1_ITA4a_Z001_Z011-008	93367.45	45.41	183.19	159.72	145.79		126.48	7.28	224.19		559.09	850.69
003_2012Dec6_Mt1_ITA4a_Z001_Z011-009	95869.17	42.07	40.93	4.46	6.65		42.11	0	191.06		635.91	1028.11
003_2012Dec6_Mt1_ITA4a_Z001_Z011-010	94881.45	59.73	301.34	268.48	244.93		232.38	5.54	317.62		716.41	1146.24
003_2012Dec6_Mt1_ITA4a_Z001_Z011-011	98626.88	38.49	63.3	43.1	37.35		53.93	0	141.11		478.34	833.45
004_2012Dec6_Mt1_ITA4a_Z012_Z022-001	103080.23	52.43	83.55	63.21	61.36		84.16	0	180.91		567.71	976.43
004_2012Dec6_Mt1_ITA4a_Z012_Z022-002	97673.59	53.32	52.22	17.44	25.09		72.16	3.37	272.76		647.55	1063.84
004_2012Dec6_Mt1_ITA4a_Z012_Z022-003	96945.13	44.55	162.5	138.96	128.94		119	3.95	161.86		394.74	639.37
004_2012Dec6_Mt1_ITA4a_Z012_Z022-004	97695.91	83.06	124.33	91.57	74.91		111.57	4.83	235.83		697.81	1147.58
004_2012Dec6_Mt1_ITA4a_Z012_Z022-005	98158.53	53.22	308.52	285.04	291.82		320.39	6.03	499.28		1066.75	1576.42
004_2012Dec6_Mt1_ITA4a_Z012_Z022-006	95826.06	41.62	272.62	275.47	226.79		210.8	3.09	283.58		577.95	861.05
004_2012Dec6_Mt1_ITA4a_Z012_Z022-007	96945.27	32.13	22.08	2.3	7.4		34.07	3.2	131.73		421.6	722.81
004_2012Dec6_Mt1_ITA4a_Z012_Z022-008	95933.66	37.08	23.33	1.91	3.12		31.21	0	92.3		349.11	609.87
005_2012Dec6_Mt1_ITA4a_Z023_Z033-001	98459.35	47.27	33.28	4.58	7.63		40.19	0	159.72		502.97	813.1
005_2012Dec6_Mt1_ITA4a_Z023_Z033-002	97256.51	33.98	64.58	34.22	29.4		50.6	3.53	172.35		545.57	936.78
005_2012Dec6_Mt1_ITA4a_Z023_Z033-005	91193.51	25.68	51.35	30.24	37.23		104.58	5.99	288.54		730.57	1182.89
005_2012Dec6_Mt1_ITA4a_Z023_Z033-006	97078.98	92.8	32.31	14.12	18.35		62.77	0	177.97		489.97	797.23
005_2012Dec6_Mt1_ITA4a_Z023_Z033-007	92947.25	26.22	25	0.92	2.5		28.77	0	159.58		556.43	931.24
005_2012Dec6_Mt1_ITA4a_Z023_Z033-010	93362.11	57.59	46.87	21.73	23.74		51.87	0	161.02		531.4	905.28
005_2012Dec6_Mt1_ITA4a_Z023_Z033-011	92480.84	30.97	389.51	276.1	222.57		153.93	3.21	247		561.68	900.29
Averages	**96476.58**	**44.12**	**152.58**	**118.76**	**112.14**		**126.17**	**3.76**	**231.65**		**588.34**	**933.99**
CAM-10b (n=17)												
017_2012Oct12_CAM10b_Z3	82347.06	41.18	60.23	80.06	40.98		154.89	28.14	453.45		1026.85	1425.78
018_2012Oct12_CAM10b_Z4	81586.45	22.54	41.46	16.32	47.57		166.46	33	487.61		1063.7	1581.53
019_2012Oct12_CAM10b_Z5	79864.87	16.41	45.29	21.24	48.78		158.99	27.37	390.23		842.75	1197.77
021_2012Oct12_CAM10b_Z7	86033.88	39.78	55.43	11.66	30.7		119.69	39.07	431.3		1075.8	1500.82
022_2012Oct12_CAM10b_Z8	85068.21	20.57	40.18	11.07	45.02		240.48	40.12	582.41		1298.3	1795.07

Appendix L: Zircon LA-ICP-MS Elemental Analyses, Camaquã and Itajaí Igneous Units

Samples	Zr90	Nb93	Ce	Pr	Nd	[Pm]	Sm	Eu	Gd	[Tb]	Dy	Y
023_2012Oct12_CAM10b_Z9	83915.27	29.51	61.16	22.29	52.89		204.08	36.26	573.19		1335.27	1866.47
024_2012Oct12_CAM10b_Z10	72831.2	50.97	2571.9	2068.76	1680.41		870.11	132.26	731.44		1135.55	1501.25
031_2012Oct12_CAM10b_Z11	85337.11	66.24	15741.9	12336.58	9256.65		4863.22	581.44	2359.13		1505.44	1911.19
032_2012Oct12_CAM10b_Z12	90480.55	25.92	81.48	41.67	70.98		210.77	34.61	516.85		1247.8	1693.14
034_2012Oct12_CAM10b_Z14	92340.13	18.64	36.35	10.85	31.25		152.26	35.31	383.09		838.14	1190.98
035_2012Oct12_CAM10b_Z15	88660.6	38.99	61.6	10.54	29.77		119.55	19.75	390.61		941.9	1328.12
037_2012Oct12_Auto_Stds_CAM10b_Z17_23-002	90971.29	19.28	143.52	285.6	102.18		185.7	41.25	421.69		881.89	1241.4
037_2012Oct12_Auto_Stds_CAM10b_Z17_23-003	93211.09	54.4	51.68	11.07	21.81		101.37	14.77	275.34		747.06	1138.08
037_2012Oct12_Auto_Stds_CAM10b_Z17_23-012	104327.2	17.71	29.67	13.14	48.62		200.55	40.69	532.89		1028.63	1459.46
050_2012Oct12_CAM10b_Z24	100184.02	13.86	25.42	14.1	45.44		168.75	39.64	406.55		779.93	1152.71
054_2012Oct12_Stds_CAM10b_Z28_31-003	107874.57	35.35	51.5	9.61	44.19		244.28	37.94	681.15		1606.8	2340.97
054_2012Oct12_Stds_CAM10b_Z28_31-004	128499.66	37.88	76.07	13.27	22.99		94.25	29.06	321.82		864.32	1041.35
Averages	**91384.30**	**32.31**	**1127.93**	**881.05**	**683.54**		**485.61**	**71.22**	**584.63**		**1071.77**	**1492.12**
LRA303 (n=45)												
002_15Oct2012_NIST12_LRA303_Z1-10-004	94197.69	18.8	70.23	49.66	59.47		66.92	13.74	158.2		471.15	834.27
002_15Oct2012_NIST12_LRA303_Z1-10-005	91324.18	17.76	86.88	6.65	11.06		48.63	12.3	168.05		499.52	838.19
002_15Oct2012_NIST12_LRA303_Z1-10-006	89745.98	33	265.14	13.51	46.51		61.24	14.99	200.49		625.04	1097.58
002_15Oct2012_NIST12_LRA303_Z1-10-011	95948.2	26.15	142.1	20.97	24.57		54.34	7.17	161.58		536.68	910
002_15Oct2012_NIST12_LRA303_Z1-10-013	87295.84	30.57	133.46	14.81	18.03		69.3	8.79	219.5		697.05	1183.93
003_15Oct2012_Stds_LRA303_Z11_17-007	93792.02	25.72	116.68	22.24	23.39		57.62	10.38	175.55		556.05	951.32
003_15Oct2012_Stds_LRA303_Z11_17-008	92181.1	32.77	60.92	17.93	17.23		65.26	6.74	254.18		654.22	1243.74
003_15Oct2012_Stds_LRA303_Z11_17-009	95332.62	24.53	66.17	3.34	9.91		40.2	5.41	130.35		422.12	759.12
003_15Oct2012_Stds_LRA303_Z11_17-010	93734.08	24.79	154.26	16.06	31.91		114.8	14.39	329.23		1010.89	1551.03
003_15Oct2012_Stds_LRA303_Z11_17-012	94908.2	34.06	90.9	4.86	15.5		60.39	11.12	253.39		783.86	1276.16
003_15Oct2012_Stds_LRA303_Z11_17-014	96964.69	24.38	87.26	46.15	50.68		51.2	9.85	125.28		406.89	667.56
004_15Oct2012_Stds_LRA303_Z19_26-011	93608.33	29.8	59.07	7.55	11.99		67.23	9.61	197.73		668.33	1131.43
004_15Oct2012_Stds_LRA303_Z19_26-012	96592.96	28.05	283.59	25.85	39.29		119.08	8.55	326.87		1100.1	1517.84
004_15Oct2012_Stds_LRA303_Z19_26-013	93293.39	27.97	57.16	9.55	15.93		46.84	14.75	168.66		516.84	898.82
002_16Oct2012_LRA303Small_Z27_37-001	76852.67	29.09	383.88	203.7	169.4		195.48	21.04	404.08		1098.26	1709.5
002_16Oct2012_LRA303Small_Z27_37-005	74664.31	27.67	158.53	98.68	88.69		73.68	8.66	150.86		387.64	686.67
002_16Oct2012_LRA303Small_Z27_37-006	73362.31	15.3	183.9	15.29	29.3		70.69	21.17	234.53		739.16	1134.44
002_16Oct2012_LRA303Small_Z27_37-011	76405.15	29.34	243.27	95.07	101.18		202.05	32.24	439.42		1289.37	1862.07
003_16Oct2012_LRA303Small_Z38_49-001	82554.59	44.57	80.57	15.52	33.89		56.2	0	204.94		586.71	1100.66
003_16Oct2012_LRA303Small_Z38_49-006	80614.02	27.06	72.32	6.75	11.32		87.33	10.27	264.89		824.51	1445.18
003_16Oct2012_LRA303Small_Z38_49-009	74374.16	22.83	214.97	13.55	26.41		85.88	5.98	210.51		811.53	1243.69
003_16Oct2012_LRA303Small_Z38_49-010	72553.04	21.46	95.18	33.51	34.32		73.76	9.81	230.46		676.01	1149.53
003_16Oct2012_LRA303Small_Z38_49-011	79609.38	24.13	29.31	5.2	12.36		68.36	8.78	232.52		726.73	1197.32
003_16Oct2012_LRA303Small_Z38_49-012	81401.33	24.48	126.79	9.32	17.35		57.27	11.5	227.07		677.06	1084.35
004_16Oct2012_LRA303Small_Z50_61-001	81106.38	26.1	305.61	20.1	32.51		102.14	18.06	262.27		919.3	1502.26
004_16Oct2012_LRA303Small_Z50_61-004	71937.84	21.41	511.74	26.36	30.09		90.73	25.92	228.81		876.03	1369.84
004_16Oct2012_LRA303Small_Z50_61-005	75983.79	26.95	143.34	11.82	15.85		63.72	10.39	192.56		632.6	1029.71
004_16Oct2012_LRA303Small_Z50_61-006	75096.23	20.62	144.41	8.41	13.11		67.76	10.89	219.3		682.83	1067.03
004_16Oct2012_LRA303Small_Z50_61-007	73602.95	21.03	42.11	18.94	21.48		29.28	4.65	90.9		289.35	518.34
004_16Oct2012_LRA303Small_Z50_61-011	69700.98	21.73	135.54	41.05	48.97		72.07	10.52	166.82		488.48	800.77
004_16Oct2012_LRA303Small_Z50_61-012	76671.58	29.11	242.47	16.53	30.32		95.5	13.72	303.16		946.65	1488.77
002_25Oct2012_LRA303Large_Z1_11-001	87386.41	27.96	24.12	3.35	8.98		58.61	6.29	282.36		895.2	1424.38
002_25Oct2012_LRA303Large_Z1_11-002	89549.19	103.86	69.52	6	8.59		64.95	5.73	288.89		1048.68	1657.3
002_25Oct2012_LRA303Large_Z1_11-003	90039.23	21.62	18.22	2.13	10.74		64.9	7.51	217.98		679.15	1005.7
002_25Oct2012_LRA303Large_Z1_11-006	92793.34	21.87	36.06	5.69	11.32		69.86	9.82	257.92		767.76	1254.39
002_25Oct2012_LRA303Large_Z1_11-009	86336.51	78.08	62.62	2.64	11.18		109.87	9.79	413.26		1524.27	2374.84
003_25Oct2012_LRA303Large_Z12_23-003	88845.91	22.37	20.09	3.04	5.52		24.79	2.69	83.19		240.32	389.45

Appendix L: Zircon LA-ICP-MS Elemental Analyses, Camaquã and Itajaí Igneous Units

Samples	**Zr90**	**Nb93**	**Ce**	**Pr**	**Nd**	**[Pm]**	**Sm**	**Eu**	**Gd**	**[Tb]**	**Dy**	**Y**
003_25Oct2012_LRA303Large_Z12_23-006	84559.41	157.78	125.52	39.29	42.66		173.93	15.73	621.29		1899.34	2716.08
003_25Oct2012_LRA303Large_Z12_23-007	82066.09	75.22	3339.35	2657.55	2073.32		1247.09	91.36	874.31		1002.09	1386.01
003_25Oct2012_LRA303Large_Z12_23-008	88564.81	47.75	39.34	7.97	7.8		74.12	9.71	365.14		1283.82	2018.02
003_25Oct2012_LRA303Large_Z12_23-009	86124.39	174.12	258.27	151.38	134.87		204.03	19.87	475.4		1486.1	2190.29
003_25Oct2012_LRA303Large_Z12_23-010	88181.04	33.46	31.04	6.11	9.53		34.82	3.33	142.98		434.5	680.34
003_25Oct2012_LRA303Large_Z12_23-011	86751.39	138.03	94.81	17.31	27.01		95.09	7.52	370.48		1364.14	2051.48
004_25Oct2012_LRA303Large_Z23_30-002	87946.94	47.46	40.28	2.1	7		47.66	5.7	194.58		662.85	1038.91
004_25Oct2012_LRA303Large_Z23_30-006	84656.67	64.92	67.94	16.53	28.23		123.81	13.47	526.35		1929.23	2942.94
Averages	**85093.58**	**40.57**	**200.33**	**84.89**	**77.31**		**106.86**	**12.89**	**267.70**		**818.19**	**1297.36**
CAM-18 (n=27)												
015_2012Oct5_CAM18Large_Z1	83173.61	18.66	204.02	141.68	150.84		104.07	13.15	172.66		420.95	707.19
016_2012Oct5_CAM18Large_Z2	82669.98	18.04	73.22	2.77	7.46		47.76	10.95	149.5		514.3	874.96
019_2012Oct5_CAM18Large_Z5	78754.92	24.2	31.59	5.16	9.83		32.53	5.63	103		327.88	593.41
022_2012Oct5_CAM18Large_Z8	81720.88	19.9	58.01	31.31	37.55		38.8	9.59	83.39		274.58	495.07
028_2012Oct5_CAM18Large_Z11	78962.37	25.64	50.98	7.92	15.58		66.78	10.38	254.12		807.41	1372.85
029_2012Oct5_CAM18Large_Z12	83555.98	22.63	37.95	12.52	17.56		66.65	10.55	203.35		628.09	1108.74
031_2012Oct5_CAM18Large_Z14	83415.7	19.53	27.19	2.37	9.24		44.63	13	151.81		445.87	772.83
017_2012Oct8_CAM18Small_Z2	87182.27	22.77	106.24	4.23	8.1		50.15	10.01	171.62		518.48	922.19
018_2012Oct8_CAM18Small_Z3	98831.04	26.23	72.41	2.54	11.53		66.22	6.53	255.14		825.26	1360.7
024_2012Oct8_CAM18Small_Z9	105593.88	29.36	179.28	23.19	41.19		94.59	22.05	405.76		1143.84	1803.53
017_2012Oct9_CAM18Small_Z14	89469.92	24.56	79.43	24.79	24.23		72.86	8.28	230.26		699.87	1150.3
018_2012Oct9_CAM18Small_Z15	88431.12	32.08	33.68	6.09	10.61		46.89	7.5	173.53		592.17	1035.28
020_2012Oct9_CAM18Small_Z18	76299.94	31.56	170.2	5.27	12.76		72.85	13.83	284.19		880.55	1423.92
022_2012Oct9_CAM18Small_Z20	85410.7	31.37	78.05	17.97	16.63		37.49	5.36	103.59		375.24	664.28
024_2012Oct9_CAM18Small_Z22	92039.83	36.22	75.75	19.6	30.06		83.68	7.59	266.16		840.52	1375.67
025_2012Oct9_CAM18Small_Z23	94392.12	43.83	189.3	349.5	94.51		110.87	11.74	354.73		1095.62	1742.5
002_2012Oct11_Auto_CAM18Small_Z27_36-002	103147.33	17.76	22.75	150.67	9.24		55.61	11.46	176.83		563.89	982.92
002_2012Oct11_Auto_CAM18Small_Z27_36-003	95530.56	24.46	62.95	11.85	17.08		99.15	16.08	291.36		884.39	1485.7
002_2012Oct11_Auto_CAM18Small_Z27_36-004	100186.87	31.72	233.31	87.47	83.5		87.52	10.65	231.41		678.49	1105.72
002_2012Oct11_Auto_CAM18Small_Z27_36-005	98445.41	21.42	32.54	0.73	5.32		24.96	7.26	93.23		290.63	551.88
002_2012Oct11_Auto_CAM18Small_Z27_36-007	86032.78	19.57	165.38	7.63	17.11		53.94	7.15	183.6		612.31	984.36
002_2012Oct11_Auto_CAM18Small_Z27_36-008	95240.39	29.98	128.7	35.12	39.67		88.97	8.85	245.24		795.47	1316.39
002_2012Oct11_Auto_CAM18Small_Z27_36-010	93055.27	35.69	215.26	181.94	178.56		145.05	10.46	216.05		490.52	776.01
004_2012Oct11_Auto_CAM18Small_Z37_47-003	79980.54	18.86	104.18	3.38	8		47.22	10.9	158.65		542.4	933.6
004_2012Oct11_Auto_CAM18Small_Z37_47-004	77139.66	20.86	100.9	5.5	12.24		65.58	5.25	227.94		717.4	1133.75
004_2012Oct11_Auto_CAM18Small_Z37_47-005	77385.52	30.29	55.66	9.19	26.36		117.35	23.73	367.66		1132.08	1716.79
004_2012Oct11_Auto_CAM18Small_Z37_47-011	75502.27	20.09	107.52	12.54	27.48		93.95	18.15	328.79		762.53	1232.87
Averages	**87835.22**	**25.83**	**99.87**	**43.07**	**34.16**		**70.97**	**10.97**	**217.91**		**661.51**	**1097.16**
RAM01A (n=15)												
002_17Oct2012_RAM01ASmalls_Z1_11-002	80194.35	12.23	14.22	0	7.63		29.5	0	108.03		265.22	420.87
002_17Oct2012_RAM01ASmalls_Z1_11-003	84979.21	38.55	36.08	2.44	14.87		68.56	7.54	285.98		865.55	1377.65
002_17Oct2012_RAM01ASmalls_Z1_11-004	81754.15	51.24	79.12	40.91	48.55		110.29	8.13	355.91		1173.97	1870.3
002_17Oct2012_RAM01ASmalls_Z1_11-005	77288.34	70.65	75.8	34.03	31.43		100.31	7.93	429.57		1481.57	2348.45
002_17Oct2012_RAM01ASmalls_Z1_11-006	81096.89	15.54	130.88	14	17.58		51.25	13.97	144.33		465.07	799.11
002_17Oct2012_RAM01ASmalls_Z1_11-008	81343.16	12.78	21.47	8.21	14.47		55.56	6.19	162.24		363.94	542.63
002_17Oct2012_RAM01ASmalls_Z1_11-010	75828.05	79.88	77.43	18.42	21.55		123.84	7.01	476.12		1596.75	2486.59
003_17Oct2012_RAM01ASmalls_Z12_22-002	83468.21	143.23	94.31	4.42	9.26		83.54	6.53	381.06		1424.92	2208.4
003_17Oct2012_RAM01ASmalls_Z12_22-004	82611.55	30.84	25.78	1.23	5.44		46.97	4.95	153.12		503.46	837.87
003_17Oct2012_RAM01ASmalls_Z12_22-008	88059.35	39.69	63.17	25.81	39.3		101.81	14.87	448.06		1370.82	2195.71
003_17Oct2012_RAM01ASmalls_Z12_22-011	81930.49	70.76	90.63	34.15	42.46		142.91	13.51	582.86		2140.22	3187.54

Samples	Zr90	Nb93	Ce	Pr	Nd	[Pm]	Sm	Eu	Gd	[Tb]	Dy	Y
002_26Oct2012_RMA01Large_Z1_8-001	84402.05	18.68	67.63	36.22	36.3		61.55	6.13	156.06		478.66	817.99
002_26Oct2012_RMA01Large_Z1_8-003	79420.15	20.58	80.38	66.57	58.93		98.35	22.62	257		700.65	1173.96
002_26Oct2012_RMA01Large_Z1_8-005	82171.05	27.98	75.38	3.89	10.22		56.53	16.65	204.48		654.83	1126.4
002_26Oct2012_RMA01Large_Z1_8-007	76388.66	22.95	46.48	22.05	23.55		37.93	5.11	92.34		318.78	541.01
Averages	**81395.71**	**43.71**	**65.25**	**20.82**	**25.44**		**77.93**	**9.41**	**282.48**		**920.29**	**1462.30**
ITA-8 (n=38)												
002_18Oct2012_ITA-8_Z1_11-001	82421.53	11.55	19.17	10.22	22.7		86.67	69.64	244.01		660.49	1048.04
002_18Oct2012_ITA-8_Z1_11-002	86335.56	15.56	82.8	62.1	56.84		91.09	53.68	215.86		571.5	925.91
002_18Oct2012_ITA-8_Z1_11-003	86719.31	12.45	196.41	160.96	141.03		125.9	51.35	240.93		532.8	863.83
002_18Oct2012_ITA-8_Z1_11-007	84961.78	11.94	18.31	10.25	11.54		23.59	25.49	89.74		240.07	437.9
002_18Oct2012_ITA-8_Z1_11-008	83358.51	12.51	62.07	39.99	40.08		56.81	36.84	142.21		401.38	682.9
002_18Oct2012_ITA-8_Z1_11-009	84685.73	13.84	36.4	24.34	24.63		34.75	27.04	109.11		326.51	575.78
002_18Oct2012_ITA-8_Z1_11-010	87111.88	15.76	69.85	60.69	49.97		84.08	38.73	205.47		548.44	905.79
002_18Oct2012_ITA-8_Z1_11-011	83390.13	11.44	650.55	512.54	410.26		238.43	62.93	266.02		649.84	912.81
003_18Oct2012_ITA-8_Z12_22-003	81388.75	9.59	12.03	5.36	15.6		62.61	48.81	193.65		527.46	817.94
003_18Oct2012_ITA-8_Z12_22-004	81156.09	12.16	59.51	39.23	38.96		57.67	37.02	169.35		443.1	699.81
003_18Oct2012_ITA-8_Z12_22-006	81786.09	12.88	95.56	69.81	72.57		92.01	50.24	225.36		580.35	911.77
003_18Oct2012_ITA-8_Z12_22-007	83602.47	12.21	24.21	9.29	14.66		48.74	33.67	134.56		368.55	620.96
003_18Oct2012_ITA-8_Z12_22-008	85595.91	10.21	62.65	44.77	45.28		77.1	40.78	198.98		443.67	745.18
003_18Oct2012_ITA-8_Z12_22-011	85556	16.13	26.5	12.19	14.47		46.42	32.85	152.89		432.6	735.49
004_18Oct2012_ITA-8_Z23_30-002	89937.71	9.09	180.42	145.68	140.16		120.57	75.38	217.98		517.03	810.08
004_18Oct2012_ITA-8_Z23_30-003	84147.21	13.37	239.93	188.59	160.43		120.29	33.59	160.73		393.38	660.36
004_18Oct2012_ITA-8_Z23_30-006	91469.5	11.89	15.46	3.57	13.06		61.6	38.94	157.62		428.01	744.8
002_24Oct2012_ITA8Large_Z1_11-001	76428.95	21.43	48.52	34.58	40.8		64.82	46.96	172.83		470.56	758.08
002_24Oct2012_ITA8Large_Z1_11-002	73607.95	28.81	868.43	719.21	597.13		341.99	58.27	317.28		627.84	970.84
002_24Oct2012_ITA8Large_Z1_11-003	74784.63	22.78	60.19	44	35.02		35.47	20.26	72.16		190.82	340.47
002_24Oct2012_ITA8Large_Z1_11-004	71290.8	22.66	2709.15	2302.79	1788.45		904.66	116.21	655.57		803.55	1071.68
002_24Oct2012_ITA8Large_Z1_11-007	75887.09	22.73	20.09	9.05	11.88		30.01	25.5	92.38		256.87	462.26
002_24Oct2012_ITA8Large_Z1_11-008	75023.1	28.1	135.85	104.39	81.43		56.01	11.07	83.62		201.57	382.55
002_24Oct2012_ITA8Large_Z1_11-009	74208.95	30.54	77.8	55.42	57.18		75.54	28.5	226.17		658.89	1052.97
002_24Oct2012_ITA8Large_Z1_11-010	77548.95	26.79	16.57	4.3	11.82		36.15	28.57	138.36		400.94	697.26
002_24Oct2012_ITA8Large_Z1_11-011	79496.98	20.59	13.16	6.56	12.68		50.3	38.93	192.09		481.2	782.57
003_24Oct2012_ITA8Large_Z12_23-002	77188.67	23.39	16.18	2.35	9.84		36.2	30.66	120.92		340.19	621.61
003_24Oct2012_ITA8Large_Z12_23-007	76876.4	19.77	49.35	34.61	37.73		49.05	31.64	125.73		345.66	560.75
003_24Oct2012_ITA8Large_Z12_23-008	80291.71	18.21	31.64	25.48	27.33		54.31	47.92	168.48		481.64	749.55
003_24Oct2012_ITA8Large_Z12_23-009	81351.35	29.12	39.55	22.25	28.94		55.11	53.33	170.6		541.66	876.93
004_24Oct2012_ITA8Large_Z24_35-001	77979.17	21.95	31.34	14.84	20.52		72.16	48.2	243.96		621.15	1013.68
004_24Oct2012_ITA8Large_Z24_35-002	79500.68	21.63	23.19	7.1	10.64		35.21	30.45	101.51		329.35	590.31
004_24Oct2012_ITA8Large_Z24_35-003	78145.93	21.6	331.37	262.05	211.69		143.49	45.52	218.16		483.32	789.76
004_24Oct2012_ITA8Large_Z24_35-005	81540.46	24.45	20.01	9.59	17.72		60.53	45.49	209.66		587.91	948.65
004_24Oct2012_ITA8Large_Z24_35-006	82882.22	20.29	192.15	150.36	138.08		108.58	33.75	154.09		353.8	592.58
004_24Oct2012_ITA8Large_Z24_35-009	87266.29	24.14	48.34	39.1	43.83		90.98	57	217.98		590.65	937.98
004_24Oct2012_ITA8Large_Z24_35-010	83647.28	19.8	16.3	5.74	14.16		57.95	34.14	172.45		460.04	743.64
004_24Oct2012_ITA8Large_Z24_35-011	77593.91	25.25	1006.06	830.88	667.58		380.5	47.44	291.53		476.46	744.15
Averages	**81214.89**	**18.60**	**200.19**	**160.11**	**135.18**		**109.67**	**43.07**	**191.32**		**467.61**	**757.57**

Appendix L: Zircon LA-ICP-MS Elemental Analyses, Camaquã and Itajaí Igneous Units

Samples	[Er]	[Tm]	Yb	Lu	Hf178	Hg202	Tl203	Pb204	Tl205	Pb206	Pb207	Pb208
CAM-1 (n=5)												
028_2011Nov2_Mt2_CAM1_Z46			1776.17	2138	59605.84	****	0	0	0	32.54	2.5	3.07
002_2012Dec4_Mt1_CAM1_Z001_011-003			4858.06	5564.69	51694.93	0	7.92	3.24	0	30.84	2.41	6.09
002_2012Dec4_Mt1_CAM1_Z001_011-007			2592.89	3051.23	50231.96	****	0	0	0	24.48	2.7	3.09
002_2012Dec4_Mt1_CAM1_Z001_011-011			2027.64	2404.8	61090.5	****	0	0	0	40.98	3.25	2.9
002_2012Dec6_Mt1_CAM1_Z047_053-005			8442.91	8449.72	71810.41	0	0	5.28	0	109.92	7.82	10.1
Averages			**3939.53**	**4321.69**	**58886.73**	**0.00**	**1.58**	**1.70**	**0.00**	**47.75**	**3.74**	**5.05**
CAM-2 (n = 43)												
014_Mt2_CAM2_Z2			6743.55	8193.76	97710.56	****	0	0	0	255.41	17	18.35
015_Mt2_CAM2_Z3			3643.29	4482.15	80434.72	0	0	0	0	76.04	4.69	6.97
017_Mt2_CAM2_Z5			4178.44	4909.94	92812.75	0	0	0	1.35	64.48	4.01	6.05
018_Mt2_CAM2_Z6			1695.79	2100.79	72394.8	0	0	2.41	0	9.05	0.65	0.96
020_Mt2_CAM2_Z8			3477.9	4033.84	96082.94	0	0	5.31	0	73.37	9.45	13.52
021_Mt2_CAM2_Z9			980.8	1321.8	83464.3	****	0	0	0	9.04	0.74	0.93
022_Mt2_CAM2_Z10			1510.76	1807.01	84975.13	0	1.92	0	0	12.74	3.4	4.07
029_2012Apr21_Mt2_CAM2_Z16			1242.36	1030.11	39369.07	0	0	0	0.82	11.97	0.69	1.52
015_2012Apr20_Mt2_CAM2_Z20			7226.56	7707.7	61480.92	****	0	1.29	0	133.15	9.26	15.07
016_2012Apr20_Mt2_CAM2_Z21			3728.4	4368.52	58686.1	0	0	0	0	60.34	6.71	7.48
017_2012Apr20_Mt2_CAM2_Z22			1909.63	2398.66	64552.28	0	0	0	0	34.12	2.54	2.52
018_2012Apr20_Mt2_CAM2_Z23			785.64	987.61	48683.67	0	1.38	0	0.95	4.71	0.564	0.7
019_2012Apr20_Mt2_CAM2_Z24			3648.72	4174.92	58835.06	0	1.93	1.01	0	45.85	2.81	5.23
020_2012Apr20_Mt2_CAM2_Z25			5250.27	5922.88	57017.98	0	0	2.16	0	102.71	7.86	10.68
021_2012Apr20_Mt2_CAM2_Z26			1498.36	1908.75	47348.48	0	0	0	0	9.94	0.567	1.373
028_2012Apr20_Mt2_CAM2_Z30			2759.17	3280.27	65224.45	****	0	0	0	94.81	6.64	12.8
032_2012Apr20_Mt2_CAM2_Z34			1154.78	1506.16	44456.46	0	0	0	0	6.11	0.219	0.707
033_2012Apr20_Mt2_CAM2_Z345			984.14	1155.27	52222.03	****	0	0	0	8.56	0.53	0.84
002_2012Nov30_Mt1_CAM2_Z2_12-002			2984.25	3418.39	58025.09	0	0	0	0	29.46	2.07	4.7
002_2012Nov30_Mt1_CAM2_Z2_12-006			2830.11	3653.44	49193.84	****	0	0	0	18.62	1.3	2.11
002_2012Nov30_Mt1_CAM2_Z2_12-007			1437.71	1844.77	48118.13	0	0	0	0	13.17	1.31	1.2
002_2012Nov30_Mt1_CAM2_Z2_12-010			3262.56	4046.87	71262.8	0	0	4.09	0	77.27	5.26	5.9
003_2012Nov30_Mt1_CAM2_Z13_22-001			1543.43	1860.59	53920.59	0	0	0	0	16.87	1.71	1.99
003_2012Nov30_Mt1_CAM2_Z13_22-002			2717.77	3174.16	57514.39	****	0	0	0	29.92	1.97	3.54
003_2012Nov30_Mt1_CAM2_Z13_22-003			2088.63	2359.04	59440.69	0	0	0	0	29.86	2.52	2.98
003_2012Nov30_Mt1_CAM2_Z13_22-004			2161.77	2557.63	62623.8	0	0	5.92	0	34.35	2.51	3.31
003_2012Nov30_Mt1_CAM2_Z13_22-005			2307.41	2607.51	54479.47	0	0	0	0	20.5	1.46	2.16
003_2012Nov30_Mt1_CAM2_Z13_22-007			1703.8	1820.44	55806.32	0	0	0	13.03	20.11	0.97	1.55
003_2012Nov30_Mt1_CAM2_Z13_22-008			4144.61	5004.08	72555.54	****	0	15.83	0	102.54	23	23.63
004_2012Nov30_Mt1_CAM2_Z23_33-006			2727.73	3313.88	70143.72	0	0	4.69	0	46.41	3.65	4.55
004_2012Nov30_Mt1_CAM2_Z23_33-007			2767.82	3406.2	64355.29	0	0	0	0	34.51	2.5	2.89
004_2012Nov30_Mt1_CAM2_Z23_33-009			2553.05	2950.6	57377.05	0	0	0	0	50.93	4.85	5.91
004_2012Nov30_Mt1_CAM2_Z23_33-011			4197.02	4779.17	50197.57	0	0	0	0	33.03	2.47	6.57
002_2012Dec3_CAM2_Z034_044-001			2504.9	3235.3	69530.48	<****	0	0	6.04	63.37	4.26	2.96
002_2012Dec3_CAM2_Z034_044-002			2937.28	3438.21	52582.98	<****	15.22	2.15	0	26.9	2.29	2.6
002_2012Dec3_CAM2_Z034_044-003			4921.94	6077.96	55112.31	<****	0	6.18	0	56.4	5.71	14.76
002_2012Dec3_CAM2_Z034_044-004			1658.66	2002.44	55013.6	<****	0	0	0	18.25	1.24	1.48
002_2012Dec3_CAM2_Z034_044-005			2356.93	2935.12	63269.49	<****	0	0	0	38.45	2.35	4.21
002_2012Dec3_CAM2_Z034_044-008			4189	4693.15	55381.87	<****	0	2.68	0	47.95	3.09	6.7
002_2012Dec3_CAM2_Z034_044-009			2326.37	2939.61	61859.56	<****	0	1.93	0	59.73	4.51	4.92
002_2012Dec3_CAM2_Z034_044-010			2143.25	2640.95	59045.27	<****	8.87	0	0	40.83	2.19	2.48
003_2012Dec3_CAM2_Z045_055-006			3207.65	4064.24	63263.39	<****	0	4.7	0	77.09	5.64	7.88
003_2012Dec3_CAM2_Z045_055-007			2998.83	3417.23	60126.59	<****	0	0	0	32.25	1.87	3.59

Samples	[Er]	[Tm]	Yb	Lu	Hf178	Hg202	Tl203	Pb204	Tl205	Pb206	Pb207	Pb208
Averages			**2816.07**	**3337.93**	**62463.99**	**0.00**	**0.68**	**1.40**	**0.52**	**47.24**	**3.93**	**5.45**
CAM-4 (n = 25)												
052_2011Oct26_Mt2_CAM4_Z12			4643.16	5372.19	46557.88	0	0	0	0	26.14	1.87	5.18
025_2011Oct27_Mt2_CAM4_Z26			3127.27	3621.78	53697.98	****	0	0	0	45.47	3.08	5.31
010_2012June15_CAM4_Mt1_Z10			4210.63	4988.54	53155.27	0	2.64	0	1.58	35.47	2.08	6.14
018_2012June15_CAM4_Mt1_Z3			6058.39	7409	74463.73	0	0	0	0	203.11	15.69	17.13
020_2012June15_CAM4_Mt1_Z5			5187.68	5779.31	68002.61	0	0	1.33	0	74.11	6.36	8.46
021_2012June15_CAM4_Mt1_Z6			3282.19	4015.27	67064.63	****	0	0	0	44.45	3.72	5.01
022_2012June15_CAM4_Mt1_Z7			3006.4	3563.62	50308.84	****	0	0	2.22	23	1.66	2.78
024_2012June15_CAM4_Mt1_Z9			3726.59	4253.26	45707.86	0	0	1.18	0	17.34	1.61	4.1
016_2012June18_CAM4_Mt1_Z12			4604.67	5498.97	46334.43	****	0	2.07	0	19.05	1.35	3.6
019_2012June18_CAM4_Mt1_Z15			2748.49	3177.16	54207.52	0	0	0	0	23.52	1.95	2.81
020_2012June18_CAM4_Mt1_Z16			2874.16	3402.8	45973.64	0	0	0	0	14.64	1	2.63
021_2012June18_CAM4_Mt1_Z17			4854.1	5500.24	71389.22	0	0	3.27	0	57.85	5.25	6.04
024_2012June18_CAM4_Mt1_Z20			4193.44	4994.39	62713.79	0	0	0.95	0	49.51	3.2	5.72
033_2012June18_CAM4_Mt1_Z23			3476.56	4203.92	53640.38	0	1.36	0	0.97	33.38	3.59	4.54
039_2012June18_CAM4_Mt1_Z29			6976.71	8354.49	56989.66	****	0	0	0.74	96.85	7.31	13.45
040_2012June18_CAM4_Mt1_Z30			3992.26	4582.65	55598.65	****	0	1.8	0	41.87	2.63	6.55
042_2012June18_CAM4_Mt1_Z32			3208.64	3506.72	48121.92	0	1.66	1.57	0	20.89	1.82	3.92
043_2012June18_CAM4_Mt1_Z33			1610	1900.85	54150.49	0	0	1.37	1.21	11.21	1.01	1.49
015_2012June20_CAM4_Mt1_Z36			4331.75	5064.19	50236.07	****	0	0	0	31.19	2.07	4.41
016_2012June20_CAM4_Mt1_Z37			3532.84	4148.04	57400.06	****	0	0	0	49.72	3.91	5.4
018_2012June20_CAM4_Mt1_Z39			3070.32	3672.12	72594.26	****	0	4.2	0	42.16	2.92	4.03
021_2012June20_CAM4_Mt1_Z42			4407.89	5264.73	66256.84	0	0	5.2	0	38.88	2.23	4.71
022_2012June20_CAM4_Mt1_Z43			4615.94	5274.45	67144.34	0	0	0	0	63.87	5	6.34
023_2012June20_CAM4_Mt1_Z44			2531.02	3014.15	52477.42	0	0	0	0	20.96	1.8	2.76
025_2012June20_CAM4_Mt1_Z46			3247.73	3987.63	71923.98	0	0	0	0	60.99	4.21	4.74
Averages			**3900.75**	**4582.02**	**57844.46**	**0.00**	**0.23**	**0.92**	**0.27**	**45.83**	**3.49**	**5.49**
CAM-11 (n=52)												
015_2011Nov4_Mt2_CAM11_Z1			1005.31	1071.18	47478.36	0	0	0	0.38	50.42	3.3	2.26
016_2011Nov4_Mt2_CAM11_Z2			1210.26	1462.62	62263.88	0	0	1.11	0	91.32	6.18	4.45
017_2011Nov4_Mt2_CAM11_Z3			1490.84	1617.96	48067.05	0	0	0	0	64.14	4.41	3.55
018_2011Nov4_Mt2_CAM11_Z4			1248.75	1354.55	42213.81	****	1.32	0	0	58.4	3.75	3.33
020_2011Nov4_Mt2_CAM11_Z6			1406.55	1616.45	58980.15	0	0	0.66	0	73.46	5.2	3.62
021_2011Nov4_Mt2_CAM11_Z7			1909.55	2075.17	67514.36	0	0	0	0	121.23	8.69	6.11
024_2011Nov4_Mt2_CAM11_Z10			1127.7	1327.11	53258.41	****	0	0.55	0	59.33	4.09	2.85
026_2011Nov4_Mt2_CAM11_Z12			1531.22	1684.94	52441.7	0	0	0	0	53.49	3.39	2.92
015_2011Nov10_Mt2_CAM11_Z13			1105.13	1292.57	69099.68	****	0	0	0	93.99	6.13	4.32
016_2011Nov10_Mt2_CAM11_Z14			1159.3	1279.65	50663.71	****	0	1.03	0	69.97	4.57	3.84
017_2011Nov10_Mt2_CAM11_Z15			2213.54	2315.68	40244.41	****	0	0	0	59.32	3.69	3.59
018_2011Nov10_Mt2_CAM11_Z16			1714.22	1888.04	48912.27	0	0	0	0	66.96	4.37	4.25
019_2011Nov10_Mt2_CAM11_Z17			2137.6	2305.8	38076.17	0	0	0	0.87	62.75	4.36	4
023_2011Nov10_Mt2_CAM11_Z21			1883.76	1982.89	48438.06	****	0	0	0	71.91	4.96	4.26
024_2011Nov10_Mt2_CAM11_Z22			2189.94	2524.87	48847.99	0	1.47	0	0	92.31	5.79	10.34
031_2011Nov10_Mt2_CAM11_Z23			1240.5	1367.75	38186.76	0	0	0	0	46.8	3.08	2.41
032_2011Nov10_Mt2_CAM11_Z24			1594.45	1703.29	41627.54	****	0	0	0	55.03	3.65	3.19
034_2011Nov10_Mt2_CAM11_Z26			1298.95	1439.31	52394.99	0	0	0	0	57.49	3.77	2.89
035_2011Nov10_Mt2_CAM11_Z27			1583.95	1690.88	48271.34	0	0	0	0	64.23	4.32	4.28
038_2011Nov10_Mt2_CAM11_Z30			1283.11	1366.88	40736.78	0	0	0	0	42.16	3.03	2.07
039_2011Nov10_Mt2_CAM11_Z31			1348.26	1658	65354.1	0	1.13	0	0	100.29	6.92	4.81

Samples	**[Er]**	**[Tm]**	**Yb**	**Lu**	**Hf178**	**Hg202**	**Tl203**	**Pb204**	**Tl205**	**Pb206**	**Pb207**	**Pb208**
048_2011Nov10_Mt2_CAM11_Z33			1319.06	1440.92	39299.73	0	0	0	0	63.2	4.25	3.95
049_2011Nov10_Mt2_CAM11_Z34			1016.87	1197.68	56565.71	0	0	0	0	74.18	4.99	3.86
050_2011Nov10_Mt2_CAM11_Z35			1495.1	1566.21	38647.62	0	0	0	0	74.79	5.04	4.97
052_2011Nov10_Mt2_CAM11_Z37			1353.46	1478.81	45192.41	0	0	0	0	68.98	4.6	4.24
053_2011Nov10_Mt2_CAM11_Z38			1746.9	1986.4	65637.7	0	0	0.9	0	87.91	6.07	4.83
054_2011Nov10_Mt2_CAM11_Z39			1179.61	1385.09	62745.67	****	0	0.61	0	64.95	4.58	2.83
055_2011Nov10_Mt2_CAM11_Z40			1587.05	1772.23	50398.92	0	0	0	0	67.68	4.5	3.8
056_2011Nov10_Mt2_CAM11_Z41			1216.73	1272.71	45725.03	0	0	0	0	54.71	3.58	3.02
016_2011Nov11_Mt2_CAM11_Z44			2214.45	2374.87	38568.61	0	0	0	0	62.7	4.32	4.16
017_2011Nov11_Mt2_CAM11_Z45			1005.8	1068.98	47872.64	****	0	0	0	50.26	3.47	2.51
018_2011Nov11_Mt2_CAM11_Z46			1817.8	2096.53	52680.01	0	0	0	0	88.13	5.71	4.75
020_2011Nov11_Mt2_CAM11_Z48			1516.16	1648.95	36241.26	0	0	0	0	51.98	3.39	2.9
021_2011Nov11_Mt2_CAM11_Z49			1354.15	1717.9	66364.39	****	0	0	0	105.91	7.51	4.71
022_2011Nov11_Mt2_CAM11_Z50			1113.05	1236.71	44078.32	0	0	0.78	0	58.5	3.78	3.22
026_2011Nov11_Mt2_CAM11_Z52			852.96	1011.02	59950.1	0	0	1.05	0	73.88	4.95	3.27
027_2011Nov11_Mt2_CAM11_Z53			1385.42	1668.94	67358.05	****	0	0.86	0	102.02	7.1	4.87
015_2011Nov15_Mt2_CAM11_Z55			1444.93	1538.53	47180.14	****	0	0	0	54.62	3.59	2.99
016_2011Nov15_Mt2_CAM11_Z56			1791.93	2074.04	62771.01	0	1.5	0	0	90.03	6.34	4.46
017_2011Nov15_Mt2_CAM11_Z57			1098.02	1299.01	67871.17	0	0	0	0	52.35	3.93	2.64
020_2011Nov15_Mt2_CAM11_Z60			997.27	1146.45	69920	0	0	0	0.56	77.05	4.91	3.22
021_2011Nov15_Mt2_CAM11_Z61			1563.38	1643.05	52895.03	0	0	0	0	55.83	3.63	2.9
022_2011Nov15_Mt2_CAM11_Z62			1005.42	1143.38	65108.72	0	0	0	0	57.05	3.71	2.62
023_2011Nov15_Mt2_CAM11_Z63			2192.27	2306.27	41879.38	****	0	0	0	64.26	4.34	4.58
018_2011Nov17_Mt2_CAM11_Z68			1607.54	1804.67	70612.65	****	0	1.45	0	92.59	6.78	4.9
019_2011Nov17_Mt2_CAM11_Z69			1066.7	1245.9	60132.5	0	0	0	0	74.01	5.25	3.85
020_2011Nov17_Mt2_CAM11_Z70			2222.89	2343.23	39062.56	****	0	0	0	65.27	4.33	4.37
021_2011Nov17_Mt2_CAM11_Z71			1022.22	1113.29	57717.4	****	0	0	0	63.76	4.65	3.01
022_2011Nov17_Mt2_CAM11_Z72			1169.75	1350.66	57170.18	0	0	8.14	1.03	77.53	10.72	9.62
029_2011Nov17_Mt2_CAM11_Z74			1058.79	1212.59	53050.19	0	0	0	0	59.55	4.06	2.79
031_2011Nov17_Mt2_CAM11_Z76			1218.27	1285.85	41722.21	****	0	0.56	0	50.11	3.09	2.66
032_2011Nov17_Mt2_CAM11_Z77			1156.53	1398.19	62837.88	0	0	1.25	0	86.95	6.09	5.82
Averages			**1432.18**	**1593.36**	**52506.32**	**0.00**	**0.10**	**0.36**	**0.05**	**69.73**	**4.83**	**3.96**
ITA-4a (n=62)												
014_2012May7_Mt2_ITA4a_Z1			1714.5	1922.05	46527.24	<****	0	0	0	10.91	0.61	0.876
015_2012May7_Mt2_ITA4a_Z2			1352.18	1541.13	41249.37	<****	0	0	0.8	9.7	0.662	1.125
016_2012May7_Mt2_ITA4a_Z4			1926.59	2158.31	47734.61	<****	0	0	0	17.81	1.21	1.76
020_2012May7_Mt2_TA4a_Z5			1703.95	2060.08	49398.97	<****	0	0	0	12.7	0.7	1.041
024_2012May7_Mt2_ITA4a_Z10			2902.13	3436.59	41015	<****	0	1.58	0	16.74	1.84	2.59
025_2012May7_Mt2_ITA4a_Z11			1633.21	1968.55	55560.28	<****	0	0	0	18.7	1.26	1.386
026_2012May7_Mt2_ITA4a_Z12			1856.48	2223.13	54135.49	<****	3.45	0	0	14.81	1.41	1.34
027_2012May7_Mt2_ITA4a_Z13			2807.36	3168.38	42401.86	<****	0	0	0.76	23.71	1.63	3.58
033_2012May7_Mt2_ITA4a_Z15			1561.2	1765.89	46225.93	<****	0	1.76	0	8.97	0.52	0.86
034_2012May7_Mt2_ITA4a_Z16			1705.26	2019	51871.15	<****	0	0	0	18.5	1.26	1.36
036_2012May7_Mt2_ITA4a_Z18			1081.67	1444.25	39434.91	<****	0	0	0	3.61	0.377	1.02
037_2012May7_Mt2_ITA4a_Z19			2720.7	3058.37	40466.22	<****	1.76	0	0	9.92	0.633	1.39
038_2012May7_Mt2_ITA4a_Z20			2347.09	2756.08	56319.82	<****	0	0	0	24.99	1.57	3.67
039_2012May7_Mt2_ITA4a_Z21			2448.76	2872.89	60540.78	<****	0	0	0	27.69	1.99	2.26
040_2012May7_Mt2_ITA4a_Z23			3113.59	3735.6	37809.41	<****	0	0	0	10.91	0.514	2.29
041_2012May7_Mt2_ITA4a_Z24			3375.96	3871.84	41283.25	<****	0	0	0	19.44	1.29	2.46
047_2012May7_Mt2_ITA4a_Z26			3934.29	4657.96	44557.41	<****	0	0	0	15.71	1.17	2.94
048_2012May7_Mt2_ITA4a_Z27			2386.63	2865.95	51822.56	<****	0	0	0	15.63	1.38	1.82

Samples	[Er]	[Tm]	Yb	Lu	Hf178	Hg202	Tl203	Pb204	Tl205	Pb206	Pb207	Pb208
049_2012May7_Mt2_ITA4a_Z28			926.61	1196.96	48848.71	<****	1.76	0	0	6.41	0.39	0.681
052_2012May7_Mt2_ITA4a_Z31			2131.18	2484.57	42465.33	<****	0	0	0	15.95	1.28	3.33
053_2012May7_Mt2_ITA4a_Z32			1481.11	1739.22	45591.01	<****	0	0	0	11.73	0.91	1.53
054_2012May7_Mt2_ITA4a_Z33			1726.75	2058.54	54506.22	<****	0	0	0	12.07	0.8	1.21
055_2012May7_Mt2_ITA4a_Z34			1758.6	2050.35	49443.39	<****	0	0	0	15.19	0.96	1.64
056_2012May7_Mt2_ITA4a_Z35			1013.99	1383.51	47025.61	<****	0	0	0	4.07	0.45	1
015_2012May8_Mt2_ITA4a_Z36			2767.17	3211.94	42575.59	0	0	0	0	13.2	0.97	1.82
016_2012May8_Mt2_ITA4a_Z37			1460.56	1749.61	52001.86	0	0	0	0	14.62	0.883	1.136
017_2012May8_Mt2_ITA4a_Z38			1211.82	1546.93	42446.38	****	0	0	0	8.58	0.636	0.899
018_2012May8_Mt2_ITA4a_Z39			2091.71	2379.96	50576.93	0	0	0	0	10.21	0.58	1.34
019_2012May8_Mt2_ITA4a_Z40			1745.96	2018.19	41564.91	0	1.12	0	0	6.14	0.404	0.797
021_2012May8_Mt2_ITA4a_Z42			2092.34	2473.46	49632.84	****	0	0	0	14.95	0.82	1.62
022_2012May8_Mt2_ITA4a_Z43			2027.2	2387.22	45368.18	****	1.69	0	0	12.15	0.81	3.96
023_2012May8_Mt2_ITA4a_Z44			2873.48	3343.4	39254.49	0	0	2.08	0	16.09	1.27	2.29
030_2012May8_Mt2_ITA4a_Z48			3170.36	3661.58	52744.78	0	0	0	0	18.53	1.12	2.73
031_2012May8_Mt2_ITA4a_Z49			2279.97	2772.14	40296.05	****	0	0	0	14.21	1.05	2.26
032_2012May8_Mt2_ITA4a_Z50			1899.62	2149.78	46284.46	0	0	0	0	10.78	0.74	1.089
034_2012May8_Mt2_ITA4a_Z52			1385.78	1597.55	53005.29	0	0	0	0	12.89	0.81	1.202
035_2012May8_Mt2_ITA4a_Z53			1417.81	1729.96	54725.36	0	0	1.7	0	13.64	1	1.1
036_2012May8_Mt2_ITA4a_Z54			2981.96	3570.37	48878.41	0	0	0	0.71	16.9	0.68	2
003_2012Dec6_Mt1_ITA4a_Z001_Z011-001			1604.43	1978.24	49249.51	0	0	0	0	14.02	0.86	1.34
003_2012Dec6_Mt1_ITA4a_Z001_Z011-003			4180.79	4901.18	41791.3	0	0	0	3.85	19.58	1.5	3.55
003_2012Dec6_Mt1_ITA4a_Z001_Z011-004			2431.2	2694.66	45341.2	0	0	0	0	12.89	0.84	1.76
003_2012Dec6_Mt1_ITA4a_Z001_Z011-005			1386.4	1674.96	44824.97	****	10.43	0	0	4.91	0.44	0.611
003_2012Dec6_Mt1_ITA4a_Z001_Z011-006			1765.81	2000.29	39955.53	0	0	0	6.95	10.57	0.92	2.05
003_2012Dec6_Mt1_ITA4a_Z001_Z011-008			1720.74	1824.45	38644.96	0	0	0	0	9.11	0.51	1.3
003_2012Dec6_Mt1_ITA4a_Z001_Z011-009			2111.84	2393.1	41878.51	0	0	0	0	15.16	0.89	1.71
003_2012Dec6_Mt1_ITA4a_Z001_Z011-010			2702.18	3106.27	52256.1	0	0	0	0	26.54	2.21	2.95
003_2012Dec6_Mt1_ITA4a_Z001_Z011-011			1980.32	2286.49	51511.29	0	0	0	0	18.04	1.21	1.42
004_2012Dec6_Mt1_ITA4a_Z012_Z022-001			2191.1	2707.93	51351.88	****	0	0	0	16.16	1.11	1.73
004_2012Dec6_Mt1_ITA4a_Z012_Z022-002			2303.83	2884.63	43064.7	0	0	0	0	16.86	0.88	3.51
004_2012Dec6_Mt1_ITA4a_Z012_Z022-003			1533.18	1866.4	51661.94	0	0	0	0	16.78	0.87	1.38
004_2012Dec6_Mt1_ITA4a_Z012_Z022-004			2673.61	3117.68	48584.64	0	0	2.57	0	24.49	1.63	2.87
004_2012Dec6_Mt1_ITA4a_Z012_Z022-005			3239.36	3858.03	47096.25	0	0	0	0	22.86	1.58	2.98
004_2012Dec6_Mt1_ITA4a_Z012_Z022-006			1716.56	1919.96	40173.73	0	0	0	0	9.62	0.67	1.188
004_2012Dec6_Mt1_ITA4a_Z012_Z022-007			1749.09	2118.58	45917.34	0	0	0	0	13.28	0.64	1.25
004_2012Dec6_Mt1_ITA4a_Z012_Z022-008			1500.7	1726.12	47720.49	0	0	0	0	13.83	0.57	1.2
005_2012Dec6_Mt1_ITA4a_Z023_Z033-001			1699.72	1961.74	41457.37	0	0	0	0	11.75	0.7	1.2
005_2012Dec6_Mt1_ITA4a_Z023_Z033-002			2111.02	2281.98	51549.33	****	0	0	0	16.41	0.94	1.71
005_2012Dec6_Mt1_ITA4a_Z023_Z033-005			2598.1	3097.65	38295.98	0	0	0	0	15.14	1.37	1.69
005_2012Dec6_Mt1_ITA4a_Z023_Z033-006			1969.1	2351.09	54536.29	0	0	0	0	25.5	1.64	1.46
005_2012Dec6_Mt1_ITA4a_Z023_Z033-007			2089.3	2340.04	45552.9	****	0	0	0	12.14	0.81	1.019
005_2012Dec6_Mt1_ITA4a_Z023_Z033-010			2136.06	2474.11	52027.73	0	0	0	0	20.93	1.44	2.32
005_2012Dec6_Mt1_ITA4a_Z023_Z033-011			1876.18	2122.2	40338.48	0	0	0	0	12.37	1	1.39
Averages			**2101.39**	**2463.21**	**46780.20**	**0.00**	**0.33**	**0.16**	**0.21**	**14.64**	**1.00**	**1.79**
CAM-10b (n=17)												
017_2012Oct12_CAM10b_Z3			2920.41	3241.98	35854.64	0	0	0	0	6.71	0.54	1.42
018_2012Oct12_CAM10b_Z4			3381.62	3845.71	31869.26	0	9.4	0	0	7.51	0.48	1.44
019_2012Oct12_CAM10b_Z5			2583.82	3011.83	30237.16	0	6.86	0	0	6.19	0.377	1.54
021_2012Oct12_CAM10b_Z7			3068.05	3447.5	34110.58	0	0	0	0	10.35	1.09	3.26
022_2012Oct12_CAM10b_Z8			3793.36	4320.21	32991.03	****	0	0	0	7.84	0.67	1.42

Samples	**[Er]**	**[Tm]**	**Yb**	**Lu**	**Hf178**	**Hg202**	**Tl203**	**Pb204**	**Tl205**	**Pb206**	**Pb207**	**Pb208**
023_2012Oct12_CAM10b_Z9			3708.98	4285.68	33200.34	****	0	0	0	10.25	0.7	2.26
024_2012Oct12_CAM10b_Z10			3025.56	3300.29	28379.78	0	0	0	0	12.79	1.41	4.68
031_2012Oct12_CAM10b_Z11			3804.43	4187.53	32771.04	****	0	0	0	8.48	0.55	4.48
032_2012Oct12_CAM10b_Z12			3556.11	4021.38	33779.53	0	0	0	0	7.38	0.47	1.74
034_2012Oct12_CAM10b_Z14			2559.4	3085.99	32823.7	****	0	0	0	6.27	0.45	1.69
035_2012Oct12_CAM10b_Z15			2686.59	3067.17	33826.15	0	0	0	0	12.46	0.85	3.81
037_2012Oct12_Auto_Stds_CAM10b_Z17_23-002			2748.49	3195.68	30963.53	0	0	0	0	5.34	0.54	1.31
037_2012Oct12_Auto_Stds_CAM10b_Z17_23-003			2252.94	2411.69	34749.98	****	0	0	0	9.1	0.7	2.14
037_2012Oct12_Auto_Stds_CAM10b_Z17_23-012			3273.52	3861.45	33948.23	****	0	0	0	5.7	0.46	1.25
050_2012Oct12_CAM10b_Z24			2586.51	3171.01	31761.07	0	0	2.34	0	3.71	0.3	1.09
054_2012Oct12_Stds_CAM10b_Z28_31-003			4479.29	5061.73	36533.27	****	14.34	0	0	10.41	0.76	2.04
054_2012Oct12_Stds_CAM10b_Z28_31-004			2722.99	2718.15	32540.19	****	0	12.4	62.31	9.73	4.48	3.67
Averages			**3126.59**	**3543.23**	**32961.15**	**0.00**	**1.80**	**0.87**	**3.67**	**8.25**	**0.87**	**2.31**
LRA303 (n=45)												
002_15Oct2012_NIST12_LRA303_Z1-10-004			1967.62	2380.75	46514.91	0	0	0	0	17.14	0.82	1.64
002_15Oct2012_NIST12_LRA303_Z1-10-005			1930.95	2254.59	46652.88	0	0	0	0	21.49	1.59	2.27
002_15Oct2012_NIST12_LRA303_Z1-10-006			2376.14	2819.75	50509.49	0	0	0	0	30.46	2.6	4.06
002_15Oct2012_NIST12_LRA303_Z1-10-011			2181.73	2546.35	53850.73	0	0	1.44	0	24.85	2.07	2.44
002_15Oct2012_NIST12_LRA303_Z1-10-013			2733.85	3159.28	46493.93	0	0	0	0	29.74	1.97	3.03
003_15Oct2012_Stds_LRA303_Z11_17-007			2156.94	2572.5	54120.67	0	0	0	0	21.85	1.56	2.44
003_15Oct2012_Stds_LRA303_Z11_17-008			2871.92	3405.83	52667.84	0	0	0	0	32.11	2.19	3.54
003_15Oct2012_Stds_LRA303_Z11_17-009			1773.62	2298.03	56433.94	****	0	0	0	25.02	1.67	2.61
003_15Oct2012_Stds_LRA303_Z11_17-010			3306.11	3864.41	54964.05	0	0	0	0	27.94	2.14	2.86
003_15Oct2012_Stds_LRA303_Z11_17-012			2953.74	3487.85	52805.11	0	0	0	0	29.05	1.98	3.19
003_15Oct2012_Stds_LRA303_Z11_17-014			1618.66	1935.35	55805.93	0	0	0	0	19.22	1.1	1.57
004_15Oct2012_Stds_LRA303_Z19_26-011			2695.34	3148	51930.96	****	0	0	0	31.07	2.11	3.24
004_15Oct2012_Stds_LRA303_Z19_26-012			3035.49	3436.44	55553.27	0	0	5.25	0	27.66	2.49	3.14
004_15Oct2012_Stds_LRA303_Z19_26-013			2275.37	2650.52	54842.62	0	0	0	4.47	21.77	1.78	2.13
002_16Oct2012_LRA303Small_Z27_37-001			3758.35	4420.31	52301.61	0	0	2.34	0	32.11	2.6	4.25
002_16Oct2012_LRA303Small_Z27_37-005			1731.79	2082.05	53688.86	0	0	0	0	21.39	1.34	2.06
002_16Oct2012_LRA303Small_Z27_37-006			2578.45	2879.9	47411.85	****	0	0	0	17.05	1.69	2.48
002_16Oct2012_LRA303Small_Z27_37-011			3245.37	3462.62	53980.82	0	0	2.47	0	28.11	2.12	3.02
003_16Oct2012_LRA303Small_Z38_49-001			2678.98	3112.41	59952.62	****	0	0	0	27.44	2.38	2.84
003_16Oct2012_LRA303Small_Z38_49-006			3515.41	4295.88	58213.2	0	10.25	0	0	33.27	1.85	3.07
003_16Oct2012_LRA303Small_Z38_49-009			2907.08	3418.41	56611.16	0	0	2.17	0	22.37	2.63	2.71
003_16Oct2012_LRA303Small_Z38_49-010			2851.35	3250.21	52008.14	****	0	1.66	0	25.41	2.05	2.43
003_16Oct2012_LRA303Small_Z38_49-011			2894.32	3417.41	52732.02	0	0	0	0	24.41	1.3	2.43
003_16Oct2012_LRA303Small_Z38_49-012			2669.05	3108.21	58553.15	****	0	2.63	0	26.9	2	3.7
004_16Oct2012_LRA303Small_Z50_61-001			3197.39	3627.19	58699.19	0	0	6.79	0	27.31	2.26	2.87
004_16Oct2012_LRA303Small_Z50_61-004			3067.56	3327.64	55875.62	****	0	0	0	24.15	4.13	6.31
004_16Oct2012_LRA303Small_Z50_61-005			2512.13	3017.05	56212.93	0	0	0	0	25.58	2.1	2.31
004_16Oct2012_LRA303Small_Z50_61-006			2420.73	2829.61	55060.73	0	0	0	0	21.34	1.6	1.93
004_16Oct2012_LRA303Small_Z50_61-007			1366.92	1605.97	52684.71	****	0	0	0	16.46	1.11	1.365
004_16Oct2012_LRA303Small_Z50_61-011			2094.31	2346.45	51396.36	0	0	0	0	24.28	1.73	2.68
004_16Oct2012_LRA303Small_Z50_61-012			3363.89	3500.33	54236.4	****	0	0	0	23.28	2.24	2.94
002_25Oct2012_LRA303Large_Z1_11-001			2973.37	3336.43	45319.77	0	0	0	0	13.62	0.912	1.436
002_25Oct2012_LRA303Large_Z1_11-002			3605.96	3854.79	48085.73	0	0	0	0	31.76	2.12	3.16
002_25Oct2012_LRA303Large_Z1_11-003			2204.13	2526.85	42436.76	0	0	0	0	8.28	0.54	0.91
002_25Oct2012_LRA303Large_Z1_11-006			2914.82	3474.03	57531.63	0	0	0	0	23.98	1.89	2.52
002_25Oct2012_LRA303Large_Z1_11-009			5063.2	5513.83	48240.69	****	0	0	0	31.29	2.06	3.25
003_25Oct2012_LRA303Large_Z12_23-003			976.94	1210.61	42419.59	0	0	0	0	4.43	0.354	0.54

Appendix L: Zircon LA-ICP-MS Elemental Analyses, Camaquã and Itajaí Igneous Units

Samples	**[Er]**	**[Tm]**	**Yb**	**Lu**	**Hf178**	**Hg202**	**Tl203**	**Pb204**	**Tl205**	**Pb206**	**Pb207**	**Pb208**
003_25Oct2012_LRA303Large_Z12_23-006			5887.51	6100.04	47929.22	0	0	1.06	0	50.67	3.35	6.45
003_25Oct2012_LRA303Large_Z12_23-007			2861.72	3167.02	45221.3	0	0	2.72	0	27.51	4.03	5.35
003_25Oct2012_LRA303Large_Z12_23-008			4438.63	4870.56	49568.58	0	0	0	0	24.65	1.65	2.33
003_25Oct2012_LRA303Large_Z12_23-009			4661.46	5054.09	48794.13	****	0	1.12	0	52.21	3.77	6.99
003_25Oct2012_LRA303Large_Z12_23-010			1596.21	1884.6	43112.1	****	0	0	0	9.66	0.609	1.047
003_25Oct2012_LRA303Large_Z12_23-011			4302.81	4649.52	49710.47	****	0	0.88	0	49	3.93	5.93
004_25Oct2012_LRA303Large_Z23_30-002			2360.14	2700.6	45407.58	****	3.01	0	0	13.09	0.913	1.209
004_25Oct2012_LRA303Large_Z23_30-006			6270.64	6861.41	47998.01	0	0	0	0	38.19	2.33	4.09
Averages			**2907.74**	**3308.13**	**51656.47**	**0.00**	**0.29**	**0.68**	**0.10**	**25.75**	**1.99**	**2.95**
CAM-18 (n=27)												
015_2012Oct5_CAM18Large_Z1			1815.72	2239.57	52338.71	0	0	1.56	0	16.99	1.12	1.53
016_2012Oct5_CAM18Large_Z2			2161.57	2608.54	53093.81	0	4.55	0	0	19.66	1.28	1.9
019_2012Oct5_CAM18Large_Z5			1559.24	1890.13	48514.52	0	0	0	0	18.49	1.15	1.544
022_2012Oct5_CAM18Large_Z8			1406.59	1754.79	52306.74	****	0	0	0	19.39	1.41	1.59
028_2012Oct5_CAM18Large_Z11			3162.19	3728.2	52220.75	0	0	1.9	0	31.91	2.02	3.12
029_2012Oct5_CAM18Large_Z12			2662.06	3135.2	56551.47	0	0	0.66	0	24.43	1.69	2.13
031_2012Oct5_CAM18Large_Z14			1792.81	2168.5	47810.25	0	0	0.83	0	12.34	0.65	1.116
017_2012Oct8_CAM18Small_Z2			2279.78	2759.91	51685.63	****	0	0	0	19.01	1.38	1.81
018_2012Oct8_CAM18Small_Z3			3285.87	3829.71	59896.06	****	0	0	0	25.7	1.96	2.61
024_2012Oct8_CAM18Small_Z9			3942.53	4178.25	58182.17	0	0	0	0	29.56	1.58	4.93
017_2012Oct9_CAM18Small_Z14			2682.81	3283.45	57506.38	0	0	0	0	20.79	1.6	2.3
018_2012Oct9_CAM18Small_Z15			2482.4	3088.12	57143.01	0	0	0.89	0	26.54	1.5	2.18
020_2012Oct9_CAM18Small_Z18			3104.28	3625.34	45742.08	0	0	1.45	0	25.78	1.98	3.34
022_2012Oct9_CAM18Small_Z20			1693.02	2036.82	53775.53	0	0	0	0	21.44	1.46	1.788
024_2012Oct9_CAM18Small_Z22			3280.19	3863.41	55458.61	0	0	0	0	33.46	2.4	3.48
025_2012Oct9_CAM18Small_Z23			3992.57	4699.74	52706.73	0	0	0	0	44.17	3.27	5.18
002_2012Oct11_Auto_CAM18Small_Z27_36-002			2396.83	2970.41	55598.99	0	0	0	0	21.73	1.35	2.02
002_2012Oct11_Auto_CAM18Small_Z27_36-003			3515.43	3957.52	52802.08	0	13.79	0	0	35.4	2.55	3.4
002_2012Oct11_Auto_CAM18Small_Z27_36-004			2667.63	3225.77	57284.55	0	0	0	0	27.63	1.93	2.9
002_2012Oct11_Auto_CAM18Small_Z27_36-005			1471.27	1809.14	52571.21	0	5.51	0	0	14.07	1.13	1.17
002_2012Oct11_Auto_CAM18Small_Z27_36-007			2440.72	3059.83	54794.65	0	0	2.68	3.41	31.33	2	2.79
002_2012Oct11_Auto_CAM18Small_Z27_36-008			3054.68	3745.3	56347.6	0	0	1.76	0	29.3	2.14	3.31
002_2012Oct11_Auto_CAM18Small_Z27_36-010			2035.92	2315.91	59807.73	0	0	1.48	0	25.88	1.47	2.55
004_2012Oct11_Auto_CAM18Small_Z37_47-003			2389.75	2909.93	55301.59	0	0	0	0	26.58	1.6	2.43
004_2012Oct11_Auto_CAM18Small_Z37_47-004			2777.07	3175.76	54609.02	0	0	0	0	27.61	1.7	2.54
004_2012Oct11_Auto_CAM18Small_Z37_47-005			3734.34	4248.21	49106.27	0	0	0	4.39	22.21	1.95	2.81
004_2012Oct11_Auto_CAM18Small_Z37_47-011			2869.19	3257.83	55356.62	0	0	0	0	24.5	1.37	2.35
Averages			**2616.91**	**3095.01**	**54018.99**	**0.00**	**0.88**	**0.49**	**0.29**	**25.03**	**1.69**	**2.55**
RAM01A (n=15)												
002_17Oct2012_RAM01ASmalls_Z1_11-002			1008.63	1306.24	39311.3	0	0	0	0	2.93	0	0.25
002_17Oct2012_RAM01ASmalls_Z1_11-003			3012.4	3591.31	47713.97	0	0	0	0	14.17	0.7	1.47
002_17Oct2012_RAM01ASmalls_Z1_11-004			3890.87	4383.5	47344.2	0	0	0	0	23.02	1.5	2.54
002_17Oct2012_RAM01ASmalls_Z1_11-005			4812.11	5461.88	46749.62	0	9.67	0	0	31.27	2.25	3.74
002_17Oct2012_RAM01ASmalls_Z1_11-006			1769.22	2124.33	49938.82	0	0	0	0	16.7	1.02	1.43
002_17Oct2012_RAM01ASmalls_Z1_11-008			1282.86	1633.6	38630.82	0	0	0	0	3.57	0.254	0.457
002_17Oct2012_RAM01ASmalls_Z1_11-010			5073.36	5572.68	46548.45	****	0	0	0	34.51	2.6	4.02
003_17Oct2012_RAM01ASmalls_Z12_22-002			4537.36	5028.6	51603.72	0	0	0	0	46.19	3.14	5.23
003_17Oct2012_RAM01ASmalls_Z12_22-004			1918.06	2320.03	47521.33	****	0	0	0	8.77	0.63	0.929
003_17Oct2012_RAM01ASmalls_Z12_22-008			4741.79	5176.49	50545.39	****	0	0	0	23.16	1.71	2.4
003_17Oct2012_RAM01ASmalls_Z12_22-011			6903.05	7189.74	50050.7	****	0	0	0	36.59	2.4	4

Samples	[Er]	[Tm]	Yb	Lu	Hf178	Hg202	Tl203	Pb204	Tl205	Pb206	Pb207	Pb208
002_26Oct2012_RMA01Large_Z1_8-001			2029.63	2359.4	53517.4	<****	0	0	0	20.18	1.3	1.94
002_26Oct2012_RMA01Large_Z1_8-003			2791.82	3302.57	51004.82	<****	0	0	0	30.54	2.34	4.76
002_26Oct2012_RMA01Large_Z1_8-005			2797.23	3192.37	52805.97	<****	0	0	0	25.48	1.79	2.65
002_26Oct2012_RMA01Large_Z1_8-007			1496.94	1835.15	53957.95	<****	0	0	0	21.36	1.38	1.514
Averages			**3204.36**	**3631.86**	**48482.96**	**0.00**	**0.64**	**0.00**	**0.00**	**22.56**	**1.53**	**2.49**
ITA-8 (n=38)												
002_18Oct2012_ITA-8_Z1_11-001			2335.9	2922.93	38808.51	0	0	0	0	5.78	0.3	0.979
002_18Oct2012_ITA-8_Z1_11-002			2212.72	2831.26	41902.39	****	0	0	0	7.3	0.63	1.127
002_18Oct2012_ITA-8_Z1_11-003			2079.41	2622	41743.7	****	0	0	0	5.66	0.26	0.879
002_18Oct2012_ITA-8_Z1_11-007			1177.12	1559.19	40022.44	****	0	0	0	3.35	0	0.315
002_18Oct2012_ITA-8_Z1_11-008			1824.07	2247.08	39082.04	0	0	0	0	6.13	0.621	0.775
002_18Oct2012_ITA-8_Z1_11-009			1592.03	2061.1	40176.66	****	0	0	0	6.13	0.45	0.822
002_18Oct2012_ITA-8_Z1_11-010			2298.35	2867.07	41017.55	0	0	0	0	6.5	0.49	0.813
002_18Oct2012_ITA-8_Z1_11-011			2003.11	2625.71	38665.07	0	0	0	0	5.72	0.57	0.943
003_18Oct2012_ITA-8_Z12_22-003			1967.09	2470.39	39043.86	0	0	0	0	4.71	0.434	0.713
003_18Oct2012_ITA-8_Z12_22-004			1734.66	2157.2	39848.91	0	0	0	0	6.11	0.42	0.877
003_18Oct2012_ITA-8_Z12_22-006			2294.45	2888.44	40500.28	0	0	0	0	6.88	0.25	0.821
003_18Oct2012_ITA-8_Z12_22-007			1642.18	2093.61	40737.13	****	0	278.9	0	297.94	300.7	299
003_18Oct2012_ITA-8_Z12_22-008			1674.48	2204.98	41422.35	****	0	0	0	4.65	0.53	0.76
003_18Oct2012_ITA-8_Z12_22-011			1821.7	2345.62	39862.13	0	0	0	0	6.19	0.5	0.791
004_18Oct2012_ITA-8_Z23_30-002			1893.44	2428.81	43391.22	****	9.59	0	0	4.54	0	0.62
004_18Oct2012_ITA-8_Z23_30-003			1785.69	2238	40864.28	****	0	0	0	5.66	0.34	0.587
004_18Oct2012_ITA-8_Z23_30-006			1999.07	2730.51	43772.07	****	7.26	0	0	5.81	0.38	0.73
002_24Oct2012_ITA8Large_Z1_11-001			1785.05	2287.72	40570.55	0	0	0	0	4.68	0.448	0.683
002_24Oct2012_ITA8Large_Z1_11-002			2295.87	2850.57	41854.25	****	0	0	0	7.84	0.66	1.23
002_24Oct2012_ITA8Large_Z1_11-003			946.35	1221.95	41411.59	****	0	0	0	4.07	0.3	0.418
002_24Oct2012_ITA8Large_Z1_11-004			2092.28	2519.26	39573.62	0	0	2.39	0	6.31	0.68	1.38
002_24Oct2012_ITA8Large_Z1_11-007			1349.5	1717.04	39407.25	0	0	0	0	4.48	0.239	0.428
002_24Oct2012_ITA8Large_Z1_11-008			1140.92	1517.37	43516.46	0	0	0	0	4.36	0.34	0.374
002_24Oct2012_ITA8Large_Z1_11-009			2540.18	3130.63	48502.69	0	0	0	0	11.82	0.73	1.531
002_24Oct2012_ITA8Large_Z1_11-010			1896.76	2400.68	41434.55	0	0	0	0	6.13	0.31	0.547
002_24Oct2012_ITA8Large_Z1_11-011			1900.39	2351.88	43487.75	****	0	0	0	4.82	0.261	0.79
003_24Oct2012_ITA8Large_Z12_23-002			1849.71	2405.54	42102.87	0	0	0	0	7.24	0.54	0.549
003_24Oct2012_ITA8Large_Z12_23-007			1484.59	1957.19	42288.91	****	0	0	0	4.31	0.35	0.541
003_24Oct2012_ITA8Large_Z12_23-008			1856.66	2363.35	44498.91	****	0	0	0	4.85	0.192	0.706
003_24Oct2012_ITA8Large_Z12_23-009			2027.5	2387.41	43312.86	0	0	0	0	9.54	0.88	1.44
004_24Oct2012_ITA8Large_Z24_35-001			2465.97	3068.13	43336.84	0	0	0	0	8.21	0.456	1.371
004_24Oct2012_ITA8Large_Z24_35-002			1602.62	2073.98	42969.93	0	0	0	0	7.86	0.66	1.017
004_24Oct2012_ITA8Large_Z24_35-003			2109.21	2556.4	43316.82	****	0	0	0	7.58	0.55	0.775
004_24Oct2012_ITA8Large_Z24_35-005			2300.61	2817.18	45490.25	0	0	0	0	6.35	0.5	0.814
004_24Oct2012_ITA8Large_Z24_35-006			1615.33	2007.71	44765.18	0	0	0	0	4.94	0.32	0.506
004_24Oct2012_ITA8Large_Z24_35-009			2229.19	2726.66	48965.12	0	0	0	0	6.08	0.29	0.85
004_24Oct2012_ITA8Large_Z24_35-010			1987.04	2461.69	45470.79	0	0	0	0	6.14	0.47	0.87
004_24Oct2012_ITA8Large_Z24_35-011			2057.53	2558.24	42217.5	****	0	0	0	7.84	0.88	1.25
Averages			**1891.28**	**2386.17**	**42088.30**	**0.00**	**0.44**	**7.40**	**0.00**	**13.80**	**8.34**	**8.67**

Appendix L: Zircon LA-ICP-MS Elemental Analyses, Camaquã and Itajaí Igneous Units

Samples	Th232	U235	U238
CAM-1 (n=5)			
028_2011Nov2_Mt2_CAM1_Z46	4365.13	86675	27956.67
002_2012Dec4_Mt1_CAM1_Z001_011-003	8680.42	95415.13	27587.37
002_2012Dec4_Mt1_CAM1_Z001_011-007	5698.31	69815.24	23564.44
002_2012Dec4_Mt1_CAM1_Z001_011-011	4725.23	100921.55	35319.6
002_2012Dec6_Mt1_CAM1_Z047_053-005	16813.31	297081.25	94955.54
Averages	**8056.48**	**129981.63**	**41876.72**
CAM-2 (n = 43)			
014_Mt2_CAM2_Z2	34977.59	663379.44	235508.52
015_Mt2_CAM2_Z3	10848.04	153566.06	63890.02
017_Mt2_CAM2_Z5	11872.8	161434.36	63039.7
018_Mt2_CAM2_Z6	2037.82	23825.89	7462.21
020_Mt2_CAM2_Z8	17117.85	189579.2	62998.47
021_Mt2_CAM2_Z9	1408.36	18830.3	6048.23
022_Mt2_CAM2_Z10	1694.17	17390.33	8074.77
029_2012Apr21_Mt2_CAM2_Z16	2243.4	23113.43	10417.67
015_2012Apr20_Mt2_CAM2_Z20	26481.8	331405.41	123160.48
016_2012Apr20_Mt2_CAM2_Z21	16590.86	161464.61	60592.69
017_2012Apr20_Mt2_CAM2_Z22	3881.07	85302.45	29738.93
018_2012Apr20_Mt2_CAM2_Z23	723.05	20385.5	4443.52
019_2012Apr20_Mt2_CAM2_Z24	8622.5	128527.09	39699.94
020_2012Apr20_Mt2_CAM2_Z25	15862.25	273482.09	88345.58
021_2012Apr20_Mt2_CAM2_Z26	1990.48	25539.07	8028.79
028_2012Apr20_Mt2_CAM2_Z30	19986.67	225093.17	79326.7
032_2012Apr20_Mt2_CAM2_Z34	1076.83	9519.16	4903.14
033_2012Apr20_Mt2_CAM2_Z345	1427.28	24899.35	7482.43
002_2012Nov30_Mt1_CAM2_Z2_12-002	7667.22	80584.55	24683.09
002_2012Nov30_Mt1_CAM2_Z2_12-006	3739.35	62407.41	17268.97
002_2012Nov30_Mt1_CAM2_Z2_12-007	1893.7	34194	11594.24
002_2012Nov30_Mt1_CAM2_Z2_12-010	9724.35	232039.48	68322.03
003_2012Nov30_Mt1_CAM2_Z13_22-001	3023.24	61719.3	15298.02
003_2012Nov30_Mt1_CAM2_Z13_22-002	6814.63	80971.76	28596.21
003_2012Nov30_Mt1_CAM2_Z13_22-003	7327.62	96532.42	30455.6
003_2012Nov30_Mt1_CAM2_Z13_22-004	4963.7	115017.13	30501.19
003_2012Nov30_Mt1_CAM2_Z13_22-005	3479.24	74491.78	17166.22
003_2012Nov30_Mt1_CAM2_Z13_22-007	3045.03	49799.52	17880.51
003_2012Nov30_Mt1_CAM2_Z13_22-008	12372.3	265294.44	78401.13
004_2012Nov30_Mt1_CAM2_Z23_33-006	7282.37	146068.2	44016.13
004_2012Nov30_Mt1_CAM2_Z23_33-007	4749.7	99823.1	28025.38
004_2012Nov30_Mt1_CAM2_Z23_33-009	8648.5	141569.61	46617.9
004_2012Nov30_Mt1_CAM2_Z23_33-011	23668.13	107340.65	36636.27
002_2012Dec3_CAM2_Z034_044-001	4588.6	174938.25	53368.14
002_2012Dec3_CAM2_Z034_044-002	4027.63	75829.01	22647.13
002_2012Dec3_CAM2_Z034_044-003	19979.74	158538.98	52186.51
002_2012Dec3_CAM2_Z034_044-004	2538.39	61271.31	15657.71
002_2012Dec3_CAM2_Z034_044-005	7118.79	107464.71	32834.02
002_2012Dec3_CAM2_Z034_044-008	10808.22	122048.93	39973.07
002_2012Dec3_CAM2_Z034_044-009	7558.45	163052.88	50265.66
002_2012Dec3_CAM2_Z034_044-010	3824.5	98584.82	31175.46
003_2012Dec3_CAM2_Z045_055-006	9854.77	193031.66	68082.38
003_2012Dec3_CAM2_Z045_055-007	5695.76	79804.74	26345.58

Appendix L: Zircon LA-ICP-MS Elemental Analyses, Camaquã and Itajaí Igneous Units

Samples	**Th232**	**U235**	**U238**
Averages	**8447.37**	**126026.87**	**41654.89**
CAM-4 (n = 25)			
052_2011Oct26_Mt2_CAM4_Z12	9108.27	81086.77	24417.63
025_2011Oct27_Mt2_CAM4_Z26	9351.04	123838.77	39248.96
010_2012June15_CAM4_Mt1_Z10	11247.72	106509.34	31346.36
018_2012June15_CAM4_Mt1_Z3	24623.21	525173.31	161736.69
020_2012June15_CAM4_Mt1_Z5	17561.23	246354.17	76759.78
021_2012June15_CAM4_Mt1_Z6	8121.26	114396.39	43587.48
022_2012June15_CAM4_Mt1_Z7	4451.1	46755.68	18894.97
024_2012June15_CAM4_Mt1_Z9	6156.55	39762.03	16753.26
016_2012June18_CAM4_Mt1_Z12	5963.73	49445.8	15876.13
019_2012June18_CAM4_Mt1_Z15	5063.13	55050.13	20650.31
020_2012June18_CAM4_Mt1_Z16	4348.47	36669.27	13472.77
021_2012June18_CAM4_Mt1_Z17	13035.79	172961.83	62808.14
024_2012June18_CAM4_Mt1_Z20	9518.07	124746.2	43571.63
033_2012June18_CAM4_Mt1_Z23	7669.91	83578.68	31928
039_2012June18_CAM4_Mt1_Z29	23675.61	248476.98	86526.16
040_2012June18_CAM4_Mt1_Z30	11249.28	98288.54	37232.31
042_2012June18_CAM4_Mt1_Z32	5730.05	51937.78	17916.98
043_2012June18_CAM4_Mt1_Z33	2048.27	27510.08	10489.51
015_2012June20_CAM4_Mt1_Z36	7940.19	128621.68	28819.83
016_2012June20_CAM4_Mt1_Z37	7292.38	145094.92	43727.57
018_2012June20_CAM4_Mt1_Z39	7183.07	127021.3	39851.36
021_2012June20_CAM4_Mt1_Z42	8577.63	92362.07	37949.75
022_2012June20_CAM4_Mt1_Z43	10906.3	165963.45	57460.99
023_2012June20_CAM4_Mt1_Z44	5034.5	80505.44	18879.48
025_2012June20_CAM4_Mt1_Z46	8203.1	246621.2	56749.85
Averages	**9362.39**	**128749.27**	**41466.24**
CAM-11 (n=52)			
015_2011Nov4_Mt2_CAM11_Z1	3772.01	118473.55	40666.51
016_2011Nov4_Mt2_CAM11_Z2	7212.76	234148.28	79997.73
017_2011Nov4_Mt2_CAM11_Z3	5361.52	157024.02	52229.37
018_2011Nov4_Mt2_CAM11_Z4	5163.88	134438.56	46605.5
020_2011Nov4_Mt2_CAM11_Z6	6066.67	170621.13	59263.79
021_2011Nov4_Mt2_CAM11_Z7	10421.42	304384.28	108022.85
024_2011Nov4_Mt2_CAM11_Z10	4606.68	142547.77	49614.32
026_2011Nov4_Mt2_CAM11_Z12	5137.43	143292.52	48812.72
015_2011Nov10_Mt2_CAM11_Z13	6546.42	219205.45	74994.04
016_2011Nov10_Mt2_CAM11_Z14	5767.66	164799.52	54643.34
017_2011Nov10_Mt2_CAM11_Z15	5376.64	158824.53	48000.53
018_2011Nov10_Mt2_CAM11_Z16	6227.49	160925.13	52022.91
019_2011Nov10_Mt2_CAM11_Z17	5835.89	147397.36	49561.63
023_2011Nov10_Mt2_CAM11_Z21	6252.01	158032.66	55412.14
024_2011Nov10_Mt2_CAM11_Z22	17055.54	247504.23	73960.45
031_2011Nov10_Mt2_CAM11_Z23	3431.64	103805.02	35864.5
032_2011Nov10_Mt2_CAM11_Z24	4578.42	129365.89	43005.19
034_2011Nov10_Mt2_CAM11_Z26	4142.41	133143.69	44334.3
035_2011Nov10_Mt2_CAM11_Z27	6756.22	157549.05	50658.02
038_2011Nov10_Mt2_CAM11_Z30	3200.67	109455.95	33812.53
039_2011Nov10_Mt2_CAM11_Z31	7401.32	239794.06	80332.46

Samples	**Th232**	**U235**	**U238**
048_2011Nov10_Mt2_CAM11_Z33	5978.05	152787.44	50383.32
049_2011Nov10_Mt2_CAM11_Z34	5883.61	176892.64	58605.6
050_2011Nov10_Mt2_CAM11_Z35	8030.09	183475.91	60752.11
052_2011Nov10_Mt2_CAM11_Z37	6828.4	168635.3	55710.29
053_2011Nov10_Mt2_CAM11_Z38	7959.42	235981.45	74667.94
054_2011Nov10_Mt2_CAM11_Z39	4399.08	175010.92	54179.74
055_2011Nov10_Mt2_CAM11_Z40	5867.96	155561.45	52776.99
056_2011Nov10_Mt2_CAM11_Z41	4560.13	129063.88	44081.71
016_2011Nov11_Mt2_CAM11_Z44	6027.83	153844.52	49472.95
017_2011Nov11_Mt2_CAM11_Z45	3409.31	126265.91	38323.15
018_2011Nov11_Mt2_CAM11_Z46	7046.08	210489.2	67822.77
020_2011Nov11_Mt2_CAM11_Z48	4254.78	126827.51	41177.21
021_2011Nov11_Mt2_CAM11_Z49	6915.5	257284.7	81966.56
022_2011Nov11_Mt2_CAM11_Z50	4545.03	142276.48	44573.68
026_2011Nov11_Mt2_CAM11_Z52	4585.3	157903.19	54459.96
027_2011Nov11_Mt2_CAM11_Z53	7370.02	260205.64	85179.73
015_2011Nov15_Mt2_CAM11_Z55	4690.49	132779.61	44403.26
016_2011Nov15_Mt2_CAM11_Z56	6608.4	232751.16	75502.07
017_2011Nov15_Mt2_CAM11_Z57	3705.44	128238.43	41677.93
020_2011Nov15_Mt2_CAM11_Z60	5239.71	179729.41	62795.4
021_2011Nov15_Mt2_CAM11_Z61	4452.73	140172.98	43911.14
022_2011Nov15_Mt2_CAM11_Z62	4107.52	151095.67	46920.64
023_2011Nov15_Mt2_CAM11_Z63	7064.99	161393.89	55468.52
018_2011Nov17_Mt2_CAM11_Z68	7409.73	239130.72	81210.76
019_2011Nov17_Mt2_CAM11_Z69	5847.77	170316.45	58210.84
020_2011Nov17_Mt2_CAM11_Z70	6895.6	155948.58	54934.34
021_2011Nov17_Mt2_CAM11_Z71	4483.66	151873.23	51086.35
022_2011Nov17_Mt2_CAM11_Z72	4634.99	193212.14	59298.16
029_2011Nov17_Mt2_CAM11_Z74	4486.86	139275.25	48095.38
031_2011Nov17_Mt2_CAM11_Z76	4288.37	126380.26	40459.29
032_2011Nov17_Mt2_CAM11_Z77	9506.18	221016.66	72238.8
Averages	**5911.49**	**170587.56**	**56387.72**
ITA-4a (n=62)			
014_2012May7_Mt2_ITA4a_Z1	1673.06	36243.54	10413.18
015_2012May7_Mt2_ITA4a_Z2	1885.97	36810.79	8893.34
016_2012May7_Mt2_ITA4a_Z4	3580.04	64607.42	16973.03
020_2012May7_Mt2_TA4a_Z5	2027.06	31039.51	11991.79
024_2012May7_Mt2_ITA4a_Z10	4901.45	66138.59	15686.84
025_2012May7_Mt2_ITA4a_Z11	2495.25	58544.72	16843.89
026_2012May7_Mt2_ITA4a_Z12	2704.39	54012.19	13925.63
027_2012May7_Mt2_ITA4a_Z13	6797.9	72411.73	21920.84
033_2012May7_Mt2_ITA4a_Z15	1444.25	46865.18	8717.53
034_2012May7_Mt2_ITA4a_Z16	2933.56	52932.58	15649.1
036_2012May7_Mt2_ITA4a_Z18	1945.42	12593.45	3435.17
037_2012May7_Mt2_ITA4a_Z19	2323.6	41081.03	9855.03
038_2012May7_Mt2_ITA4a_Z20	6660.05	83834.55	24173.75
039_2012May7_Mt2_ITA4a_Z21	4192.37	98556.89	26531.4
040_2012May7_Mt2_ITA4a_Z23	4105.87	32478.31	9632.8
041_2012May7_Mt2_ITA4a_Z24	4806.39	60587.57	18712.6
047_2012May7_Mt2_ITA4a_Z26	5754.16	66562.79	14968.08
048_2012May7_Mt2_ITA4a_Z27	3594.45	53550.02	15094.62

Appendix L: Zircon LA-ICP-MS Elemental Analyses, Camaquã and Itajaí Igneous Units

Samples	Th232	U235	U238
049_2012May7_Mt2_ITA4a_Z28	1160.8	21659.91	5344.3
052_2012May7_Mt2_ITA4a_Z31	6043.32	66385.17	15894.72
053_2012May7_Mt2_ITA4a_Z32	2330.18	29092.96	10955.94
054_2012May7_Mt2_ITA4a_Z33	2303.37	49482.34	11372.73
055_2012May7_Mt2_ITA4a_Z34	2991.79	63629.35	14321.04
056_2012May7_Mt2_ITA4a_Z35	1372.48	21614.2	4073.98
015_2012May8_Mt2_ITA4a_Z36	3099.67	41070.48	11986.68
016_2012May8_Mt2_ITA4a_Z37	2069.57	44385.17	12906.04
017_2012May8_Mt2_ITA4a_Z38	1657.28	28483.11	7579.35
018_2012May8_Mt2_ITA4a_Z39	2322.25	46197.51	8732.62
019_2012May8_Mt2_ITA4a_Z40	1304.9	20664.4	5724.05
021_2012May8_Mt2_ITA4a_Z42	2568.67	38929.34	13724.78
022_2012May8_Mt2_ITA4a_Z43	6981.75	34442.02	11807.21
023_2012May8_Mt2_ITA4a_Z44	4273.32	57613.28	14883.37
030_2012May8_Mt2_ITA4a_Z48	4721.87	58640.58	17758.45
031_2012May8_Mt2_ITA4a_Z49	3664.04	45580.51	12656.57
032_2012May8_Mt2_ITA4a_Z50	1851.34	39943.51	10371.55
034_2012May8_Mt2_ITA4a_Z52	2036.44	44808.8	12599.94
035_2012May8_Mt2_ITA4a_Z53	2131.51	34616.53	12920.95
036_2012May8_Mt2_ITA4a_Z54	3499.41	49814.19	16309.84
003_2012Dec6_Mt1_ITA4a_Z001_Z011-001	2728.01	43238.16	12876.2
003_2012Dec6_Mt1_ITA4a_Z001_Z011-003	6042.96	69278.62	18344.99
003_2012Dec6_Mt1_ITA4a_Z001_Z011-004	3141.6	46500.88	11725.07
003_2012Dec6_Mt1_ITA4a_Z001_Z011-005	1391.91	21941.18	4752
003_2012Dec6_Mt1_ITA4a_Z001_Z011-006	4092.19	35126.06	10006.36
003_2012Dec6_Mt1_ITA4a_Z001_Z011-008	2405.55	23144.89	8482.69
003_2012Dec6_Mt1_ITA4a_Z001_Z011-009	3071.56	46774.37	14064.72
003_2012Dec6_Mt1_ITA4a_Z001_Z011-010	4072.21	85750.99	25679.15
003_2012Dec6_Mt1_ITA4a_Z001_Z011-011	2553.99	52832.09	15490.96
004_2012Dec6_Mt1_ITA4a_Z012_Z022-001	2857.76	52198.51	15829.15
004_2012Dec6_Mt1_ITA4a_Z012_Z022-002	6143.21	51645.89	15126.25
004_2012Dec6_Mt1_ITA4a_Z012_Z022-003	2657.82	41332.11	14931.75
004_2012Dec6_Mt1_ITA4a_Z012_Z022-004	5010.98	62012.33	21788.22
004_2012Dec6_Mt1_ITA4a_Z012_Z022-005	5810.07	58535.34	21557.04
004_2012Dec6_Mt1_ITA4a_Z012_Z022-006	1975.42	30066.66	8837.95
004_2012Dec6_Mt1_ITA4a_Z012_Z022-007	2180.93	34097.67	11752.01
004_2012Dec6_Mt1_ITA4a_Z012_Z022-008	1978.53	38552.11	11689.08
005_2012Dec6_Mt1_ITA4a_Z023_Z033-001	2217.35	40084.36	11832.53
005_2012Dec6_Mt1_ITA4a_Z023_Z033-002	2361.34	50672.53	14808.34
005_2012Dec6_Mt1_ITA4a_Z023_Z033-005	3425.29	36634.01	14035.11
005_2012Dec6_Mt1_ITA4a_Z023_Z033-006	3634.48	89705.81	23832.31
005_2012Dec6_Mt1_ITA4a_Z023_Z033-007	1809.44	31843.84	10871.23
005_2012Dec6_Mt1_ITA4a_Z023_Z033-010	3471.13	62253.04	18684.56
005_2012Dec6_Mt1_ITA4a_Z023_Z033-011	2161.91	25213.26	11212.15
Averages	**3216.21**	**47344.18**	**13605.69**
CAM-10b (n=17)			
017_2012Oct12_CAM10b_Z3	2220.43	17109.68	6006.08
018_2012Oct12_CAM10b_Z4	2598.75	26559.15	6564.36
019_2012Oct12_CAM10b_Z5	2458.22	17948.72	5124.6
021_2012Oct12_CAM10b_Z7	4570.98	34123.21	8562.62
022_2012Oct12_CAM10b_Z8	2829.85	17178.47	6554.39

Samples	Th232	U235	U238
023_2012Oct12_CAM10b_Z9	4006.01	29263.01	8969.5
024_2012Oct12_CAM10b_Z10	8446.38	37463.37	11259.68
031_2012Oct12_CAM10b_Z11	7088.01	26476.4	7260.35
032_2012Oct12_CAM10b_Z12	2692.82	15377.01	6845.6
034_2012Oct12_CAM10b_Z14	2866.06	15416.94	5543.54
035_2012Oct12_CAM10b_Z15	6132.75	24818.78	10483.58
037_2012Oct12_Auto_Stds_CAM10b_Z17_23-002	2234.59	13817.27	4761.65
037_2012Oct12_Auto_Stds_CAM10b_Z17_23-003	3421.45	19003.9	7677.11
037_2012Oct12_Auto_Stds_CAM10b_Z17_23-012	2235.34	24688.93	5353.54
050_2012Oct12_CAM10b_Z24	1607.71	13731.61	3592.67
054_2012Oct12_Stds_CAM10b_Z28_31-003	3750.42	41824.15	10310.25
054_2012Oct12_Stds_CAM10b_Z28_31-004	2067.48	0	14483.56
Averages	**3601.60**	**22047.09**	**7609.00**
LRA303 (n=45)			
002_15Oct2012_NIST12_LRA303_Z1-10-004	2644.45	47757.13	15167.49
002_15Oct2012_NIST12_LRA303_Z1-10-005	3589.39	52246.42	17312.7
002_15Oct2012_NIST12_LRA303_Z1-10-006	6516.94	72285.25	24649.68
002_15Oct2012_NIST12_LRA303_Z1-10-011	4205.33	66610.97	21351.1
002_15Oct2012_NIST12_LRA303_Z1-10-013	5207.88	75203.38	25055.28
003_15Oct2012_Stds_LRA303_Z11_17-007	3777.37	59672.77	19790.28
003_15Oct2012_Stds_LRA303_Z11_17-008	5475.94	79525.81	27824.98
003_15Oct2012_Stds_LRA303_Z11_17-009	4131.47	72745.69	22011.12
003_15Oct2012_Stds_LRA303_Z11_17-010	5286.4	78389.68	24784.16
003_15Oct2012_Stds_LRA303_Z11_17-012	5729.2	74307.45	25593.73
003_15Oct2012_Stds_LRA303_Z11_17-014	2671.41	51272.35	17580.2
004_15Oct2012_Stds_LRA303_Z19_26-011	5934.6	81406.74	27877.71
004_15Oct2012_Stds_LRA303_Z19_26-012	5727.33	76165.6	23154.48
004_15Oct2012_Stds_LRA303_Z19_26-013	3718.62	72606.41	20373.16
002_16Oct2012_LRA303Small_Z27_37-001	6807.8	106004.83	30119.84
002_16Oct2012_LRA303Small_Z27_37-005	3590.72	64187.19	19700.47
002_16Oct2012_LRA303Small_Z27_37-006	3746.91	47694.94	14633.7
002_16Oct2012_LRA303Small_Z27_37-011	4784.91	63289.86	23972.04
003_16Oct2012_LRA303Small_Z38_49-001	4601.94	80027.32	24829.01
003_16Oct2012_LRA303Small_Z38_49-006	5872.91	106985.29	29779.3
003_16Oct2012_LRA303Small_Z38_49-009	4690.99	81271.89	19352.45
003_16Oct2012_LRA303Small_Z38_49-010	4181.77	79344.84	21434.23
003_16Oct2012_LRA303Small_Z38_49-011	4777.21	67208.63	22911.52
003_16Oct2012_LRA303Small_Z38_49-012	5772.09	73803.41	25724.78
004_16Oct2012_LRA303Small_Z50_61-001	5390.91	86314.27	25386.73
004_16Oct2012_LRA303Small_Z50_61-004	6063.8	60902.19	17855.26
004_16Oct2012_LRA303Small_Z50_61-005	4249.3	66927.29	22210.71
004_16Oct2012_LRA303Small_Z50_61-006	3708.71	53746.54	17916.79
004_16Oct2012_LRA303Small_Z50_61-007	2251.11	46617.51	14675.49
004_16Oct2012_LRA303Small_Z50_61-011	3853.81	54457.13	20456.03
004_16Oct2012_LRA303Small_Z50_61-012	5112.65	62643.48	20856.2
002_25Oct2012_LRA303Large_Z1_11-001	2339.61	37329.67	12479.02
002_25Oct2012_LRA303Large_Z1_11-002	5943.07	98915.84	30276.92
002_25Oct2012_LRA303Large_Z1_11-003	1573.81	23895.57	7840.52
002_25Oct2012_LRA303Large_Z1_11-006	4557.48	64441.36	23630.43
002_25Oct2012_LRA303Large_Z1_11-009	5321.37	91365.69	29350.02
003_25Oct2012_LRA303Large_Z12_23-003	628.37	10279.72	4062.72

Appendix L: Zircon LA-ICP-MS Elemental Analyses, Camaquã and Itajaí Igneous Units

Samples	Th232	U235	U238
003_25Oct2012_LRA303Large_Z12_23-006	11140.86	139536.5	49133.98
003_25Oct2012_LRA303Large_Z12_23-007	4457.51	65374.19	22080.14
003_25Oct2012_LRA303Large_Z12_23-008	4272.3	65693.11	22940.63
003_25Oct2012_LRA303Large_Z12_23-009	11297.1	154336.36	47730.74
003_25Oct2012_LRA303Large_Z12_23-010	1809.8	27673.28	8846.35
003_25Oct2012_LRA303Large_Z12_23-011	10273.85	121494.7	44012.01
004_25Oct2012_LRA303Large_Z23_30-002	2076.27	34061.26	11826.62
004_25Oct2012_LRA303Large_Z23_30-006	7009.97	89884.42	33906.07
Averages	**4817.23**	**70797.87**	**22943.48**
CAM-18 (n=27)			
015_2012Oct5_CAM18Large_Z1	2676.34	42931.24	14581.78
016_2012Oct5_CAM18Large_Z2	3290.05	44024.55	17016.88
019_2012Oct5_CAM18Large_Z5	2372.13	38302.63	15340.44
022_2012Oct5_CAM18Large_Z8	2594.39	57518.09	16992.18
028_2012Oct5_CAM18Large_Z11	5139.13	82922.85	27401.7
029_2012Oct5_CAM18Large_Z12	3874.75	67791.28	21666.06
031_2012Oct5_CAM18Large_Z14	1948.19	31173.09	10744.68
017_2012Oct8_CAM18Small_Z2	3230.89	53587.67	17166.51
018_2012Oct8_CAM18Small_Z3	4829.47	76818.12	25505.52
024_2012Oct8_CAM18Small_Z9	6333.66	102420.05	26507.64
017_2012Oct9_CAM18Small_Z14	3632.07	66003.03	19816.27
018_2012Oct9_CAM18Small_Z15	4106.62	81328.07	23679.43
020_2012Oct9_CAM18Small_Z18	4610.81	64119.96	21046.76
022_2012Oct9_CAM18Small_Z20	3111.1	55777.41	18511.09
024_2012Oct9_CAM18Small_Z22	5814.74	81862.53	29811.08
025_2012Oct9_CAM18Small_Z23	8648.03	105604.16	39480.95
002_2012Oct11_Auto_CAM18Small_Z27_36-002	3608.88	57031.79	20075.73
002_2012Oct11_Auto_CAM18Small_Z27_36-003	5442.62	50740.55	27568.51
002_2012Oct11_Auto_CAM18Small_Z27_36-004	5138.55	65302.46	24888.43
002_2012Oct11_Auto_CAM18Small_Z27_36-005	1851.23	28997.85	12265.43
002_2012Oct11_Auto_CAM18Small_Z27_36-007	4470.14	40996.46	24424.74
002_2012Oct11_Auto_CAM18Small_Z27_36-008	5007.92	80809	25246.29
002_2012Oct11_Auto_CAM18Small_Z27_36-010	4229.34	59360.13	23671.42
004_2012Oct11_Auto_CAM18Small_Z37_47-003	4087.94	71982.97	23850.54
004_2012Oct11_Auto_CAM18Small_Z37_47-004	3859.82	54754.39	20947.85
004_2012Oct11_Auto_CAM18Small_Z37_47-005	4336.29	53297.64	20387.97
004_2012Oct11_Auto_CAM18Small_Z37_47-011	3646.01	61063.77	19713.84
Averages	**4144.12**	**62093.40**	**21789.25**
RAM01A (n=15)			
002_17Oct2012_RAM01ASmalls_Z1_11-002	578.62	8419.84	2624.03
002_17Oct2012_RAM01ASmalls_Z1_11-003	2981.99	43084.36	14004.76
002_17Oct2012_RAM01ASmalls_Z1_11-004	4362	61862.25	20380.15
002_17Oct2012_RAM01ASmalls_Z1_11-005	6052.53	84134.09	27964.44
002_17Oct2012_RAM01ASmalls_Z1_11-006	2596.16	46033.26	13983.38
002_17Oct2012_RAM01ASmalls_Z1_11-008	772.71	10973.95	3330.72
002_17Oct2012_RAM01ASmalls_Z1_11-010	6149.86	113251.98	29339.94
003_17Oct2012_RAM01ASmalls_Z12_22-002	9788.09	135876.64	43219.75
003_17Oct2012_RAM01ASmalls_Z12_22-004	1516.17	22272.88	8429.09
003_17Oct2012_RAM01ASmalls_Z12_22-008	4244.01	57255.89	20591.66
003_17Oct2012_RAM01ASmalls_Z12_22-011	7456.03	115961.3	35691.12

Samples	**Th232**	**U235**	**U238**
002_26Oct2012_RMA01Large_Z1_8-001	2929.96	45773.72	16860.3
002_26Oct2012_RMA01Large_Z1_8-003	7327.43	82836.76	25150.97
002_26Oct2012_RMA01Large_Z1_8-005	4095.36	52139.63	21969.07
002_26Oct2012_RMA01Large_Z1_8-007	2708.08	54716.46	17957.38
Averages	**4237.27**	**62306.20**	**20099.78**
ITA-8 (n=38)			
002_18Oct2012_ITA-8_Z1_11-001	1641.77	16679.55	5162.77
002_18Oct2012_ITA-8_Z1_11-002	2029.14	19471.12	6899.91
002_18Oct2012_ITA-8_Z1_11-003	1458.37	13064.97	5026.14
002_18Oct2012_ITA-8_Z1_11-007	616.62	9133.43	3284.63
002_18Oct2012_ITA-8_Z1_11-008	1385.48	11954.99	5190.52
002_18Oct2012_ITA-8_Z1_11-009	1328.18	17041.56	5092.05
002_18Oct2012_ITA-8_Z1_11-010	1691.89	14643.64	6327.87
002_18Oct2012_ITA-8_Z1_11-011	1227.37	11660.81	4796.13
003_18Oct2012_ITA-8_Z12_22-003	1235.12	14393.66	4231.67
003_18Oct2012_ITA-8_Z12_22-004	1472.72	9713.46	5066.32
003_18Oct2012_ITA-8_Z12_22-006	1631.25	6415.2	5905.96
003_18Oct2012_ITA-8_Z12_22-007	1048.9	23317.88	8639.26
003_18Oct2012_ITA-8_Z12_22-008	1054.32	16940.23	3939.56
003_18Oct2012_ITA-8_Z12_22-011	1260.01	16585.31	6149.68
004_18Oct2012_ITA-8_Z23_30-002	1226.45	17637.76	4299.03
004_18Oct2012_ITA-8_Z23_30-003	1148.08	16200.03	5044.38
004_18Oct2012_ITA-8_Z23_30-006	1145.61	14315.06	5237.91
002_24Oct2012_ITA8Large_Z1_11-001	1170.28	13959.09	4154.99
002_24Oct2012_ITA8Large_Z1_11-002	1760.08	18465.44	6937.93
002_24Oct2012_ITA8Large_Z1_11-003	685.69	14745.03	3391.09
002_24Oct2012_ITA8Large_Z1_11-004	1559.48	14150.38	5657.72
002_24Oct2012_ITA8Large_Z1_11-007	707.55	10511.39	3819.73
002_24Oct2012_ITA8Large_Z1_11-008	663.34	12135.63	4054.16
002_24Oct2012_ITA8Large_Z1_11-009	2510.72	29762.45	9825.77
002_24Oct2012_ITA8Large_Z1_11-010	1128.68	17554.2	5451.34
002_24Oct2012_ITA8Large_Z1_11-011	1243.43	14769.6	4159.67
003_24Oct2012_ITA8Large_Z12_23-002	1159.36	24511.57	5683.82
003_24Oct2012_ITA8Large_Z12_23-007	849.57	6931.4	3482.9
003_24Oct2012_ITA8Large_Z12_23-008	1178.24	10896.26	4453.49
003_24Oct2012_ITA8Large_Z12_23-009	1802.7	34481.16	9841.12
004_24Oct2012_ITA8Large_Z24_35-001	2383.49	29040.04	7922.46
004_24Oct2012_ITA8Large_Z24_35-002	1564.33	22991.33	7907.49
004_24Oct2012_ITA8Large_Z24_35-003	1433.18	20184.77	6368.06
004_24Oct2012_ITA8Large_Z24_35-005	1488.75	28768.77	7451.12
004_24Oct2012_ITA8Large_Z24_35-006	991.53	21990.54	4660.62
004_24Oct2012_ITA8Large_Z24_35-009	1601.9	23728.94	6087.08
004_24Oct2012_ITA8Large_Z24_35-010	1358.47	13126.3	5239.38
004_24Oct2012_ITA8Large_Z24_35-011	1308.61	23316.36	7300.17
Averages	**1346.07**	**17241.82**	**5635.37**

Appendix M: Quartz SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

	Li7/Si30	Na23/Si30	Mg24/Si30	Al27/Si30	Si30 (CPS)	K39/Si30	Ca40/Si30	Ti47/Si30	Ti48/Si30	Ti49/Si30	Fe56/Si30	Ge74/Si30
BCD-1-1.1	0.0004882	0.0002184	0.0002098	0.0182909	1842660	0.0008007	0.0007322	0.0007552	0.0075959	0.0005533	0.0002021	0.0000064
BCD-1-1.10	0.0004990	0.0002120	0.0001851	0.0199420	1902441	0.0007066	0.0006501	0.0008369	0.0083325	0.0006223	0.0002369	0.0000063
BCD-1-1.11	0.0005097	0.0002219	0.0002112	0.0188812	1783096	0.0008551	0.0007938	0.0007785	0.0080144	0.0005957	0.0002226	0.0000067
BCD-1-1.2	0.0006068	0.0002741	0.0002074	0.0218462	1851600	0.0009218	0.0008079	0.0009132	0.0090079	0.0006734	0.0002140	0.0000055
BCD-1-1.3	0.0005480	0.0002082	0.0002201	0.0207311	1863698	0.0006190	0.0005767	0.0009478	0.0094758	0.0007106	0.0002586	0.0000072
BCD-1-1.4	0.0005089	0.0001901	0.0002511	0.0229577	1813267	0.0006590	0.0006203	0.0011297	0.0115892	0.0009064	0.0002816	0.0000065
BCD-1-1.5	0.0004251	0.0001982	0.0002105	0.0202937	1833823	0.0006107	0.0005765	0.0010832	0.0109437	0.0008129	0.0002429	0.0000068
BCD-1-1.6	0.0004588	0.0001826	0.0002191	0.0208082	1954540	0.0005809	0.0005341	0.0011172	0.0111804	0.0008327	0.0002724	0.0000060
BCD-1-1.7	0.0004250	0.0002102	0.0002205	0.0208219	1907681	0.0006558	0.0006319	0.0010615	0.0105350	0.0007743	0.0002682	0.0000076
BCD-1-1.8	0.0004332	0.0002155	0.0002203	0.0198088	1860002	0.0007806	0.0007202	0.0010036	0.0101802	0.0007616	0.0002571	0.0000061
BCD-1-1.9	0.0004098	0.0002059	0.0001934	0.0200948	1887606	0.0006714	0.0006271	0.0008815	0.0087351	0.0006461	0.0002476	0.0000065
BCD-1-2.1	0.0011953	0.0003975	0.0001869	0.0240052	2156928	0.0014299	0.0014783	0.0007612	0.0076736	0.0005631	0.0001919	0.0000070
BCD-1-2.2	0.0007170	0.0001876	0.0001630	0.0182953	2144128	0.0005462	0.0005149	0.0008975	0.0089989	0.0006672	0.0002152	0.0000066
BCD-1-2.3	0.0008434	0.0002202	0.0002091	0.0214060	2151411	0.0009880	0.0009737	0.0012266	0.0123560	0.0009168	0.0002642	0.0000069
BCD-1-2.4	0.0009328	0.0001818	0.0002217	0.0225926	2155615	0.0004518	0.0004276	0.0013846	0.0137760	0.0010169	0.0002946	0.0000058
BCD-1-2.5	0.0008591	0.0001708	0.0001999	0.0216622	2148419	0.0004939	0.0004485	0.0015843	0.0159527	0.0011911	0.0002582	0.0000065
BCD-1-2.6	0.0007589	0.0001702	0.0001864	0.0206000	2161771	0.0004255	0.0004139	0.0012505	0.0125145	0.0009336	0.0002553	0.0000056
BCD-1-2.7	0.0010887	0.0016822	0.0003519	0.0313882	2122546	0.0042756	0.0043317	0.0009018	0.0090850	0.0006841	0.0002232	0.0000060
BCD-1-2.8	0.0005675	0.0001699	0.0001398	0.0170661	2125148	0.0005349	0.0005173	0.0007812	0.0078373	0.0005818	0.0001897	0.0000064
MP-1-1-4.1	0.0010770	0.0002903	0.0008713	0.0428668	1969833	0.0007051	0.0006755	0.0027657	0.0274697	0.0020261	0.0007487	0.0000093
MP-1-1-4.2	0.0008003	0.0002672	0.0008697	0.0421724	2144140	0.0006510	0.0006033	0.0029870	0.0301769	0.0022443	0.0008089	0.0000091
MP1-1-4.3	0.0005841	0.0004190	0.0008491	0.0372432	2093109	0.0019207	0.0017795	0.0026286	0.0263293	0.0019383	0.0007310	0.0000085
MP1-1-4.4	0.0003988	0.0003660	0.0006388	0.0299603	2093537	0.0024493	0.0020324	0.0017956	0.0179265	0.0013415	0.0005792	0.0000069
MP1-1-5.1	0.0118532	0.0005310	0.0001135	0.1117709	2090415	0.0011039	0.0010677	0.0000424	0.0004069	0.0000326	0.0000735	0.0000188
MP1-1-5.4	0.0060845	0.0004856	0.0001093	0.0962267	2020166	0.0008385	0.0009448	0.0000116	0.0001205	0.0000097	0.0000602	0.0000193
MP1-1-5.5	0.0007898	0.0002477	0.0000892	0.0072288	2075445	0.0005915	0.0005571	0.0000186	0.0001894	0.0000153	0.0000565	0.0000040
MP1-1-7.1	0.0010674	0.0105627	0.0010287	0.0609200	2390946	0.0260390	0.0286273	0.0026488	0.0264538	0.0019713	0.0015385	0.0000088
MP1-1-7.2	0.0005181	0.0043656	0.0013015	0.0428686	2329246	0.0090482	0.0100375	0.0021285	0.0214744	0.0016013	0.0012072	0.0000079
MP1-1-7.3	0.0006189	0.0003560	0.0009691	0.0397910	2385467	0.0018929	0.0018145	0.0026889	0.0270540	0.0019997	0.0007770	0.0000083
MP1-1-7.4	0.0005983	0.3293884	0.0011728	0.2065885	2341890	0.0143312	0.0101964	0.0027205	0.0273860	0.0020159	0.0008434	0.0000078
MP1-1-8.1	0.0007787	0.0002422	0.0010716	0.0403168	2381876	0.0007009	0.0006623	0.0030649	0.0308734	0.0022922	0.0007772	0.0000082
MP1-1-8.2	0.0005595	0.1183798	0.0012365	0.2241090	2378673	0.3673167	0.3777010	0.0025876	0.0259099	0.0019398	0.0016338	0.0000079
MP1-1-8.3	0.0006460	0.0002399	0.0009765	0.0415070	2325318	0.0006837	0.0006271	0.0027897	0.0279420	0.0020764	0.0007910	0.0000091
MP1-4-1.1	0.0008171	0.0002712	0.0009572	0.0388558	1835839	0.0006948	0.0006656	0.0025377	0.0254913	0.0018796	0.0007310	0.0000080
MP1-4-1.10	0.0031186	0.0002540	0.0007202	0.0559288	1717229	0.0006240	0.0005889	0.0021603	0.0216927	0.0015871	0.0008455	0.0000157
MP1-4-1.2	0.0014164	0.0005789	0.0009994	0.0376978	1057463	0.0019485	0.0017807	0.0049800	0.0503037	0.0037970	0.0014358	0.0000167
MP1-4-1.3	0.0023702	0.0003307	0.0014252	0.0451923	1974948	0.0015135	0.0016078	0.0030665	0.0306430	0.0022711	0.0009426	0.0000081
MP1-4-1.4	0.0025765	0.0003249	0.0016671	0.0489902	1857126	0.0009070	0.0008568	0.0033079	0.0330311	0.0024424	0.0010968	0.0000084
MP1-4-1.5	0.0005306	0.0003722	0.0011259	0.0399632	1829782	0.0010519	0.0009735	0.0028409	0.0280913	0.0020871	0.0008339	0.0000080
MP1-4-1.6	0.0023218	0.0003423	0.0015321	0.0475841	1816070	0.0009108	0.0008672	0.0033399	0.0333668	0.0024676	0.0010811	0.0000079
MP1-4-1.7	0.0014182	0.0002728	0.0011657	0.0403685	1881491	0.0006864	0.0006483	0.0026388	0.0261466	0.0019101	0.0007948	0.0000066
MP1-4-1.8	0.0010032	0.0002924	0.0008992	0.0364316	1799155	0.0008062	0.0007287	0.0024924	0.0248866	0.0018348	0.0006805	0.0000072
MP1-4-2.1	0.0038536	0.0002244	0.0008629	0.0374253	2077778	0.0003693	0.0003613	0.0027006	0.0270811	0.0020215	0.0007135	0.0000077
MP1-4-5.1	0.0061766	0.0004241	0.0011009	0.0742146	2018397	0.0008386	0.0008047	0.0023638	0.0239008	0.0017809	0.0014404	0.0000154
MP1-4-5.2	0.0014081	0.0008698	0.0011570	0.0987936	1970264	0.1317983	0.1676450	0.0022475	0.0225988	0.0016686	0.0057793	0.0000144
MP1-4-5.3	0.0016857	0.0002689	0.0012538	0.0552765	1994475	0.0013004	0.0014951	0.0026919	0.0270656	0.0019959	0.0010761	0.0000068
MP1-4-5.4	0.0016165	0.0041465	0.0020007	0.0769870	1970262	0.0136535	0.0123188	0.0030417	0.0307000	0.0022652	0.0021929	0.0000110
MP1-4-5.5	0.0009021	0.0002892	0.0011340	0.0412270	1978242	0.0007092	0.0006734	0.0026638	0.0266904	0.0019512	0.0008103	0.0000091
MP1-4-5.6	0.0010389	0.0004612	0.0012184	0.0419590	1931864	0.0015503	0.0012739	0.0028873	0.0288668	0.0021365	0.0010020	0.0000074
MP1-4-5.7	0.0006879	0.0003386	0.0010364	0.0416466	1910227	0.0008883	0.0008478	0.0029565	0.0301239	0.0022416	0.0007950	0.0000094
MP1-4-7.1	0.0013100	0.0003446	0.0012701	0.0428056	1565697	0.0010600	0.0010300	0.0028198	0.0279869	0.0021060	0.0008784	0.0000090

Appendix M: Quartz SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

	Li7/Si30	Na23/Si30	Mg24/Si30	Al27/Si30	Si30 (CPS)	K39/Si30	Ca40/Si30	Ti47/Si30	Ti48/Si30	Ti49/Si30	Fe56/Si30	Ge74/Si30
MP1-4-7.2	0.0011123	0.0004575	0.0010338	0.0429692	1567656	0.0013529	0.0013916	0.0027508	0.0274293	0.0020150	0.0008137	0.0000089
MP1-7.3	0.0012857	0.0003720	0.0011190	0.0453560	1579539	0.0012699	0.0011732	0.0028262	0.0297022	0.0021608	0.0008887	0.0000097
MP1-7.4	0.0010503	0.0004163	0.0009345	0.0387486	1510624	0.0014951	0.0013799	0.0026153	0.0259229	0.0019136	0.0007154	0.0000070
MP1-4-8.1	0.0021802	0.0004714	0.0013526	0.0919276	1494046	0.0032535	0.0034259	0.0022262	0.0226650	0.0016545	0.0016165	0.0000126
MP1-4-8.2	0.0023665	0.0011092	0.0014777	0.0916902	1456520	0.0040503	0.0060276	0.0023214	0.0233042	0.0016997	0.0019891	0.0000124
MP1-4-8.3	0.0030489	0.0006166	0.0016804	0.0965619	1431445	0.0053334	0.0073201	0.0024280	0.0240835	0.0017743	0.0020363	0.0000125
MP1-4-8.4	0.0008940	0.0004380	0.0004854	0.0293003	1522546	0.0013876	0.0012979	0.0011331	0.0112240	0.0008297	0.0004672	0.0000100
MP1-4-8.5	0.0009000	0.0018648	0.0002975	0.0315124	1392039	0.0038796	0.0038275	0.0000052	0.0000492	0.0000032	0.0002405	0.0000084
SCM-37-1-10.1	0.0024811	0.0002147	0.0002280	0.0285367	2156155	0.0005784	0.0005125	0.0007496	0.0074634	0.0005559	0.0001793	0.0000159
SCM-37-1-10.2	0.0030500	0.0006397	0.0006298	0.0522305	2138110	0.0016356	0.0016731	0.0014380	0.0144311	0.0010515	0.0005503	0.0000151
SCM-37-1-10.3	0.0029633	0.0008489	0.0006835	0.0551395	2102469	0.0018967	0.0018454	0.0013349	0.0136281	0.0010226	0.0006063	0.0000135
SCM-37-1-10.4	0.0016478	0.0013882	0.0006362	0.0441095	1989845	0.0026907	0.0023709	0.0011900	0.0120650	0.0009044	0.0003658	0.0000155
SCM-37-1-11.1	0.0012358	0.0005785	0.0002414	0.0286774	1998473	0.0031493	0.0029328	0.0008661	0.0088046	0.0006612	0.0001391	0.0000102
SCM-37-1-11.2	0.0013637	0.0003379	0.0003108	0.0296205	1978987	0.0008882	0.0008377	0.0010870	0.0109195	0.0008052	0.0001853	0.0000109
SCM-37-1-11.3	0.0010718	0.0003499	0.0002126	0.0268647	1988224	0.0009484	0.0008666	0.0011811	0.0118441	0.0008772	0.0001299	0.0000097
SCM-37-1-12.1	0.0012093	0.0004575	0.0004327	0.0331977	1965740	0.0015712	0.0012906	0.0017536	0.0174740	0.0012997	0.0005103	0.0000091
SCM-37-1-12.2	0.0012097	0.0003431	0.0002571	0.0289348	1982942	0.0009711	0.0009982	0.0017351	0.0173805	0.0012967	0.0002089	0.0000092
SCM-37-1-12.3	0.0004297	0.0007006	0.0001936	0.0191341	2042901	0.0028757	0.0038510	0.0007778	0.0078511	0.0005759	0.0001680	0.0000100
SCM-37-1-13.1	0.0010608	0.0002760	0.0002658	0.0329875	2000228	0.0007415	0.0006996	0.0016241	0.0164041	0.0012085	0.0002211	0.0000107
SCM-37-1-13.2	0.0010052	0.0004812	0.0004173	0.0288067	1974021	0.0017182	0.0014313	0.0017047	0.0170449	0.0012739	0.0049601	0.0000085
SCM-37-1-13.3	0.0005031	0.0011466	0.0002725	0.0257433	1940872	0.0024687	0.0035517	0.0015126	0.0150292	0.0011114	0.0001842	0.0000088
SCM-37-1-13.4	0.0008851	0.0004795	0.0002569	0.0311461	1964952	0.0020213	0.0021505	0.0017687	0.0179223	0.0013375	0.0002929	0.0000080
SCM-37-13.5	0.0008358	0.0003159	0.0001625	0.0252075	2015709	0.0008292	0.0007752	0.0016172	0.0162383	0.0012137	0.0002131	0.0000083
SCM-37-1-14.1	0.0011747	0.0006165	0.0002061	0.0290535	2031838	0.0026594	0.0029520	0.0018321	0.0186835	0.0013828	0.0002370	0.0000082
SCM-37-1-15.1	0.0009127	0.0002367	0.0002227	0.0264486	2031639	0.0006996	0.0006434	0.0017139	0.0172341	0.0012790	0.0001733	0.0000087
SCM-37-1-15.2	0.0011234	0.0002580	0.0002109	0.0286748	2047860	0.0007652	0.0007117	0.0018995	0.0191339	0.0014349	0.0001707	0.0000089
SCM-37-1-5.1	0.0013690	0.0030267	0.0004579	0.0331563	1886626	0.0054951	0.0053628	0.0009477	0.0092852	0.0006897	0.0005119	0.0000126
SCM-37-1-5.2	0.0016764	0.0008497	0.0003830	0.0357807	1871525	0.0026035	0.0020711	0.0008883	0.0086952	0.0006545	0.0002571	0.0000136
SCM-37-1-6.1	0.0009013	0.0003168	0.0002247	0.0268469	1851105	0.0009042	0.0008597	0.0015399	0.0160400	0.0011869	0.0001771	0.0000094
SCM-37-1-6.2	0.0010585	0.0007529	0.0003952	0.0321142	1793896	0.0020062	0.0022850	0.0009042	0.0088554	0.0006803	0.0005634	0.0000153
SCM-37-6.3	0.0009176	0.0003953	0.0003189	0.0325904	1915858	0.0011828	0.0011805	0.0016570	0.0166656	0.0012492	0.0001931	0.0000089
SCM-37-1-6.4	0.0016274	0.0015726	0.0003097	0.0401543	1865680	0.0055100	0.0034748	0.0009686	0.0095728	0.0006670	0.0002893	0.0000131
SCM-37-1-7.1	0.0014213	0.0003329	0.0002582	0.0315548	1810757	0.0010424	0.0010069	0.0010466	0.0106409	0.0007777	0.0001752	0.0000108
SCM-37-1-7.2	0.0016713	0.0003851	0.0002341	0.0307989	1834803	0.0013225	0.0012529	0.0010687	0.0109487	0.0008215	0.0002194	0.0000096
SCM-37-1-7.3	0.0014820	0.0004229	0.0002794	0.0344156	1732978	0.0012053	0.0011658	0.0010477	0.0104116	0.0008325	0.0002535	0.0000110
SCM-37-1-8.1	0.0029882	0.0007742	0.0003827	0.0308811	1794968	0.0008817	0.0008128	0.0021730	0.0219845	0.0016413	0.0001715	0.0000085
SCM-37-1-8.2	0.0011547	0.0003069	0.0002656	0.0319552	1821723	0.0011902	0.0011068	0.0021477	0.0216708	0.0015793	0.0002160	0.0000071
SCM-37-1-8.3	0.0012369	0.0003835	0.0002680	0.0307283	1991994	0.0013584	0.0012876	0.0018738	0.0189290	0.0014109	0.0002132	0.0000083
SCM-37-1-8.4	0.0010676	0.0003463	0.0003079	0.0272603	1913170	0.0011072	0.0010743	0.0015735	0.0161883	0.0011942	0.0001565	0.0000113
SCM-37-1-9.1	0.0009106	0.0003909	0.0002985	0.0298047	1897370	0.0009780	0.0009152	0.0018906	0.0190830	0.0014287	0.0001614	0.0000089
SCM-37-1-9.2	0.0006778	0.0011843	0.0002666	0.0311899	1909383	0.0028282	0.0015691	0.0017872	0.0181606	0.0013258	0.0002242	0.0000098
SCM-37-1-9.3	0.0005492	0.0008968	0.0006227	0.0302117	1762532	0.0030274	0.0031857	0.0014749	0.0149765	0.0010998	0.0016739	0.0000096
SCM37-2-1.1	0.0016060	0.0001698	0.0002398	0.0301776	2068723	0.0003940	0.0003778	0.0006675	0.0067411	0.0004971	0.0002645	0.0000183
SCM37-2-1.2	0.0020442	0.0001713	0.0003478	0.0382212	2045671	0.0003973	0.0003862	0.0009984	0.0101154	0.0007472	0.0003414	0.0000200
SCM37-2-1.3	0.0025074	0.0001158	0.0003514	0.0306540	1826237	0.0001772	0.0001708	0.0006558	0.0065538	0.0004855	0.0004120	0.0000216
SCM37-2-1.4	0.0008836	0.0001228	0.0002108	0.0286653	1675316	0.0003163	0.0002938	0.0016191	0.0165072	0.0012393	0.0003481	0.0000098
SCM37-2-5.1	0.0023352	0.0001336	0.0002686	0.0292407	2212089	0.0002336	0.0002252	0.0009576	0.0096539	0.0007210	0.0002611	0.0000098
SCM37-2-5.2	0.0023566	0.0001905	0.0002506	0.0298293	2177106	0.0007084	0.0009490	0.0016850	0.0168120	0.0012254	0.0004638	0.0000123
SCM37-2-5.3	0.0008380	0.0002612	0.0001348	0.0210904	2113615	0.0005654	0.0007617	0.0013778	0.0137766	0.0010314	0.0001303	0.0000076
SCM-6-10.1	0.0007076	0.0003295	0.0008776	0.0323929	2128183	0.0009136	0.0009956	0.0023733	0.0235712	0.0017415	0.0006643	0.0000078
SCM-6-10.2	0.0005813	0.0002476	0.0007711	0.0325890	2116005	0.0006100	0.0005845	0.0028853	0.0291714	0.0021620	0.0006700	0.0000088

Appendix M: Quartz SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

	Li7/Si30	Na23/Si30	Mg24/Si30	Al27/Si30	Si30 (CPS)	K39/Si30	Ca40/Si30	Ti47/Si30	Ti48/Si30	Ti49/Si30	Fe56/Si30	Ge74/Si30
SCM-6-10.3	0.0006414	0.0048153	0.0011695	0.0353343	2166492	0.0124053	0.0137367	0.0031024	0.0311691	0.0025389	0.0010507	0.0000071
SCM-6-10.4	0.0009243	0.0089043	0.0017228	0.0406373	2137188	0.0061444	0.0065972	0.0029748	0.0302967	0.0021820	0.0070321	0.0000082
SCM-6-11.1	0.0012920	0.0009366	0.0046877	0.0348433	2129949	0.0148882	0.0144297	0.0024651	0.0263613	0.0020269	0.0023976	0.0000071
SCM-6-12.1	0.0013028	0.0028272	0.0019293	0.0309974	2134321	0.0469383	0.0193922	0.0015304	0.0145222	0.0010225	0.0019289	0.0000088
SCM-6-12.2	0.0014861	0.0023944	0.0008161	0.0314697	2128098	0.0065537	0.0058865	0.0016970	0.0169928	0.0012672	0.0006996	0.0000094
SCM-6-12.3	0.0014067	0.0429500	0.0008869	0.0295008	2135335	0.0386450	0.0619673	0.0018920	0.0188428	0.0014115	0.0040525	0.0000070
SCM-6-12.4	0.0005671	0.0156821	0.0174468	0.0387804	2116249	0.0545374	0.0806355	0.0002248	0.0022409	0.0001685	0.0227410	0.0000074
SCM-6-12.5	0.0014846	0.0005042	0.0019094	0.0299349	2132357	0.0014899	0.0044501	0.0027312	0.0283083	0.0021761	0.0010456	0.0000069
SCM-6-12.6	0.0014500	0.0003730	0.0021786	0.0297013	2145295	0.0010393	0.0009921	0.0031670	0.0322822	0.0024435	0.0012211	0.0000081
SCM-6-13.1	0.0012890	0.0003660	0.0004874	0.0194494	2137809	0.0019984	0.0010763	0.0008527	0.0089322	0.0007181	0.0003387	0.0000085
SCM-6-13.2	0.0012879	0.2090579	0.0005193	0.0313688	2136739	0.1752516	0.1615826	0.0013487	0.0136446	0.0010142	0.0003831	0.0000075
SCM-6-13.3	0.0012504	0.0010691	0.0012055	0.0252583	2132189	0.0011783	0.0010947	0.0008576	0.0085474	0.0006204	0.0005150	0.0000077
SCM-6-14.1	0.0014481	0.0061191	0.0016851	0.0350927	1943664	0.0416037	0.0409463	0.0015257	0.0153679	0.0011489	0.0068433	0.0000111
SCM-6-14.2	0.0013702	0.0018835	0.0014155	0.0294168	2071400	0.0031956	0.0036728	0.0004137	0.0042809	0.0003295	0.0008378	0.0000095
SCM-6-14.3	0.0017625	0.0045135	0.0065341	0.0551188	2092071	0.0479369	0.0435855	0.0031231	0.0317071	0.0023972	0.0025702	0.0000091
SCM-6-14.4	0.0018407	0.0007660	0.0016589	0.0356991	1910761	0.0020752	0.0023800	0.0023911	0.0238358	0.0017874	0.0011992	0.0000066
SCM-6-7.1	0.0053219	0.0002706	0.0010868	0.0333463	2046089	0.0108350	0.0189857	0.0033547	0.0335781	0.0024913	0.0006116	0.0000079
SCM-6-7.2	0.0005772	0.0201974	0.0020960	0.0264026	2041299	0.0031560	0.0033151	0.0016250	0.0164235	0.0012271	0.0014037	0.0000068
SCM-6-7.3	0.0008565	0.0042715	0.0009382	0.0273305	2093100	0.0056135	0.0034091	0.0013395	0.0136944	0.0010169	0.0004903	0.0000080
SCM-6-7.4	0.0013275	0.0002476	0.0009554	0.0291855	2100544	0.0007640	0.0007190	0.0022430	0.0221058	0.0015872	0.0005186	0.0000079
SCM-6-7.5	0.0011660	0.0057394	0.0012337	0.0337314	2069289	0.0014242	0.0020200	0.0027466	0.0276625	0.0020454	0.0011079	0.0000068
SCM-6-8.1	0.0008092	0.0017066	0.0017543	0.0270172	2122078	0.0013193	0.0011953	0.0024922	0.0240798	0.0017620	0.0009062	0.0000060
SCM-6-8.3	0.0010304	0.0113480	0.0014553	0.0442720	2117942	0.0077205	0.0086681	0.0034663	0.0343307	0.0025391	0.0012043	0.0000085
SCM-6-8.4	0.0009262	0.0044318	0.0023714	0.0438988	2120560	0.0216440	0.0588822	0.0025083	0.0247169	0.0018212	0.0137288	0.0000090
SCM-6-8.5	0.0009605	0.0004638	0.0009159	0.0255709	2130037	0.0012286	0.0011272	0.0016480	0.0152244	0.0007801	0.0005451	0.0000064
SCM-6-8.6	0.0008790	0.0004346	0.0018302	0.0275095	2147528	0.0010126	0.0010581	0.0019813	0.0201628	0.0014973	0.0007617	0.0000083
SCM-6-9.1	0.0012656	0.0003009	0.0013552	0.0313951	2126955	0.0008123	0.0007848	0.0020731	0.0204960	0.0015308	0.0006548	0.0000071
SCM-6-9.2	0.0010731	0.0004939	0.0007077	0.0277989	2113756	0.0016494	0.0016781	0.0052436	0.0497731	0.0025666	0.0006613	0.0000065
SCM-6-9.3	0.0009239	0.0004950	0.0008501	0.0322428	2129454	0.0031289	0.0026626	0.0023089	0.0229739	0.0016905	0.0012537	0.0000073
SCM-6-9.4	0.0010649	0.0567495	0.0012032	0.0315351	2118640	0.0280621	0.0295875	0.0027543	0.0274929	0.0020649	0.0052516	0.0000078
SCM-6-9.5	0.0008090	0.0081737	0.0023938	0.0418124	2106576	0.0074997	0.0086118	0.0013865	0.0139645	0.0010498	0.0019081	0.0000071

[1] Wark, D. A., & Watson, E. B. (2006). TitaniQ: a titanium-in-quartz geothermometer. *Contributions to Mineralogy and Petrology* , ***152*** (6), 743-754.

Appendix M: Quartz SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

			Ti 48/47	Ti 48/49	Ti Concentration (ppm)			Ti-in-Quartz Temperature (°C)[1]		
	Si303028 (CPS)	Ti48 (CPS)			Ti47	Ti48	Ti49	Temp 47	Temp 48	Temp 49
BCD-1-1.1	187580	13997	10.06	13.73	51.8	51.6	50.9	712	712	710
BCD-1-1.10	192737	15852	9.96	13.39	57.4	56.6	57.2	724	723	724
BCD-1-1.11	190242	14291	10.29	13.45	53.4	54.5	54.8	716	718	719
BCD-1-1.2	191444	16679	9.86	13.38	62.6	61.2	61.9	734	731	733
BCD-1-1.3	190524	17660	10.00	13.33	65.0	64.4	65.4	738	737	739
BCD-1-1.4	189269	21014	10.26	12.79	77.4	78.8	83.4	760	762	769
BCD-1-1.5	190880	20069	10.10	13.46	74.2	74.4	74.8	754	755	755
BCD-1-1.6	201279	21853	10.01	13.43	76.6	76.0	76.6	758	757	758
BCD-1-1.7	201480	20098	9.92	13.61	72.7	71.6	71.2	752	750	749
BCD-1-1.8	192295	18935	10.14	13.37	68.8	69.2	70.1	745	746	747
BCD-1-1.9	190734	16489	9.91	13.52	60.4	59.4	59.4	730	728	728
BCD-1-2.1	223899	16552	10.08	13.63	52.2	52.2	51.8	713	713	712
BCD-1-2.2	221592	19295	10.03	13.49	61.5	61.2	61.4	732	731	732
BCD-1-2.3	223602	26583	10.07	13.48	84.1	84.0	84.3	770	770	770
BCD-1-2.4	224208	29696	9.95	13.55	94.9	93.6	93.5	785	783	783
BCD-1-2.5	223297	34273	10.07	13.39	108.6	108.4	109.6	803	803	804
BCD-1-2.6	223564	27054	10.01	13.40	85.7	85.1	85.9	772	771	772
BCD-1-2.7	221351	19283	10.07	13.28	61.8	61.7	62.9	733	732	735
BCD-1-2.8	218086	16656	10.03	13.47	53.5	53.3	53.5	716	716	716
MP-1-1-4.1	193480	54111	9.93	13.56	189.5	186.7	186.4	883	881	880
MP-1-1-4.2	222757	64704	10.10	13.45	204.7	205.1	206.5	895	895	896
MP1-1-4.3	220619	55110	10.02	13.58	180.1	179.0	178.3	875	874	873
MP1-1-4.4	216756	37530	9.98	13.36	123.1	121.8	123.4	820	819	820
MP1-1-5.1	214816	851	9.59	12.47	2.9	2.8	3.0	469	466	471
MP1-1-5.4	212235	244	10.41	12.49	0.8	0.8	0.9	395	397	401
MP1-1-5.5	216826	393	10.18	12.36	1.3	1.3	1.4	420	421	426
MP1-1-7.1	246410	63250	9.99	13.42	181.5	179.8	181.3	876	875	876
MP1-1-7.2	241135	50019	10.09	13.41	145.9	146.0	147.3	844	844	845
MP1-1-7.3	243093	64537	10.06	13.53	184.3	183.9	184.0	879	878	878
MP1-1-7.4	242700	64135	10.07	13.58	186.4	186.1	185.4	880	880	879
MP1-1-8.1	242512	73537	10.07	13.47	210.0	209.8	210.9	899	899	899
MP1-1-8.2	243138	61631	10.01	13.36	177.3	176.1	178.4	873	872	874
MP1-1-8.3	237452	64974	10.02	13.46	191.2	189.9	191.0	884	883	884
MP1-4-1.1	187652	46798	10.04	13.56	173.9	173.3	172.9	870	869	869
MP1-4-1.10	178514	37251	10.04	13.67	148.0	147.4	146.0	846	845	844
MP1-4-1.2	202514	53194	10.10	13.25	341.3	341.9	349.3	981	982	985
MP1-4-1.3	201760	60518	9.99	13.49	210.2	208.3	208.9	899	898	898
MP1-4-1.4	189008	61343	9.99	13.52	226.7	224.5	224.7	911	910	910
MP1-4-1.5	189068	51401	9.89	13.46	194.7	190.9	192.0	887	884	885
MP1-4-1.6	187839	60597	9.99	13.52	228.9	226.8	227.0	913	911	911
MP1-4-1.7	197907	49195	9.91	13.69	180.8	177.7	175.7	876	873	871
MP1-4-1.8	180328	44775	9.99	13.56	170.8	169.2	168.8	867	866	865
MP1-4-2.1	221853	56269	10.03	13.40	185.1	184.1	186.0	879	878	880
MP1-4-5.1	211290	48241	10.11	13.42	162.0	162.5	163.8	859	860	861
MP1-4-5.2	205944	44526	10.05	13.54	154.0	153.6	153.5	852	851	851
MP1-4-5.3	110636	53982	10.05	13.56	184.5	184.0	183.6	879	878	878
MP1-4-5.4	201191	60487	10.09	13.55	208.5	208.7	208.4	898	898	898
MP1-4-5.5	201442	52800	10.02	13.68	182.6	181.4	179.5	877	876	874
MP1-4-5.6	203215	55767	10.00	13.51	197.9	196.2	196.5	889	888	888
MP1-4-5.7	195852	57544	10.19	13.44	202.6	204.7	206.2	893	895	896
MP1-4-7.1	172155	43819	9.93	13.29	193.2	190.2	193.7	886	883	886

Appendix M: Quartz SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

			Ti 48/47	Ti 48/49	Ti Concentration (ppm)			Ti-in-Quartz Temperature (°C)[1]		
	Si303028 (CPS)	Ti48 (CPS)			Ti47	Ti48	Ti49	Temp 47	Temp 48	Temp 49
MP1-4-7.2	159519	43000	9.97	13.61	188.5	186.4	185.4	882	880	879
MP1-7.3	157597	46916	10.51	13.75	193.7	201.9	198.8	886	893	890
MP1-7.4	157249	39160	9.91	13.55	179.2	176.2	176.0	874	872	872
MP1-4-8.1	139847	33863	10.18	13.70	152.6	154.1	152.2	850	852	850
MP1-4-8.2	152306	33943	10.04	13.71	159.1	158.4	156.4	856	856	854
MP1-4-8.3	139715	34474	9.92	13.57	166.4	163.7	163.2	863	861	860
MP1-4-8.4	144014	17089	9.91	13.53	77.7	76.3	76.3	760	758	758
MP1-4-8.5	146337	69	9.38	15.22	0.4	0.3	0.3	357	353	348
SCM-37-1-10.1	218564	16092	9.96	13.42	51.4	50.7	51.1	711	710	711
SCM-37-1-10.2	221891	30855	10.04	13.72	98.5	98.1	96.7	790	790	788
SCM-37-1-10.3	205294	28653	10.21	13.33	91.5	92.6	94.1	781	782	784
SCM-37-1-10.4	207293	24008	10.14	13.34	81.6	82.0	83.2	766	767	768
SCM-37-1-11.1	207108	17596	10.17	13.32	59.4	59.8	60.8	728	729	731
SCM-37-1-11.2	203414	21610	10.05	13.56	74.5	74.2	74.1	755	754	754
SCM-37-1-11.3	205125	23549	10.03	13.50	80.9	80.5	80.7	765	764	765
SCM-37-1-12.1	203652	34349	9.96	13.44	120.2	118.8	119.6	817	815	816
SCM-37-1-12.2	205146	34465	10.02	13.40	118.9	118.1	119.3	815	814	816
SCM-37-1-12.3	210407	16039	10.09	13.63	53.3	53.4	53.0	716	716	715
SCM-37-1-13.1	204465	32812	10.10	13.57	111.3	111.5	111.2	806	806	806
SCM-37-1-13.2	201138	33647	10.00	13.38	116.8	115.9	117.2	813	812	813
SCM-37-1-13.3	193925	29170	9.94	13.52	103.7	102.2	102.2	797	795	795
SCM-37-1-13.4	197985	35217	10.13	13.40	121.2	121.8	123.0	818	818	820
SCM-37-13.5	206297	32732	10.04	13.38	110.8	110.4	111.7	806	805	807
SCM-37-1-14.1	209101	37962	10.20	13.51	125.6	127.0	127.2	823	824	824
SCM-37-1-15.1	206069	35014	10.06	13.47	117.5	117.1	117.7	814	813	814
SCM-37-1-15.2	207866	39184	10.07	13.33	130.2	130.1	132.0	828	828	830
SCM-37-1-5.1	189929	17518	9.80	13.46	64.9	63.1	63.5	738	735	736
SCM-37-1-5.2	199309	16273	9.79	13.29	60.9	59.1	60.2	731	727	730
SCM-37-1-6.1	189258	29692	10.42	13.51	105.5	109.0	109.2	799	803	804
SCM-37-1-6.2	201426	15886	9.79	13.02	62.0	60.2	62.6	733	730	734
SCM-37-6.3	199078	31929	10.06	13.34	113.6	113.3	114.9	809	809	811
SCM-37-1-6.4	175813	17860	9.88	14.35	66.4	65.1	61.4	741	739	732
SCM-37-1-7.1	180057	19268	10.17	13.68	71.7	72.3	71.5	750	751	750
SCM-37-1-7.2	181848	20089	10.25	13.33	73.2	74.4	75.6	753	755	757
SCM-37-1-7.3	181853	18043	9.94	12.51	71.8	70.8	76.6	750	749	758
SCM-37-1-8.1	192630	39462	10.12	13.39	148.9	149.4	151.0	847	847	849
SCM-37-1-8.2	186640	39478	10.09	13.72	147.2	147.3	145.3	845	845	843
SCM-37-1-8.3	185039	37707	10.10	13.42	128.4	128.7	129.8	826	826	827
SCM-37-1-8.4	196210	30971	10.29	13.56	107.8	110.0	109.9	802	805	804
SCM-37-1-9.1	194731	36208	10.09	13.36	129.6	129.7	131.4	827	827	829
SCM-37-1-9.2	190986	34676	10.16	13.70	122.5	123.4	122.0	819	820	819
SCM-37-1-9.3	189072	26397	10.15	13.62	101.1	101.8	101.2	793	794	794
SCM37-2-1.1	206752	13946	10.10	13.56	45.7	45.8	45.7	699	699	699
SCM37-2-1.2	203114	20693	10.13	13.54	68.4	68.8	68.7	745	745	745
SCM37-2-1.3	174818	11969	9.99	13.50	44.9	44.5	44.7	697	696	696
SCM37-2-1.4	161269	27655	10.20	13.32	111.0	112.2	114.0	806	807	809
SCM37-2-5.1	223024	21355	10.08	13.39	65.6	65.6	66.3	740	740	741
SCM37-2-5.2	217808	36602	9.98	13.72	115.5	114.3	112.7	811	810	808
SCM37-2-5.3	202082	29119	10.00	13.36	94.4	93.6	94.9	785	784	785
SCM-6-10.1	217769	50164	9.93	13.54	162.6	160.2	160.2	860	857	857
SCM-6-10.2	221549	61727	10.11	13.49	197.7	198.3	198.9	889	890	890

Appendix M: Quartz SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

			Ti 48/47	**Ti 48/49**	**Ti Concentration (ppm)**			**Ti-in-Quartz Temperature (°C)[1]**		
	Si303028 (CPS)	**Ti48 (CPS)**			**Ti47**	**Ti48**	**Ti49**	**Temp 47**	**Temp 48**	**Temp 49**
SCM-6-10.3	216536	67528	10.05	12.28	212.6	211.9	233.6	901	900	916
SCM-6-10.4	218196	64750	10.18	13.88	203.9	205.9	200.7	894	896	892
SCM-6-11.1	222169	56148	10.69	13.01	168.9	179.2	186.5	865	874	880
SCM-6-12.1	223634	30995	9.49	14.20	104.9	98.7	94.1	798	790	784
SCM-6-12.2	223772	36162	10.01	13.41	116.3	115.5	116.6	812	811	812
SCM-6-12.3	219894	40236	9.96	13.35	129.7	128.1	129.8	827	825	827
SCM-6-12.4	223572	4742	9.97	13.30	15.4	15.2	15.5	593	592	594
SCM-6-12.5	221559	60364	10.36	13.01	187.2	192.4	200.2	881	885	891
SCM-6-12.6	225500	69255	10.19	13.21	217.0	219.4	224.8	904	906	910
SCM-6-13.1	222892	19095	10.47	12.44	58.4	60.7	66.1	726	731	740
SCM-6-13.2	225026	29155	10.12	13.45	92.4	92.7	93.3	782	782	783
SCM-6-13.3	221707	18225	9.97	13.78	58.8	58.1	57.1	727	725	723
SCM-6-14.1	220082	29870	10.07	13.38	104.6	104.5	105.7	798	798	799
SCM-6-14.2	222185	8868	10.35	12.99	28.4	29.1	30.3	649	652	656
SCM-6-14.3	219719	66334	10.15	13.23	214.0	215.5	220.5	902	903	907
SCM-6-14.4	200620	45545	9.97	13.34	163.9	162.0	164.4	861	859	861
SCM-6-7.1	220100	68704	10.01	13.48	229.9	228.2	229.2	913	912	913
SCM-6-7.2	213462	33525	10.11	13.38	111.4	111.6	112.9	806	807	808
SCM-6-7.3	216987	28664	10.22	13.47	91.8	93.1	93.5	781	783	783
SCM-6-7.4	206889	46434	9.86	13.93	153.7	150.3	146.0	851	848	844
SCM-6-7.5	212439	57242	10.07	13.52	188.2	188.0	188.2	882	882	882
SCM-6-8.1	220068	51099	9.66	13.67	170.8	163.7	162.1	867	861	859
SCM-6-8.3	222011	72711	9.90	13.52	237.6	233.3	233.6	919	916	916
SCM-6-8.4	208482	52414	9.85	13.57	171.9	168.0	167.5	868	865	864
SCM-6-8.5	219717	32429	9.24	19.52	112.9	103.5	71.8	808	797	750
SCM-6-8.6	223793	43300	10.18	13.47	135.8	137.0	137.7	834	835	836
SCM-6-9.1	219058	43594	9.89	13.39	142.1	139.3	140.8	840	837	839
SCM-6-9.2	217343	105208	9.49	19.39	359.4	338.3	236.1	991	980	918
SCM-6-9.3	220053	48922	9.95	13.59	158.2	156.2	155.5	856	854	853
SCM-6-9.4	224238	58248	9.98	13.31	188.8	186.9	190.0	882	881	883
SCM-6-9.5	221642	29417	10.07	13.30	95.0	94.9	96.6	785	785	787

[1] Wark, D. A., & Watson, E. B. (2006). TitaniQ: a titanium-in-quartz geothermometer. *Contributions to Mineralogy and Petrology* , ***152*** (6), 743-754.

Appendix N: Sphene SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

Samples	F	Na	Mg	Si	P	K	Ca	Al	Ti	V	Cr	Mn	Fe	Sr	Y	Zr (from Zr90)
MPe1-E-S10B-1.1I	10600	81	147	165562	47	204.1	165220	55911	128519	433	36	434	26924	437.6	187	122
MPe1-E-S10B-1.2I	2840	7341	72	290914	15432	7942.3	71710	54977	51865	105	5	83	2946	210.5	212	126
MPe1-E-S10C-1I	7045	97	110	133917	224	26.6	204229	4404	218666	705	40	265	18162	15.3	422	701
MPe1-E-S8-1.1I	7655	136	220	128198	781	2.1	212987	4716	226385	572	75	401	27995	26.5	795	194
MPe1-E-S8-1.2E	1992	117	103	135988	21	4.7	211613	3711	246800	273	32	416	13190	37.8	1041	133
MPe1-M-S10A-1I	1286	85	20	136836	33	2.1	197869	2727	234334	161	57	382	11119	39.5	846	165
MPe1-M-S2-1.1E	5688	59	39	126511	92	4.4	209201	5247	232594	421	13	234	9985	16.0	2239	1058
MPe1-M-S2-1.2I	2894	253	163	133738	10	6.5	209473	2687	238732	215	12	161	16028	18.4	760	299
MPe1-M-S2-1.3E	4236	242	116	134491	123	11.8	205851	3142	231048	319	11	323	19702	35.8	2473	477
MPe1-M-S2-1.4E	3584	178	102	132656	88	9.1	204611	3563	224644	274	25	323	18165	22.9	1763	377
MPe1-M-S2-1.5E	4434	164	172	128640	13	5.9	209088	3692	229317	301	25	204	18645	21.9	2018	302
MPe1-M-S6-1I	9616	25	180	140016	4	12.6	199684	9717	209492	600	7	133	12179	8.1	836	175
TIP1-S7-1.1I	8129	499	723	121362	284	2.4	196902	7915	221444	191	2	2400	19951	14.3	6254	1038
TIP1-S7-1.2I	7768	615	823	138142	226	1.9	193475	7587	227678	128	1	3218	21214	6.9	7527	943
TIP1-S7-1.3E	12636	554	878	130262	168	4.5	188131	8614	215919	156	4	3553	23452	5.9	7096	1005
TIP1-S8-1.1E	10385	498	796	136524	175	2.8	192367	7896	215358	141	4	3542	21889	7.2	6613	875
TIP1-S8-1.2I	7311	573	834	129069	187	2.7	183463	7524	202049	150	1	3018	22658	5.0	8707	1141
TIP1-S9A-1.1E	14025	446	857	132469	166	3.9	201505	8466	208213	161	3	3429	24634	9.3	5607	1204
TIP1-S9A-1.2I	10079	547	823	129613	188	2.4	193047	7943	221146	134	2	3644	22676	10.8	7205	934
TIP1-S9A-1.3I	9235	595	826	140050	180	3.8	199775	7671	227770	135	2	3592	20294	8.0	6765	863
TIP1-S9B1-1.1I	10937	411	708	133011	261	3.6	194812	7886	217650	181	0	2472	21109	5.6	5187	1665
TIP1-S9B1-1.2E	14635	406	706	132832	135	5.0	199109	7644	218318	149	1	3804	20468	21.3	1889	892
TIP1-S9B1-1.3E	11370	563	957	132085	153	4.0	200319	8660	237437	147	2	3700	23278	3.3	7904	942
TIP1-S9B2-1.1I	10812	524	895	131806	666	26.0	189677	7974	212495	139	0	3171	23393	5.7	8461	1265
TIP1-S9B2-1.2E	14122	499	936	126583	4806	8.5	207427	8803	214841	150	1	3238	24052	13.3	7950	963
TIP1-S9B3-1.1E	8761	626	790	137697	165	2.3	196821	7873	218367	131	0	3247	20123	4.8	6811	876
TIP1-S9B3-1.2I	12091	665	1124	135864	234	3.2	198915	7997	213077	121	1	3873	24639	9.5	5025	6347
TIP1-S9B3-1.3I	15242	442	1423	143685	191	3.5	188285	9157	200723	156	1	3321	25419	7.8	4593	2179
TIP1-S12A-1.1E	13402	467	854	136438	149	72.1	195609	7934	210675	160	3	3456	21676	8.3	5137	1325
TIP1-S12A-1.2I	9750	539	864	128599	229	2.8	193011	8206	219182	139	1	3212	23353	4.3	8946	1110
TIP1-S12B-1.1I	6499	503	716	135797	317	18.6	196425	7434	235618	267	6	1834	20258	23.8	7625	1511
TIP1-S12B-1.2I	8178	460	693	133164	239	68.6	201333	7730	224159	215	3	2125	20084	14.3	5803	1168
TIP1-S12B-1.3I	8737	625	851	127037	228	78.3	193588	7444	225581	164	1	2957	21895	5.6	8248	1088
TIP1-S12B-1.4E	10700	565	841	133942	146	2.5	194284	7867	219899	132	2	3597	22223	6.7	7018	904
TIP1-S12D-1.1E	22170	601	2315	146219	75	102.2	193130	11839	194818	158	1	3616	30545	12.4	2654	1162
TIP1-S12D-1.2I	8612	442	731	132789	256	2.5	198612	8493	226736	265	5	2045	21551	19.0	7649	1444
TIP1-S12D-1.3EI	10781	543	846	134422	199	3.9	194735	7997	220668	133	2	3581	22602	6.4	7197	941
TIP1-S12D-1.4EI	20010	466	1520	146075	89	13.3	195047	10591	204011	156	11	3728	26668	14.3	1317	1052
SCM27b-E-S10-1.1E	9377	591	1231	139523	155	4.9	202391	8454	216406	193	4	2249	26683	2.6	11265	7349
SCM27b-E-S1-1.1E	18474	327	425	148814	30	1038.6	189941	15440	189464	183	1	314	12412	23.7	807	700
SCM27b-E-S1-1.2I	10806	536	980	143443	252	3.1	197893	8114	215894	146	4	2427	25716	2.9	4805	2957
SCM27b-E-S1-1.3I	13972	303	1318	146851	156	20.4	201939	10020	206846	158	38	2380	26877	1.6	3781	907
SCM27b-E-S2-1.1I	12363	298	780	144064	97	3.3	199412	7903	221241	119	4	2786	23767	4.9	845	1858
SCM27b-E-S2-1.2I	8711	776	976	141398	240	6.1	194452	7010	211510	152	4	2191	26115	0.8	7307	2880
SCM27b-E-S2-1.3EI	10750	317	978	145772	132	5.0	201103	7891	210972	125	8	2771	23753	1.4	873	993
SCM27b-E-S8-1.1EI	14489	235	359	141425	24	609.6	197443	14446	205052	175	1	442	14373	15.2	1802	160
SCM27b-E-S8-1.2I	8545	727	1260	141704	170	2.5	197012	8360	208321	177	5	2130	27815	3.9	12840	5141
SCM27b-T-S12-1.1E	12192	708	1640	131155	200	19.6	205027	9770	210639	231	2	2338	30458	4.6	11444	3695
SCM27b-T-S12-1.2E	14356	363	1231	141311	124	5.7	206737	9759	210669	213	5	2512	25887	2.1	3731	2120
SCM27b-T-S12-1.3E	12808	354	1158	146613	108	55.0	191634	9838	205126	218	8	1937	22269	3.1	8522	1948

Appendix N: Sphene SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

	Concentration (ppm)																			
Samples	**Zr (from Zr91)**	**Nb**	**Ba**	**La**	**Ce**	**Pr**	**Nd**	**Sm**	**Eu**	**Gd**	**Tb**	**Dy**	**Ho**	**Er**	**Tm**	**Yb**	**Lu**	**Hf**	**Ta**	**Pb206**
MPe1-E-S10B-1.1I	119	359	10.3	314	485	45	159	32	9	34	6	38	8	22	3	15	2	3	20	1.7
MPe1-E-S10B-1.2I	122	160	4.2	285	892	117	489	95	15	68	9	46	8	21	3	17	2	6	21	0.1
MPe1-E-S10C-1I	695	1066	19.6	1144	2931	289	1008	164	20	128	17	94	19	50	7	39	5	18	72	0.2
MPe1-E-S8-1.1I	170	1238	20.3	2903	7200	758	2722	429	39	320	38	190	35	89	12	75	10	15	82	0.7
MPe1-E-S8-1.2E	83	454	19.3	1090	4323	575	2408	443	48	370	45	235	46	116	15	96	12	3	44	0.3
MPe1-M-S10A-1I	116	674	18.1	809	2918	357	1571	304	48	265	36	197	38	99	13	86	10	3	13	0.0
MPe1-M-S2-1.1E	1089	1863	20.7	155	1149	274	1787	649	96	603	83	467	91	251	34	219	30	49	97	0.2
MPe1-M-S2-1.2I	264	552	22.2	260	1775	364	1868	412	16	327	40	198	36	97	13	102	16	11	65	0.1
MPe1-M-S2-1.3E	448	4628	17.5	1801	9886	1700	7956	1591	70	1122	129	623	107	260	35	235	30	16	174	0.3
MPe1-M-S2-1.4E	344	3433	16.8	1041	6303	1141	5422	1094	55	761	91	441	78	196	28	195	26	16	203	1.3
MPe1-M-S2-1.5E	267	1156	21.7	415	3062	655	3533	875	35	685	84	430	80	204	29	184	25	12	101	0.1
MPe1-M-S6-1I	164	402	17.5	44	156	47	398	225	23	313	48	273	54	138	17	93	12	8	29	0.1
TIP1-S7-1.1I	1037	3406	19.9	4787	16926	2191	8690	1608	104	1389	205	1215	254	685	90	511	59	54	318	0.5
TIP1-S7-1.2I	924	3903	17.4	4008	14475	1994	7635	1559	59	1429	233	1389	288	783	100	567	64	57	335	0.3
TIP1-S7-1.3E	952	2857	18.1	3514	11858	1646	7044	1522	89	1470	228	1354	286	784	109	610	73	59	213	0.5
TIP1-S8-1.1E	809	2486	17.9	3585	12490	1758	7049	1665	85	1466	208	1252	250	688	94	534	68	54	205	0.3
TIP1-S8-1.2I	1088	3544	19.2	3837	14177	2193	8621	2108	84	1880	297	1775	350	853	111	584	66	63	286	0.4
TIP1-S9A-1.1E	1219	3160	18.0	3096	11590	1450	6036	1476	103	1291	187	1065	233	652	92	541	66	77	249	0.4
TIP1-S9A-1.2I	890	3149	18.9	3618	13137	1807	7515	1715	79	1596	242	1434	296	814	106	597	69	60	253	0.4
TIP1-S9A-1.3I	853	3163	18.2	3421	12756	1791	7391	1588	86	1489	225	1298	265	722	93	529	64	49	246	0.4
TIP1-S9B1-1.1I	1666	4406	18.1	4087	13664	1739	6562	1153	82	956	144	874	192	575	81	494	61	94	375	0.4
TIP1-S9B1-1.2E	885	3445	17.9	2963	8168	814	2648	389	54	306	42	269	62	204	35	258	40	61	122	0.4
TIP1-S9B1-1.3E	937	2950	15.7	3585	13389	1861	7833	1835	83	1711	263	1501	328	877	112	646	74	56	199	0.6
TIP1-S9B2-1.1I	1260	3815	18.6	3932	14236	1914	7687	1710	69	1637	262	1601	345	959	121	639	73	81	360	0.5
TIP1-S9B2-1.2E	959	2492	17.7	3798	13158	1810	7407	1624	65	1583	252	1558	333	894	118	648	77	58	187	0.6
TIP1-S9B3-1.1E	845	4181	18.7	4558	15599	1924	7433	1467	55	1299	212	1282	273	769	101	555	65	54	344	0.4
TIP1-S9B3-1.2I	6488	8162	17.6	4699	14292	1612	5629	896	63	749	114	718	170	546	87	593	81	373	749	0.6
TIP1-S9B3-1.3I	2201	4470	17.3	3318	10670	1208	4238	714	52	664	99	658	164	530	87	599	83	126	197	0.5
TIP1-S12A-1.1E	1298	3720	15.3	3178	11234	1466	5760	1163	78	1020	147	882	195	575	83	508	64	76	242	0.4
TIP1-S12A-1.2I	1097	3419	21.1	4138	15937	1996	8208	1785	68	1696	269	1642	348	922	123	669	74	65	334	0.4
TIP1-S12B-1.1I	1497	2875	19.8	4238	16106	2516	11574	2741	222	2318	328	1782	342	846	101	531	58	77	333	0.4
TIP1-S12B-1.2I	1192	3048	19.6	4408	15583	2119	8926	1753	134	1453	206	1164	236	634	80	463	52	54	274	0.4
TIP1-S12B-1.3I	1083	3431	18.7	4143	15520	2163	9239	2087	92	2003	307	1776	360	923	115	595	66	62	300	0.4
TIP1-S12B-1.4E	883	3047	19.0	3546	13056	1766	7310	1658	76	1518	234	1368	285	784	103	586	68	54	221	0.3
TIP1-S12D-1.1E	1153	4604	13.3	3992	12721	1430	4981	722	44	561	70	395	86	261	42	290	48	80	117	0.9
TIP1-S12D-1.2I	1455	2422	20.4	4119	15720	2444	11309	2610	216	2290	319	1736	335	831	101	530	61	72	254	0.3
TIP1-S12D-1.3EI	909	3027	18.5	3600	13398	1789	7351	1652	74	1529	231	1374	285	785	105	585	69	46	193	0.4
TIP1-S12D-1.4EI	1035	4511	16.6	2992	7542	728	2208	287	21	229	30	178	41	136	24	181	30	58	181	0.8
SCM27b-E-S10-1.1E	7894	9491	17.2	2324	9374	1467	6753	2070	40	2135	373	2277	459	1215	155	821	87	228	647	0.5
SCM27b-E-S1-1.1E	688	1547	12.2	299	672	83	341	91	15	96	18	125	30	91	15	92	15	23	118	5.3
SCM27b-E-S1-1.2I	2978	10055	18.1	4386	11720	1266	4691	866	17	784	124	794	176	529	80	499	63	96	1030	0.8
SCM27b-E-S1-1.3I	892	4910	16.2	3073	8040	879	3104	641	10	589	97	608	132	392	60	388	51	25	140	0.7
SCM27b-E-S2-1.1I	1856	2753	17.5	4109	8433	762	2454	330	12	241	29	157	30	88	14	92	13	107	248	0.3
SCM27b-E-S2-1.2I	2946	15203	14.9	3265	11925	1753	7785	2076	36	1964	311	1730	313	738	86	421	40	81	383	0.5
SCM27b-E-S2-1.3EI	980	2436	12.5	4940	9564	858	2851	382	16	278	35	178	36	95	13	96	15	41	166	0.6
SCM27b-E-S8-1.1EI	121	1859	17.6	317	1246	194	995	303	17	271	47	296	62	166	23	136	16	5	206	3.1
SCM27b-E-S8-1.2I	5179	14412	13.9	2539	10429	1596	7015	2035	29	2059	378	2372	489	1311	169	916	95	273	1139	0.5
SCM27b-T-S12-1.1E	3788	16178	16.5	2976	10584	1437	5691	1532	23	1602	295	1910	400	1129	163	934	101	88	769	0.6
SCM27b-T-S12-1.2E	2133	4446	17.3	3002	7819	875	3310	718	14	696	110	679	143	395	55	330	42	142	614	0.5
SCM27b-T-S12-1.3E	1967	4770	11.9	2084	6658	895	4026	1229	28	1361	262	1689	349	960	131	723	71	117	729	0.9

Appendix N: Sphene SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

								Zr in sphene temperature						
Samples	**Th**	**U**	**Y89**	**90ZrC**	**91ZrC**	**Ycr**	**NbC**	**Est. P**	**Act. SiO2**	**Act. TiO2**	**Temperature (°C)**	**Al+Fe**	**Sm/La**	**Ce/Sm**
MPe1-E-S10B-1.1I	6	7	185	118	118	185	359	0.1	1.0	0.7	634	82835	0.10	14.92
MPe1-E-S10B-1.2I	27	12	210	121	121	210	160	0.1	1.0	0.7	635	57924	0.33	9.43
MPe1-E-S10C-1I	262	81	411	693	693	411	1066	0.1	1.0	0.7	723	22566	0.14	17.85
MPe1-E-S8-1.1I	1875	321	789	163	163	789	1237	0.1	1.0	0.7	649	32711	0.15	16.79
MPe1-E-S8-1.2E	36	7	1030	67	67	1030	452	0.1	1.0	0.7	609	16901	0.41	9.77
MPe1-M-S10A-1I	38	7	832	100	100	832	672	0.1	1.0	0.7	627	13847	0.38	9.59
MPe1-M-S2-1.1E	27	58	2247	1099	1099	2247	1864	0.1	1.0	0.7	749	15232	4.18	1.77
MPe1-M-S2-1.2I	5	1	748	253	253	748	551	0.1	1.0	0.7	670	18715	1.59	4.31
MPe1-M-S2-1.3E	159	162	2472	439	439	2472	4629	0.1	1.0	0.7	699	22844	0.88	6.21
MPe1-M-S2-1.4E	75	133	1757	333	333	1757	3434	0.1	1.0	0.7	684	21728	1.05	5.76
MPe1-M-S2-1.5E	20	7	2014	255	255	2014	1155	0.1	1.0	0.7	671	22337	2.11	3.50
MPe1-M-S6-1I	6	3	835	161	161	835	402	0.1	1.0	0.7	648	21897	5.11	0.69
TIP1-S7-1.1I	457	26	6278	1036	1036	6278	3407	0.1	1.0	0.7	746	27866	0.34	10.53
TIP1-S7-1.2I	370	21	7556	918	918	7556	3903	0.1	1.0	0.7	739	28801	0.39	9.29
TIP1-S7-1.3E	330	28	7109	935	935	7109	2855	0.1	1.0	0.7	740	32066	0.43	7.79
TIP1-S8-1.1E	314	24	6621	788	788	6621	2484	0.1	1.0	0.7	730	29784	0.46	7.50
TIP1-S8-1.2I	376	23	8729	1072	1072	8729	3542	0.1	1.0	0.7	748	30182	0.55	6.72
TIP1-S9A-1.1E	332	29	5630	1224	1224	5630	3160	0.1	1.0	0.7	756	33100	0.48	7.85
TIP1-S9A-1.2I	311	24	7223	876	876	7223	3148	0.1	1.0	0.7	736	30619	0.47	7.66
TIP1-S9A-1.3I	283	22	6793	850	850	6793	3163	0.1	1.0	0.7	735	27965	0.46	8.03
TIP1-S9B1-1.1I	470	34	5194	1666	1666	5194	4406	0.1	1.0	0.7	774	28995	0.28	11.85
TIP1-S9B1-1.2E	530	50	1884	883	883	1884	3445	0.1	1.0	0.7	737	28112	0.13	21.02
TIP1-S9B1-1.3E	296	24	7940	936	936	7940	2950	0.1	1.0	0.7	740	31939	0.51	7.30
TIP1-S9B2-1.1I	376	27	8496	1259	1259	8496	3815	0.1	1.0	0.7	757	31366	0.43	8.33
TIP1-S9B2-1.2E	326	26	7987	958	958	7987	2491	0.1	1.0	0.7	741	32855	0.43	8.10
TIP1-S9B3-1.1E	368	23	6832	835	835	6832	4181	0.1	1.0	0.7	734	27996	0.32	10.63
TIP1-S9B3-1.2I	838	68	4997	6532	6532	4997	8161	0.1	1.0	0.7	865	32636	0.19	15.94
TIP1-S9B3-1.3I	743	61	4594	2208	2208	4594	4470	0.1	1.0	0.7	792	34576	0.22	14.94
TIP1-S12A-1.1E	378	33	5141	1289	1289	5141	3719	0.1	1.0	0.7	759	29611	0.37	9.66
TIP1-S12A-1.2I	397	26	8983	1092	1092	8983	3419	0.1	1.0	0.7	749	31559	0.43	8.93
TIP1-S12B-1.1I	372	27	7647	1493	1493	7647	2874	0.1	1.0	0.7	767	27692	0.65	5.88
TIP1-S12B-1.2I	354	26	5830	1199	1199	5830	3049	0.1	1.0	0.7	754	27814	0.40	8.89
TIP1-S12B-1.3I	353	22	8283	1082	1082	8283	3431	0.1	1.0	0.7	748	29340	0.50	7.44
TIP1-S12B-1.4E	301	25	7043	877	877	7043	3047	0.1	1.0	0.7	736	30090	0.47	7.87
TIP1-S12D-1.1E	587	247	2648	1150	1150	2648	4605	0.1	1.0	0.7	752	42384	0.18	17.61
TIP1-S12D-1.2I	340	26	7680	1459	1459	7680	2422	0.1	1.0	0.7	766	30044	0.63	6.02
TIP1-S12D-1.3EI	322	26	7219	899	899	7219	3027	0.1	1.0	0.7	738	30599	0.46	8.11
TIP1-S12D-1.4EI	367	118	1303	1030	1030	1303	4511	0.1	1.0	0.7	746	37259	0.10	26.29
SCM27b-E-S10-1.1E	575	117	11396	8066	8066	11396	9502	0.1	1.0	0.7	880	35137	0.89	4.53
SCM27b-E-S1-1.1E	24	9	797	684	684	797	1546	0.1	1.0	0.7	722	27852	0.30	7.39
SCM27b-E-S1-1.2I	930	344	4794	2985	2985	4794	10056	0.1	1.0	0.7	811	33830	0.20	13.54
SCM27b-E-S1-1.3I	514	247	3786	887	887	3786	4911	0.1	1.0	0.7	737	36897	0.21	12.55
SCM27b-E-S2-1.1I	524	43	818	1856	1856	818	2751	0.1	1.0	0.7	781	31669	0.08	25.52
SCM27b-E-S2-1.2I	542	67	7329	2967	2967	7329	15209	0.1	1.0	0.7	811	33124	0.64	5.74
SCM27b-E-S2-1.3EI	960	69	857	975	975	857	2435	0.1	1.0	0.7	742	31644	0.08	25.05
SCM27b-E-S8-1.1EI	33	20	1798	108	108	1798	1858	0.1	1.0	0.7	630	28819	0.95	4.12
SCM27b-E-S8-1.2I	817	110	12851	5191	5191	12851	14413	0.1	1.0	0.7	848	36175	0.80	5.12
SCM27b-T-S12-1.1E	1154	217	11489	3817	3817	11489	16185	0.1	1.0	0.7	827	40228	0.51	6.91
SCM27b-T-S12-1.2E	579	116	3725	2137	2137	3725	4446	0.1	1.0	0.7	789	35646	0.24	10.88
SCM27b-T-S12-1.3E	368	76	8553	1973	1973	8553	4770	0.1	1.0	0.7	784	32107	0.59	5.42

Appendix N: Sphene SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

	Elemental ratios										Concentratior						
	Gd/Yb	**Th/U**	**Y/Yb**	**Gd/Ho**	**Dy/Yb**	**Y/V**	**Y/Nb**	**Zr/Hf**	**Nb/Ta**		**La**	**Ce**	**Pr**	**Nd**	**Sm**	**Eu**	**Gd**
Samples										Chondrite[1]	0.319	0.82	0.121	0.615	0.2	0.076	0.267
MPe1-E-S10B-1.1I	2.18	0.88	12.2	4.2	2.5	0	0.52	38.7	18		986	591	371	258	162	120	126
MPe1-E-S10B-1.2I	4.09	2.33	12.7	8.1	2.8	2	1.32	21.8	8		893	1087	965	795	473	194	256
MPe1-E-S10C-1I	3.26	3.24	10.7	6.8	2.4	1	0.40	39.0	15		3585	3575	2386	1638	821	268	479
MPe1-E-S8-1.1I	4.28	5.83	10.6	9.1	2.5	1	0.64	13.0	15		9100	8780	6264	4426	2144	514	1197
MPe1-E-S8-1.2E	3.87	4.84	10.9	8.0	2.5	4	2.30	53.1	10		3417	5272	4748	3915	2213	634	1385
MPe1-M-S10A-1I	3.09	5.76	9.8	6.9	2.3	5	1.26	58.2	53		2536	3559	2949	2555	1521	634	994
MPe1-M-S2-1.1E	2.75	0.47	10.2	6.6	2.1	5	1.20	21.8	19		487	1401	2268	2905	3243	1266	2257
MPe1-M-S2-1.2I	3.22	3.88	7.5	9.1	1.9	4	1.38	26.3	8		815	2165	3006	3037	2061	215	1226
MPe1-M-S2-1.3E	4.77	0.99	10.5	10.4	2.7	8	0.53	30.3	27		5645	12056	14053	12937	7953	925	4203
MPe1-M-S2-1.4E	3.91	0.56	9.0	9.8	2.3	6	0.51	23.8	17		3263	7686	9431	8816	5468	722	2852
MPe1-M-S2-1.5E	3.72	2.88	11.0	8.6	2.3	7	1.75	25.6	11		1300	3735	5411	5745	4373	467	2565
MPe1-M-S6-1I	3.36	2.08	9.0	5.8	2.9	1	2.08	22.9	14		138	190	390	647	1126	308	1173
TIP1-S7-1.1I	2.72	17.74	12.2	5.5	2.4	33	1.84	19.1	11		15007	20642	18104	14130	8040	1373	5202
TIP1-S7-1.2I	2.52	17.80	13.3	5.0	2.5	59	1.93	16.6	12		12565	17652	16482	12414	7793	770	5353
TIP1-S7-1.3E	2.41	11.85	11.6	5.1	2.2	45	2.48	17.1	13		11014	14461	13600	11454	7609	1173	5504
TIP1-S8-1.1E	2.74	13.28	12.4	5.9	2.3	47	2.66	16.3	12		11238	15231	14529	11462	8323	1114	5490
TIP1-S8-1.2I	3.22	16.02	14.9	5.4	3.0	58	2.46	18.1	12		12028	17289	18124	14017	10541	1106	7042
TIP1-S9A-1.1E	2.39	11.39	10.4	5.5	2.0	35	1.77	15.7	13		9706	14135	11983	9815	7380	1356	4833
TIP1-S9A-1.2I	2.67	12.91	12.1	5.4	2.4	54	2.29	15.7	12		11341	16021	14938	12219	8576	1042	5977
TIP1-S9A-1.3I	2.81	12.85	12.8	5.6	2.5	50	2.14	17.4	13		10723	15556	14801	12017	7941	1129	5575
TIP1-S9B1-1.1I	1.93	13.69	10.5	5.0	1.8	29	1.18	17.7	12		12813	16663	14370	10670	5767	1073	3579
TIP1-S9B1-1.2E	1.19	10.65	7.3	4.9	1.0	13	0.55	14.7	28		9287	9961	6727	4305	1943	709	1147
TIP1-S9B1-1.3E	2.65	12.41	12.2	5.2	2.3	54	2.68	16.8	15		11238	16328	15377	12736	9174	1091	6407
TIP1-S9B2-1.1I	2.56	13.90	13.2	4.8	2.5	61	2.22	15.6	11		12325	17361	15818	12500	8548	912	6131
TIP1-S9B2-1.2E	2.44	12.42	12.3	4.8	2.4	53	3.19	16.7	13		11907	16046	14956	12044	8119	852	5930
TIP1-S9B3-1.1E	2.34	16.02	12.3	4.8	2.3	52	1.63	16.3	12		14288	19023	15902	12087	7334	724	4867
TIP1-S9B3-1.2I	1.26	12.23	8.5	4.4	1.2	41	0.62	17.0	11		14731	17429	13324	9153	4482	824	2806
TIP1-S9B3-1.3I	1.11	12.26	7.7	4.1	1.1	29	1.03	17.3	23		10402	13012	9986	6891	3571	681	2487
TIP1-S12A-1.1E	2.01	11.37	10.1	5.2	1.7	32	1.38	17.4	15		9962	13700	12112	9366	5816	1029	3819
TIP1-S12A-1.2I	2.54	15.20	13.4	4.9	2.5	64	2.62	17.2	10		12970	19435	16495	13347	8924	899	6352
TIP1-S12B-1.1I	4.36	13.87	14.3	6.8	3.4	29	2.65	19.6	9		13286	19641	20796	18820	13707	2921	8682
TIP1-S12B-1.2I	3.14	13.70	12.5	6.2	2.5	27	1.90	21.8	11		13817	19004	17510	14514	8764	1757	5441
TIP1-S12B-1.3I	3.37	16.12	13.9	5.6	3.0	50	2.40	17.5	11		12988	18927	17876	15022	10435	1212	7500
TIP1-S12B-1.4E	2.59	12.18	12.0	5.3	2.3	53	2.30	16.8	14		11115	15922	14595	11885	8292	998	5684
TIP1-S12D-1.1E	1.93	2.37	9.1	6.5	1.4	17	0.58	14.5	39		12514	15513	11819	8099	3612	578	2100
TIP1-S12D-1.2I	4.32	13.21	14.4	6.8	3.3	29	3.16	20.1	10		12914	19170	20202	18389	13048	2836	8575
TIP1-S12D-1.3EI	2.62	12.39	12.3	5.4	2.4	54	2.38	20.5	16		11286	16339	14786	11952	8262	980	5728
TIP1-S12D-1.4EI	1.26	3.10	7.3	5.5	1.0	8	0.29	18.1	25		9381	9198	6020	3591	1434	277	858
SCM27b-E-S10-1.1E	2.60	4.92	13.7	4.7	2.8	58	1.19	32.2	15		7284	11431	12122	10981	10349	523	7996
SCM27b-E-S1-1.1E	1.04	2.76	8.7	3.3	1.3	4	0.52	30.0	13		937	819	683	555	455	203	360
SCM27b-E-S1-1.2I	1.57	2.70	9.6	4.5	1.6	33	0.48	31.0	10		13748	14293	10464	7628	4328	230	2935
SCM27b-E-S1-1.3I	1.52	2.08	9.7	4.5	1.6	24	0.77	37.0	35		9635	9805	7262	5047	3204	131	2208
SCM27b-E-S2-1.1I	2.62	12.32	9.2	7.9	1.7	7	0.31	17.3	11		12882	10284	6301	3990	1652	161	902
SCM27b-E-S2-1.2I	4.66	8.13	17.3	6.3	4.1	48	0.48	35.7	40		10236	14543	14486	12658	10382	475	7357
SCM27b-E-S2-1.3EI	2.90	14.00	9.1	7.8	1.9	7	0.36	24.0	15		15487	11663	7093	4635	1909	208	1042
SCM27b-E-S8-1.1EI	1.99	1.66	13.2	4.4	2.2	10	0.97	31.0	9		994	1520	1604	1618	1513	226	1016
SCM27b-E-S8-1.2I	2.25	7.43	14.0	4.2	2.6	73	0.89	18.8	13		7959	12718	13186	11406	10175	381	7711
SCM27b-T-S12-1.1E	1.72	5.32	12.3	4.0	2.0	50	0.71	41.8	21		9330	12908	11872	9254	7659	301	5998
SCM27b-T-S12-1.2E	2.11	5.02	11.3	4.9	2.1	18	0.84	14.9	7		9410	9536	7230	5382	3592	181	2607
SCM27b-T-S12-1.3E	1.88	4.86	11.8	3.9	2.3	39	1.79	16.7	7		6532	8119	7400	6546	6147	367	5096

Appendix N: Sphene SHRIMP Elemental Analyses, Silver Creek Caldera and Environs

/Chondrite

	Tb	Dy	Ho	Er	Tm	Yb	Lu
Samples	0.0493	0.33	0.0755	0.216	0.0329	0.221	0.033
MPe1-E-S10B-1.1I	118	114	105	101	94	70	56
MPe1-E-S10B-1.2I	174	139	112	97	84	75	65
MPe1-E-S10C-1I	348	286	250	232	199	178	137
MPe1-E-S8-1.1I	779	575	464	413	370	338	305
MPe1-E-S8-1.2E	907	713	613	537	460	432	359
MPe1-M-S10A-1I	730	596	508	459	404	389	305
MPe1-M-S2-1.1E	1675	1416	1208	1161	1027	993	913
MPe1-M-S2-1.2I	807	600	475	447	400	460	473
MPe1-M-S2-1.3E	2621	1889	1423	1203	1051	1064	904
MPe1-M-S2-1.4E	1839	1335	1029	908	837	882	792
MPe1-M-S2-1.5E	1710	1302	1059	942	870	832	754
MPe1-M-S6-1I	968	826	711	640	507	422	349
TIP1-S7-1.1I	4161	3681	3370	3172	2730	2313	1779
TIP1-S7-1.2I	4730	4210	3816	3624	3044	2566	1935
TIP1-S7-1.3E	4616	4102	3785	3628	3328	2760	2226
TIP1-S8-1.1E	4215	3793	3315	3184	2872	2417	2066
TIP1-S8-1.2I	6032	5378	4632	3951	3373	2643	2004
TIP1-S9A-1.1E	3802	3226	3088	3019	2796	2448	2011
TIP1-S9A-1.2I	4906	4345	3917	3768	3216	2701	2096
TIP1-S9A-1.3I	4557	3934	3506	3341	2830	2394	1934
TIP1-S9B1-1.1I	2925	2648	2541	2660	2456	2238	1836
TIP1-S9B1-1.2E	859	814	827	946	1066	1168	1203
TIP1-S9B1-1.3E	5333	4548	4346	4059	3416	2924	2242
TIP1-S9B2-1.1I	5314	4852	4563	4441	3692	2891	2210
TIP1-S9B2-1.2E	5107	4721	4411	4141	3585	2933	2345
TIP1-S9B3-1.1E	4292	3886	3610	3558	3060	2511	1964
TIP1-S9B3-1.2I	2305	2174	2252	2528	2644	2684	2453
TIP1-S9B3-1.3I	2005	1995	2169	2451	2659	2709	2506
TIP1-S12A-1.1E	2984	2672	2580	2661	2527	2298	1954
TIP1-S12A-1.2I	5450	4977	4609	4268	3728	3026	2251
TIP1-S12B-1.1I	6647	5401	4530	3918	3074	2404	1767
TIP1-S12B-1.2I	4173	3528	3121	2936	2432	2093	1587
TIP1-S12B-1.3I	6220	5382	4764	4272	3502	2691	1999
TIP1-S12B-1.4E	4742	4146	3771	3629	3124	2654	2050
TIP1-S12D-1.1E	1419	1197	1144	1207	1283	1313	1463
TIP1-S12D-1.2I	6466	5261	4437	3848	3059	2397	1850
TIP1-S12D-1.3EI	4695	4164	3771	3634	3199	2645	2091
TIP1-S12D-1.4EI	606	539	548	629	734	821	913
SCM27b-E-S10-1.1E	7566	6901	6075	5625	4723	3716	2648
SCM27b-E-S1-1.1E	364	378	392	423	443	418	441
SCM27b-E-S1-1.2I	2522	2407	2332	2451	2437	2260	1907
SCM27b-E-S1-1.3I	1966	1842	1749	1814	1815	1757	1558
SCM27b-E-S2-1.1I	598	477	404	408	415	415	406
SCM27b-E-S2-1.2I	6302	5242	4151	3415	2614	1906	1200
SCM27b-E-S2-1.3EI	704	540	470	438	403	435	455
SCM27b-E-S8-1.1EI	951	897	816	769	698	617	471
SCM27b-E-S8-1.2I	7665	7188	6478	6068	5137	4143	2883
SCM27b-T-S12-1.1E	5975	5787	5303	5226	4959	4225	3067
SCM27b-T-S12-1.2E	2233	2058	1892	1827	1676	1492	1284
SCM27b-T-S12-1.3E	5311	5117	4622	4446	3986	3271	2138

[1] Anders & Grevesse (1989) * 1.3596

REFERENCES

Allan, A.S., Wilson, C.J., Millet, M.A., & Wysoczanski, R.J. (2012) The invisible hand: Tectonic triggering and modulation of a rhyolitic supereruption. *Geology*, ***40***(6), 563-566.

Allen, C.M., Wooden, J.L., Howard, K.A., Foster, D.A., and Tosdal, R.M. (1995) Sources of the Early Cretaceous plutons in the Turtle and West Riverside mountains, California; anomalous Cordilleran interior intrusions. *Journal of Petrology, **36***, 1675–1700.

Almeida, D.P.M., Borba, A.W., Chemale Jr., F., Koester, E., Conceicão, R.V. (2003) Isotopic signature of the Acampamento Velho and Rodeio Velho volcanic successions from the Camaquã Basin, Southern Brazil. IV South American Symposium on Isotope Geology: Short Papers, pp. 491–494.

Almeida, D.P.M., Conceicão, R.V., Chemale-Jr, F., Koester, E., Borba, A.W., Petry, K. (2005) Evolution of heterogeneous mantle in the Acampamento Velho and Rodeio Velho events, Camaquã Basin, Southern Brazil. *Gondwana Research, **8***, 479–492.

de Almeida, F.F.M., Hasui, Y., de Brito Neves, B.B., & Fuck, R.A. (1981). Brazilian structural provinces: an introduction. *Earth-Science Reviews*, ***17***(1), 1-29.

de Almeida, R.P., Janikian, L., Fragoso-Cesar, A.R.S., and Fambrini, G.L. (2010) The Ediacaran to Cambrian rift system of southeastern South America: tectonic implications. *The Journal of Geology, **118***, p. 145-161.

Anders, E., & Grevesse, N. (1989). Abundances of the elements: Meteoritic and solar. *Geochimica et Cosmochimica acta*, ***53***(1), 197-214.

Annen, C. (2009) From plutons to magma chambers: Thermal constraints on the accumulation of eruptible silicic magma in the upper crust. *Earth and Planetary Science Letters*, ***284***(3), 409-416.

Babinski, M., Chemale Jr., F., Van Schmus, W.R., Hartmann, L.A., and da Silva, L.C. (1997) U-Pb and Sm-Nd geochronology of the Neoproterozoic granitic-gneissic Dom Feliciano belt, southern Brazil. *Journal of South American Earth Sciences, **10***(3-4), 263-274.

Bachl, C.A., Miller, C.F., Miller, J.S., and Faults, J.E. (2001) Construction of a pluton: Evidence from an exposed cross-section of the Searchlight pluton, Eldorado Mountains, Nevada. *GSA Bulletin, **113***(9), 1213-1228.

Bachmann, O., & Bergantz, G.W. (2004) On the origin of crystal-poor rhyolites: extracted from batholithic crystal mushes. *Journal of Petrology, **45***(8), 1565-1582.

Bachmann, O., & Bergantz, G. (2008) The magma reservoirs that feed supereruptions. *Elements*, ***4***(1), 17-21.

Bachmann, O., Miller, C.F., & De Silva, S.L. (2007) The volcanic–plutonic connection as a stage for understanding crustal magmatism. *Journal of Volcanology and Geothermal Research*, ***167***(1), 1-23.

Baertschi, P. (1976) Absolute ^{18}O content of standard mean ocean water. *Earth and Planetary Science Letters*, ***31***(3), 341-344.

Barth, A.P., & Wooden, J.L. (2010) Coupled elemental and isotopic analyses of polygenetic zircons from granitic rocks by ion microprobe, with implications for melt evolution and the sources of granitic magmas. *Chemical Geology*, ***277***(1-2), 149-159.

Basei, M.A.S., Drukas, C.O., Nutman, A.P., Wemmer, K., Dunyi, L., Santos, P.R., Passarelli, C.R., Campos Neto, C.R., Siga Jr., O., and Osako, L. (2011) The Itajaí foreland basin: a tectono-sedimentary record of the Ediacaran period, southern Brazil. *International Journal of Earth Sciences,* ***100***, p. 543-569.

Basei, M.A.S., Siga, O., Masquelin, H., Harara, O.M., Reis Neto, J.M., and Preciozzi, F.P. (2000) The Dom Feliciano Belt of Brasil and Uruguay and its foreland domain, the Rio de La Plata Craton: framework, tectonic evolution, and correlation with similar provinces of southwestern Africa. In Cordani, U.G., Milani, E.J., Thomaz Filho, A., and Campos, D.A. (Eds.), Tectonic evolution of South America. Rio de Janeiro, 31 International Geological Congress, p. 311-334.

Basei, M.A.S. (1985) O cinturao Dom Feliciano em Santa Catarina. Ph.D. thesis, Universidade de Saõ Paulo.

Beard, B.L., and Glazner, A.F. (1995) Trace element and Sr and Nd isotopic composition of mantle xenoliths from the Big Pine Volcanic Field, California. *Journal of Geophysical Research,* ***100***, 4169–4179.

Bennett, V.C., and DePaolo, D.J. (1987) Proterozoic crustal history of the western United States as determined by neodymium isotopic mapping. *Geological Society of America Bulletin,* ***99***, 674-685.

Bickford, M.E., Van, W.R., & Zietz, I. (1986) Proterozoic history of the midcontinent region of North America. *Geology*, ***14***(6), 492-496.

Bindeman, I.N., & Valley, J.W. (2001) Low-δ18O rhyolites from Yellowstone: Magmatic evolution based on analyses of zircons and individual phenocrysts. *Journal of Petrology,* ***42***(8), 1491-1517.

Bindeman, I.N., Watts, K.E., Schmitt, A.K., Morgan, L.A., & Shanks, P.W. (2007) Voluminous low δ18O magmas in the late Miocene Heise volcanic field, Idaho: Implications for the fate of Yellowstone hotspot calderas. *Geology*, ***35***(11), 1019-1022.

Black, L.P., Kamo, S.L., Allen, C.M., Davis, D.W., Aleinikoff, J.N., Valley, J.W., Mundil, R., Campbell, I.H., Korsch, R.J., Williams, I.S., & Foudoulis, C. (2004) Improved ^{206}Pb/^{238}U microprobe geochronology by the monitoring of a trace-element-related matrix effect; SHRIMP, ID-TIMS, ELA-ICP-MS and oxygen isotope documentation for a series of zircon standards. *Chemical Geology,* ***205***(1-2), 115-140.

Blichert-Toft, J., Chauvel, C., & Albarède, F. (1997) Separation of Hf and Lu for high-precision isotope analysis of rock samples by magnetic sector-multiple collector ICP-MS. *Contributions to Mineralogy and Petrology*, ***127***(3), 248-260.

Boehnke, P., Watson, E.B., Trail, D., Harrison, T.M., & Schmitt, A.K. (2013) Zircon saturation re-revisited. *Chemical Geology,* ***351****,* 324-334.

Bonin, B., Azzouni-Sekkal, A., Bussy, F., and Ferrag, S. (1998) Alkali-calcic and alkaline post-orogenic (PO) granite magmatism: petrologic constraints and geodynamic settings*. Lithos,* ***45****,* p. 45-70.

Bonin, B. (2007) A-type granites and related rocks: evolution of a concept, problems and prospects. *Lithos,* ***97***(1), 1-29.

Bouvier, A., Vervoort, J.D., & Patchett, P.J. (2008) The Lu–Hf and Sm–Nd isotopic composition of CHUR: constraints from unequilibrated chondrites and implications for the bulk composition of terrestrial planets. *Earth and Planetary Science Letters*, *273*(1), 48-57.

Braun, S.A., Bream, B.R., and Gualda, G.A. (2009) Age and chemistry of megacrystic zircons from Zirconia, North Carolina. *Geological Society of America Abstracts with Programs*, ***41***(7), 671.

Braun, S.A., Gualda, G.A.R., Bream, B., and Vlach, S.R.F. (2010) Importance of LA-ICP-MS zircon geochronology and geochemistry in determining the history of magmatic systems: insights from the Graciosa A-type province, southern Brazil. AGU Fall Meeting, 2010, San Francisco. (Abstract ID# V41B-2287).

Brito Neves, B.B., Campos Neto, M.C., and Fuck, R. (1999) From Rodinia to eastern Gondwana: an approach to the Brasiliano-Pan African cycle and orogenic collage. *Episodes*, ***22***, 155-166.

Bromley, S.A., Bleick, H.A., Ericksen, S.M., Miller, C.F., Miller, J.S., Claiborne, L.L., Wooden, J.L., & Mazdab, F.K. (2008) In situ mechanical and diffusive mixing in Aztec Wash pluton, NV: Evidence from zircon Ti thermometry and elemental zoning. *Geological Society of America Abstracts with Programs,* ***40***(1), 62.

Buesch, D.C. (1992) Incorporation and redistribution of locally derived lithic fragments within a pyroclastic flow. *GSA Bulletin*, ***104***, 1193-1207.

Buesch, D.C. and Valentine, G.A. (1986) Peach Springs Tuff and volcanic stratigraphy of the southern Cerbat Mountains, Kingman, Arizona, *in* Nielson, J.E., and Glazner, A.F., eds., *Cenozoic stratigraphy, structure and mineralization in the Mojave Desert*: Los Angeles, California State University, 7-14.

Burdakin, N.J., McDowell, S.M., and Gualda, G. (2013) Geochronology and geochemistry of volcanic rocks from a large rift system in southern Brazil: preliminary data from the Camaquã and Itajaí basins. *Geological Society of America Abstracts with Programs*, ***45***(3), 86.

Carley, T.L., Miller, C.F., Wooden, J.L., Bindeman, I.N., & Barth, A.P. (2011) Zircon from historic eruptions in Iceland: reconstructing storage and evolution of silicic magmas. *Mineralogy and Petrology*, ***102***(1-4), 135-161.

Carley, T.L., Miller, C.F., Wooden, J., Padilla, A., Schmitt, A., Economos, R., Bindeman, I., and Jordan, B. (In review) Iceland is not a magmatic analog for the Hadean: Evidence from the zircon record. Submitted to *Earth and Planetary Science Letters.*

Chemale, F. (2000) Evolução geológica do Escudo Sul-rio-grandense. In: Holz, M. and De Ros, L.F. (Eds.), Geologica do Rio Grande do Sul, pp. 13-52.

Cherniak, D.J., & Watson, E.B. (2001) Pb diffusion in zircon. *Chemical Geology*, ***172***(1), 5-24.

Cherniak, D.J., & Watson, E.B. (2003) Diffusion in zircon. *Reviews in mineralogy and geochemistry*, ***53***(1), 113-143.

Claiborne, L.L., Miller, C.F., Walker, B.A., Wooden, J.L., Mazdab, F.K., & Bea, F. (2006) Tracking magmatic processes through Zr/Hf ratios in rocks and Hf and Ti zoning in zircons: an example from the Spirit Mountain batholith, Nevada. *Mineralogical Magazine*, ***70***(5), 517-543.

Claiborne, L.L., Miller, C.F., Flanagan, D.M., Clynne, M.A., & Wooden, J.L. (2010a) Zircon reveals protracted magma storage and recycling beneath Mt. St. Helens. *Geology*, ***38***(11), 1011-1014.

Claiborne, L.L**.**, Miller, C.F., Wooden, J.L. (2010b) Trace element composition of igneous zircon: a thermal and compositional record of the accumulation and evolution of a large silicic batholith, Spirit Mountain, Nevada. *Contributions to Mineralogy and Petrology*, ***160***, 511–531.

Colombini, L.L., Miller, C.F., Gualda, G.A., Wooden, J.L., & Miller, J.S. (2011) Sphene and zircon in the Highland Range volcanic sequence (Miocene, southern Nevada, USA): elemental partitioning, phase relations, and influence on evolution of silicic magma. *Mineralogy and Petrology*, ***102***(1-4), 29-50.

Condie, K.C., Belousova, E., Griffin, W.L., & Sircombe, K.N. (2009) Granitoid events in space and time: constraints from igneous and detrital zircon age spectra. *Gondwana Research*, ***15***(3), 228-242.

Condie, K.C., & Aster, R.C. (2010) Episodic zircon age spectra of orogenic granitoids: the supercontinent connection and continental growth. *Precambrian Research*, ***180***(3), 227-236.

Covey, A.K., Braun, S.A., Gualda, G.A.R., Bream, B.R., Fisher, C., Wooden, J.L., and Schmitz, M.D. (2012) Zirconia (NC) zircon as a potential standard. 2012 Fall Meeting, AGU, San Francisco, CA, 3-7 Dec.

Crowley, J.L., Schoene, B., & Bowring, S.A. (2007) U-Pb dating of zircon in the Bishop Tuff at the millennial scale. *Geology*, ***35***(12), 1123-1126.

DePaolo, D.J. (1981) Trace element and isotopic effects of combined wallrock assimilation and fractional crystallization. *Earth and Planetary Science Letters*, ***53***(2), 189-202.

DePaolo, D J., & Wasserburg, G.J. (1979) Sm-Nd age of the Stillwater Complex and the mantle evolution curve for neodymium. *Geochimica et Cosmochimica Acta*, ***43***(7), 999-1008.

DePaolo, D.J., & Wasserburg, G.J. (1976) Inferences about magma sources and mantle structure from variations of ^{143}Nd/^{144}Nd. *Geophysical Research Letters*, ***3***(12), 743-746.

DeWitt, E., Thorson, J.P., & Smith, R.C. (1986) Geology and gold deposits of the Oatman District, northwestern Arizona. *U.S. Geological Survey Bulletin* ***1857-1***, I1-I28.

Drew, D.L., Bindeman, I.N., Watts, K.E., Schmitt, A.K., Fu, B., and McCurry, M. (2013) Crustal-scale recycling in caldera complexes and rift zones along the Yellowstone hotspot track: O and Hf isotopic evidence in diverse zircons from voluminous rhyolites of the Picabo volcanic field, Idaho. *Earth and Planetary Science Letters*, ***381,*** 63-77.

Druitt, T.H., Costa, F., Deloule, E., Dungan, M., & Scaillet, B. (2012) Decadal to monthly timescales of magma transfer and reservoir growth at a caldera volcano. *Nature*, ***482***(7383), 77-80.

Eby, G.N. (1990) The A-type granitoids: a review of their occurrence and chemical characteristics and speculations on their petrogenesis. *Lithos*, ***26***(1), 115-134.

Ericksen, S.M., Miller, J.S., Miller, C.F., Harper, B.E., and Aggarwal, J.K. (2004) Isotopic constraints on the evolution of felsic magma in the Aztec Wash pluton, Eldorado Mountains, Nevada. *Geological Society of America Abstracts with Programs*, ***36***(4), 8.

Falkner, C.M., Miller, C.F., Wooden, J.L., and Heizler, M.T. (1995) Petrogenesis and tectonic significance of the calc-alkaline, bimodal Aztec Wash pluton, Eldorado Mountains, Colorado River extensional corridor. *Journal of Geophysical Research,* ***100***(B7), 10453-10476.

Farmer, G.L., Perry, F.V., Semken, S., Crowe, B., Curtis, D., and DePaolo, D.J. (1989) Isotopic evidence of the structure and origin of subcontinental lithospheric mantle in southern Nevada. *Journal of Geophysical Research*, ***94***, 7885-7898.

Faulds, J.E., Feuerbach, D.L., Reagan M., Metcalf, R.V., Gans, P., and Walker, J.D. (1995) The Mount Perkins block, northwestern Arizona: An exposed cross section of an evolving, preextensional to synextensional magmatic system. *Journal of Geophysical Research,* ***100***(B8), 15,249-15,266.

Faulds, J.E., Feuerbach, D.L., Miller, C.F., & Smith, E.I. (2001) Cenozoic evolution of the northern Colorado River extensional corridor, southern Nevada and northwest Arizona, in Erskine M.C., et al*., eds., The geologic transition, High Plateaus to Great Basin – A symposium and field guide: The Makin volume:* Utah Geological Association Publication 30, Pacific Section American Association of Petroleum Geologists Publication GB78*, p.* 239–271.

Faulds, J.E., Mawer, C.K., and Geissman, J.W. (1990) Structural development of a major extensional accommodation zone in the Basin and Range province, northwestern Arizona and southern Nevada: Implications for kinematic models of continental extension. *In* Wernicke, B. (Ed.), Basin and Range extensional tectonics near the latitude of Las Vegas, Nevada. *Geological Society of America Memoir*, 176, 37-78.

Faulds, J.E., Smith, E.I., and Gans, P. (1999) Spatial and temporal patterns of magmatism and extension in the northern Colorado River extensional corridor, Nevada and Arizona: A preliminary report. *In* Cenozoic geology of the northern Colorado River extensional corridor, Nevada and Arizona: Economic implications of extensional segmentation structures: Nevada Petroleum Society, Field Trip Guide, p. 171-183.

Ferguson, C.A. (2008) Silver Creek Caldera, probable source of the Miocene Peach Spring Tuff, Oatman Mining District, Arizona. *Geological Society of America Abstracts with Programs*, ***40***(1), 33.

Ferguson, C.A., McIntosh, W.C., & Miller, C.F. (2013) Silver Creek caldera—The tectonically dismembered source of the Peach Spring Tuff. *Geology*, ***41***(1), 3-6.

Ferry, J.M., & Watson, E.B. (2007) New thermodynamic models and revised calibrations for the Ti-in-zircon and Zr-in-rutile thermometers. *Contributions to Mineralogy and Petrology*, ***154***(4), 429-437.

Feuerbach, D.L., Reagan, M.K., Faulds, J.E., & Walker, J.D. (1998) Lead isotopic evidence for synextensional lithospheric ductile flow in the Colorado River extensional corridor, western United States. *Journal of Geophysical Research: Solid Earth (1978–2012)*, ***103***(B2), 2515-2528.

Feuerbach, D.L., Smith, E.I., Walker, J.D., & Tangeman, J.A. (1993) The role of the mantle during crustal extension: Constraints from geochemistry of volcanic rocks in the Lake Mead area, Nevada and Arizona. *Geological Society of America Bulletin*, ***105***, 1561-1575.

Fisher, C.M., Vervoort, J.D., & DuFrane, S.A. (2014a) Accurate Hf isotope determinations of complex zircons using the "laser ablation split stream" method. *Geochemistry, Geophysics, Geosystems*, ***15***(1), 121-139.

Fisher, C.M., Vervoort, J.D., & Hanchar, J.M. (2014b) Guidelines for reporting zircon Hf isotopic data by LA-MC-ICPMS and potential pitfalls in the interpretation of these data. *Chemical Geology*, ***363***, 125-133.

Fragoso-Cesar, A.R.S., Fambrini, G.L., Almeida, R.P., Pelosi, A.P.M.R., Janikian, L., Riccomini, C., Machado, R., Nogueira, A.C.R., and Saes, G.S. (2000) The Camaquã extensional basin: Neoproterozoic to Early Cambrian sequences in southernmost Brazil. *Reviews of Brasilian Geosciences*, ***30***, 438-441.

Frazier, W.O. (2013) *Petrochemical constraints on generation of the Peach Spring Tuff supereruption magma, Arizona, Nevada, California*. (Masters thesis). Vanderbilt University, Nashville, TN.

Frost, B.R., and Frost, C.D. (2008) A geochemical classification for feldspathic rocks, *Journal of Petrology*, ***49***(11), 1955-1969.

Frost, C.D., and Frost, B.R. (2011) On ferroan (A-type) granitoids: their compositional variability and modes of origin. *Journal of Petrology*, ***52***(1), p. 39-53.

Fu, B., Page, F.Z., Cavosie, A.J., Fournelle, J., Kita, N.T., Lackey, J.S., & Valley, J.W. (2008) Ti-in-zircon thermometry: applications and limitations. *Contributions to Mineralogy and Petrology*, ***156***(2), 197-215.

Galer, S.J.G., & Abouchami, W. (1998) Practical application of lead triple spiking for correction of instrumental mass discrimination. *Mineralogical Magazine of America*, ***62***, 491-492.

Gaschnig, R.M., Vervoort, J.D., Lewis, R.S., & Tikoff, B. (2011) Isotopic evolution of the Idaho batholith and Challis intrusive province, northern US Cordillera. *Journal of Petrology*, ***52***(12), 2397-2429.

Gastal, M.C.P., & Lafon, J.M. (1998) Genese e evolução dos granitóides metaluminosos de afinidade alkalina da porção oeste do escudo Sul-RioGrandense: geoquímica e isótopos de Rb-Se e Pb-Pb. *Revista Brasileira de Geociencias*, ***28***(1), 11-28.

Geisler, T., Schaltegger, U., & Tomaschek, F. (2007) Re-equilibration of zircon in aqueous fluids and melts. *Elements, **3***(1), 43-50.

Gerber, M.E., Miller, C.F., and Wooden, J.L. (1995) Plutonism at the eastern edge of the Cordilleran Jurassic magmatic belt, Mojave Desert, California. In Miller D.M., and Busby, C., (Eds.), Jurassic magmatism and tectonism in the Cordillera, *Geological Society of America Special Paper, **299***, 351-374.

Ghiorso, M.S., & Gualda, G.A. (2013) A method for estimating the activity of titania in magmatic liquids from the compositions of coexisting rhombohedral and cubic iron–titanium oxides. *Contributions to Mineralogy and Petrology*, ***165***(1), 73-81.

Glazner, A.F., Coleman, D.S., & Bartley, J.M. (2008) The tenuous connection between high-silica rhyolites and granodiorite plutons. *Geology*, ***36***(2), 183-186.

Glazner, A.F., Nielson, J.E., Howard, K.E., & Miller, D.M. (1986) Correlation of the Peach Springs Tuff, a large-volume Miocene ignimbrite sheet in California and Arizona. *Geology*, ***14***, 840-843.

Goodge, J.W., & Vervoort, J.D. (2006) Origin of Mesoproterozoic A-type granites in Laurentia: Hf isotope evidence. *Earth and Planetary Science Letters*, ***243***(3), 711-731.

Gregg, P.M., de Silva, S.L., Grosfils, E.B., & Parmigiani, J.P. (2012) Catastrophic caldera-forming eruptions: Thermomechanics and implications for eruption triggering and maximum caldera dimensions on Earth. *Journal of Volcanology and Geothermal Research*, ***241***, 1-12.

Gresse, P.G., Chemale, F., da Silva, L.C., Walraven, F., and Hartmann, L.A. (1996) Late- to post-orogenic basins of the Pan-African-Brasiliano collision orogen in southern Africa and southern Brazil. *Basin Research*, ***8***, p. 157-171.

Griffin, W.L., Powell, W.J., Pearson, N.J., & O'Reilly, S.Y. (2008) GLITTER: Data reduction software for laser ablation ICP-MS. *Laser Ablation-ICP-MS in the Earth Sciences. Mineralogical Association of Canada Short Course Series*, ***40***, 204-207.

Grimes, C.B., John, B.E., Cheadle, M.J., Mazdab, F.K., Wooden, J.L., Swapp, S., & Schwartz, J.J. (2009) On the occurrence, trace element geochemistry, and crystallization history of zircon from in situ ocean lithosphere. *Contributions to Mineralogy and Petrology*, ***158***(6), 757-783.

Gualda, G.A., Pamukcu, A.S., Ghiorso, M.S., Anderson Jr, A.T., Sutton, S.R., & Rivers, M.L. (2012) Timescales of quartz crystallization and the longevity of the Bishop giant magma body. *PloS One*, ***7***(5), e37492.

Gualda, G.A.R., and Vlach, S.R.F. (2007) The Serra da Graciosa A-type Granites and Syenites, southern Brazil. Part 1: Regional setting and geological characterization. *Annals of the Brazilian Academy of Sciences*, ***79***, p. 405-430.

Hamilton, J.O. (1977) Sr isotope and trace element studies of the Great Dyke and Bushveld mafic phase and their relation to early Proterozoic magma genesis in southern Africa. *Journal of Petrology*, ***18***(1), 24-52.

Hanchar, J.M. & Hoskin, P.W.O. (Eds.) (2003) Zircon. *Reviews in mineralogy and geochemistry*, ***53***(1). 500 pp.

Harley, S.L., & Kelly, N.M. (2007) Zircon: tiny but timely. *Elements*, ***3***(1), 13-18.

Harrison, T.M., Watson, E.B., & Aikman, A.B. (2007) Temperature spectra of zircon crystallization in plutonic rocks. *Geology*, ***35***(7), 635-638.

Hawkesworth, C.J., & Kemp, A.I.S. (2006) Using hafnium and oxygen isotopes in zircons to unravel the record of crustal evolution. *Chemical Geology*, ***226***(3), 144-162.

Hayden, L.A., & Watson, E.B. (2007) Rutile saturation in hydrous siliceous melts and its bearing on Ti-thermometry of quartz and zircon. *Earth and Planetary Science Letters*, ***258***(3), 561-568.

Hayden, L.A., Watson, E.B., & Wark, D.A. (2008) A thermobarometer for sphene (titanite). *Contributions to Mineralogy and Petrology*, ***155***(4), 529-540.

Irmis, R.B., Mundil, R., Martz, J.W., & Parker, W.G. (2011) High-resolution U–Pb ages from the Upper Triassic Chinle Formation (New Mexico, USA) support a diachronous rise of dinosaurs. *Earth and Planetary Science Letters*, ***309***(3), 258-267.

Janikian, L., de Almeida, R.P., da Trinidade, R.I.F., Fragoso-Cesar, A.R.S., D'Agrella-Filho, M.S., Dantas, E.L., and Tohver, E. (2008) The continental record of Ediacaran volcano-sedimentary successions in southern Brazil and their global implications. *Terra Nova*, **20**, 259-266.

Janikian, L., Paes de Almeida, R., Fragoso-Cesar, A.R.S., de Souza Martins, V.T., Dantas, E.L., Tohver, E., McReath, I., and D'Agrella-Filho, M.S. (2012) Ages (U-Pb SHRIMP and LA-ICPMS) and stratigraphic evolution of the Neoproterozoic volcano-sedimentary successions from the extensional Camaquã Basin, Southern Brazil. *Gondwana Research*, **21**, 466-482.

Kemp, A.I.S., Hawkesworth, C.J., Foster, G.L., Paterson, B.A., Woodhead, J.D., Hergt, J.M., Gray, C.M., & Whitehouse, M.J. (2007) Magmatic and crustal differentiation history of granitic rocks from Hf-O isotopes in zircon. *Science*, ***315***(5814), 980-983.

Kemp, A.I.S., Hawkesworth, C.J., Paterson, B.A., & Kinny, P.D. (2006) Episodic growth of the Gondwana supercontinent from hafnium and oxygen isotopes in zircon. *Nature*, ***439***(7076), 580-583.

Kemp, A.I.S., Wilde, S.A., Hawkesworth, C.J., Coath, C.D., Nemchin, A., Pidgeon, R.T., Vervoort, J.D., & DuFrane, S.A. (2010) Hadean crustal evolution revisited: new constraints from Pb–Hf isotope systematics of the Jack Hills zircons. *Earth and Planetary Science Letters*, ***296***(1), 45-56.

Košler, J., & Sylvester, P.J. (2003) Present trends and the future of zircon in geochronology: laser ablation ICPMS. *Reviews in Mineralogy and Geochemistry*, ***53***(1), 243-275.

Lang, N.P. (2001) Evolution of the Secret Pass Canyon Volcanic Center, Colorado River Extensional Corridor, Northwestern Arizona (M.S. Thesis): Vanderbilt University – 228 p.

Lang, N.P., Walker, B.J., Claiborne, L.L., Miller, C.F., Hazlett, R.W., & Heizler, M.T. (2008) The Spirit Mountain batholith and Secret Pass Canyon volcanic center: A cross-sectional view of the magmatic architecture of the uppermost crust of an extensional terrain, Colorado River, Nevada–Arizona: *Geological Society of America Field Guide*, ***11***, 187-214, doi:10.1130/2008.fld011(09).

Le Bas, M.J., Le Maitre, R.W., Streckeisen, A., & Zanettin, B. (1986) A chemical classification of volcanic rocks based on the total alkali-silica diagram. *Journal of Petrology*, ***27***(3), 745-750.

Leite, J.A., Hartman, L.A., Mcnaughton, N.J., & Chemale Jr, F. (1998) SHRIMP U/Pb zircon geochronology of Neoproterozoic juvenile and crustal-reworked terranes in southernmost Brazil. *International Geology Review*, ***40***(8), 688-705.

Lidzbarski, M., Mundil, R., Miller, J.S., & Vasquez, J.A. (2012) Comparing pre- and post-chemical abrasion ages for Miocene Peach Springs Tuff zircon from ID-TIMS and SIMS analyses. *AGU Fall Meeting, December 2012*.

Lipman, P.W. (1984) The roots of ash flow calderas in western North America: Windows into the tops of granitic batholiths. *Journal of Geophysical Research: Solid Earth (1978–2012)*, ***89***(B10), 8801-8841.

Lipman, P.W. (2007) Incremental assembly and prolonged consolidation of Cordilleran magma chambers: Evidence from the Southern Rocky Mountain volcanic field. *Geosphere*, ***3***(1), 42-70.

Ludwig, K.R. (2003) *User's manual for Isoplot 3.00: a geochronological toolkit for Microsoft Excel* (No. 4). Kenneth R. Ludwig.

Mazdab, F.K. & Wooden, J.L. (2006) Trace element analysis of accessory and rock forming minerals by ion microprobe (SHRIMP-RG). Eos Trans AGU 87:V33A-0630.

McDowell, S.M., Miller, C.F., and Ferguson, C.A. (2011) Post-supereruption (18-19 Ma) magmatic reactivation beneath the Silver Creek Caldera, Black Mountains, AZ. *AGU Fall Meeting, December 2011*.

McDowell, S.M., Miller, C.F., Ferguson, C.A., Fisher, C., Frazier, W.O., Miller, J.S., Mundil, R., Overton, S., & Vervoort, J. (2012) Geochemical insights into the evolution of a supereruptive volcanic center: magmatic precursors and successors of the Miocene Peach Spring Tuff, southern Black Mountains, western AZ. *GSA Abstracts with Programs*, ***44***(7), 320.

McDowell, S.M., Miller, C.F., Mundil, R., Ferguson, C.A., and Wooden, J.L. (2014) Zircon evidence for a ~200 k.y. supereruption-related thermal flare-up in the Miocene southern Black Mountains, western Arizona, USA: Contributions to Mineralogy and Petrology, DOI 10.1007/s00410-014-1031-5.

Metcalf, R.V. (2004) Volcanic–plutonic links, plutons as magma chambers and crust–mantle interaction: a lithospheric scale view of magma systems. *Transactions of the Royal Society of Edinburgh: Earth Sciences*, ***95***(1-2), 357-374.

Metcalf, R.V., Smith, E.I., Walker, J.D., Reed, R.C., & Gonzales, D.A. (1995) Isotopic disequilibrium among commingled hybrid magmas; evidence for a two-stage magma mixing-commingling process in the Mt. Perkins pluton, Arizona. *Journal of Geology*, ***103***(5), 509-527.

Miller, C.F., McDowell, S.M., & Mapes, R.W. (2003) Hot and cold granites? Implications of zircon saturation temperatures and preservation of inheritance. *Geology*, ***31***(6), 529-532.

Miller, C.F., & Miller, J.S. (2002) Contrasting stratified plutons exposed in tilt blocks, Eldorado Mountains, Colorado River Rift, NV, USA. *Lithos*, ***61***(3), 209-224.

Miller, C.F., & Wooden, J.L. (1994) Anatexis, hybridization and the modification of ancient crust: Mesozoic plutonism in the Old Woman Mountains area, California. *Lithos*, ***32***(1), 111-133.

Miller, C.F., & Wark, D.A. (2008) Supervolcanoes and their explosive supereruptions. *Elements*, ***4***(1), 11-15.

Miller, J.S., Glazner, A.F., Farmer, G.L., Suayah, I.B., & Keith, L.A. (2000) A Sr, Nd, and Pb isotopic study of mantle domains and crustal structure from Miocene volcanic rocks in the Mojave Desert, California. *Geological Society of America Bulletin*, ***112***(8), 1264-1279.

Mills, J.G., Saltoun, B.W., and Vogel, T.A. (1997) Magma batches in the Timber Mountain magmatic system, Southwestern Nevada Volcanic Field, Nevada, USA. *Journal of Volcanology and Geothermal Research*, ***78***, 185-208.

Mills, R.D., & Coleman, D.S. (2013) Temporal and chemical connections between plutons and ignimbrites from the Mount Princeton magmatic center. *Contributions to Mineralogy and Petrology*, ***165***(5), 961-980.

Moecher, D.P., McDowell, S.M., Samson, S.D., & Miller, C.F. (2014) Ti-in-zircon thermometry and crystallization modeling support hot Grenville granite hypothesis. *Geology*, ***42***(3), 267-270.

Moecher, D.P., & Samson, S.D. (2006) Differential zircon fertility of source terranes and natural bias in the detrital zircon record: Implications for sedimentary provenance analysis. *Earth and Planetary Science Letters*, ***247***(3), 252-266.

Mukasa, S.B., and Wilshire, H.G. (1997) Trace-element and Nd-, Sr-, and Pb-isotopic compositions of upper mantle and lower crustal xenoliths, Cima Volcanic Field, California: Implications for evolution of the subcontinental lithospheric mantle. *Journal of Geophysical Research*, ***102***, 20133–20148.

Mundil, R., Ludwig, K.R., Metcalfe, I., & Renne, P.R. (2004) Age and timing of the Permian mass extinctions: U/Pb dating of closed-system zircons. *Science*, ***305***, 1760-1763.

Münker, C., Weyer, S., Scherer, E., & Mezger, K. (2001) Separation of high field strength elements (Nb, Ta, Zr, Hf) and Lu from rock samples for MC-ICPMS measurements. *Geochemistry, Geophysics, Geosystems*, ***2***(12).

Murphy, R.T. (2004) Tectono-magmatic interaction and extensional folding in the Union Pass area, northern Colorado River extensional corridor, northwest Arizona. [M.S. Thesis.] Reno, Nevada: University of Nevada, Reno, 150 p.

Murphy, R.T., and Faulds, J.E. (2003) Interactions between Tertiary magmatism and extension in the Colorado River Extensional Corridor, Union Pass area, northwestern Arizona. *Geological Society of America Abstracts with Programs*, ***35***(6), 348.

Murphy, R.T. and Faulds, J.E. (2013) Preliminary geologic map of the north half of the Union Pass Quadrangle, Mohave County, Arizona. Arizona Geological Survey Contributed Map, CM-13-A, 1 map sheet, map scale 1:24,000.

Murphy, R.T., Faulds, J.E., and Hillmeyer, F.L. (2004) Evolution of Miocene extensional fault and fold systems and influence of magmatism in the northern Colorado River extensional corridor, Union Pass area, northwest Arizona. *Geological Society of America Abstracts with Programs*, ***36***(4), 21.

Naime, R.H. (1988) Geologia, geoquimica e petrologia do complexo granitico Ramada e do granito Cerro da Cria. Masters thesis, Universidade Fed. RS, Porto Alegre. 184 pp.

Nardi, L.V.S., and Bonin, B. (1991) Post-orogenic and non-orogenic alkaline granite associations: the Saibro intrusive suite, southern Brazil – a case study. *Chemical Geology*, ***92***, 197-211.

Oyhantçabal, P., Siegesmund, S., Wemmer, K., Frei, R., and Layer, P. (2007) Post-collisional transition from calc-alkaline to alkaline magmatism during transcurrent deformation in the southernmost Dom Feliciano belt (Braziliano-Pan-African, Uruguay). *Lithos*, ***98***, 141-159.

Pamukçu, A.S., Carley, T.L., Gualda, G.A., Miller, C.F., & Ferguson, C.A. (2013) The evolution of the Peach Spring giant magma body: Evidence from accessory mineral textures and compositions, bulk pumice and glass geochemistry, and rhyolite-MELTS modeling. *Journal of Petrology*, ***54***(6), 1109-1148.

Patchett, P.J., & Tatsumoto, M. (1981) A routine high-precision method for Lu-Hf isotope geochemistry and chronology. *Contributions to Mineralogy and Petrology*, ***75***(3), 263-267.

Patrick, D.W., & Miller, C.F. (1997) Processes in a composite, recharging magma chamber: evidence from magmatic structures in the Aztec Wash pluton, Nevada. In *Proceedings of the 30th International Geological Congress (Research Volume)* (pp. 121-135).

Pearce, J.A., Harris, N.B.W., & Tindle, A.G. (1984) Trace element discrimination diagrams for the tectonic interpretation of granitic rocks. *Journal of Petrology*, ***25***(4), 956-983.

Pearce, N.J., Perkins, W.T., Westgate, J.A., Gorton, M.P., Jackson, S.E., Neal, C.R., and Chenery, S.P. (1997) A compilation of new and published major and trace element data for NIST SRM 610 and NIST SRM 612 glass reference materials. *Geostandards Newsletter*, ***21***(1), 115-144.

Pearthree, P.A., Ferguson, C.A., Johnson, B.J., and Guynn, J. (2009) Geologic Map and Report for the Proposed State Route 95 Realignment Corridor, Mohave County, Arizona, v. 1: Arizona Geological Survey DGM-65, 5 sheets, 1:24,000 scale, 44 pp.

Pin, C., & Zalduegui, J.S. (1997) Sequential separation of light rare-earth elements, thorium and uranium by miniaturized extraction chromatography: application to isotopic analyses of silicate rocks. *Analytica Chimica Acta*, *339*(1), 79-89.

Prytulak, J., Vervoort, J.D., Plank, T., & Yu, C. (2006) Astoria Fan sediments, DSDP site 174, Cascadia Basin: Hf–Nd–Pb constraints on provenance and outburst flooding. *Chemical Geology*, ***233***(3), 276-292.

Ransome, F.L. (1923*)* Geology of the Oatman gold district, Arizona. *U.S. Geological Survey Bulletin*, ***743***, 58p.

Remus, M.V.D., McNaughton, N.J., Hartmann, L.A., Koppe, J.C., Fletcher, I.R., Groves, D.I., & Pinto, V.M. (1999) Gold in the Neoproterozoic juvenile Bossoroca Volcanic Arc of southernmost Brazil: isotopic constraints on timing and sources. *Journal of South American Earth Sciences*, ***12***(4), 349-366.

Remus, M.V.D., Hartmann, L.A., McNaughton, N.J., Groves, D.I., and Reischl, J.L. (2000a) Distal magmatic-hydrothermal origin for the Camaquã Cu (Au-Ag) and Santa Maria Pb, Zn (Cu-Ag) deposits, southern Brazil. *Gondwana Research*, ***3***(2), 155-174.

Remus, M.V.D., Hartmann, L.A., McNaughton, N.J., Groves, D.I., & Fletcher, I.R. (2000b) The link between hydrothermal epigenetic copper mineralization and the

Caçapava Granite of the Brasiliano Cycle in southern Brazil. *Journal of South American Earth Sciences*, ***13***(3), 191-216.

Renne, P.R., Balco, G., Ludwig, K.R., Mundil, R., & Min, K. (2011) Response to the comment by WH Schwartz et al. on "Joint determination of ^{40}K decay constants and ^{40}Ar*/^{40}K for the Fish Canyon sanidine standard, and improved accuracy for ^{40}Ar/^{39}Ar geochronology" by PR Renne et al. (2010). *Geochimica et Cosmochimica Acta*, ***75***(17), 5097-5100.

Renne, P.R., Mundil., R., Balco, G., Min, K., & Ludwig, K.R. (2010) Joint determination of ^{40}K decay constants and ^{40}Ar*/^{40}K for the Fish Canyon sanidine standard, and improved accuracy for ^{40}Ar/^{39}Ar geochronology. *Geochimica et Cosmochimica Acta*, ***74***(18), 5349-5367.

Reid, M.R. (2008) How long does it take to supersize an eruption?. *Elements*, ***4***(1), 23-28.

Reid, M.R., Vazquez, J.A., & Schmitt, A.K. (2011) Zircon-scale insights into the history of a supervolcano, Bishop Tuff, Long Valley, California, with implications for the Ti-in-zircon geothermometer. *Contributions to Mineralogy and Petrology*, ***161***(2), 293-311.
Self, S. (2006). The effects and consequences of very large explosive volcanic eruptions. *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences*, ***364***(1845), 2073-2097.

da Silva, L.C., McNaughton, N.J., Armstrong, R., Hartmann, L.A., and Fletcher, I.R. (2005) The neoproterozoic Mantiqueira Province and its African connections: a zircon-based U-Pb geochronologic subdivision for the Brasiliano-Pan-African systems of orogens. *Precambrian Research*, ***136***, p. 203-240.

Simon, J.I., Weis, D., DePaolo, D.J., Renne, P.R., Mundil, R., & Schmitt, A.K. (2014) Assimilation of preexisting Pleistocene intrusions at Long Valley by periodic magma recharge accelerates rhyolite generation: rethinking the remelting model. *Contributions to Mineralogy and Petrology*, ***167***(1), 1-34.

Soliani, E. (1985) *Os dados geochronologicos do Escudo Sul Riograndense e suas implicaçoes de ondem geotectônica.* PhD thesis, Universidade de São Paulo.

Sommer, C.A., Lima, E.F., Nardi, L.V.S., Liz, J.D., and Waichel, B.L. (2006) The evolution of Neoproterozoic magmatism in southernmost Brazil: shoshonitic, high-K tholeiitic and silica-saturated, sodic alkaline volcanism in post-collisional basins. *Academia Brasileira de Ciências*, ***78***, 573-589.

Spencer, J.E., Ferguson, C.A., Pearthree, P.A., & Richard, S.M. (2007) Geologic Map of the Boundary Cone 7½' Quadrangle, Mohave County, Arizona. Arizona Geological Survey Digital Geologic Map DGM-54.

Tappa, M.J., Coleman, D.S., Mills, R.D., and Samperton, K.M. (2011) The plutonic record of a silicic ignimbrite from the Latir volcanic field, New Mexico. *Geochemistry, Geophysics, Geosystems*, ***12***(10), Q10011.

Thorson, J.P. (1971) Igneous petrology of the Oatman district, Mohave County, Arizona (Ph.D. Thesis): University of California – Santa Barbara, 189 p.

Trail, D., Mojzsis, S.J., Harrison, T.M., Schmitt, A.K., Watson, E.B., & Young, E.D. (2007) Constraints on Hadean zircon protoliths from oxygen isotopes, Ti-thermometry, and rare earth elements. *Geochemistry, Geophysics, Geosystems*, ***8***(6).

Valley, J.W., Lackey, J.S., Cavosie, A.J., Clechenko, C.C., Spicuzza, M.J., Basei, M.A.S., Bindeman, I.N., Ferreira, V.P., Sial, A.N., King, E.M., Peck, W.H., Sinha, A.K.,& Wei, C. S. (2005) 4.4 billion years of crustal maturation: oxygen isotope ratios of magmatic zircon. *Contributions to Mineralogy and Petrology*, ***150***(6), 561-580.

Van Schmus, W.R., Bickford, M.E., & Turek, A. (1996) Proterozoic geology of the east-central Midcontinent basement. *Special Papers – Geological Society of America*, ***308***, 7-32.

Varga, R.J., Faulds, J.E., Snee, L.W., Harlan, S.S., & Bettison-Varga, L. (2004) Miocene extension and extensional folding in an anticlinal segment of the Black Mountains accommodation zone, Colorado River extensional corridor, southwestern United States. *Tectonics*, ***23***(1).

Varga, R.J., Horst, A., Welty, N., Siegner, K., and Ferringer, P. (2006) Paleomagnetism of the Peach Springs Tuff revisited. *Geological Society of America Abstracts with Programs*, ***38***(7), p. 352.

Vazquez, J.A., & Reid, M.R. (2002) Time scales of magma storage and differentiation of voluminous high-silica rhyolites at Yellowstone caldera, Wyoming. *Contributions to Mineralogy and Petrology*, ***144***(3), 274-285.

Vazquez, J.A., & Reid, M.R. (2004) Probing the accumulation history of the voluminous Toba magma. *Science*, ***305***(5686), 991-994.

Vieira, N. and Soliani, E. (1989). Um novo modelo genetico-evolutivo para o Maciço Granitico de Lavras do Sul, RS. *Acta Geologica Leopoldensia*, ***29***, 143-160.

Vlach, S.R.F., Siga Jr., O., Harara, O.M.M., Gualda, G.A.R., Basei, M.A.S., and Vilalva, F.C.J. (2011) Crystallization ages of the A-type magmatism of the Graciosa Province (Southern Brazil): Constraints from zircon U-Pb (ID-TIMS) dating of coeval K-rich gabbro-dioritic rocks. *Journal of South American Earth Sciences*, ***32***(4), 407-415.

Vlach, S.R., & Gualda, G.A. (2007) Allanite and chevkinite in A-type granites and syenites of the Graciosa Province, southern Brazil. *Lithos*, ***97***(1), 98-121.

Walker, B.A., Miller, C.F., Claiborne, L., Wooden, J.L., & Miller, J.S. (2007) Geology and geochronology of the Spirit Mountain batholith, southern Nevada: implications for timescales and physical processes of batholith construction. *Journal of Volcanology and Geothermal Research*, ***167***(1), 239-262.

Wark, D.A., Hildreth, W., Spear, F.S., Cherniak, D.J., & Watson, E.B. (2007) Pre-eruption recharge of the Bishop magma system. *Geology*, ***35***(3), 235-238.

Wark, D.A., & Watson, E.B. (2006) TitaniQ: a titanium-in-quartz geothermometer. *Contributions to Mineralogy and Petrology*, ***152***(6), 743-754.

Watson, E.B., & Harrison, T.M. (1983) Zircon saturation revisited: temperature and composition effects in a variety of crustal magma types. *Earth and Planetary Science Letters*, ***64***(2), 295-304.

Watson, E.B., & Harrison, T.M. (2005) Zircon thermometer reveals minimum melting conditions on earliest Earth. *Science*, ***308***(5723), 841-844.

Watson, E.B., Wark, D.A., & Thomas, J.B. (2006) Crystallization thermometers for zircon and rutile. *Contributions to Mineralogy and Petrology*, ***151***(4), 413-433.

Watts, K.E., Bindeman, I.N., and Schmitt, A.K. (2011) Large-volume rhyolite genesis in caldera complexes of the Snake River Plain: Insights from the Kilgore Tuff of the Heise Volcanic Field, Idaho, with comparison to Yellowstone and Bruneau–Jarbidge Rhyolites. *Journal of Petrology*, ***52***(5), 857-890.

Watts, K.E., Bindeman, I.N., & Schmitt, A.K. (2012) Crystal scale anatomy of a dying supervolcano: an isotope and geochronology study of individual phenocrysts from voluminous rhyolites of the Yellowstone caldera. *Contributions to Mineralogy and Petrology*, ***164***(1), 45-67.

Whalen, J.B., Currie, K.L., & Chappell, B.W. (1987) A-type granites: geochemical characteristics, discrimination and petrogenesis. *Contributions to Mineralogy and Petrology*, ***95***(4), 407-419.

White, W.M., & Patchett, J. (1984) Hf-Nd-Sr isotopes and incompatible element abundances in island arcs: implications for magma origins and crust-mantle evolution. *Earth and Planetary Science Letters*, ***67***(2), 167-185.

Wiebe, R.A. (1993) The Pleasant Bay layered gabbro—diorite, coastal Maine: Ponding and crystallization of basaltic injections into a silicic magma chamber. *Journal of Petrology*, ***34***(3), 461-489.

Wiebe, R.A., & Adams, S.D. (1997) Felsic enclave swarms in the Gouldsboro granite, coastal Maine: a record of eruption through the roof of a silicic magma chamber. *The Journal of Geology*, ***105***(5), 617-628.

Wiedenbeck, M.A.P.C., Alle, P., Corfu, F., Griffin, W.L., Meier, M., Oberli, F. von Quadt, A., Roddick, J.C., & Spiegel, W. (1995) Three natural zircon standards for U-Th-Pb, Lu-Hf, trace element and REE analyses. *Geostandards Newsletter*, ***19***(1), 1-23.

Wildner, W., Lima, E.F., Nardi, L.V.S., & Sommer, C.A. (2002) Volcanic cycles and setting in the Neoproterozoic III to Ordovician Camaquã Basin succession in southern Brazil: characteristics of post-collisional magmatism. *Journal of Volcanology and Geothermal Research*, ***118***(1), 261-283.

Wilson, C.J. (2008) Supereruptions and supervolcanoes: processes and products. *Elements*, ***4***(1), 29-34.

Wooden, J.L., Stacey, J.S., Howard, K.A., Doe, B.R., and Miller, D.M. (1988) Pb isotopic evidence for the formation of Proterozoic crust in the southwestern United States. *In* Ernst, W. G., (Ed.), Metamorphism and crustal evolution in the western United States. Englewood Cliffs, N.J., Prentice Hall, p. 68-86.

Wooden, J.L., & Miller, D.M. (1990) Chronologic and isotopic framework for early Proterozoic crustal evolution in the eastern Mojave desert region, SE California. *Journal of Geophysical Research,* ***95***(B12), 20,133-20,146.

Wooden, J.L., Barth, A.P., & Mueller, P.A. (2013) Crustal growth and tectonic evolution of the Mojave crustal province: Insights from hafnium isotope systematics in zircons. *Lithosphere*, ***5***(1), 17-28.

Woodhead, J.D., & Hergt, J.M. (2005) A preliminary appraisal of seven natural zircon reference materials for in situ Hf isotope determination. *Geostandards and Geoanalytical Research*, ***29***(2), 183-195.

Young, R.A., & Brennan, W.J. (1974) Peach Springs Tuff: Its bearing on structural evolution of the Colorado Plateau and development of Cenozoic drainage in Mohave County, Arizona. *GSA Bulletin,* ***85***, 83-90.

Zimmerer, M.J., and McIntosh, W.C. (2012a) An investigation of caldera-forming magma chambers using the timing of ignimbrite eruptions and pluton emplacement at the Mt. Aetna caldera complex. *Journal of Volcanology and Geothermal Research,* ***245-246***, 128-148.

Zimmerer, M.J., & McIntosh, W.C. (2012b) The geochronology of volcanic and plutonic rocks at the Questa caldera: Constraints on the origin of caldera-related silicic magmas. *Geological Society of America Bulletin*, ***124***(7-8), 1394-140.