MAFIC-SILICIC MAGMA INTERACTIONS FROM VOLCANIC TO PLUTONIC: IMPLICATIONS FOR THE EVOLUTION AND ERUPTION OF SILICIC MAGMA CHAMBERS

A

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By

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ABSTRACT

In order to investigate the role that mafic-silicic magma interactions play in the origin, evolution, and eruption of shallow crustal magma chambers, a three-part study was undertaken of both effusive (Mt. Dutton volcano, Alaska) and explosive (Volcán Ceboruco, Mexico) eruptions, as well as associated volcanic (Unalaska Formation) and plutonic (Captain's Bay pluton) suites. Major- and trace-element variations suggest that the eruptive products (both andesite and dacite) of Mt. Dutton are not simply a result of fractional crystallization, but instead are affected to varying degrees by two-component mixing of distinct and separate magmas. In this case, petrologic and geochemical evidence, as well as eruptive stratigraphy, suggests the evolution of shallow, silicic magmatic systems inferred to exist beneath small stratovolcanoes can be modeled as resulting from repeated intrusion of mantle-derived mafic magmas into shallow, silicic, crystal-rich, crustal magma chambers.

Volcán Ceboruco, Mexico, erupted ~1000 years ago, producing the Jala Pumice and forming a ~4 km wide caldera. During that eruption, 2.8 to 3.5 km^3 of rhyodacite magma and 0.2 to 0.5 km^3 of mixed dacite magma were tapped and deposited as the Jala Pumice. Subsequently, the caldera was partially filled by extrusion of the Dos Equis Dome, a low-silica dacite dome with a volume of ~1.3 km^3. In this case, petrographic evidence indicates that the Jala and Dos Equis dacites originated largely through the mixing of three end-member magmas: 1) rhyodacite magma, 2) dacite magma, and 3) mafic magma.

Study of the Captain's Bay pluton and Unalaska Formation volcanics from Unalaska Island, Alaska, indicates that whole-rock compositions between the two suites span a similar range and particular plutonic units correspond chemically to specific volcanic products. Plagioclase phenocrysts from these chemically similar units also display comparable textures and compositional zoning patterns. Most strikingly, magmatic enclaves found within the pluton show a chemical affinity to andesite lavas from the volcanic suite. In this case, mixing of melts and extrusion of hybrid lava may be

a prompt response to recharge, whereas the enclaves may represent "leftovers" that thermally equilibrated with the reservoir as a whole.

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Research at Mt. Dutton volcano would not have been possible without the help of Tom Miller, who introduced me to Aleutian volcanoes. He was more than generous with his time, samples, data, and wealth of knowledge on Mt. Dutton and many other Aleutian volcanoes. Early on during my tenure here at the University of Alaska Fairbanks (UAF), he showed me the value of collaboration, which resulted in the first publication (as second author) of my career.

Studies at Volcán Ceboruco coincided with the arrival of Jim Gardner here at UAF. He, along with Brandon Browne, collected the samples for this part of my thesis. Credit should also be given to Jim for painstakingly reading a great deal of this thesis and encouraging me to submit each chapter as a manuscript for publication. Jim taught me much about scientific writing (including the difference between while and whereas) and never let me forget that there is always more to be learned about all things volcanic, for this I am grateful.

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All the members of my committee, including Mary Keskinen and Rainer Newberry, deserve thanks for critically reading, revising, and no doubt substantially improving the manuscript. Furthermore, I would like to give special thanks to Mary Keskinen and Rainer Newberry for teaching me that rocks are much more than their chemical compositions and that often minerals provide the key to understanding them.

Ken Severin deserves particular thanks for teaching me more than most people will ever care to know about the electron microprobe. Because of him, the microprobe is much more than a "black box" and I realized the incredible potential of the microprobe as a research tool. Substantial quantities of the data upon which this thesis is based could not have been acquired without his assistance. In addition, Ken Severin introduced me to the wonders of skijoring and deserves props for never faking the funk! Endless hours spent in the microprobe lab were made more enjoyable by tightening up our backstrokes to the rhythms of Funkadelic, Parliament, Kool and the Gang, and James Brown, among many others.

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Henderson, whose courage and resilience were a constant source of inspiration for me. She has taught me the power of positivity and I am a better person having known her.

Finally, I gratefully acknowledge the financial support I received from the Alaska Volcano Observatory, through the Volcano Hazards Program of the U.S. Geological Survey, and the National Science Foundation, through various grants.

INTRODUCTION

Magma mixing is considered to play an important role in producing petrologic diversity in both volcanic (Anderson, 1976; Eichelberger, 1975, 1978) and plutonic systems (Vogel, 1982; Wiebe, 1974). Many studies, both volcanic and plutonic, have found evidence that the evolution of silicic magma chambers may in fact be dominated by multiple replenishments of more mafic magma. In the volcanic regime, these mafic additions to silicic magma chambers are thought to play a role in eruption dynamics (Pallister et al., 1992; Sparks et al., 1977). In this regard, it is important to note that an association appears to exist between enclave-bearing volcanic rocks and predominantly effusive eruption style (Miller et al., 1999). Accordingly, in many intermediate to silicic lava flows and domes, the most straightforward evidence for mixing is the preservation of disequilibrium phase assemblages as well as the presence of mafic magma as magmatic inclusions or enclaves. In contrast, evidence for magma mixing during explosive events often appears as either banded tephra or dramatically zoned tuff sheets.

Similarly, in the plutonic regime, there is a vast amount of evidence that suggests silicic magma chambers often trap basaltic magma as it rises through the crust (Vogel, 1982; Wiebe, 1974, 1994). However, it has long been the case that the silicic chambers responsible for trapping the basalt have not commonly been recognized in the plutonic record (Wiebe, 1994). Recent work suggests that many plutonic systems are characterized by interlayered mafic and silicic sequences which must have formed by the repeated injection of mafic magma onto the crystal-rich floor of a silicic magma chamber (Chapman and Rhodes, 1992; Wiebe, 1993). These "mafic-silicic layered intrusions" can provide detailed records of replenishments, mingling, and mixing between contrasted magmas that have the potential to be correlated to specific kinds of volcanic events (Wiebe, 1996; Wiebe and Collins, 1998). Furthermore, plutons often contain the same straightforward evidence for magma mixing, in the form of magmatic enclaves, disequilibrium phase assemblages and mineral zoning, that is found in lava flows and domes (Cantagrel et al., 1984; Didier and Barbarin, 1991).

The basic goal of this thesis is thus to provide a better understanding of magmatic processes in compositionally diverse systems. In particular, I hope to elucidate the following: (1) the role mafic-silicic magma interactions play in the origin and evolution of shallow crustal magma chambers, and (2) the consequences of relatively mafic replenishments for the eruption of silicic magma reservoirs. In addition, I hope to establish specific links between comparable processes in volcanic and plutonic systems, such as the formation and fate of magmatic enclaves. These problems will be addressed by undertaking a three-part study that will investigate eruptive products from both effusive and explosive eruptions and span both the volcanic and plutonic regimes.

Part one of the study consists of a detailed petrologic and geochemical study of Mount Dutton Volcano. Mount Dutton's eruptive behavior and petrology is remarkably similar to other silicic dome complexes such as Chaos Crags (Heiken and Eichelberger, 1980) and Lassen Peak Volcano in California (Clynne, 1999), Soufriere Hills Volcano in Montserrat (Devine et al., 1998), and Unzen Volcano in Japan (Nakada and Motomura, 1999). This part of the study seeks to address the origin of enclaves in hybrid lavas, chemical and physical interactions between mafic and silicic magmas and the question of why mixing often produces enclaves in effusive lava flows.

The second part of the study focuses on the nature of magma chamber processes associated with more explosive eruptions, including an in-depth investigation of magma interactions before, during, and after the caldera-forming eruption of Volcán Ceboruco, Mexico. This research has ramifications for magmatic systems that produce caldera-forming eruptions, such as the 1883 eruption of Krakatau volcano, Indonesia and the 1991 eruption of Pinatubo volcano, Philippines.

The third part of the study attempts to establish specific links between comparable processes in plutonic and volcanic systems, and in particular, understanding the formation and fate of magmatic enclaves as well as the process of hybridization through the interpretation of mixed phase assemblages and mineral zoning. This part of the thesis involves examination of samples from the Captain's Bay pluton and associated Unalaska Formation volcanics.

CHAPTER 1

Compositional, Thermal, and Temporal Constraints on Variable Mafic-Silicic Magma Interactions at Mt. Dutton volcano, Alaska: Implications for the Evolution and Eruption of Small Magma Reservoirs*

* Submitted to *Bulletin of Volcanology* under the same title with authors D. G. Chertkoff, J. C. Eichelberger, and T. P. Miller

Abstract

Mount Dutton is a small Late Quaternary volcano that lies close to the tip of the Alaska Peninsula, near the west end of the continental margin segment of the Aleutian arc. Both major- and trace-element variations, as well as more detailed trace-element modeling, suggest that the eruptive products of Mt. Dutton do not simply result from fractional crystallization, but are instead affected to varying degrees by two-component mixing of distinct and separate magmas. During the Late Pleistocene, the volcano consistently erupted well-mixed andesitic lavas. Beginning in the early Holocene, however, the volcano suddenly began generating less-thoroughly mixed (or mingled) dacitic magma that contains basaltic enclaves. Analyses of mineral and melt phases indicate that the most recent of these dacite dome eruptions began shortly (~ 1 month) after mixing with more mafic magma, and that mixing of the two magmas raised the temperature of the host reservoir from 865±25°C to 975±25°C. Measured widths of reaction rims on amphibole phenocrysts indicate an average ascent rate for dacite dome emplacement of ~17 days, which corresponds to an average ascent velocity of ~ 7-12 m/h (~ 0.002 to 0.003 m/s). Petrologic and geochemical evidence, as well as the eruptive history of Mt. Dutton, indicates that the evolution of shallow, silicic magmatic systems inferred to exist beneath small stratovolcanoes can be modeled as resulting from the repeated intrusion of mantle-derived mafic magma into a shallow, silicic, crystal-rich, magma chamber. Abrupt shifts from well mixed to less-thoroughly-hybridized magmas (or vice versa) most likely reflect fundamental changes in the conditions of mixing. Such changes could include 1) a shift in the volume of magma being injected into the system, 2) an increase

or decrease in the periodicity of new inputs to the magmatic system, or 3) a change in the geometry of the magma chamber.

Introduction

Not only are the geochemical trends and petrologic features found in many volcanic systems often attributable to magma mixing, but new inputs of magma to stagnant reservoirs may also trigger volcanic eruptions (e.g., Pallister et al., 1996; Sparks et al., 1977). In this regard, enclave-bearing volcanic rocks and predominantly effusive eruption style appear to be associated (Eichelberger et al., 2000; Miller et al., 1999). Such a relationship is demonstrated by the many intermediate to silicic lava flows and domes that contain mafic magma as magmatic inclusions or enclaves. In contrast, magma mixing is recorded by explosive eruption through either banded tephra or dramatically zoned tuff sheets.

Initial studies of magma mixing focused on using whole-rock samples to investigate the petrogenetic evolution of enclaves and their hosts (e.g., Eichelberger and Gooley, 1977; Frost and Mahood, 1987). Thus, the details of magma mixing at smaller length scales were less well documented and understood. More recent petrologic and experimental studies have revealed important compositional and physical interactions on smaller length scales, which can provide further insight into the timing and nature of magma interactions (e.g., Coombs et al., 2000; Nakamura, 1995). Despite the large number of studies investigating enclaves and their hosts (e.g., Bacon, 1986; Davidson et al., 1990) or modeling the dynamics of mafic and silicic magma interaction (e.g., Blake and Fink, 2000; Sparks and Marshall, 1986; Thomas and Tait, 1997; Thomas et al., 1993), the physical mechanism by which contrasting magmas mix and how this process triggers eruptions are still a matter of debate. Proposed mechanisms often invoke predominantly liquid-liquid mixing, such as dynamic injection and fountaining of mafic magma into more silicic magma reservoirs, or turbulent mixing of mafic and silicic magma, an early stage of which may be seen in banded pumices from explosive eruptions (e.g., Blake and Campbell, 1986; Koyaguchi, 1985). Sparks and Marshall (1986), however, have shown that if the silicic magma is volumetrically dominant and the temperature and viscosity contrast between end-members is large, the mafic magma may be hindered from mixing with the silicic magma, resulting in the formation of discrete magmatic inclusions or enclaves. In these cases, limited exchange of phenocrysts between magmas, as well as formation of enclaves, followed by disaggregation and dispersal of enclave debris, has been proposed as a physically more realistic mechanism for producing the geochemical trends and petrologic features found in mixed magmas (e.g., Clynne, 1999; Coombs et al., 2000; Coulon et al., 1986; Eichelberger, 1975; Feeley and Dungan, 1996).

Not all hybrid magmas, however, contain enclaves. In some cases, magma mixing may result in the generation of thoroughly mixed intermediate-composition magmas. Even during a single eruptive phase, over a period of as little as a month, a volcano may initially produce banded tephra, while subsequently generating an increasingly hybridized mixture of these originally separate magmas throughout the eruption (e.g., Gourgaud et al., 1989; Nye et al., 1994). Therefore, explaining how and why mixing conditions change is important to understanding the generation of both hybrid magmas and enclaves, as well as the evolution and eruption of magmatic systems that produce variably mixed magmas.

Mt. Dutton serves as an excellent example of a volcanic system that has produced both completely hybridized andesitic magmas, as well as less thoroughly mixed or mingled dacitic magmas that contain mafic enclaves. The petrology and evolution of the volcano is remarkably similar to other silicic dome complexes, such as Chaos Crags (Heiken and Eichelberger, 1980) and Lassen Peak Volcano in California (Clynne, 1999), Kizimen volcano in Kamchatka (Melekestsev et al., 1995), Soufriere Hills Volcano in Montserrat (Devine et al., 1998), and Unzen Volcano in Japan (Nakada and Motomura, 1999). All of the eruptive products from Mt. Dutton contain abundant evidence of magma mixing, including disequilibrium phase assemblages, relict unstable phases, reaction rims on phenocrysts, pronounced zoning in phenocrystic solid solutions, and the common presence of up-to-meter-sized, mafic enclaves in the most recent dacitic domes (Miller et al., 1999). Earlier work at Mt. Dutton (Miller et al., 1999) focused on a more general description of the volcano, the volcanological implications of its distinctive eruptive behavior and petrology, and the importance of understanding the origin of such magmatic systems because of the hazards they pose. Building upon that previous work, this paper seeks to further elucidate the time and length scales as well as the nature of mechanisms by which mafic and silicic magmas interact to produce hybrid magmas and enclaves.

In this paper, detailed major- and trace-element geochemical models are constructed to ascertain the origin of the Mount Dutton rock types. Compositions of phenocrysts and the bulk-rock of the host in which they reside are used to determine whether minerals are in equilibrium with their surroundings. Fe-Ti oxide compositions are used to reconstruct the thermal evolution of the magma reservoir, and zoning profiles of magnetite phenocrysts are used to estimate the timing between mixing and eruption. Similarly, pronounced zoning of other phenocryst phases, as well as reaction rims on phenocrysts, are used to determine both the time scale of mixing and the rate of magma ascent to the surface. Compositions of the minerals, bulk-rock, and interstitial melt phases of enclaves are used to unravel the processes that affect enclave formation and evolution. Finally, thermodynamic calculations have been done to estimate how much of the volume of the magma chamber was refilled during influx of more mafic magmas.

Geologic Setting and Eruptive History

Mount Dutton is located near the tip of the Alaska Peninsula, 1000 km southwest of Anchorage (see Miller et al. 1999 for location and geologic map). The volcano lies partially within the Alaska Peninsula National Wildlife Refuge and partially within the Izembek National Wilderness, situated less than 15 km north of King Cove, an important fishing village with a population of about 800. Pyroclastic flows and lahars from Mt. Dutton are a threat to the community as evidenced by the debris avalanche deposits that underlie the local airstrip (Miller et al., 1999).

Mount Dutton is one of over 60 Late Quaternary volcanic centers that comprise the Aleutian arc, which stretches 2500 km from Hayes volcano west of Anchorage to Buldir Island in the west-central Aleutian Islands. Volcanism in the region is a result of subduction of the Pacific plate beneath the North American plate. Mount Dutton resides on the western edge of the continental margin segment of the arc (Miller and Richter, 1994), and sits about 100 km above the Benioff zone. The arc-trench gap in this part of the arc is approximately 220 km (House and Jacob, 1983), with subduction of the Pacific plate beneath the North American plate occurring at a rate of about 85 mm/yr in a direction virtually perpendicular to the North American plate boundary.

Mount Dutton volcano is deeply dissected and has a snow-and-glacier mantled summit 1506 m in height. It has a diameter of approximately 7-8 km and a volume of 10-15 km^3 (Miller et al., 1999). The volcano is built on a basement of arc-derived Tertiary andesitic volcanic and volcaniclastic rocks, known as the Belkofski Formation. Locally, these basement rocks are intruded by a series of hypabyssal dioritic plutons, stocks, and dikes ranging in age from 5 to 11 Ma (Wilson et al., 1992).

Late Pleistocene eruptive activity at Mount Dutton was dominated by the emplacement of extensive cone-building, basaltic andesite to andesite lava flows. Outcrops of these lava flows and volcaniclastic rocks all dip outward from the present summit, suggesting a long-lived central source vent (Miller et al., 1999). Starting in the Holocene, Mt. Dutton shifted to erupting dacitic domes, forming the present summit area of the volcano. This Holocene dome complex has undergone numerous destructive events resulting in the shedding of a series of massive debris flows and block-and-ash flows that extend down the flanks of the volcano (Miller et al., 1999).

Despite the emplacement of at least seven summit domes at Mount Dutton, related tephra units have been remarkably hard to find. Even in proximal areas where tephra accumulation seems probable, there is scant locally derived tephra, suggesting that the domes were extruded with few if any accompanying explosive events (Miller et al., 1999). Presumably, slow ascent of magma from the sub-volcanic reservoir allowed for syneruptive degassing in the shallow subsurface before extrusion. Vapor-poor domes and spines thus emplaced failed by gravitational collapse of their unstable edifice, resulting in extensive debris flows and small volume pyroclastic flows that mantle the flanks of the volcano (Miller et al., 1999).

Analytical Methods

Bulk-rock analyses of twenty-nine samples from Mt. Dutton were analyzed at Washington State University using XRF (major and some trace elements) and ICP-MS (REEs and Th, Hf, Ta, Pb and Cs) techniques. Cone-building andesitic volcanic rocks were sampled primarily from the large exposures of lava-flows on the eastern flank of the cone and the remnants of valley-filling lava flows southwest of the main center (Miller et al., 1999). Exposures of the dacitic dome cluster at the summit of Mt. Dutton are inaccessible due to snow, ice, and overlapping steep collapse scars. Therefore, dome-building dacitic volcanic rocks were sampled from a series of poorly sorted, thick, block-and-ash flows and massive debris flows that emanated from the summit dome cluster and swept down most of the flanks of the volcano. Due to their heterogeneous nature, Mount Dutton samples were processed carefully before final crushing. Samples were broken into fragments (~1cm in diameter) using a piston and cylinder, and any fragment containing a small (> 2 mm) piece of mafic enclave was discarded, before the remaining portion of sample was powdered.

Thin sections were prepared of all the Mt. Dutton rock types for petrographic examination. Mineral modes were calculated by point counting using a petrographic microscope. A minimum of 500 points were counted on each sample, with as many as 1000 points counted on several samples to affirm reproducibility. Mineral, glass, and groundmass analyses were acquired using a Cameca SX-50 electron microprobe at the University of Alaska Fairbanks, using wavelength-dispersive analysis and the Phi-Rho-Z matrix correction of Armstrong (1981). Synthetic and natural minerals and glasses were used as standards. Mineral analyses were done using a focused beam, accelerating voltage of 15 keV, and a beam current of 10 nA. Glass analyses were done with a 10-μm-diameter defocused beam, accelerating voltage of 15 keV, and a beam current of 10 nA. Groundmass analyses were conducted using a scanning beam, which covered an area of 60 μm x 60 μm, accelerating voltage of 15 keV, and a beam current of 10 nA. In order to avoid sodium migration, especially when analyzing glass, a self-calibrating volatile acquisition method was used, whereby data is corrected for the possible degradation of volatile element x-ray intensity over time (Devine et al., 1995).

Description of Eruptive Units

Samples from the early cone-building volcanic sequence, the latter summit domes, and their associated flowage deposits span a compositional range of basaltic andesite to dacite (54.8 to 64.6 wt.% SiO_2). Only mafic enclaves, found almost exclusively within dacitic lavas, are basaltic (51.3 to 53.6 wt.% SiO_2). Mt. Dutton rocks are a medium-K series but have slightly lower K_2O contents compared to other eastern Aleutian arc volcanoes (Miller et al., 1999).

Samples collected from debris and block-and-ash flows originating from older summit domes plot separately from samples of the most recent dome-building dacites. When the system is considered as a whole, both major and trace elements form continuous, remarkably linear arrays, without compositional gaps between eruptive units (fig. 1.1). Correlation coefficients for most of the elements are > 0.90, exhibiting an excellent fit over the entire range in SiO_2 (~13 wt.%). When individual eruptive units are considered, however, it becomes apparent that, whereas the andesite field appears compositionally continuous, a compositional gap does exist between host dacite lavas and co-existing mafic enclaves.

Phenocryst assemblages in Mount Dutton andesites and dacites consist of plagioclase, orthopyroxene, and clinopyroxene, typical for intermediate composition rocks; dacites also contain hornblende. All of the eruptive products also contain extensive petrologic evidence for magma mixing, primarily consisting of disequilibrium phase assemblages (including coexisting olivine and quartz), relict unstable phases, reaction rims on phenocrysts, and pronounced zoning of phenocryst solid solutions

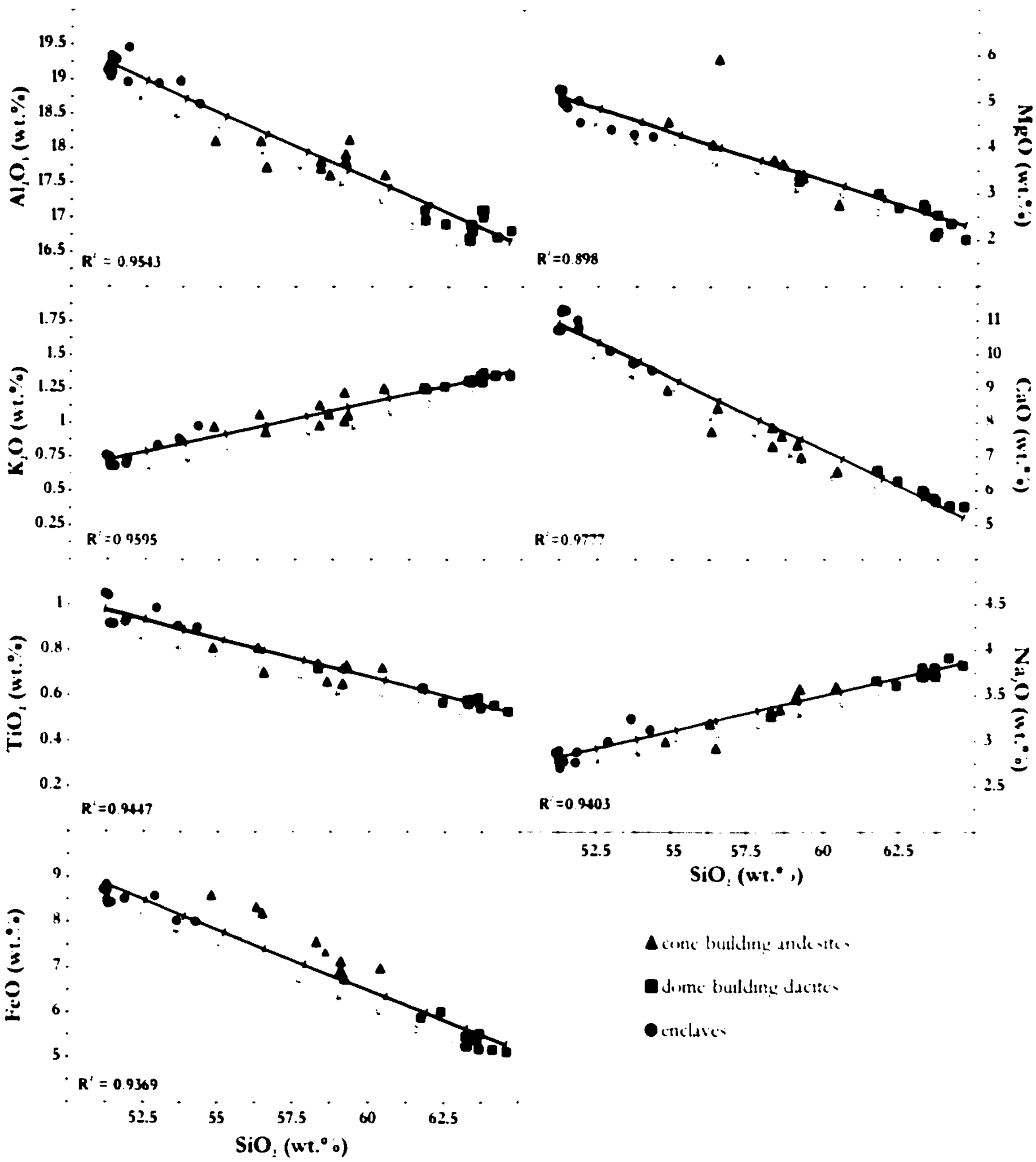

Figure 1.1 Variations of select major elements vs. wt.% SiO_2 for late Pleistocene cone-building andesites, Holocene dome-building dacites, and mafic enclaves (found exclusively in the dacites). The main mixing trend between mafic and silicic end-members is illustrated schematically by the solid black line, with tick marks indicating the proportion of mafic end-member required to produce the accompanying whole-rock compositions.

(Miller et al., 1999). Further evidence for magma mixing in the most recent of the dacitic domes includes the common presence of discrete mafic enclaves, up to a meter in size.

Plagioclase exhibits a broad range in composition, and the sodic varieties show pronounced resorption and reverse zoning. Orthopyroxene appears to have been in equilibrium with its silicic host matrix, although some phenocrysts are encased by prominent rims of clinopyroxene. Clinopyroxene occurs as apparent "xenocrysts" not in contact with the matrix melt, but protected in crystal clumps accompanied by calcic plagioclase and, less commonly, olivine. Forsteritic olivine is present throughout the entire compositional range of basaltic andesite to dacite. Quartz phenocrysts are sparse but ubiquitous, and contain either substantial embayments, or are surrounded by glass and pyroxene jackets.

Geochemistry

Trace Element Variations

Trace-element concentrations of Mt. Dutton rocks have many similarities to those found at other Aleutian arc volcanoes (Kay and Kay, 1994). High ratios of large-ion-lithophile elements (LILE) to rare-earth elements (RRE) and LILE to high-field-strength elements (HFSE) are typical of arc magmas (Nye et al., 1994). Chondrite normalized (Sun and McDonough, 1989) multi-element patterns of Mt. Dutton magmas demonstrate some of these relationships with relatively high concentrations of Ba, Th, U, and Sr, LREE about 20-40 times chondrite, and heavy REE only ~8-10 times chondrite (fig. 1.2).

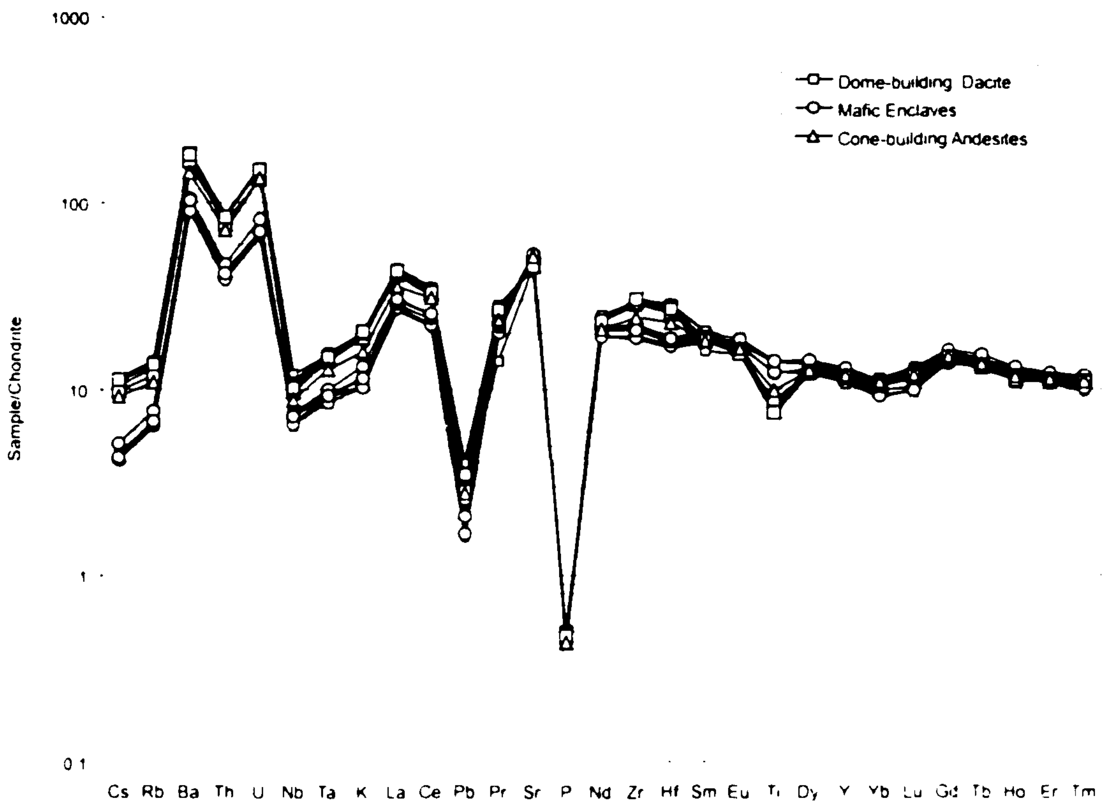

Figure 1.2 Trace-element concentrations of Mt. Dutton magmas normalized to bulk chondrite of Sun and McDonough (1989). Note high concentrations of Ba, Th, and U compared to REE, and LREE enrichment with respect to HREE.

In order to determine whether trace-element variations are consistent with fractional crystallization, previous studies (e.g., Nye et al., 1994) have equated slopes of trace-element plots to apparent bulk distribution coefficients (D^a). Log-log diagrams of trace elements versus a highly incompatible trace element (assumed D of close to zero) allow for the slope (m) of these trends to be related to the D^a by the relationship m = -(D^a-1). This relationship is derived from the Rayleigh fractionation equation $C_l/C_o = F^{(D-1)}$, where C_l/C_o is the ratio of concentrations in the evolved liquid to that in the parent, F is the fraction of liquid remaining and D is the distribution coefficient. For the Mt. Dutton system, apparent distribution coefficients were calculated assuming $D_{Rb} = 0$; thus, they represent true D's only if D_{Rb} is 0 and the magmas are related by Raleigh fractionation. Apparent D^a values for the Mt. Dutton system range from nearly zero for Th to about 1.10 for Sr and Eu, with relative enrichments of similarly incompatible Cs exceeding those of U and Th by as much as 20% (fig. 1.3).

Comparing apparent bulk distribution coefficients to those calculated using published values and the actual modal proportions of minerals observed in the volcanic rocks of interest, provides a first-order test for the viability of fractional crystallization as a process in generating a suite of magma compositions. A comparison of apparent values for D^a at Mount Dutton to those calculated using published values (Rollinson, 1993) for andesitic to dacitic systems reveals that whereas some inter-element variations are roughly consistent with those produced by fractional crystallization, others are not (fig. 1.4). Whereas low D^a values for LILE and moderate values for some HFSE and LREE are crudely consistent with published values, dramatic differences in D^a for similarly

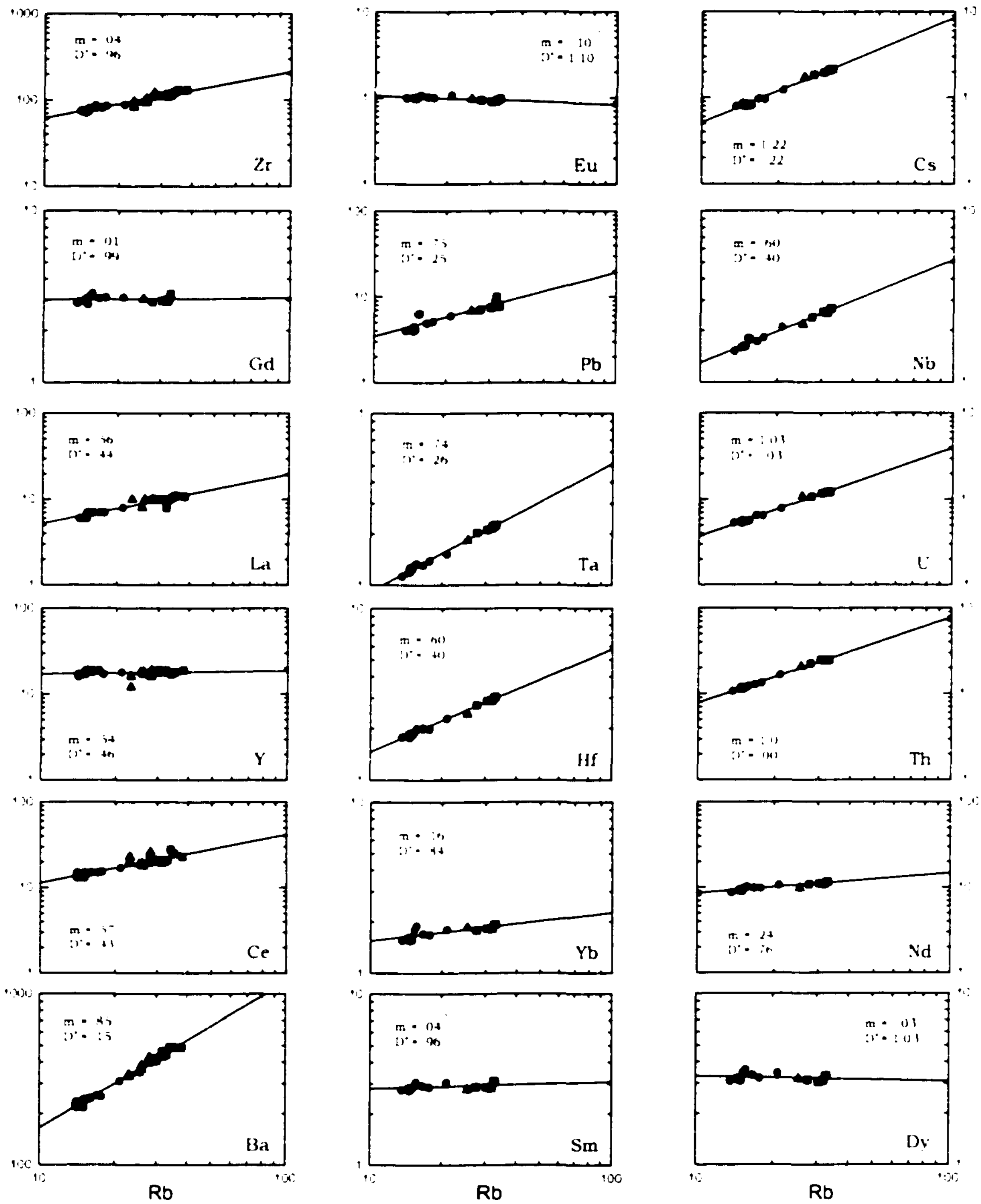

Figure 1.3 Log-log diagrams of selected trace elements vs. Rb (in ppm), with the slope (m) and equivalent apparent bulk distribution D', calculated by the relationship m = -(D' 1), displayed accordingly.

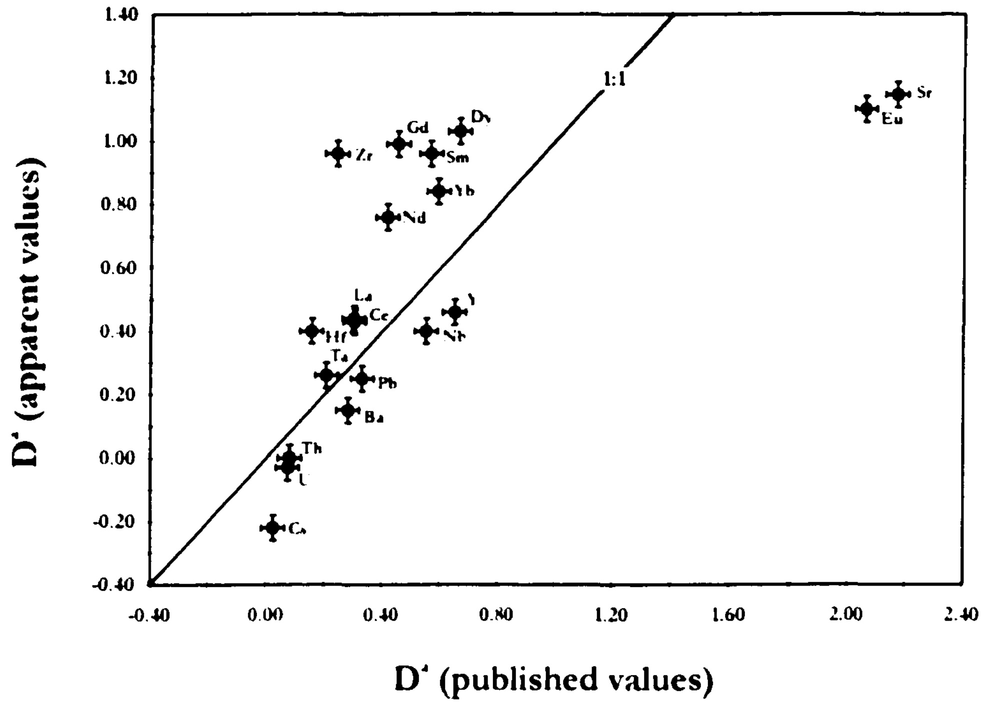

Figure 1.4 Apparent bulk distribution coefficients (D') for the Mt. Dutton magmatic system vs. published values for intermediate composition systems (Rollinson 1993).

incompatible elements, such as Cs, U, and Th, are not expected. D^a values of greater than one for Sr and Eu are typical for intermediate composition systems, but are not as high as predicted when taking into account the phase assemblage (particularly the abundance of plagioclase) found at Mt. Dutton. In addition, apparent D^a values close to or greater than one for MREE (such as Sm, Gd, and Dy), and HREE are especially hard to reconcile with closed-system crystal-liquid fractionation. Published D^a values for these elements in andesitic to dacitic systems range from about 1 to 3 for hornblende and 0.5 to 2.0 for pyroxenes (Rollinson, 1993). In the Mt. Dutton andesites and dacites, however, ferromagnesian minerals comprise at most 10% of the whole-rock and 20% of the crystal assemblage; thus, the bulk D should be <0.6, rather than ≥ 1 as observed. These relationships suggest that either end-members of the array are not directly related to each other through fractional crystallization or there is some MREE- and HREE- bearing phase in the system. Apatite is present in trace amounts in the Mt. Dutton magmas, but would have increased the partition coefficients of U, Th, and Ba far above those observed. Furthermore, although the amount of apatite required to increase the D^a values of MREE and HREE is small, it is still greater than that observed in Mt. Dutton rocks. It seems most likely therefore that the linear arrays seen in both major and trace elements are not simply the result of fractional crystallization from basalt to dacite.

In contrast, previous studies have shown that ratio-ratio plots can be useful in determining whether trace element data are consistent with a magma mixing origin (Langmuir et al., 1978). On a ratio-ratio plot, if the denominators are different, data consistent with magma mixing will produce a hyperbolic curve, whereas if the denominators are the same, a linear relationship will occur. Each of the plotted data points should maintain its relative position on all plots, because the order of the data points is a function of mixing proportions, which is the same regardless of the plot used. In addition, the difference in behavior between compatible and incompatible elements may be used to distinguish between magma mixing and source mixing. While partial melting and differentiation do not affect the ratios of incompatible elements, they will offset the ratio of a compatible to an incompatible element. Thus, a ratio-ratio plot involving both compatible (Sr) and incompatible elements (Ba, Rb) will produce a scattered trend if mixing occurred in the source region (source mixing) and a simple mixing line if mixing occurred between two magmas after separation from their sources (magma mixing). A plot of Zr Ba versus Rb Sr forms a curved array, while a companion plot of Zr Ba versus Sr Ba produces a linear array (fig. 1.5). In all plots of the data, sample points remain in the same groups and maintain their relative positions. These patterns indicate that, in contrast to fractional crystallization, two-component mixing of magmas works well in producing the linear compositional variations in trace elements seen at Mt. Dutton.

Mixing Calculations

Whole-rock data were fit by linear regression in order to calculate the proportions of end-member magmas in each of the Mt. Dutton rock types (fig. 1.1). The mafic end member at Mt. Dutton is represented by magmas that formed the basaltic enclaves found in dome-building dacites. The most mafic and least contaminated enclaves at Mt. Dutton

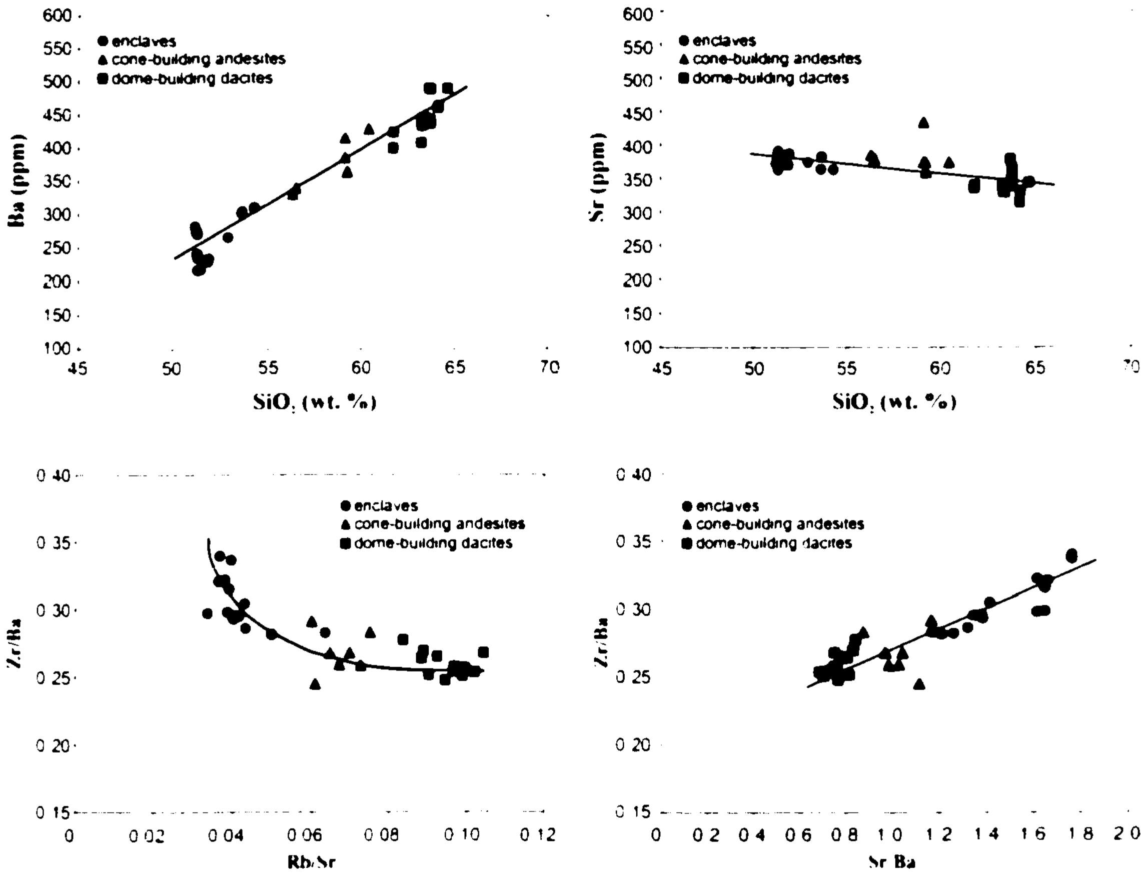

Figure 1.5 Variations of the trace elements Ba and Sr (in ppm) vs. wt.% SiO_2 for the Mt. Dutton rocks, as well as ratio ratio plots of Zr/Ba vs. Rb/Sr and Zr/Ba vs. Sr/Ba. Note that while a plot of Zr/Ba vs. Rb/Sr for the Mt. Dutton rocks forms a curved array, a companion plot of Zr/Ba vs. Sr/Ba produces a linear array, with samples in the same groups and relative positions in both plots.

have a SiO_2 content of ~ 51 wt.% and are similar in composition to high-Al basalts found at other Aleutian arc volcanoes (see below). Given the presence of resorbed quartz and prevalence of xenocrysts derived from the mafic end-member in some dacites, the silicic end member is a bit harder to define. The most silicic samples at Mt. Dutton contain the least disequilibria. If we assume those closely represent the composition of uncontaminated silicic magma prior to mixing, then the silicic end member would have a SiO_2 content of ~ 65 wt.%.

Using the most mafic and silicic rocks as end members, mixing calculations reveal that a significant amount of both end member magmas is required to produce most of the Mt. Dutton rock types. The dome-building dacites contain ≤ 21% of the mafic end member, whereas the cone-building andesites contain 30-70%. Mafic enclaves contain ≤ 25% silicic component. Enclaves typically comprise only 1-10% of the dome-building dacite at any given outcrop, and are absent from the cone-building andesites. This suggests that during the cone-building andesitic phase substantial amounts of mafic magma were thoroughly mixed with silicic magma, whereas during the dome-building dacitic phase, mixing was relatively limited and largely involved the disaggregation of enclaves.

Mineralogy and Mineral-Melt Equilibria

Further evidence for mixing and the nature of the end-member magmas involved can be found in the compositions of minerals found in the Mt. Dutton rock types. Previous work by Miller et al. (1999) included a limited description of the petrography, mineralogic compositions and textures found in Mt. Dutton rocks, but did not include data on Fe-Ti oxides or on reaction rims surrounding hornblende phenocrysts (see below). Furthermore, no explicit tests of mineral-melt equilibria were done to demonstrate unequivocally if the phenocrysts found in the Mt. Dutton rocks were out of equilibrium with their host rocks. Therefore, in this section we present new compositional data on Fe-Ti oxides and tests of mineral-melt equilibria.

Fe-Ti Oxides

Mount Dutton dacites contain both magnetite and ilmenite. Titanomagnetite crystals are subhedral and vary in size from phenocrysts (>50μm) to smaller groundmass crystals (1-50μm). Large, solitary titanomagnetite phenocrysts are reversely zoned with low-TiO_2 cores (~7-8wt%) and high-TiO_2 rims (~10-11wt%). Titanomagnetite phenocrysts in contact with ilmenite show even stronger reverse zonation from cores with ~8-9 wt.% TiO_2 to rims at the magnetite-ilmenite contact with ≥12 wt.% TiO_2. Smaller, magnetite-ilmenite pairs found in the groundmass contain magnetite with TiO_2 contents similar to those in the rims of larger phenocrysts. The ilmenite component in ilmenite phenocrysts and groundmass crystals is relatively homogenous at 75-80 mol%. Larger ilmenite phenocrysts in contact with magnetite phenocrysts are sometimes slightly zoned from ~75-77 mol% in the core to ~78-80 mol% in the rim.

Mafic enclaves also contain magnetite and ilmenite. Finer-grained magnetites are unzoned or slightly normally zoned with higher TiO_2 contents (10-12 wt.%) at the rim. In addition, the enclaves contain large, solitary titanomagnetites which are reversely zoned in TiO_2 from ~7-8 wt.% to ~10-11 wt.%. These magnetites are compositionally identical to phenocrysts in the dacite, suggesting they are xenocrystic. Where titanomagnetite is found in contact with ilmenite, it often forms a thin rim on larger ilmenite grains. These magnetite rims are normally zoned from the magnetite-ilmenite contact (≥12 wt.% TiO_2) to the magnetite-melt contact (~8-9 wt.% TiO_2). The ilmenite component in ilmenite crystals is similar to the host dacite and relatively homogenous at 75-80 mol%. Some of the larger ilmenite grains surrounded by magnetite are slightly zoned from ~75-76 mol% in the core to ~79-80 mol% in the rim.

Olivine

Experimental work suggests that in a melt with as much as 63 wt.% SiO_2, Mg-rich olivine can be stable (Ussler III and Glazner, 1989). Equilibrium K_D values of 0.27-0.33 for the partitioning of Fe and Mg between olivine and silicate liquid have been determined for a multitude of compositions, temperatures, and water contents (Roeder and Emslie, 1970; Sisson and Grove, 1993; Ussler III and Glazner, 1989). Thus, plotting the forsterite contents of olivine phenocrysts versus the Mg # of the enclosing rock provides a means of determining whether olivine phenocrysts are in equilibrium with their host rock (fig. 1.6).

Mafic enclaves and basaltic andesites contain normally zoned olivine phenocrysts with core compositions that are consistent with liquidus or near-liquidus nucleation in melts with MgO contents similar to their surrounding host rock. It is considered likely, however, that the olivine phenocrysts found in basaltic andesites are actually xenocrysts

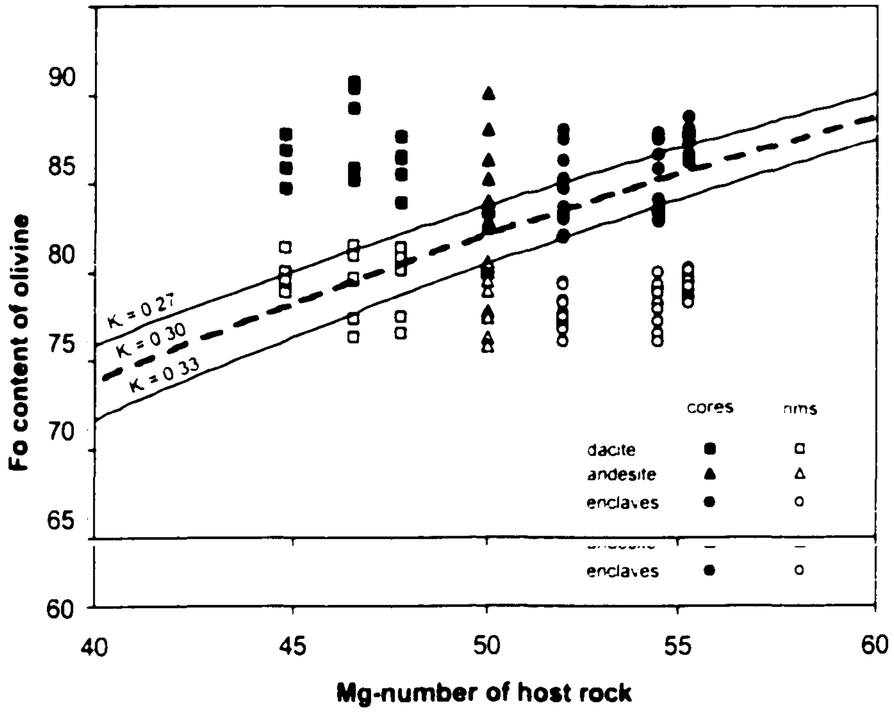

Figure 1.6 Forsterite contents of olivine phenocryst cores and rims vs. molar Mg-number of their host rock (andesite, dacite, or enclave). Dashed lines indicate equilibrium between minerals and whole-rock compositions, calculated following the method of Feeley and Dungan (1996) and assuming equilibrium values of 0.27-0.33 (Roeder and Emslie 1970).

derived from the mafic end member, because their forsterite contents are nearly identical to those found in mafic enclaves. Conversely, none of the rare olivine crystals found in more silicic andesites and dacites could have crystallized from liquids with MgO contents equivalent to their host rocks. This suggests that all of the olivine crystals found in Mt. Dutton rocks are derived either from the magma that formed the enclaves or from disaggregation of the enclaves themselves.

Pyroxene

Similar to olivine, equilibrium K_D values of 0.20-0.30 for the partitioning of Fe and Mg between pyroxene and liquid have been determined for a wide range of compositions, temperatures, and water contents (Baker and Eggler, 1983; Grove et al., 1982). Plotting the Mg-numbers of clinopyroxene and orthopyroxene versus the FeO/MgO of the surrounding rock provides a method of determining whether the pyroxene phenocrysts are in equilibrium with their host rock (fig. 1.7).

A comparison of the Mg-numbers of clinopyroxenes and orthopyroxenes from the same host rock reveals that Mg-numbers of clinopyroxenes are consistently higher than Mg-numbers of orthopyroxenes. In the andesites and dacites, this could be explained by early crystallization of clinopyroxene succeeded by later crystallization of orthopyroxene during evolution of the host magma. Conversely, orthopyroxene is rare in the enclaves and undoubtedly was incorporated from the host dacite, as evidenced by an omnipresent clinopyroxene jacket on all orthopyroxene crystals. Clinopyroxenes found in mafic enclaves are normally zoned, whereas more silicic lavas contain clinopyroxenes that are

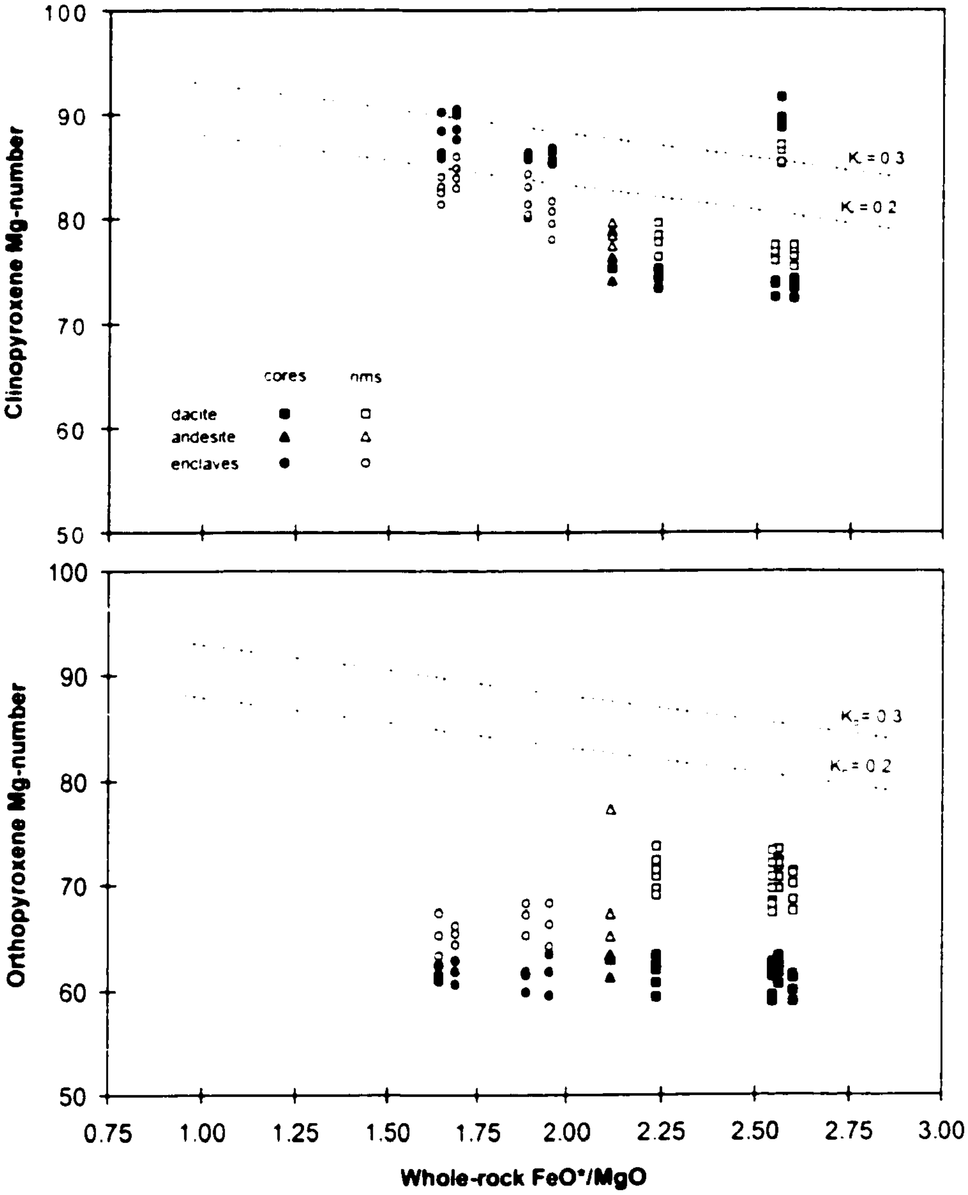

Figure 1.7 Molar Mg-numbers of clinopyroxene and orthopyroxene phenocrysts vs. FeO* MgO of their host rock (andesite, dacite, or enclave). Dashed lines indicate equilibrium between minerals and whole-rock compositions, calculated using the method of Feeley and Dungan (1996) and assuming equilibrium values of 0.20-0.30 (Grove et al. 1982; Baker and Eggler 1983).

predominantly reversely zoned along with some Mg-rich clinopyroxenes identical to those in the enclaves.

The core compositions of clinopyroxene phenocrysts within mafic enclaves are consistent with liquidus crystallization in equilibrium with melts resembling the composition of their host rocks. In the andesites and dacites, however, neither population of clinopyroxenes appears to be in equilibrium with its surroundings (fig 1.7). Given that the compositions of Mg-rich clinopyroxenes found in andesites and dacites overlap those found in enclaves, it seems probable that these are in fact xenocrysts inherited from more mafic magma. On the other hand, the reverse zoning of Fe-rich host clinopyroxene phenocrysts suggests that their compositions were affected by the injection of more mafic magma into the host silicic reservoir following initial pyroxene crystallization. The former is supported by the presence of clinopyroxene in crystal clumps, accompanied by calcic plagioclase and sometimes olivine, whereas the latter is supported by the presence of pronounced zoning in some clinopyroxene phenocrysts.

Origin of the Mount Dutton End-Member Magmas

Geochemical and mineralogic data suggest that the Mt. Dutton rocks originated largely through variable mixing of basalt and dacite. Those end-member magmas can be defined either by whole-rock compositions or the population of phenocrysts that originated in each of the end-member magmas. In this section, we use trace-element variations to shed light on the origin of the mafic end-member (Hi-Al basalt) and both major and trace-element modeling to determine if the dacite could have originated from an andesitic magma predominantly by crystal fractionation, rather than mixing.

Mafic End-Member/Primitive Enclaves (High-Al Basalt)

High-Al basalt (17 to 21 wt.% Al_2O_3) is the most abundant type of basalt in the Aleutian arc (Kay and Kay, 1994). The most mafic enclaves at Mt. Dutton are similar to high-Al basalts in almost every respect (fig. 1.8). Previous work suggested that high-Al basalts are derived from Mg-rich basalts through fractional crystallization of olivine and clinopyroxene, but not of plagioclase (Conrad and Kay, 1984; Gust and Perfit, 1987; Kay and Kay, 1985). In such models, Mg-rich mafic magmas are partial melts of mantle peridotite overlying the subducting slab.

Concentration levels of almost all of the incompatible trace elements (with the exception of Nb) in Mt. Dutton mafic enclaves are higher than those in Aleutian Arc high-Mg basalts, consistent with the two being related by crystal fractionation (fig. 1.9). Furthermore, mafic enclaves are also depleted in compatible elements (Cr and Ni). This suggests that the production of high-Al basalt at Mt. Dutton involved olivine fractionation.

Silicic End-Member (Dacite Magma)

In order to ascertain the origin of the silicic end-member at Mt. Dutton, major and trace element models were constructed. In conjunction with Mt. Dutton whole-rock and mineral compositions, the BASIC program IGPET2000 was used to produce a major-

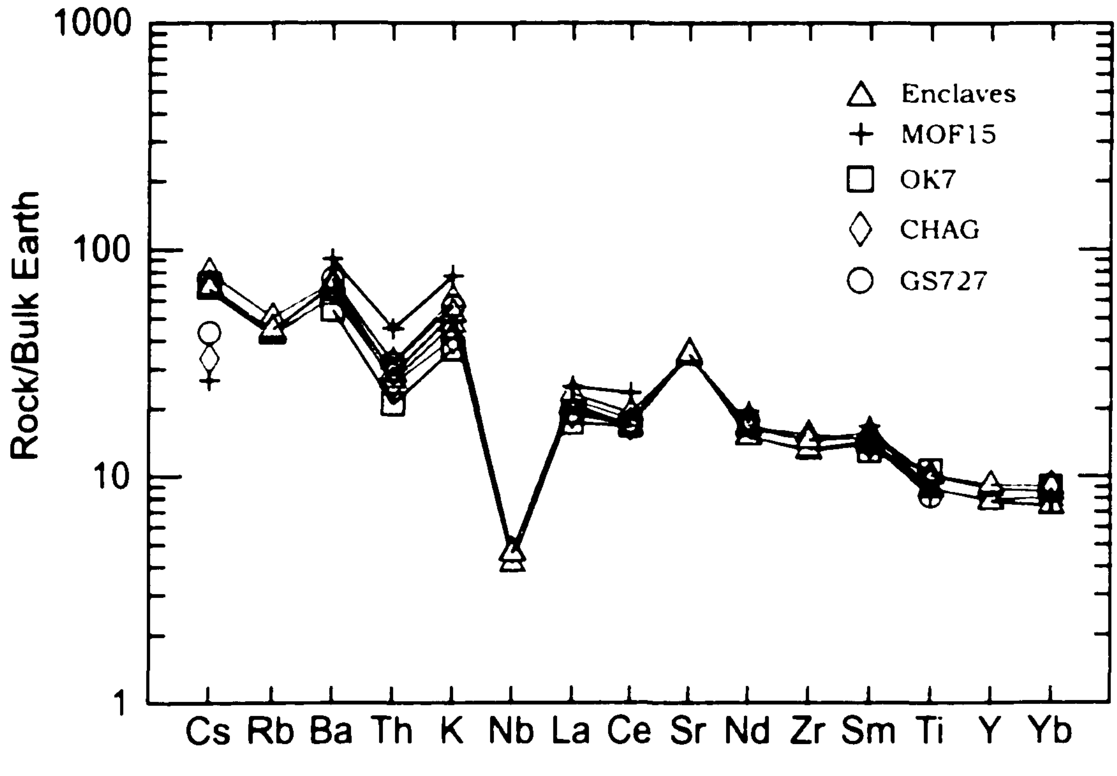

Figure 1.8 Multi-element variation diagram showing trace-element concentrations of Mt. Dutton mafic enclaves compared to representative analyses of High-Al basalts from other Aleutian Arc volcanic centers (Kay and Kay 1994). All samples are normalized to bulk earth. MOF15 is from Moffett volcano, Adak Island, OK7 from Okmok volcano, Umnak Island, CHAG from Chagulak volcano, and GS727 from Great Sitkin volcano.

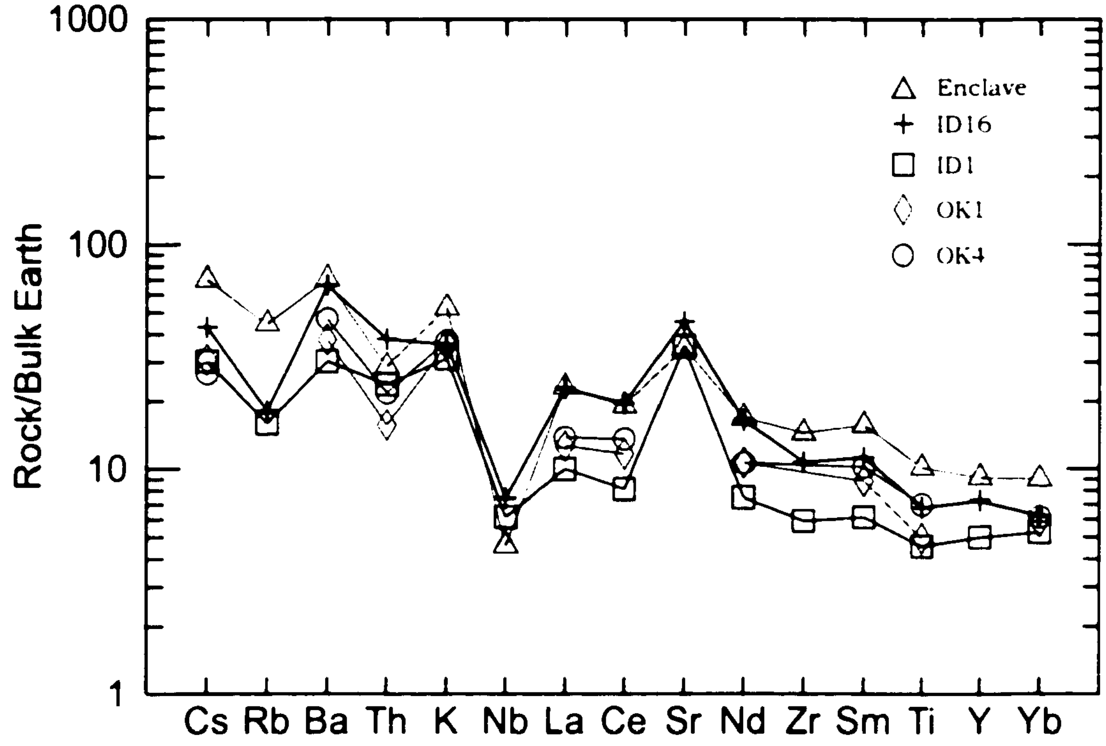

Figure 1.9 Multi-element variation diagram showing trace-element concentrations of the most primitive mafic enclave found at Mt. Dutton compared to representative analyses of Mg-rich basalts from Okmok Volcano, Umnak Island, in the central Aleutians. All samples have been normalized to bulk earth. OK1 and OK4 are from Kay and Kay (1994), while ID1 and ID16 are from Nye and Reid (1986).

element model. The results of this best-fit model indicate the types and proportions of phases needed to produce the major-element concentrations of the dacitic lavas from fractional crystallization of an andesitic parent.

A trace-element model was then generated following the method of Feeley and Davidson (1994). Bulk trace-element partition coefficients were calculated using the types and proportions of phases indicated by the major-element model and ranges in mineral melt partition coefficients reported in the published literature (Rollinson, 1993). Subsequently, these bulk partition coefficients were used to construct a projected range in trace-element compositions by Rayleigh fractionation of the cumulate assemblage determined by the major element model. These projected ranges in trace-element composition were then compared with the actual measured trace-element composition of the dacite (fig. 1.10).

According to major-element modeling, a cumulate assemblage with 68.0% plagioclase, 14.1% clinopyroxene, 10.8% orthopyroxene, and 7.1% magnetite is needed to generate the dacitic lavas by fractional crystallization from an andesitic parent. The proportions and phases of minerals needed to generate the dacites from the andesites are consistent with the modal proportions and phases observed in andesite lavas. The trace-element model for fractional crystallization from andesite to dacite also produces a good match with the observed trace element concentrations. Projected concentrations of U, Th, some of the MREE and most of the HREE are all greater, however, than those in the dacite lavas.

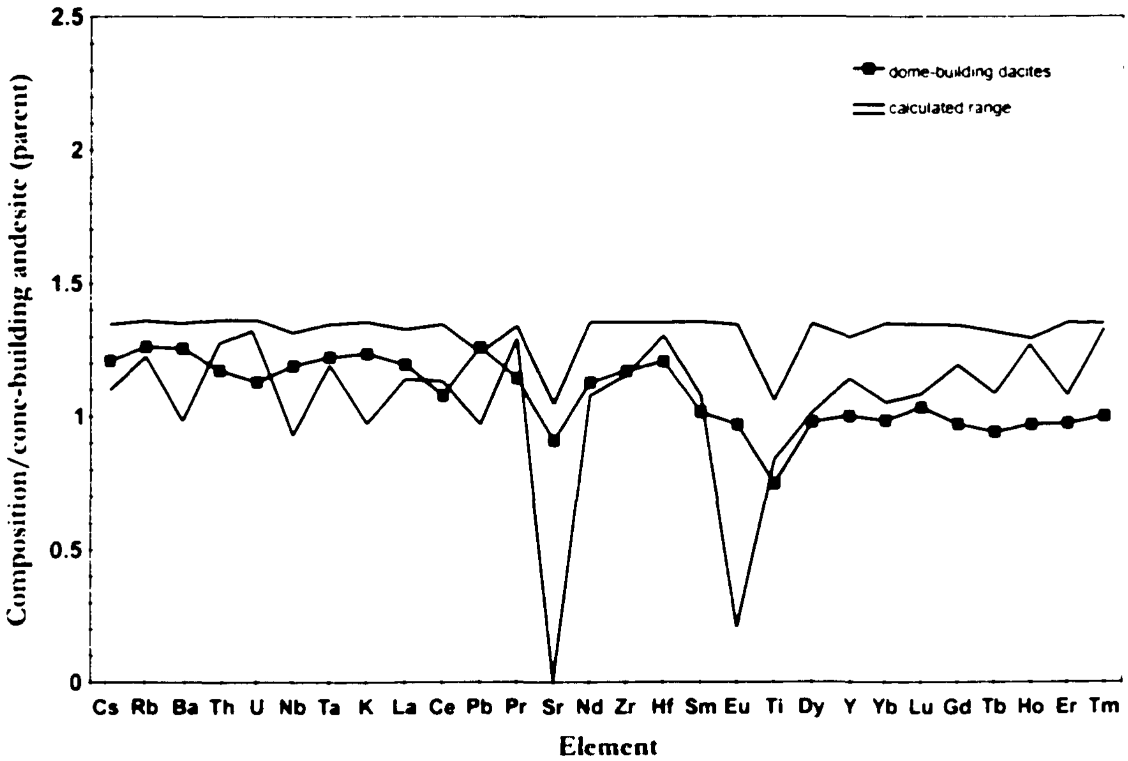

Figure 1.10 Observed trace-element contents of dome-building dacites compared to the possible range of trace-element compositions predicted by modeling of fractional crystallization from Mt. Dutton andesite. Compositions have been normalized to the possible andesitic parent magma.

One possible explanation for the lack of agreement between calculated and measured values includes the addition of zircon and/or apatite to the crystallizing assemblage. The addition of zircon would lower the calculated concentrations of Zr, Hf, and Y, as well as the heavy REE, whereas the addition of apatite would similarly lower some heavy REE. The addition of zircon and/or apatite as fractionating phases would, however, adversely affect the projected range in concentrations of other trace elements (e.g., MREE). Furthermore, neither of these phases can explain the difference between the projected and measured concentrations of Ce and Pr found in the dacites.

Another possible explanation for the slightly low concentrations of Zr, Hf, and heavy REE in the more silicic magmas could be crustal contamination. Other studies have attributed low Zr and heavy REE contents to the incorporation of a crustal melt that is depleted in those elements (Feeley and Davidson, 1994; Watson, 1979). If the contaminant is similar in composition to the magma in all other respects or assimilation is selective, this process could allow the more silicic lavas to become depleted in certain elements without affecting the concentrations of other elements.

These results suggest that fractional crystallization may have been a contributing process for deriving the dacitic lavas from andesitic magmas, similar in composition to the earlier erupted andesite lavas. Even though the model for fractional crystallization from andesite to dacite produces a good fit between the projected and observed trace element concentrations, however, other processes, such as crustal contamination, seem to be required.

Pre-eruptive Temperatures, Timing of Mixing and Enclave Formation

We have developed a picture of the evolution of the Mt. Dutton magma system in which injections of more mafic magma have played an important role. Here, we use zoning profiles in magnetite to estimate changes that occurred in the thermal conditions of the magmatic system prior to eruption of the most recent major summit eruption of Mt. Dutton dacite, as well as to constrain the timing of these mixing events. Variations in enclave textures, as well as detailed microprobe transects of enclave glass from rim to core of individual concentrically zoned enclaves, are similarly used to elucidate the nature and timing of mixing events at Mt. Dutton. Although the andesites at Mt. Dutton may have experienced more substantial mixing than the dacites, we have chosen to focus here on these dacites because the common presence of magnetite-ilmenite pairs, as well as mafic enclaves, provides a unique opportunity to investigate mafic-silicic magma interactions not afforded by the andesites.

Geothermometry

Temperatures based on adjacent Fe-Ti oxide grains were calculated using the Andersen and Lindsley (1988) algorithm and the Stormer (1983) mineral reformulation model (fig. 1.11). For each pair, an average of three or more analyses from the core and rim of each mineral were used to calculate temperatures. Equilibrium was tested by the Mg/Mn ratio between each pair (Bacon and Hirschmann, 1988).

Zoning profiles in Fe-Ti oxides are thought to result from diffusive re-equilibration in response to a sudden change in temperature (Coombs et al., 2000;

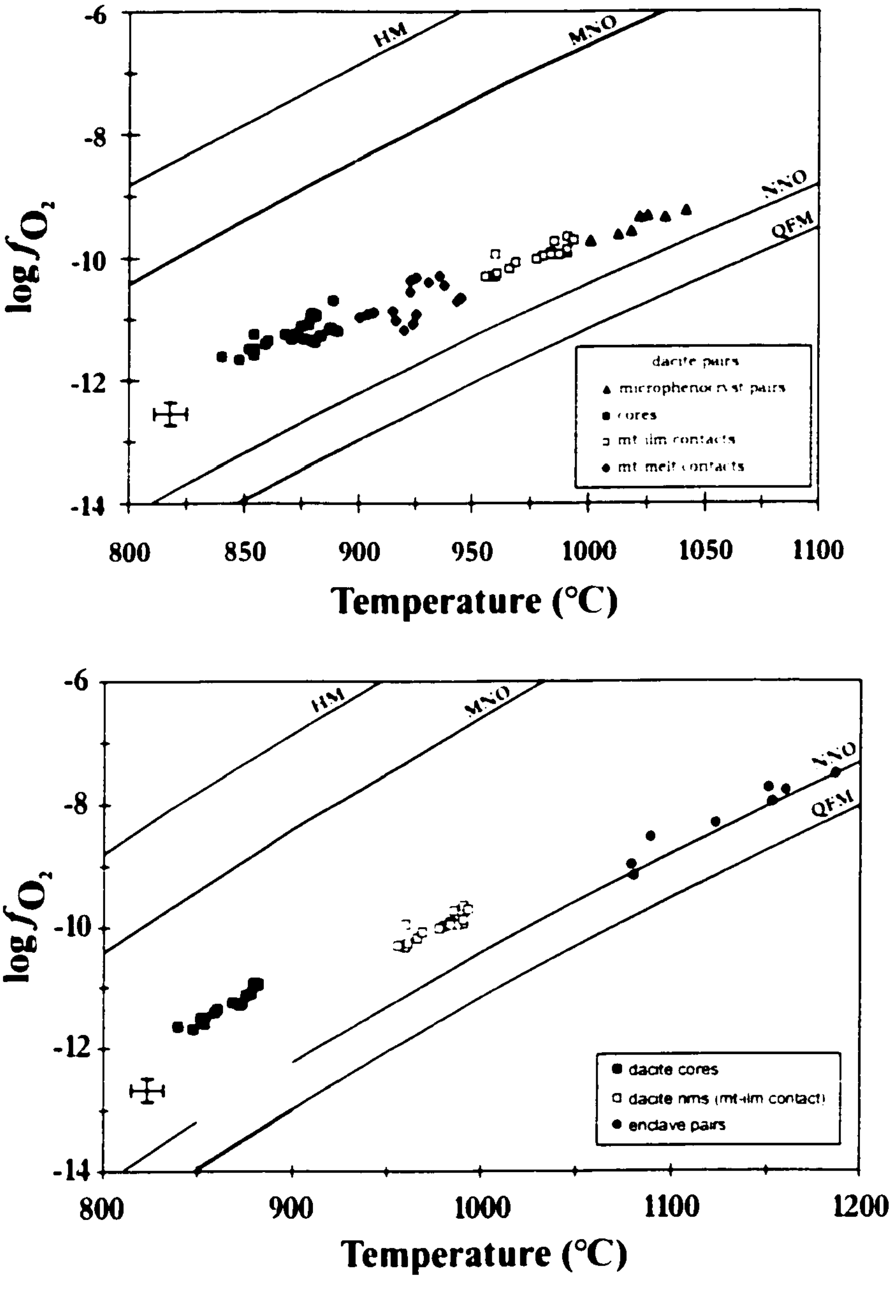

Figure 1.11 Temperatures and oxygen fugacities calculated from magnetite-ilmenite pairs using the Stormer (1983) mineral reformulation model and the Andersen and Lindsley (1988) algorithm: a) all analyses of pairs (both phenocrysts and groundmass) inherent to the most recent dacite magma to be erupted at Mt. Dutton; b) temperatures and oxygen fugacities for zoned pairs in the dacite compared to pairs found within mafic enclaves. Error bars show one standard deviation.

Nakamura, 1995; Venezky and Rutherford, 1999). If this is indeed the case, the cores may preserve the equilibrium composition in the low-temperature host dacite before magma mixing, whereas the rim (magnetite-ilmenite contact) records the composition formed as a result of mixing with the high-temperature mafic magma. Adjoining two-oxide pairs of cores and rims found in the host dacite yielded temperatures of ~865±25°C and ~975±25°C, respectively (fig. 1.11). Microphenocryst Fe-Ti oxide pairs in the groundmass gave temperatures similar to those of the rims of magnetite phenocrysts, except for a few anomalously high temperatures. Venezky and Rutherford (1999) reported similarly anomalous temperatures from small pairs in petrologic experiments, which they interpreted to be the result of nucleation and growth of groundmass Fe-Ti oxides within temporary zones of heterogeneous melt created by silicate mineral dissolution in response to a large change in temperature (simulating mixing).

Apparent temperatures and oxygen fugacities were also calculated for the magnetite-rimmed ilmenites present in the enclaves. In such a situation it is important to remember that a given titanomagnetite is not necessarily saturated with respect to its Ti content unless there is an adjacent Ti phase growing at the same time. Thus, only the magnetite rim in direct contact with the enclosed ilmenite is likely to have been in equilibrium and only its composition was used to calculate temperatures. Temperatures calculated using the composition of ilmenites and surrounding magnetite rims at this contact that are in equilibrium gave temperatures that vary from 1080-1180°C (fig. 1.11). Fe-Ti oxide geothermometry thus indicates that, prior to eruption of the last dacite from

Mt. Dutton, a mafic magma at 1080-1180°C mixed with a dacite magma at ~865±25°C. Mixing of the two magmas caused the dacite to be heated to ~975±25°C.

Magnetite Zoning Profiles

Zoning profiles in magnetite phenocrysts may record the time scale from mixing to eruption (Coombs et al., 2000; Nakamura, 1995; Venezky and Rutherford, 1999). The fast diffusivity of the ulvospinel component in magnetite compared to diffusivities of cations in silicate minerals allows for the detection of short times (Nakamura, 1995). Re-equilibration of magnetite phenocrysts should have started as soon as the magmas mixed. If eruptive quenching interrupts the process of re-equilibration, however, the time interval from mixing to eruption can be estimated by fitting a calculated diffusion profile to the observed zoning profile (Nakamura, 1995). Calculated profiles were determined using data for magnetite diffusion from Freer and Hauptman (1978). Comparing calculated profiles to zoning profiles in magnetite crystals adjacent to ilmenite grains indicates that the typical zoning profile for the most recently erupted dacite corresponds to a diffusion time of ~ 1 month (fig. 1.12). This suggests that injection of mafic magma into the host reservoir preceded eruption by ~ 1 month.

Enclave Textures

Variations in enclave composition described in detail by Miller, et al. (1999), were found to be primarily the result of bulk assimilation of varying amounts of dacite host. In this section, we focus on important textural variations in enclaves that correlate

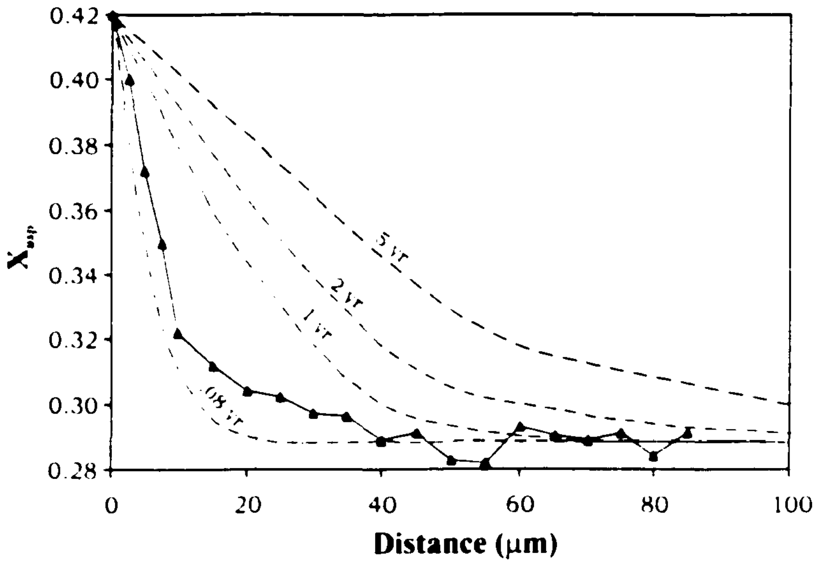

Figure 1.12 Typical zoning profile found in magnetite phenocrysts, which originally crystallized in the dacite magma reservoir beneath Mt. Dutton, but subsequently were reheated by influx of hotter, mafic magma. Dashed lines indicate calculated diffusion profiles for various times between mixing and final eruptive quenching.

with those variations in bulk composition (fig. 1.13). More mafic enclaves are comprised predominantly of elongate microphenocrysts of skeletal plagioclase and hornblende, with little to no large, sieved-core plagioclase or blocky clinopyroxene and olivine phenocrysts. Such microphenocrysts are thought to form during rapid crystallization of the mafic magma as it cools against the low-temperature host reservoir magma. Conversely, more hybrid enclaves are largely composed of phenocrysts of sieved-core plagioclase and blocky clinopyroxene and olivine with a subordinate amount of skeletal plagioclase and hornblende microphenocrysts. These textural differences allow enclaves to be placed into one of two categories: quenched, in the case of more mafic enclaves, and coarsely crystalline, in the case of more hybrid enclaves.

The resorbed cores of sieved-core plagioclase phenocrysts found in coarsely crystalline enclaves have a calcic core composition (~An_{80}), which suggests they originated in the more mafic enclave-forming magma. It is likely that such dissolution textures formed when the plagioclase phenocrysts decompressed during ascent from a deeper storage region (Nelson and Montana, 1992; Singer et al., 1995). If this is indeed the case, then the abundance of sieved-core plagioclase and blocky clinopyroxene and olivine in coarsely crystalline enclaves suggests that at least some of the crystallization of hybrid enclaves took place at greater depths, before injection into the silicic reservoir.

Recent experimental studies (Coombs, 2001) have shown that textural evidence can provide important constraints on the processes that lead to enclave formation. Those experiments demonstrated that some enclave groundmass textures (i.e., skeletal hornblende and plagioclase microphenocrysts) are best replicated by cooling of the

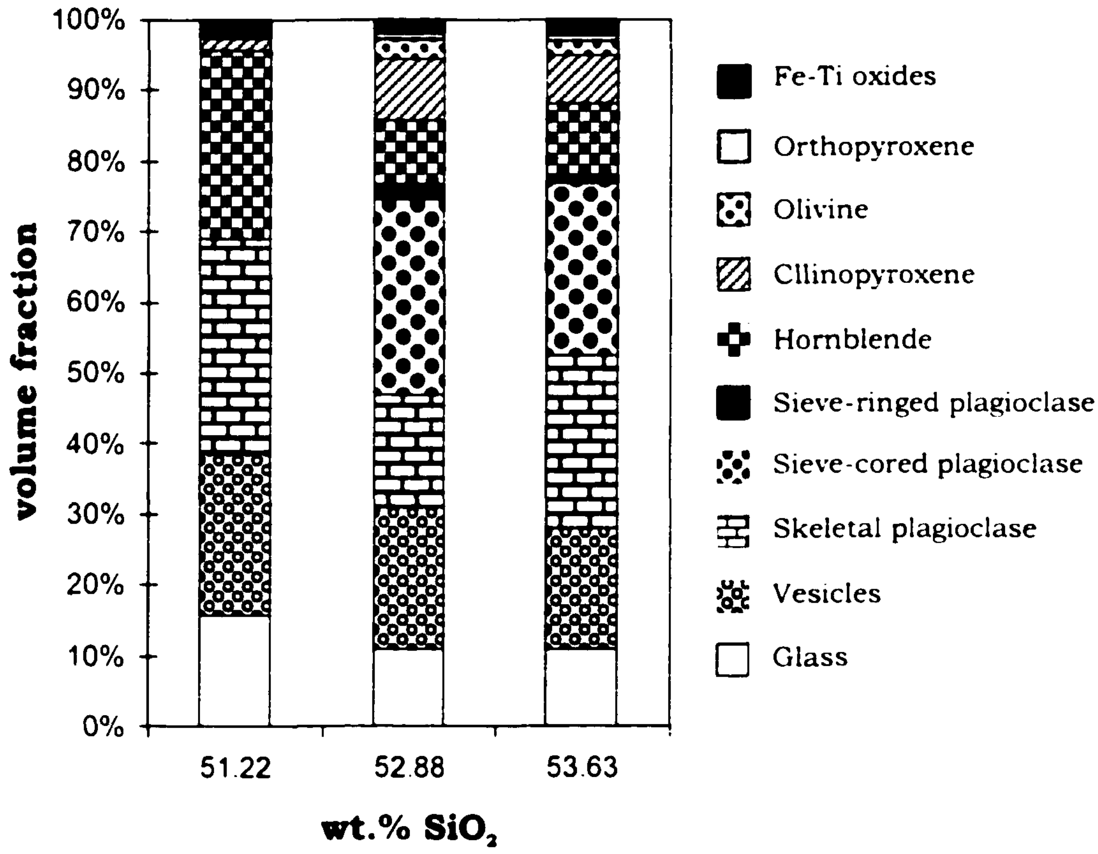

Figure 1.13 Modal proportions versus whole-rock composition (wt.% SiO_2) for mafic enclaves. "Quenched" enclaves are represented by enclaves with whole-rock compositions of ~51 wt.% SiO_2, whereas "coarsely crystalline" enclaves are represented by enclaves with whole-rock compositions of ~53-54 wt.% SiO_2. Note the difference in the type and texture of minerals present in the two enclave types and the decrease in vesicularity with increasing silica content.

enclave-forming magma below a mafic-silicic interface, rather than cooling of individual, spherical-shaped enclaves. Thus, Coombs (2001) concluded that enclave formation was most likely the result of second-boiling induced flotation as previously hypothesized by Eichelberger (1980). Coombs (2001) determined that such flotation was achieved upon crystallization of ~34 vol. % of the mafic magma groundmass and ~18 vol. % vesiculation. Given the similar temperature and compositional contrast between the end-member magmas at Mt. Dutton compared to the Trident magmas studied by Coombs (2001), it is reasonable to conclude that the vesicularities (~17-23 vol. %) of all enclaves at Mt. Dutton are also consistent with formation as a result of second boiling induced flotation.

All of the enclaves at Mt. Dutton contain skeletal hornblende and plagioclase microphenocrysts that are similar in composition and size to those observed at SW Trident volcano (Coombs, 2001). This suggests that both quenched and coarsely crystalline enclaves experienced cooling beneath a mafic-silicic interface prior to enclave formation. On the other hand, chilled margins and concentric zonation in crystal size within some individual enclaves suggest that additional crystallization occurred after enclaves had formed as discrete entities. Chilled margins of enclaves could act as barriers to release of gas bubbles (Bacon, 1986), as evidenced by the high chlorine contents of interstitial enclave glass (up to 4700 ppm) relative to host melt, lowering enclave density.

Accepting that both quenched and coarsely crystalline enclaves experienced significant microphenocryst crystallization beneath a mafic-silicic interface prior to entrainment, correlation of variations in enclave texture with composition suggests that there are two competing processes at work during enclave formation, hybridization and microphenocryst crystallization (which results in second-boiling-induced flotation). If the temperature difference between the mafic and silicic magmas is extreme, faster microphenocryst crystallization and subsequent second-boiling-induced flotation may occur before much hybridization at the mafic-silicic interface takes place, resulting in quenched texture enclaves with a more mafic composition.

Conversely, if the intruding magma experienced some phenocryst crystallization at depth prior to injection into the host reservoir, as was the case for coarsely crystalline enclaves, the contrast in temperature between intruding and reservoir magmas may not have been as large. Microphenocryst crystallization may thus have occurred at a slower rate, allowing time for more extensive hybridization to occur prior to second-boiling-induced flotation and enclave entrainment. In addition, if the intruding magma contains a significant number of previously crystallized phenocrysts, less melt may be available for microphenocryst crystallization. In the case of coarsely crystalline enclaves, this could have resulted in an intruding magma that experienced less vesiculation and was therefore less buoyant, allowing for more substantial hybridization to occur due to slower rise of mafic magma from the mafic-silicic interface. Such an interpretation is supported by the fact that the vesicularity of enclaves decreases with increasing bulk SiO_2 content (fig. 1.13).

Timing of Enclave Formation (Glass Diffusion Profiles)

Prior studies have revealed that the shape of compositional profiles in mineral phases can be used to determine diffusion times and thus the timing between mixing and eruptive quenching. Experimental work (Vaan Der Laan and Wyllie, 1993) has shown that such inter-element diffusion can also occur between two compositionally distinct melts. Van Der Laan and Wyllie (1993) suggested that the diffusivities calculated in their experiments could be applied to enclaves by using spherical enclave geometry and the methods of Crank (1975). Reported diffusivities (in cm^2 s) from the experiments of Van Der Laan and Wyllie (1993) were: $D_{Na2O} = 6 \times 10^{-7}$, $D_{K2O} = 3 \times 10^{-7}$, D_{SiO2} and $D_{Al2O3} = (3\text{-}0.6) \times 10^{-8}$. It is important to note that the conditions at which the experiments of Van Der Laan and Wyllie (1993) were run (T = 920°C, P = 10 kbar, H_2O content = 5 wt.%) are somewhat different from the pre-eruptive magmatic conditions at Mt. Dutton (post mixing T = 975±25°C, P ≥ 1 kbar, H_2O content > 4 wt.%). In the later case, the only constraint on pressure is that inferred by the depth of shallow seismic activity underneath the volcano, whereas an H_2O content of at least 4 wt.% is required for hornblende to be present in a high-SiO2 melt (Merzbacher and Eggler, 1984; Naney, 1983; Ritchey and Eggler, 1978; Rutherford and Hill, 1993).

In order to test whether diffusion is a process that affects the interstitial melt composition of enclaves, detailed microprobe transects of enclave glass were made from rim to core of concentrically zoned enclaves. Coarse crystalline enclaves were used because they showed the most dramatic intra-enclave variations in melt composition. For each enclave, two radial transects were done from rim to core in opposite directions, with two analyses of the melt phase at each distance interval. The resulting four points were then averaged in order to determine a representative melt composition for each distance interval. Another process that could impact melt composition on a smaller scale includes the crystallization of mineral phases within the enclaves, resulting in local heterogeneities in the melt composition. Therefore, during selection of microprobe transect points, care was taken to probe the interstitial melt phase as far as possible from the edge of phenocryst phases. Plots of electron probe transects were then compared to calculated time-dependent diffusion profiles in order to estimate diffusion times and subsequently the time between enclave formation and eruption (fig. 1.14).

Profiles for concentrically zoned, coarsely crystalline enclaves from the dacite dome-building eruptions show zoning profiles that are steepest in the outer ~1-2 cm of the enclaves. When compared to calculated diffusion profiles, these variations equate to a diffusion time between >1 month and 2 years, depending on the element evaluated and the diffusivity value used. These diffusion times are substantially longer than those calculated using zoning profiles in magnetite phenocrysts. Possible reasons for these differences include the following: 1) coarsely crystalline enclaves are "leftovers" from a previous mixing event, 2) mixing began approximately 2 years prior to eruptive quenching, but was continuous, resulting in shorter diffusion times for magnetite phenocrysts, or 3) diffusion within the interstitial melt of enclaves is confined to the outer ~1-2 cm, while in the interior, melt is also affected by other processes such as continued microphenocryst crystallization following enclave formation.

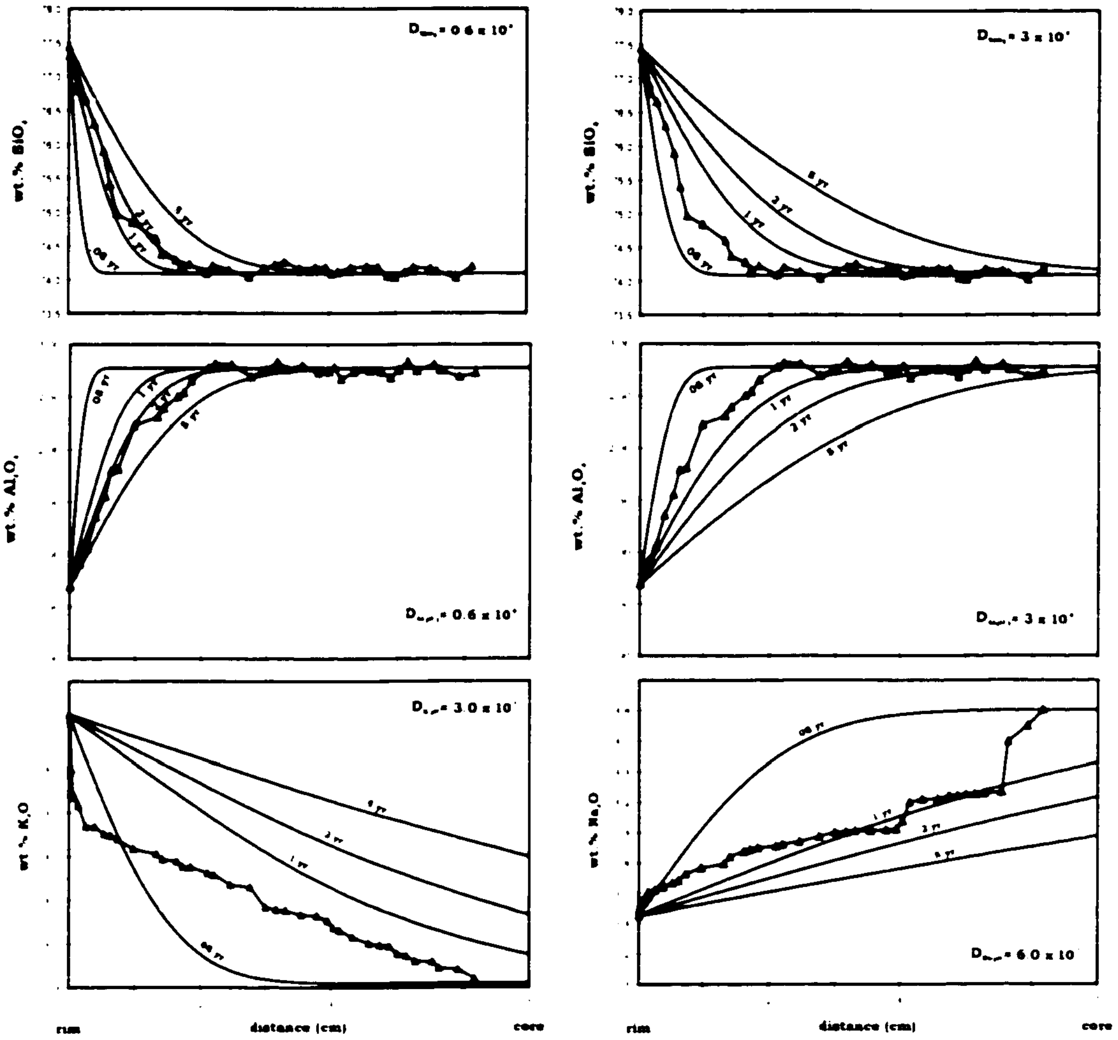

Figure 1.14 Representative zoning profiles in matrix glass composition (SiO_2, Al_2O_3, K_2O, and Na_2O) from core to rim of coarsely crystalline enclaves found within dacite dome-building lavas. Lines indicate calculated diffusion profiles for various times between mixing and final eruptive quenching using the method of Crank (1975) and the diffusivities of Van Der Laan and Wyllie (1993).

Determination of Ascent Rates

Although injection of more mafic magma may trigger an eruption, for volatile-rich magmas such as those found at Mt. Dutton, eruptive style is now thought to depend largely on ascent rate (e.g., Eichelberger et al., 1986; Jaupart and Allegre, 1991). If ascent is relatively slow, the magma will have ample time to lose much of its volatile content, resulting in predominantly effusive eruption (Eichelberger et al., 1986). Alternatively, if ascent is relatively rapid, the magma will not have time to degass until it reaches a high vesicularity, at which point the trapped gas will fragment the magma, resulting in an explosive eruption (e.g., Gardner et al., 1996; Sparks, 1978). Experimental work combined with observations of natural samples has shown that ascent rates for amphibole-bearing magmas similar to dacites found at Mt. Dutton can be estimated (Devine et al., 1998; Rutherford and Hill, 1993). Such estimates are accomplished by measuring the thickness of amphibole reaction rims that form as a result of water loss from the host melt during ascent. The thickness of the rims varies with the decompression rate, which is proportional to the ascent rate. Slower ascent rates result in relatively thick rims, whereas fast ascent rates may result in no evidence of amphibole breakdown (Devine et al., 1998; Rutherford and Hill, 1993).

Dacites at Mt. Dutton contain two populations of hornblende phenocrysts (fig. 1.15). The first population has 40 ± 10 μm-thick rims and makes up a vast majority (about 80%) of amphiboles in the dacite. The second population consists of amphiboles with coarse-grained 300-400 μm-thick rims and only makes up a small percentage (about 20%) of the total number of hornblende phenocrysts. Similar coarse-grained reaction

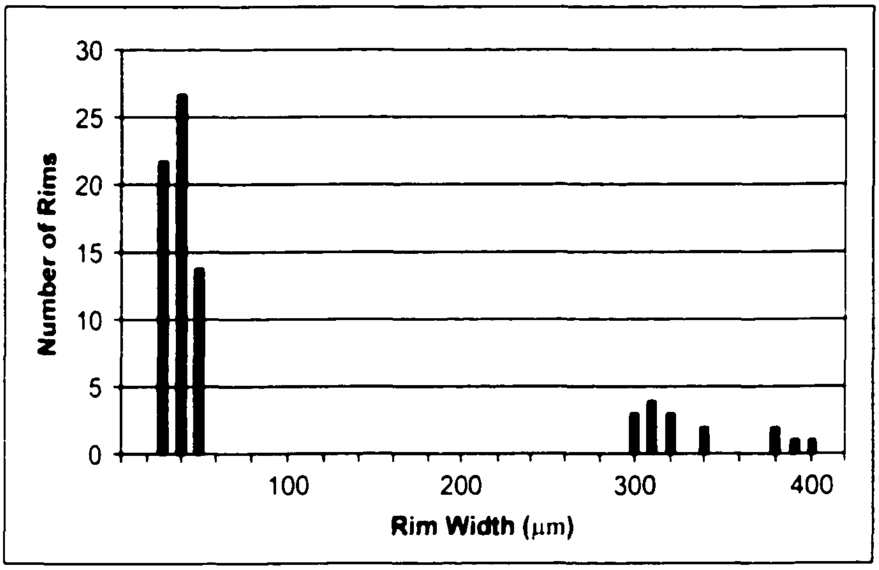

Figure 1.15 Histogram showing the presence of two populations of hornblende phenocrysts in dacites at Mt. Dutton. 1) a main population with relatively thin rims, 40 - - 10 m in width, and 2) a secondary population with much thicker, coarse-grained rims, 300-400 m in width.

rims have been observed at Soufriere Hills Volcano (Devine et al., 1998). Following Devine et al. (1998), we attribute reaction rims on the first population of amphiboles to decompression upon ascent, and the thick, coarse-grained reaction rims on the second population of amphiboles to relicts of mixing from long ago.

By applying the experimental calibration of Rutherford and Hill (1993) to the measured width of reaction rims on the main population of thin-rimmed amphiboles, an average ascent rate for the dome-building dacites at Mt. Dutton has been estimated. Strictly speaking, the experimental calibration of Rutherford and Hill (1993) applies only to Mount. St. Helens dacite; however, prior studies have shown that the calibration curves may be qualitatively applied to similar composition magmas (Devine et al., 1998).

Estimates of the temperature and pressure conditions at which the magma was stored are also required in order to use the Rutherford and Hill (1993) calibration. Fe-Ti oxide thermometry indicates that the post-mixing temperature of the Mt. Dutton dacite was 975±25°C, whereas recent shallow earthquake swarms suggest the existence of a magma chamber ~ 3-5 km depth (equivalent to ~ 1 kbar pressure) beneath the volcano (Davies et al., 1988). It is important to note this temperature estimate means the pre-eruptive magmatic conditions at Mt. Dutton were somewhat higher than the temperature at which the calibration for amphibole breakdown was determined. Therefore, estimates for the amount of time needed to produce the thickness of reaction rims at Mt. Dutton are maximum estimates, and hence inferred ascent rates are likely to be faster than actual rates. Breakdown rim thickness data for the main population of thin-rimmed hornblende phenocrysts within the dacite gives an average ascent time of ~ 17 days, corresponding to an average ascent velocity of ~ 7-12 m/h (~ 0.002 to 0.003 m/s). These are similar to ascent rates (~0.001 to ~0.008 m/s) calculated for extrusive eruptions at Soufriere Hills Volcano (Devine et al., 1998), but slower than those estimated (15-50 m/h) for the effusively erupted, post May 18, 1980, Mt. St. Helens dacites (Rutherford and Hill, 1993).

It is interesting to note that hornblende phenocrysts within the mafic enclaves show no evidence of breakdown in response to decompression, despite having experienced the same conditions during final ascent from the magma chamber to the surface. One possible explanation for this phenomenon could be that the chilled margins of enclaves act as barriers to the release of water vapor from enclosed interstitial melt, preventing the development of amphibole reaction rims. Rutherford and Hill (1993) also noticed that amphibole breakdown did not occur where amphibole crystals were in contact with or partially enclosed by another crystalline phase; therefore, another possibility could be that the coarsely crystalline nature of enclaves suppresses crystal-melt interaction, thereby prohibiting the generation of amphibole reaction rims.

Discussion and Conclusions

Thermal, Chemical, and Mass Constraints on the Mixing Process

Building upon previous work by Sparks and Marshall (1986), Bindeman (1993) described a petrologic method for determining the volume proportion of mafic magma injected during the refilling of a silicic magma chamber. This method is based on determining estimates of both the change in crystal contents and temperature of the two end-member magmas resulting from thermal equilibration after influx of hotter mafic magma into the cooler silicic reservoir. Mafic enclaves and their surrounding host are presumed to represent the two thermally equilibrated end-member magmas.

Determination of the change in temperature in each of the magmas was accomplished using the composition of Fe-Ti oxide phenocrysts as described earlier. For mafic enclaves, the total amount of crystallization due to rapid cooling during temperature equilibration is assumed to be approximately equivalent to the total volume of microphenocrysts present (i.e., skeletal plagioclase and hornblende). In contrast, estimates for the decreased volume fraction of host phenocrysts in the silicic magma due to heating and dissolution of minerals was accomplished by comparing the crystal content of the most silicic, almost disequilibrium-free rocks to that of the more contaminated dacites (excluding xenocrysts inherited from the mafic magma). This may result in a slight underestimate of the initial host phenocryst content because even the most silicic dacites show some evidence of heating in the form of partially dissolved and or reacted quartz, orthopyroxene, and hornblende phenocrysts.

From these calculations it is possible to see that in the case of quenched texture enclaves estimations of the proportion of injected mafic magma vary from ~ 14-18%, whereas in the case of coarsely crystalline enclaves vary from ~ 16-28%. This difference is a reflection of the greater amount of micro-phenocrysts present in quenched (~ 57 vol.%) vs. coarsely crystalline (~ 25-35 vol.%) enclaves. The range of volume estimates in each case also results from the variation in temperature estimates for the intruding mafic magma (1080-1180°C).

In contrast to the results of Bindeman (1993), the estimated proportions of magma chamber refilling overlaps with or slightly overestimates the proportion of mafic end-member (≤ 21%) needed to produce the range of whole-rock compositions found in the dacite (according to mixing calculations done by linear regression). This suggests perhaps as much as 7% of the mafic magma injected may pond at the base of the chamber and never be incorporated by the resident silicic magma. On the other hand, as mentioned previously, mafic enclaves comprise only 1-10% of the dome-building dacite at any given outcrop, substantially less than the amount of mafic end-member needed according to both compositional constraints and thermodynamic calculations. This points to disaggregation of enclaves as an important process during the incorporation of mafic magma into the silicic reservoir. Alternatively, a similar or larger proportion of mafic magma may have been directly mixed into the silicic magma rather than initially forming as enclaves.

It is also interesting to note that heating of the silicic reservoir as a result of mafic magma injection (approximately 1/3 to 1/2 the temperature contrast between end-members) appears substantially larger than the accompanying change in composition of the two end-member magmas (≤ 1/5 the compositional contrast). Two possible scenarios exist that may account for this apparent contradiction. In the first, heat may have come from mafic magma that was not subsequently mixed into the silicic reservoir. In the second, non-equilibrium heating may have caused fast heating of the reservoir without much accompanying crystal dissolution, resulting in an actual equilibrium temperature much higher than the equilibrium temperature of the mixture that would be computed from simple theory (Bindeman, 1993). The first scenario is supported by thermodynamic calculations, which suggest the proportion of magma chamber refilling may have been greater than the proportion of mafic end-member physically mixed into the silicic reservoir. Conversely, the second scenario is supported by the fact that the silicic end-member appears to have only experienced a slight decrease in crystal contents (~ 2 vol.%).

Evolution and Eruption of Small Magma Reservoirs

Previous studies have shown that geochemical data in combination with mineral compositions and modes, glass compositions, and textural relationships between enclaves and their surrounding hosts may provide constraints on the physical and chemical evolution of sub-volcanic magma reservoirs (e.g., Feeley and Davidson, 1994; Feeley and Dungan, 1996). In the case of Mt. Dutton, we have demonstrated that whereas dacite magmas may have been generated from andesites through a combination of fractional crystallization and contamination, ultimately, the evolution and eruption of the magma system beneath the volcano has been dominated by the episodic input of more mafic magmas.

Of particular interest is that the nature of mafic-silicic magma interactions at the volcano have appeared to change abruptly with time. The long-lived, repeated eruption of thoroughly hybridized andesite lavas during the late Pleistocene suggests that the magma chamber beneath Mt. Dutton at this time was capable of receiving repeated injections of more mafic magma and still generating magmas that were andesitic in composition. At other volcanic centers, it has been suggested that the repeated production of monotonous composition andesite magmas implies the existence of a relatively large volume sub-volcanic reservoir which is essentially oblivious to shot-term variations in the volume of magma batches being added at the base of the system (e.g., Feeley and Davidson, 1994; O'Hara, 1977; O'Hara and Matthews, 1981). At Mt. Dutton, however, andesite lavas erupted during the Late Pleistocene range in composition from ~ 55-60 wt.% SiO_2. Furthermore, geochemical and mineral data (including the presence of both olivine and quartz in all andesite lavas) unequivocally demonstrate that these andesites could only have been produced through mixing of dacitic and basaltic magmas. Thus, at Mt. Dutton, all the evidence appears to point towards the existence of a relatively small volume of dacitic magma under the volcano that was dramatically affected by injections of more mafic magma at the base of the chamber. Subsequent rapid mixing between these two end-member magmas resulted in eruption of thoroughly hybridized andesite lavas, without enclaves.

The preservation of disequilibrium phase assemblages and mineral textures in the andesite lavas suggests that mixing and thorough hybridization of basaltic and dacitic magmas may have occurred at a rate approaching that of an eruptive time-scale. Such rapid hybridization suggests a more efficient mixing mechanism than that which resulted in the generation and eruption of dacite magmas during the Holocene (all of which contain ubiquitous mafic enclaves). A small, but laterally extensive chamber (fig. 1.16) would provide a more substantial mafic-silicic interface, producing the necessary conditions to promote rapid heat and mass transfer. Such conditions could result in a

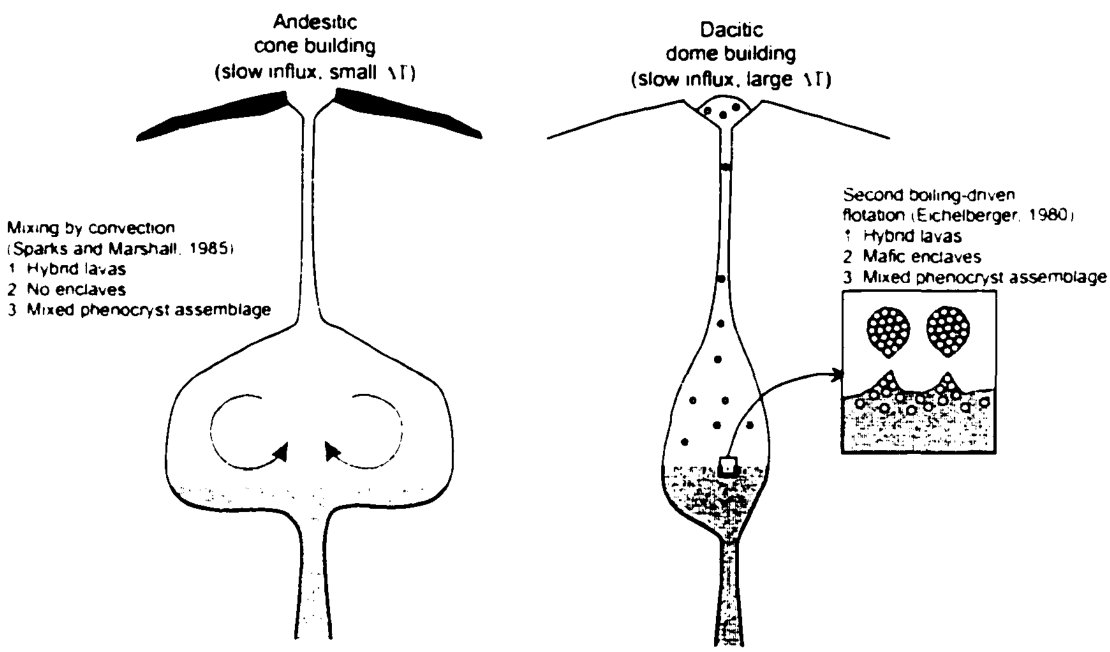

Figure 1.16 Schematic illustration depicting how a change in the geometry of the magma chamber that fed eruptions of Mt. Dutton could account for the abrupt shift from effusion of thoroughly hybridized cone-building basaltic andesite to andesite lava flows to emplacement of less well-mixed dome-building dacites (plus mafic enclaves). Other possible explanations include a) a decrease in the volume of mafic injections, or b) an increase in the time between mafic inputs to the magmatic system.

higher proportion of basalt in the mixture, speedy hybridization, and generation of well-mixed andesite magmas through wholesale convective mixing (Sparks and Marshall, 1986).

In direct contrast, the abrupt change at Mt. Dutton to eruption of less thoroughly hybridized dacitic magma with enclaves (beginning in the Holocene), suggests an accompanying shift in the nature of mafic-silicic interactions beneath the volcano. The sudden nature of the change in mixing conditions once again suggests that in the case of Mt. Dutton, the volume of the magma reservoir beneath the volcano was small enough to be perturbed by short-term variations in open-system parameters such as the volume or recurrence interval of mafic recharge. Textural evidence suggests that enclaves were generated through crystallization, vesiculation, and subsequent buoyant flotation into the overlying silicic host reservoir (Eichelberger, 1980). Limited mixing was therefore likely accomplished largely through disaggregation of enclaves shortly after formation (e.g., Clynne, 1999; Coombs et al., 2000; Coulon et al., 1986; Eichelberger, 1975; Feeley and Dungan, 1996). Similar to the case of generation of well-mixed andesite magma, we have also presented evidence that mafic injection, enclave formation, disaggregation and subsequent mixing were accomplished on an eruptive time-scale.

Possible explanations for the abrupt shift in the nature of mafic-silicic interactions beneath Mt. Dutton include the following: 1) a variation in the volume of mafic magma injections, 2) a decrease in the rate of new inputs to the magmatic system, or 3) a change in the geometry of the magma chamber. At this point, discriminating between the possibilities has proved difficult. It seems unlikely, however, that there would be such a sudden decrease in the volume of mafic magma being added to the system. The abundance of enclaves with primitive compositions in dacites at Mt. Dutton seems to preclude the development of a long-lived, thick, zoned mafic layer (including an uppermost hybrid zone) at the base of the magma reservoir that might decrease the volume of mafic magma entering the silicic reservoir through time. Furthermore, thermodynamic calculations indicate that a substantial volume of injected mafic magma is required to produce the documented change in temperature of the silicic host reservoir.

A decrease in the recurrence interval of mafic inputs to the magmatic system could allow time for fractional crystallization and crustal contamination to take place, resulting in the generation of dacite from parental andesite magma (as suggested by whole-rock geochemistry). The production of previously erupted andesite magmas, however, requires the presence of both basaltic and dacitic magmas earlier in the evolution of the magma system. The shift from thoroughly hybridized andesite lavas to less well-mixed dacitic domes plus enclaves may therefore reflect a simple change in the geometry of the magma chamber, rather than one in the chemical composition of the dominant silicic volume (fig. 1.16). A more restricted silo-like form would limit exchange between already existing basaltic and dacitic magmas, resulting in the eruption of more silicic, less thoroughly mixed lavas with abundant mafic enclaves.

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CHAPTER 2

Nature and timing of magma interactions before, during, and after the caldera-forming eruption of Volcán Ceboruco, Mexico*

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Abstract

Volcán Ceboruco, Mexico, erupted ~1000 years ago, producing the Jala Pumice and forming a ~4 km wide caldera. During that eruption, 2.8 to 3.5 km^3 of rhyodacite (~70 wt.% SiO_2) magma and 0.2 to 0.5 km^3 of mixed dacite (~67 wt.% SiO_2) magma were tapped and deposited as the Jala Pumice. Subsequently, the caldera was partially filled by extrusion of the Dos Equis Dome, a low-silica (~64 wt.% SiO_2) dacite dome with a volume of ~1.3 km^3. Petrographic evidence indicates that the Jala dacite and Dos Equis dacite originated largely through the mixing of three end-member magmas: 1) rhyodacite magma, 2) dacite magma, and 3) mafic magma. In contrast, aside from relatively limited mixing with dacite magma just prior to eruption, the Jala rhyodacite seems to have been generated predominantly by crystal fractionation from a pre-caldera dacite parent. Linear least squares modeling and detailed modal analysis indicate that the Jala dacite is predominantly a bimodal mixture of rhyodacite and dacite with a small additional mafic component, whereas the Dos Equis dacite is composed of mostly dacite mixed with subordinate amounts of rhyodacite and mafic magma. According to Fe-Ti oxide geothermometry, before the caldera-forming eruption the rhyodacite last equilibrated at ~865°C, whereas the dacite was originally at ~890°C but was heated to ~960°C by intrusion of mafic magma as hot as ~1030°C. Zoning profiles in plagioclase and/or magnetite phenocrysts indicate that mixing between mafic and dacite magma occurred ~34-46 days prior to eruption, whereas subsequent mixing between rhyodacite and dacite magmas occurred only 1-4 days prior to eruption. Following the caldera-forming eruption, continued inputs of mafic magma led to effusion of the Dos Equis

Dome dacite. In this case, timing between mixing and eruption is estimated at ~23-4600 days based on the thickness of plagioclase overgrowth rims. Our results suggest that the magmatic system has evolved over the last 1,000 years since eruption of the Jala pumice through a combination of crystal fractionation and magma mixing. After extrusion of the Dos Equis Dome, protracted mafic recharge resulted in an andesitic system, whereas subsequent fractional crystallization resulted in the generation of more silicic magma.

Introduction

Magma mixing has been implicated as a process that leads to hybrid magmas and possibly explosive eruption (e.g., Pallister et al., 1992; Sparks et al., 1977). Many studies have found evidence that the evolution of silicic magmas may be dramatically affected by multiple replenishments of new magma (e.g., Eichelberger et al., 2000; Wiebe, 1994, 1996). In this regard, it is important to note that explosive eruptions often display evidence of magma mixing in the form of banded tephra or dramatically zoned tuff sheets. Early studies of magma mixing often concentrated on variations in whole-rock composition, thereby overlooking the effects of magma mixing at smaller length scales. Recently, however, petrologic and experimental studies have revealed that important insights into the timing and nature of magma interactions can be gained by investigating the effects of magma mixing on much smaller length scales (e.g., Davidson and Tepley, 1997; Davidson et al., 1998; Devine et al., 1998; Pallister et al., 1996). For example, previous work has shown that the size of reverse zoning profiles and reaction rims on mineral phases can be used to constrain the time between mixing and subsequent eruption

(Coombs et al., 2000; Nakamura, 1995; Venezky and Rutherford, 1999). In addition, petrographic evidence commonly suggests the occurrence of multiple mixing events before eruption.

Volcán Ceboruco, Mexico, offers an excellent opportunity to investigate the nature and timing of the processes prior to explosive eruptions, because it erupted multiple magmas during a caldera-forming event ~1,000 years ago. These magmas show substantial petrologic evidence of mixing (i.e., multiple mixing events), including disequilibrium phase assemblages, relict unstable phases, reaction rims on phenocrysts, and abrupt compositional zoning in certain mineral phases. In addition, the caldera-forming eruption at Volcán Ceboruco was followed shortly thereafter by extrusion of a hybrid dacite dome, affording us the opportunity to investigate any subsequent mixing following the caldera-forming event. In this paper, we combine the analysis of overall trends in whole-rock compositions with detailed petrologic observations and microprobe analysis in order to ascertain the nature and timing of these mafic-silicic magma interactions.

Geologic Setting and Eruptive History

Volcán Ceboruco is located in the northwestern section of the Trans Mexican Volcanic Belt (TMVB), a chain of Miocene to Holocene volcanoes that stretches across Mexico from the Pacific to the gulf coast (fig. 2.1). Active volcanism in the region results from northward subduction of the Cocos Plate beneath the North American Plate. Nine volcanoes in the TMVB have been active historically, but only two, including

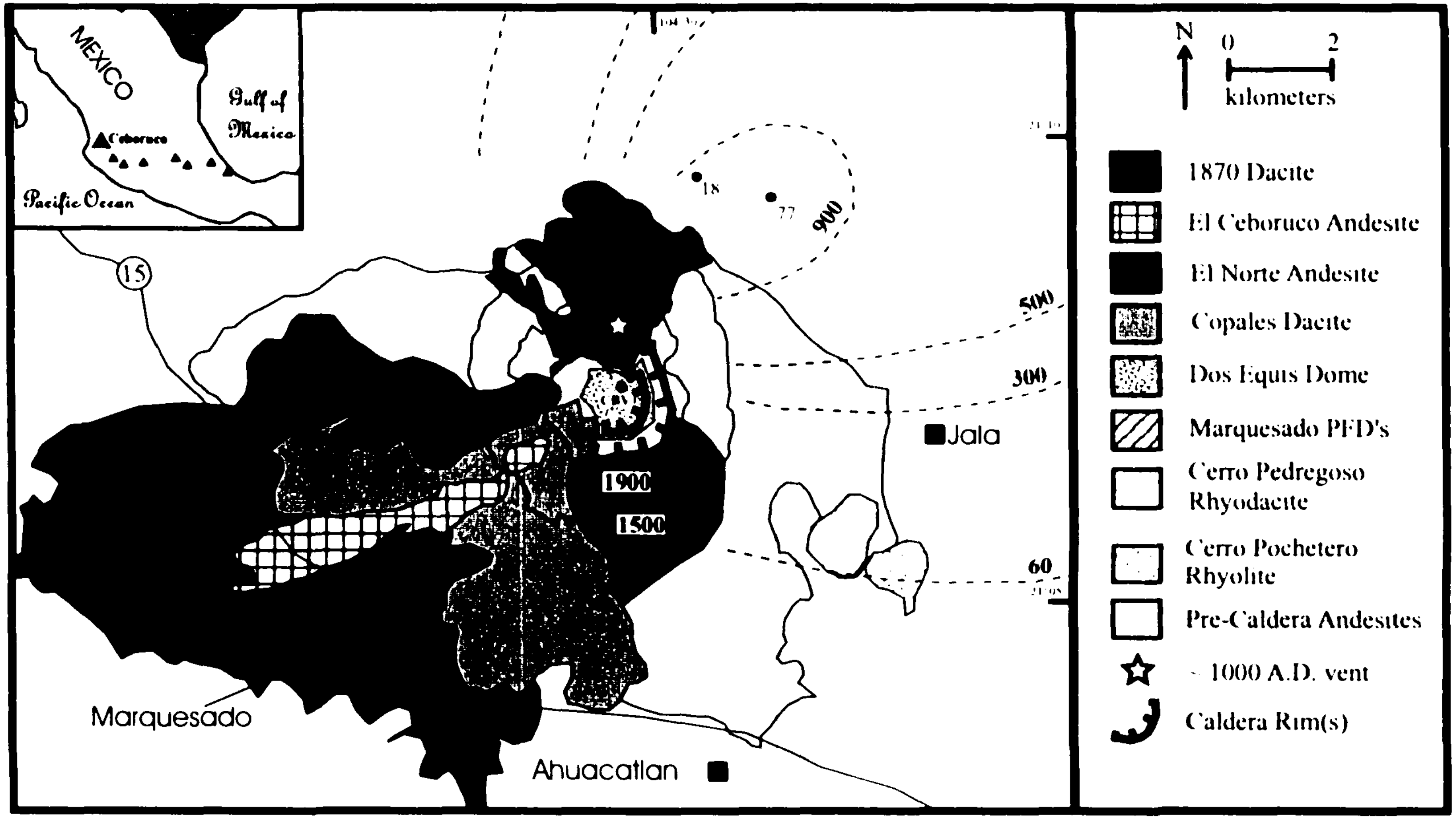

Figure 2.1 Generalized map of Volcán Ceboruco (Gardner and Tait, 2000 modified from Nelson, 1980) including current configuration of the following units: pre-caldera andesites and rhyolitic flank domes, Marquesado ash-flow deposits, rims of inner and outer calderas, and post-caldera andesitic and dacitic lava flows. Dashed curves represent proximal isopachs (in centimeters) of total Jala pumice thickness. Inset shows location of Volcán Ceboruco and other recently active volcanoes in the Trans-Mexican Volcanic Belt. Sample localities indicated by solid dots (18, 77, and CBV).

Volcán Ceboruco, which last erupted from 1870 to 1875 AD, are in the western portion. Exposures of bedrock in the surrounding valley walls indicate that Volcán Ceboruco is underlain by rhyolitic ash-flow tuffs of the Sierra Madre, whereas granitic xenoliths found in bombs erupted from flank cinder cones suggest that at deeper levels the crust is at least partially granitic (Nelson, 1980).

Nelson (1980) described the eruptive history of Volcán Ceboruco in detail; the following is a summary. The summit of Volcán Ceboruco reaches a height of 2,200 m, extending roughly 1,200 m above the basin in which it is located. The volcano is truncated by two concentric calderas, the outer and older of which is approximately 3.7 km in diameter, whereas the inner one is about 1.5 km in diameter (fig. 2.1). The main volcanic edifice is composed predominantly of ~60 km^3 of andesitic lava flows, extruded over a relatively long period of time prior to formation of the calderas. In between the cone-building activity and the caldera-forming eruptions, the volcano was relatively quiet for an unknown length of time, except for the extrusion of two domes on the lower flanks of the volcano: the rhyodacitic Cerro Pedregoso and the rhyolitic Cerro Pochetero. Then, ~1,000 years ago, Volcán Ceboruco erupted explosively, producing the Jala Pumice and Marquesado pyroclastic flow deposits, which resulted in the volcano collapsing to form the outer caldera. The Jala Pumice consists of a thick sequence of pumice fall and ash layers that extend mostly to the northeast, whereas deposits from the Marquesado flows are found in the southwest. Soon thereafter, effusion of a dacite dome began, partially filling the newly formed caldera. Subsequent extrusions and dome growth caused the dome to become unstable and partially collapse to form the inner caldera. Later eruptions primarily involved the effusion of andesitic lava flows, which cover the north and southwest flanks of the volcano. The most recent eruption at Volcán Ceboruco, from 1870 to 1875 AD, began with small ash explosions and ended with the extrusion of 1.1 km^3 of dacitic (~ 68 wt.% SiO_2) lava.

Jala Pumice and Dos Equis Dome Eruption

A previous study by Gardner and Tait (2000) investigated in detail the stratigraphy and physical characteristics of the pyroclastic deposits (Jala Pumice and Marquesado Flow deposits). That study revealed the presence of two pumice types, white (rhyodacite) and gray (dacite) in every tephra layer. Furthermore, Gardner and Tait (2000) were able to construct a precise chronology of eruptive events, which are as follows. The eruption began with the dispersal of a thin, narrowly distributed fall layer (P0) to the north, followed by a widely dispersed, coarse, Plinian fall deposit (P1), the most voluminous layer of the deposit (fig. 2.1). Subsequent activity alternated between pyroclastic surges and flows (including the Marquesado pyroclastic flow) and Plinian falls (P2-P6). Gardner and Tait (2000) estimated that 3-4 km^3 of magma erupted, ~95% of which was deposited as fall layers. The shift from P1 to post-P1 activity included dramatic changes in both lithic content (P1 contains ~8% lithics; post-P1 layers ~30-60%) and magma composition (P1 is 98% rhyodacite; post-P1 layers are 60-90% rhyodacite). Indeed, the final deposits of the eruption alternated between lithic-rich flows (>80% lithics) and dacite falls (Browne, 2001). This evidence led Gardner and Tait (2000) to conclude that caldera collapse began at the end of the P1 phase of the eruption.

Two magmas were tapped during the Jala Pumice eruption, one a homogenous rhyodacite (~70 wt.% SiO_2) and the other a mixed dacite (~67 wt.% SiO_2). Banded pumices record intimate mixing between the two. Of the 3 to 4 km^3 of magma erupted, 2.8 to 3.5 km^3 was rhyodacite and 0.2 to 0.5 km^3 was a mixed dacite (Gardner and Tait, 2000). Sometime soon after eruption of the Jala Pumice, the caldera was partially filled by the extrusion of the Dos Equis Dome, a low-silica (~64 wt.% SiO_2) dacite dome with a volume of ~ 1.3 km^3 (Nelson, 1980).

Analytical Methods

Bulk rock analyses of three Jala Pumice rhyodacite samples and four Jala Pumice dacite samples were obtained by using the electron microprobe to analyze fused glass samples of each rock type (Table 2.1). Samples of the Jala Pumice rhyodacite came from the base, middle, and top of layer P1, whereas samples of the Jala Pumice dacite came from the base of layer P2. None of the pumices analyzed were banded. Fused samples were created using the following method. First, each sample was crushed to a fine powder, individually wrapped in Mo foil, and placed inside separate silica tubes that were sealed at one end. The tubes were then vacuum evacuated, welded shut, and suspended inside a DelTech furnace at 1300°C for three hours. Thin sections were made of the fused glass samples and analyzed using the Cameca Camebax electron microprobe at Brown University, following the procedures of Devine et al. (1995). Precision and accuracy were checked by frequently analyzing KN-18, a comendite obsidian. Whole

Table 2.1: Representative whole rock and glass compositions of samples from Volcán Ceboruco

	Whole-rock compositions			Glass compositions		
	Caldara-forming eruption			matrix glass	glass inclusions inside hornblende	
	Jala rhyodacita	Jala dacita	Dos Equis dacita*	Jala rhyodacita	Jala rhyodacita	Jala dacita
SiO_2	70.69	67.48	[illegible]	[illegible]	64.6[illegible]	65.09
TiO_2	0.27	[illegible]	[illegible]	[illegible]	0.81	0.99
Al_2O_3	16.0[illegible]	[illegible]	17.29	[illegible]	17.69	17.17
FeO	1.97	[illegible]	[illegible]	[illegible]	3.69	3.53
Fe2O3			1.84			
MnO	0.09	[illegible]	[illegible]	0.13	0.16	0.13
MgO	0.38	[illegible]	1.63	0.37	1.5[illegible]	1.53
CaO	1.56	[illegible]	3.78	1.34	3.99	3.87
Na_2O	5.72	[illegible]	5.27	[illegible]	5.36	5.36
K_2O	3.27	2.98	2.43	3.27	2.21	2.33
P_2O_5			0.32			
BaO			0.10			
Total	99.49	99.37	99.52	99.70	98.55	98.86
Phase						
Plagioclase	<1	[illegible]	19.0			
Orthopyroxene	<1	tr	4.0			
Clinopyroxene		tr	1.0			
Olivine		tr	tr			
Hornblende	tr.	[illegible]				
Fe-Ti Oxides	<1	[illegible]	[illegible]			
Groundmass/Matrix	99.6	[illegible]	[illegible]			

Note: All iron reported as FeO for Jala rhyodacite and dacite, oxides in wt %, *whole rock data from Nelson (1980).
Modal abundances are in volume percent, calculated vesicle free.

rock data for the Dos Equis dome and coexisting basaltic enclaves comes from the work of Nelson (1980).

Thin sections were prepared of fifteen white, twenty gray, and ten banded pumices, as well as six dacite dome samples for petrographic examination. Mineral modes were calculated by point counting using a petrographic microscope. A minimum of 500 points were counted on each sample, with as many as 1000 points counted on several samples in order to assure reproducibility. Mineral and matrix glass analyses were acquired using either the Cameca SX-50 electron microprobe at the University of Alaska Fairbanks or the Cameca Camebax electron microprobe at Brown University (Tables 2.1-2.5). Synthetic and natural minerals and glasses were used as standards. Mineral analyses were done using a focused beam, accelerating voltage of 15 keV, and a beam current of 10 nA. Glass analyses were done with a 10-µm-diameter defocused beam, accelerating voltage of 15 keV, and a beam current of 10 nA. In order to minimize sodium migration, sodium was counted in two-second intervals for the first 10 seconds of each analysis, and the counts were regressed to determine the initial sodium content (Devine et al., 1995).

Description of Eruptive Units

Rhyodacite of the Jala Pumice

The predominant product from the caldera-forming eruption of Volcán Ceboruco is a rhyodacitic (~70 wt.% SiO_2) white pumice, which consists of highly vesicular rhyodacitic glass (fig. 2.2a) and <1 vol.% plagioclase, orthopyroxene, magnetite, and

Table 2.2: Representative plagioclase analyses from Volcán Ceboruco

	Type I: sodic plagioclase Jala rhyodacite		Jala dacite		Dos Equis dacite	
	core	rim	core	rim	core	rim
SiO_2	[illegible]	59.87	[illegible]	[illegible]	[illegible]	55.48
Al_2O_3	26.05	25.39	[illegible]	[illegible]	[illegible]	[illegible]
FeO	0.17	0.24	[illegible]	[illegible]	[illegible]	[illegible]
CaO	6.58	6.49	[illegible]	[illegible]	[illegible]	9.68
Na_2O	6.72	6.55	6.88	[illegible]	[illegible]	5.48
K_2O	0.39	[illegible]	[illegible]	[illegible]	[illegible]	0.37
Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
An	34	34	[illegible]	[illegible]	[illegible]	48
Ab	63	63	64	[illegible]	[illegible]	[illegible]
Or	2	3	3	3	4	[illegible]

	Type II: intermediate plagioclase Jala rhyodacite (attached to hbl)		Jala dacite		Dos Equis dacite		
	core	rim	core	rim	core	inner rim	outer rim
SiO_2	[illegible]	57.48	55.88	[illegible]	56.83	52.77	60.89
Al_2O_3	27.84	27.89	[illegible]	[illegible]	[illegible]	30.20	24.01
FeO	0.48	0.24	[illegible]	[illegible]	[illegible]	[illegible]	0.83
CaO	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Na_2O	[illegible]	5.63	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
K_2O	0.19	0.25	[illegible]	[illegible]	[illegible]	0.22	1.01
Total	100.58	100.65	99.47	[illegible]	[illegible]	100.36	99.99
An	49	47	45	61	45	63	27
Ab	50	52	52	38	52	36	67
Or	1	2	3	1	3	1	6

	Type III: calcic plagioclase Jala dacite		Dos Equis dacite		Microlites Jala dacite	Dos Equis dacite
	core	rim	core	rim		
SiO_2	47.86	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Al_2O_3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
FeO	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
CaO	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Na_2O	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
K_2O	[illegible]	0.26	[illegible]	[illegible]	[illegible]	[illegible]
Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
An	[illegible]	48	[illegible]	[illegible]	[illegible]	[illegible]
Ab	[illegible]	[illegible]	[illegible]	[illegible]	64	[illegible]
Or	[illegible]	2		[illegible]	[illegible]	[illegible]

Note: All iron reported as FeO; oxides in wt %

Table 2.3: Representative pyroxene analyses from Volcán Ceboruco

	Type I: Fe rich orthopyroxene						Type II: Mg rich orthopyroxene	
	Jala rhyodacite		Jala dacite		Dos Equis dacite		Dos Equis dacite	
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

	Orthopyroxene Microlites		Clinopyroxene					
	Dos Equis dacite		Jala dacite		Dos Equis dacite		Jala dacite	
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]

Table 2.4

Representative olivine and hornblende analyses from Volcán Ceboruco

	Olivine			
	Jala dacite		**Dos Equis dacite**	
	core	rim	core	rim
SiO_2	37.89	37.86	38.10	38.14
TiO_2	0.11	0.02	0.14	0.01
Al_2O_3	0.04	0.00	0.07	0.03
Cr_2O_3	0.00	0.00	0.00	0.06
FeO	21.55	24.28	22.55	24.24
MnO	0.28	0.38	0.50	0.41
MgO	38.85	37.07	38.08	37.29
CaO	0.31	0.13	0.20	0.20
Na_2O	0.02	0.00	0.00	0.02
K_2O	0.01	0.02	0.04	0.03
Total	99.06	99.76	99.68	100.43
Fo	76	73	75	73
Fa	24	27	25	27

	Hornblende			
	Jala rhyodacite		**Jala dacite**	
	core	rim	core	rim
SiO_2	43.65	41.69	43.36	42.24
TiO_2	3.13	4.21	2.50	3.77
Al_2O_3	12.30	12.35	11.18	12.13
Cr_2O_3	0.01	0.03	0.05	0.00
FeO	12.58	12.37	14.28	12.50
MnO	0.29	0.14	0.53	0.27
MgO	13.42	13.82	13.66	13.78
CaO	10.84	11.58	10.74	11.39
Na_2O	2.42	2.66	2.47	2.55
K_2O	0.55	0.41	0.47	0.51
Total	99.19	99.26	99.24	99.14

Note: All iron reported as FeO, oxides in wt.%

Table 2.5: Representative Fe-Ti Oxide analyses from Volcán Ceboruco

Type I: low Al and Mg contents

	Jala rhyodacite		Jala dacite		Jala dacite	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Type II: intermediate Al and Mg contents

	Jala dacite		Jala dacite	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Type III: high Al and Mg contents

	phenocrysts		hornblende reaction rims		magnetite inclusions in olivine	
	Jala dacite		Jala dacite		Jala dacite	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible] Temperatures [illegible]

ilmenite. Compositions of whole rocks, matrix glasses, plagioclases, and orthopyroxenes are homogeneous (Tables 2.1-2.5). Rare hornblendes are present, but are usually found attached to relatively calcic plagioclases (fig. 2.2b), and are believed to be derived from the dacite (see below).

Dacite of the Jala Pumice

A subordinate amount of gray, dacitic (~67 wt.% SiO_2) pumice was also erupted during the caldera-forming event. Similar to the rhyodacite, dacite pumices are homogeneous in whole-rock composition. Unlike the rhyodacite, however, dacite pumices contain a microlite-rich groundmass (fig. 2.2a) and heterogeneous population of ~3-5 vol.% phenocrysts, including plagioclase, clinopyroxene, orthopyroxene, hornblende, olivine, magnetite, and ilmenite (Tables 2.1-2.5). The phenocrysts often display strong compositional zoning and many have fine-grained reaction coronas (fig. 2.2c,d). Crystal aggregates of olivine, clinopyroxene, and calcic plagioclase are also present (fig. 2.2f).

Dos Equis Dome

The Dos Equis dome consists of light gray, low-silica dacite (~64 wt.% SiO_2), which contains ~25-30 vol.% phenocrysts of plagioclase, clinopyroxene, orthopyroxene, olivine, magnetite, and ilmenite, set in a microlite-rich groundmass. Phenocrysts are often found grouped in aggregates, and the groundmass consists of plagioclase, orthopyroxene, magnetite, and ilmenite microlites with little or no glass. Similar to the

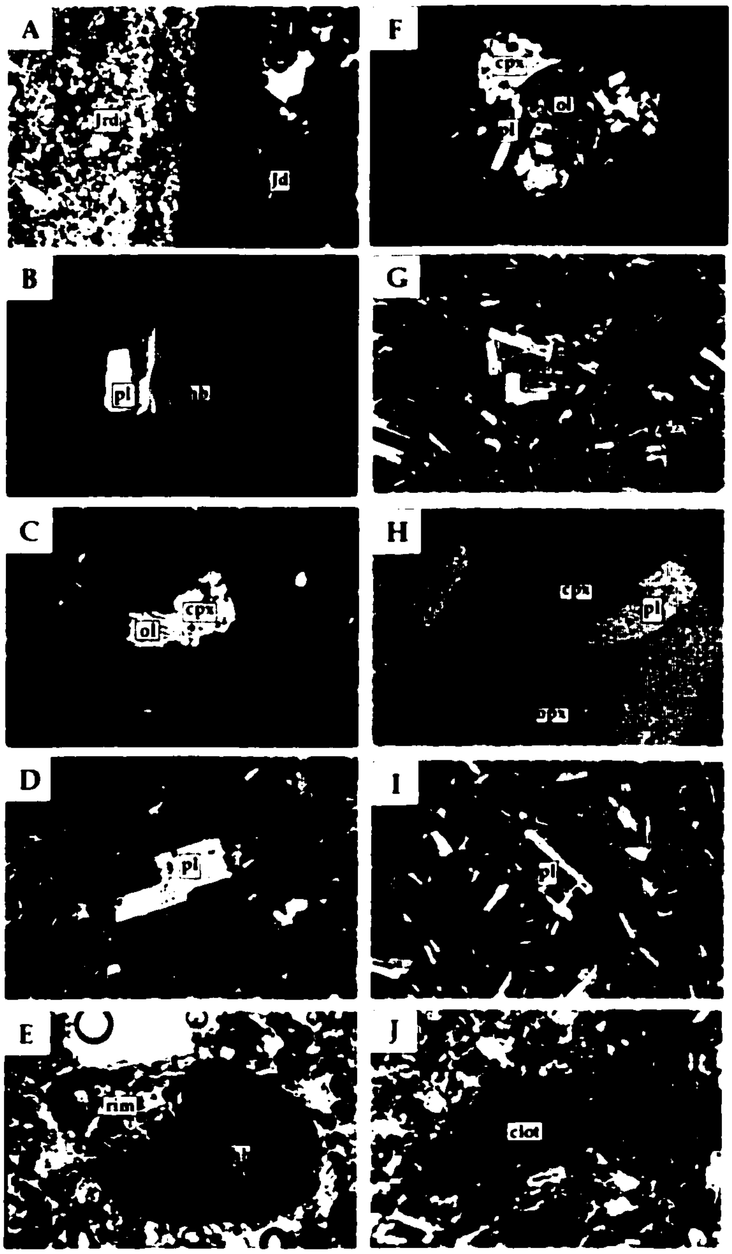

Figure 2.2 Photomicrographs showing petrologic characteristics of Jala rhyodacite, Jala dacite and Dos Equis dacite as discussed in text. A) Contrast between highly vesicular, microlite-free, rhyolitic glass in the Jala rhyodacite (Jrd) and the microlite-rich groundmass in the Jala dacite (Jd). Field of view 1mm. B) Hornblende with attached, relatively calcic plagioclase (~An50) in the Jala rhyodacite. Field of view 2mm. C) Crystal aggregate of clinopyroxene and olivine in the Jala dacite; note reaction rim surrounding olivine. Field of view 8mm. D) Plagioclase phenocryst in the Jala dacite with calcic core (~An80) and sodic rim (~An45) rim. Field of view 8mm. E) Hornblende phenocryst in Jala dacite encircled by thick, fine-grained reaction rim. Field of view 1mm. F) Crystal aggregate in Jala dacite comprised of olivine, clinopyroxene, and calcic plagioclase. Field of view 2mm. G) Crystal aggregate in Dos Equis dacite composed of olivine, clinopyroxene and calcic plagioclase. Field of view 8mm. H) Clinopyroxene phenocryst in Dos Equis dacite surrounded by rim of orthopyroxene. Field of view 2mm. I) Plagioclase phenocryst in Dos Equis dacite with calcic core (~An80) and sodic rim (~An45) rim. Field of view 8mm. J) "Dirty" micro-crystalline clot in Dos Equis dacite, which may be the remnant of a hornblende phenocryst. Field of view 1mm.

dacite of the Jala pumice, the Dos Equis dome contains a mixed assemblage of phenocrysts (Tables 2.1-2.5), which frequently exhibit complex zoning and are rimmed with reaction products (fig. 2.2h,i). Unlike the Jala pumice dacite, however, the Dos Equis dome contains no hornblende, but only "dirty" micro-crystalline clots, which appear to pseudomorph hornblende (fig. 2.2j). Crystal aggregates of olivine, clinopyroxene, and calcic plagioclase are also present (fig. 2.2g). Magnetite and ilmenite contain numerous exsolution lamellae, presumably in response to slow cooling within the interior of the dome. In addition, Nelson (1980) reports that the Dos Equis dome contains magmatic inclusions of hi-Al basalt that were partially molten at the time of their formation. None of these inclusions were sampled in this study.

Mineralogy

Plagioclase

Plagioclase is the largest and most abundant crystal phase present in pumices from the caldera-forming eruption, as well as in rocks from the post-caldera Dos Equis dome (Nelson, 1980). It also displays the most prominent zoning and consists of multiple populations with varying origins and crystallization histories (Table 2.2). Based on their compositions, we group them into three populations (fig. 2.3). The first is mostly unzoned, sodic phenocrysts with a composition of ~An_{35}, which are found primarily in the Jala Pumice rhyodacite. A few such plagioclases are also present in the Jala Pumice dacite, as well as trace amounts of strongly zoned plagioclase with sodic core compositions in the Dos Equis dacite. The second population consists of plagioclases of

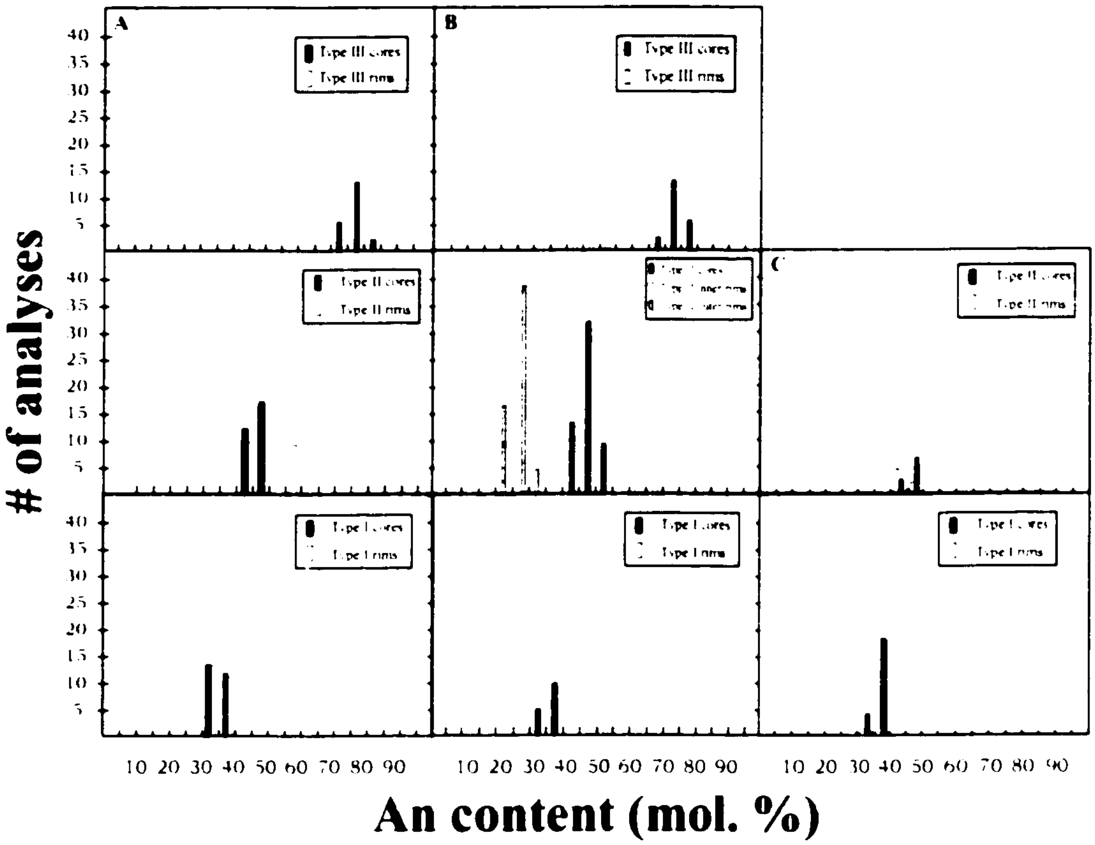

Figure 2.3 Histograms of compositions and zoning of the populations of plagioclase phenocrysts found in a) Jala dacite, b) Dos Equis dacite, and c) Jala rhyodacite. Note that Type I "sodic" plagioclases are unzoned in the Jala rhyodacite and dacite, but zoned in the Dos Equis dacite. Type II "intermediate-composition" plagioclases are reversely zoned in the Jala and Dos Equis dacites, and Type III "calcic" plagioclases have sodic overgrowth rims.

intermediate composition (An_{40}-An_{60}), and is found primarily in the Jala Pumice dacite and the Dos Equis dome. A few of these plagioclases are also found in the Jala pumice rhyodacite, but are inevitably attached to hornblende (fig. 2.2b). In the Jala Pumice dacite, these plagioclases are often found as phenocrysts in crystal clots attached to hornblende and are also found within reaction rims on individual hornblende crystals (fig. 2.2c). Intermediate composition plagioclases in rocks from the Dos Equis dome are often found in aggregates with orthopyroxene, and exhibit complex, oscillatory compositional zoning. This zoning most often consists of an intermediate core (~An_{45}) zoned outward to a relatively calcic (~An_{65}), 20-40-μm-thick inner rim, surrounded by a sodic (~An_{20-30}) outer rim, 5-10 μm in thickness. The third population of plagioclase consists of calcic plagioclases (~An_{80}). They are found in the Jala Pumice dacite and the Dos Equis dome, often in crystal clots with olivine and clinopyroxene, and are strongly zoned from ~An_{80} cores to ~An_{45} rims. In the Jala Pumice dacite, rims are 10 to 30 μm thick, whereas in the Dos Equis dome rims are 20 to 40 μm thick (fig. 2.2d,i).

Plagioclase also occurs as microlites in dacite pumices and in the highly crystal-charged groundmass of Dos Equis dome. In the Jala pumice dacite, microlites are relatively sodic (~An_{30-45}) in composition, slightly overlapping the sodic end of the range for intermediate composition phenocrysts. Similarly, microlites in the Dos Equis dome are sodic (~An_{20-30}), which equals the outer rims of oscillatory zoned, intermediate composition phenocrysts.

Pyroxene

Pyroxene, present in both rhyodacite and dacite pumices from the caldera-forming eruption and in the dacite lava from the Dos Equis dome, is the second most abundant phenocrystic phase (Table 2.3). Orthopyroxene predominates, commonly as relatively large, equant phenocrysts (Nelson, 1980). In rhyodacite pumice, it is found as relatively unzoned phenocrysts with a composition of En_{59-61}. Similar to sodic plagioclases, a few such orthopyroxenes are found in dacite pumices (fig. 2.4). Conversely, multiple populations of orthopyroxenes are present in the Dos Equis dacite that display complex compositional zoning. One population is reversely zoned from Fe-rich cores (~En_{60}) to Mg-rich rims (~En_{70}), whereas a second population is normally zoned from Mg-rich cores (~En_{70}) to Fe-rich rims (~En_{60}). Orthopyroxenes from the dacite lava are commonly clustered with intermediate composition plagioclase, and can also be found as Fe-rich microlites, zoned from ~En_{60-65} cores to ~En_{50-55} rims, within the surrounding groundmass.

Clinopyroxene is less abundant than orthopyroxene, and is found in both dacitic pumices and lava, most often in crystal clots accompanied by calcic plagioclase and olivine (Nelson, 1980). In dacite pumice, some clinopyroxenes occur as solitary, strongly normally zoned phenocrysts with 10-to-30 μm thick, relatively Fe-rich rims, whereas in dacite lava, the clinopyroxenes that are not encased in crystal clots are surrounded by rims of orthopyroxene (fig. 2.2h). In dacite pumice, clinopyroxene can also be found within reaction rims on hornblende phenocrysts. Clinopyroxenes in the two dacites, as

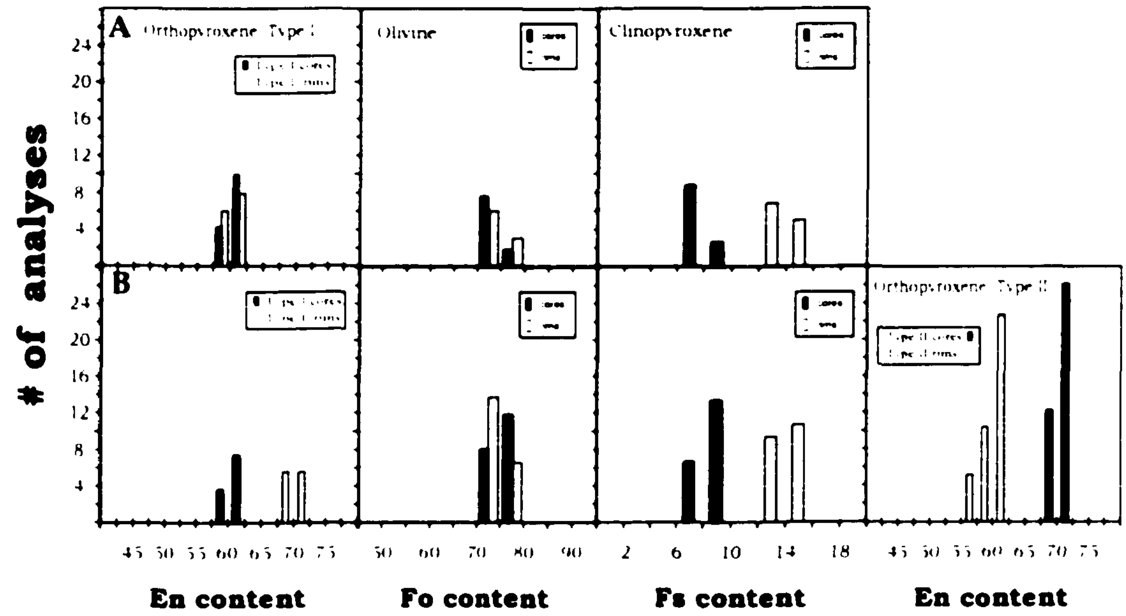

Figure 2.4 Histograms of compositions and zoning of orthopyroxene, clinopyroxene, and olivine in a) Jala dacite, and b) Dos Equis dacite. Type I "Fe-rich" orthopyroxenes have a core composition of ~$En_{[illegible]}$ and originated in the Jala rhyodacite, whereas Type II "Mg-rich" orthopyroxenes have a core composition of ~$En_{[illegible]}$ and originated in the Dos Equis dacite.

well as those found in reaction rims surrounding hornblende phenocrysts, are all equivalent in composition.

Hornblende

Only samples from the Jala Pumice eruption contain hornblende, found as ubiquitous, euhedral phenocrysts as much as 3 mm in length (Nelson, 1980). Hornblende occurs primarily in dacite pumice, as unzoned phenocrysts (Table 2.4) often encircled by thick, fine-grained reaction rims, which contain olivine, plagioclase, clinopyroxene, magnetite, ilmenite, and glass (fig. 2.2e). When hornblendes are found in rhyodacite, they are inevitably attached to intermediate-composition plagioclase (An_{40} – An_{50}), similar to those found in dacite pumice (fig. 2.2b). Glass inclusions inside those hornblende grains are dacitic in composition (see below).

Olivine

Olivine is found only as rare crystals in dacite pumice (Table 2.4) and the Dos Equis dome (Nelson, 1980). Most often olivine phenocrysts occur in crystal clots with calcic (~An_{80}) plagioclase and clinopyroxene (fig. 2.2f,g). Where olivine is in contact with the groundmass, it is enveloped by a reaction rim of clinopyroxene and Fe-Ti oxides (fig. 2.2c). Olivine also occurs in hornblende reaction rims, where it is equivalent in composition to the phenocrysts.

Fe-Ti Oxides

Both magnetite and ilmenite are ubiquitous phases, present in all samples from the Jala Pumice and Dos Equis dome (Nelson, 1980). Magnetite and ilmenite occur as phenocrysts and as microlites in the matrix of dacite pumices and lavas. In rhyodacite pumices, magnetite and ilmenite are unzoned and homogeneous (Table 2.5). The compositions of touching pairs of magnetite and ilmenite are in equilibrium, based on the scheme of Bacon and Hirschmann (1988), and give an average temperature of ~865°C and an oxygen fugacity of NNO+0.4, using the scheme of Stormer (1983) and the algorithm of Anderson and Lindsley (1988).

Magnetites and ilmenites in dacite pumices are zoned and vary greatly in composition (Table 2.5). In particular, magnetite phenocrysts show the greatest variation in composition and texture, and can be divided into three populations based on their Al and Mg contents (fig. 2.5). One population is low in Al and Mg, overlapping in composition with those found in the rhyodacite. Zoned magnetite-ilmenite pairs of this variety produce temperatures varying from ~865°C to ~905°C (fig. 2.6). A second population has high Al and Mg contents, similar to the composition of magnetite inclusions in olivine phenocrysts and magnetites found within reaction rims on hornblende. Magnetites from this population paired with ilmenites record much higher temperatures, upwards of 980-1000°C (fig. 2.6). These temperatures overlap with estimates calculated for magnetite-ilmenite pairs in hornblende reaction rims (from 945±8°C to 959±8°C). A third population of magnetites has intermediate Al and Mg compositions, and is found only in dacite pumice. Temperature estimates calculated using

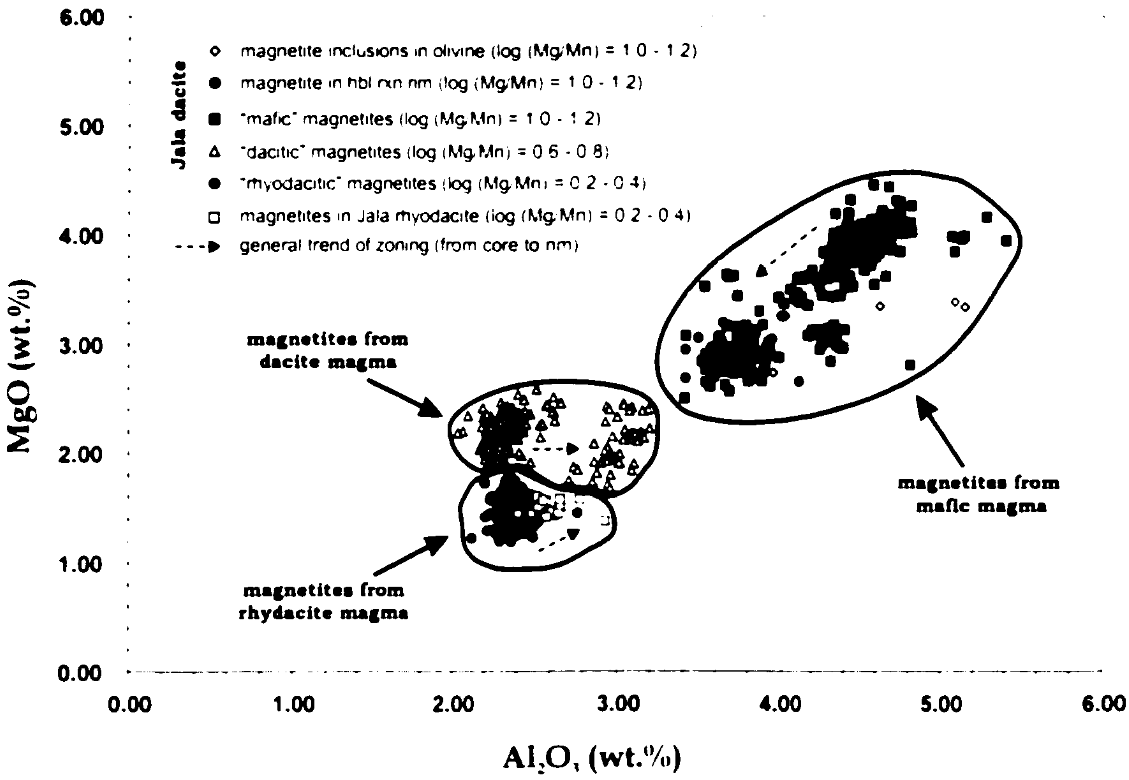

Figure 2.5 Magnetite compositions found in the Jala rhyodacite and Jala dacite. Three magnetite populations are found in the Jala dacite: 1) low Al and Mg magnetites that overlap with those found in the Jala rhyodacite; 2) intermediate composition magnetites found only in the Jala dacite; and 3) high Al and Mg magnetites, similar to those found as inclusions in olivine and those found in hornblende reaction rims. Dashed arrows represent the general trend of zoning from core to rim within magnetite phenocrysts.

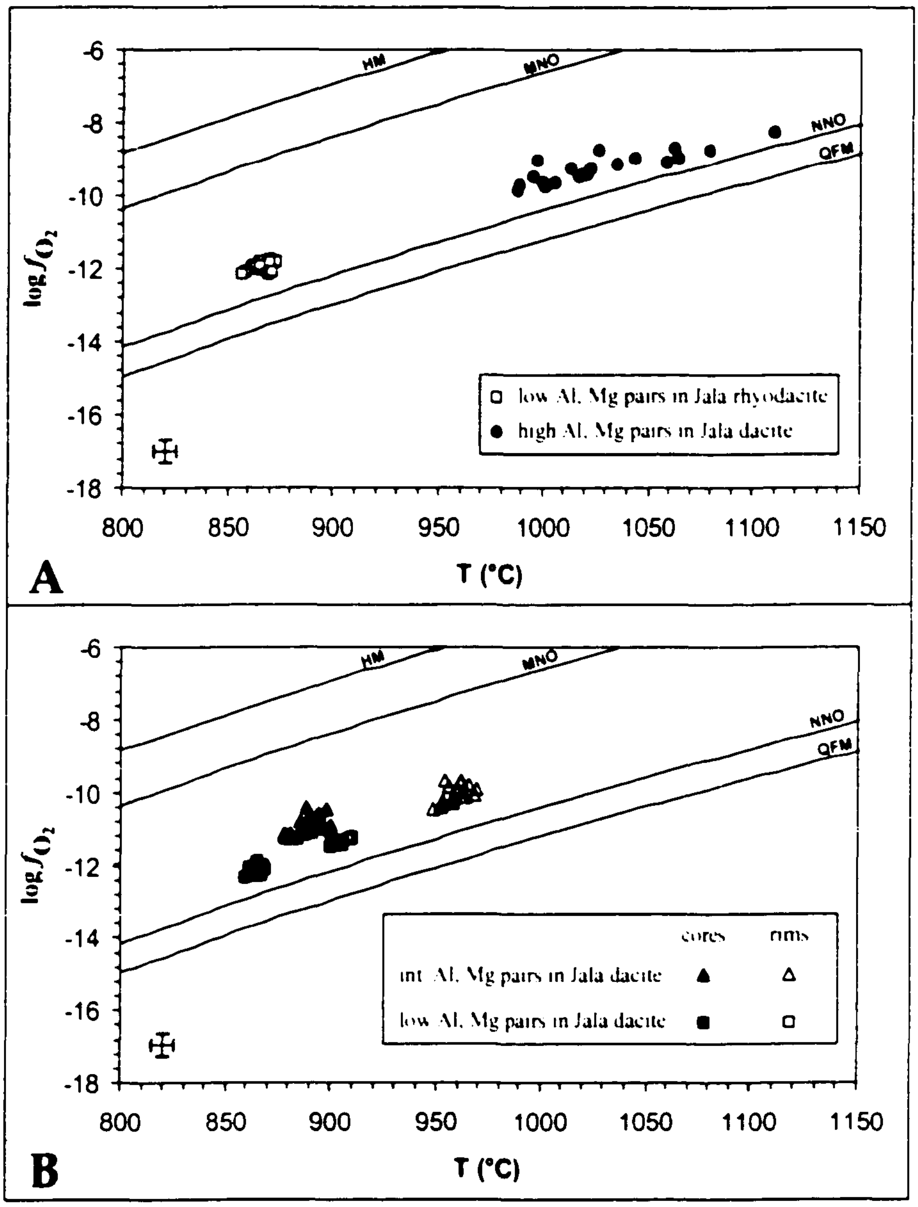

Figure 2.6 Temperatures and oxygen fugacities calculated from magnetite-ilmenite pairs using the Stormer (1983) mineral reformulation model and the Anderson and Lindsley (1988) algorithm. A) temperatures and oxygen fugacities for unzoned pairs, with low Al and Mg contents, found in the Jala rhyodacite and pairs with high Al and Mg contents inherited by the Jala dacite from mafic magma. B) temperatures and oxygen fugacities for zoned, "rhyodacitic" pairs with low Al and Mg contents found in the Jala dacite and zoned, "dacitic" pairs with intermediate Al and Mg contents inherent to the Jala dacite. Error bars show one standard deviation.

zoned magnetite-ilmenite pairs from this population vary from ~890°C to ~960°C (fig. 2.6), the highest of which overlap with the aforementioned pairs found in hornblende reaction rims. In samples from Dos Equis dome, magnetite grains contain exsolution lamellae of ilmenite, most likely due to slow cooling in the interior of the dome; thus we do not make estimates of temperature for the dome magma.

Melt (inclusions/matrix)

Microlite-free matrix glass is present only in the Jala pumice rhyodacite (Fig 2.2a). Microprobe analysis (Table 2.1) indicates it to be homogenous and rhyodacitic in composition (~71 wt. % SiO_2). This is in direct contrast with the groundmasses of both the Jala pumice (fig. 2.2a) and Dos Equis dacites, which are too microlite-rich to obtain pure matrix glass compositions. Glass inclusions inside hornblende phenocrysts found in both rhyodacite and dacite from the Jala Pumice eruption (Table 2.1) are dacitic (~64 wt. % SiO_2). It is interesting to note that this melt composition is substantially more mafic than the whole-rock composition of the Jala Pumice dacite, yet only slightly more silicic than the whole-rock composition of Dos Equis dacite.

Magmas of the Caldera-Forming Eruption

In the following sections we will construct a model for the magmatic system beneath Volcán Ceboruco, both before and after eruption of the Jala pumice and Dos Equis dome, for which there appears to have been three magmas present at various times and several different mixing events (fig. 2.7). Before eruption of the Jala pumice, two

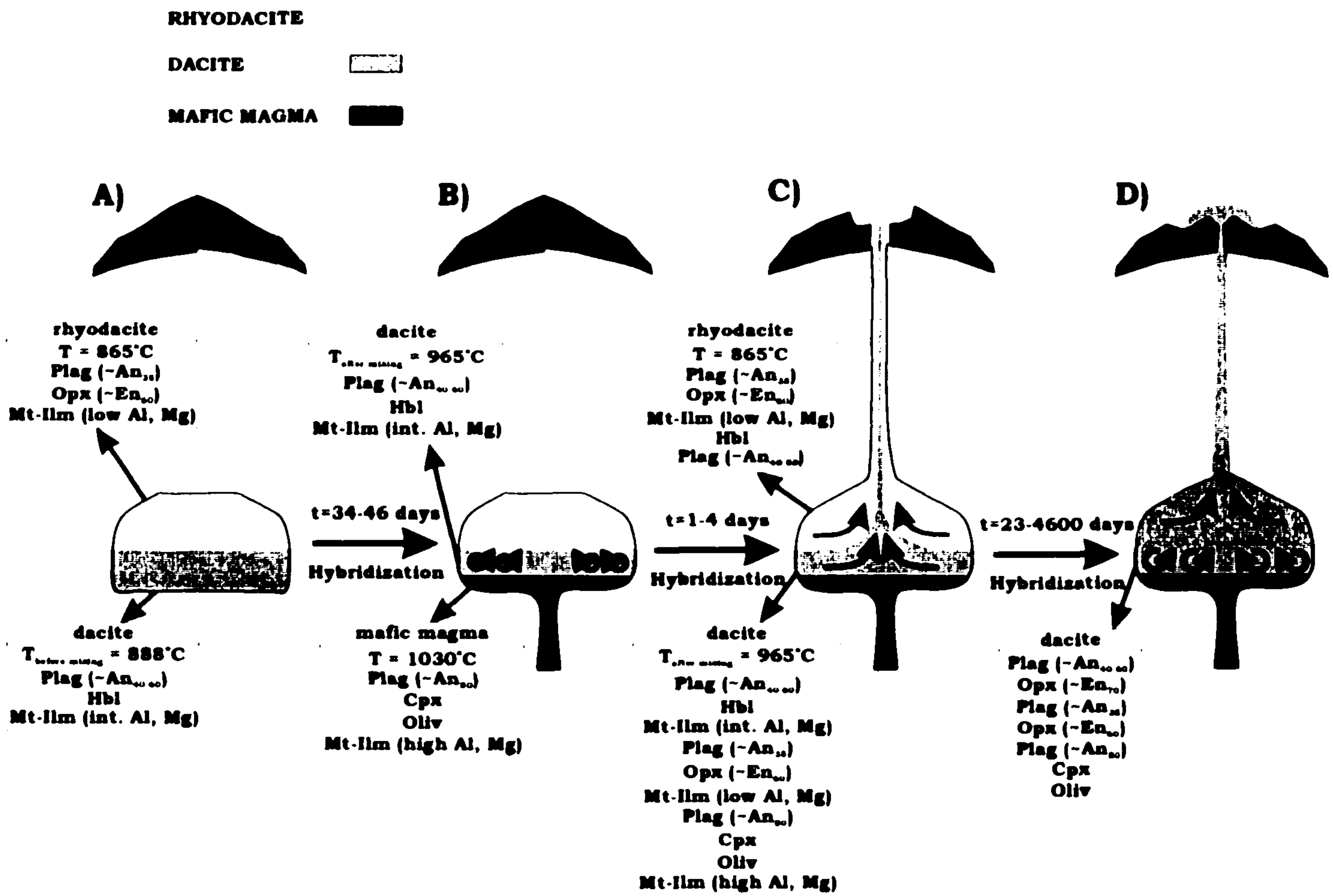

Figure 2.7 Schematic illustration depicting the nature and timing of magma interactions involved before, during, and after the caldera-forming eruption of Volcán Ceboruco. State of magmatic system: a) before the caldera-forming eruption and prior to mafic influx; b) before the caldera-forming eruption, but after mafic injection; c) during the caldera-forming eruption; and d) post-caldera, during eruption of the Dos Equis dacite. For the sake of simplicity, we have drawn one single zoned system, however it is also possible that the magmas were present as separate bodies before mixing and subsequent eruption. Panels indicate temperature, phases present, and time between mixing and eruption.

magmas were present, rhyodacite and dacite magma. These two magmas may have been present as a singular, zoned magma or as separate magma bodies. The Jala rhyodacite contained a crystallizing mineral assemblage, which included sodic plagioclase, orthopyroxene, ilmenite, and magnetite; whereas the Jala dacite contained a crystallizing mineral assemblage that included intermediate composition plagioclase, hornblende, plus magnetite and ilmenite, but no orthopyroxene.

Sometime prior to eruption of the Jala Pumice, the dacite experienced a significant injection of mafic magma that caused hornblende to become unstable, but did not stabilize orthopyroxene. This first mixing event may have put into motion a chain of events including subsequent mixing between the rhyodacite and dacite magmas as well as triggering of the caldera-forming eruption. Mixing between the Jala dacite and rhyodacite most likely occurred just prior to and during the caldera-forming eruption, which consequently exhausted the rhyodacite. Continued mafic inputs into the magma reservoir raised the temperature of the dacite high enough to completely obliterate hornblende, while the dramatic change in magmatic conditions following the caldera-forming eruption resulted in subsequent crystallization of newly stable orthopyroxene (along with continued crystallization of intermediate composition plagioclase). These repetitive and possibly continuous mixing events between dacite and mafic magma eventually led to extrusion of dacite magma as the Dos Equis dome.

Phenocryst Origins and Magma Mixing

According to the textures, compositions, and relative abundances of minerals found within the Volcán Ceboruco rock types, three populations of phenocrysts can be identified. Phenocrysts derived from the rhyodacite magma include predominantly unreacted and unzoned mineral phases, whereas those derived from the dacite and mafic magma have undergone more complex crystallization histories, based on their strong zoning and/or reaction rims. All evidence suggests that three end-member magmas were involved in the eruptions of both the Jala Pumice and Dos Equis Dome (fig. 2.7). The first group of phenocrysts was derived from a rhyodacite, the second from a dacite, and the third from a mafic magma.

Rhyodacite Magma

Phenocrysts derived from rhyodacite magma include the following phases: sodic plagioclase (~An_{35}), Fe-rich orthopyroxene (~En_{60}), ilmenite, and magnetite with low Al and Mg contents. When found in the Jala Pumice rhyodacite and dacite, the "rhyodacitic" plagioclases are unzoned (~An_{35}). In the Dos Equis dome, however, these same plagioclases, while retaining their "rhyodacitic" cores, are strongly zoned to more "intermediate" compositions (~An_{48}). The relative abundance of the "rhyodacitic" plagioclase to other plagioclase types decreases with decreasing bulk SiO_2 content, as the Jala Pumice rhyodacite contains the largest abundance of this type of plagioclase, the Jala Pumice dacite relatively fewer crystals, and the Dos Equis dome only trace amounts.

Similar to sodic plagioclase, solitary, often relatively unzoned, Fe-rich (~En_{60}) orthopyroxene is most abundant in the Jala Pumice rhyodacite, occurs in relatively smaller amounts within the Jala Pumice dacite, and is rare but ubiquitous in Dos Equis dome lava. Their Fe-rich composition and greater abundance in Jala Pumice rhyodacite suggest that this type of orthopyroxene was derived from rhyodacite magma. When found in the Jala Pumice rhyodacite and dacite, such Fe-rich orthopyroxenes are relatively unzoned; however, in the Dos Equis dome, crystals are zoned from Fe-rich cores (~En_{60}) to more Mg-rich rims (~En_{70}).

Unzoned magnetite phenocrysts with low Al and Mg contents are relatively abundant in the Jala pumice rhyodacite, but can also be rarely found in the Jala pumice dacite. The unzoned and unreacted nature of these phenocrysts along with their relative abundance among the eruption products indicates that this population of magnetites originated in the rhyodacite magma, which only contains these magnetites. When present in the Jala dacite, these magnetites are zoned in composition.

Dacite Magma

Mineral phases derived from the dacite magma include the following: intermediate composition plagioclase (~An_{40-60}), Mg-rich orthopyroxene (~En_{70}), hornblende, ilmenite and magnetite with intermediate concentrations of Al and Mg. It is important to note that prior to eruption of the Jala pumice, the dacite magma is believed to have been in a relatively early stage of crystallization involving primarily hornblende and intermediate composition plagioclase. Subsequently, following the caldera-forming eruption and prior to emplacement of the Dos Equis dome, the dacite magma crystallized Mg-rich orthopyroxene, whereas hornblende was no longer stable, while continuing to crystallize intermediate plagioclase of similar composition (fig. 2.7).

Plagioclase derived from dacite magma consists of strongly zoned, intermediate composition (~An_{40-60}) phenocrysts, found often in crystal clots with hornblende. The Dos Equis dome dacite contains by far the greatest abundance of this type of plagioclase, followed by the Jala pumice dacite. The few such crystals present in the Jala Pumice rhyodacite are attached to hornblende, which is also believed to be derived from dacite magma (see below).

Mg-rich orthopyroxenes are found only in the Dos Equis Dome. The Mg-rich core composition of these orthopyroxenes compared to Fe-rich orthopyroxene derived from the rhyodacite magma and their singular presence in the Dos Equis Dome suggests that they are inherent to this dacite magma. Similar to intermediate composition plagioclases, these Mg-rich orthopyroxenes display normal zoning, in this case from Mg-rich cores (~En_{70}) to Fe-rich rims (~En_{60}). This zoning pattern is in contrast to those with Fe-rich cores and Mg-rich rims that are present in the Dos Equis Dome, but are believed to be inherited from the rhyodacite. The resultant wide compositional variation of orthopyroxenes in the Dos Equis dome thus reflects their hybrid origin.

Unlike plagioclase and pyroxene, only one population of hornblende phenocrysts is present in the Jala Pumice and Dos Equis dome. Hornblende phenocrysts are abundant in the Jala pumice dacite, present in trace amounts in the Jala pumice rhyodacite, but are absent from the Dos Equis dome. When found in the rhyodacite, hornblende is attached to plagioclase identical in composition (An_{40}-An_{60}) to plagioclase found in the Jala pumice dacite. Furthermore, hornblende can often be found surrounded by fine-grained reaction rims containing olivine, plagioclase, clinopyroxene, magnetite, ilmenite and glass. Most importantly, glass inclusions inside hornblende phenocrysts are dacitic in composition, very different from that of matrix glass in the rhyodacite. All of this evidence points towards an origin for the hornblende from the dacite magma that was tapped during eruption of the Jala pumice. The presence of reaction rims suggests that a possible mixing event occurred that caused hornblende to become unstable. Subsequent mixing before effusion of the Dos Equis dome may have resulted in the complete dissolution of hornblende. This idea is supported by the presence of "dirty" micro-crystalline clots in the Dos Equis dacite, similar in shape to hornblende phenocrysts, as well as the fact that magnetite-ilmenite pairs in hornblende reaction rims gave relatively high temperatures (~ 945-959°C) which overlap with temperature estimates calculated for zoned magnetite-ilmenite pairs found in the Jala pumice dacite (upwards of 980-1000°C).

Magnetites with Al and Mg contents intermediate between those inherent from the rhyodacite and those inherent from mafic magma (see below) are found only in the Jala pumice and the Dos Equis dome dacites. When found in the Jala Pumice dacite, these magnetites are strongly zoned, indicating they experienced a time of disequilibrium (Nakamura, 1995; Venezky and Rutherford, 1999). Their singular presence in the dacites and intermediate Al and Mg content suggests an origin in the dacite magma. It is important to note that while magnetite is present in the Dos Equis dome magma it contains extensive ex-solution lamellae, and so whether these magnetites were also zoned is unknown.

Mafic Magma

Minerals that are derived from mafic magma are often found in crystal aggregates, which include calcic plagioclase, Mg-rich olivine, clinopyroxene, and magnetite. The calcic plagioclase is strongly zoned (from ~An_{80} cores to ~An_{45} rims) with a core composition too An-rich to have crystallized from either dacite or rhyodacite magma. This population of plagioclases, absent from the rhyodacite, is most abundant in the Dos Equis Dome, but can also be found in the Jala Pumice dacite. Clinopyroxene appears to have originated in the same mafic magma as calcic plagioclase and olivine, because of the common occurrence of those three phases in aggregates. When present, clinopyroxene is strongly zoned from Mg-rich cores to more Fe-rich rims. Clinopyroxene also occurs within reaction rims surrounding hornblende phenocrysts. Both the Jala pumice dacite and Dos Equis dome dacite contain clinopyroxene, but it is absent from the Jala pumice rhyodacite.

Olivine is found in both the Jala pumice dacite and Dos Equis dome, but is absent from the rhyodacite. Several lines of evidence suggest that olivine originated from a mafic magma including: (1) compositions are too Mg-rich (~Fo_{75}) to have crystallized in a dacite or rhyodacite magma, (2) crystals are often found in clots with calcic plagioclase and clinopyroxene, (3) crystals are also found in reaction rims surrounding hornblende, and (4) solitary phenocrysts are in obvious reaction with the melt (surrounded by reaction rims of clinopyroxene + Fe-Ti oxides). It is interesting to note that in the Jala dacite these same composition phases are found in reaction rims surrounding hornblende.

Magnetites derived from the mafic magma have relatively high Al and Mg contents, and are found only in the Jala pumice and Dos Equis dacites. These magnetites are similar in composition to those associated with olivine and those found in reaction rims on hornblende. This suggests that this group of magnetites originated in a mafic magma and was later mixed into the Jala pumice and Dos Equis dacites.

Proportions of Mixing and Origin of the Volcán Ceboruco Rock Types

Petrographic evidence, including mineral textures and compositions, banded pumice, and mafic enclaves, suggests that the Jala dacite and Dos Equis dacite originated largely through the mixing of three-end member magmas: 1) rhyodacite magma, 2) dacite magma, and 3) mafic magma. Those end-member magmas can be defined either by whole-rock composition or by the distinct population of phenocrysts that originated in each of the end-member magmas. This allows for the proportions of end-member magmas in both the Jala pumice and Dos Equis dacites to be determined by two methods. The first method involved using a linear least squares computer model (IGPET 2000) using the major-element compositions of the Jala pumice rhyodacite and dacite, as well as the Dos Equis dome dacite and the mafic enclaves found within. The second method consisted of doing modal analysis using the electron microprobe so that the type and composition of each phase were determined, and thus the relative number of phenocrysts derived from each of the aforementioned end-members could be calculated. Volume percents were then converted to weight percents using the appropriate mineral densities in order to directly compare modal analyses to the linear least squares models. The composition of the Jala rhyodacite seems to have been largely unaffected by mixing; therefore, a major-element model using IGPET 2000 has been constructed to determine if the rhyodacite could have originated from a pre-caldera dacite predominantly by crystal fractionation, rather than mixing.

Jala Pumice Rhyodacite

The Jala Pumice rhyodacite represents the least mixed hybrid magma; it consists of an overwhelming amount of rhyodacite magma mixed with a very minor (virtually insignificant) amount of dacite, as evidenced by traces of phenocrysts derived from the Jala dacite magma. Therefore, it seems likely that the original whole-rock composition of the rhyodacite magma was largely unaffected by mixing.

Because mixing seems not to have been the major process responsible for the origin of the Jala pumice rhyodacite, a major element model was constructed to test if instead fractional crystallization could account for production of the Jala rhyodacite (Table 2.6). The major element model was produced using the BASIC program IGPET 2000 along with Volcán Ceboruco whole-rock, mineral, and glass compositions. Evidence presented previously indicates that the mineral assemblage crystallizing in the dacite magma prior to the caldera-forming eruption consisted of intermediate composition plagioclase, hornblende, magnetite, and ilmenite. Thus, the most likely scenario for producing the Jala pumice rhyodacite by fractionation would involve

Table 2.6: Fractionation model for Jala rhyodacite

Parent Magma: dacitic melt inclusion

Mineral	%
plagioclase	66.7
hornblende	28.4
magnetite	3.2
ilmenite	1.6

	Obs.	Calc.	Δ
SiO_2	64.60	64.43	0.07
TiO_2	0.81	0.80	0.01
Al_2O_3	17.69	17.83	-0.07
FeO	3.69	3.68	0.01
MnO	0.16	0.10	0.06
MgO	1.50	1.53	-0.03
CaO	3.99	3.94	0.05
Na_2O	5.36	5.35	0.01
K_2O	2.21	2.36	-0.15

$\Sigma \Delta^2 = 0.038$

Note: $\Sigma \Delta^2$ = sum of the square of the residuals. All oxides reported in wt.%.

crystallization of such a mineral assemblage in a dacitic melt, the composition of which has been preserved by dacitic glass inclusions within hornblende phenocrysts. A best-fit model (sum of the squares of the residuals = 0.038) invoking this scenario indicates the Jala pumice rhyodacite could in fact be produced by fractional crystallization from a pre-caldera dacite (composition equivalent to dacitic glass inclusions in hornblende phenocrysts). According to these results, 31% crystallization (F=0.690) of a cumulate assemblage of ~67 wt.% intermediate composition plagioclase, ~28 wt.% hornblende, ~3 wt.% magnetite, and ~2 wt.% ilmenite would be required to generate the Jala pumice rhyodacite by fractional crystallization from a pre-caldera dacite parent.

Jala Pumice Dacite

Results using linear least squares models (Table 2.7) indicate that the Jala pumice dacite could be produced by three methods: 1) mixing a small amount (~17 wt.%) of mafic magma with a large amount (~83 wt.%) of the Jala pumice rhyodacite, 2) combining a bimodal mixture of (~53 wt.%) Jala pumice rhyodacite and (~47 wt.%) Dos Equis dacite, or 3) invoking a predominantly binary mixture of (~57 wt.%) Jala pumice rhyodacite and Dos Equis dacite (~40 wt.%) plus a small additional mafic component (~3 wt.%). The second and third mixing models correlate well with electron microprobe modal analysis of the Jala pumice dacite, which indicates that the Jala dacite is predominantly a bimodal mixture of rhyodacite (~ 52-58 wt.%) and dacite phenocrysts (~ 28-37 wt.%), with a small additional mafic component (~ 11-14 wt.%). The most likely scenario for the origin of the Jala dacite seems thus to be one that largely involved mixing

Table 2.7: Representative mixing models for Volcán Ceboruco hybrid magmas

Jala dacite

Magma	%
Jala rhyodacite	82.9
hi-al basalt	17.1

	Obs	Calc	r
SiO_2	67.48	67.62	-0.06
TiO_2	0.51	0.67	-0.16
Al_2O_3	16.63	16.77	-0.07
FeO	3.02	2.83	0.19
MnO	0.09	0.09	0.00
MgO	0.97	1.03	-0.06
CaO	2.65	2.65	0.00
Na_2O	5.68	5.50	0.18
K_2O	2.98	2.84	0.14

$\Sigma r^2 = 0.127$

Jala dacite

Magma	%
Jala rhyodacite	53.0
Dos Equis dacite	47.0

	Obs	Calc	r
SiO_2	67.48	67.60	-0.05
TiO_2	0.51	0.57	-0.05
Al_2O_3	16.63	16.61	0.01
FeO	3.02	3.02	0.00
MnO	0.09	0.09	0.00
MgO	0.97	0.97	0.00
CaO	2.65	2.61	0.04
Na_2O	5.68	5.51	0.16
K_2O	2.98	2.88	0.10

$\Sigma r^2 = 0.042$

Jala dacite

Magma	%
Jala rhyodacite	57.3
Dos Equis dacite	40.1
hi-al basalt	2.5

	Obs	Calc	r
SiO_2	67.48	67.60	-0.05
TiO_2	0.51	0.58	-0.07
Al_2O_3	16.63	16.63	0.00
FeO	3.02	2.99	0.03
MnO	0.09	0.09	0.00
MgO	0.97	0.98	-0.01
CaO	2.65	2.61	0.03
Na_2O	5.68	5.51	0.17
K_2O	2.98	2.88	0.10

$\Sigma r^2 = 0.048$

Dos Equis dacite

Magma	%
Jala rhyodacite	63.7
hi-al basalt	36.3

	Obs	Calc	r
SiO_2	64.11	64.17	-0.02
TiO_2	0.90	1.12	-0.22
Al_2O_3	17.24	17.59	-0.18
FeO	4.20	3.79	0.41
MnO	0.09	0.09	0.00
MgO	1.63	1.76	-0.13
CaO	3.79	3.88	-0.09
Na_2O	5.28	5.25	-0.03
K_2O	2.44	2.34	0.10

$\Sigma r^2 = 0.285$

Dos Equis dacite

Magma	%
Jala dacite	76.9
hi-al basalt	23.1

	Obs	Calc	r
SiO_2	64.11	64.07	0.02
TiO_2	0.90	1.00	-0.10
Al_2O_3	17.24	17.48	-0.12
FeO	4.20	3.93	0.27
MnO	0.09	0.09	0.00
MgO	1.63	1.71	-0.08
CaO	3.79	3.87	-0.08
Na_2O	5.28	5.39	-0.11
K_2O	2.44	2.45	-0.01

$\Sigma r^2 = 0.123$

Postcaldera andesites

Magma	%
Dos Equis dacite	70.4
hi-al basalt	29.6

	Obs	Calc	r
SiO_2	61.33	60.77	0.23
TiO_2	1.20	1.40	-0.21
Al_2O_3	17.01	18.15	-0.57
FeO	5.51	5.02	0.49
MnO	0.12	0.09	0.03
MgO	2.33	2.39	-0.06
CaO	5.31	5.02	0.29
Na_2O	4.71	5.03	-0.32
K_2O	2.15	1.92	0.23

$\Sigma r^2 = 0.906$

Note: Σr^2 = sum of the square of the residuals. Composition of hi-al basalt equals that of mafic enclaves found in Dos Equis dacite as reported by Nelson (1980). All oxides reported in wt %.

of rhyodacite with dacite magma, spurred by an influx of mafic magma. It is important to note that "dacitic" phenocrysts found in the Jala dacite do not include Mg-rich orthopyroxene. This suggests that at the time of the Jala Pumice eruption the dacite magma which mixed with the rhyodacite magma to form the Jala Pumice dacite was in an early stage of crystallization involving only plagioclase and hornblende, but not orthopyroxene.

Dos Equis Dome

Results using linear least squares models (Table 2.7) indicate two possibilities that produce a good fit with the whole-rock composition of the Jala pumice dacite: 1) by mixing a more substantial amount (~36 wt.%) of mafic magma with a dominant portion (~64 wt.%) of the Jala pumice rhyodacite, or 2) by adding a relatively small amount of mafic component (~23 wt.%) to the Jala pumice dacite (~77 wt.%). The second mixing model correlates well with electron microprobe modal analysis of Dos Equis dacite, which indicates that phenocrysts in the Dos Equis dome consist predominantly of those originating from dacite magma (~67-84 wt.%) with subordinate amounts derived from rhyodacitic magma (~11-22 wt.%) and mafic magma (~5-11 wt.%). Thus, it seems likely that the Dos Equis dacite originated by a process in which leftover Jala Dacite (still containing a significant rhyodacitic component) continued to mix with mafic magma, most likely from episodic inputs of mafic magma into the host reservoir.

As opposed to the Jala dacite, "dacitic" phenocrysts found in the Dos Equis dacite include intermediate composition plagioclase and Mg-rich orthopyroxene, but no hornblende. This suggests a major change in magmatic conditions occurred between eruption of the Jala pumice dacite and effusion of the Dos Equis dome dacite. Prior to mixing and eruption the Jala dacite contained a crystallizing mineral assemblage which included intermediate composition plagioclase, hornblende, plus magnetite and ilmenite, but no orthopyroxene. The mixing event did not, however, stabilize orthopyroxene, as evidenced by the lack of orthopyroxene in reaction rims surrounding hornblende. When Dos Equis dome erupted, the dacite magma contained a new crystallizing mineral assemblage in which orthopyroxene, plagioclase, and Fe-Ti oxides were stable. Therefore, it seems that the mixing event which resulted in eruption of the Jala Pumice also produced a hybrid Jala Pumice dacite in which hornblende was no longer stable. Hornblende can be destabilized by either decreasing pressure or increasing temperature (Merzbacher and Eggler, 1984). The relatively high temperatures preserved in the Jala dacite, however, suggest that inputs of mafic magma into the system raised the temperature enough to eliminate hornblende. The resultant hotter dacite thereafter crystallized plagioclase and orthopyroxene.

Estimation of Pre-eruptive Temperatures and Timing of Mixing

We have developed a picture of the Ceboruco magma system, in which multiple mixing events have played an important role (fig. 2.7). First, we find evidence for two mixing events, one between dacite and mafic magma(s), and a second between rhyodacite and dacite magma. Here we use zoning profiles in magnetite to estimate changes that occurred in the thermal conditions of the magmatic system because of magma mixing, as well as zoning profiles in both magnetite and plagioclase to constrain the relative timing of the mixing events.

Geothermometry

The Fe-Ti oxides in the Jala pumice dacite are characterized by a wide variety of compositions and strong compositional zoning within some grains. During mixing, re-equilibration of magnetite phenocrysts to new thermal conditions may result in reverse zoning profiles caused by interelement diffusion (Nakamura, 1995; Venezky and Rutherford, 1999). Analytical transects across the contact between adjoining magnetite-ilmenite pairs reveal the presence of steep reverse zoning profiles, especially within titanomagnetite phenocrysts. Cores can be interpreted to preserve the equilibrium composition in the low-temperature end-member before mixing and the rim (magnetite-ilmenite contact) the composition formed as a result of mixing with the high-temperature end-member (Nakamura, 1995; Venezky and Rutherford, 1999).

Temperatures based on adjacent Fe-Ti oxide grains were calculated using the Stormer (1983) mineral reformulation model and the Anderson and Lindsley (1988) algorithm (fig. 2.6). For each pair, a core temperature was calculated using an average of three or more analyses from the core of each oxide and a rim temperature was calculated using an average of three or more analyses from the rim of each oxide. Adjoining two-oxide pairs of cores and rims inherent to the Jala dacite, the equilibria of which were tested by Mg/Mn ratio (Bacon and Hirschmann, 1988), yielded temperatures of 890±10°C and 960±10°C, respectively. Temperatures acquired using the composition of rims from these "dacitic" pairs are consistent with estimates calculated for magnetite-ilmenite pairs in hornblende reaction rims (from 945±8°C to 959±8°C), which also formed as a result of mixing. In contrast, temperatures calculated using magnetite-ilmenite pairs inherited by the Jala dacite from the mafic magma give temperatures varying from 988±24°C to 1110±32°C, with an average of ~1030°C. Thus, Fe-Ti oxide geothermometry indicates that a mafic magma at ~1030°C mixed with the Jala dacite at ~890°C. Mixing of the two magmas caused the Jala dacite to be heated to ~960°C.

In addition, "rhyodacitic" magnetites inherited by the Jala dacite during the subsequent mixing event between rhyodacite and dacite magmas also display reverse zoning profiles. Cores of adjoining "rhyodacitic" magnetite-ilmenite pairs give temperatures of 865±5°C, whereas rims (magnetite-ilmenite contacts) give temperatures of 905±5°C. Temperature estimates acquired using the rims of "rhyodacitic" magnetite-ilmenite pairs are substantially lower than those produced using magnetite-ilmenite pairs inherent to the Jala dacite and those found in hornblende reaction rims, which both indicate the dacite was heated to ~960°C prior to mixing between the Jala dacite and rhyodacite. It seems likely, however, that these "rhyodacitic" magnetites did not have enough time to fully equilibrate with the dacite before eruptive quenching (see below), and thus these temperature estimates are not a true indication of the temperature of the dacite upon mixing with the rhyodacite.

Magnetite Zoning Profiles

Previous studies (Nakamura, 1995; Venezky and Rutherford, 1999) have shown that the time scale between mixing and eruption can be estimated by analyzing compositional zoning profiles in magnetite phenocrysts. Zoning in magnetite phenocrysts can be especially effective at detecting relatively short time scales because the diffusivity of the ulvospinel component in magnetite is fast compared to cation diffusivities in silicate minerals (Freer and Hauptman, 1978; Nakamura, 1995; Rutherford et al., 1993).

As soon as the magmas mix, re-equilibration of magnetite phenocrysts should begin. If eruptive quenching interrupts the process of re-equilibration, however, the time interval from mixing to eruption can be estimated by fitting a calculated diffusion profile to the observed zoning profile (Nakamura, 1995). Using data for magnetite diffusion from Freer and Hauptman (1978) and an assumed temperature after mixing of 960°C, calculated profiles were determined and compared to actual zoning profiles in magnetite crystals from two of the populations found in the Jala pumice dacite (fig. 2.8). Timing of the first mixing event between dacite and mafic magma(s) was estimated using magnetites inherent to the dacite magma (intermediate Al and Mg contents) which presumably re-equilibrated in response to influx of hotter, more mafic magma. These magnetites have a typical diffusion profile distance of 60-70 μm, which equates to a time of ~34-46 days between mafic injection and eruption. In contrast, magnetites inherited from the rhyodacite (low Al and Mg contents) have a typical diffusion profile distance of 10-20 μm. This suggests that for the mixing event involving rhyodacite and dacite

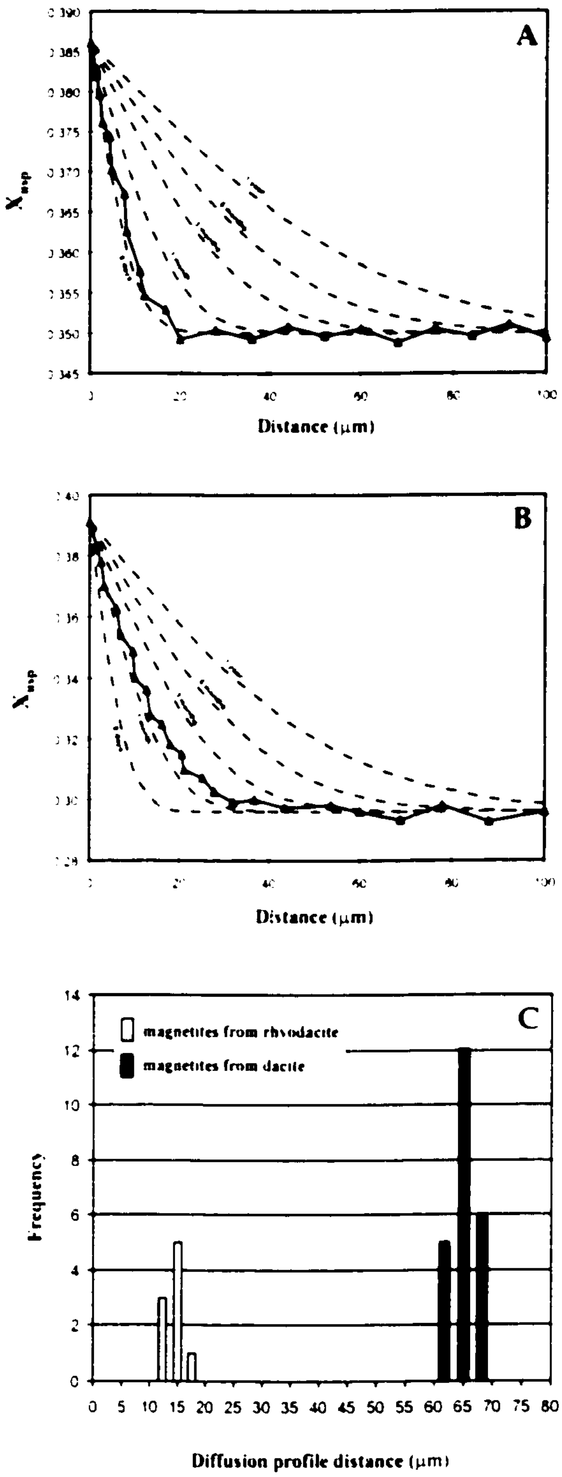

Figure 2.8 Typical zoning profiles for magnetite phenocrysts found in the Jala dacite. A) A typical zoning profile in a "rhyodacitic" magnetite incorporated by the Jala dacite prior to eruption. B) A typical zoning profile in a magnetite inherent to the Jala dacite. Profiles are from the contact with ilmenite towards the core. Dashed lines indicate calculated diffusion profiles for various times. C) Histogram showing the ranges of zoning profile lengths.

magmas, the time between mixing and subsequent eruption was much shorter, equivalent to an interval of 1-4 days.

Plagioclase Rim Widths

Sodic overgrowth rims on calcic plagioclases give another indication of the time between mixing of the mafic and dacite magmas and final eruptive quenching. Although growth rates for plagioclase are not as well constrained as diffusion times for magnetite, presumably the two methods should result in similar estimates. In addition, in cases such as the Dos Equis Dome where Fe-Ti oxides display obvious signs of exsolution, overgrowth rims on plagioclase may be the only method available for determining the timing between mixing and eruption.

In order to test this hypothesis, the width of sodic rims on calcic plagioclases found in both the Jala pumice dacite and Dos Equis Dome were measured and the time required to grow such rims was calculated (fig.2.9) using a range of plagioclase growth rates from 1×10^{-9} to 1×10^{-11} cm s (Brandeis and Jaupart, 1987; Cashman and Marsh, 1988; Dowty, 1980). Calcic plagioclases mixed into the Jala pumice dacite during mixing of mafic and dacite magmas have 10-30 μm sodic rims that grew after mixing. The time required to grow such a rim (and thus the time between mixing and eruption) would be ~12-3500 days. This estimate overlaps with the 34-46 day estimate calculated using magnetite diffusion profiles. In contrast, sodic plagioclases inherited by the Jala pumice dacite from the Jala pumice rhyodacite just prior or during eruption are unzoned, indicating a relatively short period of time between mixing and eruption. In the case of

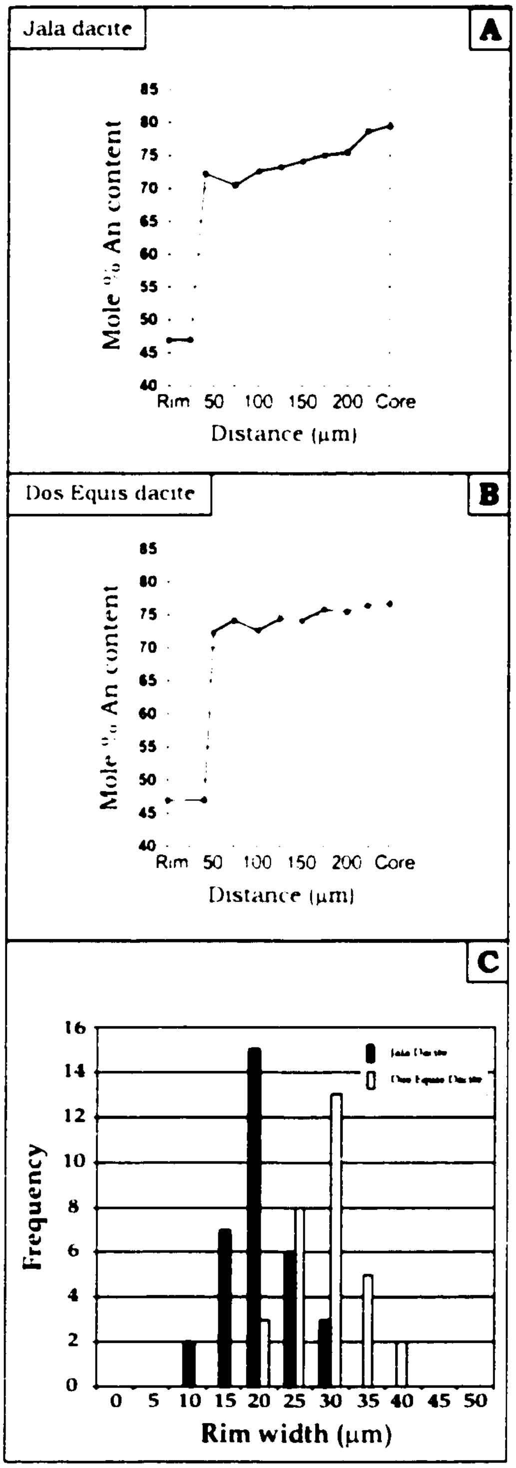

Figure 2.9 Typical zoning profiles for calcic plagioclase phenocrysts found in the Jala and Dos Equis dacites. A) A typical zoning profile in a "calcic" plagioclase phenocryst found in the Jala dacite. B) A typical zoning profile in a "calcic" plagioclase phenocryst found in the Dos Equis dacite. C) Histogram showing the ranges of rim widths.

Dos Equis Dome, calcic plagioclases incorporated from mafic magma into the dacite magma have 20-40 μm sodic rims that grew after mixing. Using the same assumed growth rate, this suggests that mixing occurred approximately 23-4600 days prior to eruptive quenching.

Discussion and Conclusions

Sequence of Events Before and After the Caldera-Forming Eruption

From the evidence presented above, the sequence of events that occurred both before and after the caldera-forming eruption at Volcán Ceboruco can be determined (fig. 2.7). First, both rhyodacite and dacite magmas were present prior to the caldera-forming eruption, either as separate magma bodies or as a single zoned magma. Major element modeling suggests that the rhyodacite may have evolved primarily from the dacite by fractional crystallization. According to Fe-Ti oxide geothermometry, the rhyodacite last equilibrated at a temperature of ~865°C, whereas the dacite was at a temperature of ~890°C.

The chain of events leading to eruption was put into motion when mafic magma at a temperature of ~1030°C intruded the dacite magma. Mixing led to the formation of hybrid dacite with a mixed phenocryst assemblage, including hornblende and intermediate plagioclase inherited from the dacite magma and clinopyroxene, olivine, and Ca-rich plagioclase from the mafic magma. As a result of this mixing, the dacite magma was heated from ~890°C to ~960°C, and hornblende became unstable and grew reaction rims. Timing between the mixing of mafic and dacite magma and eruption is estimated at

~90-130 days, based on diffusion in magnetite phenocrysts. This estimate is relatively consistent with the time required to produce sodic overgrowths on calcic plagioclase phenocrysts. Intrusion of the mafic magma into the dacite may have provoked mixing between the rhyodacite and dacite magmas. Based on zoning profiles of "rhyodacite" magnetites inherited by the dacite magma, timing between mixing of rhyodacite and dacite magmas and subsequent eruption is estimated at 3-11 days. In addition, the other "rhyodacitic" phases (sodic plagioclase and Fe-rich orthopyroxene) found in the dacite show no signs of reaction, supporting the idea that the time between mixing of rhyodacite and dacite magma and succeeding eruption was relatively brief. Perhaps as an eventual result of the initial mafic magma intrusion, Volcán Ceboruco erupted forming a caldera and producing both the Jala pumice rhyodacite and Jala pumice dacite.

Sometime after the caldera-forming eruption, the Dos Equis Dome erupted. The Dos Equis dome contains intermediate composition plagioclase and orthopyroxene that crystallized in the dacite magma, as well as clinopyroxene, olivine, and Ca-rich plagioclase that were incorporated from mafic magma. In addition, it contains orthopyroxene and Na-rich plagioclase, which originated in the rhyodacite magma; hornblende, however, is noticeably absent. Timing between mixing and eruption is estimated at ~230-465 days based on the thickness of plagioclase overgrowth rims. The more basic whole-rock composition of the Dos Equis dacite in comparison to the Jala dacite suggests that there may have been repeated mixing of mafic and dacite magmas between the caldera-forming eruption and dome effusion. Continuous mixing, and the resulting increase in temperature, could also account for the absence of hornblende in the Dos Equis dome.

Implications for the Eruptive History and Magmatic System of Volcán Ceboruco

The events both before and after the caldera-forming eruption of Volcán Ceboruco provide a small-scale picture of how the magmatic system has evolved on a larger-scale over the course of the volcano's eruptive history. We have shown that prior to the caldera-forming eruption, rhyodacite magma most likely evolved from dacite magma by fractional crystallization. The caldera-forming eruption seems to have been triggered by a mafic recharge event, which intruded into the dacite magma and led to the mixing of rhyodacite and dacite magmas. Subsequently, continued mafic injections led to the production of more mafic, intermediate composition, hybrid magmas.

During a relatively long period of time prior to the caldera-forming eruption, volcanic activity at the Volcán Ceboruco consisted largely of effusions of andesitic lava flows, with the exception of two much more silicic flank domes (Nelson, 1980). Those flank domes, the rhyodacitic Cerro Pedregoso (69.23 wt.% SiO_2) and the rhyolitic Cerro Pochetero (73.78 wt.% SiO2), were the last eruptions to precede the caldera-forming eruption (Nelson, 1980). During the 1,000 years that have elapsed since the caldera-forming eruption, Nelson (1980) estimates that the volcano has erupted eight times. Following extrusion of the dacitic Dos Equis dome, the volcano returned to outpouring predominantly andesitic lava flows (Nelson, 1980). In 1870, however, the volcano once again generated much more silicic magma, erupted as 1.1 km^3 of dacitic lava from a vent on the western flanks of the Dos Equis dome (Nelson, 1980). Thus, it seems that a cyclical pattern of magma evolution has occurred at Volcán Ceboruco, whereby a substantial period of andesite production is followed by the abrupt appearance of more silicic magmas, which is in turn succeeded by a return to generation of andesite magma.

If the compositional trends observed over the last 1,000 years at Volcán Ceboruco were generated by the same processes that produced the magmas involved in the caldera-forming eruption, then it would be expected that post-caldera andesites resulted from continued mixing between dacite and more mafic magmas. Subsequent crystal fractionation would then lead to generation of 1870 dacite. Using both major and trace element modeling, Nelson (1980) demonstrated that 1870 dacite most likely originated from post caldera-andesite by crystal fractionation. In order to test if, prior to fractionation, mafic recharge had driven the composition of the magmatic system from dacite back to andesite, a major-element model was constructed in which mafic end-member was added to Dos Equis dome dacite in order to produce the post-caldera andesites (Table 2.7). According to these results, it is possible to generate all of the post-caldera andesites by mixing various amounts of mafic end-member (~27-43 wt.%) with Dos Equis dacite (~57-73 wt.%). Given the open-ended nature of the problem (what mafic and silicic compositions are used and how they may change with time), it seems feasible that the magmas generated over the past 1,000 years resulted predominantly from the same processes that occurred before, during, and immediately after the caldera-forming eruption. Thus, we conclude that evolution of the magmatic system at Volcán Ceboruco can be attributed to a combination of crystal fractionation and magma mixing.

Fractional crystallization leads to the generation of more silicic magmas, whereas episodic mafic recharge resets the system back to its original andesitic "starting point". In addition, mafic recharge may often be responsible for triggering eruptions.

Acknowledgements

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CHAPTER 3

Hybrid Enclaves in Arc Plutons: A Possible Link Between Plutonic Processes and Eruption*

*Prepared for submission to *Geology* under the same title with authors D. G. Chertkoff, R. A. Wiebe, J. F. Larsen, J. C. Eichelberger, and P. W. Layer

Abstract

In order to elucidate the relationship between arc volcanism and plutonism, a study has been conducted of the associated Captain's Bay pluton and Unalaska Formation volcanics from Unalaska Island, Alaska. ^{39}Ar-^{40}Ar dating indicates that the two suites are broadly contemporaneous. Comparison of whole rock compositions between the two suites shows they span a similar range (~ 52-67 wt.% SiO_2) and particular plutonic units correspond compositionally to specific volcanic products. Furthermore, plagioclase phenocrysts from the compositionally similar units display comparable textures and zoning patterns. Most strikingly, magmatic enclaves found within the pluton show an affinity for andesitic lavas from the volcanic suite. Both plutonic enclaves and andesitic lavas appear to be hybrid in origin, as evidenced by the presence of both calcic (zoned from ~An_{80} cores to ~An_{50} rims) and sodic (zoned from ~An_{40} cores to ~An_{60} rims) plagioclase. In igneous texture, however, the lavas and enclaves differ substantially. Generation of enclave compositions and textures may be attributed to the same or similar recharge events as the lavas if the time scales of direct mixing of melts and crystallization in response to heat transfer are sufficiently different. Mixing of melts and extrusion of hybrid lava may be a prompt response to recharge, whereas enclaves may represent "leftovers" that thermally equilibrated with the reservoir as a whole. Eruption of andesitic hybrids while the dominantly silicic reservoir remains "behind" is consistent with the generally more silicic character of plutonic versus erupted suites.

Introduction

Magma mixing has long been considered to play an important role in producing petrologic diversity in both volcanic (e.g., Anderson, 1976; Eichelberger, 1975, 1978) and plutonic systems (e.g., Vogel, 1982; Wiebe, 1974). In the volcanic regime, many studies have implicated injection of relatively mafic magma into silicic magma chambers as a probable catalyst for eruption (e.g., Pallister et al., 1992; Sparks et al., 1977). Similarly, in the plutonic regime there is vast evidence that silicic magma chambers often trap basaltic magma as it rises through the crust (e.g., Wiebe, 1994, 1996). Plutonic rocks often contain the same straightforward evidence for magma mixing, in the form of magmatic enclaves, preservation of disequilibrium phase assemblages and dramatic mineral zoning, that is found in lava flows and domes (e.g., Cantagrel et al., 1984; Didier and Barbarin, 1991). Thus, a fundamental question arises from the study of these two areas of igneous petrology: can observations of mixing and mingling of diverse magmas in plutons be linked to their associated volcanic systems?

Unfortunately, there has been little attempt to understand how these two different igneous regimes correlate with each other. The difficulty of correlation lies in the fact that volcanic studies see only what has erupted while plutonic studies see only what was unable to erupt. Nonetheless, these two domains must provide complementary, evidence of the same magmatic processes. In this paper we present results from a detailed comparative study of the Captain's Bay pluton and associated Unalaska Formation volcanics, using ^{40}Ar-^{39}Ar dating techniques, whole-rock geochemical analysis, and textural and compositional study of plagioclase phenocrysts. These results suggest that by examining analogous plutonic and volcanic rocks, new insights can be gained into the chemical and physical processes that generate magma chambers and eruptive products. In particular, intermediate-composition magmatic enclaves, commonly found in plutonic rocks, may provide a specific link between plutonic and volcanic systems.

Geologic Framework

Unalaska Island, located 130 miles southwest from the tip of the Alaska Peninsula, is the second largest of the Aleutian Islands, which comprise part of the greater Aleutian volcanic arc. Quaternary volcanism in the arc spans ~2500 km from Hayes volcano, on the Alaska mainland, westward across the Aleutian Islands towards the Kamchatka Peninsula. More recent (younger than 5.3 Ma) island-forming volcanic rocks in the arc comprise the upper portion of the Aleutian Ridge, the earlier formation of which occurred in two other major periods of magmatic activity (Scholl et al., 1987). The first period, occurring 55 to 50 Ma, generated a substantial sequence of igneous and volcanic basement rocks, dubbed the "lower series", that comprise the greater part of the Aleutian ridge. Overlying these rocks is a "middle series" of Oligocene to Miocene age (35 to 8 Ma), which includes most of the plutons in the central Aleutian arc and some of the best-developed calc-alkaline plutons to be found in an island-arc setting (Kay et al., 1990).

Among the Aleutian plutons is that of Captain's Bay, which outcrops over an area approximately 100 km^2 on Unalaska Island, Alaska, and is relatively well-exposed due to steep-sided fjords and ravines that incise it (Perfit, 1977). Previous mapping of Captain's

Bay pluton and the surrounding area (Drewes et al., 1961; Perfit, 1977) has revealed the pluton to be crudely, concentrically zoned from a narrow gabbroic border zone to an extensive heterogeneous central region of granodiorite. The pluton intrudes the Unalaska Formation, a thick sequence of volcanics and volcaniclastics that covers two-thirds of the island. Volcanic rocks in the formation consist primarily of andesite lava flows with lesser amounts of more basaltic lava and dacite tuff (Perfit, 1977).

Analytical Methods

^{40}Ar-^{39}Ar dates for samples from the Captain's Bay pluton and Unalaska Formation volcanics were acquired using a VG-3600 mass spectrometer laser system in the Geochronology Laboratory at the University of Alaska, Fairbanks. Prior to dating, both samples and standards were irradiated in a uranium-enriched reactor at McMaster University (Hamilton, Ontario, Canada). Subsequently, standards and samples were heated using a 6-watt argon-ion laser, following the methods of York et al. (1981) and Layer et al. (1987). The hornblende standard MMhb-1 (Samson and Alexander, 1987) with an age of 513.9 +/- 2.3 Ma (Lamphere et al., 1990) was used to calculate the irradiation parameter, J. Ages for both whole-rock samples from the Unalaska Formation volcanics and amphibole separates from the Captain's Bay pluton were determined using a step-heating dating method. Each sample was heated in a series of steps from 150 mW to 8000 mW, with the number of steps (anywhere from nine to fourteen) chosen to reduce analytical error. Argon purification was accomplished using a liquid nitrogen trap and a SAES Zr-Al getter at 400°C. Following the procedures of McDougall and Harrison

(1999), measured argon isotopes were corrected for system blank and mass discrimination, as well as Ca, K, and Cl interference reactions.

Whole-rock (major and trace element) compositions of 20 samples from Captain's Bay pluton and 10 samples from Unalaska Formation volcanics were determined by XRF analysis at Franklin and Marshall College (Lancaster, Pennsylvania). Thin sections of all rock types from both the plutonic and volcanic suites were prepared for petrographic examination and microprobe analysis. Textural and compositional investigation of plagioclase phenocrysts was accomplished using the Cameca SX-50 electron microprobe located at the University of Alaska Fairbanks. Synthetic and natural minerals were used as standards. Quantitative point analyses were acquired using a 1-3 μm focused beam, an accelerating voltage of 15 keV, and a beam current of 10 nA. In order to account for any possible effects from sodium migration, sodium was counted in two-second intervals for the first ten seconds of each analysis, following which counts were regressed to ascertain the initial sodium content (Devine et al., 1995). Backscattered-electron (BSE) images of plagioclase phenocrysts were generated using a beam set in raster mode, with an accelerating voltage of 15 keV and a beam of current of 80-150 nA.

Geochronology

Previous K-Ar dating of amphibole separates from the presumably penecontemporaneous Shaler pluton, exposed in the Shaler Mountains of southern Unalaska Island, suggested that intrusion of the plutons on Unalaska occurred at approximately 11.1 Ma (Marlow et al., 1973). For this study, amphibole separates from the Captain's Bay pluton itself were analyzed by the ^{40}Ar-^{39}Ar method to further constrain the age of pluton emplacement. In addition, whole-rock fragments from the Unalaska Formation volcanics were also analyzed to determine the age of eruption and whether volcanism coincided with plutonism temporally. Samples were chosen for dating that displayed the least amount of alteration.

Table 3.1 summarizes the analytical data and ages. Plateau age criteria require 3 or more consecutive fractions within 2 sigma of the mean age, with at least 50% ^{39}Ar release. Fractions were also chosen based on compositional criteria (Ca/K and Cl/K ratios), in order to avoid dating alteration products. Five amphibole fractions from sample MH8G (hybrid andesitic enclave) give a plateau age of 10.0 ± 0.3 Ma, with 94% ^{39}Ar released and a plateau mean square weighted deviation (MSWD) of 0.45. These fractions also yield a well-defined isochron age of 10.1 ± 0.5 Ma (initial $^{40}Ar/^{36}Ar$ ratio of 296.6 ± 11.7), with a MSWD equal to 0.06. Alternatively, 4 amphibole fractions from sample 99CB9B (granodiorite) indicate a plateau age of 9.7 ± 1.5 Ma, with 70.2% of ^{39}Ar released and a plateau MSWD of 0.8. A second run using 6 amphibole fractions from the same sample produced a plateau age of 9.6 ± 2.1 Ma, with 70% of ^{39}Ar released and a plateau MSWD of 0.7.

Using four fractions, whole-rock fragments from sample 99UN37 (andesite lava) produce a plateau age of 8.9 ± 0.2 Ma, with 73.6% ^{39}Ar released and a plateau MSWD equivalent to 0.1. Six fractions from this same sample yield an isochron age of 8.6 ± 0.3 Ma (initial $^{40}Ar/^{36}Ar$ ratio of 311.8 ± 11.0), with a MSWD of 0.35. Dating of whole-rock fragments from sample 99UN9 (another andesite lava) give a plateau age of 8.8 ± 0.2 Ma,

Table 3.1 : Dates for Unalaska Formation volcanics and Captain's Bay pluton

Sample **Description**	**99UN37** **andesite lava**	**99UN9** **andesite lava**	**99CB9B** **granodiorite**	**MH8G** **andesitic enclave**
Plateau Age	8.9 +/- 0.2	8.8 +/- 0.2	9.6 +/- 2.1	10.0 +/- 0.3
Number of Fractions	4	3	6	5
% of ^{39}Ar released	73.6%	63.5%	70.2%	94.0%
Plateau MSWD	0.1	0.07	0.7	0.45
Isochron Age	8.6 +/- 0.3	8.8 +/- 0.2	-	10.1 +/- 0.5
Number of Fractions	6	13	-	3
Initial $^{40}Ar/^{36}Ar$	311.8 +/- 11.0	292.4 +/- 1.9	-	296.6 +/- 11.7
MSWD	0.35	0.57	-	0.06

using three fractions with 63.5 % ^{39}Ar released and a plateau MSWD of 0.07. This sample also exhibits a well-defined, thirteen-fraction isochron age of 8.8 ± 0.2 Ma (initial ^{40}Ar/^{36}Ar ratio of 292.4 ± 1.9), with a MSWD of 0.57.

Dating using the ^{40}Ar-^{39}Ar method thus yields an age for the Captain's Bay pluton of approximately 10 Ma, while giving a slightly younger age for the Unalaska Formation volcanics of about 9 Ma. Given a presumably slower cooling history for the pluton as compared to the eruptively quenched volcanic samples, it would be expected that the volcanism associated with these plutonic samples would be somewhat older, rather than the reverse. This suggests two possible scenarios, either 1) the plutonic units dated in this study are in fact older than the volcanics, or 2) the volcanic units dated in this study experienced more significant alteration and subsequent Ar loss after eruption at the surface, as opposed to the pluton.

Some evidence for such Ar loss exists in the age spectrum for sample 99UN37 (andesite lava), which shows a consistent "ramping-up" in the plateau age given by each fraction, with the final fraction yielding an age of 9.6 ± 0.3 Ma (fig. 3.1). This age would in fact overlap with the better-constrained age of the pluton given by sample MH-8G (hybrid enclave) taking into account analytical error. More pervasive alteration of volcanic samples, evident both in hand sample and thin section, was also observed by Perfit (1977), who noted that low-grade metamorphism had altered most of the volcanic rocks surrounding the Captain's Bay pluton, although original mineralogies and textures had not been obscured. Furthermore, when the analytical error associated with sample 99CB9B is taken into account, ages produced for the Captain's Bay pluton and Unalaska

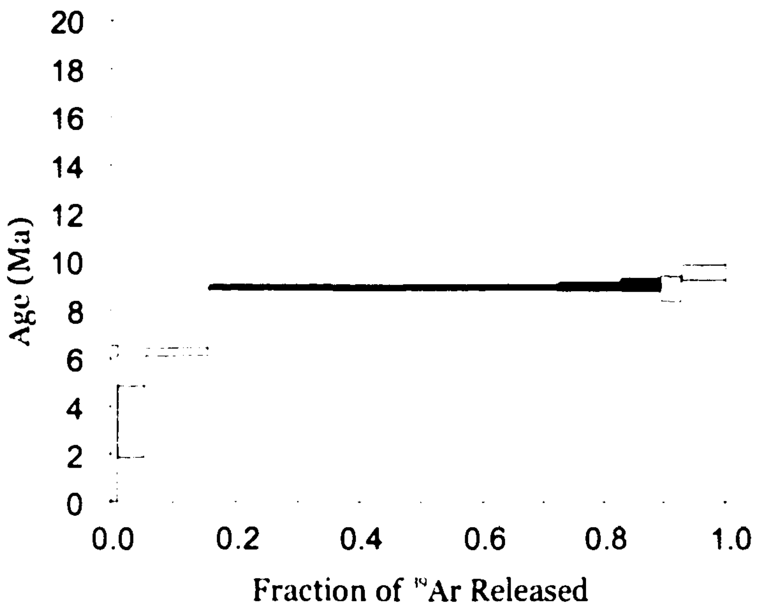

Figure 3.1 Representative age spectrum for andesite lava (sample 99UN37) from the Unalaska Formation volcanics, with a plateau age of 8.9 +/- 0.2 Ma. The four fractions used for calculating the plateau age are filled in black. Note that the final four fractions of the age spectrum show a consistent "ramping-up" towards a final fraction plateau of 9.6 +/- 0.3 Ma.

Formation volcanics do indeed overlap. Thus, while ^{40}Ar-^{39}Ar dating of the two suites does not unequivocally demonstrate that they coincided temporally, it seems fair to suggest (given apparent ambiguities in the age of some samples and geochemical evidence presented below) that the plutonic and volcanic units in this study are broadly contemporaneous.

Whole-Rock Geochemistry

Perfit (1977) attributed major- and trace-element variations in the Captain's Bay plutonic series to *in situ* fractional crystallization of a basaltic or andesitic parental magma. Chemical and field evidence compiled by Perfit (1977) indicated that associated basaltic to andesitic dikes that commonly crosscut the Unalaska Formation and also intrude the edges of the Captain's Bay pluton were coeval with emplacement of the pluton. In contrast, intrusion of more silicic aplite dikes was thought to have occurred primarily after consolidation of the pluton, with chemical evidence precluding an origin from residual liquids in equilibrium with the pluton. Perfit (1977) also noted an apparent compositional similarity between the Captain's Bay pluton and Unalaska Formation volcanics (as well as calc-alkaline series in the Aleutians and other Pacific island arcs) that suggested similar magmatic processes affected the petrogenesis of both the volcanic and plutonic rocks. The exact nature of the processes responsible for these seemingly analogous origins was, however, never determined.

Whole-rock analyses of plutonic and volcanic samples reveals that the two suites span a similar compositional range from basalt to dacite (~ 52-67 wt.% SiO_2) and resemble the modern Aleutian volcanic arc (fig. 3.2). The Captain's Bay pluton is dominated by an extensive interior of more silicic (~ 60-65 wt.% SiO_2) composition rocks, with a subordinate amount of more mafic (~ 53 wt.% SiO_2) border zone rocks. Associated dikes are both more mafic (<53 wt.% SiO_2) and more silicic (>70 wt.% SiO_2) than any found in either the volcanic or plutonic suite. Of particular interest is that intermediate compositions (~55 wt.% SiO_2) in the pluton are solely represented by hybrid enclaves found within the main body of the host pluton. Some andesitic dikes are also present which overlap in composition with these hybrid enclaves. In comparison, Unalaska Formation volcanics are represented predominantly by either intermediate composition andesitic lavas (~ 56-60 wt. % SiO_2) or more silicic dacite tuff (~ 65-67 wt.% SiO_2).

General scatter in some of the bulk chemical trends suggests that after emplacement of the Captain's Bay pluton and eruption of the Unalaska Formation volcanics some exchange with hydrothermal fluids has occurred. For a few particularly mobile elements (such as K and Na), this scatter somewhat limits opportunities to decipher potential magmatic processes responsible for producing the observed variations in whole rock composition. For the rest of the major elements (in particular more immobile major elements such as Ti, Al, P, and Fe), however, scatter is limited and whole-rock variation diagrams allow for direct comparison of the two suites. For the purposes of this study, we have not engaged in extensive geochemical modeling, but rather have used whole-rock major- and trace-element compositions to match particular plutonic units compositionally with specific volcanic products. This method provided

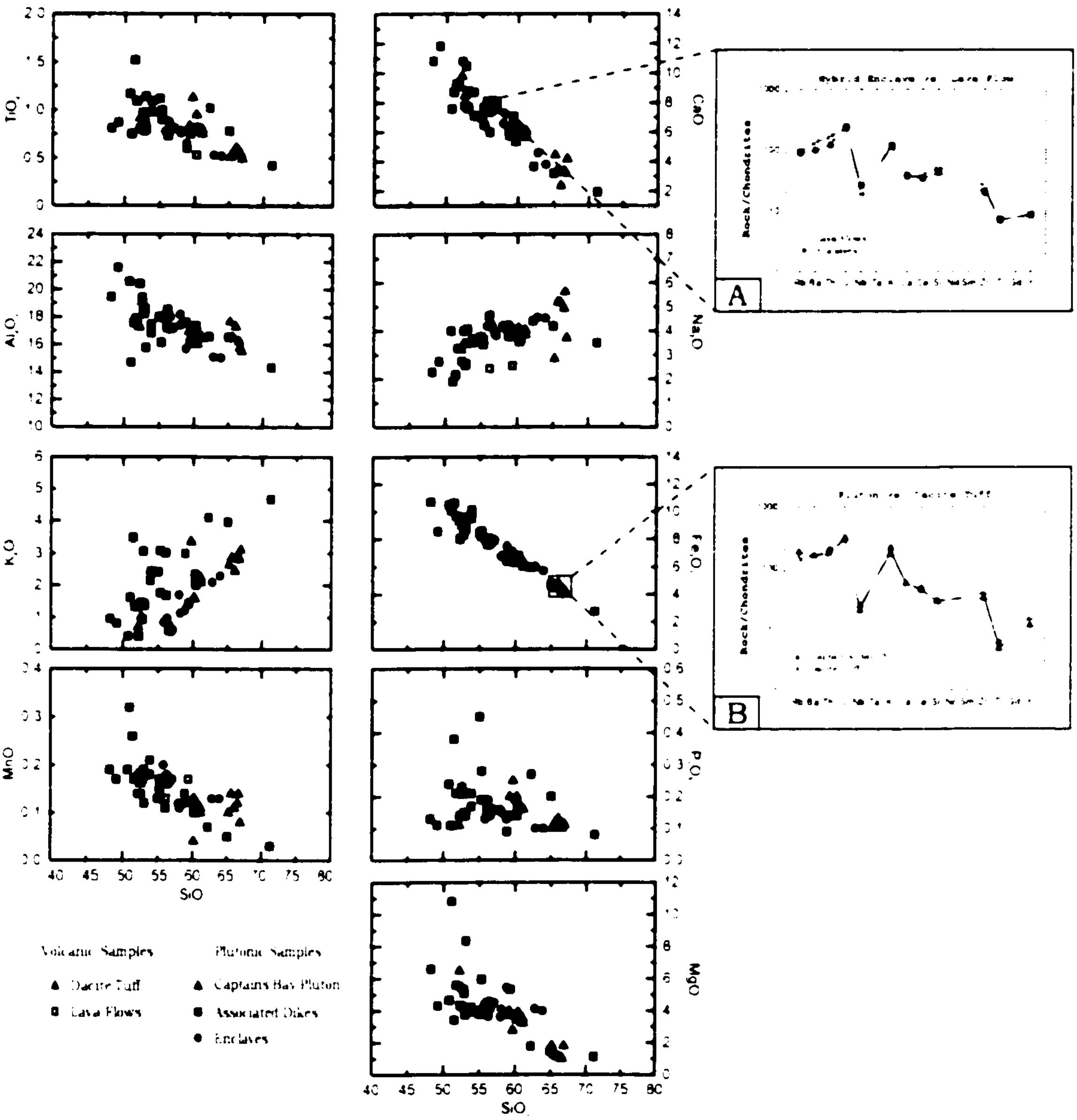

Figure 3.2 SiO_2 variation diagrams for TiO_2, Al_2O_3, K_2O, MnO, CaO, Na_2O, Fe_2O_3, P_2O_5, and MgO for samples from both the Unalaska Formation volcanics and the Captain's Bay pluton. Solid symbols represent plutonic samples; open symbols represent volcanics. Insets show spider diagrams comparing trace-element variations of particular plutonic units with specific volcanic products: A) hybrid enclave compared to andesite lava and B) more silicic pluton host granodiorite compared to dacite tuff.

justification for subsequent in-depth investigation of plagioclase textures and compositions (see below) from the correlated units.

Detailed examination of major-element variations between the two suites demonstrates that most strikingly, magmatic enclaves found within the pluton show a chemical affinity for andesite lavas, whereas more silicic samples from the host pluton correlate with dacite tuff from the volcanic suite (fig. 3.2). In particular, enclaves are nearly identical to andesite lavas in their TiO_2, Al_2O_3, CaO, Fe_2O_3, P_2O_5, and MgO contents at equivalent concentrations of SiO_2. Similarly, granodiorite host pluton is virtually indistinguishable from dacite tuff in its TiO_2, Al_2O_3, K_2O, CaO, Fe_2O_3, P_2O_5, and MgO contents at equivalent concentrations of SiO_2. Further comparison of the trace-element variations for these corresponding plutonic and volcanic rocks substantiates the possibility that the Captain's Bay pluton could have been the source of magmas that erupted as the Unalaska Formation volcanics. Spider diagrams (comparing hybrid enclaves to andesite lavas and granodiorite to dacite tuff) demonstrate that, even including rather mobile trace elements, the patterns and concentrations for these corresponding units are remarkably similar (fig. 3.2).

Types, Textures, and Compositions of Plagioclase Phenocrysts

Compositional zoning, textural discontinuities, and reaction rims within individual mineral phases have been shown to provide a record of the magmatic processes that result in generation of both plutonic and volcanic rock series (e.g., Davidson et al., 2001; Singer et al., 1995; Waight et al., 2000). Plagioclase is the most abundant and least altered phase present in rocks from both the Captain's Bay pluton and Unalaska Formation volcanics. In plutonic rocks plagioclase typically comprises >50% of the mode and varies in size from < 1 mm interstitial crystals to > 10 mm phenocrysts, whereas in volcanic rocks plagioclase is most prevalent as phenocrysts (up to > 10 mm) that make up ~10-30% of the mode in any given sample. Plutonic and volcanic units that have been compositionally correlated contain sub- to euhedral phenocrysts that exhibit comparable variations in composition and texture.

Granodiorite vs. Dacite Tuff

Plagioclase phenocrysts from both granodiorite of the Captain's Bay pluton and dacite tuff of the Unalaska Formation display the simplest zoning patterns and occur in two distinct populations. The majority (75-85%) are sodic plagioclases (~An_{30-40}), which are relatively unzoned or sometimes exhibit fine oscillatory zoning superimposed on weak normal zoning. A second population (15-25%) is more dramatically zoned from relatively calcic cores (An_{55-65}) to sodic rims (~An_{30-35}). This gives a similar, distinctly bimodal character to the compositional distribution of plagioclase phenocrysts from the two equivalent silicic end-members to the plutonic and associated volcanic series (fig. 3.3).

Hybrid Enclaves vs. Andesite Lava

Intermediate composition hybrid enclaves within the host granodiorite pluton and andesite lavas of the Unalaska formation contain multiple populations of plagioclase

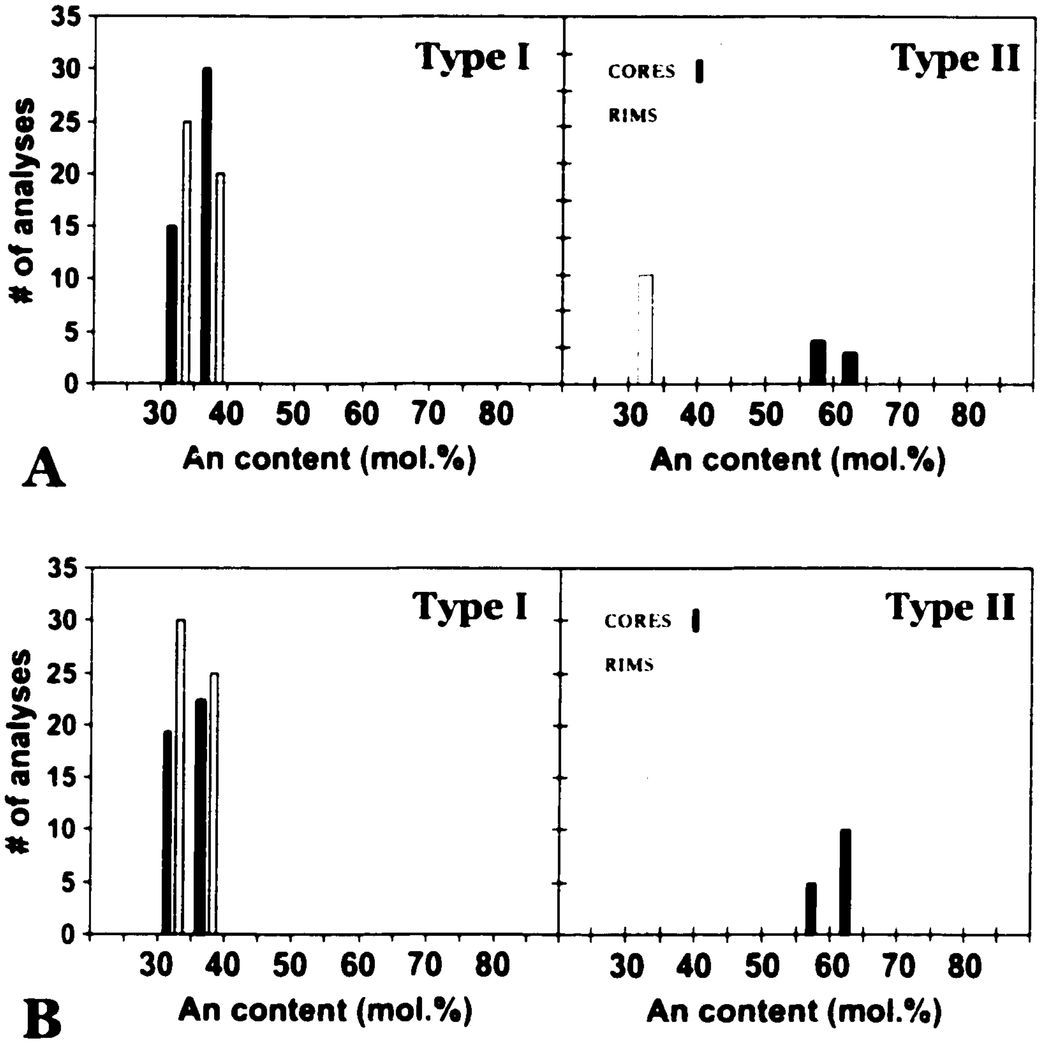

Figure 3.3 Histograms of compositions and zoning of the two populations of plagioclase phenocrysts found in a) dacite tuff and b) granodiorite. Note the nearly identical distribution of plagioclase phenocryst types for the two units and that type I sodic plagioclases are relatively unzoned, whereas type II plagioclases contain more calcic cores and display strong normal zoning to more sodic rims (equivalent in composition to the more abundant type I plagioclase phenocrysts).

phenocrysts with comparatively complex compositional variations (fig. 3.4). Plagioclase phenocrysts from the correlated units can be grouped into four main populations as follows: (1) plagioclases with intermediate composition cores (~An_{45-55}), more calcic inner rims (~An_{70}) and normally zoned outer rims (~An_{70} to ~An_{45}); (2) plagioclases that display a similar zoning pattern to type 1, but with a much wider calcic inner rim; (3) plagioclases characterized by even more complex oscillatory compositional variations; and (4) plagioclases which exhibit wide calcic cores (~An_{70-80}) and thin sodic rims (~An_{45}).

Backscattered-electron (BSE) images and accompanying electron microprobe (EPMA) analytical transects demonstrate that within these various plagioclase phenocrysts abrupt variations in An content are often associated with sudden textural changes (fig. 3.4). Type 1 plagioclase phenocrysts often display a sieve-ringed texture, in which more sodic cores are surrounded by either a zone of skeletal calcic plagioclase (in the plutonic case) or skeletal calcic plagioclase with an interconnected channel of glass inclusions, which is in turn surrounded by a thin, normally zoned overgrowth. Such sieve-ringed textures most likely form as a result of mixing and resultant heating of the surrounding melt, which causes partial dissolution of relatively sodic plagioclase followed by rapid crystallization of more Ca-rich plagioclase (Nakamura and Shimakita, 1997; Tsuchiyama, 1985). Thus, Type 1 plagioclase seems to be recording mixing events. In Type 2 plagioclase phenocrysts, this zone is significantly wider, possibly indicating a longer time between mixing and eruptive quenching. Similarly, oscillatory zoned (Type 3) plagioclase phenocrysts exhibit multiple peaks in An content that are

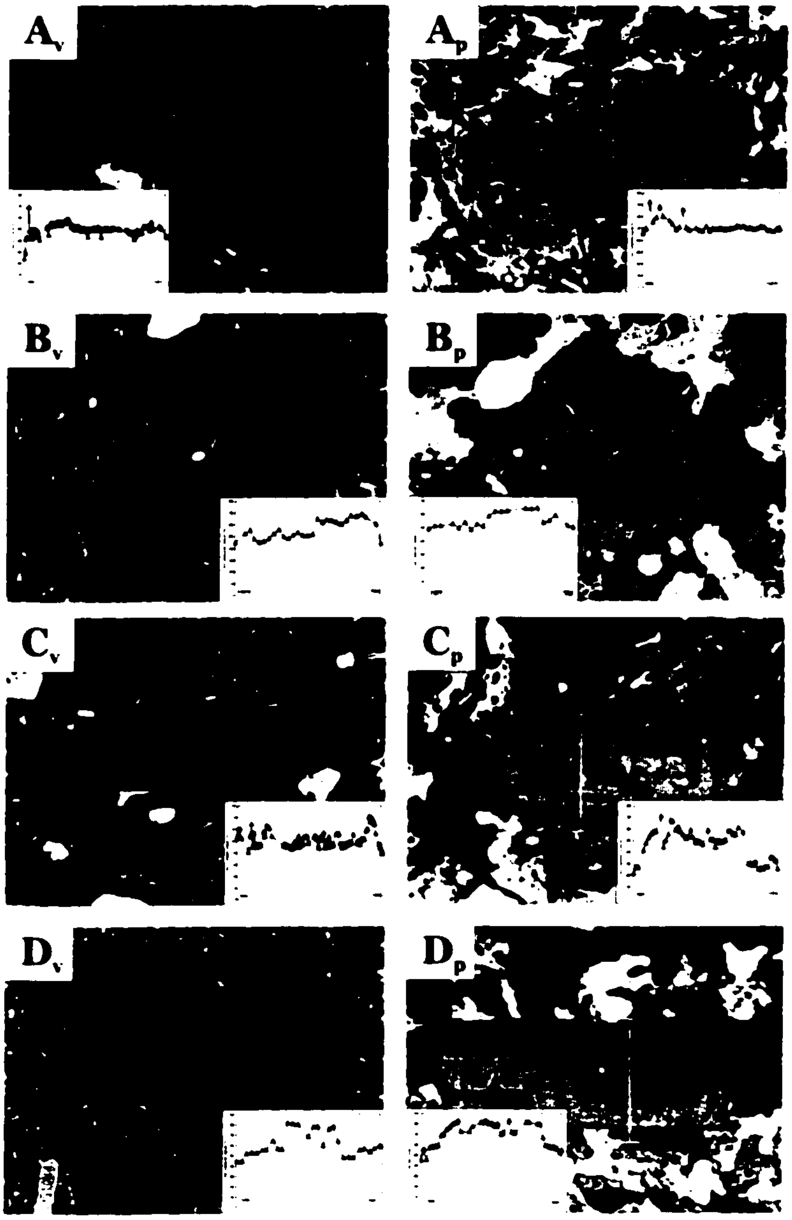

Figure 3.4 Backscattered-electron images and compositional zoning profiles for representative plagioclase phenocrysts found in andesite lava (A_v-D_v) compared to hybrid magmatic enclaves (A_p-D_p). The four main types of plagioclase phenocrysts as described in the text are: A) type 1 plagioclase phenocrysts with relatively sodic cores (~An[illegible]), more calcic inner rims (~An[illegible]), and normally zoned outer rims (~An[illegible]-An[illegible]); B) type 2 plagioclase phenocrysts with a similar zoning pattern to type 1, but with a wider calcic inner rim; c) type 3 plagioclase phenocrysts with oscillatory zoning patterns; and d) type 4 plagioclase phenocrysts with wide calcic cores (~An[illegible]) and thin sodic rims (~An[illegible]).

sometimes located in the same position as major dissolution surfaces, seemingly recording multiple mixing events.

In contrast, both andesitic lavas and hybrid plutonic enclaves also contain plagioclase phenocrysts with calcic cores that exhibit coarse-sieved interiors. In andesitic lavas coarse-sieved calcic cores within plagioclase are formed by an extensive network of erratically shaped melt inclusions. In plutonic enclaves, however, these voids have been filled with sodic plagioclase, creating a texture commonly referred to as patchy zoning. Such coarse-sieved cores have been reproduced experimentally as a result of decompression, which causes dissolution rather than rapid skeletal growth (Nelson and Montana, 1992). These coarse-sieved cores are in turn surrounded by a thin rim of more sodic plagioclase, which is similar in composition to cores of Type 1, 2 and 3 plagioclases. The boundary between core and rim is abrupt without evidence for dissolution, suggesting that the rims resulted solely from rapid growth of more sodic plagioclase around the calcic core. Plagioclase phenocrysts with similarly coarse-sieved calcic cores plus more sodic, clean overgrowth rims have been previously described in volcanic rocks, and are thought to result from rapid introduction and mixing of basalt containing previously crystallized calcic plagioclase into a more silicic magma reservoir (e.g., Izbekov et al., 2002).

Discussion: Magma origins for the Captain's Bay pluton and Unalaska Formation volcanics

Previously mapped field relations (Perfit, 1977) along with ^{40}Ar-^{39}Ar dating and geochemical and petrologic evidence presented in this paper all point to the Captain's Bay pluton as the most likely source of magmas, which erupted to produce the Unalaska Formation volcanics. Particularly compelling is geochemical and mineralogic evidence, which has allowed for the correlation of particular plutonic units with specific volcanic products, and suggests the processes of petrogenesis responsible for the origin of these magmas were (in both the plutonic and volcanic cases) nearly identical. Textural and compositional variations within plagioclase phenocrysts from these corresponding plutonic and volcanic rocks provide the most insights into the nature of these processes.

Previous geochemical modeling by Perfit et al. (1980) suggested that generation of the zoned Captain's Bay pluton was dominated by in-situ crystal fractionation. Mineralogic evidence from the dominant granodiorite interior of the pluton and dacite tuff of the Unalaska Formation agrees with such a conclusion. The presence of a vast majority of plagioclase phenocrysts characterized by relatively simple zoning profiles (fine oscillatory zoning superimposed on weak normal zoning) and a lack of major textural changes suggest that a somewhat closed magmatic system was responsible for the generation of the most silicic magmas on Unalaska Island. The presence of a secondary population of plagioclase phenocrysts, which display more pronounced zoning from relatively calcic cores (An_{55-65}) to sodic rims ($\sim An_{30-35}$) suggests, however, that the chamber was affected by episodic injections of and limited mixing with hybrid andesitic magma. Evidence for occasional andesitic recharge events also exists in the presence of sparse andesitic enclaves, found solely within the granodiorite interior of the pluton, which contain predominantly plagioclase phenocrysts of similar composition to the secondary population of plagioclase phenocrysts found in both the host granodiorite pluton and dacite tuff.

Hybrid andesitic enclaves represent the only intermediate composition rocks (~55 wt.% SiO_2) found in the Captain's Bay pluton and coincide in both major- and trace-element whole-rock composition with andesite lava of the Unalaska Formation. Mineralogic evidence suggests that both enclaves and andesite lavas are largely hybrid in origin. Plagioclase phenocrysts occur in multiple populations and exhibit abrupt variations in both composition and texture that suggest multiple mixing events between mafic and intermediate composition magma resulted in the generation of hybrid andesite magma, which was subsequently injected into the more silicic dominant magma reservoir. Both hybrid enclaves and andesitic lavas also contain a smaller population of plagioclase phenocrysts (Type 4) that contain coarse-sieved calcic cores surrounded by thin sodic overgrowths. Their coarse-sieved interiors were most likely produced during decompression of ascending basalt from depth, prior to being incorporated into andesite magma.

Two lines of evidence point to basaltic and andesite magmas mixed to form hybrid andesitic magma prior to injection of this hybrid magma into the dominant, more silicic reservoir, rather than basaltic magma being injected directly into the silicic reservoir to form hybrid andesite magma. First, plagioclase phenocrysts with calcic sieve-cored interiors can only be found in hybrid enclaves and andesite lavas, not in the dominant more silicic interior rocks of the pluton. Second, the relatively sodic rims surrounding the calcic plagioclase are similar in composition to the majority of phenocrysts found in the lavas and enclaves, not the more dominant population of sodic plagioclase found in the granodiorite pluton.

Although the lavas and enclaves are virtually identical in their whole-rock geochemistry and plagioclase phenocryst contents, in igneous texture they differ substantially. Andesite lavas are characterized by a porphyritic texture, typical for intermediate composition volcanic rocks, in which subhedral to euhedral phenocrysts of primarily plagioclase and clinopyroxene are set in an extremely fine-grained groundmass that is thoroughly charged with microlites. In contrast, hybrid enclaves are composed of larger phenocrysts of mainly plagioclase and clinopyroxene surrounded by an interstitial matrix of somewhat smaller, elongate and skeletal crystals of mostly plagioclase, indicating that the andesite magma was strongly quenched upon entrainment into the more silicic host reservoir.

Generation of enclave compositions and textures may be attributed to the same or similar recharge events as the lavas if the time scales of direct chemical mixing of melts and crystallization in response to heat transfer are sufficiently different. Recent modeling by Bergantz and Breidenthal (2001) suggests that under some circumstances replenishment may lead to "tunneling eruptions" where newly intruded magma may penetrate and erupt through resident silicic magma. In other cases, however, tunneling instabilities may often fail, leading to the entrainment of injected magma and formation of magmatic enclaves. Such a model is the only known way to account for all three of the following: (1) the virtually identical whole-rock composition and plagioclase phenocryst contents of hybrid enclaves and andesite lavas; (2) the difference between lavas and enclaves in groundmass or matrix texture; and (3) the intimate coexistence of highly mixed (in the form of enclaves) and relatively un-mixed (in the form of granodiorite host) magma. Furthermore, such a model is consistent with the idea that the intruding andesite magma was largely hybridized and then injected into the dominant granodiorite interior of the host pluton, as suggested by the mineralogic evidence mentioned above. Thus, mixing of melts and extrusion of hybrid lava may be a prompt response to recharge, whereas the enclaves may represent "leftovers" that thermally equilibrated with the reservoir as a whole (fig. 3.5). Eruption of andesitic hybrids while the dominantly silicic reservoir remains "behind" is also consistent with the generally more silicic character of the plutonic versus the erupted suites.

Conclusions: Possible link between the Plutonic and Volcanic Regimes

Although magmatic enclaves are widespread in plutonic rocks and have been the subject of numerous studies (e.g., Cantagrel et al., 1984; Didier and Barbarin, 1991; Vernon, 1984, 1990), their specific source has remained a matter of debate. For example, detailed study of enclaves in the Cadillac Mountain Granite by Wiebe et al. (1997) indicated that the most common and widespread enclaves were andesitic in composition. Although the composition of these enclaves suggested that they formed largely through hybridization between mafic and CMG magma, several lines of evidence suggested that

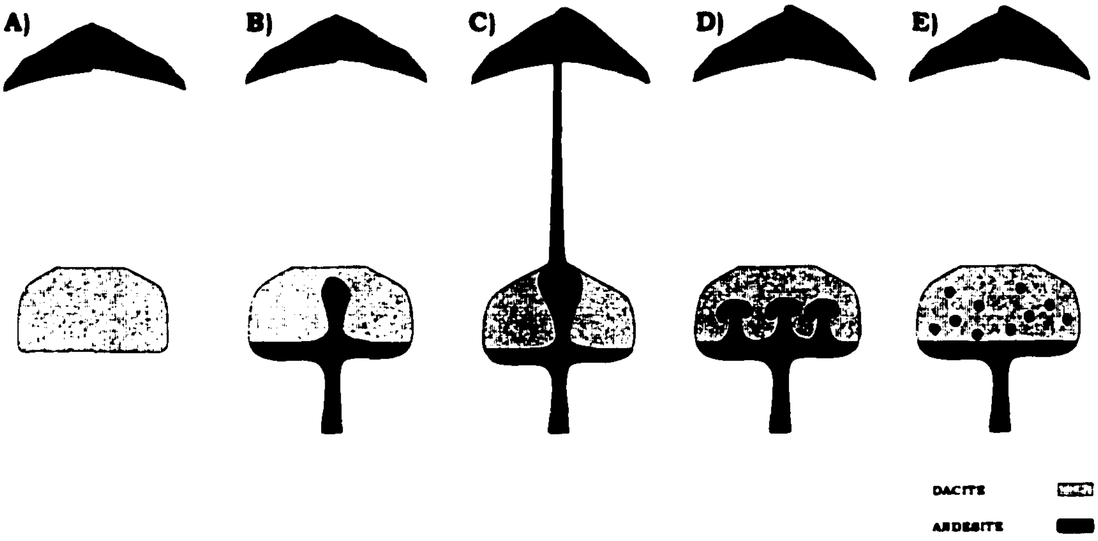

Figure 3.5 Schematic illustration depicting the nature of magma interactions that could result in the eruption of andesite lavas as well as the production of "leftover" hybrid magmatic enclaves within the host pluton. A) State of subvolcanic magma reservoir prior to influx of hybrid andesite magma. B) Initial influx and vesiculation of hybrid andesite magma. C) Continued vesiculation and an accompanying rapid increase in buoyancy leads to "tunneling" of hybrid andesite through resident silicic magma. D) The same or similar mixing events, however, may also include initial "tunneling" instabilities that fail. E) Failed instabilities result in the formation of hybrid enclaves within the host pluton.

this hybridization occurred elsewhere and that the enclave compositions were not significantly affected by direct interactions with the enclosing host granite. Evidence from the Captain's Bay pluton and associated Unalaska Formation volcanics suggests that such hybrid andesite magmatic enclaves, commonly found in granite plutons elsewhere, may be the plutonic vestiges of magma that tunneled through the silicic host reservoir and erupted at the surface to produce volcanic rocks of equivalent composition (fig. 3.5).

These results contrast with the routine interpretation of volcanic products from arc volcanoes as reflecting a stratigraphic "snapshot" of the long-stored contents of underlying magma chambers with eruption always tapping the dominant, most silicic magma first. Several recent studies (e.g., Nakamura, 1995; Pallister et al., 1996; Wolf and Eichelberger, 1997), however, have concluded that volcanic rock sequences may reflect just the opposite, with mafic and/or mixed magmas erupting near the beginning and intermittently throughout a particular eruptive phase. For example, at Southwest Trident Volcano, Coombs et al. (2000) documented the influx of hybrid andesite magma into a dacite magma reservoir. Early during the eruption, interaction between the two contrasting magmas was primarily limited to the formation of hybrid andesite enclaves and variably mixed dacite magma, but later on unmodified andesite magma ascended through the dacite reservoir and erupted as scoria. Results linking hybrid enclaves from the Captain's Bay pluton and andesite lavas from the Unalaska Formation volcanics seem to corroborate the concept that, throughout the construction of a sub-volcanic magma body, eruptive products may arise from mixed magma that is generated and/or stored directly beneath the volcano for only short periods of time relative to the bulk of the magma reservoir.

CONCLUSIONS

One of the principal goals of igneous petrology is to understand how the diverse magma compositions found on Earth are generated. Not only can chemical heterogeneity be observed on a global scale, but it can also be found at individual volcanoes (as illustrated by Mt. Dutton volcano and Volcán Ceboruco), within one solidified magma body (as seen at Captain's Bay pluton), or in the rocks from a single eruption (for example, the caldera-forming eruption of Volcán Ceboruco or dome-building eruptions at Mt. Dutton). By studying individual centers of magmatism (both volcanic and plutonic) and noting similarities or differences between these systems, it may be possible to unravel the magmatic processes responsible for producing the range of igneous rock compositions that comprise the Earth's crust.

Although magma mixing is now well-accepted as a common occurrence in magmatic systems, it is often dismissed as a secondary process not capable of generating substantial volumes of intermediate composition magmas or requiring long periods of time for mafic and silicic magmas to interact. Much of the chemical diversity found at individual volcanic centers has therefore long been thought to arise during prolonged magma storage and protracted differentiation in subvolcanic magma reservoirs. In contrast, however, evidence from all three parts of this thesis suggests that the shallow silicic magma chambers, which supposedly underlie volcanoes, are open and dynamic systems where compositionally disparate magmas interact only for short periods of time just prior to eruption.

Results from Mt. Dutton volcano and Volcán Ceboruco are particularly significant because they provide additional quantitative (thermal, temporal, and compositional) constraints on the nature and timing of these mafic-silicic interactions. In the case of Mt. Dutton, all evidence points toward the existence of a shallow, dacitic magma reservoir under the volcano that was dramatically affected by injections of more mafic magma. During the Pleistocene, subsequent rapid mixing between the two end-member magmas resulted in eruption of thoroughly hybridized andesite lavas, without enclaves. The preservation of disequilibrium phase assemblages and mineral textures in the andesite lavas suggests that mixing and thorough hybridization of basaltic and dacitic magmas may have occurred at a rate approaching that of an eruptive time-scale.

The sudden shift at Mt. Dutton to eruption of less thoroughly hybridized dacitic magma with enclaves (beginning in the Holocene), reconfirms the concept of subvolcanic silicic magma reservoirs as being easily perturbed by short-term variations in open-system parameters, such as the volume or recurrence interval of mafic recharge. Similar to the case of generation of well-mixed andesitic magma, we have also presented critical evidence that mafic injection, enclave formation, disaggregation, and subsequent mixing were also accomplished on an eruptive time-scale (~1 month between injection and eruption).

Evidence presented from the caldera-forming eruption of Volcán Ceboruco suggests that, similar to eruptions at Mt. Dutton, the sequence of events that led to expulsion of the Jala pumice rhyodacite and dacite ultimately began with intrusion of mafic magma into a dacitic magma reservoir. Timing between the mixing of mafic and dacite magma and eruption is estimated at ~90-130 days, based on diffusion in magnetite phenocrysts. Intrusion of mafic magma into the dacite may have provoked mixing between rhyodacite and dacite magmas. Based on zoning profiles of "rhyodacite" magnetites inherited by the dacite magma, timing between mixing of rhyodacite and dacite magmas and subsequent eruption is estimated at 3-11 days. Sometime following the caldera-forming eruption, Dos Equis Dome erupted. Timing between mixing and eruption of this hybrid dacite is estimated at ~230-465 days based on the thickness of plagioclase overgrowth rims. The more basic whole-rock composition of the Dos Equis dacite in comparison to the Jala dacite suggests that there may have been repeated mixing of mafic and dacite magmas between the caldera-forming eruption and dome effusion.

Evidence from both Mt. Dutton volcano and Volcán Ceboruco thus indicates that mixing between mafic and silicic magmas can indeed produce more significant volumes of intermediate composition magma over shorter periods of time (i.e., an eruptive time-scale) than previously realized. Furthermore, abrupt changes in the composition of eruptive products produced at various points during the evolution of each of these volcanoes imply that either: a) silicic magma chambers are remarkably responsive (both chemically and physically) to more mafic inputs, or b) a substantial number of distinct silicic magmas may be generated and erupt over the lifetime of an individual magmatic system.

Similarly, results linking hybrid enclaves found in granodiorite within the Captain's Bay pluton and andesite lavas from the Unalaska Formation appear to be consistent with the idea that, during the development of a subvolcanic magma body, eruptive products may arise from mixed magma that is generated and/or stored directly beneath the volcano for only short periods of time relative to the duration of the magmatic system as a whole. Perhaps just as importantly, these results suggest new insights can be gained into the chemical and physical processes responsible for generating the spectrum of magma compositions through detailed comparison of plutonic rocks and their volcanic counterparts.

Prior to this study, few attempts had been made to understand how observations of mixing and mingling of disparate magmas in plutons might be linked to evidence for mafic-silicic interactions often found in comparable volcanic systems. Although the plutonic record may often be complicated by the extended opportunity for internal equilibration of contrasting composition magmas, results from Unalaska Island, Alaska, suggest that (at least in some cases) plutons may indeed represent the crustal magma reservoirs which repeatedly fed volcanic eruptions. Therefore, it is possible that this study may lay the groundwork for and inspire further investigation by others into the plutonic-volcanic connection, for example, exploring the apparent chemical equivalence of aplite dikes and Aleutian rhyolites (Perfit, 1977).

In summary, all three parts of this thesis: (1) demonstrate the importance of magma mixing in producing the variation in igneous rock compositions found on Earth, (2) place important new constraints (chemical, thermal, and temporal) on mafic-silicic magma interactions, and (3) suggest that short-term storage of magma in long-lived subvolcanic reservoirs may be the norm rather than the exception.

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APPENDIX A

Sample names, descriptions, and locations

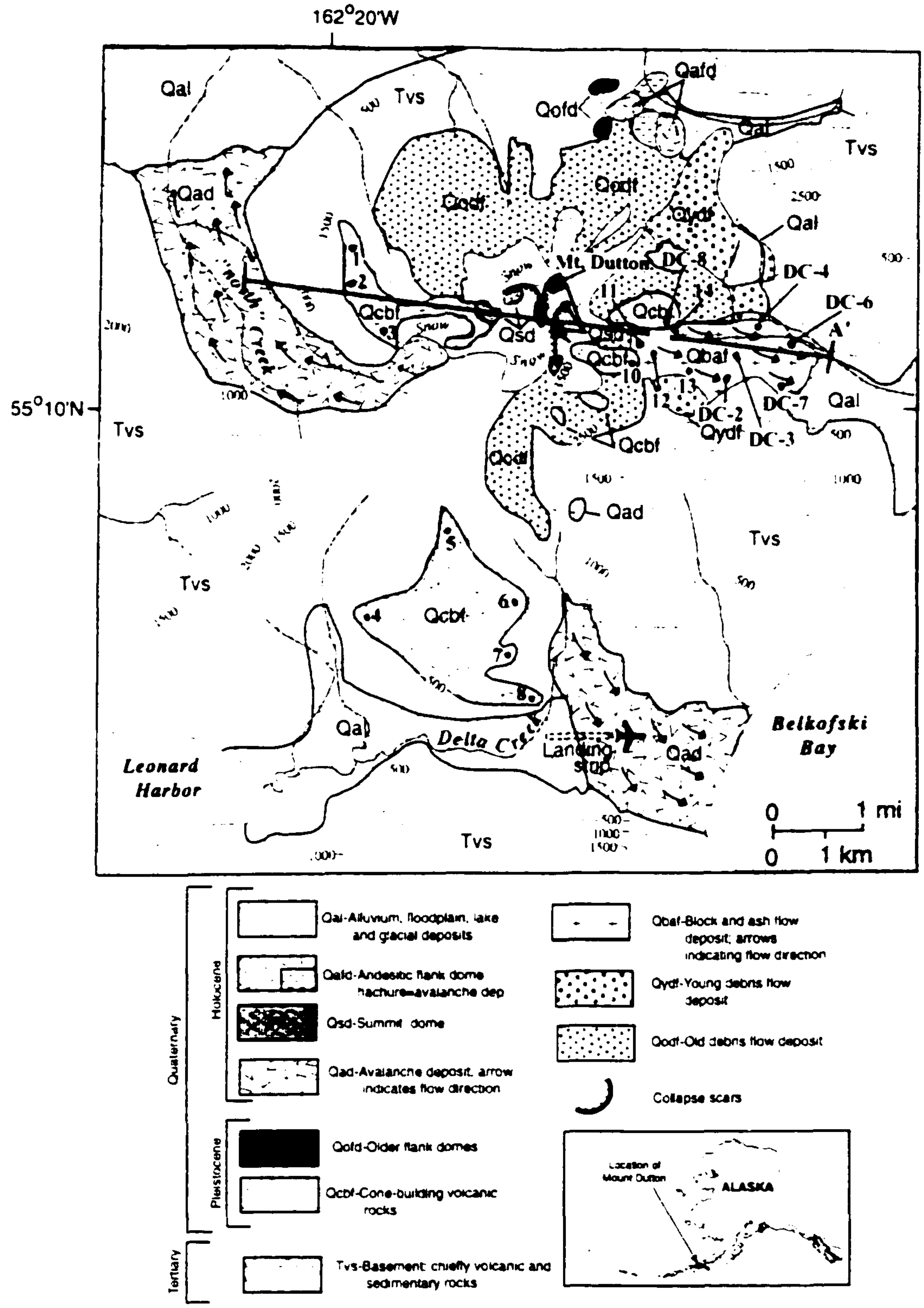
Additional field data including sample names, descriptions, and locations for: (1) Mt. Dutton volcano, Alaska, (2) Volcán Ceboruco, Mexico, and (3) Captain's Bay pluton and Unalaska Formation volcanics. Sample names correspond to those used in subsequent Appendices B-I.

Appendix A: Sample names, descriptions, and locations for Mt. Dutton volcano, Alaska

Sample	Description	Unit*	Location
1	Andesitic lava flow	Qcbf	Location 1 on sample location map
2	Andesitic lava flow	Qcbf	Location 2 on sample location map
3	Andesitic lava flow	Qcbf	Location 3 on sample location map
4	Andesitic lava flow	Qcbf	Location 4 on sample location map
5	Andesitic lava flow	Qcbf	Location 5 on sample location map
6	Andesitic lava flow	Qcbf	Location 6 on sample location map
7	Andesitic lava flow	Qcbf	Location 7 on sample location map
8	Andesitic lava flow	Qcbf	Location 8 on sample location map
10	Andesitic lava flow	Qcbf	Location 10 on sample location map
11	Dacitic lava from block-and-ash flow	Qbaf	Location 11 on sample location map
12	Dacitic lava from block-and-ash flow	Qbaf	Location 12 on sample location map
13	Dacitic lava from block-and-ash flow	Qbaf	Location 13 on sample location map
14	Dacitic lava from block-and-ash flow	Qbaf	Location 14 on sample location map
DC-2b	Dacitic lava from block-and-ash flow	Qbaf	Location DC-2 on sample location map
DC-2c	Enclave found within dacitic lava from block-and-ash flow	Qbaf	Location DC-2 on sample location map
DC-2d	Dacitic lava from block-and-ash flow	Qbaf	Location DC-2 on sample location map
DC-2i	Enclave found within dacitic lava from block-and-ash flow	Qbaf	Location DC-2 on sample location map
DC-2r	Enclave found within dacitic lava from block-and-ash flow	Qbaf	Location DC-3 on sample location map
DC-3c	Enclave found within dacitic lava from block-and-ash flow	Qbaf	Location DC-3 on sample location map
DC-3d	Dacitic lava from block-and-ash flow	Qbaf	Location DC-3 on sample location map
DC-3m	Enclave found within dacitic lava from block-and-ash flow	Qbaf	Location DC-3 on sample location map
DC-3i	Enclave found within dacitic lava from block-and-ash flow	Qbaf	Location DC-3 on sample location map
DC-3r	Enclave found within dacitic lava from block-and-ash flow	Qbaf	Location DC-3 on sample location map
DC-4a	Enclave found within dacitic lava from block-and-ash flow	Qbaf	Location DC-4 on sample location map
DC-4b	Enclave found within dacitic lava from block-and-ash flow	Qbaf	Location DC-4 on sample location map
DC-6	Dacitic lava from block-and-ash flow	Qbaf	Location DC-6 on sample location map
DC-7a	Dacitic lava from block-and-ash flow	Qbaf	Location DC-7 on sample location map
DC-7b	Dacitic lava from block-and-ash flow	Qbaf	Location DC-7 on sample location map
DC-8	Andesitic lava flow	Qcbf	Location DC-8 on sample location map

*units according to geologic map of Miller et al. (1999)

Appendix A
Sample location map for Mt. Dutton volcano, Alaska



Appendix A: Sample names, descriptions, and locations for Volcán Ceboruco, Mexico

Sample*	Description	Unit*	Location
LOC18-P1B-A	Jala pumice (rhyodacite)	base of layer P1	locality 18 on geologic map (fig 2.1)
LOC18-P1B-B	Jala pumice (rhyodacite)	base of layer P1	locality 18 on geologic map (fig 2.1)
LOC18 P1B-C	Jala pumice (rhyodacite)	base of layer P1	locality 18 on geologic map (fig 2.1)
LOC18 P1M-A	Jala pumice (rhyodacite)	middle of layer P1	locality 18 on geologic map (fig 2.1)
LOC18 P1M-B	Jala pumice (rhyodacite)	middle of layer P1	locality 18 on geologic map (fig 2.1)
LOC18 P1M-C	Jala pumice (rhyodacite)	middle of layer P1	locality 18 on geologic map (fig 2.1)
LOC18 P1T-A	Jala pumice (rhyodacite)	top of layer P1	locality 18 on geologic map (fig 2.1)
LOC18 P1T-B	Jala pumice (rhyodacite)	top of layer P1	locality 18 on geologic map (fig 2.1)
LOC18 P1T-C	Jala pumice (rhyodacite)	top of layer P1	locality 18 on geologic map (fig 2.1)
LOC18 P2BC-A	Jala pumice (banded)	base of layer P2	locality 18 on geologic map (fig 2.1)
LOC18 P2BC-B	Jala pumice (rhyodacite)	base of layer P2	locality 18 on geologic map (fig 2.1)
LOC18 P2BC-C	Jala pumice (rhyodacite)	base of layer P2	locality 18 on geologic map (fig 2.1)
LOC18 P2BC-D	Jala pumice (dacite)	base of layer P2	locality 18 on geologic map (fig 2.1)
LOC18 P2BC-E	Jala pumice (dacite)	base of layer P2	locality 18 on geologic map (fig 2.1)
LOC18 P2BC-F	Jala pumice (dacite)	base of layer P2	locality 18 on geologic map (fig 2.1)
LOC18 P2BC-G	Jala pumice (banded)	base of layer P2	locality 18 on geologic map (fig 2.1)
LOC18 P2BC-H	Jala pumice (dacite)	base of layer P2	locality 18 on geologic map (fig 2.1)
LOC18 P3T-A	Jala pumice (rhyodacite)	top of layer P3	locality 18 on geologic map (fig 2.1)
LOC18 P3T-B	Jala pumice (dacite)	top of layer P3	locality 18 on geologic map (fig 2.1)
LOC18 P3T-C	Jala pumice (banded)	top of layer P3	locality 18 on geologic map (fig 2.1)
LOC18 P3T-D	Jala pumice (dacite)	top of layer P3	locality 18 on geologic map (fig 2.1)
LOC18 P3T-E	Jala pumice (dacite)	top of layer P3	locality 18 on geologic map (fig 2.1)
LOC71 P2T-A	Jala pumice (banded)	top of layer P2	N21° 10' 4.9", W104° 29' 13.2"
LOC71 P2T-B	Jala pumice (banded)	top of layer P2	N21° 10' 4.9", W104° 29' 13.2"
LOC71 P2T-C	Jala pumice (banded)	top of layer P2	N21° 10' 4.9", W104° 29' 13.2"
LOC71 P2T-D	Jala pumice (dacite)	top of layer P2	N21° 10' 4.9", W104° 29' 13.2"
LOC71 P2T-E	Jala pumice (dacite)	top of layer P2	N21° 10' 4.9", W104° 29' 13.2"
LOC71 P3T-A	Jala pumice (dacite)	top of layer P3	N21° 10' 4.9", W104° 29' 13.2"
LOC71 P3T-B	Jala pumice (banded)	top of layer P3	N21° 10' 4.9", W104° 29' 13.2"
LOC71 P3T-C	Jala pumice (banded)	top of layer P3	N21° 10' 4.9", W104° 29' 13.2"
LOC71 P3T-D	Jala pumice (dacite)	top of layer P3	N21° 10' 4.9", W104° 29' 13.2"
LOC71 P3T-E	Jala pumice (banded)	top of layer P3	N21° 10' 4.9", W104° 29' 13.2"
LOC77 P2B-A	Jala pumice (dacite)	base of layer P2	N21° 9' 43.4", W104° 29' 6.0"
LOC77 P2B-B	Jala pumice (dacite)	base of layer P2	N21° 9' 43.4", W104° 29' 6.0"
LOC77 P2B-C	Jala pumice (dacite)	base of layer P2	N21° 9' 43.4", W104° 29' 6.0"
LOC77 P2B-D	Jala pumice (dacite)	base of layer P2	N21° 9' 43.4", W104° 29' 6.0"
LOC77 P2B-E	Jala pumice (dacite)	base of layer P2	N21° 9' 43.4", W104° 29' 6.0"
LOC77 P2B-F	Jala pumice (dacite)	base of layer P2	N21° 9' 43.4", W104° 29' 6.0"
LOC77 P2B-G	Jala pumice (dacite)	base of layer P2	N21° 9' 43.4", W104° 29' 6.0"
LOC77 P2B-H	Jala pumice (dacite)	base of layer P2	N21° 9' 43.4", W104° 29' 6.0"
LOC77 P2B-I	Jala pumice (banded)	base of layer P2	N21° 9' 43.4", W104° 29' 6.0"
CBV-XX-1A	Dacitic lava	Dos Equis dome	locality CBV on geologic map (fig 2.1)
CBV-XX-1B	Dacitic lava	Dos Equis dome	locality CBV on geologic map (fig 2.1)
CBV-XX-2A	Dacitic lava	Dos Equis dome	locality CBV on geologic map (fig 2.1)
CBV-XX-2B	Dacitic lava	Dos Equis dome	locality CBV on geologic map (fig 2.1)
CBV-XX-3A	Dacitic lava	Dos Equis dome	locality CBV on geologic map (fig 2.1)
CBV-XX-3B	Dacitic lava	Dos Equis dome	locality CBV on geologic map (fig 2.1)

*samples collected by Jim Gardner & Brandon Browne
*units according to stratigraphy of Gardner and Tait (2000)

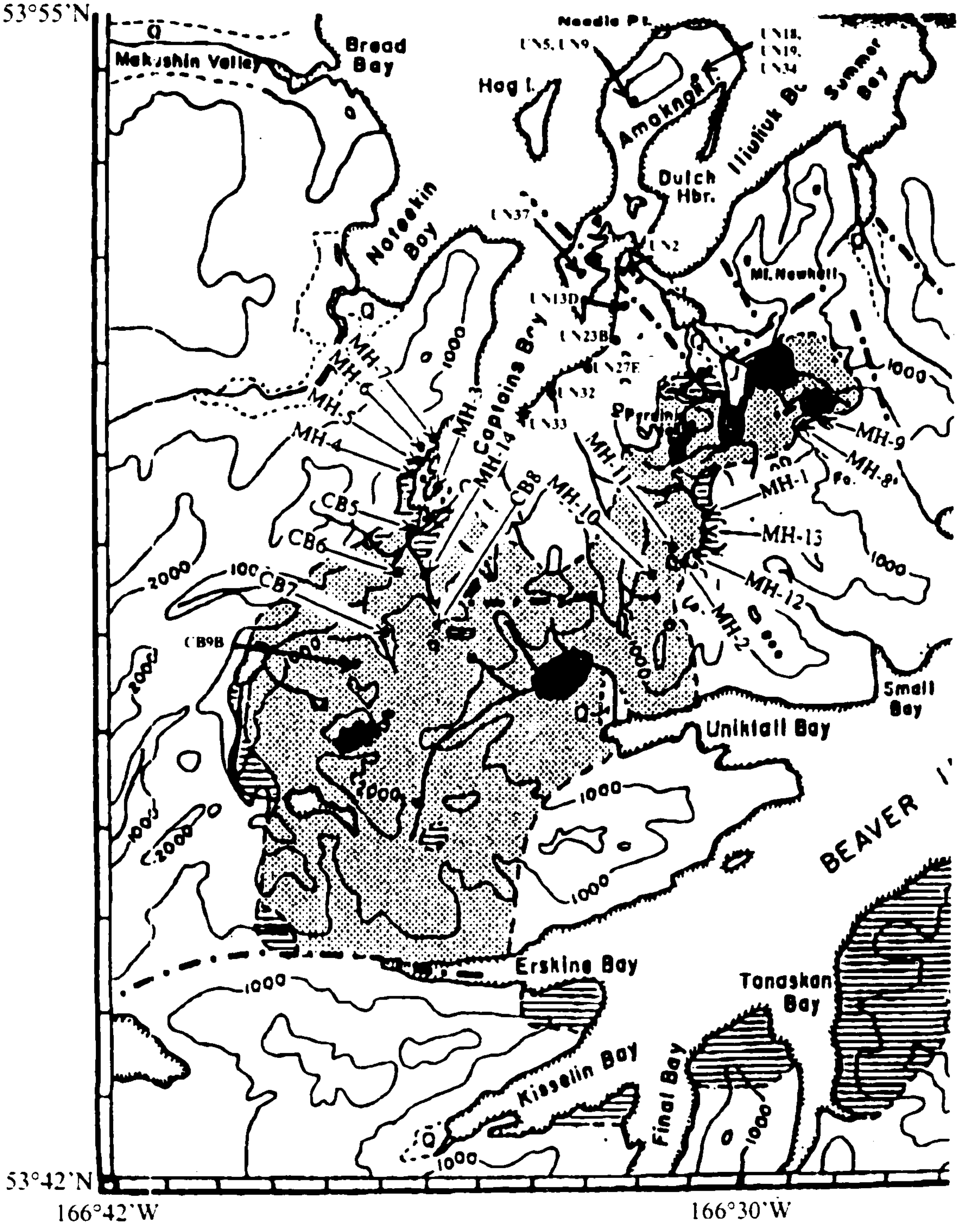
Appendix A: Sample names, descriptions, and locations for Captain's Bay pluton & Unalaska Fm. volcanics

Sample*	Description	Location*
MH-1A	Enclave in granite showing chilied margin	53° 49.4' N, 166° 30.8' W
MH-1B	Granite host of enclave (MH-1A)	53° 49.4' N, 166° 30.8' W
MH-2-G	Granite host of enclave (MH-2E)	53° 48.8' N, 166° 31' W
MH-2-E	Enlcave within pluton host (MH-2-G)	53° 48.8' N, 166° 31' W
MH-3A	Felsic dike with inclusion	53° 49.5' N, 166° 35.8' W
MH-3B	Coarse grained host rock of felsic dike	53° 49.5' N, 166° 35.8' W
MH-4A	Enclave within pluton	53° 49.7' N, 166° 36.2' W
MH-4B	Porphyritic dike	53° 49.7' N, 166° 36.2' W
MH-4C	Contact between Unalaska country rock and porphyritic dike	53° 49.7' N, 166° 36.2' W
MH-5A	Contact between pluton and country rock	53° 49.9' N, 166° 36.3' W
MH-5B	Porphyritic dike intruding country rock	53° 49.9' N, 166° 36.3' W
MH-6A	Diorite gabbro	53° 50.1' N, 166° 36.1' W
MH-6B	Coarse grained leuco-diorite dike cross-cutting pluton	53° 50.1' N, 166° 36.1' W
MH-7	Granodioritic dike cutting across Unalaska Formation	53° 50.1' N, 166° 36' W
MH-8A	Enclave surronded by granodiorite host	53° 50.3' N, 166° 28.8' W
MH-8B	Felsic host of enclave	53° 50.3' N, 166° 28.8' W
MH-8C	Enclave contained within granodiorite host	53° 50.3' N, 166° 28.8' W
MH-8D	Enclave with rind found in granodiorite pluton	53° 50.3' N, 166° 28.8' W
MH-8E	Fine-grained enclave within granodiorite host	53° 50.3' N, 166° 28.8' W
MH-8F	Medium-grained enclave within granodiorite host	53° 50.3' N, 166° 28.8' W
MH-8G	Fine-grained enclave within granodiorite host	53° 50.3' N, 166° 28.8' W
MH-9	Porphyritic andesite dike cutting across granite	53° 50.4' N, 166° 28.5' W
MH-10	Fine-grained granite dike	53° 48.6' N, 166° 31.7' W
MH-11	Porphyritic granodiorite	53° 49' N, 166° 31.2' W
MH-12A	Chilled margin of dike	53° 48.8' N, 166° 30.9' W
MH-12B	Center of dike	53° 48.8' N, 166° 30.9' W
MH-13	Fine-grained dike cross-cutting volcanics	53° 49.2' N, 166° 30.8' W
MH-14A	Mafic dike	53° 48.6' N, 166° 35.9' W
MH-14B	Biotite-rich gabbro	53° 48.6' N, 166° 35.9' W
MH-14C	Gabbro with biotite and predominantly pyroxene	53° 48.6' N, 166° 35.9' W
99CB5	More mafic border zone of pluton	53° 49.1' N, 166° 36.2' W
99CB6	Quartz diorite	53° 48.6' N, 166° 36.5' W
99CB7A	Diorite	53° 48' N, 166° 37' W
99CB7B	Mafic dike	53° 48' N, 166° 37' W
99CB7C	Mafic dike	53° 48' N, 166° 37' W
99CB8	Diorite	53° 48.1' N, 166° 35.8' W
99CB9B	Granodiorite	53° 47.6' N, 166° 37.5' W
99CB10A	Fine-grained andesitic dike	53° 48.5' N, 166° 31.8' W
99CB10B	Porphyritic andesite dike	53° 48.5' N, 166° 31.8' W
99CB11	Porphyritic andesite dike	53° 48.5' N, 166° 32.8' W
99CB12	Contact between andesite dike and granitic host	53° 48.5' N, 166° 32.8' W
99UN2	dike cross-cutting Unalaska Formation	53° 51.9' N, 166° 32.1' W
99UN5	andesitic lava flow	53° 53.5' N, 166° 32' W
99UN9	andesitic lava flow	53° 53.5' N, 166° 32' W
99UN13D	dike cross-cutting Unalaska Formation	53° 51.5' N, 166° 32.1' W
99UN18A	dacitic tuff	53° 53.9' N, 166° 30.8' W
99UN18F	lower-mid portion of welded dacitic tuff	53° 53.9' N, 166° 30.8' W
99UN18G	base of welded dacitic tuff	53° 53.9' N, 166° 30.8' W
99UN19	basal portion of dacitic tuff	53° 53.9' N, 166° 30.8' W
99UN23B	dike cross-cutting Unalaska Formation	53° 51.2' N, 166° 32.2' W
99UN27E	dike cross-cutting Unalaska Formation	53° 50.9' N, 166° 32.8' W
99UN32	dike cross-cutting Unalaska Formation	53° 50.6' N, 166° 33.5' W
99UN33B	dike cross-cutting Unalaska Formation	53° 50.3' N, 166° 34' W
99UN33D	dike cross-cutting Unalaska Formation	53° 50.3' N, 166° 34' W
99UN33J	dike cross-cutting Unalaska Formation	53° 50.3' N, 166° 34' W
99UN34	welded dacitic tuff	53° 53.9' N, 166° 30.8' W
99UN37	andesitic lava flow	53° 51.8' N, 166° 33' W

***MH and 99CB: Captain's Bay pluton; 99UN: Unalaska Formation volcanics**
***indicated on sample location map**

Appendix A

Sample location map for Captain's Bay pluton and Unalaska Formation volcanics



APPENDIX B1

Whole-rock compositions: Mt. Dutton volcano, Alaska

All analyses were conducted at Washington State University. Major elements were determined by x-ray fluorescence (XRF) and trace elements by either XRF analysis (Ni, Cr, V, Zr, Ga, Cu, and Zn) or inductively coupled plasma mass spectrometry (ICP-MS) analysis (Rare Earth Elements, Ba, Th, Nb, Y, Hf, Ta, U, Pb, Rb, Cs, Sr, and Sc). Major elements have been normalized to 100% anhydrous and are reported in weight percent (wt.%), with all Fe reported as FeO. Trace elements are reported in parts per million (ppm). Duplicate analyses of samples from this study indicates that major-element precision is about 0.2% relative for SiO_2, 0.4% for Al_2O_3, 0.6% for TiO_2, 1.3% for FeO and K_2O, 2.5% for MgO, 0.7% for Na_2O, 1.5% for P_2O_5, and < 0.1% for MnO and CaO. Trace-element analytical precision using XRF is about 20% relative for Ni, about 19% for Ga, 8% for Cu, 3% for Zn, < .7% for V, < 1.3% for Zr, and < .01% for Cr. ICP-MS analytical precision is better than 1% relative for Ba, Th, and Cs, better than 2% relative for all REE, Y, U, Pb, and Hf, just over 2% for Rb, 5% for Nb, and about 10% for Ta. "Sample location" indicates the unit from which the sample was collected according to the geologic map of Miller et al. (1999). Abbreviations as follows: **CB** - Cone-building; **DB** - Dome-building; **n.d.** - not detected.

Sample Number	1	2	3	4	5	6	7
Rock Type	CB lava	CB lava	CB lava	CB lava	CB lava	CB lava	CB lava
Sample location	Qcbf	Qcbf	Qcbf	Qcbf	Qcbf	Qcbf	Qcbf
SiO_2	54.80	56.30	56.50	58.30	58.30	58.60	59.10
Al_2O_3	18.00	18.10	16.10	17.80	17.70	17.60	17.80
FeO	8.59	8.33	8.19	7.58	7.56	7.34	6.93
MgO	4.56	4.07	5.92	3.72	3.73	3.64	3.28
CaO	8.95	7.73	8.42	7.85	0.30	7.60	7.33
Na_2O	2.99	3.19	2.92	3.27	3.32	3.34	3.50
K_2O	0.97	1.06	0.93	1.13	0.98	1.06	1.22
TiO_2	0.81	0.81	0.70	0.74	0.72	0.66	0.65
P_2O_5	0.17	0.17	0.15	0.17	0.16	0.15	0.18
MnO	0.15	0.15	0.15	0.14	0.15	0.15	0.13
Orig. Total	99.19	98.76	98.65	98.85	98.53	100.14	99.92
Ba	-	330	339	-	-	-	415
Cr	-	27	137	-	-	-	20
Cu	-	38	45	-	-	-	41
Ni	-	12	33	-	-	-	11
Rb	-	23	23	-	-	-	28
Sr	-	384	378	-	-	-	433
Zn	-	65	61	-	-	-	50
Zr	-	96	83	-	-	-	111
Y	-	16	12	-	-	-	17
La	-	10	10	-	-	-	10
Ce	-	20	23	-	-	-	26

Sample Number	8	10	11	12	13	14
Rock Type	CB lava	CB lava	DB lava	DB lava	DB lava	DB lava
Sample location	Qcbf	Qcbf	Qbaf	Qbaf	Qbaf	Qbaf
SiO_2	59.10	60.40	62.40	63.70	63.60	64.60
Al_2O_3	17.90	17.60	16.90	17.10	16.80	16.80
FeO	7.13	6.97	6.02	5.54	5.41	5.12
MgO	3.40	2.74	2.69	2.16	2.08	2.01
CaO	7.33	6.55	6.28	5.68	5.77	5.53
Na_2O	3.46	3.59	3.61	3.71	3.74	3.83
K_2O	1.01	1.25	1.27	1.37	1.35	1.35
TiO_2	0.72	0.72	0.57	0.55	0.59	0.53
P_2O_5	0.14	0.17	0.15	0.15	0.16	0.16
MnO	0.14	0.13	0.11	0.11	0.11	0.11
Orig. Total	99.91	99.50	99.65	98.27	98.12	99.88
Ba	385	428	-	489	490	490
Cr	20	20	-	20	20	20
Cu	19	31	-	18	17	18
Ni	11	10	-	10	10	10
Rb	26	28	-	38	35	34
Sr	373	373	-	365	379	344
Zn	50	51	-	48	42	36
Zr	103	121	-	131	130	123
Y	17	19	-	19	18	17
La	10	10	-	10	10	10
Ce	18	24	-	23	25	28

Sample Name	DC-8	DC-2b	DC-2d	DC-3d	DC-6	DC-7a	DC-7b	DC-2i
Rock Type	CB lava	DB lava	DB lava	DB lava	DB lava	DB lava	DB lava	Enclave
Sample Location	Qcbf	Qbaf	Qbaf	Qbaf	Qbaf	Qbaf	Qbaf	Qbaf
SiO_2	59.20	63.23	63.31	63.25	61.73	63.67	64.14	53.63
Al_2O_3	18.10	16.66	16.80	16.89	16.95	17.00	16.71	18.98
FeO	6.74	0.58	0.58	0.56	0.63	0.55	0.56	0.91
MgO	3.35	5.47	5.42	5.25	5.88	5.19	5.17	8.03
CaO	6.95	0.13	0.13	0.13	0.14	0.13	0.13	0.15
Na_2O	3.57	6.00	5.93	5.96	6.60	5.69	5.55	9.74
K_2O	1.05	2.76	2.68	2.70	3.00	2.54	2.35	4.30
TiO_2	0.73	1.31	1.30	1.32	1.25	1.30	1.35	0.88
P_2O_5	0.12	3.70	3.70	3.80	3.67	3.80	3.91	3.24
MnO	0.15	0.14	0.14	0.13	0.14	0.13	0.13	0.14
Orig. Total	99.87	99.87	99.88	99.88	99.88	99.86	99.87	99.87
Cs	1.72	1.96	2.14	2.14	1.83	2.08	2.11	0.96
Pr	2.24	2.59	2.66	2.68	2.50	2.56	2.54	2.12
Nd	9.83	11.06	11.64	11.66	10.88	11.07	10.92	9.85
Sm	2.77	2.86	3.09	3.12	2.87	2.81	2.82	2.86
Eu	0.96	0.89	0.97	0.94	0.93	0.93	0.90	1.00
Gd	3.05	2.98	3.26	3.04	2.93	2.96	3.03	3.12
Tb	0.51	0.50	0.52	0.52	0.49	0.48	0.49	0.53
Dy	3.19	3.05	3.32	3.32	3.13	3.12	3.10	3.22
Ho	0.66	0.64	0.70	0.70	0.66	0.64	0.63	0.67
Er	1.87	1.86	1.99	1.91	1.85	1.82	1.84	1.87
Tm	0.28	0.29	0.30	0.29	0.28	0.28	0.28	0.27
Yb	1.85	1.83	1.93	1.93	1.78	1.82	1.82	1.68
Lu	0.30	0.29	0.33	0.32	0.30	0.31	0.30	0.26
Hf	2.42	2.88	3.04	3.03	2.72	2.92	2.87	1.99
Nb	2.16	2.57	2.70	2.68	2.38	2.57	2.52	1.82
Ta	0.18	0.21	0.22	0.22	0.20	0.22	0.21	0.14
Pb	6.82	7.41	7.62	7.78	7.05	9.97	8.59	5.14
Th	2.07	2.48	2.48	2.46	2.23	2.43	2.42	1.35
U	1.08	1.18	1.23	1.20	1.07	1.22	1.20	0.65
Ga	16	17	18	19	18	13	17	21
V	141	106	101	99	133	94	101	248
Sc	18	14	16	16	17	14	13	32
Ba	363	408	443	446	400	437	461	302
Cr	15	26	15	17	23	14	22	36
Cu	45	7	10	11	23	23	17	21
Ni	6	10	5	7	7	8	8	7
Rb	25	30	33	32	28	32	32	18
Sr	373	338	334	329	335	355	314	391
Zn	51	59	58	56	57	55	54	69
Zr	94	110	114	114	111	110	117	85
Y	18	18	18	19	18	18	18	17
La	8	10	10	10	10	10	10	7
Ce	19	21	21	21	20	20	20	15

Sample Name	DC-3c	DC-3i	DC-4a	DC-2c	DC-2r	DC-3c	DC-3m	DC-3r
Rock Type	Enclave	Enclave	Enclave	Enclave	Enclave	Enclave	Enclave	Enclave
Sample Location	Qbaf	Qbaf	Qbaf	Qbaf	Qbaf	Qbaf	Qbaf	Qbaf
SiO_2	51.29	51.32	51.28	51.83	54.26	51.45	51.87	52.88
Al_2O_3	19.34	19.32	19.04	18.96	18.65	19.28	19.46	18.94
FeO	0.92	0.92	1.04	8.50	8.01	8.43	8.51	8.58
MgO	8.48	8.41	8.68	5.04	4.25	4.89	4.56	4.40
CaO	0.15	0.15	0.16	11.01	9.53	11.30	10.78	10.10
Na_2O	11.25	11.33	10.75	2.77	3.13	2.78	2.88	2.99
K_2O	5.00	5.05	5.27	0.70	0.98	0.68	0.73	0.84
TiO_2	0.68	0.68	0.75	0.92	0.90	0.92	0.93	0.99
P_2O_5	2.76	2.70	2.89	0.12	0.14	0.12	0.13	0.13
MnO	0.13	0.12	0.13	0.16	0.15	0.15	0.15	0.15
Orig. Total	99.87	99.89	99.88	99.06	99.11	99.73	99.61	99.17
Cs	0.79	0.79	0.84	0.85	1.22	0.79	0.86	0.98
Pr	1.90	1.92	2.04	1.93	2.24	1.84	1.88	2.09
Nd	9.12	9.00	9.86	9.44	10.71	8.71	9.24	9.86
Sm	2.74	2.81	2.91	2.81	3.05	2.75	2.83	2.91
Eu	0.98	0.98	1.02	1.00	1.07	0.99	1.00	1.02
Gd	2.99	2.84	3.18	3.06	3.12	2.89	2.98	3.08
Tb	0.50	0.49	0.54	0.51	0.54	0.49	0.51	0.53
Dy	3.13	3.10	3.48	3.20	3.46	3.09	3.22	3.36
Ho	0.66	0.66	0.71	0.68	0.73	0.63	0.66	0.69
Er	1.79	1.81	1.97	1.84	1.90	1.69	1.77	1.85
Tm	0.25	0.26	0.28	0.26	0.28	0.25	0.25	0.28
Yb	1.55	1.57	1.79	1.63	1.80	1.55	1.62	1.70
Lu	0.25	0.25	0.29	0.26	0.29	0.25	0.25	0.26
Hf	1.78	1.83	1.90	1.87	2.28	1.79	1.85	2.00
Nb	1.60	1.61	1.80	1.62	2.09	1.52	1.59	1.72
Ta	0.13	0.12	0.13	0.12	0.15	0.11	0.12	0.13
Pb	3.97	4.13	6.30	5.00	3.00	4.00	6.00	5.00
Th	1.12	1.13	1.19	1.19	1.66	1.07	1.13	1.29
U	0.53	0.55	0.55	0.57	0.78	0.53	0.55	0.65
Ga	19	18	20	19	19	17	19	20
V	285	287	303	281	261	290	285	289
Sc	39	38	37	39	29	36	36	34
Ba	238	217	271	230	311	218	234	266
Cr	45	47	41	49	37	52	39	36
Cu	23	30	27	21	20	20	24	24
Ni	5	6	4	7	3	2	n.d.	1
Rb	15	15	15	14	23	14	14	16
Sr	381	363	364	370	363	383	387	374
Zn	70	71	68	69	68	68	69	75
Zr	71	73	80	74	88	74	75	81
Y	17	17	19	17	18	16	17	19
La	6	7	7	6	16	11	2	15
Ce	18	14	15	2	21	19	11	18

APPENDIX B2

Whole-rock compositions: Captain's Bay Pluton and Unalaska Fm. Volcanics

Whole-rock major- and trace-element compositions for samples from the Captain's Bay pluton and Unalaska Formation volcanics were determined at Franklin and Marshall College (Lancaster, PA). Major elements and some trace elements (Rb, Sr, Ni, Nb, Ga, Cu, Zn, U, and Th) were determined by X-ray fluorescence using a Phillips PW2400 spectrometer. Other trace elements (Ba, Y, Zr, Cr, Be, Co, Sc, Ce, and Yb) were determined using a Thermo Jarrel Ash Corp. inductively coupled atomic plasma spectrometer (ICP). Repetitive analyses of standards suggest that errors for SiO_2 and MgO are ±1%; all other elements were ±2% except Na_2O, which was ±5%. Analyses of standards suggest that accuracy is between ±5% and ±10% for most trace element analyses. Major elements have been normalized to 100% anhydrous and are reported in weight percent (wt.%), with total Fe reported as Fe_2O_3. Trace elements are reported in parts per million (ppm). Abbreviations as follows: Captain's Bay pluton - **MH** or **CB**; Unalaska Formation - **UN**; **n.d.** - not detected.

Sample	MH-1A	MH-1B	MH-2-E	MH-2-G	MH-3B	MH-4B	MH-5B	MH-6A
Rock type	enclave	pluton	enclave	pluton	pluton	dike	dike	pluton
SiO_2	57.93	60.46	58.07	61.09	55.23	62.19	55.26	52.51
TiO_2	0.76	0.81	0.78	0.75	1.01	1.02	1.00	0.82
Al_2O_3	18.18	16.02	17.44	16.49	17.87	16.57	17.99	19.06
Fe_2O_3*	6.78	6.51	6.84	5.98	7.79	5.97	8.56	8.91
MnO	0.12	0.12	0.11	0.10	0.15	0.07	0.17	0.16
MgO	3.58	3.87	4.07	3.44	4.42	1.73	3.99	5.41
CaO	6.58	6.22	7.29	6.05	8.01	3.65	7.66	8.44
Na_2O	4.22	3.63	4.13	3.84	4.04	4.41	3.42	3.46
K_2O	1.70	2.22	1.12	2.09	1.29	4.10	1.76	1.01
P_2O_5	0.16	0.16	0.15	0.16	0.21	0.27	0.19	0.23
Orig. Total	99.25	99.26	98.97	98.85	99.36	98.59	96.10	99.49
Ba	372	475	310	462	365	767	353	399
Rb	31	39	16	32	20	79	32	16
Sr	462	405	434	405	514	415	462	547
Pb	4	5	5	5	7	13	8	7
Th	6	7	7	8	8	9	6	6
U	3	4	3	4	3	3	2	2
Zr	111	176	134	176	96	339	138	121
Nb	9	8	7	8	8	14	7	7
Y	17	21	19	21	20	34	24	18
V	138	154	182	160	235	111	210	136
Cr	3	50	34	88	43	2	6	48
Ni	17	28	30	29	32	12	21	43
Zn	47	41	41	45	87	48	61	78
Ga	21	20	21	20	22	21	21	23
Ce	27	36	28	33	23	47	25	31
La	12	17	12	11	13	21	10	13
Co	17	16	18	16	22	11	22	30
Cu	68	51	65	45	120	9	88	117
Sc	18	19	23	20	27	16	19	19

Sample	MH-6B	MH-7	MH-8A-E1	MH-8A-E2	MH-8B	MH-8C	MH-8D-I	MH-8D-M
Rock type	dike	dike	enclave	enclave	pluton	enclave	enclave	enclave
SiO_2	54.97	65.00	63.89	62.75	66.89	58.79	56.84	57.02
TiO_2	1.12	0.78	0.52	0.53	0.49	0.65	0.81	0.81
Al_2O_3	18.01	16.53	15.04	15.11	15.52	15.69	17.17	17.22
Fe_2O_3*	8.40	4.09	5.72	6.04	4.20	7.50	7.06	7.92
MnO	0.13	0.08	0.13	0.13	0.08	0.12	0.17	0.17
MgO	3.78	1.41	3.06	4.10	1.76	5.46	4.46	4.49
CaO	7.00	3.19	3.80	4.88	4.15	6.19	7.97	7.83
Na_2O	3.74	4.19	4.53	4.56	3.70	4.25	3.90	3.81
K_2O	2.42	3.96	2.30	2.10	3.11	1.21	0.56	0.60
P_2O_5	0.45	0.20	0.10	0.10	0.11	0.13	0.16	0.16
Orig. Total	98.83	98.09	98.37	98.50	99.38	98.34	98.85	98.74
Ba	529	753	467	432	603	324	277	255
Rb	38	61	51	45	64	29	5	4
Sr	588	481	310	328	324	395	483	480
Pb	11	21	8	7	10	8	6	5
Th	7	10	10	9	10	8	6	6
U	2	4	4	3	4	3	2	2
Zr	154	343	128	143	177	133	101	96
Nb	9	14	6	6	7	6	5	6
Y	29	31	22	21	23	23	21	21
V	234	88	121	121	88	170	184	190
Cr	16	3	157	163	8	208	56	54
Ni	30	6	45	50	9	54	25	26
Zn	68	74	61	51	42	94	82	79
Ga	24	21	18	18	19	21	21	22
Ce	35	39	49	32	35	30	27	29
La	16	14	19	16	18	13	10	11
Co	24	9	16	18	10	21	20	21
Cu	166	11	27	18	44	42	31	55
Sc	23	10	18	18	14	24	23	22

Sample	MH-8D-O	MH-8E	MH-8F	MH-8G	MH-9	MH-10	MH-11	MH-12A
Rock type	enclave	enclave	enclave	enclave	dike	dike	pluton	dike
SiO_2	56.33	56.21	55.75	56.49	55.26	71.21	60.12	56.06
TiO_2	0.80	0.88	0.78	0.81	0.90	0.42	0.78	0.77
Al_2O_3	17.13	18.19	17.87	17.99	16.16	14.35	17.14	17.21
Fe_2O_3*	7.88	7.76	7.94	7.68	8.18	2.73	6.26	7.62
MnO	0.17	0.18	0.20	0.16	0.15	0.03	0.04	0.11
MgO	4.58	3.62	4.41	4.09	5.96	1.09	3.67	4.50
CaO	8.12	7.34	7.80	7.77	6.41	1.93	6.38	5.98
Na_2O	4.27	4.66	4.19	4.12	3.61	3.50	3.82	4.60
K_2O	0.57	0.97	0.84	0.75	3.08	4.67	1.61	3.01
P_2O_5	0.16	0.19	0.13	0.14	0.28	0.08	0.19	0.15
Orig. Total	98.98	99.17	98.93	99.67	97.40	99.20	98.73	99.32
Ba	249	269	228	312	623	598	383	244
Rb	4	16	14	15	64	103	26	64
Sr	464	458	463	530	721	209	451	505
Pb	5	12	8	7	6	9	2	5
Th	7	8	6	6	5	14	8	6
U	2	4	3	2	2	7	2	2
Zr	96	94	106	85	185	205	167	120
Nb	6	7	6	5	5	9	8	6
Y	21	21	20	18	22	22	21	16
V	191	164	200	180	259	68	167	191
Cr	54	3	23	7	77	13	55	56
Ni	26	16	25	22	45	9	33	27
Zn	73	90	80	68	70	31	19	39
Ga	22	24	22	23	20	17	21	20
Ce	25	38	27	23	52	44	31	21
La	11	16	10	13	21	17	12	10
Co	20	18	21	19	29	6	15	22
Cu	67	41	244	103	98	148	48	44
Sc	23	18	21	19	25	9	19	22

Sample	MH-12B	MH-13	MH-14A	MH-14B	MH-14C	99CB5	99CB6	99CB7A
Rock type	dike	dike	dike	pluton	pluton	pluton	pluton	pluton
SiO_2	60.38	50.97	49.09	57.23	59.69	52.10	60.20	59.24
TiO_2	0.81	0.78	0.87	0.94	1.13	0.91	0.98	0.83
Al_2O_3	16.69	14.71	21.58	16.73	16.60	17.26	16.54	16.92
Fe_2O_3*	6.81	10.08	8.53	6.98	6.85	9.27	6.60	6.71
MnO	0.11	0.32	0.17	0.13	0.12	0.18	0.13	0.12
MgO	3.53	10.87	4.29	4.36	2.74	6.49	3.67	3.96
CaO	5.98	8.70	11.82	7.42	5.29	9.77	6.03	6.49
Na_2O	3.54	1.89	2.72	3.81	3.97	3.22	4.11	4.11
K_2O	2.01	1.62	0.81	2.22	3.35	0.68	1.58	1.41
P_2O_5	0.17	0.11	0.11	0.17	0.25	0.11	0.26	0.26
Orig. Total	98.64	96.89	94.89	99.51	98.65	99.99	99.00	101.82
Ba	502	427	198	478	757	211	350	386
Rb	23	23	8	52	60	12	32	30
Sr	488	268	458	373	391	533	406	433
Pb	5	3	5	14	17	6	12	8
Th	7	4	5	6	8	6	8	9
U	3	2	1	3	3	1	4	3
Zr	165	76	70	125	367	68	261	156
Nb	7	5	4	8	12	5	8	7
Y	21	15	16	26	30	18	26	23
V	170	252	282	205	155	224	177	184
Cr	28	760	5	81	17	130	69	81
Ni	23	246	19	40	20	63	36	43
Zn	35	130	63	95	91	78	67	58
Ga	21	18	21	22	22	22	22	21
Ce	31	9	16	34	48	18	38	35
La	14	1	7	16	21	10	17	14
Co	20	43	24	20	15	28	18	17
Cu	164	9	71	181	145	149	104	166
Sc	20	31	28	24	17	32	21	23

Sample	99CB7B	99CB8	99CB10A	99CB10B	99CB11	99UN5	99UN37	99UN9
Rock type	dike	pluton	dike	dike	dike	lava	lava	lava
SiO_2	53.00	61.08	52.48	58.83	51.65	52.71	56.14	60.25
TiO_2	0.80	0.79	0.97	0.60	1.09	0.78	0.73	0.53
Al_2O_3	15.78	16.44	19.43	17.60	17.89	18.60	18.54	17.35
Fe_2O_3*	8.73	6.31	9.22	6.44	9.66	8.30	8.06	6.53
MnO	0.12	0.11	0.14	0.14	0.17	0.17	0.13	0.10
MgO	8.37	3.20	4.25	3.77	5.59	8.32	4.17	3.43
CaO	7.60	5.67	7.81	5.77	9.16	10.47	7.94	5.77
Na_2O	4.08	4.02	4.00	3.77	3.26	2.57	2.44	3.56
K_2O	1.36	2.22	1.46	2.99	1.33	0.93	1.68	2.34
P_2O_5	0.14	0.16	0.23	0.09	0.21	0.14	0.17	0.14
Orig. Total	101.14	101.74	99.06	100.10	96.73	100.43	100.67	100.57
Ba	183	447	362	604	312	268	510	560
Rb	28	40	22	55	20	10	32	40
Sr	344	414	928	879	742	394	570	807
Pb	4	9	3	9	5	6	8	12
Th	6	8	6	7	5	4	8	7
U	3	3	1	3	2	2	3	3
Zr	100	186	116	187	116	92	140	118
Nb	5	7	5	8	6	6	6	5
Y	18	24	19	28	22	19	18	15
V	236	145	241	133	286	223	193	124
Cr	342	28	17	19	47	100	28	98
Ni	132	23	8	20	42	44	24	43
Zn	77	62	77	64	78	89	88	61
Ga	19	21	28	20	22	20	22	20
Ce	20	34	29	29	29	17	31	29
La	9	13	16	14	12	8	12	10
Co	38	18	26	16	32	27	24	18
Cu	19	78	73	62	138	99	106	109
Sc	28	19	18	20	24	28	18	14

Sample	99UN13D	99UN2	99UN23B	99UN27E	99UN32	99UN33A	99UN33B	99UN33D
Rock type	dike	dike	dike	dike	dike	dike	dike	dike
SiO_2	50.36	52.17	50.70	48.10	53.82	51.36	52.79	53.80
TiO_2	0.75	0.81	1.17	0.81	1.09	1.52	0.87	0.98
Al_2O_3	16.13	20.41	20.58	19.44	17.46	17.56	18.24	16.83
Fe_2O_3*	7.09	8.03	10.50	10.69	10.11	10.62	9.30	9.51
MnO	0.17	0.14	0.19	0.19	0.21	0.26	0.17	0.18
MgO	8.32	4.33	4.64	6.59	3.93	3.39	5.08	4.19
CaO	7.06	10.81	7.87	10.80	7.09	9.26	7.70	8.69
Na_2O	2.56	2.74	4.06	2.28	3.66	2.18	2.63	3.51
K_2O	1.42	0.41	0.41	0.96	2.44	3.48	3.06	2.14
P_2O_5	0.14	0.14	0.24	0.13	0.21	0.38	0.15	0.17
Orig. Total	100.47	100.63	100.16	100.62	99.90	100.34	99.80	100.44
Ba	728	168	250	236	403	416	427	413
Rb	17	5	2	12	39	72	48	38
Sr	442	477	552	443	512	234	405	476
Pb	6	4	6	4	5	6	8	7
Th	7	5	4	3	5	5	4	5
U	3	2	2	1	2	2	2	2
Zr	154	87	107	66	104	168	90	132
Nb	7	5	7	4	5	8	4	6
Y	20	18	24	16	25	36	23	25
V	162	239	182	258	262	257	261	243
Cr	179	35	n.d.	38	n.d.	n.d.	48	43
Ni	64	23	5	30	8	1	28	14
Zn	109	77	100	85	90	118	95	92
Ga	18	21	27	21	21	23	19	20
Ce	26	18	23	16	22	23	17	24
La	11	5	11	5	9	13	8	12
Co	22	22	25	36	24	20	26	23
Cu	38	101	70	94	111	47	121	115
Sc	22	27	21	24	27	32	28	23

Sample	99U N33J	99U N18A	99U N18F	99U N18G	99U N19	99U N34
Rock type	dike	tuff	welded tuff	welded tuff	tuff	welded tuff
SiO_2	52.92	65.20	66.50	65.60	66.02	66.65
TiO_2	1.14	0.51	0.55	0.54	0.61	0.54
Al_2O_3	18.57	17.66	16.23	16.53	17.30	15.77
Fe_2O_3*	9.57	4.73	4.33	4.40	4.79	4.17
MnO	0.19	0.10	0.12	0.14	0.11	0.14
MgO	3.71	1.77	1.00	1.16	1.07	0.96
CaO	8.78	4.43	3.34	3.46	2.35	3.21
Na_2O	3.49	2.84	4.92	5.18	5.16	5.62
K_2O	1.42	2.64	2.91	2.87	2.45	2.82
P_2O_5	0.21	0.10	0.16	0.12	0.13	0.11
Orig. Total	100.29	101.56	100.11	100.73	100.24	101.09
Ba	330	751	632	712	610	610
Rb	21	62	56	55	49	54
Sr	477	297	239	326	305	234
Pb	6	12	12	10	13	15
Th	5	8	8	8	9	8
U	2	3	4	3	4	4
Zr	114	210	242	211	218	234
Nb	6	7	9	8	8	8
Y	25	26	31	33	30	31
V	247	75	75	76	71	75
Cr	5	3	13	8	11	7
Ni	11	2	2	2	4	3
Zn	100	60	59	66	95	64
Ga	20	20	19	18	21	19
Ce	22	27	36	35	38	39
La	6	11	16	15	18	17
Co	24	7	8	8	8	8
Cu	104	55	40	61	72	49
Sc	26	12	13	13	12	13

APPENDIX C1

Plagioclase analyses: Mt. Dutton volcano, Alaska

Plagioclase analyses were obtained using a Cameca SX-50 electron microprobe at the University of Alaska Fairbanks, under the following analytical conditions: an accelerating voltage of 15 KeV, beam current of 10 nA, and a focused beam with a spot size of 1-3 μm. In addition, a self-calibrating volatile acquisition method was used to correct for the possible degradation of volatile element x-ray intensity (particularly Na) over time, following the methods of Devine et al. (1995). Major oxides are reported in weight percent (wt.%) with total Fe reported as FeO. "Line number" refers to the analysis number during a particular analytical transect. "Rock type" refers to the host rock, which contained the plagioclase that was analyzed. Abbreviations as follows: **An** anorthite content (mol.%); **Ab** albite content (mol.%); **Or** orthoclase content (mol.%). Standards, counting times, and analytical errors are summarized in the table below:

Element	Counting Times (seconds)		Standard	Typical Analytical Error (wt.%, 1σ)
	Peak	Bkgd.		
Si	10	5	Tiburon albite (TALBITE)	.266
Al	10	5	Tiburon albite (TALBITE)	.296
Ca	10	5	Anorthite (USNM 137041)	.269
Na	30	5	Tiburon albite (TALBITE)	.114
K	10	5	Orthoclase (CM Taylor)	.034
Fe	30	5	Orthoclase (CM Taylor)	.015

Sample	DC-8B	DC-8B	DC-8B	DC-8B	DC-8B	DC-8B	DC-8B	DC-8B
Rock Type	andesite	andesite	andesite	andesite	andesite	andesite	andesite	andesite
Line Number	1	2	3	4	5	6	1	2
SiO_2	49.70	47.57	56.57	57.29	55.57	57.29	52.30	49.49
Al_2O_3	31.68	33.10	27.60	27.96	29.02	27.27	30.30	32.59
CaO	14.32	15.70	9.57	9.03	10.49	9.15	12.82	15.20
Na_2O	3.11	2.40	6.32	6.43	5.59	6.16	4.32	2.96
K_2O	0.08	0.10	0.38	0.28	0.24	0.26	0.12	0.05
FeO	0.80	0.57	0.34	0.41	0.48	0.40	0.75	0.69
Total	99.60	99.43	100.78	101.41	101.38	100.52	100.60	100.98
An	71.4	77.9	44.6	43.0	50.3	44.4	61.7	73.7
Ab	28.1	21.5	53.3	55.4	48.4	54.1	37.6	26.0
Or	0.5	0.6	2.1	1.6	1.3	1.5	0.7	0.3

Sample	DC-8B	DC-8B	DC-8B	DC-8B	DC-8B	DC-8B	DC-8B	DC-8B
Rock Type	andesite	andesite	andesite	andesite	andesite	andesite	andesite	andesite
Line Number	3	4	5	6	7	1	2	3
SiO_2	47.46	55.51	56.02	51.62	54.81	44.76	44.93	44.83
Al_2O_3	33.67	28.51	27.83	30.85	28.81	35.42	35.98	35.91
CaO	16.70	10.49	9.69	12.83	10.78	18.51	18.76	18.58
Na_2O	2.10	5.43	5.88	4.40	5.38	1.05	0.92	0.93
K_2O	0.03	0.21	0.22	0.10	0.22	0.01	0.03	0.01
FeO	0.64	0.36	0.24	0.44	0.35	0.47	0.65	0.55
Total	100.59	100.51	99.88	100.23	100.35	100.23	101.26	100.81
An	81.3	51.0	47.0	61.4	51.8	90.6	91.6	91.6
Ab	18.5	47.8	51.7	38.1	47.0	9.3	8.2	8.3
Or	0.2	1.2	1.3	0.6	1.2	0.1	0.2	0.1

Sample	DC-8B	DC-8B	DC-8B	DC-8B	DC-8B	DC-8B	DC-8B	DC-8B
Rock Type	andesite	andesite	andesite	andesite	andesite	andesite	andesite	andesite
Line Number	4	5	1	2	1	2	3	1
SiO_2	44.49	44.45	46.23	47.02	50.77	50.31	48.33	54.95
Al_2O_3	35.69	36.16	34.30	34.06	31.41	31.48	32.32	28.88
CaO	18.51	18.67	17.00	16.75	13.90	14.09	15.04	10.72
Na_2O	0.96	0.92	1.79	1.91	3.51	3.98	3.19	5.43
K_2O	0.00	0.04	0.03	0.05	0.09	0.06	0.10	0.21
FeO	0.53	0.57	0.59	0.57	0.72	0.53	0.53	0.36
Total	100.18	100.81	99.94	100.35	100.40	100.45	99.50	100.55
An	91.4	91.6	83.8	82.6	68.3	65.9	71.8	51.6
Ab	8.6	8.2	16.0	17.1	31.2	33.7	27.6	47.2
Or	0.0	0.2	0.2	0.3	0.5	0.4	0.6	1.2

Sample	DC-8B	DC-8B	DC-8B	DC-8B	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1
Rock Type	andesite	andesite	andesite	andesite	dacite	dacite	dacite	dacite
Line Number	2	3	4	5	1	1	2	3
SiO_2	54.97	56.43	55.56	56.56	53.33	55.91	55.39	55.24
Al_2O_3	28.75	29.29	28.83	27.71	30.55	28.43	28.77	29.08
CaO	10.55	9.60	10.33	9.49	12.39	10.26	10.36	10.72
Na_2O	5.58	5.42	5.60	5.99	4.58	5.82	5.64	5.37
K_2O	0.17	0.21	0.16	0.25	0.12	0.23	0.16	0.15
FeO	0.38	0.26	0.41	0.38	0.58	0.28	0.41	0.29
Total	100.41	101.21	100.88	100.37	101.54	100.92	100.72	100.84
An	50.5	48.9	50.0	46.0	59.5	48.7	49.9	52.0
Ab	48.5	49.8	49.1	52.6	39.8	50.0	49.1	47.2
Or	1.0	1.3	0.9	1.4	0.7	1.3	0.9	0.8

Sample	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	1	2	3	4	5	1	2	1
SiO_2	54.25	58.00	53.30	56.52	52.92	54.13	44.34	54.26
Al_2O_3	29.31	27.31	30.62	28.27	30.38	30.48	34.26	29.50
CaO	11.57	8.75	12.18	10.28	12.69	11.92	17.97	11.72
Na_2O	5.12	6.47	4.61	5.80	4.50	4.77	1.68	5.03
K_2O	0.13	0.27	0.14	0.21	0.13	0.12	0.04	0.13
FeO	0.56	0.38	0.48	0.37	0.60	0.40	0.61	0.55
Total	100.95	101.17	101.33	101.44	101.22	101.81	98.90	101.29
An	55.1	42.1	58.8	48.9	60.5	57.6	85.3	55.9
Ab	44.1	56.4	40.4	49.9	38.8	41.7	14.5	43.3
Or	0.8	1.5	0.8	1.2	0.7	0.7	0.2	0.8

Sample	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	2	3	1	2	3	4	1	2
SiO_2	56.64	53.22	51.81	48.05	50.92	56.50	52.93	54.07
Al_2O_3	27.84	29.91	31.19	33.49	31.50	28.14	30.26	29.38
CaO	9.65	11.77	13.14	16.04	13.96	10.03	12.23	11.27
Na_2O	6.01	4.71	4.06	2.34	3.84	5.92	4.75	5.19
K_2O	0.24	0.13	0.10	0.05	0.13	0.16	0.15	0.17
FeO	0.47	0.36	0.41	0.44	0.39	0.42	0.72	0.41
Total	100.84	100.10	100.70	100.41	100.73	101.17	101.05	100.48
An	46.3	57.6	63.8	78.9	66.2	47.9	58.2	54.0
Ab	52.3	41.7	35.7	20.8	33.0	51.2	40.9	45.0
Or	1.4	0.7	0.5	0.3	0.8	0.9	0.9	1.0

Sample	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	3	4	5	1	2	3	4	5
SiO_2	57.50	56.31	55.78	57.42	55.94	57.00	56.77	55.44
Al_2O_3	27.36	27.44	28.47	27.55	28.43	27.89	27.71	28.42
CaO	9.17	9.17	10.30	9.51	10.32	9.36	9.72	10.10
Na_2O	6.39	5.92	5.76	6.14	5.64	6.18	6.11	5.84
K_2O	0.24	0.27	0.23	0.22	0.17	0.18	0.22	0.27
FeO	0.42	0.45	0.36	0.40	0.42	0.32	0.34	0.57
Total	101.07	99.56	100.89	101.24	100.92	100.92	100.87	100.64
An	43.7	45.3	49.1	45.6	49.8	45.1	46.2	48.1
Ab	54.9	53.0	49.7	53.2	49.2	53.9	52.6	50.3
Or	1.4	1.6	1.3	1.2	0.9	1.0	1.2	1.6

Sample	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	1	2	1	2	3	1	2	3
SiO_2	55.05	50.59	55.68	55.98	56.70	50.54	56.05	57.20
Al_2O_3	28.94	31.63	28.75	28.39	27.56	31.85	28.48	27.76
CaO	10.71	14.16	10.39	9.88	9.31	14.32	10.04	9.02
Na_2O	5.37	3.60	5.56	5.90	6.23	3.50	6.01	6.15
K_2O	0.17	0.07	0.21	0.20	0.20	0.10	0.21	0.21
FeO	0.49	0.69	0.42	0.39	0.37	0.69	0.47	0.32
Total	100.73	100.75	101.01	100.74	100.37	100.99	101.26	100.65
An	51.9	68.2	50.2	47.5	44.6	68.9	47.4	44.3
Ab	47.1	31.4	48.6	51.3	54.2	30.5	51.4	54.5
Or	1.0	0.4	1.2	1.2	1.2	0.6	1.2	1.2

Sample	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	4	5	1	2	1	2	3	1
SiO_2	54.77	56.59	54.88	51.14	55.73	57.12	54.92	54.62
Al_2O_3	29.19	28.07	28.92	31.45	28.42	27.53	29.09	28.76
CaO	11.02	9.78	10.79	13.84	10.28	9.23	10.85	11.07
Na_2O	5.21	5.83	5.58	3.71	5.72	6.24	5.48	5.32
K_2O	0.18	0.24	0.16	0.05	0.22	0.22	0.18	0.20
FeO	0.38	0.30	0.64	0.61	0.43	0.39	0.28	0.59
Total	100.75	100.81	100.96	100.81	100.79	100.73	100.78	100.54
An	53.4	47.4	51.2	67.1	49.2	44.5	51.7	52.9
Ab	45.6	51.2	47.9	32.6	49.6	54.3	47.3	46.0
Or	1.0	1.4	0.9	0.3	1.2	1.2	1.0	1.1

Sample	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	2	3	1	2	3	4	1	2
SiO_2	53.56	50.14	56.12	54.13	56.45	56.96	55.43	52.31
Al_2O_3	29.97	31.72	28.42	29.66	28.04	27.86	28.42	30.66
CaO	12.02	14.39	10.19	11.36	9.58	9.53	10.63	13.04
Na_2O	4.61	3.41	5.98	5.22	5.91	6.19	5.55	4.40
K_2O	0.12	0.08	0.18	0.13	0.26	0.25	0.18	0.10
FeO	0.68	0.81	0.39	0.37	0.47	0.45	0.48	0.58
Total	100.95	100.54	101.28	100.88	100.71	101.23	100.69	101.09
An	58.6	69.7	48.0	54.2	46.6	45.4	50.9	61.7
Ab	40.7	29.8	51.0	45.0	51.9	53.2	48.1	37.7
Or	0.7	0.5	1.0	0.8	1.5	1.4	1.0	0.6

Sample	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	1	2	3	4	5	6	1	2
SiO_2	57.20	55.11	54.08	57.14	57.56	56.87	55.65	52.59
Al_2O_3	27.14	28.79	28.97	27.86	27.52	28.66	28.82	30.55
CaO	8.81	10.45	11.13	9.36	9.04	9.68	10.36	12.97
Na_2O	6.49	5.51	5.48	6.07	6.14	5.95	5.74	4.25
K_2O	0.27	0.19	0.16	0.19	0.23	0.23	0.17	0.11
FeO	0.39	0.38	0.36	0.32	0.30	0.28	0.62	0.76
Total	100.29	100.43	100.19	100.93	100.79	101.67	101.36	101.17
An	42.2	50.7	52.4	45.5	44.3	46.7	49.4	62.3
Ab	56.3	48.2	46.7	53.4	54.4	52.0	49.5	37.1
Or	1.5	1.1	0.9	1.1	1.3	1.3	1.0	0.6

Sample	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	1	2	3	1	2	3	1	2
SiO_2	55.52	54.93	56.27	54.35	50.45	48.03	49.57	47.80
Al_2O_3	28.86	28.72	28.06	28.96	31.71	33.37	32.52	33.20
CaO	10.70	10.76	9.72	10.93	14.16	15.99	15.01	16.01
Na_2O	5.39	5.36	5.80	5.62	3.63	2.39	3.14	2.45
K_2O	0.21	0.19	0.24	0.16	0.09	0.03	0.07	0.07
FeO	0.30	0.44	0.35	0.52	0.54	0.63	0.63	0.64
Total	100.98	100.39	100.44	100.54	100.57	100.43	100.93	100.17
An	51.7	52.0	47.4	51.4	68.0	78.7	72.2	78.1
Ab	47.1	46.9	51.3	47.8	31.5	21.2	27.4	21.5
Or	1.2	1.1	1.3	0.9	0.5	0.1	0.4	0.4

Sample	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	1	2	1	2	1	2	3	4
SiO_2	46.56	46.39	55.63	52.63	55.07	57.36	54.37	55.98
Al_2O_3	34.77	35.05	28.68	30.51	29.13	27.17	29.70	28.08
CaO	17.11	17.08	10.46	12.78	10.82	9.03	11.26	9.96
Na_2O	1.74	1.86	5.59	4.21	5.40	6.21	5.04	5.86
K_2O	0.03	0.03	0.19	0.09	0.19	0.28	0.18	0.24
FeO	0.34	0.33	0.68	0.54	0.35	0.40	0.32	0.47
Total	100.54	100.73	101.22	100.76	100.96	100.45	100.86	100.59
An	84.3	83.4	50.3	62.3	52.0	43.9	54.7	47.8
Ab	15.5	16.4	48.6	37.2	46.9	54.5	44.3	50.8
Or	0.2	0.2	1.1	0.5	1.1	1.6	1.0	1.4

Sample	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	5	6	1	2	1	2	3	4
SiO_2	56.10	55.58	54.20	51.79	57.43	57.10	56.03	55.91
Al_2O_3	28.49	28.36	29.58	31.21	27.36	27.76	28.32	28.15
CaO	9.87	10.45	11.67	13.44	8.66	9.26	10.30	10.11
Na_2O	5.88	5.46	5.12	3.97	6.35	6.20	5.63	5.76
K_2O	0.20	0.22	0.16	0.10	0.27	0.21	0.19	0.22
FeO	0.37	0.29	0.51	0.54	0.33	0.37	0.24	0.25
Total	100.91	100.36	101.24	101.05	100.41	100.90	100.71	100.40
An	47.6	50.8	55.2	64.7	42.2	44.7	49.7	48.6
Ab	51.2	48.0	43.9	34.7	56.1	54.1	49.2	50.1
Or	1.2	1.2	0.9	0.6	1.6	1.2	1.1	1.3

Sample	DC-2D-2	DC-2D-2	DC-2D-2	DC-2D-2	DC-2D-2	DC-2D-2	DC-2D-2	DC-2D-2
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	1	2	3	4	1	2	3	4
SiO_2	54.80	56.27	54.66	55.25	53.59	56.77	57.72	56.82
Al_2O_3	29.37	28.16	28.92	28.50	29.83	27.91	27.16	27.70
CaO	11.09	9.95	11.06	10.56	11.92	9.35	8.74	9.37
Na_2O	5.16	5.80	5.32	5.65	4.59	6.14	6.37	6.10
K_2O	0.14	0.18	0.17	0.16	0.14	0.25	0.29	0.23
FeO	0.46	0.39	0.40	0.53	0.58	0.27	0.29	0.33
Total	101.03	100.74	100.53	100.64	100.64	100.69	100.56	100.57
An	53.9	48.2	52.9	50.3	58.5	45.1	42.4	45.3
Ab	45.3	50.8	46.1	48.8	40.7	53.5	56.0	53.4
Or	0.8	1.0	1.0	0.9	0.8	1.4	1.6	1.3

Sample	DC-2D-2	DC-2D-2	DC-2D-2	DC-2D-2	DC-2D-2	DC-2D-2	DC-2D-2	DC-2D-2
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	5	1	2	1	2	3	1	2
SiO_2	56.04	55.54	52.12	55.61	55.74	55.79	55.49	53.23
Al_2O_3	28.60	28.31	31.17	29.04	28.54	28.46	28.34	29.88
CaO	10.00	10.40	13.24	10.36	10.09	10.27	10.47	12.11
Na_2O	5.59	5.77	3.96	5.46	5.79	5.57	5.60	4.71
K_2O	0.20	0.18	0.11	0.21	0.21	0.20	0.15	0.10
FeO	0.25	0.47	0.63	0.30	0.30	0.18	0.66	0.77
Total	100.68	100.68	101.24	100.96	100.67	100.48	100.71	100.80
An	49.1	49.4	64.5	50.6	48.5	49.9	50.3	58.3
Ab	49.7	49.6	34.9	48.2	50.3	49.0	48.8	41.1
Or	1.1	1.0	0.6	1.2	1.2	1.1	0.9	0.6

Sample	DC-2D-2	DC-2D-2	DC-2D-2	DC-2D-2	DC-2D-2	DC-2D-2	DC-2D-2	DC-2D-2
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	1	2	3	1	2	1	2	3
SiO_2	57.33	56.47	56.35	54.39	51.15	53.90	50.83	54.74
Al_2O_3	27.97	28.13	28.23	29.37	31.68	29.74	32.17	29.42
CaO	9.33	9.80	10.03	11.24	13.87	11.72	14.09	10.88
Na_2O	6.12	5.98	5.81	4.83	3.63	4.91	3.55	5.40
K_2O	0.19	0.19	0.18	0.14	0.10	0.11	0.10	0.16
FeO	0.39	0.31	0.54	0.53	0.58	0.40	0.33	0.33
Total	101.34	100.88	101.15	100.49	101.02	100.78	101.08	100.93
An	45.3	47.0	48.3	55.8	67.4	56.6	68.3	52.2
Ab	53.6	51.9	50.7	43.4	32.0	42.8	31.1	46.9
Or	1.1	1.1	1.0	0.8	0.6	0.6	0.6	0.9

Sample	DC-4A	DC-4A	DC-4A	DC-4A	DC-4A	DC-4A	DC-4A	DC-4A
Rock Type	enclave	enclave	enclave	enclave	enclave	enclave	enclave	enclave
Line Number	1	2	3	4	1	2	3	1
SiO_2	46.49	47.45	47.39	47.12	50.90	46.71	54.36	52.08
Al_2O_3	33.38	32.72	32.71	33.47	30.94	33.84	28.33	29.91
CaO	15.99	15.90	15.50	16.21	13.12	16.28	10.44	11.87
Na_2O	1.93	2.37	2.33	2.14	3.95	2.10	5.43	4.30
K_2O	0.04	0.02	0.06	0.05	0.09	0.05	0.21	0.12
FeO	0.93	1.02	0.76	0.68	0.47	0.72	0.40	0.72
Total	98.76	99.48	98.75	99.68	99.47	99.70	99.18	98.99
An	81.8	78.7	78.4	80.5	64.4	80.9	50.9	59.9
Ab	17.9	21.2	21.3	19.2	35.1	18.8	47.9	39.3
Or	0.3	0.1	0.3	0.3	0.5	0.3	1.2	0.7

Sample	DC-4A	DC-4A	DC-4A	DC-4A	DC-4A	DC-4A	DC-4A	DC-4A
Rock Type	enclave	enclave	enclave	enclave	enclave	enclave	enclave	enclave
Line Number	2	3	4	2	3	1	2	3
SiO_2	47.18	47.26	47.89	47.70	47.49	46.46	46.57	48.82
Al_2O_3	33.41	33.31	33.33	33.07	33.58	33.67	33.65	32.12
CaO	16.14	16.16	15.72	15.44	15.95	16.22	16.40	14.53
Na_2O	2.33	2.32	2.42	2.44	2.14	2.03	2.01	3.04
K_2O	0.04	0.03	0.05	0.07	0.05	0.05	0.05	0.07
FeO	0.83	0.78	0.71	0.72	0.90	0.71	0.72	0.68
Total	99.93	99.86	100.12	99.43	100.11	99.14	99.41	99.26
An	79.1	79.3	78.0	77.4	80.2	81.2	81.5	72.2
Ab	20.7	20.6	21.7	22.2	19.5	18.5	18.2	27.4
Or	0.2	0.1	0.3	0.4	0.3	0.3	0.3	0.4

Sample	DC-4A	DC-4A	DC-4A	DC-4A	DC-4A	DC-4A	DC-4A	DC-4A
Rock Type	enclave	enclave	enclave	enclave	enclave	enclave	enclave	enclave
Line Number	1	2	3	4	5	1	2	3
SiO_2	51.57	46.73	46.68	46.32	47.53	50.53	47.39	46.72
Al_2O_3	30.95	33.62	33.58	33.29	32.24	31.35	33.13	33.74
CaO	12.78	16.21	16.31	15.73	14.80	13.24	15.64	16.45
Na_2O	4.00	1.92	2.03	2.21	2.68	3.77	2.48	1.96
K_2O	0.10	0.08	0.05	0.02	0.04	0.10	0.05	0.03
FeO	0.67	0.59	0.72	0.70	0.54	0.48	0.67	0.82
Total	100.07	99.15	99.38	98.27	97.83	99.47	99.36	99.71
An	63.5	82.0	81.4	79.7	75.2	65.6	77.6	82.2
Ab	35.9	17.6	18.3	20.2	24.6	33.8	22.1	17.7
Or	0.6	0.4	0.3	0.1	0.2	0.6	0.3	0.1

Sample	DC-4A	DC-4A	DC-4A	DC-4A	DC-4A	DC-4A	DC-4A	DC-4A
Rock Type	enclave	enclave	enclave	enclave	enclave	enclave	enclave	enclave
Line Number	4	2	3	4	1	2	3	4
SiO_2	47.18	51.98	48.90	50.29	57.22	50.03	47.39	47.21
Al_2O_3	33.64	29.78	32.43	31.45	25.85	30.76	32.48	33.05
CaO	16.62	12.18	14.70	13.28	8.06	12.83	15.03	15.63
Na_2O	1.92	4.53	3.07	3.81	6.58	3.70	2.41	2.38
K_2O	0.03	0.16	0.07	0.10	0.24	0.08	0.06	0.05
FeO	0.66	0.44	0.60	0.52	0.53	0.68	0.86	0.59
Total	100.05	99.05	99.77	99.43	98.48	98.08	98.24	98.90
An	82.6	59.3	72.3	65.4	39.8	65.4	77.2	78.1
Ab	17.2	39.8	27.3	34.0	58.8	34.1	22.4	21.6
Or	0.2	0.9	0.4	0.6	1.4	0.5	0.4	0.3

Sample	DC-4A	DC-4A	DC-4A	DC-4A	DC-4A	DC-4A	DC-4A	DC-4A
Rock Type	enclave	enclave	enclave	enclave	enclave	enclave	enclave	enclave
Line Number	5	6	7	8	2	3	4	5
SiO_2	47.92	47.10	47.69	46.39	57.10	46.90	47.16	46.98
Al_2O_3	32.06	32.43	32.21	33.38	26.59	33.60	33.35	33.24
CaO	14.67	15.02	14.92	16.21	8.52	16.33	16.17	16.12
Na_2O	2.77	2.40	2.51	2.01	6.47	2.11	2.22	2.16
K_2O	0.09	0.07	0.08	0.28	0.27	0.05	0.06	0.06
FeO	0.65	0.75	0.62	0.72	0.71	0.63	0.76	0.85
Total	98.16	97.77	98.03	98.99	99.66	99.62	99.72	99.40
An	74.2	77.2	76.4	80.4	41.4	80.8	79.8	80.1
Ab	25.3	22.4	23.2	18.0	57.0	18.9	19.8	19.5
Or	0.5	0.4	0.4	1.6	1.6	0.3	0.4	0.4

Sample	DC-4A	DC-4A	DC-4A	DC-4A	DC-4A	DC-4A	DC-4A	DC-4A
Rock Type	enclave	enclave	enclave	enclave	enclave	enclave	enclave	enclave
Line Number	3	1	2	3	4	1	2	3
SiO_2	55.28	48.94	50.90	47.94	46.76	51.60	47.37	46.97
Al_2O_3	27.35	32.60	31.10	33.16	33.82	30.53	33.16	33.41
CaO	9.38	14.83	13.57	15.71	16.44	12.82	16.10	16.13
Na_2O	5.83	2.91	3.77	2.37	2.07	4.04	2.27	2.15
K_2O	0.18	0.06	0.10	0.06	0.06	0.13	0.04	0.05
FeO	0.38	0.59	0.68	0.97	0.53	0.58	0.87	0.76
Total	98.39	99.93	100.12	100.21	99.67	99.70	99.81	99.47
An	46.6	73.5	66.1	78.3	81.2	63.2	79.4	80.4
Ab	52.4	26.1	33.3	21.4	18.5	36.0	20.3	19.3
Or	1.0	0.4	0.6	0.3	0.3	0.8	0.3	0.3

Sample	DC-4A	DC-4A	DC-4A	DC-21	DC-21	DC-21	DC-21	DC-21
Rock Type	enclave	enclave	enclave	enclave	enclave	enclave	enclave	enclave
Line Number	4	5	6	1	1	8	4	5
SiO_2	46.87	46.80	47.08	59.41	51.26	54.12	57.99	59.81
Al_2O_3	33.54	33.55	33.25	24.82	30.05	31.62	26.18	25.58
CaO	16.56	16.39	16.22	6.45	12.15	12.28	8.01	7.07
Na_2O	2.02	2.05	2.11	7.83	4.12	4.04	7.00	7.39
K_2O	0.05	0.03	0.04	0.43	0.09	0.11	0.33	0.38
FeO	0.73	0.72	0.98	0.55	0.56	0.44	0.37	0.41
Total	99.77	99.53	99.68	99.49	98.23	102.61	99.88	100.64
An	81.6	81.4	80.7	30.5	61.6	62.3	38.0	33.8
Ab	18.1	18.4	19.1	67.1	37.8	37.1	60.1	64.0
Or	0.3	0.2	0.2	2.5	0.6	0.6	1.9	2.1

Sample	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21
Rock Type	enclave	enclave	enclave	enclave	enclave	enclave	enclave	enclave
Line Number	5	1	4	2	3	3	6	2
SiO_2	50.93	57.60	50.87	56.22	50.63	55.43	50.89	54.48
Al_2O_3	30.18	26.88	30.65	27.81	30.58	28.45	30.21	27.93
CaO	12.66	8.51	12.95	9.41	12.84	9.98	12.75	9.79
Na_2O	3.99	6.41	3.81	5.91	3.95	5.62	4.15	5.69
K_2O	0.13	0.22	0.12	0.18	0.09	0.16	0.10	0.17
FeO	0.36	0.52	0.49	0.29	0.57	0.44	0.59	0.50
Total	98.25	100.14	98.89	99.82	98.66	100.07	98.69	98.55
An	63.1	41.8	64.8	46.3	63.9	49.1	62.6	48.2
Ab	36.1	57.0	34.5	52.7	35.6	50.0	36.8	50.8
Or	0.8	1.2	0.7	1.0	0.5	0.9	0.6	1.0

Sample	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21
Rock Type	enclave	enclave	enclave	enclave	enclave	enclave	enclave	enclave
Line Number	3	4	5	2	2	3	7	1
SiO_2	54.37	52.30	50.49	55.05	50.43	52.30	51.34	56.61
Al_2O_3	29.17	29.61	30.38	28.45	30.15	29.01	30.04	27.94
CaO	10.55	11.79	12.56	10.11	12.62	10.48	12.17	9.49
Na_2O	5.34	4.71	3.87	5.66	3.97	4.91	4.28	5.97
K_2O	0.17	0.15	0.13	0.14	0.11	0.14	0.10	0.23
FeO	0.59	0.48	0.66	0.35	0.53	0.41	0.48	0.41
Total	100.18	99.04	98.08	99.76	97.82	97.25	98.41	100.66
An	51.6	57.5	63.7	49.2	63.2	53.7	60.7	46.1
Ab	47.4	41.6	35.5	49.9	36.1	45.5	38.7	52.5
Or	1.0	0.9	0.8	0.8	0.7	0.8	0.6	1.3

Sample	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21
Rock Type	enclave	enclave	enclave	enclave	enclave	enclave	enclave	enclave
Line Number	2	3	4	6	7	8	9	1
SiO_2	51.87	51.60	50.43	50.77	51.41	52.61	54.53	60.58
Al_2O_3	30.10	30.74	30.72	30.34	30.11	29.85	28.24	24.35
CaO	12.02	12.40	12.71	12.62	12.58	11.81	10.12	5.84
Na_2O	4.38	3.77	3.95	4.15	4.16	4.77	5.65	7.73
K_2O	0.14	0.14	0.12	0.10	0.12	0.12	0.15	0.50
FeO	0.38	0.71	0.43	0.46	0.53	0.44	0.55	0.40
Total	98.90	99.37	98.36	98.44	98.91	99.61	99.24	99.38
An	59.8	64.0	63.5	62.3	62.1	57.3	49.3	28.6
Ab	39.4	35.2	35.8	37.1	37.1	42.0	49.8	68.5
Or	0.8	0.8	0.7	0.6	0.7	0.7	0.9	2.9

Sample	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21
Rock Type	enclave	enclave	enclave	enclave	enclave	enclave	enclave	enclave
Line Number	2	3	1	2	3	4	1	2
SiO_2	51.67	52.60	59.37	52.74	52.77	59.48	59.39	51.65
Al_2O_3	30.04	29.73	25.60	29.55	29.70	25.47	25.52	30.75
CaO	12.10	11.94	7.22	11.31	11.75	6.68	6.91	12.62
Na_2O	4.43	4.58	7.18	4.85	4.77	7.34	7.18	4.21
K_2O	0.10	0.11	0.35	0.15	0.14	0.39	0.30	0.07
FeO	0.46	0.74	0.54	0.33	0.43	0.32	0.46	0.54
Total	98.80	99.71	100.26	98.92	99.55	99.68	99.76	99.83
An	59.8	58.6	35.0	55.8	57.2	32.7	34.1	62.1
Ab	39.6	40.7	62.9	43.3	42.0	65.0	64.1	37.5
Or	0.6	0.7	2.0	0.8	0.8	2.2	1.8	0.4

Sample	DC-21	DC-6	DC-6	DC-6	DC-6	DC-6	DC-6	DC-6
Rock Type	enclave	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	3	1	2	3	1	2	3	1
SiO_2	51.89	58.45	62.81	64.65	57.84	63.89	64.80	57.62
Al_2O_3	30.52	27.26	24.01	22.13	26.75	24.26	21.72	26.97
CaO	12.67	8.99	5.45	3.41	9.00	5.07	3.14	8.85
Na_2O	4.29	6.10	7.78	8.34	5.99	7.92	8.32	6.15
K_2O	0.10	-	-	-	-	-	-	-
FeO	0.75	0.44	0.22	0.00	0.45	0.23	0.00	0.38
Total	100.21	101.23	100.28	98.53	100.04	101.39	97.98	99.96
An	61.7	44.9	27.9	31.1	63.3	42.3	29.5	62.2
Ab	37.7	55.1	72.1	68.9	36.7	57.7	70.5	37.8
Or	0.6	-	-	-	-	-	-	-

Sample	DC-6	DC-6	DC-6	DC-6	DC-6	DC-6	DC-6	DC-6
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	2	3	1	2	3	1	2	1
SiO_2	64.02	64.69	58.89	63.94	63.12	58.24	65.62	58.95
Al_2O_3	24.34	21.80	27.06	24.11	20.87	27.19	22.93	26.88
CaO	5.19	3.32	8.65	5.04	3.27	8.70	3.62	8.38
Na_2O	7.81	8.13	6.12	7.84	9.43	5.93	8.52	6.34
K_2O	-	-	-	-	-	-	-	-
FeO	0.26	0.00	0.35	0.27	0.00	0.41	0.00	0.42
Total	101.61	97.94	101.07	101.20	96.69	100.48	100.70	100.97
An	43.3	31.1	61.7	42.6	27.7	62.7	31.9	60.3
Ab	56.7	68.9	38.3	57.4	72.3	37.3	68.1	39.7

Sample	DC-6	DC-6	DC-6	DC-6	DC-6	DC-6	DC-6	DC-6
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	2	3	1	2	3	1	2	3
SiO_2	63.97	64.69	59.49	61.47	64.37	59.26	63.89	66.16
Al_2O_3	23.87	22.19	26.29	22.60	22.57	26.67	23.78	22.77
CaO	5.08	3.54	8.06	4.67	3.63	8.15	4.90	3.71
Na_2O	7.66	8.20	6.39	6.65	8.27	6.32	8.07	8.30
K_2O	-	-	-	-	-	-	-	-
FeO	0.20	0.00	0.46	0.06	0.00	0.46	0.00	0.00
Total	100.77	98.62	100.69	95.44	98.84	100.85	100.64	100.93
An	43.0	32.3	59.3	43.9	32.6	59.8	40.2	33.0
Ab	57.0	67.7	40.7	56.1	67.4	40.2	59.8	67.0

Sample	DC-6	DC-6	DC-6	DC-6	DC-6	DC-6	DC-6	DC-6
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	1	2	3	4	5	6	7	8
SiO_2	62.81	58.45	60.63	59.26	57.84	57.62	59.43	60.72
Al_2O_3	24.01	27.26	25.96	26.67	26.75	26.97	26.14	26.17
CaO	5.45	8.99	7.57	8.15	9.00	8.85	7.80	7.69
Na_2O	7.78	6.10	6.64	6.32	5.99	6.15	6.63	6.87
K_2O	-	-	-	-	-	-	-	-
FeO	0.22	0.44	0.30	0.46	0.45	0.38	0.24	0.30
Total	100.28	101.23	101.11	100.85	100.04	99.96	100.25	101.74
An	27.9	44.9	38.6	41.6	45.4	44.3	39.4	38.2
Ab	72.1	55.1	61.4	58.4	54.6	55.7	60.6	61.8

Sample	DC-6	DC-6	DC-6	DC-6	DC-6	DC-6	DC-6	DC-6
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	1	2	3	4	5	6	1	1
SiO_2	60.82	60.11	58.89	58.24	60.23	63.45	64.54	65.17
Al_2O_3	26.12	25.96	27.06	27.19	26.12	23.92	23.91	23.73
CaO	7.59	7.49	8.65	8.70	7.57	5.27	4.75	4.42
Na_2O	6.76	6.77	6.12	5.93	6.53	7.89	8.37	8.48
K_2O	-	-	-	-	-	-	-	-
FeO	0.46	0.24	0.35	0.41	0.49	0.29	0.00	0.00
Total	101.74	100.56	101.07	100.48	100.95	100.81	101.56	101.80
An	38.3	37.9	43.9	44.8	39.0	27.0	23.9	22.4
Ab	61.7	62.1	56.1	55.2	61.0	73.0	76.1	77.6

Sample	DC-6	DC-6	DC-6	DC-6	DC-6	DC-6	DC-6	DC-6
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	1	1	1	1	1	1	1	1
SiO_2	65.20	65.07	65.05	65.01	66.04	64.97	64.93	64.38
Al_2O_3	23.48	23.55	23.43	23.37	23.77	23.31	23.40	23.84
CaO	4.25	4.33	4.55	4.28	4.55	4.09	4.31	4.65
Na_2O	8.44	8.41	8.31	8.50	8.47	8.73	8.61	8.45
K_2O	-	-	-	-	-	-	-	-
FeO	0.00	0.00	0.00	0.00	0.00	0.35	0.00	0.00
Total	101.37	101.36	101.34	101.15	102.83	101.45	101.25	101.32
An	21.8	22.2	23.2	21.8	22.9	21.6	21.7	23.3
Ab	78.2	77.8	76.8	78.2	77.1	78.4	78.3	76.7

Sample	DC-6	DC-6	DC-6	DC-6	DC-6	DC-6	DC-6	DC-6
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	1	1	1	1	1	1	1	1
SiO_2	64.50	65.08	64.48	65.75	63.42	63.79	64.44	63.34
Al_2O_3	23.45	23.02	23.18	23.12	22.42	22.33	22.14	22.75
CaO	4.57	4.26	4.10	4.09	3.94	3.89	3.61	4.17
Na_2O	8.76	8.91	8.27	8.07	8.25	8.32	8.29	8.16
K_2O	-	-	-	-	-	-	-	-
FeO	0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.00
Total	101.28	101.27	100.02	101.02	98.03	98.33	98.79	98.43
An	22.4	20.9	21.5	21.9	20.9	20.5	19.4	22.0
Ab	77.6	79.1	78.5	78.1	79.1	79.5	80.6	78.0

Sample	DC-6	DC-6	DC-6	DC-6	DC-6	DC-6	DC-6	DC-6
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	1	1	1	1	1	1	1	1
SiO_2	66.08	65.44	65.18	65.80	64.95	65.51	65.31	65.54
Al_2O_3	22.82	23.17	23.41	23.01	22.86	22.98	23.50	22.58
CaO	3.74	3.91	4.03	4.02	4.13	4.19	4.03	3.73
Na_2O	8.30	8.62	8.09	8.22	8.24	8.11	7.94	8.25
K_2O	-	-	-	-	-	-	-	-
FeO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	100.94	101.15	100.71	101.04	100.18	100.79	100.77	100.10
An	20.0	20.0	21.6	21.3	21.7	22.2	20.0	22.0
Ab	80.0	80.0	78.4	78.7	78.3	77.8	80.0	78.0

APPENDIX C2

Plagioclase analyses: Volcán Ceboruco, Mexico

Plagioclase analyses were obtained using a Cameca SX-50 electron microprobe at the University of Alaska Fairbanks or a Cameca Camebax electron microprobe at Brown University, under the following analytical conditions: an accelerating voltage of 15 KeV, beam current of 10 nA, and a focused beam with a spot size of 1-3 μm. In addition, a self-calibrating volatile acquisition method was used to correct for the possible degradation of volatile element x-ray intensity (particularly Na) over time, following the methods of Devine et al. (1995). Major oxides are reported in weight percent (wt.%) with total Fe reported as FeO. "Line number" refers to the analysis number during a particular analytical transect. "Rock type" refers to the host rock, which contained the plagioclase that was analyzed. Abbreviations as follows: **Rd** - rhyodacite; **DE** - Dos Equis; **An** - anorthite content (mol.%); **Ab** - albite content (mol.%); **Or** - orthoclase content (mol.%). Standards, counting times, and analytical errors are summarized in the table below:

Element	Counting Times (seconds)		Standard	Typical Analytical Error (wt.%, 1σ)
	Peak	Bkgd.		
Si	10	5	Tiburon albite (TALBITE)	.258
Al	10	5	Tiburon albite (TALBITE)	.276
Ca	10	5	Anorthite (USNM 137041)	.262
Na	30	5	Tiburon albite (TALBITE)	.149
K	10	5	Orthoclase (CM Taylor)	.030
Fe	30	5	Orthoclase (CM Taylor)	.041

Sample	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	1	2	3	4	5	6	1	1
SiO_2	60.02	61.05	60.12	59.54	59.57	59.87	60.18	59.74
Al_2O_3	26.62	25.39	26.32	26.23	26.89	26.57	26.36	26.26
CaO	7.39	6.56	7.23	7.38	7.64	7.15	7.18	7.29
Na_2O	7.33	7.63	7.37	7.19	7.04	7.20	7.23	6.99
K_2O	0.36	0.42	0.40	0.39	0.32	0.38	0.41	0.35
FeO	0.24	0.35	0.31	0.30	0.37	0.24	0.25	0.21
Total	101.97	101.39	101.75	101.03	101.82	101.41	101.61	100.84
An	35.1	31.5	34.4	35.4	36.8	34.7	34.6	35.8
Ab	62.9	66.2	63.4	62.4	61.4	63.1	63.1	62.1
Or	2.0	2.4	2.3	2.2	1.8	2.2	2.3	2.0

Sample	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	2	1	2	3	4	5	1	2
SiO_2	60.88	60.15	61.14	59.95	59.44	59.93	60.71	58.73
Al_2O_3	25.15	26.33	25.57	26.56	26.55	26.39	26.40	25.55
CaO	6.54	7.37	6.71	7.50	7.39	7.43	7.33	7.06
Na_2O	7.30	7.14	7.65	7.24	7.01	7.45	7.10	7.06
K_2O	0.43	0.33	0.48	0.34	0.37	0.40	0.32	0.36
FeO	0.24	0.07	0.15	0.23	0.26	0.20	0.07	0.28
Total	100.53	101.38	101.69	101.82	100.95	101.86	101.93	99.04
An	32.3	35.7	31.8	35.7	36.0	34.8	35.7	34.8
Ab	65.2	62.5	65.5	62.4	61.8	63.0	62.5	63.1
Or	2.5	1.9	2.7	1.9	2.1	2.2	1.9	2.1

Sample	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	3	1	2	3	1	2	3	1
SiO_2	60.20	55.80	52.86	51.93	52.56	50.84	53.07	49.85
Al_2O_3	26.28	28.88	30.73	30.70	30.42	31.71	30.17	32.73
CaO	7.54	10.46	12.43	12.88	12.72	13.81	13.41	14.99
Na_2O	6.96	5.45	4.12	3.99	4.12	3.36	3.92	3.04
K_2O	0.36	0.25	0.20	0.14	0.18	0.14	0.18	0.08
FeO	0.24	0.36	0.54	0.47	0.49	0.53	0.46	0.44
Total	101.58	101.19	100.88	100.10	100.49	100.40	101.22	101.14
An	36.7	50.8	61.7	63.6	62.4	68.8	64.7	72.8
Ab	61.3	47.8	37.1	35.6	36.6	30.3	34.3	26.7
Or	2.1	1.4	1.2	0.8	1.0	0.8	1.0	0.5

Sample	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	1	2	3	4	5	6	7	1
SiO_2	56.40	52.94	49.06	49.94	49.65	47.84	47.73	54.90
Al_2O_3	28.37	31.29	32.93	33.34	33.09	32.42	34.14	29.61
CaO	9.62	12.85	15.47	15.04	15.46	15.42	16.85	10.94
Na_2O	5.75	4.04	2.83	2.85	2.76	2.47	2.04	5.19
K_2O	0.19	0.10	0.05	0.07	0.09	0.06	0.03	0.12
FeO	0.32	0.54	0.62	0.56	0.54	0.59	0.56	0.30
Total	100.65	101.76	100.95	101.81	101.60	98.80	101.35	101.06
An	47.5	63.4	74.9	74.2	75.2	77.2	81.8	53.4
Ab	51.4	36.0	24.8	25.4	24.3	22.4	18.0	45.9
Or	1.1	0.6	0.3	0.4	0.5	0.4	0.2	0.7

Sample	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	2	1	2	3	1	2	1	2
SiO_2	57.01	53.46	52.40	54.04	59.99	59.90	60.30	60.32
Al_2O_3	28.13	28.43	29.38	29.53	26.05	26.87	26.32	26.43
CaO	9.68	11.09	12.04	11.68	6.96	7.42	6.97	7.00
Na_2O	5.87	5.57	4.04	4.70	7.34	7.05	7.56	7.39
K_2O	0.20	0.31	0.23	0.25	0.39	0.36	0.45	0.40
FeO	0.45	0.88	0.60	0.80	0.42	0.29	0.10	0.23
Total	101.34	99.74	98.69	101.01	101.16	101.89	101.69	101.77
An	47.1	51.5	61.3	57.0	33.6	36.0	32.9	33.6
Ab	51.7	46.8	37.2	41.5	64.1	61.9	64.6	64.1
Or	1.2	1.7	1.4	1.4	2.3	2.1	2.5	2.3

Sample	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	1	2	3	4	5	1	2	3
SiO_2	61.09	59.53	60.26	61.13	60.54	54.19	53.71	53.55
Al_2O_3	25.79	26.99	26.22	25.36	25.84	30.16	29.87	29.40
CaO	6.51	7.48	7.22	6.20	6.74	11.77	11.54	11.31
Na_2O	7.70	7.06	6.98	7.68	7.25	4.81	4.50	4.71
K_2O	0.44	0.32	0.35	0.46	0.37	0.15	0.16	0.15
FeO	0.40	0.26	0.31	0.19	0.31	0.44	0.65	0.65
Total	101.92	101.63	101.36	101.02	101.05	101.53	100.43	99.85
An	31.0	36.3	35.6	30.0	33.2	57.0	58.0	56.5
Ab	66.4	61.9	62.3	67.3	64.6	42.1	41.0	42.6
Or	2.5	1.8	2.1	2.6	2.2	0.9	1.0	0.9

Sample	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	1	2	1	1	2	1	2	1
SiO_2	53.50	53.51	54.55	57.45	55.98	53.41	54.26	53.93
Al_2O_3	30.84	30.70	28.06	28.12	29.06	30.99	30.16	29.80
CaO	12.45	11.96	11.62	9.48	11.06	12.34	11.59	12.06
Na_2O	4.34	4.34	5.07	6.02	5.23	4.37	4.87	4.41
K_2O	0.16	0.13	0.22	0.31	0.19	0.13	0.18	0.12
FeO	0.63	0.46	0.39	0.21	0.40	0.50	0.46	0.41
Total	101.90	101.10	99.85	101.59	101.92	101.74	101.51	100.71
An	60.8	59.9	55.2	45.7	53.3	60.5	56.2	59.8
Ab	38.3	39.4	43.6	52.5	45.6	38.8	42.7	39.5
Or	0.9	0.7	1.2	1.8	1.1	0.7	1.0	0.7

Sample	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	1	1	2	3	1	2	3	1
SiO_2	55.09	61.24	61.57	62.27	53.93	54.31	54.48	54.32
Al_2O_3	29.90	25.72	25.49	25.04	30.40	30.23	29.79	30.44
CaO	11.61	6.49	5.92	5.89	11.69	11.61	11.53	11.69
Na_2O	4.70	7.60	7.71	7.75	4.84	4.93	4.97	4.82
K_2O	0.15	0.39	0.50	0.42	0.16	0.17	0.14	0.16
FeO	0.48	0.36	0.26	0.05	0.56	0.57	0.66	0.47
Total	101.93	101.79	101.45	101.42	101.59	101.82	101.56	101.89
An	57.2	31.3	28.9	28.8	56.7	56.0	55.8	56.8
Ab	41.9	66.4	68.2	68.7	42.4	43.1	43.4	42.3
Or	0.9	2.2	2.9	2.5	0.9	1.0	0.8	0.9

Sample	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	1	1	2	3	4	5	6	1
SiO_2	59.96	57.73	57.49	56.81	56.10	55.78	56.22	65.29
Al_2O_3	26.65	28.31	28.02	28.60	29.27	29.46	29.17	21.42
CaO	7.26	9.22	9.28	9.70	10.31	10.35	10.59	4.14
Na_2O	7.21	6.01	5.90	5.92	5.34	5.61	5.45	6.92
K_2O	0.39	0.30	0.23	0.22	0.19	0.21	0.21	1.78
FeO	0.25	0.32	0.24	0.32	0.55	0.43	0.31	1.03
Total	101.73	101.88	101.15	101.57	101.76	101.84	101.95	100.57
An	34.9	45.1	45.9	46.9	51.1	49.9	51.1	22.0
Ab	62.8	53.2	52.8	51.8	47.8	48.9	47.6	66.7
Or	2.2	1.7	1.3	1.3	1.1	1.2	1.2	11.3

Sample	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	1	2	3	4	1	2	1	2
SiO_2	60.36	59.05	62.10	68.10	60.23	61.04	60.67	59.49
Al_2O_3	26.13	25.99	25.30	20.83	26.53	25.60	25.36	25.31
CaO	7.21	7.07	5.67	3.41	7.44	6.62	6.31	6.36
Na_2O	7.21	7.30	7.80	6.36	7.15	7.55	7.85	6.83
K_2O	0.35	0.33	0.51	1.66	0.37	0.44	0.37	0.39
FeO	0.18	0.26	0.34	0.56	0.25	0.20	0.24	0.26
Total	101.43	100.00	101.72	100.93	101.97	101.45	100.80	98.64
An	34.9	34.2	27.8	20.2	35.7	31.8	30.1	33.1
Ab	63.1	63.9	69.2	68.1	62.2	65.7	67.8	64.4
Or	2.0	1.9	3.0	11.7	2.1	2.5	2.1	2.4

Sample	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	3	1	1	2	1	2	3	1
SiO_2	61.07	61.25	60.41	61.28	53.01	53.01	58.85	60.65
Al_2O_3	25.59	23.98	26.41	25.93	31.01	30.56	27.03	26.13
CaO	6.18	4.96	7.25	6.45	12.92	12.98	8.18	7.08
Na_2O	7.64	8.42	7.33	7.45	4.00	4.10	6.19	7.34
K_2O	0.42	0.57	0.34	0.39	0.20	0.24	0.38	0.37
FeO	0.32	0.39	0.19	0.21	0.62	0.45	0.63	0.31
Total	101.22	99.57	101.93	101.73	101.76	101.33	101.27	101.88
An	30.1	23.8	34.7	31.6	63.3	62.7	41.2	34.0
Ab	67.4	73.0	63.4	66.1	35.5	35.9	56.5	63.9
Or	2.5	3.2	2.0	2.3	1.2	1.4	2.3	2.1

Sample	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	2	1	1	1	1	2	3	1
SiO_2	61.11	58.53	60.00	52.74	53.21	53.76	53.13	53.15
Al_2O_3	25.59	25.45	26.45	31.12	30.48	30.52	31.08	30.35
CaO	6.62	7.61	7.38	12.98	12.44	12.11	13.18	12.33
Na_2O	7.41	6.89	7.16	4.02	4.68	4.66	3.90	4.32
K_2O	0.48	0.48	0.41	0.26	0.16	0.15	0.12	0.18
FeO	0.36	0.27	0.36	0.65	0.59	0.42	0.45	0.43
Total	101.57	99.23	101.76	101.76	101.55	101.61	101.86	100.77
An	32.1	36.9	35.4	63.1	59.0	58.5	64.7	60.6
Ab	65.1	60.4	62.2	35.4	40.1	40.7	34.6	38.4
Or	2.8	2.7	2.4	1.5	0.9	0.8	0.7	1.1

Sample	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-A	77-P2B-B	77-P2B-B	77-P2B-B
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	2	1	2	3	4	1	2	3
SiO_2	54.20	60.41	60.91	61.17	60.63	58.71	58.72	59.20
Al_2O_3	30.64	26.33	25.14	25.74	26.11	26.00	25.49	26.21
CaO	11.70	7.03	6.20	6.35	7.10	6.44	6.66	6.88
Na_2O	4.42	7.24	7.66	7.62	7.54	7.42	7.30	7.38
K_2O	0.20	0.42	0.41	0.51	0.39	0.38	0.40	0.39
FeO	0.54	0.25	0.31	0.19	0.13	0.32	0.17	0.38
Total	101.71	101.68	100.62	101.57	101.90	99.28	98.76	100.45
An	58.7	34.1	30.2	30.6	33.5	31.7	32.7	33.2
Ab	40.1	63.5	67.5	66.5	64.3	66.1	64.9	64.5
Or	1.2	2.4	2.4	2.9	2.2	2.2	2.3	2.3

Sample	77-P2B-B	77-P2B-B	77-P2B-B	77-P2B-B	77-P2B-B	77-P2B-B	77-P2B-B	77-P2B-B
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	4	1	2	3	1	2	3	4
SiO_2	58.66	58.80	59.88	59.60	61.61	60.80	60.07	60.17
Al_2O_3	25.93	25.01	25.94	26.16	24.62	25.33	25.38	25.13
CaO	6.91	6.07	6.31	7.21	5.61	5.87	6.32	5.86
Na_2O	7.06	7.49	7.57	7.24	7.54	7.83	7.72	7.61
K_2O	0.33	0.47	0.35	0.40	0.56	0.46	0.44	0.46
FeO	0.27	0.20	0.21	0.40	0.61	0.36	0.05	0.25
Total	99.16	98.05	100.26	100.99	100.56	100.64	99.96	99.48
An	34.4	30.1	30.9	34.7	28.2	28.5	30.4	29.1
Ab	63.7	67.2	67.0	63.0	68.5	68.8	67.1	68.2
Or	1.9	2.8	2.1	2.3	3.4	2.6	2.5	2.7

Sample	77-P2B-B	77-P2B-B	77-P2B-B	77-P2B-B	77-P2B-B	77-P2B-B	77-P2B-B	77-P2B-B
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	5	1	2	3	4	5	6	7
SiO_2	59.90	58.71	59.56	59.45	58.79	59.11	58.39	58.69
Al_2O_3	25.41	26.78	26.01	25.66	26.64	27.12	26.56	26.18
CaO	6.26	6.94	6.62	6.70	7.30	7.38	7.26	6.64
Na_2O	7.63	7.20	7.60	7.05	7.04	6.64	7.35	7.25
K_2O	0.38	0.39	0.40	0.43	0.36	0.29	0.32	0.40
FeO	0.32	0.21	0.26	0.38	0.19	0.22	0.13	0.36
Total	99.91	100.22	100.44	99.67	100.31	100.76	100.00	99.52
An	30.5	34.0	31.7	33.6	35.7	37.4	34.7	32.8
Ab	67.3	63.8	66.0	63.9	62.2	60.9	63.5	64.8
Or	2.2	2.3	2.3	2.5	2.1	1.8	1.8	2.3

Sample	77-P2B-B	77-P2B-B	77-P2B-B	77-P2B-B	77-P2B-B	77-P2B-B	77-P2B-B	77-P2B-B
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	8	1	2	3	4	5	1	2
SiO_2	58.91	58.97	59.10	59.20	58.58	57.94	60.55	60.41
Al_2O_3	26.16	26.14	26.32	26.74	26.26	25.76	25.28	25.55
CaO	7.01	6.99	7.44	7.35	7.17	7.17	5.91	6.28
Na_2O	6.84	7.16	7.17	6.46	7.05	7.12	7.81	7.54
K_2O	0.41	0.40	0.36	0.37	0.33	0.35	0.51	0.40
FeO	0.35	0.29	0.42	0.19	0.30	0.19	0.24	0.38
Total	99.69	99.95	100.81	100.31	99.70	98.52	100.30	100.57
An	35.3	34.2	35.7	37.7	35.3	35.0	28.6	30.8
Ab	62.3	63.5	62.3	60.0	62.8	62.9	68.4	66.9
Or	2.4	2.4	2.1	2.2	1.9	2.0	3.0	2.4

Sample	77-P2B-B	77-P2B-B	77-P2B-B	77-P2B-B	77-P2B-B	77-P2B-B	77-P2B-B	77-P2B-B
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	3	4	5	1	2	3	4	1
SiO_2	59.79	59.10	58.97	58.58	58.37	59.33	63.32	58.64
Al_2O_3	25.62	26.46	26.04	25.98	26.20	25.66	22.46	26.04
CaO	7.01	7.13	6.48	6.95	7.15	6.72	4.80	6.84
Na_2O	7.37	7.10	7.27	7.02	7.10	7.50	7.30	7.31
K_2O	0.41	0.33	0.37	0.34	0.47	0.42	1.24	0.41
FeO	0.35	0.35	0.31	0.32	0.19	0.28	0.80	0.36
Total	100.56	100.48	99.43	99.19	99.49	99.91	99.92	99.61
An	33.6	35.0	32.3	34.6	34.8	32.3	24.7	33.3
Ab	64.0	63.1	65.5	63.3	62.5	65.3	67.8	64.4
Or	2.3	1.9	2.2	2.0	2.7	2.4	7.6	2.4
Sample	77-P2B-B	77-P2B-B	77-P2B-B	77-P2B-B	77-P2B-B	77-P2B-B	77-P2B-B	77-P2B-B
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	2	3	4	1	2	3	4	5
SiO_2	58.94	59.16	58.14	58.65	58.76	59.83	59.55	59.00
Al_2O_3	26.21	26.24	26.12	25.61	26.30	26.25	25.64	26.28
CaO	6.90	6.94	7.14	6.82	6.66	6.85	6.35	6.86
Na_2O	7.13	7.16	7.23	7.57	7.20	7.02	7.22	7.13
K_2O	0.42	0.37	0.32	0.45	0.34	0.38	0.36	0.42
FeO	0.27	0.34	0.39	0.28	0.24	0.25	0.21	0.30
Total	99.86	100.22	99.34	99.38	99.51	100.59	99.34	99.99
An	34.0	34.1	34.7	32.4	33.1	34.2	32.0	33.9
Ab	63.6	63.7	63.5	65.0	64.8	63.5	65.8	63.7
Or	2.4	2.2	1.9	2.6	2.0	2.3	2.2	2.5
Sample	77-P2B-B	77-P2B-B	77-P2B-B	77-P2B-B	77-P2B-B	77-P2B-B	77-P2B-B	77-P2B-B
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	1	2	3	4	5	1	2	3
SiO_2	59.54	60.26	59.07	59.70	58.68	53.34	52.44	53.49
Al_2O_3	24.96	24.88	25.98	25.56	25.97	29.90	30.42	29.57
CaO	5.73	5.57	6.65	6.46	7.00	10.93	11.60	10.74
Na_2O	7.80	7.92	7.38	7.54	7.19	4.77	4.53	4.87
K_2O	0.52	0.47	0.37	0.44	0.45	0.14	0.15	0.16
FeO	0.22	0.45	0.42	0.29	0.29	0.57	0.33	0.74
Total	98.77	99.54	99.88	99.99	99.58	99.65	99.46	99.57
An	28.0	27.2	32.5	31.3	34.0	55.4	58.1	54.4
Ab	69.0	70.1	65.3	66.2	63.3	43.7	41.1	44.6
Or	3.0	2.7	2.2	2.5	2.6	0.8	0.9	1.0
Sample	77-P2B-B	77-P2B-B	77-P2B-B	77-P2B-B	77-P2B-B	77-P2B-B	77-P2B-B	77-P2B-B
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	4	5	1	2	3	1	2	3
SiO_2	51.32	52.07	54.44	52.59	56.60	57.64	57.08	56.62
Al_2O_3	30.03	29.66	28.43	30.47	26.11	26.35	27.31	27.24
CaO	11.51	11.58	10.52	12.05	8.52	7.75	7.95	8.01
Na_2O	4.27	4.73	5.10	4.51	6.60	6.74	6.53	6.56
K_2O	0.15	0.19	0.24	0.14	0.59	0.32	0.30	0.21
FeO	0.77	0.61	0.63	0.56	0.89	0.37	0.20	0.24
Total	98.06	98.84	99.37	100.32	99.31	99.18	99.35	98.88
An	59.3	56.9	52.5	59.1	40.2	38.1	39.5	39.8
Ab	39.8	42.0	46.1	40.0	56.4	60.0	58.7	59.0
Or	0.9	1.1	1.4	0.8	3.3	1.9	1.8	1.2

Sample	77-P2B-B	77-P2B-B	77-P2B-B	77-P2B-B	77-P2B-B	77-P2B-B	77-P2B-B	77-P2B-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	4	5	1	2	3	4	5	1
SiO_2	56.96	57.26	62.52	61.09	60.09	60.23	59.60	52.58
Al_2O_3	27.50	26.68	22.51	25.07	24.96	25.26	25.54	29.71
CaO	8.14	7.42	4.59	5.66	5.90	5.60	6.30	11.68
Na_2O	6.55	6.97	7.27	8.03	7.62	7.94	7.73	4.08
K_2O	0.25	0.31	1.18	0.51	0.47	0.50	0.49	0.15
FeO	0.33	0.26	0.45	0.37	0.30	0.13	0.37	0.60
Total	99.72	98.90	98.52	100.73	99.34	99.66	100.04	98.81
An	40.1	36.4	24.0	27.2	29.1	27.2	30.2	60.7
Ab	58.4	61.8	68.7	69.9	68.1	69.9	67.0	38.4
Or	1.4	1.8	7.4	2.9	2.8	2.9	2.8	0.9

Sample	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	2	3	4	5	6	7	8	9
SiO_2	55.77	55.84	55.44	53.32	52.97	56.19	53.57	58.49
Al_2O_3	28.62	28.53	28.49	29.18	30.03	28.77	30.14	24.74
CaO	9.85	9.34	9.89	10.61	11.11	9.45	11.18	6.79
Na_2O	5.49	5.58	5.28	4.71	4.81	5.71	4.40	6.37
K_2O	0.25	0.31	0.29	0.20	0.20	0.30	0.19	0.73
FeO	0.45	0.46	0.48	0.55	0.41	0.55	0.63	0.99
Total	100.43	100.06	99.86	98.57	99.53	100.97	100.12	98.12
An	49.0	47.1	49.9	54.8	55.4	46.9	57.7	35.4
Ab	49.5	51.0	48.3	44.0	43.4	51.3	41.1	60.1
Or	1.5	1.9	1.7	1.2	1.2	1.8	1.2	4.5

Sample	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	1	2	3	4	5	6	7	8
SiO_2	55.35	53.49	53.52	53.94	52.79	52.08	52.99	57.46
Al_2O_3	29.23	29.91	29.55	29.04	29.52	30.59	30.30	26.22
CaO	9.91	11.17	10.74	10.15	10.27	11.07	11.41	7.72
Na_2O	5.62	4.64	4.75	4.78	4.98	4.34	4.45	6.29
K_2O	0.19	0.17	0.20	0.23	0.30	0.21	0.14	0.35
FeO	0.51	0.55	0.41	0.66	0.47	0.54	0.48	0.85
Total	100.81	99.92	99.18	98.81	98.33	98.84	99.77	98.90
An	48.8	56.5	54.9	53.2	52.3	57.7	58.1	39.5
Ab	50.1	42.5	43.9	45.3	45.9	41.0	41.0	58.3
Or	1.1	1.0	1.2	1.5	1.8	1.3	0.9	2.2

Sample	77-P2B-E	77-P2B-E	77-P2B-F	77-P2B-E	77-P2B-E	77-P2B-F	77-P2B-E	77-P2B-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	1	2	3	4	5	6	7	8
SiO_2	61.12	58.95	58.91	59.46	58.73	59.86	59.17	58.87
Al_2O_3	23.89	26.43	24.92	25.64	25.45	25.33	25.06	25.94
CaO	5.45	6.64	6.13	6.53	6.40	5.92	6.02	6.58
Na_2O	7.82	7.21	7.55	7.35	7.43	7.38	7.00	7.37
K_2O	0.67	0.37	0.41	0.39	0.38	0.54	0.63	0.31
FeO	0.42	0.34	0.26	0.18	0.31	0.37	0.41	0.26
Total	99.37	99.93	98.18	99.54	98.69	99.41	98.30	99.33
An	26.7	33.0	30.2	32.2	31.5	29.7	31.0	32.4
Ab	69.3	64.8	67.4	65.5	66.2	67.1	65.2	65.8
Or	3.9	2.2	2.4	2.3	2.2	3.2	3.8	1.8

Sample	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	1	2	3	1	2	3	4	5
SiO_2	59.55	59.98	59.66	59.25	59.06	58.62	60.00	59.85
Al_2O_3	25.45	25.58	25.53	26.02	26.50	26.00	24.75	24.49
CaO	6.41	6.11	6.26	6.53	6.38	6.64	5.99	5.33
Na_2O	7.49	7.74	7.56	7.27	7.13	7.39	7.59	7.90
K_2O	0.50	0.43	0.43	0.34	0.32	0.38	0.47	0.52
FeO	0.27	0.20	0.28	0.19	0.43	0.24	0.34	0.27
Total	99.67	100.05	99.72	99.59	99.81	99.27	99.14	98.35
An	31.2	29.6	30.6	32.5	32.5	32.5	29.5	26.3
Ab	65.9	67.9	66.9	65.5	65.6	65.3	67.7	70.6
Or	2.9	2.5	2.5	2.0	1.9	2.2	2.8	3.0

Sample	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	6	7	8	9	1	2	3	4
SiO_2	58.51	58.65	58.94	58.74	59.27	58.49	61.05	60.71
Al_2O_3	25.78	26.10	26.00	25.90	25.18	25.37	25.26	24.36
CaO	6.18	6.61	6.87	6.76	6.04	6.70	5.84	5.33
Na_2O	7.12	7.30	7.49	7.28	7.54	7.12	7.97	7.79
K_2O	0.37	0.35	0.35	0.36	0.47	0.38	0.52	0.63
FeO	0.40	0.28	0.31	0.24	0.22	0.27	0.15	0.23
Total	98.35	99.29	99.96	99.27	98.72	98.33	100.79	99.05
An	31.7	32.6	33.0	33.2	29.9	33.4	28.0	26.4
Ab	66.1	65.3	65.0	64.7	67.4	64.3	69.1	69.9
Or	2.2	2.1	2.0	2.1	2.7	2.3	2.9	3.7

Sample	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	5	6	7	1	2	3	4	5
SiO_2	61.61	57.82	58.79	55.24	55.20	53.66	53.59	54.19
Al_2O_3	23.97	26.00	26.46	27.82	28.89	29.70	29.95	29.47
CaO	5.31	7.07	7.22	9.52	10.11	11.08	10.96	10.68
Na_2O	8.36	7.18	7.27	5.61	5.07	4.85	4.73	5.10
K_2O	0.48	0.32	0.35	0.24	0.29	0.18	0.20	0.22
FeO	0.51	0.35	0.23	0.31	0.51	0.49	0.56	0.50
Total	100.24	98.75	100.32	98.74	100.08	99.97	99.98	100.16
An	25.3	34.6	34.7	47.7	51.5	55.2	55.5	52.9
Ab	72.0	63.5	63.3	50.8	46.7	43.7	43.3	45.7
Or	2.7	1.9	2.0	1.4	1.8	1.1	1.2	1.3

Sample	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	6	7	8	1	2	3	1	2
SiO_2	54.47	52.52	54.58	53.57	52.98	53.65	63.20	58.90
Al_2O_3	28.14	29.64	28.36	28.43	28.81	28.69	23.42	24.94
CaO	9.69	11.45	10.18	10.38	10.91	10.99	4.99	6.44
Na_2O	5.43	4.58	5.47	5.10	4.52	4.67	7.37	7.50
K_2O	0.26	0.23	0.19	0.20	0.23	0.23	0.95	0.41
FeO	0.58	0.63	0.56	0.91	0.96	1.19	0.64	0.39
Total	98.56	99.04	99.34	98.59	98.41	99.42	100.57	98.58
An	48.9	57.3	50.1	52.3	56.3	55.7	25.6	31.4
Ab	49.6	41.4	48.8	46.5	42.3	42.9	68.6	66.2
Or	1.6	1.3	1.1	1.2	1.4	1.4	5.8	2.4

Sample	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	3	4	5	6	7	8	1	2
SiO_2	58.80	57.82	58.87	60.19	59.58	59.71	59.84	60.15
Al_2O_3	25.44	25.95	25.26	26.21	25.47	25.49	25.21	24.86
CaO	6.28	6.84	6.76	6.77	6.63	6.19	5.83	6.17
Na_2O	7.64	7.31	7.33	7.34	7.36	7.57	7.55	7.68
K_2O	0.41	0.34	0.42	0.41	0.36	0.39	0.51	0.45
FeO	0.20	0.31	0.30	0.26	0.22	0.22	0.12	0.69
Total	98.76	98.56	98.94	101.18	99.63	99.57	99.06	100.00
An	30.5	33.4	33.0	32.9	32.5	30.4	29.0	29.9
Ab	67.2	64.6	64.6	64.7	65.3	67.3	67.9	67.5
Or	2.3	2.0	2.4	2.4	2.1	2.3	3.0	2.6

Sample	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-F	77-P2B-E	77-P2B-F	77-P2B-E	77-P2B-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	3	4	5	6	1	2	3	4
SiO_2	59.35	60.50	59.32	61.56	59.73	59.73	58.76	58.28
Al_2O_3	25.75	25.47	25.16	23.59	25.10	24.78	25.60	25.57
CaO	6.78	5.98	6.11	5.44	5.97	5.90	6.31	6.77
Na_2O	7.53	7.66	7.54	7.14	7.58	7.78	7.45	7.06
K_2O	0.37	0.44	0.45	0.89	0.47	0.40	0.38	0.37
FeO	0.28	0.28	0.44	0.54	0.21	0.18	0.34	0.15
Total	100.05	100.33	99.02	99.17	99.05	98.76	98.84	98.21
An	32.5	29.3	30.1	28.0	29.5	28.8	31.2	33.9
Ab	65.4	68.1	67.3	66.5	67.7	68.9	66.6	63.9
Or	2.1	2.6	2.6	5.5	2.8	2.3	2.2	2.2

Sample	77-P2B-F	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	5	6	7	8	1	2	3	4
SiO_2	58.19	60.12	59.55	59.26	59.86	60.70	61.44	61.77
Al_2O_3	25.77	24.84	24.63	24.70	24.39	24.15	24.09	22.55
CaO	6.94	5.98	5.85	5.92	5.64	4.89	4.97	4.60
Na_2O	7.12	7.70	7.78	7.64	8.02	8.17	8.00	7.41
K_2O	0.38	0.42	0.54	0.44	0.51	0.54	0.57	1.26
FeO	0.25	0.39	0.29	0.46	0.19	0.26	0.23	0.42
Total	98.64	99.44	98.65	98.41	98.62	98.72	99.29	98.02
An	34.3	29.3	28.4	29.2	27.2	24.1	24.7	23.6
Ab	63.5	68.2	68.4	68.2	69.9	72.8	71.9	68.7
Or	2.2	2.5	3.1	2.6	2.9	3.2	3.4	7.7

Sample	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	5	6	7	8	9	1	2	3
SiO_2	62.94	60.45	61.98	61.12	60.41	59.81	59.08	57.98
Al_2O_3	22.03	24.41	24.34	24.71	25.23	26.15	26.08	25.54
CaO	4.43	5.36	5.26	5.37	5.76	6.53	6.71	6.80
Na_2O	7.18	8.63	8.24	8.25	7.73	7.23	7.41	7.21
K_2O	1.26	0.48	0.54	0.56	0.52	0.36	0.35	0.38
FeO	0.46	0.21	0.40	0.18	0.22	0.35	0.21	0.32
Total	98.29	99.54	100.75	100.20	99.87	100.42	99.84	98.24
An	23.4	24.9	25.3	25.6	28.3	32.6	32.7	33.5
Ab	68.7	72.5	71.7	71.2	68.7	65.3	65.3	64.3
Or	7.9	2.6	3.1	3.2	3.0	2.1	2.1	2.2

Sample	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	1	2	3	4	5	6	7	1
SiO_2	58.23	58.93	59.30	58.87	58.78	59.10	57.90	58.98
Al_2O_3	25.84	25.37	25.31	25.05	25.85	24.92	25.67	24.29
CaO	6.73	6.32	5.98	6.35	6.75	6.24	7.04	6.13
Na_2O	7.17	7.15	7.51	7.34	7.10	7.54	7.24	7.26
K_2O	0.42	0.39	0.45	0.44	0.40	0.50	0.38	0.50
FeO	0.32	0.33	0.25	0.21	0.28	0.41	0.22	1.07
Total	98.71	98.49	98.79	98.27	99.15	98.70	98.46	98.23
An	33.3	32.0	29.7	31.5	33.6	30.5	34.2	30.9
Ab	64.2	65.6	67.6	65.9	64.0	66.6	63.6	66.1
Or	2.4	2.4	2.7	2.6	2.4	2.9	2.2	3.0

Sample	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	2	3	4	5	6	7	8	1
SiO_2	59.70	58.91	57.73	57.94	58.70	59.30	58.80	60.39
Al_2O_3	25.40	25.70	25.69	25.87	26.28	25.89	25.85	25.28
CaO	6.46	6.67	7.02	7.31	7.11	6.71	7.01	5.90
Na_2O	7.24	7.67	7.11	7.01	7.04	7.39	7.08	7.64
K_2O	0.37	0.40	0.36	0.39	0.37	0.37	0.45	0.48
FeO	0.22	0.29	0.21	0.26	0.45	0.26	0.34	0.30
Total	99.40	99.62	98.12	98.78	99.96	99.92	99.53	99.99
An	32.3	31.7	34.5	35.7	35.1	32.7	34.5	29.0
Ab	65.5	66.0	63.3	62.0	62.8	65.2	62.9	68.1
Or	2.2	2.3	2.1	2.3	2.2	2.1	2.6	2.8

Sample	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-F	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	2	3	4	5	6	7	1	2
SiO_2	58.54	58.90	60.85	60.99	59.23	59.10	56.43	50.20
Al_2O_3	25.22	26.11	25.12	24.45	25.40	25.37	26.82	30.82
CaO	6.66	6.95	6.16	5.84	6.15	6.20	8.79	13.13
Na_2O	7.54	7.18	7.27	7.93	7.55	7.13	6.41	3.68
K_2O	0.42	0.36	0.46	0.56	0.51	0.50	0.23	0.15
FeO	0.18	0.19	0.31	0.33	0.23	0.46	0.70	0.74
Total	98.56	99.69	100.18	100.09	99.06	98.77	99.37	98.72
An	32.0	34.1	31.0	28.0	30.1	31.4	42.6	65.8
Ab	65.6	63.8	66.2	68.8	66.9	65.5	56.1	33.4
Or	2.4	2.1	2.7	3.2	3.0	3.0	1.3	0.9

Sample	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	3	4	5	6	7	8	9	10
SiO_2	50.35	49.17	49.42	50.27	51.14	50.86	51.16	50.38
Al_2O_3	30.60	31.94	31.43	31.57	30.92	30.75	31.12	30.61
CaO	12.76	14.30	13.81	13.11	13.24	12.94	12.63	13.18
Na_2O	3.93	3.27	3.30	3.67	3.93	3.97	3.99	3.93
K_2O	0.15	0.07	0.08	0.13	0.13	0.15	0.10	0.19
FeO	0.51	0.64	0.63	0.37	0.56	0.69	0.64	0.66
Total	98.30	99.38	98.68	99.12	99.91	99.36	99.63	98.94
An	63.7	70.5	69.5	65.8	64.6	63.7	63.3	64.3
Ab	35.4	29.1	30.0	33.4	34.7	35.4	36.1	34.6
Or	0.9	0.4	0.5	0.8	0.7	0.9	0.6	1.1

Sample	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	11	12	13	14	15	16	17	18
SiO_2	50.87	49.57	52.92	51.40	51.65	49.41	49.44	51.76
Al_2O_3	30.66	31.69	29.27	30.33	30.35	32.01	31.85	30.56
CaO	12.81	13.64	10.92	12.58	12.24	14.37	14.05	12.48
Na_2O	3.90	3.52	4.88	3.94	4.25	3.23	3.13	4.21
K_2O	0.14	0.08	0.19	0.12	0.15	0.11	0.11	0.16
FeO	0.49	0.68	0.46	0.50	0.42	0.67	0.52	0.55
Total	98.86	99.19	98.64	98.87	99.06	99.79	99.11	99.73
An	63.9	67.8	54.7	63.4	60.9	70.6	70.8	61.5
Ab	35.3	31.7	44.2	35.9	38.3	28.8	28.5	37.5
Or	0.8	0.5	1.2	0.7	0.9	0.6	0.7	0.9

Sample	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-F	77-P2B-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	19	20	21	22	23	24	1	1
SiO_2	50.70	49.95	53.50	52.16	51.97	56.21	54.16	54.97
Al_2O_3	32.44	31.53	30.08	30.01	31.53	28.27	28.93	28.40
CaO	14.07	13.86	11.70	12.37	13.33	10.27	10.89	10.59
Na_2O	3.56	3.13	4.99	4.31	4.17	5.72	4.77	5.15
K_2O	0.09	0.10	0.18	0.16	0.13	0.26	0.27	0.25
FeO	0.55	0.55	0.52	0.47	0.62	0.96	0.66	0.69
Total	101.42	99.12	100.96	99.48	101.75	101.69	99.67	100.04
An	68.2	70.6	55.9	60.7	63.4	49.0	54.9	52.4
Ab	31.3	28.9	43.1	38.3	35.9	49.4	43.5	46.1
Or	0.5	0.6	1.0	0.9	0.7	1.5	1.6	1.5

Sample	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-F	77-P2B-F
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	2	3	4	5	6	7	8	9
SiO_2	50.56	51.31	50.03	51.63	50.57	49.69	51.21	50.78
Al_2O_3	31.97	31.73	31.69	30.93	31.26	31.59	31.18	31.22
CaO	13.44	13.39	13.13	12.39	12.97	13.25	13.01	13.19
Na_2O	3.61	3.50	3.30	4.06	3.47	3.43	3.78	3.77
K_2O	0.15	0.12	0.08	0.13	0.10	0.11	0.11	0.12
FeO	0.65	0.50	0.57	0.34	0.46	0.48	0.42	0.63
Total	100.37	100.55	98.80	99.47	98.82	98.55	99.71	99.71
An	66.7	67.4	68.4	62.3	67.0	67.6	65.1	65.5
Ab	32.4	31.9	31.1	36.9	32.4	31.7	34.2	33.9
Or	0.9	0.7	0.5	0.8	0.6	0.7	0.7	0.7

Sample	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	10	11	12	13	14	15	16	17
SiO_2	50.95	51.63	51.50	50.56	51.01	49.13	49.91	57.44
Al_2O_3	31.56	30.99	30.64	31.88	31.84	32.54	31.86	26.66
CaO	12.64	12.99	12.49	13.73	13.38	14.57	14.16	7.87
Na_2O	3.66	3.92	3.89	3.30	3.53	3.10	3.31	6.69
K_2O	0.11	0.10	0.14	0.10	0.08	0.08	0.10	0.39
FeO	0.51	0.46	0.62	0.64	0.71	0.38	0.86	0.80
Total	99.43	100.09	99.29	100.21	100.54	99.80	100.20	99.85
An	65.2	64.3	63.4	69.3	67.4	71.8	69.9	38.5
Ab	34.2	35.1	35.7	30.1	32.1	27.7	29.5	59.2
Or	0.7	0.6	0.9	0.6	0.5	0.5	0.6	2.3

Sample	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	1	2	3	4	5	6	7	8
SiO_2	58.89	58.30	59.16	57.90	59.64	58.77	60.40	59.82
Al_2O_3	25.62	26.64	25.75	26.02	24.14	26.41	25.68	25.89
CaO	6.83	7.62	6.80	7.42	5.90	7.13	6.82	6.46
Na_2O	7.45	7.15	7.52	6.91	7.85	7.12	7.61	7.37
K_2O	0.46	0.41	0.47	0.37	0.49	0.39	0.50	0.45
FeO	0.22	0.22	0.25	0.31	0.23	0.38	0.30	0.36
Total	99.48	100.36	99.95	98.93	98.25	100.20	101.32	100.35
An	32.7	36.2	32.4	36.4	28.5	34.8	32.2	31.8
Ab	64.6	61.5	64.9	61.4	68.6	63.0	65.0	65.6
Or	2.6	2.3	2.7	2.2	2.8	2.2	2.8	2.6

Sample	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	9	1	2	3	4	5	6	1
SiO_2	64.41	59.60	59.54	59.02	59.14	57.49	58.88	59.50
Al_2O_3	21.23	25.36	25.52	25.96	25.73	25.04	26.19	25.55
CaO	3.92	6.85	6.85	7.16	7.07	7.31	7.42	6.57
Na_2O	7.37	7.51	7.53	7.21	7.44	8.05	7.20	7.35
K_2O	1.48	0.43	0.48	0.46	0.41	0.36	0.42	0.46
FeO	0.63	0.32	0.22	0.21	0.29	0.19	0.29	0.16
Total	99.04	100.07	100.14	100.03	100.08	98.44	100.40	99.59
An	20.6	32.7	32.5	34.5	33.6	32.8	35.4	32.1
Ab	70.1	64.9	64.7	62.8	64.1	65.3	62.2	65.2
Or	9.3	2.4	2.7	2.6	2.3	1.9	2.4	2.7

Sample	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	2	3	4	5	6	7	1	2
SiO_2	59.70	59.56	58.18	58.31	58.79	58.70	58.39	60.59
Al_2O_3	25.30	25.16	26.18	25.79	25.12	24.66	25.82	25.45
CaO	6.42	6.30	7.32	6.98	6.33	6.47	7.15	6.26
Na_2O	7.75	7.37	7.36	7.11	7.54	7.60	7.21	7.75
K_2O	0.34	0.46	0.45	0.39	0.50	0.54	0.37	0.43
FeO	0.38	0.37	0.24	0.30	0.33	0.26	0.32	0.33
Total	99.89	99.22	99.73	98.88	98.60	98.23	99.26	100.81
An	30.8	31.2	34.6	34.4	30.8	31.0	34.7	30.1
Ab	67.3	66.1	62.9	63.3	66.3	65.9	63.2	67.4
Or	1.9	2.7	2.5	2.3	2.9	3.1	2.1	2.4

Sample	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	3	4	5	6	7	8	9	1
SiO_2	57.95	58.21	58.28	58.94	59.21	60.10	58.80	58.63
Al_2O_3	26.01	26.50	26.21	26.13	25.49	25.35	25.94	25.57
CaO	7.29	7.56	7.56	7.27	6.35	6.41	6.84	6.89
Na_2O	7.30	7.38	6.96	7.33	7.34	7.52	7.32	7.43
K_2O	0.34	0.40	0.41	0.39	0.41	0.46	0.39	0.44
FeO	0.23	0.31	0.30	0.31	0.26	0.19	0.24	0.13
Total	99.11	100.37	99.72	100.37	99.06	100.03	99.53	99.09
An	34.9	35.4	36.6	34.6	31.6	31.2	33.3	33.6
Ab	63.2	62.4	61.0	63.2	66.0	66.2	64.4	64.5
Or	1.9	2.2	2.3	2.2	2.4	2.7	2.3	2.5

Sample	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	2	3	4	5	6	7	8	9
SiO_2	58.73	60.10	58.92	59.20	59.36	59.46	59.40	60.42
Al_2O_3	26.42	25.86	25.50	25.47	25.63	25.40	25.70	25.25
CaO	7.38	6.67	6.91	6.65	6.95	6.41	6.48	6.33
Na_2O	7.08	7.61	7.31	7.47	7.46	7.55	7.45	7.65
K_2O	0.46	0.43	0.50	0.45	0.42	0.43	0.45	0.53
FeO	0.19	0.43	0.30	0.21	0.06	0.07	0.13	0.20
Total	100.25	101.11	99.43	99.46	99.88	99.33	99.61	100.38
An	35.6	31.8	33.3	32.1	33.2	31.1	31.6	30.5
Ab	61.8	65.7	63.8	65.3	64.4	66.4	65.8	66.5
Or	2.6	2.4	2.9	2.6	2.4	2.5	2.6	3.0

Sample	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	10	11	12	13	14	15	16	17
SiO_2	58.53	59.41	59.56	60.10	59.67	60.62	60.10	60.35
Al_2O_3	24.96	25.26	25.31	24.77	24.75	25.20	24.98	25.08
CaO	6.58	6.53	6.52	6.04	6.17	6.16	6.06	6.22
Na_2O	7.47	7.49	7.95	7.88	7.82	7.91	7.80	7.85
K_2O	0.44	0.50	0.44	0.44	0.51	0.53	0.47	0.45
FeO	0.25	0.28	0.27	0.20	0.24	0.14	0.42	0.06
Total	98.24	99.48	100.04	99.42	99.16	100.56	99.83	100.01
An	31.9	31.6	30.4	29.0	29.5	29.2	29.2	29.7
Ab	65.5	65.5	67.1	68.5	67.6	67.8	68.1	67.8
Or	2.5	2.9	2.4	2.5	2.9	3.0	2.7	2.6

Sample	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	18	19	20	21	22	23	24	25
SiO_2	59.67	59.92	59.74	60.60	59.47	59.35	59.22	57.94
Al_2O_3	25.27	25.31	25.29	25.53	25.45	24.96	25.56	25.77
CaO	6.39	6.38	6.32	6.61	6.49	6.35	6.94	7.00
Na_2O	7.69	7.53	7.68	7.61	7.69	7.48	7.19	7.40
K_2O	0.49	0.46	0.53	0.47	0.39	0.47	0.47	0.41
FeO	0.25	0.27	0.48	0.13	0.25	0.24	0.24	0.20
Total	99.75	99.86	100.05	100.95	99.75	98.85	99.63	98.72
An	30.6	31.1	30.3	31.5	31.1	31.1	33.8	33.5
Ab	66.6	66.3	66.7	65.8	66.7	66.2	63.4	64.2
Or	2.8	2.7	3.0	2.7	2.2	2.7	2.7	2.3

Sample	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	26	27	28	1	2	3	4	5
SiO_2	59.26	58.22	59.77	58.85	58.90	58.18	59.33	58.68
Al_2O_3	26.53	26.27	25.33	26.32	26.16	26.43	26.26	26.21
CaO	7.47	7.34	6.52	7.14	7.28	7.82	7.51	7.46
Na_2O	7.32	7.34	7.53	7.43	7.39	7.10	7.35	7.18
K_2O	0.43	0.45	0.48	0.37	0.46	0.38	0.41	0.36
FeO	0.37	0.26	0.37	0.24	0.16	0.30	0.14	0.23
Total	101.38	99.88	100.00	100.34	100.36	100.20	100.99	100.11
An	35.2	34.7	31.5	34.0	34.3	37.0	35.3	35.7
Ab	62.4	62.8	65.7	64.0	63.1	60.8	62.5	62.2
Or	2.4	2.5	2.8	2.1	2.6	2.1	2.3	2.0

Sample	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	6	7	8	9	10	11	12	13
SiO_2	59.67	57.63	58.14	58.44	58.51	58.74	59.09	58.58
Al_2O_3	26.08	26.12	25.75	26.16	25.56	26.46	26.35	25.91
CaO	7.19	7.31	7.08	7.43	6.98	7.50	7.55	7.34
Na_2O	7.32	7.18	7.21	7.13	7.40	7.41	7.31	7.27
K_2O	0.41	0.40	0.37	0.39	0.40	0.36	0.36	0.39
FeO	0.26	0.30	0.16	0.11	0.25	0.33	0.22	0.38
Total	100.93	98.92	98.71	99.66	99.11	100.80	100.89	99.87
An	34.4	35.2	34.4	35.7	33.5	35.2	35.6	35.0
Ab	63.3	62.5	63.5	62.1	64.2	62.9	62.4	62.8
Or	2.3	2.3	2.1	2.2	2.3	2.0	2.0	2.2

Sample	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	14	15	16	17	18	19	20	21
SiO_2	59.04	59.59	58.72	57.71	59.70	59.11	58.19	59.46
Al_2O_3	25.75	25.37	25.66	25.68	26.14	25.47	25.66	26.23
CaO	7.01	6.51	6.83	7.06	6.98	6.73	7.15	7.28
Na_2O	7.35	7.43	7.25	7.20	7.22	7.55	7.21	7.48
K_2O	0.45	0.40	0.45	0.42	0.32	0.51	0.38	0.32
FeO	0.19	0.28	0.05	0.42	0.33	0.15	0.10	0.14
Total	99.79	99.58	98.96	98.49	100.69	99.52	98.68	100.90
An	33.6	31.9	33.3	34.3	34.1	32.1	34.6	34.3
Ab	63.8	65.8	64.1	63.3	64.0	65.0	63.2	63.9
Or	2.6	2.4	2.6	2.4	1.9	2.9	2.2	1.8

Sample	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	22	23	24	25	26	27	28	29
SiO_2	59.19	58.19	58.07	58.34	57.97	58.39	59.34	59.49
Al_2O_3	26.45	25.91	26.08	25.93	26.58	26.25	26.05	26.29
CaO	7.45	7.21	7.40	7.57	7.94	7.60	7.01	7.11
Na_2O	7.17	7.03	7.30	7.26	6.92	7.03	7.33	7.16
K_2O	0.36	0.39	0.37	0.42	0.41	0.39	0.43	0.43
FeO	0.19	0.19	0.17	0.18	0.19	0.31	0.23	0.39
Total	100.80	98.94	99.39	99.71	100.01	99.97	100.38	100.87
An	35.7	35.4	35.2	35.7	37.9	36.5	33.7	34.6
Ab	62.2	62.4	62.7	62.0	59.8	61.2	63.8	63.0
Or	2.0	2.3	2.1	2.3	2.3	2.3	2.5	2.5

Sample	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	1	2	3	4	5	6	7	1
SiO_2	57.20	57.26	57.03	56.49	56.58	57.20	57.64	60.09
Al_2O_3	26.57	26.62	26.58	26.03	26.48	26.38	26.58	24.16
CaO	8.73	8.45	8.34	8.61	8.96	8.52	8.52	5.79
Na_2O	6.44	6.61	6.63	6.43	6.17	6.45	6.50	7.77
K_2O	0.33	0.32	0.41	0.32	0.29	0.31	0.38	0.59
FeO	0.63	0.70	0.65	0.69	0.80	0.99	0.52	0.35
Total	99.90	99.96	99.63	98.57	99.28	99.85	100.14	98.74
An	42.0	40.7	40.0	41.8	43.8	41.5	41.1	28.2
Ab	56.1	57.5	57.6	56.4	54.5	56.8	56.8	68.4
Or	1.9	1.8	2.4	1.8	1.7	1.8	2.2	3.4

Sample	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	2	3	4	5	6	7	8	9
SiO_2	59.18	59.33	58.32	58.58	57.90	58.88	58.61	60.27
Al_2O_3	25.44	25.75	25.33	25.95	25.52	25.41	25.57	24.74
CaO	6.93	6.88	6.83	7.20	6.73	6.75	7.17	5.98
Na_2O	7.67	7.44	7.41	7.10	7.37	7.53	7.07	7.61
K_2O	0.42	0.36	0.42	0.39	0.45	0.46	0.38	0.48
FeO	0.32	0.17	0.26	0.28	0.24	0.42	0.34	0.31
Total	99.96	99.92	98.58	99.49	98.21	99.44	99.15	99.39
An	32.5	33.2	32.9	35.1	32.7	32.3	35.1	29.4
Ab	65.2	64.8	64.6	62.6	64.7	65.1	62.7	67.7
Or	2.3	2.1	2.4	2.3	2.6	2.6	2.2	2.8

Sample	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	1	2	3	4	5	6	1	2
SiO_2	58.63	58.77	58.54	59.19	59.81	59.58	59.64	59.21
Al_2O_3	25.67	25.34	25.34	25.51	25.39	25.99	25.78	26.12
CaO	7.14	6.79	6.79	7.03	6.37	6.97	6.51	7.45
Na_2O	7.33	7.31	7.33	7.42	7.92	7.37	7.77	7.43
K_2O	0.44	0.42	0.47	0.47	0.46	0.40	0.39	0.40
FeO	0.31	0.34	0.27	0.40	0.38	0.19	0.21	0.40
Total	99.53	98.97	98.75	100.02	100.33	100.51	100.31	101.00
An	34.1	33.1	33.0	33.5	30.0	33.5	30.9	34.9
Ab	63.4	64.5	64.3	63.9	67.4	64.2	66.9	62.9
Or	2.5	2.4	2.7	2.6	2.6	2.3	2.2	2.2

Sample	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	3	4	5	6	7	8	1	2
SiO_2	58.73	59.84	60.31	59.24	58.66	59.92	54.70	51.80
Al_2O_3	25.84	25.59	24.24	25.65	25.83	25.08	28.38	29.64
CaO	7.33	7.12	5.79	7.06	7.28	6.33	10.06	12.07
Na_2O	7.21	7.18	7.87	7.37	7.23	7.68	5.80	4.56
K_2O	0.40	0.42	0.54	0.39	0.37	0.45	0.26	0.25
FeO	0.14	0.19	0.24	0.33	0.28	0.36	0.73	0.67
Total	99.65	100.33	98.99	100.05	99.64	99.81	99.94	98.99
An	35.2	34.5	28.0	33.9	35.0	30.5	48.2	58.5
Ab	62.6	63.0	68.9	63.9	62.9	66.9	50.3	40.0
Or	2.3	2.4	3.1	2.2	2.1	2.6	1.5	1.5

Sample	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	3	4	5	6	7	8	9	10
SiO_2	53.76	55.03	54.48	52.86	53.47	52.74	51.69	55.00
Al_2O_3	28.45	28.80	28.49	30.62	29.63	30.38	30.41	28.76
CaO	10.95	10.80	10.68	12.65	11.58	12.38	12.32	10.69
Na_2O	5.40	5.37	5.45	4.37	4.83	4.57	4.28	5.11
K_2O	0.22	0.30	0.22	0.26	0.20	0.17	0.21	0.23
FeO	0.34	0.65	0.57	0.47	0.55	0.40	0.64	0.57
Total	99.11	100.94	99.88	101.23	100.27	100.64	99.53	100.35
An	52.2	51.7	51.3	60.6	56.3	59.4	60.7	52.9
Ab	46.6	46.6	47.4	37.9	42.5	39.7	38.1	45.7
Or	1.3	1.7	1.3	1.5	1.1	1.0	1.2	1.4

Sample	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	11	12	13	14	15	16	17	18
SiO_2	54.31	53.05	54.12	54.10	53.68	51.90	53.47	52.73
Al_2O_3	29.01	30.52	29.08	29.64	29.90	30.36	29.47	30.52
CaO	11.36	12.62	10.93	11.83	11.78	12.46	11.64	12.47
Na_2O	5.05	4.16	4.97	4.98	4.57	4.21	4.55	4.47
K_2O	0.25	0.19	0.21	0.24	0.19	0.17	0.20	0.25
FeO	0.53	0.52	0.73	0.67	0.60	0.42	0.50	0.63
Total	100.52	101.07	100.04	101.46	100.70	99.51	99.83	101.08
An	54.6	62.0	54.2	56.0	58.1	61.4	57.9	59.8
Ab	44.0	37.0	44.6	42.7	40.8	37.5	41.0	38.8
Or	1.4	1.1	1.2	1.3	1.1	1.0	1.2	1.4

Sample	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	CBV-XX-3A	CBV-XX-3A
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	DE dacite	DE dacite
Line Number	19	20	21	22	23	24	1	2
SiO_2	52.57	52.93	51.98	51.86	54.30	55.15	55.26	50.11
Al_2O_3	30.36	30.11	30.51	30.16	28.05	28.36	28.12	30.59
CaO	12.70	12.21	12.94	12.86	10.69	11.09	10.00	13.67
Na_2O	4.46	4.55	4.18	4.09	4.98	5.31	5.74	3.30
K_2O	0.17	0.22	0.22	0.24	0.50	0.25	0.40	0.24
FeO	0.61	0.54	0.48	0.58	0.75	0.75	0.46	0.47
Total	100.87	100.55	100.30	99.80	99.26	100.90	99.98	98.37
An	60.6	59.0	62.3	62.6	52.7	52.8	47.9	68.6
Ab	38.5	39.7	36.4	36.0	44.4	45.8	49.8	30.0
Or	1.0	1.3	1.3	1.4	2.9	1.4	2.3	1.4

Sample	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	3	4	5	6	1	2	3	4
SiO_2	51.22	53.12	54.30	50.73	55.15	52.25	52.60	54.51
Al_2O_3	30.33	28.86	28.29	30.99	27.55	30.52	29.79	28.63
CaO	12.99	11.68	10.50	13.87	9.53	12.36	12.17	10.89
Na_2O	4.04	4.85	5.22	3.53	5.75	4.37	4.48	5.28
K_2O	0.27	0.37	0.33	0.20	0.36	0.19	0.19	0.27
FeO	0.40	0.59	0.53	0.51	0.50	0.49	0.43	0.42
Total	99.25	99.47	99.16	99.84	98.82	100.18	99.65	100.01
An	63.0	55.9	51.6	67.7	46.8	60.3	59.4	52.4
Ab	35.5	42.0	46.5	31.2	51.1	38.6	39.5	46.0
Or	1.5	2.1	1.9	1.2	2.1	1.1	1.1	1.6

Sample	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	5	6	7	8	9	10	1	2
SiO_2	54.08	54.37	54.57	53.19	53.08	54.68	51.76	53.32
Al_2O_3	28.17	28.75	28.11	28.72	29.12	28.08	29.88	29.15
CaO	10.52	10.40	10.34	11.15	11.64	10.27	12.28	11.18
Na_2O	5.41	5.46	5.58	5.42	4.87	5.51	4.42	4.76
K_2O	0.19	0.23	0.22	0.25	0.19	0.43	0.20	0.24
FeO	0.43	0.53	0.44	0.54	0.37	0.50	0.40	0.39
Total	98.82	99.74	99.26	99.27	99.28	99.47	98.93	99.05
An	51.2	50.6	49.9	52.5	56.3	49.5	59.8	55.7
Ab	47.7	48.1	48.8	46.2	42.6	48.1	39.0	42.9
Or	1.1	1.3	1.2	1.4	1.1	2.5	1.1	1.4

Sample	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	3	4	5	6	7	8	9	10
SiO_2	53.68	52.85	53.35	52.78	52.71	53.68	51.51	57.27
Al_2O_3	28.24	29.17	29.00	28.97	29.40	28.96	29.93	25.75
CaO	10.99	11.55	11.54	11.34	11.70	11.47	12.77	7.91
Na_2O	5.18	4.97	4.86	4.94	4.65	5.05	4.31	6.95
K_2O	0.30	0.15	0.20	0.20	0.21	0.22	0.19	0.57
FeO	0.39	0.53	0.34	0.37	0.41	0.37	0.52	0.50
Total	98.77	99.22	99.37	98.59	99.08	99.74	99.24	98.95
An	53.1	55.7	56.1	55.3	57.4	55.0	61.4	37.3
Ab	45.2	43.4	42.8	43.6	41.3	43.8	37.5	59.4
Or	1.7	0.9	1.1	1.2	1.2	1.3	1.1	3.2

Sample	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	1	2	3	4	5	6	7	8
SiO_2	52.62	49.96	48.66	52.16	49.29	49.31	49.08	53.42
Al_2O_3	29.61	31.04	31.75	29.08	31.14	31.40	31.27	28.11
CaO	12.27	13.68	14.53	12.09	14.79	14.72	14.45	11.19
Na_2O	4.34	3.29	2.97	4.49	3.10	2.97	3.07	4.79
K_2O	0.27	0.17	0.08	0.17	0.12	0.11	0.11	0.29
FeO	0.83	0.74	0.49	0.64	0.61	0.60	0.62	0.50
Total	99.94	98.88	98.47	98.63	99.04	99.11	98.60	98.30
An	60.0	69.0	72.6	59.2	72.0	72.8	71.8	55.4
Ab	38.4	30.0	26.9	39.8	27.3	26.6	27.6	42.9
Or	1.6	1.0	0.5	1.0	0.7	0.7	0.6	1.7

Sample	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	1	2	3	4	5	6	7	8
SiO_2	53.18	51.26	52.12	51.65	52.37	59.12	49.89	48.39
Al_2O_3	28.76	28.13	29.55	28.95	29.52	24.29	30.97	32.10
CaO	11.26	11.69	11.90	12.23	12.48	6.14	13.77	15.25
Na_2O	4.74	4.62	4.48	4.21	4.43	7.30	3.69	2.93
K_2O	0.27	0.22	0.23	0.24	0.22	0.73	0.19	0.12
FeO	0.69	2.51	0.69	0.76	0.80	0.66	0.50	0.53
Total	98.90	98.43	99.05	98.04	99.81	98.24	99.01	99.33
An	55.9	57.5	58.9	60.8	60.1	30.4	66.6	73.7
Ab	42.5	41.2	39.8	37.8	38.6	65.3	32.3	25.6
Or	1.6	1.3	1.4	1.4	1.3	4.3	1.1	0.7

Sample	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	9	1	2	3	1	2	3	4
SiO_2	53.52	55.43	59.68	57.96	54.46	54.55	53.81	54.87
Al_2O_3	29.01	27.78	24.17	25.63	27.78	28.14	28.04	27.79
CaO	11.15	10.30	6.54	7.50	10.41	10.48	10.36	10.21
Na_2O	5.03	5.85	7.18	6.99	5.73	5.49	5.55	5.68
K_2O	0.29	0.39	0.55	0.65	0.41	0.39	0.37	0.30
FeO	0.76	0.46	0.52	0.43	0.48	0.39	0.51	0.43
Total	99.76	100.21	98.64	99.15	99.27	99.44	98.65	99.29
An	54.1	48.3	32.4	35.9	49.0	50.2	49.7	49.0
Ab	44.2	49.6	64.4	60.5	48.7	47.6	48.2	49.3
Or	1.7	2.2	3.2	3.7	2.3	2.2	2.1	1.7

Sample	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	5	1	2	3	4	5	6	7
SiO_2	54.56	55.22	52.34	48.11	46.97	51.48	52.91	48.67
Al_2O_3	27.69	27.87	29.10	32.40	33.13	30.17	29.62	32.02
CaO	10.10	10.04	11.76	15.52	16.01	12.74	11.80	14.52
Na_2O	5.64	5.69	4.74	2.63	2.35	4.29	4.70	2.86
K_2O	0.35	0.36	0.25	0.13	0.11	0.19	0.25	0.11
FeO	0.53	0.50	0.49	0.56	0.52	0.44	0.50	0.68
Total	98.86	99.67	98.68	99.35	99.09	99.30	99.78	98.86
An	48.8	48.3	57.0	76.0	78.5	61.5	57.3	73.2
Ab	49.3	49.6	41.5	23.3	20.8	37.4	41.3	26.1
Or	2.0	2.0	1.4	0.8	0.6	1.1	1.4	0.7

Sample	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	8	1	2	3	4	5	6	7
SiO_2	52.17	53.69	52.87	48.81	52.22	52.86	47.85	48.49
Al_2O_3	29.46	28.45	29.02	32.14	29.17	29.41	32.84	32.18
CaO	12.01	10.97	11.52	15.22	11.75	11.82	15.33	15.25
Na_2O	4.55	5.29	5.06	2.99	5.02	4.68	2.57	2.89
K_2O	0.25	0.35	0.24	0.14	0.30	0.21	0.08	0.15
FeO	0.34	0.56	0.68	0.58	0.57	0.47	0.31	0.53
Total	98.77	99.31	99.38	99.88	99.02	99.45	98.99	99.49
An	58.5	52.4	55.0	73.2	55.5	57.5	76.3	73.8
Ab	40.1	45.7	43.7	26.0	42.9	41.2	23.2	25.3
Or	1.4	2.0	1.4	0.8	1.7	1.2	0.5	0.9

Sample	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	8	9	1	2	3	4	5	6
SiO_2	48.50	52.53	52.30	53.34	54.67	53.98	54.61	52.51
Al_2O_3	32.74	29.32	29.48	28.96	27.68	28.61	27.85	29.78
CaO	15.33	11.98	11.59	11.64	9.89	10.58	10.11	11.57
Na_2O	2.81	4.55	4.58	4.91	5.80	5.44	5.67	4.74
K_2O	0.08	0.23	0.23	0.22	0.25	0.25	0.30	0.20
FeO	0.37	0.67	0.57	0.30	0.43	0.37	0.47	0.62
Total	99.82	99.29	98.75	99.36	98.73	99.24	99.02	99.41
An	74.8	58.4	57.5	56.0	47.8	51.1	48.8	56.8
Ab	24.8	40.2	41.1	42.7	50.8	47.5	49.5	42.1
Or	0.5	1.4	1.4	1.2	1.4	1.5	1.7	1.1

Sample	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	7	8	1	2	3	4	5	6
SiO_2	52.72	54.27	51.32	52.86	49.93	49.75	53.41	53.06
Al_2O_3	29.62	28.36	30.44	29.02	31.03	31.53	29.22	29.03
CaO	11.62	10.55	13.02	11.69	13.18	13.71	11.17	11.22
Na_2O	4.78	5.51	4.05	5.10	4.09	3.58	5.11	5.03
K_2O	0.24	0.31	0.22	0.27	0.20	0.17	0.31	0.29
FeO	0.31	0.45	0.50	0.43	0.47	0.47	0.39	0.57
Total	99.29	99.45	99.55	99.38	98.90	99.20	99.62	99.20
An	56.6	50.5	63.2	55.0	63.3	67.3	53.7	54.3
Ab	42.0	47.7	35.6	43.4	35.6	31.8	44.5	44.0
Or	1.4	1.8	1.3	1.5	1.1	1.0	1.8	1.7

Sample	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	7	1	2	3	4	5	6	7
SiO_2	54.39	54.65	54.81	54.12	56.80	54.87	54.75	55.01
Al_2O_3	27.96	28.16	27.79	28.11	27.36	28.17	28.06	28.15
CaO	10.03	10.47	10.18	10.83	9.18	10.11	10.58	10.05
Na_2O	5.53	5.57	5.59	5.40	6.14	5.75	5.70	5.58
K_2O	0.42	0.38	0.30	0.37	0.53	0.34	0.36	0.36
FeO	0.44	0.58	0.50	0.47	0.56	0.49	0.41	0.40
Total	98.78	99.81	99.16	99.30	100.58	99.72	99.86	99.55
An	48.8	49.8	49.3	51.5	43.9	48.3	49.6	48.9
Ab	48.7	48.0	49.0	46.4	53.1	49.7	48.4	49.1
Or	2.5	2.2	1.7	2.1	3.0	1.9	2.0	2.1

Sample	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	8	1	2	3	4	5	6	7
SiO_2	53.90	56.25	55.80	55.59	54.47	54.25	55.53	54.45
Al_2O_3	28.09	27.29	27.37	27.61	28.19	28.11	27.40	27.92
CaO	10.28	9.24	9.07	9.35	10.23	10.60	9.40	10.37
Na_2O	5.48	6.09	6.21	5.93	5.79	5.43	6.09	5.67
K_2O	0.34	0.48	0.50	0.44	0.26	0.34	0.43	0.43
FeO	0.53	0.51	0.55	0.35	0.37	0.50	0.48	0.38
Total	98.62	99.86	99.51	99.27	99.32	99.23	99.34	99.21
An	49.9	44.3	43.4	45.4	48.6	50.9	44.9	49.1
Ab	48.1	52.9	53.7	52.1	49.9	47.2	52.7	48.5
Or	2.0	2.7	2.8	2.5	1.5	2.0	2.5	2.4

Sample	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	8	1	2	3	4	5	6	7
SiO_2	54.92	54.73	56.09	53.81	55.26	54.53	53.75	53.58
Al_2O_3	27.47	27.78	27.34	28.36	27.81	27.80	28.18	27.93
CaO	10.11	10.35	9.20	10.64	10.31	10.40	10.77	10.56
Na_2O	5.63	5.46	6.20	5.32	5.48	5.39	5.18	5.11
K_2O	0.39	0.32	0.48	0.31	0.37	0.36	0.40	0.36
FeO	0.35	0.55	0.56	0.49	0.49	0.50	0.51	0.66
Total	98.86	99.18	99.85	98.94	99.71	98.99	98.79	98.20
An	48.7	50.2	43.8	51.5	49.0	50.5	52.3	52.2
Ab	49.1	48.0	53.5	46.6	48.0	47.4	45.4	45.7
Or	2.3	1.8	2.7	1.8	2.1	2.1	2.3	2.1

Sample	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	8	1	2	3	4	5	6	7
SiO_2	55.29	57.95	54.44	53.76	54.77	54.45	55.55	54.00
Al_2O_3	27.23	26.04	28.13	28.60	27.61	28.19	27.79	28.39
CaO	9.80	7.98	10.27	10.61	9.95	10.27	9.65	10.52
Na_2O	5.85	6.54	5.67	5.36	5.96	5.78	6.08	5.70
K_2O	0.34	0.54	0.39	0.37	0.42	0.44	0.42	0.39
FeO	0.42	0.54	0.47	0.50	0.50	0.60	0.52	0.64
Total	98.93	99.59	99.37	99.29	99.23	99.73	100.00	99.64
An	47.1	39.0	48.9	51.1	46.9	48.3	45.6	49.4
Ab	50.9	57.9	48.9	46.7	50.8	49.2	52.0	48.4
Or	2.0	3.1	2.2	2.1	2.4	2.5	2.4	2.2

Sample	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	1	2	3	4	5	6	7	1
SiO_2	54.96	55.78	51.61	53.68	55.23	53.71	55.16	54.62
Al_2O_3	27.57	26.95	31.02	27.98	26.69	28.83	27.34	27.91
CaO	10.06	9.37	13.19	10.69	9.56	11.16	10.01	10.20
Na_2O	5.80	5.98	4.01	5.13	5.73	5.23	5.64	5.54
K_2O	0.39	0.45	0.21	0.31	0.38	0.35	0.34	0.39
FeO	0.34	0.43	0.61	0.55	0.57	0.46	0.41	0.56
Total	99.12	98.97	100.64	98.32	98.17	99.75	98.90	99.22
An	47.9	45.2	63.8	52.6	46.9	53.0	48.5	49.3
Ab	49.9	52.2	35.1	45.6	50.9	45.0	49.5	48.4
Or	2.2	2.6	1.2	1.8	2.2	2.0	2.0	2.3

Sample	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	2	3	4	5	1	2	3	4
SiO_2	54.96	54.82	56.65	55.12	49.59	48.65	48.68	48.73
Al_2O_3	28.09	27.63	27.66	28.00	31.65	31.95	32.09	32.27
CaO	10.15	9.76	9.19	9.82	14.66	14.93	14.97	14.96
Na_2O	5.66	5.69	6.07	5.74	2.92	3.06	2.99	3.14
K_2O	0.50	0.44	0.47	0.40	0.13	0.12	0.12	0.13
FeO	0.65	0.47	0.51	0.73	0.42	0.44	0.67	0.52
Total	100.00	98.81	100.56	99.80	99.37	99.16	99.53	99.76
An	48.4	47.4	44.3	47.5	72.9	72.4	73.0	71.9
Ab	48.8	50.0	53.0	50.2	26.3	26.9	26.3	27.3
Or	2.8	2.5	2.7	2.3	0.8	0.7	0.7	0.8

Sample	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	5	6	7	1	2	3	4	5
SiO_2	54.60	54.37	55.09	53.20	50.60	49.15	60.26	49.58
Al_2O_3	27.48	28.33	27.59	28.74	30.06	31.27	23.25	31.37
CaO	9.98	10.69	10.16	11.12	13.56	14.81	5.93	14.66
Na_2O	5.62	5.37	5.96	5.09	3.90	3.31	7.84	3.05
K_2O	0.43	0.33	0.36	0.31	0.16	0.12	0.97	0.10
FeO	0.75	0.51	0.47	0.58	0.50	0.57	0.66	0.69
Total	98.85	99.61	99.63	99.04	98.78	99.23	98.91	99.45
An	48.3	51.4	47.6	53.8	65.2	70.7	27.9	72.2
Ab	49.2	46.7	50.4	44.5	33.9	28.6	66.7	27.2
Or	2.5	1.9	2.0	1.8	0.9	0.7	5.4	0.6

Sample	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	6	7	8	1	2	3	4	5
SiO_2	55.21	51.13	55.21	49.41	50.23	50.04	50.34	49.01
Al_2O_3	26.98	30.19	27.21	30.94	30.89	30.53	30.84	31.16
CaO	9.66	12.77	10.25	14.23	13.51	13.58	13.68	14.54
Na_2O	5.79	3.96	5.58	3.69	3.56	3.62	3.51	3.26
K_2O	0.33	0.18	0.39	0.15	0.12	0.17	0.18	0.14
FeO	0.76	0.50	0.55	0.35	0.67	0.39	0.45	0.59
Total	98.73	98.72	99.19	98.77	98.98	98.34	99.00	98.70
An	47.0	63.4	49.2	67.5	67.2	66.8	67.6	70.6
Ab	51.0	35.5	48.5	31.7	32.0	32.2	31.4	28.6
Or	1.9	1.0	2.2	0.9	0.7	1.0	1.0	0.8

Sample	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	6	1	2	3	4	5	6	7
SiO_2	49.63	59.76	54.05	54.56	56.20	54.32	54.90	54.28
Al_2O_3	31.49	24.81	28.16	27.80	27.32	27.84	28.20	28.31
CaO	14.69	6.37	10.59	10.29	9.11	10.28	10.18	10.42
Na_2O	3.17	7.11	5.43	5.45	6.04	5.50	5.48	5.45
K_2O	0.13	0.90	0.38	0.36	0.45	0.41	0.33	0.34
FeO	0.41	0.38	0.41	0.30	0.41	0.44	0.44	0.47
Total	99.50	99.34	99.02	98.77	99.52	98.80	99.53	99.26
An	71.4	31.4	50.8	50.0	44.3	49.6	49.7	50.4
Ab	27.9	63.4	47.1	47.9	53.1	48.0	48.4	47.7
Or	0.7	5.2	2.2	2.1	2.6	2.4	1.9	1.9

Sample	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	8	9	1	2	3	4	5	1
SiO_2	54.87	54.41	55.07	54.75	54.15	53.81	54.31	55.59
Al_2O_3	27.82	28.50	28.12	27.53	27.66	28.19	28.32	28.02
CaO	10.20	10.55	10.21	9.98	10.03	10.37	10.37	9.37
Na_2O	5.69	5.42	5.38	5.61	5.51	5.53	6.27	6.03
K_2O	0.36	0.35	0.40	0.39	0.38	0.48	0.44	0.46
FeO	0.39	0.54	0.40	0.50	0.50	0.45	0.54	0.46
Total	99.33	99.76	99.58	98.76	98.22	98.82	100.26	99.93
An	48.8	50.8	50.0	48.4	49.1	49.5	46.6	45.0
Ab	49.2	47.2	47.7	49.3	48.7	47.8	51.0	52.4
Or	2.0	2.0	2.3	2.3	2.2	2.7	2.4	2.7

Sample	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	2	3	4	5	1	2	3	4
SiO_2	54.54	53.16	54.74	59.44	54.71	54.79	54.39	54.72
Al_2O_3	28.92	28.68	27.98	24.89	28.44	28.56	28.88	28.08
CaO	10.75	10.50	10.15	6.55	10.14	10.15	10.32	9.84
Na_2O	5.36	5.30	5.81	7.22	5.51	5.42	5.75	5.68
K_2O	0.37	0.35	0.42	0.73	0.35	0.32	0.40	0.39
FeO	0.56	0.69	0.50	0.57	0.43	0.50	0.54	0.47
Total	100.49	98.68	99.59	99.41	99.60	99.73	100.28	99.18
An	51.5	51.2	48.0	32.0	49.4	49.9	48.7	47.8
Ab	46.4	46.7	49.7	63.8	48.6	48.2	49.1	49.9
Or	2.1	2.0	2.3	4.3	2.0	1.8	2.2	2.3

Sample	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	1	2	3	4	1	2	3	4
SiO_2	56.06	54.69	54.83	54.89	61.25	55.89	55.91	55.84
Al_2O_3	27.51	27.90	28.05	27.80	24.14	27.68	27.64	27.88
CaO	9.40	10.05	10.26	10.09	5.37	9.43	8.84	9.50
Na_2O	5.95	5.62	5.59	5.46	7.83	5.93	6.23	6.07
K_2O	0.40	0.42	0.40	0.39	0.97	0.40	0.48	0.37
FeO	0.51	0.30	0.44	0.45	0.64	0.66	0.57	0.30
Total	99.84	98.98	99.57	99.09	100.21	100.00	99.67	99.96
An	45.5	48.5	49.2	49.4	25.9	45.7	42.7	45.4
Ab	52.2	49.1	48.5	48.3	68.5	52.0	54.5	52.5
Or	2.3	2.4	2.3	2.3	5.6	2.3	2.8	2.1

Sample	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	5	6	7	8	9	10	1	2
SiO_2	55.33	54.85	53.98	54.33	54.69	54.65	59.87	54.73
Al_2O_3	28.18	28.30	28.88	28.49	29.10	28.63	24.33	28.79
CaO	9.68	9.76	10.61	10.24	10.62	10.13	5.73	10.33
Na_2O	5.85	5.60	5.33	5.39	5.35	5.41	7.70	5.59
K_2O	0.38	0.36	0.32	0.28	0.38	0.34	0.96	0.37
FeO	0.62	0.52	0.51	0.78	0.71	0.55	0.42	0.63
Total	100.04	99.38	99.62	99.51	100.86	99.72	99.00	100.43
An	46.7	48.1	51.4	50.4	51.2	49.8	27.5	49.4
Ab	51.1	49.8	46.7	48.0	46.6	48.2	67.0	48.4
Or	2.2	2.1	1.8	1.6	2.2	2.0	5.5	2.1

Sample	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	3	4	5	6	7	8	9	10
SiO_2	54.94	54.58	54.95	54.80	54.86	55.08	55.36	61.13
Al_2O_3	28.64	28.74	28.61	28.31	28.59	28.17	28.35	23.40
CaO	9.95	10.21	10.07	10.29	9.82	10.15	10.16	5.17
Na_2O	5.56	5.70	5.54	5.62	5.52	5.89	5.62	7.73
K_2O	0.34	0.38	0.31	0.37	0.43	0.37	0.36	1.05
FeO	0.56	0.49	0.59	0.47	0.62	0.69	0.57	0.44
Total	99.98	100.10	100.07	99.86	99.83	100.35	100.41	98.91
An	48.8	48.7	49.2	49.2	48.3	47.8	49.0	25.3
Ab	49.3	49.2	49.0	48.7	49.2	50.1	49.0	68.6
Or	2.0	2.2	1.8	2.1	2.5	2.1	2.0	6.1

Sample	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	1	2	3	4	5	6	7	8
SiO_2	56.23	54.52	54.30	53.22	55.56	54.89	54.21	55.06
Al_2O_3	27.89	28.84	29.03	27.90	28.24	28.46	28.48	28.48
CaO	9.74	10.21	10.32	9.79	10.28	10.03	10.22	9.71
Na_2O	5.92	5.36	5.38	5.77	5.75	5.67	5.39	5.61
K_2O	0.48	0.32	0.36	0.27	0.37	0.33	0.41	0.36
FeO	0.78	0.64	0.53	1.73	0.62	0.53	0.56	0.58
Total	101.04	99.88	99.93	98.69	100.81	99.92	99.26	99.80
An	46.3	50.3	50.4	47.6	48.6	48.5	49.9	47.9
Ab	50.9	47.8	47.5	50.8	49.3	49.6	47.7	50.0
Or	2.7	1.9	2.1	1.6	2.1	1.9	2.4	2.1

Sample	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	9	10	1	2	3	4	5	6
SiO_2	56.04	60.07	54.84	54.72	54.94	55.13	59.73	61.15
Al_2O_3	28.12	24.88	28.22	28.46	28.44	27.71	25.22	23.70
CaO	9.55	5.92	10.26	10.19	10.30	9.97	6.74	5.42
Na_2O	6.25	7.39	5.34	5.67	5.50	5.35	7.54	8.17
K_2O	0.46	1.00	0.38	0.30	0.38	0.35	0.86	1.14
FeO	0.65	0.70	0.69	0.57	0.56	0.39	0.66	0.47
Total	101.08	99.97	99.73	99.90	100.11	98.90	100.76	100.04
An	44.6	28.9	50.3	49.0	49.7	49.7	31.5	25.1
Ab	52.8	65.3	47.5	49.3	48.1	48.2	63.7	68.6
Or	2.6	5.8	2.2	1.7	2.2	2.1	4.8	6.3

Sample	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	7	8	9	1	2	3	4	5
SiO_2	54.34	60.77	61.93	57.24	57.05	56.93	56.69	56.75
Al_2O_3	28.10	24.52	23.36	27.28	27.13	27.39	27.46	27.91
CaO	9.86	5.58	4.72	8.73	8.72	9.27	9.25	9.39
Na_2O	5.66	7.67	8.12	6.25	6.38	6.22	6.18	6.22
K_2O	0.36	1.01	1.24	0.54	0.45	0.46	0.43	0.45
FeO	0.34	0.55	0.55	0.40	0.31	0.42	0.40	0.40
Total	98.66	100.09	99.93	100.45	100.04	100.69	100.42	101.13
An	48.0	27.0	22.6	42.2	41.9	44.0	44.2	44.3
Ab	49.9	67.1	70.3	54.7	55.5	53.4	53.4	53.1
Or	2.1	5.8	7.1	3.1	2.6	2.6	2.5	2.5

Sample	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	6	7	8	9	10	11	12	13
SiO_2	56.25	56.40	53.77	54.62	55.13	55.35	55.38	55.02
Al_2O_3	27.56	28.20	29.09	28.75	28.71	27.88	27.89	28.04
CaO	9.52	9.32	10.61	11.10	10.58	9.78	9.90	9.61
Na_2O	6.17	6.31	5.34	5.40	5.68	6.10	6.15	5.93
K_2O	0.52	0.46	0.31	0.29	0.37	0.35	0.43	0.41
FeO	0.42	0.52	0.52	0.45	0.74	0.56	0.46	0.26
Total	100.43	101.21	99.64	100.61	101.21	100.02	100.21	99.27
An	44.7	43.8	51.4	52.3	49.7	46.1	46.0	46.1
Ab	52.4	53.7	46.8	46.0	48.3	52.0	51.7	51.5
Or	2.9	2.6	1.8	1.6	2.1	2.0	2.4	2.4

Sample	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	14	15	16	17	18	1	2	3
SiO_2	55.39	56.39	55.84	55.43	61.04	60.04	55.74	55.31
Al_2O_3	28.49	27.81	27.38	27.99	24.19	24.57	28.10	28.15
CaO	10.37	9.49	8.89	9.60	5.26	6.08	9.80	10.11
Na_2O	5.79	6.09	6.26	6.19	8.53	7.66	6.05	5.86
K_2O	0.36	0.41	0.50	0.38	0.78	1.02	0.48	0.43
FeO	0.58	0.43	0.49	0.51	0.72	0.51	0.44	0.59
Total	100.99	100.61	99.35	100.10	100.54	99.88	100.61	100.45
An	48.7	45.2	42.7	45.2	24.3	28.7	46.0	47.6
Ab	49.3	52.5	54.4	52.7	71.4	65.5	51.3	49.9
Or	2.0	2.3	2.9	2.1	4.3	5.7	2.7	2.4

Sample	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	4	5	6	7	8	9	1	2
SiO_2	55.22	55.12	54.80	55.94	55.77	60.34	59.82	58.10
Al_2O_3	28.11	28.15	29.07	27.64	27.64	24.29	25.04	26.14
CaO	9.87	10.29	10.75	9.32	9.67	5.64	6.59	7.83
Na_2O	5.89	5.79	5.60	6.13	5.91	7.97	7.60	6.96
K_2O	0.37	0.40	0.23	0.47	0.36	1.09	0.69	0.70
FeO	0.66	0.49	0.38	0.47	0.72	0.61	0.51	0.53
Total	100.13	100.25	100.82	99.98	100.07	99.93	100.25	100.27
An	47.1	48.4	50.8	44.4	46.5	26.4	31.2	36.8
Ab	50.8	49.3	47.9	52.9	51.5	67.5	65.0	59.3
Or	2.1	2.3	1.3	2.7	2.1	6.1	3.9	3.9

Sample	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	3	4	5	6	7	8	9	10
SiO_2	56.96	58.07	58.15	59.86	61.10	61.23	60.71	61.61
Al_2O_3	27.45	26.79	26.51	24.84	23.51	24.11	24.55	23.61
CaO	9.09	8.17	7.99	6.57	5.04	5.21	5.73	4.93
Na_2O	6.54	6.59	6.96	7.74	8.07	8.01	7.56	7.97
K_2O	0.54	0.61	0.69	0.78	1.08	1.21	1.33	1.20
FeO	0.45	0.70	0.68	0.63	0.57	0.61	0.68	0.80
Total	101.02	100.93	100.97	100.41	99.37	100.37	100.55	100.12
An	42.2	39.2	37.3	30.5	24.1	24.7	27.3	23.7
Ab	54.9	57.3	58.8	65.1	69.8	68.6	65.2	69.4
Or	3.0	3.5	3.8	4.3	6.1	6.8	7.5	6.9

Sample	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	11	12	1	2	3	4	5	6
SiO_2	57.14	57.98	61.59	60.47	55.72	54.79	55.70	55.93
Al_2O_3	27.12	26.02	24.06	24.83	28.14	27.78	27.89	27.69
CaO	8.47	7.97	5.48	6.13	9.85	9.87	10.07	10.07
Na_2O	6.60	6.82	7.93	7.31	6.04	6.05	5.83	5.95
K_2O	0.61	0.61	1.10	0.95	0.43	0.41	0.40	0.41
FeO	1.03	0.74	0.77	0.65	0.50	0.47	0.55	0.61
Total	100.96	100.14	100.93	100.34	100.67	99.38	100.43	100.66
An	40.1	37.9	25.9	29.9	46.3	46.3	47.8	47.2
Ab	56.5	58.7	67.9	64.5	51.3	51.4	50.0	50.5
Or	3.4	3.5	6.2	5.5	2.4	2.3	2.2	2.3

Sample	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	7	8	9	1	2	3	4	5
SiO_2	56.38	56.46	61.53	61.55	61.40	57.04	55.61	56.08
Al_2O_3	27.71	27.69	23.59	23.89	23.70	26.98	28.23	28.16
CaO	9.27	9.15	5.07	5.17	5.30	8.50	9.93	9.89
Na_2O	6.37	6.30	8.36	7.87	7.85	6.46	5.93	5.88
K_2O	0.41	0.49	1.17	1.27	1.28	0.56	0.45	0.46
FeO	0.53	0.58	0.69	0.52	0.44	0.34	0.46	0.51
Total	100.68	100.68	100.40	100.28	99.97	99.89	100.61	100.98
An	43.6	43.3	23.5	24.7	25.2	40.8	46.9	46.9
Ab	54.1	54.0	70.1	68.1	67.6	56.1	50.6	50.4
Or	2.3	2.8	6.4	7.2	7.2	3.2	2.5	2.6

Sample	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	6	7	8	9	1	2	3	4
SiO_2	54.61	55.05	56.44	60.01	60.57	60.74	54.92	55.01
Al_2O_3	28.38	28.21	27.55	24.39	24.13	24.20	28.52	28.46
CaO	10.17	9.84	9.38	5.97	5.51	5.37	10.24	10.33
Na_2O	5.76	6.10	6.05	7.56	7.64	7.80	5.64	5.77
K_2O	0.38	0.46	0.48	0.93	1.16	1.19	0.34	0.38
FeO	0.44	0.44	0.75	0.49	0.61	0.45	0.50	0.51
Total	99.73	100.10	100.65	99.34	99.61	99.76	100.17	100.46
An	48.3	45.9	44.9	28.7	26.6	25.7	49.1	48.7
Ab	49.5	51.5	52.4	65.9	66.7	67.5	49.0	49.2
Or	2.1	2.6	2.8	5.3	6.7	6.8	1.9	2.1

Sample	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	5	6	7	8	9	10	1	2
SiO_2	54.99	55.46	55.54	56.28	61.20	60.36	56.95	56.37
Al_2O_3	28.99	28.99	28.25	27.58	23.82	24.00	26.66	27.79
CaO	10.30	10.39	10.20	9.68	5.03	5.73	8.23	9.00
Na_2O	5.93	5.79	5.94	6.12	8.05	7.63	6.53	6.25
K_2O	0.39	0.34	0.38	0.44	1.29	1.14	0.53	0.47
FeO	0.38	0.55	0.55	0.52	0.44	0.52	0.65	0.71
Total	100.98	101.50	100.86	100.62	99.83	99.39	99.56	100.59
An	47.9	48.9	47.6	45.5	23.8	27.4	39.8	43.1
Ab	49.9	49.3	50.2	52.0	68.9	66.1	57.2	54.2
Or	2.1	1.9	2.1	2.5	7.3	6.5	3.0	2.7

Sample	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	3	4	5	6	7	8	9	1
SiO_2	56.05	56.25	55.08	55.08	55.41	60.32	61.34	56.00
Al_2O_3	27.76	27.90	28.64	28.38	27.72	24.96	23.90	27.97
CaO	9.28	9.27	10.40	10.28	9.72	6.30	5.18	9.77
Na_2O	6.26	5.99	5.74	5.58	6.16	7.62	8.07	5.89
K_2O	0.45	0.52	0.40	0.35	0.46	0.92	1.21	0.42
FeO	0.55	0.42	0.36	0.37	0.64	0.53	0.66	0.40
Total	100.34	100.35	100.62	100.05	100.11	100.65	100.38	100.44
An	43.9	44.7	48.9	49.4	45.4	29.7	24.4	46.7
Ab	53.6	52.3	48.8	48.6	52.1	65.1	68.8	50.9
Or	2.5	3.0	2.3	2.0	2.5	5.2	6.8	2.4

Sample	CBV-XX-1A	CBV-XX-1A	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	2	3	1	2	3	4	5	6
SiO_2	56.14	55.33	55.27	56.30	54.78	54.79	56.26	56.49
Al_2O_3	27.73	27.96	28.39	27.94	28.75	27.67	27.57	27.80
CaO	9.39	9.81	10.47	9.95	10.48	10.19	9.06	9.53
Na_2O	6.08	5.90	5.66	6.03	5.81	5.90	6.36	6.23
K_2O	0.43	0.36	0.40	0.41	0.42	0.44	0.49	0.47
FeO	0.58	0.52	0.52	0.70	0.46	0.64	0.52	0.63
Total	100.36	99.89	100.71	101.33	100.70	99.64	100.26	101.16
An	44.9	46.9	49.4	46.6	48.8	47.6	42.8	44.6
Ab	52.6	51.1	48.3	51.1	48.9	49.9	54.4	52.8
Or	2.5	2.0	2.2	2.3	2.3	2.5	2.8	2.6

Sample	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	7	8	1	2	3	4	5	1
SiO_2	56.33	55.07	55.38	55.99	55.80	55.76	55.74	54.81
Al_2O_3	27.46	28.60	28.06	27.66	27.54	27.44	27.64	28.11
CaO	9.45	10.15	9.79	9.41	9.17	9.34	9.90	10.18
Na_2O	6.33	5.68	6.00	6.14	6.23	6.22	5.84	5.56
K_2O	0.47	0.34	0.42	0.46	0.50	0.47	0.41	0.33
FeO	0.29	0.58	0.43	0.74	0.50	0.55	0.46	0.75
Total	100.31	100.41	100.08	100.40	99.74	99.78	100.00	99.74
An	44.1	48.7	46.3	44.7	43.6	44.1	47.2	49.3
Ab	53.4	49.3	51.3	52.7	53.6	53.2	50.4	48.7
Or	2.6	1.9	2.4	2.6	2.8	2.7	2.3	1.9

Sample	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	2	3	4	5	6	7	8	9
SiO_2	55.22	55.88	55.77	55.70	54.80	56.75	55.03	61.08
Al_2O_3	28.45	28.44	28.30	27.77	28.24	27.89	27.83	24.16
CaO	10.28	9.94	10.03	9.67	10.31	9.36	9.62	5.27
Na_2O	5.57	6.02	5.94	6.22	5.78	6.25	5.88	8.18
K_2O	0.38	0.41	0.36	0.46	0.34	0.46	0.43	0.99
FeO	0.68	0.66	0.57	0.59	0.45	0.76	0.74	0.48
Total	100.58	101.35	100.97	100.40	99.92	101.47	99.53	100.15
An	49.4	46.6	47.3	45.0	48.7	44.1	46.3	24.8
Ab	48.4	51.1	50.7	52.4	49.4	53.3	51.2	69.7
Or	2.2	2.3	2.0	2.5	1.9	2.6	2.5	5.5

Sample	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	1	2	3	4	5	6	7	8
SiO_2	56.09	60.56	55.00	54.74	54.57	55.35	55.59	54.97
Al_2O_3	27.50	24.39	28.68	28.47	28.25	28.11	28.52	28.46
CaO	9.11	5.82	10.62	10.68	10.23	9.96	10.09	10.31
Na_2O	6.25	7.63	5.54	5.48	5.85	5.72	5.63	5.70
K_2O	0.45	1.10	0.41	0.34	0.36	0.42	0.42	0.41
FeO	0.65	0.46	0.71	0.52	0.68	0.56	0.48	0.58
Total	100.05	99.97	100.97	100.23	99.94	100.12	100.72	100.43
An	43.5	27.8	50.3	50.9	48.2	47.8	48.6	48.8
Ab	54.0	66.0	47.5	47.2	49.8	49.7	49.1	48.9
Or	2.5	6.3	2.3	1.9	2.0	2.4	2.4	2.3

Sample	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DF dacite	DE dacite
Line Number	1	2	3	4	5	6	7	8
SiO_2	54.49	60.70	54.31	56.19	55.36	55.80	54.80	54.98
Al_2O_3	28.78	24.37	29.15	27.45	27.97	27.95	29.15	27.96
CaO	10.65	5.86	10.85	9.17	9.78	9.59	10.82	10.04
Na_2O	5.50	7.32	5.36	6.07	6.08	5.87	5.64	5.78
K_2O	0.30	1.54	0.37	0.45	0.41	0.47	0.32	0.38
FeO	0.56	0.51	0.59	0.58	0.74	0.52	0.48	0.37
Total	100.28	100.30	100.64	99.91	100.34	100.19	101.21	99.51
An	50.8	28.0	51.7	44.3	46.0	46.2	50.5	47.9
Ab	47.5	63.3	46.2	53.1	51.7	51.1	47.7	49.9
Or	1.7	8.7	2.1	2.6	2.3	2.7	1.8	2.2

Sample	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	1	2	3	4	5	6	7	8
SiO_2	61.03	55.40	55.12	55.93	55.66	56.71	56.79	56.91
Al_2O_3	24.37	27.38	28.27	28.24	28.54	28.15	27.16	27.58
CaO	5.58	9.78	10.24	10.11	10.16	9.69	9.11	9.09
Na_2O	8.18	5.90	5.84	6.01	5.81	6.17	6.37	6.11
K_2O	0.92	0.46	0.38	0.44	0.38	0.44	0.51	0.45
FeO	0.64	0.53	0.39	0.43	0.58	0.31	0.56	0.49
Total	100.74	99.55	100.24	101.16	101.13	101.47	100.50	100.63
An	26.0	46.2	48.2	47.0	48.1	45.3	42.9	43.9
Ab	68.9	51.2	49.7	50.5	49.8	52.2	54.3	53.5

Sample	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	9	10	1	2	3	4	5	6
SiO_2	54.89	56.00	57.22	56.01	55.26	54.97	54.55	60.95
Al_2O_3	28.65	28.12	26.61	28.40	28.27	28.41	28.60	25.04
CaO	10.77	9.86	8.51	9.77	9.97	10.42	10.48	5.95
Na_2O	5.44	5.94	6.82	5.66	5.67	5.58	5.40	7.57
K_2O	0.37	0.45	0.52	0.41	0.41	0.37	0.35	1.02
FeO	0.43	0.72	0.62	0.62	0.78	0.82	0.74	0.52
Total	100.54	101.08	100.30	100.87	100.36	100.57	100.10	101.04
An	51.2	46.6	39.7	47.7	48.1	49.7	50.7	28.5
Ab	46.7	50.8	57.5	50.0	49.5	48.2	47.3	65.7
Or	2.1	2.5	2.9	2.4	2.4	2.1	2.0	5.8

Sample	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	7	1	2	3	4	5	6	7
SiO_2	60.45	61.04	57.66	56.25	56.06	55.72	56.82	55.43
Al_2O_3	24.56	23.68	26.73	27.63	27.76	27.98	27.42	27.71
CaO	5.89	5.07	8.56	9.35	9.72	9.50	8.60	9.76
Na_2O	7.96	8.24	6.74	6.14	6.12	6.09	6.37	6.08
K_2O	1.09	1.24	0.42	0.44	0.44	0.46	0.54	0.39
FeO	0.53	0.61	0.63	0.75	0.71	0.70	0.40	0.56
Total	100.48	99.88	100.73	100.55	100.81	100.45	100.15	99.94
An	27.3	23.6	40.3	44.6	45.6	45.1	41.4	46.0
Ab	66.7	69.5	57.4	52.9	51.9	52.3	55.5	51.8
Or	6.0	6.9	2.3	2.5	2.4	2.6	3.1	2.2

Sample	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	8	9	10	1	2	3	4	5
SiO_2	55.90	56.06	55.85	57.30	55.51	55.03	55.35	56.04
Al_2O_3	28.22	28.19	28.08	27.22	28.57	28.22	28.21	27.80
CaO	9.96	9.75	9.66	8.38	10.05	10.12	9.93	9.94
Na_2O	5.93	5.82	5.99	6.67	5.87	5.72	5.80	5.87
K_2O	0.40	0.44	0.47	0.44	0.40	0.37	0.44	0.41
FeO	0.58	0.59	0.52	0.55	0.70	0.74	0.48	0.72
Total	100.99	100.86	100.57	100.56	101.10	100.18	100.20	100.78
An	47.1	46.9	45.8	40.0	47.5	48.4	47.4	47.2
Ab	50.7	50.6	51.5	57.5	50.2	49.5	50.1	50.5
Or	2.3	2.5	2.7	2.5	2.2	2.1	2.5	2.3

Sample	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	6	7	8	9	1	2	3	4
SiO_2	60.90	61.85	62.50	61.21	60.88	54.10	54.34	56.17
Al_2O_3	23.96	23.30	22.77	24.28	24.16	28.62	29.12	27.51
CaO	5.24	4.77	4.19	5.77	5.26	10.61	11.09	9.03
Na_2O	8.05	8.33	8.32	8.02	7.95	5.47	5.34	6.32
K_2O	1.33	1.50	1.50	0.84	0.98	0.36	0.40	0.49
FeO	0.76	0.57	0.86	0.67	0.65	0.32	0.55	0.45
Total	100.24	100.31	100.13	100.78	99.88	99.48	100.83	99.97
An	24.5	22.1	19.9	27.1	25.3	50.7	52.3	42.9
Ab	68.1	69.7	71.6	68.2	69.1	47.3	45.5	54.3
Or	7.4	8.2	8.5	4.7	5.6	2.0	2.2	2.8

Sample	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	5	6	7	8	9	10	1	2
SiO_2	57.32	56.66	56.34	56.00	55.63	57.79	59.53	54.47
Al_2O_3	26.60	26.81	27.73	27.27	27.29	26.00	23.84	28.66
CaO	8.75	9.13	9.42	9.36	9.29	7.88	5.58	11.05
Na_2O	6.28	6.19	5.96	6.28	6.06	6.82	7.71	5.33
K_2O	0.52	0.50	0.45	0.51	0.44	0.53	1.04	0.39
FeO	0.50	0.48	0.51	0.49	0.64	0.49	0.50	0.55
Total	99.96	99.75	100.42	99.91	99.36	99.51	98.20	100.43
An	42.2	43.6	45.4	43.9	44.7	37.8	26.9	52.2
Ab	54.8	53.5	52.0	53.2	52.8	59.2	67.2	45.6
Or	3.0	2.8	2.6	2.9	2.5	3.0	6.0	2.2

Sample	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	3	4	5	6	7	8	9	1
SiO_2	54.59	54.24	55.20	54.10	54.45	55.23	55.08	54.74
Al_2O_3	28.87	29.05	28.69	29.14	28.63	28.65	27.42	28.89
CaO	10.74	10.35	10.72	11.33	10.97	10.42	9.72	10.52
Na_2O	5.27	5.55	5.52	5.17	5.15	5.57	5.75	5.43
K_2O	0.35	0.38	0.45	0.37	0.33	0.36	0.31	0.32
FeO	0.49	0.69	0.27	0.62	0.71	0.64	0.39	0.40
Total	100.31	100.26	100.85	100.73	100.24	100.87	98.68	100.30
An	51.9	49.7	50.4	53.6	53.0	49.8	47.4	50.8
Ab	46.1	48.2	47.0	44.3	45.1	48.2	50.8	47.4
Or	2.0	2.2	2.5	2.1	1.9	2.0	1.8	1.8

Sample	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	2	3	4	5	6	7	8	9
SiO_2	55.36	53.96	53.42	54.21	54.20	54.35	54.51	60.83
Al_2O_3	28.38	29.65	29.27	29.20	29.58	29.12	27.96	24.28
CaO	10.13	11.24	10.79	11.23	11.52	11.06	10.65	5.87
Na_2O	5.65	5.28	5.19	5.17	5.07	5.08	5.77	7.88
K_2O	0.39	0.30	0.30	0.29	0.28	0.33	0.36	0.99
FeO	0.53	0.68	0.53	0.45	0.63	0.44	0.63	0.83
Total	100.44	101.10	99.52	100.54	101.30	100.37	99.89	100.68
An	48.7	53.1	52.5	53.7	54.8	53.6	49.5	27.6
Ab	49.1	45.2	45.7	44.7	43.6	44.6	48.5	66.9
Or	2.3	1.7	1.7	1.6	1.6	1.9	2.0	5.5

Sample	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	1	2	3	4	5	6	7	8
SiO_2	55.88	56.17	56.76	56.40	55.93	55.17	56.19	55.89
Al_2O_3	28.23	27.54	26.59	28.45	27.67	28.01	27.86	27.86
CaO	10.18	9.27	8.78	9.82	9.95	9.87	9.75	9.58
Na_2O	5.77	6.41	5.99	5.87	5.82	5.66	5.77	6.22
K_2O	0.42	0.52	0.47	0.44	0.43	0.42	0.47	0.43
FeO	0.37	0.44	0.34	0.38	0.44	0.42	0.34	0.32
Total	100.85	100.36	98.92	101.37	100.23	99.54	100.38	100.30
An	48.2	43.1	43.5	46.8	47.4	47.9	47.01	44.88
Ab	49.4	54.0	53.7	50.7	50.2	49.7	50.33	52.74
Or	2.4	2.9	2.8	2.5	2.4	2.4	2.67	2.38

Sample	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	9	10	1	2	3	4	5	6
SiO_2	56.51	54.48	60.63	59.68	55.74	56.07	56.40	56.34
Al_2O_3	28.14	28.80	24.87	24.05	26.76	27.67	27.79	28.07
CaO	9.49	10.56	6.10	5.50	9.30	9.64	9.51	9.58
Na_2O	6.10	5.71	7.62	8.13	6.10	6.20	6.09	5.98
K_2O	0.41	0.34	0.85	0.97	0.49	0.52	0.39	0.53
FeO	0.40	0.70	0.71	0.56	0.49	0.33	0.51	0.65
Total	101.04	100.59	100.79	98.89	98.88	100.43	100.70	101.14
An	45.2	49.6	29.2	25.7	44.4	44.9	45.3	45.6
Ab	52.5	48.5	66.0	68.9	52.8	52.3	52.5	51.5
Or	2.3	1.9	4.9	5.4	2.8	2.9	2.2	3.0

Sample	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	7	8	9	10	1	2	3	4
SiO_2	55.98	56.28	55.63	56.37	55.50	56.10	53.96	53.60
Al_2O_3	27.61	28.05	27.88	28.06	28.99	28.79	28.85	28.83
CaO	9.77	9.70	9.83	9.68	10.42	10.47	11.25	11.13
Na_2O	5.92	6.09	6.04	5.86	5.82	5.68	5.55	5.48
K_2O	0.51	0.45	0.46	0.44	0.44	0.39	0.33	0.36
FeO	0.39	0.77	0.42	0.56	0.55	0.45	0.70	0.46
Total	100.20	101.35	100.26	100.97	101.72	101.88	100.64	99.86
An	46.3	45.6	46.1	46.5	48.5	49.4	51.9	51.8
Ab	50.8	51.8	51.3	50.9	49.1	48.4	46.3	46.2
Or	2.9	2.5	2.6	2.5	2.5	2.2	1.8	2.0

Sample	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	5	6	7	8	9	1	2	3
SiO_2	60.78	56.77	54.57	56.19	55.03	61.15	55.68	55.54
Al_2O_3	24.28	27.71	29.01	28.11	28.68	23.96	26.97	27.70
CaO	5.60	9.34	10.84	9.72	10.48	5.19	8.85	9.74
Na_2O	8.06	6.16	5.60	6.17	5.65	7.73	6.12	6.00
K_2O	1.01	0.40	0.34	0.43	0.33	1.25	0.53	0.41
FeO	0.57	0.46	0.57	0.57	0.59	0.56	0.84	0.82
Total	100.30	100.84	100.93	101.19	100.77	99.84	98.99	100.21
An	26.2	44.6	50.7	45.4	49.7	25.1	43.0	46.2
Ab	68.2	53.2	47.4	52.2	48.5	67.7	53.9	51.5
Or	5.6	2.3	1.9	2.4	1.8	7.2	3.1	2.3

Sample	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	4	5	6	7	8	9	1	2
SiO_2	55.65	55.91	57.51	55.23	54.78	60.87	61.11	54.06
Al_2O_3	28.34	28.16	27.17	26.63	28.05	24.28	24.57	28.74
CaO	9.95	9.74	8.73	9.22	10.23	5.25	5.65	10.99
Na_2O	5.80	5.89	6.57	5.82	5.71	8.04	8.03	5.50
K_2O	0.41	0.47	0.55	0.59	0.39	1.06	1.07	0.37
FeO	0.67	0.53	0.31	0.58	0.62	0.46	0.61	0.46
Total	100.81	100.69	100.84	98.08	99.77	99.97	101.03	100.13
An	47.5	46.5	41.0	45.1	48.7	24.9	26.3	51.4
Ab	50.2	50.9	55.9	51.5	49.1	69.1	67.7	46.5
Or	2.3	2.7	3.1	3.5	2.2	6.0	5.9	2.1

Sample	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	3	4	5	6	7	8	1	2
SiO_2	55.22	54.55	54.52	55.93	55.88	56.22	60.92	55.21
Al_2O_3	28.11	28.43	28.98	28.50	28.11	27.64	23.97	28.53
CaO	10.22	10.70	10.76	10.38	9.92	9.40	5.42	10.39
Na_2O	5.70	5.53	5.60	5.77	5.79	6.04	7.62	5.60
K_2O	0.44	0.43	0.38	0.39	0.41	0.40	1.15	0.37
FeO	0.38	0.44	0.56	0.80	0.50	0.43	0.52	0.48
Total	100.07	100.07	100.80	101.76	100.61	100.13	99.60	100.59
An	48.6	50.4	50.4	48.8	47.5	45.2	26.3	49.5
Ab	49.0	47.2	47.5	49.0	50.1	52.6	67.0	48.4
Or	2.5	2.4	2.1	2.2	2.3	2.3	6.6	2.1

Sample	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	3	4	5	6	7	8	9	1
SiO_2	56.06	54.44	55.76	55.82	55.81	54.81	61.03	60.38
Al_2O_3	27.37	28.82	27.93	28.49	28.14	28.78	24.57	23.77
CaO	9.54	10.41	9.75	10.32	9.30	10.32	5.94	5.47
Na_2O	5.83	5.65	6.14	5.66	6.06	5.27	7.71	7.64
K_2O	0.47	0.42	0.46	0.35	0.48	0.39	1.01	1.11
FeO	0.50	0.48	0.49	0.43	0.37	0.74	0.43	0.61
Total	99.77	100.22	100.53	101.08	100.15	100.31	100.70	98.98
An	46.2	49.2	45.6	49.2	44.6	50.8	28.2	26.5
Ab	51.1	48.4	51.9	48.8	52.7	46.9	66.1	67.1
Or	2.7	2.4	2.6	2.0	2.7	2.3	5.7	6.4

Sample	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	2	3	4	5	6	7	8	9
SiO_2	54.63	55.58	55.58	55.62	55.16	55.91	54.74	55.33
Al_2O_3	28.44	27.30	27.60	28.19	27.96	27.76	28.55	26.50
CaO	10.56	9.26	9.52	9.95	10.08	9.55	10.24	8.93
Na_2O	5.37	6.12	6.14	5.82	5.90	6.30	5.87	6.30
K_2O	0.36	0.51	0.53	0.42	0.39	0.45	0.38	0.59
FeO	0.72	0.50	0.37	0.46	0.48	0.34	0.74	0.57
Total	100.08	99.28	99.73	100.48	99.96	100.31	100.53	98.22
An	51.0	44.2	44.8	47.4	47.5	44.5	48.0	42.5
Ab	46.9	52.9	52.3	50.2	50.3	53.1	49.8	54.2
Or	2.1	2.9	2.9	2.4	2.2	2.5	2.1	3.3

Sample	CBV-XX-1B	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	10	1	2	3	4	5	6	7
SiO_2	60.24	60.89	54.83	55.48	54.60	54.89	54.44	55.09
Al_2O_3	23.25	24.01	27.54	28.13	27.97	28.48	28.46	28.66
CaO	5.24	5.56	9.83	9.68	10.47	11.08	10.70	10.94
Na_2O	7.73	7.69	5.41	5.48	5.18	5.12	5.37	5.06
K_2O	1.15	1.01	0.37	0.37	0.36	0.32	0.31	0.29
FeO	0.73	0.83	0.56	0.55	0.56	0.62	0.51	0.66
Total	98.34	99.99	98.55	99.69	99.14	100.51	99.79	100.69
An	25.4	26.9	49.0	48.3	51.7	53.5	51.5	53.5
Ab	67.9	67.3	48.8	49.5	46.3	44.7	46.8	44.8
Or	6.6	5.8	2.2	2.2	2.1	1.8	1.8	1.7

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	8	9	10	11	12	13	14	15
SiO_2	56.60	57.20	57.17	57.96	56.63	55.81	56.83	56.55
Al_2O_3	26.50	26.60	26.72	26.53	27.39	26.65	26.93	27.02
CaO	8.78	9.01	8.39	8.35	9.07	9.01	8.98	8.95
Na_2O	6.32	6.40	6.23	6.25	6.00	5.91	5.80	6.18
K_2O	0.45	0.46	0.58	0.50	0.45	0.42	0.46	0.45
FeO	0.54	0.35	0.31	0.40	0.39	0.47	0.59	0.36
Total	99.19	100.02	99.39	99.98	99.93	98.28	99.58	99.51
An	42.3	42.6	41.2	41.2	44.3	44.6	44.8	43.3
Ab	55.1	54.8	55.4	55.8	53.1	52.9	52.4	54.1
Or	2.6	2.6	3.4	2.9	2.6	2.5	2.7	2.6

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	16	17	18	1	2	3	4	5
SiO_2	56.84	57.11	57.34	55.51	54.52	55.84	56.18	56.54
Al_2O_3	27.16	27.26	26.93	27.57	28.53	27.62	27.46	27.22
CaO	8.79	8.77	8.89	9.54	10.30	9.32	9.37	9.37
Na_2O	6.16	6.04	6.03	5.59	5.43	5.85	5.87	6.16
K_2O	0.46	0.51	0.42	0.44	0.33	0.41	0.40	0.36
FeO	0.49	0.55	0.36	0.67	0.76	0.58	0.49	0.54
Total	99.92	100.24	99.98	99.31	99.88	99.62	99.77	100.18
An	42.9	43.2	43.8	47.3	50.2	45.7	45.8	44.7
Ab	54.4	53.8	53.8	50.1	47.9	51.9	51.9	53.2
Or	2.7	3.0	2.4	2.6	1.9	2.4	2.4	2.0

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	6	7	8	9	10	11	12	13
SiO_2	55.88	56.94	57.28	55.99	55.28	55.50	55.25	55.48
Al_2O_3	27.05	26.35	26.30	26.95	28.12	27.89	27.71	27.98
CaO	9.48	8.36	8.23	9.17	10.22	10.20	10.13	9.57
Na_2O	5.99	6.12	6.18	5.95	5.35	5.66	5.57	5.91
K_2O	0.45	0.56	0.54	0.45	0.38	0.37	0.40	0.39
FeO	0.62	0.70	0.60	0.49	0.49	0.50	0.61	0.60
Total	99.47	99.03	99.14	99.00	99.85	100.11	99.67	99.92
An	45.5	41.6	41.0	44.8	50.2	48.9	48.9	46.2
Ab	51.9	55.1	55.8	52.6	47.6	49.0	48.7	51.6
Or	2.6	3.3	3.2	2.6	2.3	2.1	2.3	2.3

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	14	15	16	17	18	1	2	3
SiO_2	54.85	54.74	55.10	54.50	59.14	56.57	53.93	57.49
Al_2O_3	28.95	28.69	28.17	27.76	24.94	27.25	28.90	26.81
CaO	10.70	10.83	10.35	10.07	6.32	9.68	10.94	8.63
Na_2O	5.12	5.13	5.27	5.59	7.41	5.76	4.94	6.10
K_2O	0.34	0.36	0.35	0.38	0.90	0.35	0.33	0.53
FeO	0.50	0.46	0.61	0.59	0.69	0.67	0.40	0.45
Total	100.46	100.20	99.85	98.88	99.40	100.29	99.43	100.01
An	52.5	52.7	51.0	48.8	30.4	47.2	54.0	42.5
Ab	45.5	45.2	47.0	49.0	64.5	50.8	44.1	54.4
Or	2.0	2.1	2.1	2.2	5.1	2.0	1.9	3.1

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	4	5	6	7	8	9	10	11
SiO_2	57.08	57.51	57.28	56.69	57.76	57.25	56.82	56.97
Al_2O_3	26.60	26.52	26.74	26.82	26.27	26.92	27.17	26.88
CaO	8.52	8.86	8.57	8.98	8.57	8.66	8.71	8.76
Na_2O	6.06	6.36	5.97	6.14	6.09	6.23	6.13	6.01
K_2O	0.41	0.44	0.51	0.47	0.42	0.46	0.54	0.46
FeO	0.39	0.54	0.48	0.43	0.55	0.45	0.43	0.60
Total	99.05	100.21	99.55	99.53	99.68	99.97	99.79	99.69
An	42.7	42.4	42.9	43.5	42.6	42.3	42.6	43.4
Ab	54.9	55.1	54.1	53.8	54.8	55.1	54.3	53.9
Or	2.4	2.5	3.0	2.7	2.5	2.6	3.1	2.7

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	12	13	14	15	16	17	18	19
SiO_2	54.89	54.80	56.76	54.86	54.85	55.16	54.83	60.79
Al_2O_3	28.01	28.47	26.96	28.24	28.00	28.14	27.54	23.85
CaO	9.88	10.81	8.84	10.61	10.74	10.37	9.83	6.11
Na_2O	5.49	5.25	6.07	5.15	5.37	5.38	5.41	7.81
K_2O	0.36	0.34	0.54	0.32	0.35	0.36	0.37	0.84
FeO	0.46	0.39	0.61	0.68	0.54	0.54	0.56	0.52
Total	99.09	100.07	99.78	99.85	99.94	99.95	98.55	99.92
An	48.8	52.2	43.2	52.3	51.4	50.5	49.0	28.8
Ab	49.1	45.9	53.7	45.9	46.6	47.4	48.8	66.5
Or	2.1	2.0	3.1	1.9	2.0	2.1	2.2	4.7

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	1	2	3	4	5	6	7	8
SiO_2	61.32	57.06	54.10	55.56	56.55	57.07	54.42	54.24
Al_2O_3	23.89	27.02	28.74	27.67	26.89	27.33	29.13	29.03
CaO	5.30	9.07	10.79	10.07	8.92	8.94	11.05	11.16
Na_2O	7.68	6.12	5.11	5.48	6.04	6.08	4.97	5.01
K_2O	0.95	0.42	0.37	0.40	0.47	0.46	0.30	0.31
FeO	0.61	0.73	0.53	0.73	0.58	0.51	0.61	0.56
Total	99.74	100.42	99.65	99.90	99.45	100.39	100.47	100.32
An	26.1	43.9	52.7	49.2	43.7	43.6	54.1	54.2
Ab	68.3	53.6	45.2	48.5	53.6	53.7	44.1	44.0
Or	5.6	2.4	2.1	2.3	2.7	2.7	1.7	1.8

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	9	10	11	12	13	14	15	16
SiO_2	57.14	56.80	54.36	54.38	54.70	54.98	55.47	61.89
Al_2O_3	26.73	26.92	28.58	28.63	28.29	28.28	27.14	23.82
CaO	8.54	8.90	10.72	10.89	10.55	10.33	9.40	5.15
Na_2O	6.47	6.28	5.12	5.12	5.04	5.46	5.96	7.00
K_2O	0.50	0.47	0.31	0.33	0.34	0.37	0.46	1.05
FeO	0.59	0.51	0.60	0.51	0.53	0.63	0.61	0.62
Total	99.97	99.89	99.69	99.86	99.46	100.04	99.05	100.14
An	41.0	42.7	52.7	53.0	52.5	50.0	45.3	25.6
Ab	56.2	54.6	45.5	45.1	45.4	47.8	52.0	68.2
Or	2.9	2.7	1.8	1.9	2.0	2.1	2.7	6.2

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	17	1	2	3	4	5	6	7
SiO_2	61.76	62.33	60.94	59.35	57.72	58.52	57.88	59.09
Al_2O_3	23.67	22.85	24.14	25.20	25.76	25.73	25.73	25.52
CaO	5.12	4.63	5.79	7.26	7.63	7.71	7.89	7.45
Na_2O	7.72	8.12	7.63	6.92	6.56	6.69	6.60	6.61
K_2O	1.12	1.25	0.92	0.71	0.59	0.56	0.57	0.66
FeO	0.75	0.75	0.77	0.91	0.76	0.55	0.61	0.68
Total	100.15	99.93	100.20	100.35	99.02	99.77	99.27	100.00
An	25.0	22.3	28.0	35.2	37.8	37.6	38.5	36.9
Ab	68.4	70.6	66.7	60.7	58.7	59.1	58.2	59.2
Or	6.5	7.2	5.3	4.1	3.5	3.3	3.3	3.9

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	8	9	10	1	2	3	4	5
SiO_2	58.14	58.11	58.92	61.35	61.18	61.02	60.68	60.08
Al_2O_3	25.83	25.88	25.78	22.79	23.65	23.91	24.14	23.90
CaO	7.62	7.55	7.30	4.73	5.22	5.33	5.93	5.67
Na_2O	6.38	6.54	6.81	7.75	7.77	7.88	7.55	7.53
K_2O	0.67	0.60	0.69	1.15	1.21	1.16	1.01	1.17
FeO	0.65	0.70	0.49	0.84	0.55	0.66	0.70	0.63
Total	99.28	99.39	100.07	98.60	99.57	99.96	100.02	98.98
An	38.2	37.5	36.0	23.5	25.2	25.4	28.5	27.4
Ab	57.8	58.9	60.0	69.7	67.8	68.0	65.7	65.8
Or	4.0	3.6	4.0	6.8	6.9	6.6	5.8	6.7

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	6	7	8	9	1	2	3	4
SiO_2	59.80	58.83	59.24	59.57	61.37	60.39	60.88	66.03
Al_2O_3	24.63	24.31	25.16	24.04	23.61	24.23	24.07	19.94
CaO	6.23	7.23	7.17	6.24	5.11	6.21	5.31	3.95
Na_2O	7.40	7.10	6.72	7.12	7.69	7.34	7.80	6.77
K_2O	1.06	0.80	0.73	0.87	1.11	0.94	1.10	1.55
FeO	0.76	0.74	0.60	0.73	0.83	0.82	0.55	1.06
Total	99.88	99.01	99.61	98.57	99.70	99.93	99.71	99.31
An	29.8	34.4	35.5	31.0	25.1	30.1	25.6	21.9
Ab	64.2	61.1	60.2	63.9	68.4	64.5	68.1	67.9
Or	6.0	4.5	4.3	5.1	6.5	5.4	6.3	10.2

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	1	2	3	4	5	6	7	8
SiO_2	62.60	55.82	53.48	54.81	54.92	54.38	54.32	54.06
Al_2O_3	21.83	28.05	28.07	28.24	28.41	28.28	28.72	28.44
CaO	3.98	9.90	10.51	10.85	10.64	10.70	11.17	10.83
Na_2O	8.18	5.50	5.28	5.29	5.29	5.12	5.07	5.00
K_2O	1.53	0.36	0.37	0.29	0.35	0.36	0.38	0.30
FeO	0.73	0.65	0.54	0.59	0.53	0.55	0.57	0.57
Total	98.85	100.27	98.26	100.08	100.14	99.39	100.23	99.19
An	19.3	48.8	51.3	52.2	51.6	52.4	53.7	53.5
Ab	71.9	49.0	46.6	46.1	46.4	45.4	44.1	44.7
Or	8.8	2.1	2.2	1.7	2.0	2.1	2.2	1.8

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	9	10	11	12	13	14	15	1
SiO_2	58.30	54.57	54.91	55.19	59.97	61.79	60.48	60.85
Al_2O_3	25.83	28.54	27.74	27.40	23.84	23.30	23.92	23.82
CaO	7.74	10.45	9.86	10.03	5.77	5.23	5.31	5.28
Na_2O	6.07	5.14	5.63	5.46	7.55	7.73	7.97	7.79
K_2O	1.42	0.36	0.40	0.33	1.01	1.26	0.70	1.14
FeO	0.54	0.68	0.37	0.54	0.64	0.52	0.76	0.77
Total	99.90	99.73	98.93	98.95	98.79	99.83	99.14	99.66
An	37.9	51.8	48.0	49.4	28.0	25.2	25.8	25.5
Ab	53.8	46.1	49.6	48.7	66.2	67.5	70.1	68.0
Or	8.3	2.1	2.3	2.0	5.8	7.3	4.1	6.6

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	2	3	4	5	6	7	8	9
SiO_2	53.85	54.46	54.69	54.78	54.02	54.56	54.51	55.27
Al_2O_3	28.66	28.38	28.31	28.48	28.41	28.61	28.42	27.63
CaO	10.61	10.72	10.41	10.37	10.77	10.85	10.61	10.50
Na_2O	5.08	5.24	5.22	5.39	5.29	5.15	5.46	5.43
K_2O	0.36	0.32	0.33	0.40	0.29	0.34	0.36	0.40
FeO	0.72	0.66	0.72	0.80	0.88	0.80	0.47	0.65
Total	99.28	99.78	99.68	100.21	99.66	100.32	99.83	99.88
An	52.4	52.1	51.4	50.3	52.0	52.7	50.7	50.5
Ab	45.4	46.1	46.6	47.4	46.3	45.3	47.2	47.2
Or	2.1	1.9	1.9	2.3	1.7	2.0	2.0	2.3

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	10	11	12	13	14	15	16	17
SiO_2	55.34	63.67	60.85	61.28	61.48	61.22	60.80	60.58
Al_2O_3	27.74	20.63	23.65	23.79	23.35	23.69	24.09	24.17
CaO	10.18	2.17	5.04	5.40	5.34	5.21	5.60	5.97
Na_2O	5.57	6.98	7.70	8.10	8.02	8.23	7.96	7.61
K_2O	0.30	4.77	1.29	0.69	1.12	0.69	0.86	0.96
FeO	0.69	0.58	0.56	0.66	0.60	0.76	0.48	0.71
Total	99.83	98.80	98.50	99.91	99.90	99.80	99.79	100.00
An	49.4	10.6	24.6	25.9	25.2	24.9	26.6	28.6
Ab	48.9	61.7	67.9	70.2	68.5	71.2	68.5	65.9
Or	1.7	27.7	7.5	3.9	6.3	3.9	4.9	5.5

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	18	1	2	3	4	5	6	7
SiO_2	62.04	60.56	60.93	55.47	54.72	55.70	54.52	54.70
Al_2O_3	22.78	23.48	23.54	27.70	27.31	28.26	27.98	27.59
CaO	4.59	5.14	5.35	10.20	9.87	10.35	9.84	10.23
Na_2O	8.38	7.91	7.77	5.51	5.52	5.44	5.39	5.37
K_2O	1.16	1.13	1.15	0.37	0.41	0.37	0.35	0.38
FeO	0.66	0.57	0.63	0.76	0.62	0.47	0.65	0.62
Total	99.61	98.79	99.37	100.02	98.46	100.58	98.73	98.90
An	21.7	24.7	25.8	49.5	48.5	50.2	49.1	50.1
Ab	71.8	68.8	67.7	48.4	49.1	47.7	48.8	47.6
Or	6.5	6.5	6.6	2.2	2.4	2.1	2.1	2.2

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	8	9	10	11	12	13	14	15
SiO_2	54.79	55.83	56.19	56.41	55.16	55.83	54.82	55.48
Al_2O_3	27.73	28.00	27.88	27.63	27.47	27.73	28.33	28.38
CaO	10.50	9.99	9.76	10.04	9.75	9.86	10.30	10.32
Na_2O	5.30	5.80	5.63	5.71	5.53	5.66	5.22	5.68
K_2O	0.35	0.37	0.31	0.37	0.40	0.40	0.37	0.38
FeO	0.54	0.75	0.57	0.51	0.52	0.45	0.67	0.67
Total	99.21	100.74	100.34	100.66	98.83	99.93	99.72	100.92
An	51.2	47.7	48.1	48.3	48.2	47.9	51.0	49.0
Ab	46.8	50.2	50.1	49.6	49.5	49.8	46.8	48.8
Or	2.0	2.1	1.8	2.1	2.3	2.3	2.2	2.2

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	16	17	18	19	1	2	3	4
SiO_2	55.08	55.22	55.36	61.32	61.17	55.00	54.83	54.85
Al_2O_3	27.63	27.96	28.12	23.69	23.64	28.66	28.29	28.54
CaO	10.13	10.43	10.31	5.49	5.69	10.52	10.60	10.39
Na_2O	5.53	5.40	5.38	7.74	7.61	5.14	5.12	5.28
K_2O	0.39	0.34	0.38	1.15	1.07	0.35	0.37	0.34
FeO	0.60	0.50	0.59	0.69	0.56	0.56	0.59	0.40
Total	100.27	99.85	100.13	100.09	99.75	100.23	99.80	99.79
An	49.2	50.6	50.3	26.3	27.4	52.0	52.2	51.0
Ab	48.6	47.4	47.5	67.1	66.4	45.9	45.7	47.0
Or	2.3	2.0	2.2	6.6	6.2	2.0	2.2	2.0

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	5	6	7	8	9	10	11	12
SiO_2	54.05	54.93	53.62	54.95	60.16	61.60	55.43	56.63
Al_2O_3	28.47	28.87	27.91	28.29	23.78	23.65	28.34	27.13
CaO	10.48	10.46	10.58	10.64	5.92	5.23	10.42	9.24
Na_2O	5.11	5.25	5.20	5.15	6.98	7.46	5.38	5.96
K_2O	0.29	0.33	0.40	0.32	1.07	1.17	0.37	0.48
FeO	0.56	0.58	0.54	0.55	0.77	0.68	0.56	0.34
Total	98.97	100.42	98.26	99.90	98.68	99.78	100.50	99.79
An	52.2	51.4	51.7	52.3	29.9	26.0	50.6	44.8
Ab	46.1	46.7	46.0	45.8	63.7	67.1	47.3	52.4
Or	1.7	1.9	2.3	1.9	6.4	6.9	2.1	2.8

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	13	14	15	16	17	18	1	2
SiO_2	56.14	56.66	54.45	54.48	53.80	55.19	61.54	53.98
Al_2O_3	26.83	26.26	27.58	28.38	28.70	27.69	23.95	27.86
CaO	9.17	8.63	10.14	10.87	11.30	9.99	5.63	10.60
Na_2O	5.95	5.95	5.45	5.20	4.90	5.63	7.73	5.23
K_2O	0.46	0.51	0.31	0.39	0.32	0.37	0.95	0.35
FeO	0.55	0.42	0.70	0.62	0.49	0.54	0.56	0.62
Total	99.10	98.42	98.64	99.92	99.53	99.42	100.37	98.63
An	44.8	43.2	49.8	52.4	55.0	48.4	27.1	51.8
Ab	52.5	53.8	48.4	45.4	43.2	49.4	67.4	46.2
Or	2.7	3.0	1.8	2.2	1.9	2.1	5.5	2.0

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	3	4	5	6	7	8	9	10
SiO_2	55.23	55.11	54.31	54.38	54.41	54.51	54.72	54.09
Al_2O_3	27.43	27.94	28.52	28.52	28.23	28.23	27.93	28.36
CaO	9.66	10.40	10.58	11.03	10.72	10.76	10.59	10.57
Na_2O	5.79	5.28	5.23	5.14	4.94	5.16	5.26	5.37
K_2O	0.38	0.44	0.36	0.31	0.34	0.34	0.31	0.37
FeO	0.84	0.62	0.50	0.53	0.45	0.41	0.53	0.53
Total	99.34	99.78	99.50	99.92	99.09	99.41	99.32	99.28
An	46.9	50.8	51.7	53.3	53.4	52.5	51.7	51.0
Ab	50.9	46.7	46.2	44.9	44.6	45.5	46.5	46.9
Or	2.2	2.6	2.1	1.8	2.0	2.0	1.8	2.1

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	11	12	13	14	1	2	3	1
SiO_2	54.83	55.03	54.65	54.78	54.63	54.97	61.14	60.88
Al_2O_3	28.34	28.59	27.52	28.44	27.93	28.32	23.45	23.39
CaO	10.78	10.54	10.32	10.88	10.33	10.58	5.05	5.24
Na_2O	5.19	5.43	5.14	5.27	5.26	5.34	7.45	7.72
K_2O	0.36	0.34	0.34	0.37	0.36	0.34	1.11	1.13
FeO	0.49	0.54	0.94	0.50	0.56	0.53	0.59	0.60
Total	99.99	100.48	98.91	100.25	99.08	100.07	98.78	98.95
An	52.3	50.7	51.5	52.2	51.0	51.2	25.4	25.5
Ab	45.6	47.3	46.5	45.7	46.9	46.8	67.9	68.0
Or	2.1	2.0	2.0	2.1	2.1	2.0	6.7	6.5

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	2	3	4	5	6	7	8	1
SiO_2	60.63	60.44	58.20	61.06	57.91	61.60	61.07	59.38
Al_2O_3	23.83	24.56	25.56	23.90	25.70	23.39	23.40	24.54
CaO	5.68	6.27	7.52	5.49	7.52	4.92	5.56	6.71
Na_2O	7.60	7.25	6.64	7.76	6.82	7.90	7.70	6.24
K_2O	0.89	0.93	0.38	1.05	0.67	1.28	0.97	0.83
FeO	0.77	0.59	0.37	0.55	0.65	0.59	0.61	0.89
Total	99.41	100.05	98.67	99.81	99.27	99.68	99.30	98.60
An	27.7	30.6	37.7	26.4	36.4	23.7	26.9	35.3
Ab	67.1	64.0	60.1	67.6	59.7	68.9	67.5	59.4
Or	5.2	5.4	2.2	6.0	3.9	7.3	5.6	5.2

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	2	3	4	5	6	7	1	2
SiO_2	60.79	58.48	59.35	60.36	61.53	63.06	60.91	57.97
Al_2O_3	22.86	25.05	25.61	23.85	23.85	22.31	23.82	26.17
CaO	5.02	7.16	6.96	5.66	5.50	3.93	5.52	7.97
Na_2O	7.41	6.71	7.05	7.22	7.74	8.07	7.79	6.59
K_2O	2.35	0.82	0.81	1.19	0.97	1.69	1.13	0.67
FeO	0.70	0.64	0.60	0.53	0.59	0.69	0.74	0.63
Total	99.13	98.87	100.39	98.81	100.19	99.76	99.91	100.00
An	23.6	35.3	33.6	28.1	26.6	19.1	26.3	38.5
Ab	63.2	59.9	61.7	64.8	67.8	71.0	67.3	57.6
Or	13.2	4.8	4.7	7.1	5.6	9.8	6.4	3.9

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	3	4	5	6	7	8	9	10
SiO_2	55.41	55.04	54.61	54.50	54.05	53.17	54.19	53.43
Al_2O_3	27.65	28.17	28.56	28.51	28.63	28.76	28.85	28.41
CaO	9.91	10.05	10.12	10.46	10.88	11.30	11.03	10.69
Na_2O	5.21	5.28	5.24	5.13	5.05	4.97	4.95	5.21
K_2O	0.38	0.42	0.38	0.35	0.34	0.31	0.29	0.37
FeO	0.47	0.56	0.53	0.44	0.40	0.69	0.47	0.61
Total	99.04	99.52	99.44	99.37	99.34	99.19	99.78	98.71
An	50.1	50.0	50.5	51.9	53.3	54.7	54.3	52.0
Ab	47.6	47.5	47.3	46.1	44.8	43.5	44.0	45.8
Or	2.3	2.5	2.3	2.0	2.0	1.8	1.7	2.1

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	11	12	13	14	15	16	17	18
SiO_2	54.27	54.24	53.61	53.93	55.00	55.17	55.80	54.95
Al_2O_3	28.05	28.75	28.63	29.10	28.01	27.83	28.04	27.33
CaO	10.81	10.88	11.00	11.16	10.40	10.10	9.83	9.87
Na_2O	5.16	5.02	4.94	5.01	5.39	5.56	5.36	5.37
K_2O	0.32	0.33	0.37	0.27	0.37	0.36	0.39	0.43
FeO	0.73	0.46	0.44	0.46	0.34	0.54	0.49	0.55
Total	99.34	99.67	98.99	99.93	99.51	99.55	99.91	98.50
An	52.7	53.4	54.0	54.3	50.5	49.1	49.2	49.1
Ab	45.5	44.6	43.9	44.1	47.3	48.9	48.5	48.4
Or	1.9	1.9	2.1	1.6	2.1	2.1	2.3	2.5

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	1	2	3	4	5	6	7	8
SiO_2	56.20	54.57	56.67	55.69	55.90	56.63	56.86	55.18
Al_2O_3	27.26	27.83	27.10	27.47	27.59	27.07	27.70	28.39
CaO	9.63	10.04	9.19	9.69	9.64	8.87	9.36	10.85
Na_2O	5.85	5.41	5.84	5.47	5.65	6.05	5.60	5.31
K_2O	0.38	0.38	0.53	0.39	0.42	0.47	0.48	0.35
FeO	0.68	0.53	0.65	0.51	0.55	0.84	0.48	0.59
Total	100.01	98.76	99.97	99.22	99.74	99.94	100.49	100.68
An	46.6	49.5	45.1	48.3	47.4	43.5	46.7	52.0
Ab	51.2	48.3	51.8	49.4	50.2	53.7	50.5	46.1
Or	2.2	2.2	3.1	2.3	2.4	2.8	2.8	2.0

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	1	2	3	4	5	6	7	8
SiO_2	61.34	56.22	54.75	54.01	54.25	53.84	54.40	54.66
Al_2O_3	23.27	27.23	28.71	28.72	28.84	28.74	28.27	28.02
CaO	5.51	9.80	10.55	11.03	11.23	10.68	10.45	10.16
Na_2O	7.75	5.68	5.06	4.94	5.08	4.94	5.20	5.34
K_2O	1.09	0.36	0.29	0.34	0.29	0.31	0.29	0.40
FeO	0.70	0.68	0.40	0.52	0.75	0.38	0.56	0.54
Total	99.65	99.97	99.77	99.56	100.44	98.89	99.17	99.12
An	26.4	47.8	52.6	54.2	54.1	53.4	51.7	50.0
Ab	67.3	50.1	45.7	43.9	44.3	44.7	46.6	47.6
Or	6.2	2.1	1.7	2.0	1.7	1.9	1.7	2.3

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	9	10	11	12	13	14	15	16
SiO_2	55.29	55.27	55.08	55.13	53.90	54.01	53.89	54.94
Al_2O_3	27.87	27.89	27.95	28.05	29.06	29.00	28.13	28.14
CaO	10.05	9.98	9.89	10.19	11.02	10.99	10.44	10.13
Na_2O	5.34	5.62	5.61	5.47	5.04	5.16	5.29	5.15
K_2O	0.46	0.38	0.37	0.38	0.35	0.36	0.38	0.37
FeO	0.56	0.45	0.31	0.45	0.42	0.51	0.49	0.63
Total	99.57	99.58	99.21	99.66	99.79	100.05	98.62	99.37
An	49.6	48.5	48.3	49.6	53.6	52.9	51.0	50.9
Ab	47.7	49.3	49.6	48.2	44.4	45.0	46.8	46.9
Or	2.7	2.2	2.2	2.2	2.0	2.1	2.2	2.2

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	1	2	3	4	5	6	7	8
SiO_2	58.07	57.63	55.15	55.35	55.11	55.43	55.35	55.03
Al_2O_3	25.17	26.62	28.02	28.07	27.83	27.92	28.04	28.76
CaO	7.59	8.43	9.96	9.91	10.11	10.35	9.94	10.74
Na_2O	6.54	6.52	5.53	5.44	5.52	5.48	5.54	5.13
K_2O	0.70	0.52	0.34	0.42	0.46	0.34	0.44	0.35
FeO	0.69	0.64	0.67	0.53	0.55	0.48	0.65	0.59
Total	98.76	100.36	99.67	99.72	99.58	100.00	99.96	100.60
An	37.5	40.4	48.9	49.0	49.0	50.1	48.5	52.5
Ab	58.4	56.6	49.1	48.6	48.4	48.0	49.0	45.4
Or	4.1	3.0	2.0	2.5	2.6	1.9	2.5	2.0

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	9	10	11	12	13	14	15	16
SiO_2	54.70	54.87	55.09	54.35	54.58	54.88	54.81	55.65
Al_2O_3	28.68	28.51	28.11	28.03	28.52	28.39	28.53	27.18
CaO	10.43	10.65	10.15	10.53	10.55	10.66	10.75	9.11
Na_2O	5.27	5.22	5.26	5.25	5.13	5.23	4.98	5.73
K_2O	0.36	0.36	0.33	0.38	0.38	0.33	0.37	0.45
FeO	0.42	0.53	0.50	0.66	0.62	0.45	0.55	0.50
Total	99.88	100.14	99.44	99.20	99.80	99.94	100.00	98.63
An	51.2	51.9	50.6	51.4	52.0	51.9	53.2	45.5
Ab	46.7	46.0	47.4	46.4	45.8	46.1	44.6	51.8
Or	2.1	2.1	2.0	2.2	2.2	1.9	2.2	2.7

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	17	18	1	2	3	4	5	6
SiO_2	56.06	61.59	55.24	57.33	57.50	56.12	57.23	54.89
Al_2O_3	27.95	23.48	27.79	27.13	26.68	27.24	26.74	27.88
CaO	9.99	5.37	10.19	9.23	8.75	9.07	8.86	10.21
Na_2O	5.67	7.35	5.30	5.95	6.19	5.76	6.41	5.47
K_2O	0.42	1.12	0.44	0.49	0.54	0.47	0.46	0.42
FeO	0.61	0.65	0.74	0.41	0.44	0.54	0.38	0.57
Total	100.70	99.57	99.70	100.54	100.10	99.19	100.09	99.44
An	48.2	26.8	50.2	44.9	42.5	45.3	42.2	49.5
Ab	49.4	66.5	47.2	52.3	54.4	52.0	55.2	48.0
Or	2.4	6.7	2.6	2.8	3.1	2.8	2.6	2.4

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	7	8	9	10	1	2	3	4
SiO_2	55.74	53.65	54.93	61.50	57.00	55.90	57.27	56.22
Al_2O_3	27.98	28.21	27.33	23.95	27.20	27.99	26.95	27.47
CaO	10.28	10.52	10.02	5.67	9.39	9.90	8.91	9.46
Na_2O	5.67	4.95	5.67	7.63	5.73	5.62	6.38	5.90
K_2O	0.38	0.34	0.41	1.03	0.47	0.41	0.49	0.40
FeO	0.48	0.56	0.64	0.46	0.56	0.54	0.49	0.40
Total	100.54	98.23	99.00	100.24	100.36	100.35	100.49	99.84
An	49.0	52.9	48.2	27.4	46.2	48.1	42.4	45.9
Ab	48.8	45.0	49.4	66.7	51.1	49.5	54.9	51.8
Or	2.2	2.0	2.4	5.9	2.7	2.4	2.8	2.3

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	5	6	7	8	9	1	2	3
SiO_2	56.14	56.76	55.65	55.58	55.63	61.11	55.73	56.32
Al_2O_3	27.26	27.15	27.83	27.30	28.02	23.56	27.29	27.03
CaO	9.36	8.91	10.18	9.56	9.90	5.53	9.48	9.01
Na_2O	5.79	6.01	5.53	5.88	5.45	7.34	5.86	6.09
K_2O	0.41	0.43	0.39	0.43	0.39	1.06	0.44	0.49
FeO	0.39	0.52	0.52	0.48	0.62	0.66	0.70	0.52
Total	99.34	99.78	100.11	99.23	100.00	99.27	99.51	99.46
An	46.0	43.9	49.3	46.1	48.9	27.5	46.0	43.7
Ab	51.6	53.5	48.5	51.4	48.8	66.2	51.5	53.5
Or	2.4	2.6	2.3	2.5	2.3	6.3	2.5	2.8

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	4	5	6	7	8	9	10	11
SiO_2	55.88	55.09	56.09	56.34	55.99	55.25	55.11	55.32
Al_2O_3	26.99	27.50	27.54	27.55	27.29	27.62	27.51	28.05
CaO	9.04	9.34	9.66	9.34	9.13	9.78	9.95	10.23
Na_2O	5.72	6.18	5.53	5.76	5.67	5.49	5.78	5.20
K_2O	0.51	0.49	0.39	0.45	0.46	0.43	0.41	0.37
FeO	0.47	0.65	0.47	0.56	0.46	0.55	0.45	0.56
Total	98.60	99.25	99.68	99.93	99.00	99.11	99.21	99.74
An	45.2	44.2	48.0	46.0	45.8	48.4	47.6	50.9
Ab	51.8	53.0	49.7	51.3	51.5	49.1	50.1	46.9
Or	3.0	2.8	2.3	2.6	2.7	2.5	2.4	2.2

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	12	13	14	15	16	17	18	19
SiO_2	55.42	54.20	55.18	56.21	56.54	55.28	54.59	57.54
Al_2O_3	28.13	28.47	28.03	27.90	27.47	27.50	27.65	26.21
CaO	9.74	10.75	10.05	9.55	9.19	9.50	9.84	8.46
Na_2O	5.39	5.04	5.59	5.64	5.97	5.54	5.42	6.39
K_2O	0.34	0.36	0.41	0.42	0.49	0.49	0.38	0.57
FeO	0.55	0.50	0.29	0.54	0.53	0.57	0.62	0.90
Total	99.56	99.33	99.55	100.26	100.20	98.89	98.51	100.06
An	48.96	52.93	48.68	47.15	44.65	47.24	48.95	40.88
Ab	48.99	44.94	48.94	50.38	52.51	49.85	48.80	55.87
Or	2.05	2.14	2.38	2.47	2.84	2.91	2.25	3.25

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	20	1	2	3	4	5	6	7
SiO_2	61.40	61.55	61.25	61.25	61.11	60.79	60.54	59.95
Al_2O_3	23.52	23.66	24.01	23.92	23.41	24.83	24.42	24.19
CaO	5.03	5.15	5.52	5.53	5.46	6.24	5.83	5.86
Na_2O	8.03	7.88	7.69	7.54	7.67	7.21	7.38	7.43
K_2O	1.10	1.07	1.01	1.05	1.26	0.91	1.05	1.09
FeO	0.74	0.70	0.63	0.61	0.60	0.59	0.42	0.64
Total	99.83	100.01	100.11	99.90	99.50	100.57	99.63	99.16
An	24.1	24.9	26.8	27.1	26.2	30.6	28.5	28.5
Ab	69.6	69.0	67.4	66.8	66.6	64.1	65.4	65.3
Or	6.3	6.2	5.8	6.1	7.2	5.3	6.1	6.3

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	8	9	1	2	3	4	5	6
SiO_2	61.47	60.52	61.84	58.08	56.68	56.45	56.54	55.24
Al_2O_3	23.41	23.87	23.54	26.12	27.22	27.15	27.11	27.01
CaO	5.08	5.35	4.77	7.71	9.30	9.11	9.11	9.28
Na_2O	7.55	7.27	7.97	6.55	6.15	6.15	6.01	5.83
K_2O	1.21	1.05	1.20	0.60	0.42	0.45	0.48	0.50
FeO	0.70	0.67	0.48	0.60	0.57	0.70	0.65	0.58
Total	99.42	98.72	99.80	99.66	100.34	100.01	99.90	98.43
An	25.1	27.1	23.1	38.0	44.4	43.8	44.3	45.4
Ab	67.7	66.6	70.0	58.5	53.2	53.6	52.9	51.7
Or	7.1	6.3	6.9	3.5	2.4	2.6	2.8	2.9

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	7	8	9	10	11	12	13	14
SiO_2	55.99	57.34	57.60	56.58	56.79	55.94	55.50	55.79
Al_2O_3	27.36	26.65	26.54	26.77	27.68	27.03	27.76	27.13
CaO	9.06	8.49	8.46	9.35	9.27	9.58	9.73	9.35
Na_2O	5.96	6.49	6.34	5.92	5.79	6.04	5.53	5.67
K_2O	0.57	0.53	0.58	0.43	0.47	0.48	0.37	0.41
FeO	0.59	0.58	0.57	0.55	0.42	0.56	0.59	0.69
Total	99.53	100.08	100.08	99.61	100.43	99.62	99.49	99.05
An	44.1	40.7	41.0	45.4	45.7	45.5	48.2	46.5
Ab	52.6	56.3	55.6	52.1	51.6	51.9	49.6	51.0
Or	3.3	3.0	3.3	2.5	2.7	2.7	2.2	2.4

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	15	16	17	18	1	2	3	4
SiO_2	56.49	61.75	60.06	60.97	61.22	54.81	55.46	54.92
Al_2O_3	27.29	22.86	23.41	23.43	23.96	27.14	27.66	27.54
CaO	9.15	4.44	5.31	5.59	5.14	9.81	9.94	9.70
Na_2O	6.02	7.39	7.75	7.66	7.78	5.36	5.64	5.60
K_2O	0.42	2.60	1.02	0.86	1.18	0.41	0.33	0.41
FeO	0.57	0.42	0.68	0.64	0.80	0.76	0.52	0.61
Total	99.94	99.47	98.22	99.15	100.08	98.28	99.56	98.78
An	44.6	21.2	25.9	27.3	24.9	49.0	48.4	47.7
Ab	53.0	63.9	68.2	67.7	68.3	48.5	49.7	49.9
Or	2.4	14.8	5.9	5.0	6.8	2.4	1.9	2.4

Sample	18-P1B-A	18-P1B-A	18-P1B-A	18-P1B-A	18-P1B-A	18-P1B-A	18-P1B-A	18-P1B-A
Rock Type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line Number	1	2	3	1	1	2	1	2
SiO_2	59.76	59.66	59.24	59.07	60.49	59.25	59.67	60.07
Al_2O_3	26.11	26.00	26.00	27.02	25.90	26.56	25.84	25.95
CaO	7.32	7.13	7.10	7.30	6.96	7.43	7.16	7.42
Na_2O	5.91	6.68	6.60	6.24	6.66	6.44	6.38	6.30
K_2O	0.39	0.37	0.41	0.37	0.42	0.37	0.37	0.41
FeO	0.25	0.28	0.24	0.24	0.24	0.28	0.23	0.18
Total	99.74	100.11	99.59	100.24	100.67	100.32	99.64	100.33
An	39.6	36.3	36.3	38.4	35.7	38.1	37.4	38.4
Ab	57.8	61.5	61.1	59.3	61.7	59.6	60.3	59.1
Or	2.5	2.2	2.5	2.3	2.6	2.3	2.3	2.5

Sample	18-P1B-A	18-P1B-A	18-P1B-A	18-P1B-A	18-P1B-A	18-P1B-A	18-P1B-A	18-P1B-A
Rock Type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line Number	1	2	1	2	1	2	1	2
SiO_2	60.04	60.00	59.72	60.04	59.92	59.38	59.79	61.12
Al_2O_3	25.79	26.08	25.62	25.44	26.05	26.21	25.73	24.99
CaO	7.25	7.07	6.81	7.15	6.58	7.22	7.31	6.16
Na_2O	6.71	6.68	6.39	6.60	6.72	6.62	6.60	6.97
K_2O	0.42	0.35	0.37	0.39	0.39	0.38	0.43	0.46
FeO	0.21	0.20	0.27	0.25	0.17	0.27	0.22	0.26
Total	100.42	100.37	99.18	99.87	99.82	100.07	100.08	99.96
An	36.5	36.1	36.2	36.6	34.3	42.8	37.2	31.9
Ab	61.0	61.8	61.5	61.1	63.3	55.1	60.7	65.3
Or	2.5	2.1	2.3	2.4	2.4	2.1	2.1	2.9

Sample	18-P1B-A	18-P1M-B	18-P1M-B	18-P1M-B	18-P1M-B	18-P1M-B	18-P1M-B	18-P1M-B
Rock Type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line Number	1	2	1	2	1	2	1	2
SiO_2	59.85	59.51	59.44	58.99	59.75	58.85	59.71	59.22
Al_2O_3	26.22	25.66	25.68	25.88	25.90	26.07	26.04	25.91
CaO	7.06	7.21	6.83	7.28	7.06	7.71	7.17	7.16
Na_2O	6.19	6.16	6.56	6.23	6.70	6.19	6.54	6.33
K_2O	0.40	0.34	0.45	0.38	0.35	0.33	0.33	0.36
FeO	0.28	0.29	0.26	0.19	0.30	0.21	0.28	0.28
Total	100.00	99.16	99.21	98.95	100.06	99.36	100.06	99.25
An	37.7	38.4	35.5	38.3	36.0	39.9	37.0	37.6
Ab	59.8	59.4	61.7	59.3	61.9	58.1	61.0	60.2
Or	2.5	2.1	2.8	2.4	2.2	2.0	2.0	2.2

Sample	18-P1M-B	18-P1M-B	18-P1M-B	18-P1M-B	18-P1M-B	18-P1M-B	18-P1M-B	18-P1M-B
Rock Type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line Number	1	2	1	2	1	2	1	2
SiO_2	59.18	59.36	60.04	59.01	59.37	59.26	59.14	59.08
Al_2O_3	25.86	26.23	25.32	25.74	25.79	26.11	25.81	25.80
CaO	7.07	7.40	7.05	7.10	7.06	7.45	7.36	7.27
Na_2O	6.45	6.33	6.57	6.08	6.41	6.19	6.19	6.33
K_2O	0.38	0.36	0.37	0.42	0.38	0.40	0.36	0.40
FeO	0.18	0.21	0.19	0.22	0.24	0.18	0.24	0.19
Total	99.12	99.89	99.55	98.56	99.25	99.58	99.10	99.06
An	36.9	38.4	36.3	38.2	36.9	39.0	38.8	37.8
Ab	60.8	59.4	61.4	59.2	60.7	58.6	59.0	59.7
Or	2.4	2.2	2.3	2.7	2.3	2.5	2.2	2.5

Sample	18-P1M-B	18-P1M-B	18-P1M-B	18-P1M-B	18-P1M-B	18-P1M-B	18-P1M-B	18-P1M-B
Rock Type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line Number	1	2	1	2	1	2	1	2
SiO_2	59.92	59.99	59.87	60.41	59.74	60.11	59.75	59.17
Al_2O_3	26.11	26.12	25.39	25.23	25.96	25.27	25.93	25.82
CaO	7.44	7.29	6.49	6.59	6.82	6.72	7.08	7.15
Na_2O	6.45	6.42	6.55	6.65	6.56	6.43	6.59	6.55
K_2O	0.37	0.34	0.42	0.41	0.43	0.46	0.36	0.43
FeO	0.22	0.20	0.24	0.19	0.32	0.21	0.23	0.19
Total	100.50	100.36	98.95	99.49	99.82	99.20	99.94	99.29
An	38.1	37.7	34.4	34.5	35.5	35.6	36.5	36.6
Ab	59.7	60.2	62.9	63.0	61.8	61.6	61.3	60.8
Or	2.2	2.1	2.6	2.6	2.7	2.9	2.2	2.6

Sample	18-P1M-B	18-P1M-B	18-P1M-B	18-P1M-B	18-P1M-B	18-P1M-B	18-P1M-B	18-P1M-B
Rock Type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line Number	1	1	2	1	2	1	2	1
SiO_2	59.18	59.77	59.10	60.35	59.57	59.68	58.61	61.01
Al_2O_3	25.93	26.01	25.84	25.42	25.94	26.33	25.59	25.09
CaO	7.36	7.30	7.01	6.22	7.13	7.37	7.22	5.85
Na_2O	6.52	6.45	6.56	6.67	6.64	6.55	6.52	7.13
K_2O	0.43	0.39	0.33	0.42	0.38	0.34	0.38	0.46
FeO	0.25	0.18	0.25	0.20	0.18	0.16	0.25	0.17
Total	99.65	100.09	99.09	99.28	99.83	100.43	98.57	99.70
An	37.4	37.6	36.3	33.1	36.4	37.5	37.1	30.3
Ab	60.0	60.1	61.6	64.2	61.3	60.4	60.6	66.9
Or	2.6	2.4	2.0	2.7	2.3	2.1	2.3	2.8

Sample	18-P1M-B	18-P1M-B	18-P1M-B	18-P1M-B	18-P1M-B	18-P1M-B	18-P1T-C	18-P1T-C
Rock Type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Dacite	Jala Dacite
Line Number	2	1	2	1	2	1	1	2
SiO_2	59.35	60.18	59.41	60.30	58.80	59.87	57.06	57.48
Al_2O_3	25.65	25.54	25.50	25.94	26.10	25.70	27.84	27.89
CaO	6.79	6.76	7.04	7.30	7.02	7.20	9.57	9.36
Na_2O	6.60	6.82	6.84	6.61	6.72	6.71	5.50	5.63
K_2O	0.47	0.48	0.38	0.45	0.39	0.44	0.19	0.25
FeO	0.21	0.20	0.28	0.30	0.31	0.24	0.48	0.24
Total	99.07	99.98	99.44	100.90	99.35	100.14	100.58	100.65
An	35.2	34.4	35.4	36.9	35.7	36.2	48.5	46.6
Ab	61.9	62.7	62.3	60.4	61.9	61.1	50.4	46.6
Or	2.9	2.9	2.3	2.7	2.4	2.7	1.2	1.5

Sample	18-P1T-C	18-P1T-C	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E
Rock Type	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite
Line Number	3	4	1	1	1	1	1	2
SiO_2	57.12	58.98	52.40	53.17	49.21	51.06	46.52	51.49
Al_2O_3	27.12	26.44	30.53	29.82	32.35	30.64	34.40	30.85
CaO	9.46	8.00	13.26	12.20	15.30	13.34	17.29	13.58
Na_2O	5.51	6.23	3.67	4.20	2.61	3.53	1.64	3.67
K_2O	0.29	0.34	0.09	0.16	0.10	0.11	0.05	0.10
FeO	0.39	0.40	0.61	0.43	0.62	0.53	0.47	0.50
Total	99.89	100.39	100.56	99.98	100.19	99.21	100.37	100.19
An	47.8	40.7	66.3	61.0	76.0	67.2	85.1	66.8
Ab	47.8	40.7	33.2	38.0	23.5	32.2	14.6	32.7
Or	1.8	2.1	0.5	1.0	0.6	0.7	0.3	0.6

Sample	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E
Rock Type	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite
Line Number	3	4	5	6	1	2	1	2
SiO_2	46.38	50.76	50.03	46.79	60.99	60.21	60.65	59.93
Al_2O_3	34.48	31.55	32.24	33.92	25.05	25.28	25.36	25.81
CaO	18.09	14.16	14.69	16.99	6.46	6.67	6.51	6.82
Na_2O	1.44	3.05	2.84	1.61	6.88	6.64	6.75	6.66
K_2O	0.02	0.08	0.14	0.01	0.42	0.44	0.42	0.35
FeO	0.51	0.48	0.51	0.58	0.21	0.29	0.22	0.20
Total	100.92	100.08	100.45	99.90	100.01	99.53	99.91	99.77
An	87.3	71.6	73.5	85.3	33.3	34.7	33.9	35.4
Ab	12.6	27.9	25.7	14.6	64.1	62.6	63.5	62.5
Or	0.1	0.5	0.8	0.1	2.6	2.7	2.6	2.2

Sample	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E
Rock Type	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite
Line Number	1	2	3	1	2	3	1	2
SiO_2	51.66	54.67	50.87	60.32	60.29	59.89	51.05	57.50
Al_2O_3	30.51	29.08	31.46	25.84	25.73	25.68	31.03	27.04
CaO	13.29	11.35	14.01	6.97	7.04	7.02	13.96	9.04
Na_2O	3.43	4.54	3.20	6.68	6.63	6.67	3.29	5.57
K_2O	0.11	0.17	0.10	0.41	0.39	0.34	0.10	0.37
FeO	0.51	0.39	0.60	0.21	0.15	0.29	0.57	0.59
Total	99.51	100.20	100.24	100.43	100.23	99.89	100.00	100.11
An	67.7	57.4	70.3	35.7	36.1	36.9	69.7	46.2
Ab	31.6	41.6	29.1	61.8	61.5	61.1	29.7	51.5
Or	0.7	1.0	0.6	2.5	2.4	2.1	0.6	2.3

Sample	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E
Rock Type	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite
Line Number	3	4	1	2	1	2	3	4
SiO_2	50.53	56.10	50.83	55.41	53.35	54.79	57.58	55.01
Al_2O_3	31.88	28.09	30.89	27.74	29.61	28.60	27.05	28.16
CaO	14.42	10.11	13.57	10.35	12.52	11.02	8.65	10.78
Na_2O	2.99	5.04	3.18	4.97	3.98	4.60	5.79	4.74
K_2O	0.11	0.23	0.09	0.21	0.20	0.27	0.33	0.23
FeO	0.61	0.55	0.74	0.48	0.80	0.86	0.80	0.80
Total	100.54	100.12	99.30	99.16	100.46	100.14	100.20	99.72
An	72.2	51.8	69.8	52.8	62.7	56.0	44.3	54.9
Ab	27.1	46.8	29.6	45.9	36.1	42.3	53.7	43.7
Or	0.7	1.4	0.6	1.3	1.2	1.6	2.0	1.4

Sample	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E
Rock Type	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite
Line Number	5	6	7	8	1	2	3	4
SiO_2	54.05	52.67	55.53	53.76	61.02	59.42	61.84	59.56
Al_2O_3	28.52	30.30	27.69	30.11	25.09	26.46	25.00	25.88
CaO	11.53	13.02	10.24	12.36	6.53	7.72	5.93	7.08
Na_2O	4.27	3.61	4.98	3.91	6.95	6.68	7.22	6.40
K_2O	0.26	0.23	0.20	0.22	0.41	0.30	0.50	0.44
FeO	0.99	0.97	0.94	0.76	0.25	0.23	0.22	0.29
Total	99.62	100.80	99.58	101.12	100.25	100.81	100.71	99.71
An	58.9	65.7	52.5	62.8	33.3	38.3	30.3	36.7
Ab	39.5	33.0	46.2	35.9	64.2	60.0	66.7	60.6
Or	1.6	1.4	1.2	1.3	2.5	1.8	3.0	2.7

Sample	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E
Rock Type	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite
Line Number	1	2	3	4	5	6	7	8
SiO_2	50.06	48.74	52.77	56.64	53.23	57.44	53.01	57.60
Al_2O_3	32.29	32.65	30.20	27.70	29.74	27.19	29.91	26.81
CaO	15.16	15.63	12.73	9.62	12.34	9.34	12.63	9.01
Na_2O	2.58	2.39	3.93	5.36	4.04	5.49	3.93	5.54
K_2O	0.08	0.11	0.22	0.25	0.18	0.26	0.24	0.30
FeO	0.40	0.37	0.51	0.57	0.66	0.72	0.51	0.66
Total	100.57	99.89	100.36	100.14	100.19	100.44	100.23	99.92
An	76.1	77.8	63.3	49.0	62.1	47.7	63.1	46.5
Ab	23.4	21.5	35.4	49.4	36.8	50.7	35.5	51.7
Or	0.5	0.7	1.3	1.5	1.1	1.6	1.4	1.8

Sample	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E
Rock Type	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite
Line Number	9	1	2	1	2	1	2	1
SiO_2	50.83	60.29	60.15	60.97	61.52	60.61	61.34	53.61
Al_2O_3	31.58	25.83	25.36	25.34	24.86	25.57	25.33	29.90
CaO	14.76	7.44	6.54	6.39	5.75	6.92	6.74	12.10
Na_2O	2.92	6.51	6.81	6.74	7.12	6.78	7.05	4.19
K_2O	0.16	0.40	0.40	0.53	0.51	0.38	0.39	0.16
FeO	0.30	0.28	0.29	0.29	0.30	0.36	0.22	0.45
Total	100.55	100.75	99.55	100.26	100.06	100.62	101.07	100.41
An	72.9	37.8	33.8	33.3	29.9	35.2	33.8	60.9
Ab	26.1	59.8	63.7	63.5	67.0	62.5	63.9	38.2
Or	0.9	2.4	2.5	3.3	3.2	2.3	2.3	1.0

Sample	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E
Rock Type	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite
Line Number	2	3	4	1	2	3	1	2
SiO_2	53.86	49.44	51.94	51.22	62.07	62.09	59.62	60.37
Al_2O_3	29.74	32.40	31.14	31.58	25.13	24.77	25.69	26.34
CaO	12.32	15.36	13.77	14.12	6.01	5.70	6.93	7.27
Na_2O	4.30	2.52	3.48	3.10	7.23	7.17	6.18	6.53
K_2O	0.20	0.07	0.07	0.12	0.48	0.52	0.35	0.40
FeO	0.62	0.52	0.50	0.61	0.19	0.27	0.23	0.25
Total	101.04	100.31	100.90	100.75	101.11	100.52	99.00	101.16
An	60.6	76.8	68.3	71.1	30.6	29.5	37.4	37.2
Ab	38.3	22.8	31.3	28.2	66.5	67.3	60.4	60.4
Or	1.2	0.4	0.4	0.7	2.9	3.2	2.3	2.4

Sample	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E	77-P2B-E
Rock Type	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite
Line Number	1	2	1	2	3	1	1	2
SiO_2	60.24	61.05	47.86	57.07	54.09	53.27	54.54	59.02
Al_2O_3	26.09	25.24	33.37	27.17	28.99	29.30	29.02	26.21
CaO	6.99	6.37	16.68	9.23	11.93	12.19	11.84	8.41
Na_2O	6.50	6.78	1.94	5.30	4.26	4.13	4.54	5.69
K_2O	0.34	0.43	0.09	0.28	0.25	0.26	0.30	0.47
FeO	0.27	0.23	0.56	0.56	0.68	0.79	0.61	0.64
Total	100.43	100.10	100.50	99.61	100.20	99.94	100.85	100.44
An	36.5	33.3	82.2	48.2	59.8	61.0	58.0	43.7
Ab	61.4	64.7	17.3	50.1	38.7	37.4	40.3	53.4
Or	2.1	2.7	0.5	1.7	1.5	1.6	1.8	2.9

Sample	77-P2B-E	77-P2B-E	77-P2B-E	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B
Rock Type	Jala Dacite	Jala Dacite	Jala Dacite	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line Number	1	1	2	1	2	3	1	2
SiO_2	53.41	60.66	61.52	59.87	60.00	59.92	59.27	59.37
Al_2O_3	30.21	25.71	24.92	26.23	26.08	26.05	26.05	25.79
CaO	11.80	6.81	6.04	7.20	7.07	6.58	7.24	7.06
Na_2O	4.09	6.62	6.92	6.55	6.68	6.72	6.39	6.41
K_2O	0.16	0.47	0.53	0.40	0.35	0.39	0.37	0.38
FeO	0.46	0.18	0.30	0.26	0.20	0.17	0.20	0.24
Total	100.13	100.45	100.23	100.51	100.38	99.83	99.52	99.25
An	60.9	35.2	31.5	36.9	36.1	34.3	37.6	36.9
Ab	38.2	61.9	65.2	60.7	61.8	63.3	60.1	60.7
Or	1.0	2.9	3.3	2.4	2.1	2.4	2.3	2.4

Sample	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B
Rock Type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line Number	3	4	1	2	3	1	2	3
SiO_2	59.14	59.92	59.10	59.57	61.01	59.79	59.85	59.51
Al_2O_3	25.81	26.11	25.84	25.94	25.09	25.73	26.22	25.66
CaO	7.36	7.44	7.01	7.13	5.85	7.31	7.06	7.21
Na_2O	6.19	6.45	6.56	6.64	7.13	6.60	6.19	6.16
K_2O	0.36	0.37	0.33	0.38	0.46	0.43	0.40	0.34
FeO	0.24	0.22	0.25	0.18	0.17	0.22	0.28	0.29
Total	99.10	100.51	99.09	99.84	99.71	100.08	100.00	99.17
An	38.8	38.1	36.4	36.4	30.3	37.0	37.7	38.4
Ab	59.0	59.7	61.6	61.3	66.9	60.4	59.8	59.4
Or	2.3	2.3	2.0	2.3	2.8	2.6	2.5	2.2

Sample	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B
Rock Type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line Number	4	1	2	3	4	5	1	2
SiO_2	58.99	59.87	59.74	59.75	59.17	59.18	59.04	59.41
Al_2O_3	25.86	25.39	25.96	25.93	25.82	25.93	25.65	25.50
CaO	7.28	6.49	6.82	7.08	7.15	7.36	6.79	7.04
Na_2O	6.23	6.55	6.56	6.59	6.55	6.52	6.60	6.84
K_2O	0.38	0.42	0.43	0.36	0.43	0.43	0.47	0.38
FeO	0.19	0.24	0.32	0.23	0.19	0.25	0.21	0.28
Total	98.93	98.96	99.83	99.94	99.31	99.67	98.76	99.45
An	38.3	34.4	35.5	36.4	36.6	37.4	35.2	35.4
Ab	59.3	62.9	61.8	61.4	60.7	60.0	61.9	62.3
Or	2.4	2.7	2.7	2.2	2.6	2.6	2.9	2.3

Sample	18-P1T-B	18-P1T-B	18-P1T-B
Rock Type	Jala Rd	Jala Rd	Jala Rd
Line Number	3	4	5
SiO_2	60.30	58.80	59.87
Al_2O_3	25.94	26.10	25.70
CaO	7.30	7.02	7.20
Na_2O	6.61	6.72	6.71
K_2O	0.45	0.39	0.44
FeO	0.30	0.31	0.24
Total	100.90	99.34	100.16
An	36.9	35.7	36.2
Ab	60.4	61.9	61.1
Or	2.7	2.4	2.6

APPENDIX C3

Plagioclase analyses: Captain's Bay Pluton and Unalaska Fm. Volcanics

Plagioclase analyses were obtained using a Cameca SX-50 electron microprobe at the University of Alaska Fairbanks, under the following analytical conditions: an accelerating voltage of 15 KeV, beam current of 10 nA, and a focused beam with a spot size of 1-3 μm. In addition, a self-calibrating volatile acquisition method was used to correct for the possible degradation of volatile element x-ray intensity (particularly Na) over time, following the methods of Devine et al. (1995). Major oxides are reported in weight percent (wt.%) with total Fe reported as FeO. "Line number" refers to the analysis number during a particular analytical transect. "Rock type" refers to the host rock, which contained the plagioclase that was analyzed. Abbreviations as follows: **And** - andesite; **encl** - enclave; **Qtz** - quartz; **Grd** - granodiorite; **An** - anorthite content (mol.%); **Ab** - albite content (mol.%); **Or** - orthoclase content (mol.%). Standards, counting times, and analytical errors are summarized in the table below:

Element	Counting Times (seconds)		Standard	Typical Analytical Error (wt.%, 1σ)
	Peak	Bkgd.		
Si	10	5	Tiburon albite (TALBITE)	.276
Al	10	5	Tiburon albite (TALBITE)	.271
Ca	10	5	Anorthite (USNM 137041)	.260
Na	30	5	Tiburon albite (TALBITE)	.212
K	10	5	Orthoclase (CM Taylor)	.015
Fe	30	5	Orthoclase (CM Taylor)	.041

Sample	MH-6A	MH-6A	MH-6A	MH-6A	MH-6A	MH-6A	MH-6A	MH-6A
Rock Type	Diorite	Diorite	Diorite	Diorite	Diorite	Diorite	Diorite	Diorite
Line Number	1	2	3	4	5	6	1	2
SiO_2	54.02	54.88	49.17	51.61	56.40	56.20	51.62	51.64
Al_2O_3	28.92	28.83	32.77	31.39	28.01	25.81	32.10	33.08
CaO	10.99	10.45	14.58	13.66	8.96	7.57	12.96	13.00
Na_2O	5.12	5.02	3.17	4.12	5.63	6.87	3.72	3.74
K_2O	0.46	0.40	0.15	0.17	0.46	0.48	0.11	0.12
FeO	0.50	0.94	0.22	0.27	0.35	1.25	0.40	0.35
Total	99.96	100.52	100.06	101.20	99.82	98.18	100.91	101.94
An	53.0	52.2	71.2	64.1	45.5	36.8	65.4	65.3
Ab	44.7	45.4	28.0	35.0	51.7	60.4	34.0	34.0
Or	2.3	2.4	0.9	0.9	2.8	2.8	0.7	0.7

Sample	MH-6A	MH-6A	MH-6A	MH-6A	MH-6A	MH-6A	MH-6A	MH-6A
Rock Type	Diorite	Diorite	Diorite	Diorite	Diorite	Diorite	Diorite	Diorite
Line Number	3	4	5	1	2	3	4	5
SiO_2	51.99	57.57	56.12	53.68	51.39	54.82	53.78	51.55
Al_2O_3	32.38	28.67	28.59	31.74	32.80	30.56	31.20	32.88
CaO	13.07	8.79	8.67	11.18	12.69	10.52	11.25	12.85
Na_2O	3.74	6.00	5.56	4.13	3.65	4.83	4.61	3.71
K_2O	0.12	0.44	0.34	0.22	0.15	0.31	0.25	0.21
FeO	0.38	0.45	0.35	0.50	0.46	0.20	0.27	0.38
Total	101.68	101.92	99.63	101.45	101.13	101.23	101.36	101.58
An	65.4	43.6	45.3	59.1	65.2	53.6	56.6	64.8
Ab	33.9	53.8	52.6	39.5	33.9	44.5	41.9	33.9
Or	0.7	2.6	2.1	1.4	0.9	1.9	1.5	1.2

Sample	MH-6A	MH-6A	MH-6A	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F
Rock Type	Diorite	Diorite	Diorite	And encl	And encl	And encl	And encl	And encl
Line Number	6	7	1	1	2	1	2	3
SiO_2	56.61	56.15	57.11	55.69	61.49	61.88	55.49	59.43
Al_2O_3	29.72	29.34	28.26	28.17	24.89	24.41	28.96	26.11
CaO	9.21	9.69	8.47	9.16	5.94	5.68	10.07	7.39
Na_2O	5.63	5.53	6.20	5.61	7.71	6.93	5.41	6.74
K_2O	0.43	0.34	0.28	0.43	1.05	1.05	0.45	0.64
FeO	0.32	0.36	0.49	0.69	0.48	0.31	0.38	0.44
Total	101.92	101.41	100.80	99.75	101.56	100.27	100.76	100.75
An	46.3	48.2	42.3	46.2	28.1	29.2	49.4	36.3
Ab	51.2	49.8	56.0	51.2	66.0	64.4	48.0	59.9
Or	2.6	2.0	1.6	2.6	5.9	6.4	2.6	3.7

Sample	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	4	5	6	7	8	9	10	11
SiO_2	63.23	56.85	57.36	52.32	52.47	57.81	60.06	54.98
Al_2O_3	24.09	28.43	28.20	30.00	31.55	27.52	25.74	29.35
CaO	5.60	9.37	9.36	11.95	13.32	8.76	6.05	10.84
Na_2O	7.10	5.89	5.65	4.15	3.71	5.82	7.15	4.72
K_2O	0.58	0.37	0.50	0.29	0.27	0.58	0.94	0.37
FeO	0.29	0.52	0.52	0.30	0.39	0.56	0.29	0.49
Total	100.91	101.42	101.61	99.01	101.72	101.05	100.24	100.75
An	29.3	45.8	46.4	60.3	65.4	43.8	30.1	54.7
Ab	67.1	52.1	50.7	37.9	33.0	52.7	64.3	43.1
Or	3.6	2.1	2.9	1.7	1.6	3.4	5.6	2.2

Sample	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	12	13	14	15	16	17	18	19
SiO_2	56.21	55.76	57.16	54.77	55.23	56.96	55.04	55.42
Al_2O_3	28.13	28.47	28.50	28.73	28.67	28.48	29.44	28.78
CaO	9.32	10.07	8.96	10.72	9.71	9.46	10.53	10.30
Na_2O	6.05	5.80	5.85	5.53	5.09	5.87	5.09	5.75
K_2O	0.54	0.43	0.56	0.36	0.47	0.54	0.43	0.38
FeO	0.56	0.50	0.43	0.23	0.49	0.26	0.42	0.36
Total	100.82	101.04	101.47	100.35	99.66	101.56	100.95	101.00
An	44.6	47.8	44.3	50.6	49.9	45.7	52.0	48.7
Ab	52.4	49.8	52.4	47.3	47.3	51.2	45.5	49.2
Or	3.1	2.4	3.3	2.0	2.8	3.1	2.5	2.1

Sample	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	20	21	22	23	24	25	26	27
SiO_2	55.00	54.58	54.76	56.05	54.10	55.70	57.26	60.59
Al_2O_3	29.29	29.76	29.58	29.32	29.75	29.43	27.88	24.28
CaO	10.67	11.74	10.60	10.21	10.72	10.67	8.93	5.41
Na_2O	5.24	4.87	4.77	5.37	4.49	4.74	5.71	7.35
K_2O	0.45	0.37	0.35	0.42	0.35	0.41	0.42	1.25
FeO	0.33	0.49	0.27	0.61	0.24	0.46	0.44	0.21
Total	100.97	101.80	100.33	101.99	99.66	101.41	100.64	99.10
An	51.6	55.9	53.9	50.0	55.6	54.1	45.2	26.8
Ab	45.8	42.0	43.9	47.6	42.2	43.5	52.3	65.8
Or	2.6	2.1	2.1	2.5	2.1	2.8	2.6	7.4

Sample	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	28	29	30	31	32	33	34	1
SiO_2	57.34	57.04	56.40	57.66	57.81	55.95	58.10	62.25
Al_2O_3	28.37	28.08	27.66	28.35	27.32	28.36	27.53	23.93
CaO	8.55	8.90	9.23	8.37	8.40	8.87	8.41	5.06
Na_2O	5.72	5.87	5.35	6.13	6.16	6.50	6.65	8.36
K_2O	0.42	0.40	0.44	0.49	0.43	0.40	0.50	0.70
FeO	0.28	0.21	0.35	0.47	0.40	0.33	0.47	0.66
Total	100.69	100.51	99.44	101.47	100.52	100.41	101.66	100.90
An	44.1	44.5	47.5	41.8	41.9	42.0	39.97	24.08
Ab	53.4	53.1	49.8	55.4	55.6	55.7	57.21	71.95
Or	2.6	2.4	2.7	2.9	2.6	2.3	2.82	3.97

Sample	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	2	3	4	5	6	7	8	9
SiO_2	61.66	55.68	57.39	56.83	57.41	54.71	55.71	54.77
Al_2O_3	23.95	28.54	27.99	28.56	27.48	29.59	28.36	29.43
CaO	4.99	9.22	8.67	9.74	8.15	10.72	8.90	11.34
Na_2O	6.29	6.73	6.40	5.35	6.20	5.21	5.76	5.00
K_2O	0.90	0.45	0.52	0.53	0.66	0.56	0.62	0.44
FeO	1.47	0.29	0.39	0.24	0.44	0.36	0.70	0.57
Total	99.26	100.91	101.37	101.25	100.34	101.15	100.05	101.55
An	28.6	42.1	41.5	48.6	40.4	51.5	44.4	54.2
Ab	65.2	55.5	55.5	48.3	55.7	45.3	52.0	43.3
Or	6.2	2.4	3.0	3.1	3.9	3.2	3.7	2.5

Sample	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	10	11	12	13	14	15	16	17
SiO_2	54.71	55.08	54.80	54.90	54.40	54.40	54.72	54.20
Al_2O_3	29.41	29.70	29.89	29.72	29.77	29.62	29.62	29.98
CaO	11.19	10.68	11.09	11.33	11.30	10.87	11.23	11.49
Na_2O	4.73	5.06	5.03	4.55	4.88	4.49	5.23	4.88
K_2O	0.37	0.36	0.36	0.36	0.40	0.40	0.35	0.34
FeO	0.27	0.54	0.40	0.32	0.52	0.24	0.29	0.40
Total	100.68	101.43	101.58	101.17	101.27	100.04	101.45	101.28
An	55.4	52.7	53.8	56.7	54.8	55.8	53.2	55.4
Ab	42.4	45.2	44.1	41.2	42.9	41.7	44.8	42.6
Or	2.2	2.1	2.1	2.1	2.3	2.4	2.0	2.0

Sample	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	18	19	20	21	22	23	24	25
SiO_2	53.81	53.86	53.73	54.28	54.86	55.42	55.38	55.86
Al_2O_3	29.82	30.67	30.71	29.34	29.53	29.12	29.06	29.50
CaO	11.38	11.85	11.52	10.50	10.54	9.70	9.74	10.16
Na_2O	4.57	4.56	4.29	4.39	4.99	5.17	4.80	4.82
K_2O	0.37	0.28	0.30	0.40	0.37	0.43	0.40	0.43
FeO	0.47	0.36	0.41	0.35	0.35	0.29	0.40	0.24
Total	100.42	101.58	100.96	99.26	100.63	100.13	99.77	101.00
An	56.7	58.0	58.7	55.5	52.7	49.5	51.5	52.4
Ab	41.1	40.4	39.5	42.0	45.2	47.8	46.0	45.0
Or	2.2	1.6	1.8	2.5	2.2	2.6	2.5	2.6

Sample	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	26	27	28	29	30	31	32	33
SiO_2	55.47	56.72	54.42	56.86	57.62	55.16	54.95	55.64
Al_2O_3	28.66	28.64	28.65	28.36	27.79	29.06	29.35	28.71
CaO	9.57	9.49	10.08	9.91	8.29	10.03	9.61	10.03
Na_2O	5.44	4.87	5.29	5.42	5.63	5.21	5.27	5.41
K_2O	0.43	0.45	0.44	0.54	0.62	0.43	0.39	0.44
FeO	0.52	0.37	0.40	0.33	0.26	0.43	0.24	0.21
Total	100.08	100.54	99.28	101.42	100.22	100.32	99.82	100.43
An	48.7	48.0	50.4	49.9	48.6	43.1	49.0	49.3
Ab	48.9	49.4	46.8	47.5	48.2	53.0	48.6	48.1
Or	2.5	2.5	2.8	2.6	3.2	3.9	2.4	2.6

Sample	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	34	35	36	37	38	39	40	41
SiO_2	55.38	56.29	55.42	59.01	55.81	56.16	54.40	55.57
Al_2O_3	28.51	28.53	28.91	27.07	28.62	28.69	28.34	29.32
CaO	9.87	10.09	9.99	8.23	9.89	9.42	9.72	10.10
Na_2O	5.39	5.29	4.89	5.63	5.32	5.08	4.99	5.32
K_2O	0.43	0.47	0.41	0.66	0.40	0.45	0.43	0.47
FeO	0.34	0.35	0.21	0.40	0.47	0.37	0.47	0.34
Total	99.91	101.02	99.82	101.90	100.51	100.15	98.36	101.10
An	49.0	49.9	51.7	42.9	49.5	49.2	50.4	49.8
Ab	48.4	47.3	45.8	53.0	48.2	48.0	46.9	47.5
Or	2.6	2.8	2.5	4.1	2.4	2.8	2.7	2.7

Sample	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	42	43	44	45	46	47	48	49
SiO_2	56.11	55.02	55.84	54.96	55.47	56.11	55.83	57.15
Al_2O_3	28.73	29.17	29.01	29.30	28.84	29.33	29.03	28.74
CaO	9.57	9.90	9.99	10.61	9.89	10.07	9.95	9.63
Na_2O	5.28	5.28	5.11	5.44	5.17	5.43	5.37	5.45
K_2O	0.49	0.48	0.50	0.44	0.47	0.54	0.43	0.49
FeO	0.36	0.80	0.32	0.36	0.60	0.16	0.55	0.49
Total	100.54	100.66	100.76	101.10	100.44	101.64	101.15	101.94
An	48.6	49.4	50.4	50.6	49.9	49.0	49.3	48.0
Ab	48.5	47.7	46.6	46.9	47.2	47.9	48.2	49.1
Or	2.9	2.9	3.0	2.5	2.8	3.1	2.5	2.9

Sample	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	50	51	52	53	54	55	56	57
SiO_2	55.93	55.75	56.74	56.51	56.95	56.81	56.98	55.90
Al_2O_3	27.99	27.64	26.54	27.76	28.62	28.92	28.06	28.43
CaO	9.17	8.78	8.09	9.09	9.97	9.21	9.11	9.51
Na_2O	5.70	5.21	5.74	6.03	5.48	5.43	5.68	5.74
K_2O	0.56	0.50	1.04	0.49	0.49	0.44	0.46	0.62
FeO	0.63	0.21	0.42	0.40	0.27	0.38	0.44	0.40
Total	99.97	98.09	98.57	100.29	101.78	101.19	100.74	100.59
An	45.5	46.7	41.0	44.2	48.7	47.1	45.7	46.1
Ab	51.2	50.2	52.7	53.0	48.4	50.2	51.5	50.3
Or	3.3	3.1	6.3	2.8	2.9	2.7	2.8	3.6

Sample	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	58	59	60	61	62	63	64	65
SiO_2	55.28	55.69	54.55	53.19	56.25	54.04	57.78	56.95
Al_2O_3	28.67	29.03	28.88	29.63	29.27	30.22	27.77	27.60
CaO	10.09	10.09	10.19	10.78	9.96	9.95	8.60	9.05
Na_2O	4.88	5.05	5.83	4.48	5.37	4.84	5.84	5.77
K_2O	0.46	0.42	0.45	0.37	0.46	0.38	0.60	0.53
FeO	0.26	0.57	0.32	0.22	0.42	0.34	0.33	0.29
Total	99.64	100.86	100.21	98.68	101.73	99.78	100.93	100.19
An	51.8	51.1	47.9	55.8	49.2	51.9	43.2	45.0
Ab	45.3	46.3	49.6	42.0	48.0	45.7	53.2	51.9
Or	2.8	2.5	2.5	2.3	2.7	2.4	3.6	3.1

Sample	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	1	2	3	4	5	6	7	8
SiO_2	59.87	56.37	57.43	50.83	50.51	51.04	57.41	57.30
Al_2O_3	26.28	28.30	28.24	32.11	32.56	30.54	27.91	27.81
CaO	7.16	9.80	9.18	13.29	13.75	13.18	9.43	8.82
Na_2O	6.51	6.03	5.67	3.35	2.84	2.62	5.37	6.09
K_2O	0.70	0.48	0.54	0.29	0.16	0.38	0.49	0.52
FeO	0.44	0.57	0.56	0.42	0.40	0.27	0.49	0.36
Total	100.97	101.54	101.63	100.29	100.22	98.03	101.10	100.90
An	36.2	46.1	45.7	67.5	72.1	71.8	47.8	43.1
Ab	59.6	51.3	51.1	30.8	26.9	25.8	49.3	53.8
Or	4.2	2.7	3.2	1.8	1.0	2.5	2.9	3.1

Sample	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	9	10	11	12	13	14	16	17
SiO_2	58.28	55.86	55.97	56.23	49.51	57.77	60.80	60.15
Al_2O_3	27.60	28.91	28.48	28.81	32.53	28.03	25.45	26.33
CaO	8.94	9.77	9.33	8.98	13.61	9.42	6.52	7.46
Na_2O	5.81	5.61	5.58	4.97	3.03	5.33	7.09	6.50
K_2O	0.49	0.40	0.42	0.47	0.17	0.41	0.63	0.65
FeO	0.38	0.53	0.49	0.59	0.51	0.33	0.44	0.60
Total	101.50	101.07	100.26	100.06	99.36	101.29	100.93	101.69
An	44.6	47.9	46.8	48.4	70.5	48.2	32.4	37.3
Ab	52.4	49.8	50.7	48.5	28.4	49.3	63.8	58.8
Or	2.9	2.4	2.5	3.0	1.0	2.5	3.8	3.9

Sample	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	18	1	2	3	4	5	6	7
SiO_2	62.47	60.20	60.69	55.60	57.53	55.33	56.01	55.30
Al_2O_3	24.22	25.59	25.44	29.69	28.13	28.99	28.69	28.66
CaO	4.63	6.66	6.46	10.51	9.06	9.58	9.87	9.74
Na_2O	7.64	7.63	7.45	4.73	6.19	5.45	5.50	5.59
K_2O	0.88	0.69	0.62	0.33	0.41	0.40	0.42	0.37
FeO	1.07	0.37	0.26	0.16	0.35	0.15	0.48	0.50
Total	100.91	101.15	100.92	101.02	101.67	99.90	100.96	100.16
An	23.7	31.3	31.2	54.0	43.6	48.1	48.6	48.0
Ab	70.9	64.9	65.2	44.0	54.0	49.5	49.0	49.8
Or	5.4	3.8	3.5	2.0	2.4	2.4	2.5	2.1

Sample	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	8	9	10	11	12	13	14	15
SiO_2	56.60	56.15	54.96	54.72	55.07	54.67	54.49	54.89
Al_2O_3	27.11	28.70	28.29	30.06	29.85	30.14	29.52	29.47
CaO	7.66	9.23	9.76	10.15	10.82	10.34	10.54	10.48
Na_2O	5.74	5.03	5.34	4.90	4.81	4.66	4.67	5.46
K_2O	1.10	0.45	0.46	0.36	0.39	0.37	0.32	0.36
FeO	0.51	0.38	0.42	0.64	0.31	0.31	0.58	0.36
Total	98.71	99.94	99.23	100.82	101.26	100.49	100.13	101.01
An	39.6	48.9	48.9	52.2	54.1	53.8	54.4	50.4
Ab	53.7	48.3	48.4	45.6	43.6	43.9	43.6	47.5
Or	6.7	2.9	2.7	2.2	2.3	2.3	2.0	2.1

Sample	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	16	17	18	19	20	21	22	23
SiO_2	55.43	58.08	56.47	55.60	56.52	55.40	57.09	56.12
Al_2O_3	28.75	27.51	28.63	28.63	28.87	27.93	28.92	28.76
CaO	9.57	8.26	8.80	9.76	10.12	10.00	9.53	10.44
Na_2O	5.27	5.92	5.53	5.34	5.54	5.39	5.28	5.32
K_2O	0.46	0.50	0.56	0.53	0.49	0.50	0.46	0.41
FeO	0.35	0.29	0.95	0.35	0.37	0.48	0.31	0.34
Total	99.83	100.56	100.94	100.21	101.91	99.70	101.59	101.40
An	48.7	42.2	45.2	48.7	48.8	49.1	48.6	50.8
Ab	48.5	54.7	51.4	48.2	48.4	47.9	48.7	46.8
Or	2.8	3.0	3.4	3.2	2.8	2.9	2.8	2.4

Sample	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	24	25	26	27	28	29	30	31
SiO_2	56.27	55.88	56.51	54.27	55.21	54.67	55.45	56.17
Al_2O_3	28.11	29.58	28.72	30.12	29.32	29.15	29.47	28.67
CaO	9.75	10.41	9.66	11.24	10.10	9.66	9.76	9.66
Na_2O	5.50	5.22	4.69	4.83	4.96	5.26	4.89	5.65
K_2O	0.55	0.45	0.43	0.32	0.43	0.39	0.41	0.46
FeO	0.51	0.44	0.33	0.38	0.43	0.41	0.18	0.53
Total	100.70	101.98	100.33	101.16	100.45	99.53	100.16	101.14
An	47.9	51.1	51.8	55.2	51.5	49.1	51.1	47.3
Ab	48.9	46.3	45.5	42.9	45.8	48.5	46.3	50.0
Or	3.2	2.6	2.7	1.9	2.6	2.4	2.6	2.7

Sample	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	32	33	34	35	36	37	38	39
SiO_2	57.42	56.23	55.18	54.64	55.77	56.97	55.73	54.97
Al_2O_3	28.24	29.32	29.06	29.72	29.66	28.90	29.02	29.56
CaO	9.05	10.37	10.32	10.52	10.06	9.83	10.06	11.47
Na_2O	5.68	4.94	5.54	4.52	4.96	4.81	5.07	4.93
K_2O	0.58	0.41	0.38	0.38	0.42	0.40	0.46	0.33
FeO	0.67	0.70	0.53	0.52	0.46	0.49	0.29	0.24
Total	101.63	101.97	101.01	100.30	101.33	101.40	100.63	101.51
An	45.2	52.4	49.6	54.9	51.5	51.7	50.8	55.2
Ab	51.3	45.1	48.2	42.7	45.9	45.8	46.4	42.9
Or	3.4	2.5	2.2	2.4	2.6	2.5	2.8	1.9

Sample	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	40	41	42	43	44	45	46	47
SiO_2	54.75	54.81	55.04	55.23	55.48	54.79	56.02	57.34
Al_2O_3	29.50	29.50	29.19	29.32	29.51	28.78	29.00	28.59
CaO	11.30	10.36	10.67	10.23	10.38	10.20	9.71	9.07
Na_2O	4.74	5.16	5.14	4.85	5.22	4.64	5.44	5.95
K_2O	0.37	0.40	0.39	0.43	0.31	0.46	0.51	0.52
FeO	0.37	0.25	0.24	0.30	0.42	0.58	0.41	0.32
Total	101.04	100.48	100.67	100.35	101.33	99.45	101.08	101.78
An	55.6	51.4	52.2	52.4	51.4	53.3	48.2	44.4
Ab	42.2	46.3	45.5	45.0	46.8	43.9	48.8	52.6
Or	2.2	2.4	2.3	2.6	1.8	2.8	3.0	3.0

Sample	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	48	49	50	51	52	53	54	55
SiO_2	56.30	53.19	55.07	55.52	55.42	54.33	57.15	54.89
Al_2O_3	28.84	28.85	29.42	29.57	29.36	29.97	27.97	29.20
CaO	9.68	10.25	10.51	11.09	9.92	10.95	9.22	10.47
Na_2O	5.42	5.53	4.98	4.99	5.03	5.38	6.25	5.33
K_2O	0.50	0.42	0.38	0.41	0.43	0.34	0.34	0.39
FeO	0.35	0.19	0.50	0.40	0.58	0.34	0.15	0.31
Total	101.09	98.43	100.87	101.99	100.74	101.30	101.08	100.60
An	48.2	49.4	52.6	53.8	50.8	51.9	44.0	50.9
Ab	48.8	48.2	45.1	43.8	46.6	46.2	54.0	46.9
Or	3.0	2.4	2.3	2.4	2.6	1.9	1.9	2.3

Sample	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	56	57	58	59	60	61	62	63
SiO_2	55.53	54.85	54.61	54.38	54.82	54.27	56.12	55.17
Al_2O_3	28.58	29.71	30.18	29.57	30.05	29.80	29.66	29.89
CaO	9.76	10.89	10.44	10.63	10.93	10.93	11.22	10.50
Na_2O	5.49	5.21	5.08	4.63	4.98	4.77	4.22	4.57
K_2O	0.41	0.43	0.32	0.40	0.36	0.38	0.36	0.40
FeO	0.37	0.23	0.50	0.58	0.51	0.59	0.27	1.01
Total	100.14	101.31	101.12	100.18	101.64	100.74	101.83	101.54
An	48.4	52.3	52.2	54.5	53.7	54.6	58.2	54.6
Ab	49.2	45.2	45.9	43.0	44.2	43.1	39.6	43.0
Or	2.4	2.5	1.9	2.5	2.1	2.3	2.2	2.5

Sample	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	64	65	66	67	68	69	70	71
SiO_2	55.32	54.38	55.84	55.54	54.98	56.65	55.39	54.88
Al_2O_3	29.95	29.83	29.06	28.61	29.26	29.02	29.18	29.74
CaO	10.61	10.41	10.18	9.16	9.53	9.69	10.18	10.94
Na_2O	4.95	5.02	5.10	5.14	5.28	5.34	4.84	5.04
K_2O	0.34	0.34	0.44	0.48	0.36	0.42	0.46	0.44
FeO	0.44	0.50	0.30	0.29	0.53	0.45	0.26	0.38
Total	101.60	100.49	100.92	99.22	99.94	101.57	100.31	101.42
An	53.1	52.3	51.1	48.1	48.9	48.8	52.2	53.1
Ab	44.9	45.7	46.3	48.9	48.9	48.7	44.9	44.3
Or	2.0	2.0	2.6	3.0	2.2	2.5	2.8	2.6

Sample	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F	MH-8F
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	72	73	74	75	76	77	78	79
SiO_2	55.97	58.50	55.00	55.50	55.60	56.82	56.77	56.40
Al_2O_3	29.32	27.74	29.21	29.02	27.57	28.65	29.10	28.22
CaO	10.44	7.85	9.98	10.63	8.96	9.86	9.72	8.60
Na_2O	4.88	5.94	4.97	5.38	4.75	5.46	5.42	5.69
K_2O	0.45	0.51	0.35	0.48	0.91	0.49	0.44	0.38
FeO	0.34	0.43	0.55	0.22	2.51	0.29	0.27	0.28
Total	101.38	100.98	100.06	101.23	100.30	101.57	101.72	99.58
An	52.7	40.9	51.5	50.8	48.1	48.5	48.5	44.4
Ab	44.6	56.0	46.3	46.5	46.2	48.6	49.0	53.2
Or	2.7	3.2	2.2	2.7	5.8	2.9	2.6	2.4

Sample	MH-8F	MH-6A	MH-6A	MH-6A	MH-6A	MH-6A	MH-6A	MH-6A
Rock Type	And encl	Diorite	Diorite	Diorite	Diorite	Diorite	Diorite	Diorite
Line Number	80	1	2	3	4	5	6	7
SiO_2	55.91	57.30	54.22	54.93	55.70	56.96	55.78	54.74
Al_2O_3	28.78	27.15	29.32	29.51	28.36	28.07	28.84	29.84
CaO	9.72	9.13	10.13	11.14	9.82	9.38	9.41	11.71
Na_2O	5.26	5.93	4.94	4.73	5.70	5.86	5.50	4.92
K_2O	0.42	0.54	0.32	0.36	0.47	0.45	0.31	0.32
FeO	0.49	0.57	0.17	0.27	0.26	0.33	0.66	0.30
Total	100.59	100.61	99.10	100.94	100.31	101.06	100.50	101.82
An	49.3	44.5	52.1	55.4	47.5	45.7	47.7	55.8
Ab	48.2	52.4	45.9	42.5	49.9	51.7	50.4	42.4
Or	2.5	3.1	2.0	2.1	2.7	2.6	1.9	1.8

Sample	MH-6A	MH-6A	MH-6A	MH-6A	MH-6A	MH-6A	MH-6A	MH-6A
Rock Type	Diorite	Diorite	Diorite	Diorite	Diorite	Diorite	Diorite	Diorite
Line Number	8	9	10	11	12	13	14	15
SiO_2	55.81	55.45	56.08	56.58	55.12	56.21	53.57	51.70
Al_2O_3	27.96	28.53	29.33	28.93	29.13	28.88	30.66	31.26
CaO	9.59	9.26	10.26	10.25	10.84	10.32	13.26	13.00
Na_2O	5.22	5.35	5.27	4.79	5.61	5.16	3.80	4.37
K_2O	0.34	0.37	0.34	0.33	0.39	0.39	0.25	0.17
FeO	0.11	0.29	0.25	0.29	0.20	0.87	0.37	0.31
Total	99.02	99.25	101.54	101.16	101.29	101.83	101.90	100.80
An	49.4	47.8	50.8	53.1	50.5	51.3	64.9	61.6
Ab	48.6	50.0	47.2	44.9	47.3	46.4	33.6	37.5
Or	2.1	2.2	2.0	2.0	2.2	2.3	1.5	0.9

Sample	MH-6A	MH-6A	MH-6A	MH-6A	MH-6A	MH-6A	MH-6A	MH-6A
Rock Type	Diorite	Diorite	Diorite	Diorite	Diorite	Diorite	Diorite	Diorite
Line Number	16	17	18	19	20	21	22	1
SiO_2	52.05	52.39	50.03	48.81	51.24	53.64	56.58	57.70
Al_2O_3	31.37	31.04	31.86	31.34	31.63	30.64	28.54	27.87
CaO	12.93	13.01	13.89	13.54	13.01	12.38	8.82	9.05
Na_2O	3.95	4.26	3.57	3.29	3.59	4.40	6.14	5.89
K_2O	0.25	0.24	0.19	0.16	0.21	0.22	0.25	0.50
FeO	0.46	0.24	0.14	1.35	1.07	0.32	0.04	0.35
Total	101.00	101.19	99.68	98.49	100.75	101.61	100.36	101.36
An	63.5	62.0	67.5	68.8	65.8	60.1	43.6	44.6
Ab	35.1	36.7	31.4	30.2	32.9	38.6	54.9	52.5
Or	1.5	1.4	1.1	1.0	1.3	1.3	1.5	3.0

Sample	MH-6A	MH-6A	MH-6A	MH-6A	MH-6A	MH-6A	MH-6A	MH-6A
Rock Type	Diorite	Diorite	Diorite	Diorite	Diorite	Diorite	Diorite	Diorite
Line Number	2	3	4	5	6	7	8	9
SiO_2	56.35	55.02	51.84	54.92	47.98	48.81	50.64	48.21
Al_2O_3	27.86	29.30	31.85	29.89	34.52	33.60	32.10	33.92
CaO	9.47	10.54	13.00	11.55	16.01	15.62	13.59	16.00
Na_2O	6.21	5.08	3.83	4.70	1.94	2.07	3.42	2.38
K_2O	0.52	0.32	0.20	0.36	0.09	0.13	0.17	0.19
FeO	0.45	0.41	0.31	0.15	0.31	0.67	1.17	0.61
Total	100.86	100.68	101.04	101.56	100.85	100.90	101.10	101.31
An	44.4	52.4	64.4	56.4	81.6	80.0	68.0	77.9
Ab	52.7	45.7	34.4	41.5	17.9	19.2	31.0	21.0
Or	2.9	1.9	1.2	2.1	0.5	0.8	1.0	1.1

Sample	MH-6A	MH-6A	MH-6A	MH-6A	MH-6A	MH-6A	MH-6A	MH-6A
Rock Type	Diorite	Diorite	Diorite	Diorite	Diorite	Diorite	Diorite	Diorite
Line Number	10	11	12	13	14	15	16	17
SiO_2	47.94	51.83	48.23	48.87	55.31	55.59	55.01	54.14
Al_2O_3	34.75	30.38	33.24	33.96	28.73	28.54	29.34	29.96
CaO	15.91	12.61	15.17	15.29	10.27	10.68	11.24	11.85
Na_2O	2.35	4.55	2.48	2.09	5.78	5.94	4.75	4.87
K_2O	0.14	0.38	0.29	0.43	0.62	0.51	0.40	0.26
FeO	0.14	0.34	0.31	0.34	0.40	0.32	0.41	0.78
Total	101.23	100.09	99.72	100.97	101.11	101.59	101.16	101.86
An	78.3	59.2	75.8	78.1	47.8	48.5	55.3	56.5
Ab	20.9	38.7	22.4	19.3	48.7	48.8	42.3	42.1
Or	0.8	2.1	1.8	2.6	3.4	2.8	2.4	1.5

Sample	**MH-6A**	**MH-6A**	**MH-6A**	**MH-6A**	**MH-6A**	**MH-6A**	**MH-6A**	**MH-6A**
Rock Type	**Diorite**	**Diorite**	**Diorite**	**Diorite**	**Diorite**	**Diorite**	**Diorite**	**Diorite**
Line Number	**18**	**19**	**20**	**1**	**2**	**3**	**4**	**5**
SiO_2	55.57	54.14	53.91	57.04	55.43	56.43	53.29	52.59
Al_2O_3	29.38	30.24	30.56	28.04	29.11	28.26	30.36	30.24
CaO	10.79	11.35	12.05	9.28	11.23	9.69	11.86	11.78
Na_2O	5.06	4.55	4.38	6.04	4.71	6.13	4.60	4.49
K_2O	0.28	0.34	0.27	0.27	0.38	0.44	0.27	0.27
FeO	0.76	0.50	0.37	0.19	0.33	0.38	0.19	0.22
Total	101.85	101.12	101.53	100.85	101.18	101.33	100.57	99.59
An	53.2	56.8	59.4	45.2	55.6	45.5	57.8	58.3
Ab	45.2	41.2	39.0	53.2	42.2	52.1	40.6	40.2
Or	1.6	2.0	1.6	1.6	2.2	2.4	1.6	1.6
Sample	**MH-6A**	**MH-6A**	**MH-6A**	**MH-6A**	**MH-6A**	**MH-6A**	**MH-6A**	**MH-6A**
Rock Type	**Diorite**	**Diorite**	**Diorite**	**Diorite**	**Diorite**	**Diorite**	**Diorite**	**Diorite**
Line Number	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
SiO_2	53.17	51.70	51.81	50.17	48.66	47.66	47.60	51.48
Al_2O_3	30.28	31.12	32.50	33.08	33.80	34.34	34.64	32.74
CaO	12.27	13.47	14.30	15.09	15.56	16.35	17.10	14.03
Na_2O	4.50	3.24	3.34	2.77	2.59	2.07	1.88	2.90
K_2O	0.32	0.22	0.19	0.17	0.09	0.12	0.07	0.15
FeO	0.55	0.38	0.29	0.67	0.49	0.60	0.17	0.53
Total	101.09	100.12	102.43	101.94	101.20	101.14	101.45	101.83
An	59.0	68.8	69.5	74.3	76.4	80.8	83.0	72.1
Ab	39.2	29.9	29.4	24.7	23.0	18.5	16.5	27.0
Or	1.8	1.3	1.1	1.0	0.6	0.7	0.4	0.9
Sample	**MH-6A**	**MH-6A**	**MH-6A**	**MH-6A**	**MH-6A**	**MH-6A**	**MH-6A**	**MH-6A**
Rock Type	**Diorite**	**Diorite**	**Diorite**	**Diorite**	**Diorite**	**Diorite**	**Diorite**	**Diorite**
Line Number	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**
SiO_2	48.94	47.54	48.02	47.93	48.79	48.32	51.57	49.79
Al_2O_3	33.34	34.32	34.42	33.60	34.22	32.72	32.50	32.77
CaO	16.39	16.69	16.49	16.38	16.26	14.55	14.10	14.43
Na_2O	2.57	2.11	1.87	2.19	2.15	1.93	3.36	3.08
K_2O	0.12	0.07	0.07	0.11	0.10	0.57	0.14	0.17
FeO	0.15	0.34	0.43	0.53	0.20	2.57	0.17	0.45
Total	101.51	101.07	101.30	100.75	101.73	100.67	101.84	100.69
An	77.4	81.0	82.6	80.0	80.2	77.7	69.3	71.4
Ab	22.0	18.6	16.9	19.4	19.2	18.7	29.9	27.6
Or	0.7	0.4	0.4	0.6	0.6	3.6	0.8	1.0
Sample	**MH-6A**	**MH-6A**	**MH-6A**	**MH-6A**	**MH-6A**	**MH-6A**	**MH-6A**	**MH-6A**
Rock Type	**Diorite**	**Diorite**	**Diorite**	**Diorite**	**Diorite**	**Diorite**	**Diorite**	**Diorite**
Line Number	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**
SiO_2	50.91	50.64	47.84	47.27	48.05	49.61	50.62	53.94
Al_2O_3	32.51	32.45	34.42	32.54	34.48	33.13	31.80	30.27
CaO	14.86	14.10	17.17	15.81	16.03	15.94	12.97	12.23
Na_2O	3.09	3.05	2.10	1.91	2.20	2.19	3.46	4.41
K_2O	0.17	0.17	0.06	0.14	0.07	0.09	0.14	0.28
FeO	0.35	0.27	0.34	1.33	0.71	0.71	0.42	0.37
Total	101.89	100.67	101.93	98.99	101.52	101.67	99.40	101.50
An	72.0	71.1	81.6	81.4	79.8	79.6	66.9	59.5
Ab	27.1	27.9	18.0	17.8	19.8	19.8	32.3	38.9
Or	1.0	1.0	0.4	0.8	0.4	0.5	0.8	1.6

Sample	MH-6A	MH-6A	MH-6A	MH-6A	MH-6A	MH-6A	MH-6A	MH-6A
Rock Type	Diorite	Diorite	Diorite	Diorite	Diorite	Diorite	Diorite	Diorite
Line Number	30	31	32	33	34	1	2	3
SiO_2	53.29	53.51	53.48	53.67	56.19	54.71	54.45	49.25
Al_2O_3	29.89	30.21	30.17	29.41	28.96	30.16	30.51	32.65
CaO	12.24	11.58	12.39	11.55	9.80	11.66	11.75	15.00
Na_2O	4.52	4.39	4.73	4.74	5.63	4.31	3.74	2.72
K_2O	0.34	0.55	0.30	0.32	0.36	0.34	0.38	0.15
FeO	0.22	0.21	0.56	0.32	0.54	0.30	0.26	0.57
Total	100.51	100.45	101.63	100.01	101.49	101.49	101.10	100.34
An	58.8	57.4	58.1	56.3	48.0	58.7	62.0	74.6
Ab	39.3	39.4	40.2	41.8	49.9	39.3	35.7	24.5
Or	2.0	3.2	1.7	1.9	2.1	2.1	2.4	0.9

Sample	MH-6A	MH-6A	MH-6A	MH-6A	MH-6A	MH-6A	MH-6A	MH-6A
Rock Type	Diorite	Diorite	Diorite	Diorite	Diorite	Diorite	Diorite	Diorite
Line Number	4	5	6	7	8	9	10	11
SiO_2	49.20	54.98	48.63	52.95	48.87	55.64	55.07	54.87
Al_2O_3	33.66	29.96	33.37	29.93	33.59	28.51	29.03	29.46
CaO	14.67	11.39	16.31	11.43	16.07	9.12	10.09	11.45
Na_2O	2.74	4.55	2.43	4.17	2.37	5.17	4.99	4.93
K_2O	0.12	0.32	0.08	0.39	0.13	0.45	0.45	0.46
FeO	0.30	0.42	0.55	0.48	0.55	0.39	0.31	0.33
Total	100.70	101.64	101.37	99.36	101.58	99.27	99.94	101.50
An	74.2	56.9	78.4	58.8	78.3	48.0	51.3	54.8
Ab	25.1	41.2	21.1	38.8	20.9	49.2	46.0	42.6
Or	0.7	1.9	0.5	2.4	0.8	2.8	2.7	2.6

Sample	MH-6A	MH-6A	MH-6A	MH-6A	MH-6A	MH-6A	MH-6A	MH-6A
Rock Type	Diorite	Diorite	Diorite	Diorite	Diorite	Diorite	Diorite	Diorite
Line Number	12	13	14	15	16	17	18	19
SiO_2	53.79	52.68	52.93	48.83	53.87	53.81	53.46	54.07
Al_2O_3	30.84	31.02	30.34	33.27	30.23	30.21	29.91	30.09
CaO	11.96	13.01	11.83	15.81	12.38	11.88	12.00	11.55
Na_2O	4.13	4.04	4.18	2.56	4.21	4.32	4.63	4.79
K_2O	0.31	0.34	0.33	0.12	0.31	0.32	0.41	0.33
FeO	0.44	0.37	0.30	0.22	0.40	0.28	0.51	0.44
Total	101.46	101.46	99.93	100.81	101.39	100.82	100.94	101.28
An	60.4	62.7	59.8	76.8	60.8	59.2	57.5	56.0
Ab	37.7	35.3	38.2	22.5	37.4	38.9	40.1	42.1
Or	1.8	2.0	2.0	0.7	1.8	1.9	2.4	1.9

Sample	MH-6A	MH-6A	MH-6A	MH-6A	MH-6A	MH-6A	MH-6A	MH-6A
Rock Type	Diorite	Diorite	Diorite	Diorite	Diorite	Diorite	Diorite	Diorite
Line Number	20	21	22	23	24	25	26	27
SiO_2	49.38	47.63	50.27	54.38	53.27	54.32	47.20	47.01
Al_2O_3	34.00	32.37	32.91	29.63	30.45	29.51	34.05	34.18
CaO	15.52	15.16	14.52	11.52	12.02	12.24	16.03	16.73
Na_2O	2.50	2.39	3.07	4.66	4.28	4.98	2.32	2.44
K_2O	0.12	0.14	0.14	0.34	0.27	0.36	0.16	0.12
FeO	0.18	1.24	0.41	0.33	0.35	0.28	0.19	0.50
Total	101.70	98.94	101.31	100.85	100.65	101.69	99.95	100.98
An	76.9	77.2	71.8	56.6	59.8	56.4	78.5	78.6
Ab	22.4	22.0	27.4	41.4	38.6	41.6	20.5	20.7
Or	0.7	0.9	0.8	2.0	1.6	2.0	1.0	0.7

Sample	MH-6A	MH-6A	MH-6A	MH-6A	MH-6A	MH-6A	MH-6A	MH-8E
Rock Type	Diorite	Diorite	Diorite	Diorite	Diorite	Diorite	Diorite	And encl
Line Number	28	29	30	31	32	33	34	1
SiO_2	49.11	47.17	47.26	53.01	52.45	53.15	49.07	60.89
Al_2O_3	33.86	33.57	33.90	30.97	30.83	30.08	33.48	24.73
CaO	16.10	16.27	15.73	13.53	12.05	12.40	15.34	5.50
Na_2O	2.18	2.39	2.83	3.90	4.12	4.45	2.57	7.74
K_2O	0.09	0.08	0.12	0.33	0.27	0.39	0.13	0.65
FeO	0.22	0.27	0.22	0.18	0.17	0.48	0.48	0.10
Total	101.55	99.75	100.05	101.92	99.89	100.94	101.06	99.59
An	79.9	78.6	74.9	64.5	60.8	59.3	76.2	27.1
Ab	19.6	20.9	24.4	33.6	37.6	38.5	23.1	69.1
Or	0.5	0.5	0.7	1.9	1.6	2.2	0.7	3.8

Sample	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	2	3	4	5	6	7	8	9
SiO_2	61.37	55.01	55.75	55.03	52.70	49.46	56.88	56.26
Al_2O_3	24.73	28.81	29.28	29.94	30.13	32.24	28.17	28.89
CaO	5.67	9.75	10.53	11.58	11.70	14.29	9.09	9.85
Na_2O	8.10	5.71	5.04	4.48	4.63	3.13	6.23	5.24
K_2O	0.94	0.35	0.38	0.28	0.22	0.12	0.33	0.34
FeO	0.15	0.27	0.36	0.39	0.78	0.38	0.46	0.48
Total	100.96	99.90	101.35	101.71	100.18	99.63	101.15	101.06
An	26.5	47.5	52.4	57.8	57.5	71.1	43.8	49.9
Ab	68.3	50.4	45.4	40.5	41.2	28.2	54.3	48.0
Or	5.2	2.0	2.3	1.7	1.3	0.7	1.9	2.0

Sample	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E
Rock Type	And encl	And Encl	And Encl	And Encl	And Encl	And Encl	And Encl	And Encl
Line Number	10	11	12	13	14	15	16	17
SiO_2	53.83	50.71	54.23	52.46	54.22	55.02	55.02	55.78
Al_2O_3	30.12	31.81	30.64	31.33	30.41	29.74	29.56	29.58
CaO	10.94	13.45	11.72	13.00	11.38	10.75	10.94	10.70
Na_2O	4.71	3.68	4.41	4.27	4.50	4.73	5.46	5.02
K_2O	0.27	0.19	0.25	0.22	0.31	0.35	0.32	0.33
FeO	0.52	0.30	0.42	0.38	0.71	0.26	0.39	0.21
Total	100.39	100.14	101.66	101.66	101.53	100.85	101.68	101.63
An	55.3	66.1	58.6	61.9	57.2	54.5	51.6	53.9
Ab	43.1	32.7	39.9	36.8	40.9	43.4	46.6	45.0
Or	1.6	1.1	1.5	1.3	1.9	2.1	1.8	1.9

Sample	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E
Rock Type	And Encl	And Encl	And Encl	And Encl	And Encl	And Encl	And Encl	And Encl
Line Number	18	19	20	21	22	23	24	25
SiO_2	52.31	54.33	56.41	57.56	57.56	54.67	55.90	55.98
Al_2O_3	30.29	29.39	28.21	28.31	27.65	30.68	29.13	28.57
CaO	12.20	10.70	10.08	9.92	9.66	11.63	10.50	9.92
Na_2O	4.49	5.17	5.43	5.58	5.89	4.32	5.54	5.05
K_2O	0.28	0.28	0.42	0.42	0.51	0.27	0.39	0.36
FeO	1.33	0.24	0.21	0.16	0.68	0.29	0.45	0.39
Total	100.91	100.12	100.76	101.95	101.95	101.85	101.91	100.27
An	59.0	52.5	49.4	48.4	46.2	58.8	50.0	50.9
Ab	39.3	45.9	48.1	49.2	51.0	39.6	47.7	46.9
Or	1.6	1.6	2.4	2.4	2.9	1.6	2.2	2.2

Sample	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	26	27	28	29	30	31	32	33
SiO_2	55.00	56.16	56.81	55.98	56.91	53.88	53.41	54.52
Al_2O_3	28.62	28.64	28.37	28.89	29.09	30.52	30.17	29.32
CaO	8.96	10.00	9.98	9.78	9.46	11.43	10.86	10.91
Na_2O	6.14	5.27	5.66	5.35	5.08	4.46	4.78	4.89
K_2O	0.37	0.39	0.40	0.41	0.34	0.30	0.23	0.28
FeO	0.57	0.36	0.43	0.58	0.21	0.48	0.27	0.30
Total	99.65	100.82	101.66	100.99	101.09	101.06	99.72	100.22
An	43.7	50.0	48.2	49.0	49.7	57.6	54.9	54.3
Ab	54.2	47.7	49.5	48.5	48.2	40.6	43.7	44.0
Or	2.1	2.3	2.3	2.5	2.1	1.8	1.4	1.7

Sample	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	34	35	36	37	38	39	40	41
SiO_2	53.05	54.37	61.72	59.95	62.31	60.10	62.07	62.36
Al_2O_3	30.54	29.90	25.02	25.86	24.72	23.92	24.64	24.41
CaO	12.30	11.47	6.19	6.10	5.51	6.21	5.18	5.19
Na_2O	4.05	4.74	7.86	7.27	7.04	6.85	8.17	7.71
K_2O	0.59	0.26	0.80	0.87	0.94	1.07	0.93	0.93
FeO	0.40	0.34	0.38	0.15	0.14	0.44	0.87	0.25
Total	100.94	101.10	101.97	100.20	100.68	98.58	101.86	100.85
An	60.5	56.3	29.0	30.1	28.4	31.2	24.6	25.6
Ab	36.1	42.1	66.6	64.8	65.8	62.4	70.2	68.9
Or	3.4	1.5	4.5	5.1	5.8	6.4	5.2	5.5

Sample	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	42	43	44	45	46	47	48	1
SiO_2	61.27	61.43	61.29	59.10	60.43	62.30	61.50	62.99
Al_2O_3	24.23	24.21	25.10	25.90	25.93	24.46	24.70	25.38
CaO	5.15	5.40	5.44	7.09	6.47	5.09	5.14	6.25
Na_2O	8.04	7.62	7.83	6.96	7.22	7.72	7.68	7.54
K_2O	0.90	0.80	0.60	0.69	0.62	1.00	0.98	0.54
FeO	0.45	0.29	0.29	0.27	0.34	0.21	0.18	0.32
Total	100.03	99.76	100.56	100.00	101.02	100.78	100.18	103.02
An	24.8	26.8	26.8	34.6	31.9	25.2	25.4	30.5
Ab	70.1	68.5	69.7	61.4	64.4	69.0	68.8	66.4
Or	5.1	4.7	3.5	4.0	3.7	5.9	5.8	3.1

Sample	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	2	3	4	5	6	7	8	9
SiO_2	55.81	60.75	62.11	61.60	61.41	61.61	62.26	61.88
Al_2O_3	28.43	23.89	24.71	25.23	24.54	24.46	24.48	24.27
CaO	10.08	5.32	5.89	5.46	4.86	5.30	5.68	5.25
Na_2O	5.85	7.99	7.95	8.17	7.95	7.61	7.67	7.16
K_2O	0.35	0.63	0.67	0.64	0.93	0.84	0.91	0.78
FeO	0.33	0.93	0.58	0.26	0.20	0.25	0.35	0.46
Total	100.86	99.49	101.92	101.37	99.89	100.09	101.35	99.79
An	47.8	25.9	28.0	26.0	23.9	26.4	27.5	27.4
Ab	50.2	70.4	68.2	70.4	70.7	68.6	67.2	67.7
Or	2.0	3.6	3.8	3.6	5.4	5.0	5.3	4.8

Sample	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	10	11	12	13	14	15	16	1
SiO_2	62.93	60.30	56.98	62.27	62.44	58.10	58.18	57.30
Al_2O_3	24.47	25.51	27.55	24.60	24.33	27.46	26.74	28.50
CaO	5.05	6.16	9.13	5.13	5.24	8.70	8.67	9.62
Na_2O	7.80	7.29	5.90	7.88	7.43	6.29	6.58	5.78
K_2O	0.68	0.54	0.43	1.15	1.04	0.52	0.38	0.37
FeO	0.36	0.54	0.32	0.22	0.50	0.60	0.49	0.16
Total	101.29	100.33	100.32	101.25	100.97	101.67	101.03	101.73
An	25.3	30.8	44.9	24.7	26.3	42.0	41.2	46.9
Ab	70.7	66.0	52.5	68.7	67.5	55.0	56.6	51.0
Or	4.0	3.2	2.5	6.6	6.2	3.0	2.1	2.2

Sample	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	2	3	4	5	6	7	8	9
SiO_2	56.71	58.39	57.30	55.87	52.88	52.49	50.53	50.03
Al_2O_3	28.05	27.88	28.08	29.13	30.08	31.95	32.87	32.76
CaO	9.19	8.93	9.29	9.93	11.33	12.76	14.68	13.59
Na_2O	5.42	5.76	5.86	6.07	4.21	3.64	2.78	3.18
K_2O	0.37	0.39	0.45	0.40	0.27	0.21	0.12	0.12
FeO	0.25	0.30	0.26	0.32	1.30	0.31	0.63	0.39
Total	99.99	101.65	101.24	101.71	100.07	101.36	101.60	100.08
An	47.3	45.0	45.5	46.4	58.8	65.1	74.0	69.7
Ab	50.5	52.6	51.9	51.4	39.6	33.6	25.3	29.6
Or	2.3	2.4	2.6	2.2	1.6	1.3	0.7	0.7

Sample	MH-8E	MH-8E	MH-8E	MH-8E	MH-8F	MH-8E	MH-8E	MH-8E
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	10	11	12	13	14	15	1	2
SiO_2	49.41	50.25	48.99	53.96	54.05	56.00	56.49	50.97
Al_2O_3	32.91	32.69	32.74	29.91	29.59	28.92	28.79	32.39
CaO	15.09	14.57	15.08	11.86	10.54	10.32	10.65	14.52
Na_2O	3.05	2.68	3.19	4.35	4.98	5.50	5.83	2.95
K_2O	0.14	0.14	0.11	0.28	0.30	0.38	0.37	0.15
FeO	0.53	0.24	0.15	0.21	0.46	0.20	0.44	0.34
Total	101.14	100.57	100.26	100.57	99.93	101.31	102.57	101.33
An	72.6	74.4	71.9	59.1	52.9	49.8	49.2	72.4
Ab	26.6	24.7	27.5	39.2	45.3	48.0	48.8	26.6
Or	0.8	0.9	0.6	1.7	1.8	2.2	2.0	0.9

Sample	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	3	4	5	6	7	8	9	10
SiO_2	55.26	52.14	51.15	52.13	54.37	55.30	56.31	55.94
Al_2O_3	29.83	29.38	32.00	30.23	29.86	29.18	28.78	28.96
CaO	10.92	11.75	13.46	12.27	11.55	10.44	9.53	10.82
Na_2O	4.78	4.33	3.32	4.36	4.81	4.94	5.43	5.58
K_2O	0.28	0.32	0.18	0.28	0.27	0.29	0.38	0.39
FeO	0.43	3.89	0.51	0.37	0.49	0.43	0.49	0.27
Total	101.50	101.79	100.63	99.65	101.35	100.59	100.91	101.97
An	54.9	58.9	68.4	59.9	56.1	52.9	48.1	50.6
Ab	43.4	39.2	30.5	38.5	42.3	45.3	49.6	47.2
Or	1.7	1.9	1.1	1.6	1.6	1.8	2.3	2.2

Sample	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	11	12	13	14	15	16	17	18
SiO_2	51.51	55.77	55.59	57.09	54.79	55.74	56.35	56.60
Al_2O_3	31.90	28.62	28.58	28.62	28.96	29.22	28.88	28.55
CaO	13.82	10.06	10.06	9.77	10.01	9.91	10.05	9.44
Na_2O	3.83	5.30	5.76	5.17	4.95	5.91	5.46	5.28
K_2O	0.19	0.39	0.40	0.41	0.43	0.39	0.34	0.34
FeO	0.38	0.36	0.47	0.47	0.32	0.30	0.37	0.48
Total	101.63	100.44	100.86	101.53	99.47	101.48	101.45	100.69
An	65.9	50.0	48.0	49.8	51.4	47.0	49.4	48.7
Ab	33.1	47.7	49.7	47.7	46.0	50.8	48.6	49.2
Or	1.1	2.3	2.3	2.5	2.6	2.2	2.0	2.1

Sample	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	19	20	21	22	23	24	25	26
SiO_2	56.47	55.65	56.44	56.67	55.01	56.18	55.20	55.10
Al_2O_3	28.87	28.70	29.12	28.99	29.01	29.15	28.93	29.38
CaO	10.29	10.12	9.98	9.90	10.54	9.98	9.93	9.93
Na_2O	5.41	5.78	5.61	5.40	5.23	5.00	5.21	5.59
K_2O	0.40	0.34	0.37	0.39	0.34	0.37	0.36	0.34
FeO	0.38	0.28	0.35	0.28	0.13	0.29	0.32	0.73
Total	101.83	100.87	101.87	101.63	100.25	100.97	99.94	101.07
An	50.0	48.2	48.5	49.2	51.7	51.3	50.2	48.5
Ab	47.6	49.8	49.3	48.5	46.4	46.5	47.7	49.5
Or	2.3	1.9	2.2	2.3	2.0	2.3	2.1	2.0

Sample	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E	MH-8E
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	27	28	29	30	31	32	33	34
SiO_2	56.90	55.20	55.31	55.98	56.16	56.08	55.30	55.52
Al_2O_3	28.75	28.65	28.67	28.39	28.84	28.93	29.05	29.00
CaO	9.91	10.22	9.42	9.33	9.55	9.58	10.39	10.60
Na_2O	5.34	5.35	5.48	5.38	5.92	5.15	5.84	5.65
K_2O	0.40	0.39	0.41	0.46	0.38	0.42	0.34	0.34
FeO	0.32	0.18	0.25	0.31	0.09	0.46	0.19	0.36
Total	101.63	99.99	99.55	99.85	100.92	100.61	101.11	101.48
An	49.4	50.2	47.5	47.6	46.1	49.4	48.6	49.9
Ab	48.2	47.5	50.0	49.6	51.7	48.0	49.5	48.2
Or	2.4	2.3	2.5	2.8	2.2	2.6	1.9	1.9

Sample	MH-8E	MH-8E	MH-1A	MH-1A	MH-1A	MH-1A	MH-1A	MH-1A
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	35	36	1	2	3	4	5	6
SiO_2	55.42	56.46	57.05	54.23	47.65	47.64	48.23	48.19
Al_2O_3	28.80	28.53	28.00	30.43	34.33	33.14	34.26	33.51
CaO	10.61	9.44	9.41	11.05	16.18	16.17	16.43	16.56
Na_2O	5.38	5.72	5.93	4.96	1.87	2.43	2.23	2.36
K_2O	0.36	0.38	0.18	0.16	0.06	0.09	0.06	0.08
FeO	0.24	0.40	0.59	1.02	0.70	0.72	0.62	0.35
Total	100.81	100.93	101.17	101.85	100.80	100.19	101.83	101.05
An	51.1	46.7	46.2	54.7	82.4	78.2	80.0	79.1
Ab	46.8	51.1	52.7	44.4	17.2	21.3	19.6	20.4
Or	2.1	2.2	1.0	0.9	0.4	0.5	0.4	0.5

Sample	MH-1A	MH-1A	MH-1A	MH-1A	MH-1A	MH-1A	MH-1A	MH-1A
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	7	8	9	1	2	3	4	5
SiO_2	50.29	52.93	52.14	52.27	54.50	57.57	55.56	52.27
Al_2O_3	32.66	30.01	30.77	31.26	29.47	27.70	29.56	31.42
CaO	15.05	11.17	12.73	12.71	11.00	8.02	10.91	12.74
Na_2O	3.31	4.71	3.79	4.51	5.41	6.33	4.97	3.81
K_2O	0.13	0.20	0.16	0.09	0.14	0.33	0.19	0.12
FeO	0.53	0.50	0.49	0.53	0.77	0.28	0.50	0.76
Total	101.96	99.53	100.09	101.36	101.29	100.22	101.69	101.11
An	71.0	56.0	64.4	60.6	52.5	40.4	54.2	64.4
Ab	28.3	42.7	34.7	38.9	46.7	57.7	44.7	34.9
Or	0.7	1.2	1.0	0.5	0.8	2.0	1.1	0.7

Sample	MH-1A	MH-1A	MH-1A	MH-1A	MH-1A	MH-1A	MH-1A	MH-1A
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	6	7	8	9	10	11	12	13
SiO_2	56.98	55.38	56.70	57.24	56.42	57.02	52.78	52.07
Al_2O_3	28.54	27.28	28.30	28.14	27.89	27.38	29.69	31.36
CaO	9.34	9.02	9.84	9.26	9.54	8.72	11.77	12.89
Na_2O	6.17	5.88	6.00	6.01	5.93	5.44	4.69	3.95
K_2O	0.28	0.45	0.23	0.34	0.41	0.31	0.18	0.34
FeO	0.54	0.64	0.68	0.45	0.82	0.54	0.52	0.39
Total	101.85	98.65	101.74	101.44	101.01	99.42	99.62	101.00
An	44.8	44.7	46.9	45.0	46.0	46.0	57.5	63.1
Ab	53.6	52.7	51.8	53.0	51.7	52.0	41.5	35.0
Or	1.6	2.6	1.3	2.0	2.3	2.0	1.0	2.0

Sample	MH-1A	MH-1A	MH-1A	MH-1A	MH-1A	MH-1A	MH-1A	MH-1A
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	14	15	16	17	18	19	20	21
SiO_2	52.09	55.24	57.04	56.56	57.24	57.68	57.63	55.79
Al_2O_3	31.12	29.19	28.27	28.22	28.35	28.04	28.20	28.43
CaO	12.17	11.16	9.76	9.75	9.51	8.63	9.11	9.97
Na_2O	4.25	5.22	6.27	5.85	5.93	6.11	6.11	5.56
K_2O	0.13	0.13	0.25	0.23	0.33	0.29	0.33	0.38
FeO	0.49	0.26	0.36	1.06	0.45	0.18	0.47	0.39
Total	100.25	101.19	101.94	101.66	101.82	100.92	101.86	100.52
An	60.8	53.7	45.6	47.3	46.1	43.1	44.3	48.7
Ab	38.4	45.5	53.0	51.3	52.0	55.2	53.8	49.1
Or	0.8	0.7	1.4	1.3	1.9	1.7	1.9	2.2

Sample	MH-1A	MH-1A	MH-1A	MH-1A	MH-1A	MH-1A	MH-1A	MH-1A
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	22	23	24	25	26	27	28	29
SiO_2	56.93	55.61	53.62	55.98	55.73	56.35	54.95	55.74
Al_2O_3	27.43	28.65	29.94	28.20	28.73	29.01	29.21	29.06
CaO	9.00	10.17	10.47	10.06	10.26	10.49	10.64	10.82
Na_2O	5.83	5.43	4.72	5.96	6.12	4.90	5.00	5.03
K_2O	0.33	0.33	0.25	0.41	0.38	0.32	0.30	0.17
FeO	0.60	0.81	0.57	0.61	0.44	0.57	0.79	0.75
Total	100.12	100.99	99.57	101.23	101.64	101.64	100.90	101.56
An	45.1	49.9	54.2	47.2	47.1	53.1	53.1	53.8
Ab	52.9	48.2	44.2	50.6	50.8	44.9	45.2	45.2
Or	2.0	1.9	1.5	2.3	2.1	1.9	1.8	1.0

Sample	MH-1A	MH-1A	MH-1A	MH-1A	MH-1A	MH-1A	MH-1A	MH-1A
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	30	31	32	33	34	35	36	37
SiO_2	55.73	55.01	53.87	54.54	55.05	56.39	55.88	53.72
Al_2O_3	28.71	29.36	30.09	28.59	28.18	27.86	28.97	30.12
CaO	10.21	11.19	11.17	10.66	9.31	8.96	10.34	11.76
Na_2O	6.09	5.25	5.03	5.40	6.15	6.22	5.25	4.80
K_2O	0.18	0.19	0.19	0.24	0.27	0.28	0.29	0.15
FeO	0.31	0.90	0.33	0.45	0.71	0.63	0.29	0.73
Total	101.23	101.89	100.68	99.89	99.68	100.34	101.02	101.27
An	47.6	53.5	54.5	51.5	44.8	43.6	51.2	57.0
Ab	51.4	45.4	44.4	47.2	53.6	54.8	47.1	42.1
Or	1.0	1.1	1.1	1.4	1.5	1.6	1.7	0.9

Sample	MH-1A	MH-1A	MH-1A	MH-1A	MH-1A	MH-1A	MH-1A	MH-1A
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	38	39	40	41	42	43	44	45
SiO_2	55.91	56.33	54.95	56.30	56.25	54.19	54.88	53.93
Al_2O_3	28.33	28.50	29.28	28.26	28.13	30.10	29.77	29.76
CaO	8.78	9.90	11.13	9.21	8.59	11.18	10.76	10.98
Na_2O	5.96	5.67	5.28	5.53	5.28	4.81	4.63	4.71
K_2O	0.29	0.24	0.16	0.25	0.29	0.13	0.17	0.16
FeO	0.59	0.32	0.41	0.71	0.62	0.53	0.44	0.49
Total	99.86	101.04	101.21	100.27	99.16	100.94	100.64	100.02
An	44.1	48.6	53.3	47.2	46.5	55.8	55.7	55.8
Ab	54.2	50.0	45.8	51.3	51.7	43.5	43.3	43.3
Or	1.7	1.4	0.9	1.5	1.8	0.7	1.0	1.0

Sample	MH-1A	MH-1A	MH-1A	MH-1A	MH-1A	MH-1A	MH-1A	MH-1A
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	46	47	48	49	50	51	52	53
SiO_2	57.02	57.65	56.10	55.74	56.46	56.07	55.46	54.32
Al_2O_3	28.34	28.37	28.28	28.61	27.95	28.51	28.82	29.91
CaO	9.51	9.36	9.29	10.00	9.91	9.72	9.89	11.20
Na_2O	6.56	5.78	6.03	5.85	6.11	5.71	5.73	4.85
K_2O	0.30	0.35	0.36	0.30	0.29	0.33	0.25	0.15
FeO	0.24	0.31	0.80	0.69	0.83	0.63	0.41	0.61
Total	101.96	101.82	100.86	101.20	101.56	100.98	100.56	101.05
An	43.8	46.3	45.0	47.7	46.5	47.5	48.1	55.6
Ab	54.6	51.7	52.9	50.5	51.9	50.6	50.4	43.5
Or	1.6	2.0	2.1	1.7	1.6	1.9	1.4	0.9

Sample	MH-1A	MH-1A	MH-1A	MH-1A	MH-1A	MH-1A	MH-1A	MH-1A
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	54	55	56	57	58	59	60	61
SiO_2	57.79	57.83	54.53	55.63	55.30	53.82	53.16	49.51
Al_2O_3	28.12	28.50	29.50	28.70	28.67	30.00	30.84	33.06
CaO	9.62	9.15	10.61	10.23	9.86	11.65	12.54	14.80
Na_2O	5.69	5.58	5.36	5.15	5.09	4.45	4.51	3.38
K_2O	0.27	0.34	0.27	0.43	0.24	0.22	0.21	0.12
FeO	0.38	0.53	0.59	0.66	0.60	1.04	0.64	0.57
Total	101.87	101.92	100.86	100.81	99.77	101.18	101.91	101.45
An	47.6	46.6	51.4	51.0	50.9	58.3	50.9	70.3
Ab	50.9	51.4	47.0	46.5	47.6	40.4	39.0	29.0
Or	1.6	2.0	1.6	2.6	1.5	1.3	1.2	0.7

Sample	MH-1A	MH-1A	MH-1A	MH-1A	MH-1A	99UN9	99UN9	99UN9
Rock Type	And encl	And encl	And encl	And encl	And encl	And lava	And lava	And lava
Line Number	62	63	64	65	66	1	2	3
SiO_2	51.79	53.37	54.17	56.74	57.58	50.84	45.64	44.50
Al_2O_3	31.87	31.26	29.88	27.14	28.01	29.80	34.63	35.11
CaO	13.32	12.56	11.88	9.35	8.03	13.78	17.28	18.39
Na_2O	3.55	3.84	5.08	5.73	6.52	3.62	1.58	1.10
K_2O	0.11	0.16	0.17	0.23	0.40	0.27	0.06	0.04
FeO	0.65	0.55	0.78	1.39	0.63	0.61	0.74	0.73
Total	101.29	101.74	101.95	100.58	101.17	98.93	99.94	99.87
An	67.0	63.7	55.9	46.8	39.5	66.7	85.5	90.0
Ab	32.3	35.3	43.2	51.8	58.1	31.7	14.1	9.7
Or	0.7	1.0	0.9	1.4	2.4	1.6	0.4	0.2

Sample	99UN9	99UN9	99UN9	99UN9	99UN9	99UN9	99UN9	99UN9
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	4	1	2	3	1	2	1	2
SiO_2	50.42	46.29	44.84	50.35	46.11	45.43	52.69	50.08
Al_2O_3	32.55	34.00	34.66	31.11	33.37	34.93	29.48	31.33
CaO	14.21	17.69	18.56	14.36	17.48	18.21	12.17	14.46
Na_2O	3.62	1.53	0.99	3.34	1.60	1.13	4.72	3.99
K_2O	0.20	0.09	0.06	0.15	0.03	0.02	0.25	0.17
FeO	0.96	0.87	0.74	0.53	0.77	0.73	0.68	0.71
Total	101.98	100.46	99.86	99.83	99.36	100.45	99.99	100.75
An	67.7	86.0	90.9	69.8	85.7	89.8	57.9	66.1
Ab	31.2	13.5	8.7	29.4	14.2	10.1	40.7	33.0
Or	1.2	0.5	0.4	0.9	0.2	0.1	1.4	1.0

Sample	99UN9	99UN9	99UN9	99UN9	99UN9	99UN9	99UN9	99UN9
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	3	4	5	6	7	8	1	2
SiO_2	49.63	48.72	47.84	57.30	48.74	52.90	52.13	49.53
Al_2O_3	31.82	32.04	31.96	26.28	31.78	29.65	30.01	32.41
CaO	14.60	15.17	15.80	7.81	15.51	12.12	12.92	14.79
Na_2O	3.14	2.72	2.65	7.00	2.82	4.45	4.13	3.00
K_2O	0.19	0.15	0.12	0.20	0.12	0.30	0.25	0.13
FeO	0.86	0.60	0.73	0.32	0.71	0.82	0.78	0.83
Total	100.25	99.41	99.11	98.90	99.69	100.24	100.23	100.71
An	71.2	74.9	76.2	37.7	74.7	59.0	62.4	72.6
Ab	27.7	24.2	23.1	61.2	24.6	39.2	36.1	26.7
Or	1.1	0.9	0.7	1.1	0.7	1.8	1.4	0.8

Sample	99UN9	99UN9	99UN9	99UN9	99UN9	99UN9	99UN9	99UN9
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	3	1	2	3	4	5	6	7
SiO_2	46.12	50.06	47.83	48.06	49.75	48.77	48.81	48.93
Al_2O_3	33.62	31.63	32.88	31.57	31.88	32.31	32.35	30.82
CaO	17.18	14.48	16.30	15.68	15.03	16.03	15.25	15.04
Na_2O	1.62	3.54	2.49	2.76	3.09	2.64	3.03	3.04
K_2O	0.09	0.12	0.08	0.10	0.14	0.11	0.11	0.09
FeO	0.58	0.74	0.72	0.75	0.82	0.78	0.71	0.89
Total	99.20	100.57	100.30	98.93	100.72	100.63	100.27	98.80
An	85.0	68.8	78.0	75.4	72.3	76.6	73.1	72.8
Ab	14.5	30.5	21.6	24.0	26.9	22.8	26.3	26.7
Or	0.5	0.7	0.4	0.6	0.8	0.6	0.6	0.5

Sample	99UN9	99UN9	99UN9	99UN9	99UN9	99UN9	99UN9	99UN9
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	8	1	2	3	4	5	1	2
SiO_2	50.31	53.18	48.91	49.01	51.33	50.08	54.45	48.93
Al_2O_3	30.93	29.54	32.27	31.79	30.85	30.63	28.69	31.24
CaO	13.98	11.89	15.05	14.71	13.33	13.93	10.99	14.90
Na_2O	3.69	4.86	2.86	3.12	3.99	3.43	5.19	3.10
K_2O	0.17	0.30	0.12	0.09	0.20	0.16	0.35	0.14
FeO	0.72	0.90	0.64	0.93	0.70	0.57	1.18	0.71
Total	99.79	100.67	99.85	99.65	100.41	98.79	100.85	99.02
An	67.0	56.5	73.9	71.9	64.1	68.5	52.9	72.1
Ab	32.0	41.8	25.4	27.6	34.7	30.5	45.1	27.1
Or	1.0	1.7	0.7	0.5	1.1	1.0	2.0	0.8

Sample	99UN9	99UN9	99UN9	99UN9	99UN9	99UN9	99UN9	99UN9
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	3	4	5	6	7	1	2	3
SiO_2	49.78	51.68	49.69	51.46	55.83	53.64	52.27	48.94
Al_2O_3	31.87	29.97	30.74	31.33	25.60	28.75	28.76	32.73
CaO	14.65	13.36	15.03	14.23	8.61	11.23	12.62	15.50
Na_2O	3.34	4.06	2.81	3.43	5.82	5.12	4.05	2.67
K_2O	0.14	0.23	0.12	0.19	1.14	0.36	0.41	0.16
FeO	0.63	0.69	0.67	0.76	1.17	0.97	1.44	0.94
Total	100.43	99.99	99.07	101.40	98.17	100.07	99.55	100.94
An	70.2	63.7	74.2	68.9	42.0	53.7	61.8	75.5
Ab	29.0	35.0	25.1	30.0	51.4	44.3	35.9	23.6
Or	0.8	1.3	0.7	1.1	6.6	2.0	2.4	0.9

Sample	99UN9	99UN9	99UN9	99UN9	99UN9	99UN9	99UN9	99UN9
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	4	5	6	7	8	9	10	1
SiO_2	47.99	48.40	50.28	50.01	49.91	52.39	53.31	59.34
Al_2O_3	32.01	32.89	30.98	32.78	31.16	30.23	28.54	25.75
CaO	15.39	15.49	14.20	15.13	13.95	12.71	11.17	6.77
Na_2O	2.69	2.61	3.45	2.87	3.44	4.42	5.26	7.79
K_2O	0.11	0.13	0.19	0.16	0.11	0.33	0.37	0.94
FeO	0.66	0.79	0.60	0.82	0.65	0.96	0.74	0.86
Total	98.85	100.30	99.70	101.77	99.23	101.04	99.33	101.46
An	75.5	76.1	68.7	73.7	68.7	60.2	53.1	30.8
Ab	23.9	23.2	30.2	25.3	30.7	37.9	44.8	64.1
Or	0.6	0.7	1.1	0.9	0.7	1.9	2.1	5.1

Sample	99UN9	99UN9	99UN9	99UN9	99UN9	99UN9	99UN9	99UN9
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	2	3	4	1	2	3	4	5
SiO_2	48.56	48.16	55.27	54.60	49.10	49.22	48.68	49.12
Al_2O_3	33.15	33.28	28.17	28.05	32.26	32.98	33.05	31.96
CaO	15.78	15.61	10.60	10.65	14.77	14.88	15.21	15.11
Na_2O	2.72	2.84	5.58	5.42	2.93	2.95	3.16	2.72
K_2O	0.13	0.13	0.41	0.35	0.19	0.08	0.12	0.08
FeO	0.89	0.68	0.93	0.92	0.68	0.67	0.70	0.57
Total	101.21	100.71	100.96	100.00	99.93	100.79	100.93	99.56
An	75.7	74.7	50.0	51.0	72.7	73.2	72.2	75.1
Ab	23.6	24.6	47.7	47.0	26.2	26.3	27.1	24.4
Or	0.7	0.8	2.3	2.0	1.1	0.5	0.7	0.5

Sample	**99UN9**	**99UN9**	**99UN9**	**99UN9**	**99UN9**	**99UN9**	**99UN9**	**99UN9**
Rock Type	**And lava**	**And lava**	**And lava**	**And lava**	**And lava**	**And lava**	**And lava**	**And lava**
Liae Number	**6**	**7**	**8**	**9**	**1**	**2**	**3**	**4**
SiO_2	49.15	49.21	48.92	52.05	46.40	48.53	45.76	45.64
Al_2O_3	32.25	31.80	32.32	30.27	34.37	31.19	35.29	34.12
CaO	14.97	14.93	15.13	12.64	16.80	14.81	17.78	17.40
Na_2O	2.98	2.91	2.94	4.17	2.09	2.89	1.54	1.53
K_2O	0.19	0.11	0.15	0.23	0.09	0.18	0.04	0.02
FeO	1.15	0.87	0.83	0.95	0.82	1.55	0.73	0.60
Total	100.69	99.83	100.28	100.31	100.57	99.15	101.14	99.31
An	72.7	73.5	73.4	61.8	81.2	73.1	86.3	86.2
Ab	26.2	25.9	25.8	36.9	18.3	25.8	13.5	13.7
Or	1.1	0.6	0.8	1.3	0.5	1.1	0.2	0.1
Sample	**99UN9**	**99UN9**	**99UN9**	**99UN9**	**99UN9**	**99UN9**	**99UN9**	**99UN9**
Rock Type	**And lava**	**And lava**	**And lava**	**And lava**	**And lava**	**And lava**	**And lava**	**And lava**
Line Number	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**
SiO_2	49.37	50.96	50.12	52.35	50.71	49.47	52.20	48.52
Al_2O_3	31.81	30.65	31.45	29.71	30.83	31.49	29.71	32.53
CaO	14.10	13.74	13.64	12.37	14.23	14.87	12.79	14.91
Na_2O	3.39	3.71	3.66	4.53	3.38	3.23	3.98	3.01
K_2O	0.15	0.20	0.20	0.22	0.16	0.17	0.20	0.15
FeO	1.53	0.65	0.69	0.82	0.66	0.76	0.87	0.96
Total	100.36	99.92	99.76	100.01	99.97	99.99	99.74	100.09
An	69.1	66.4	66.5	59.4	69.3	71.1	63.2	72.6
Ab	30.0	32.4	32.3	39.4	29.8	28.0	35.6	26.5
Or	0.9	1.2	1.1	1.3	0.9	1.0	1.2	0.9
Sample	**99UN9**	**99UN9**	**99UN9**	**99UN9**	**99UN9**	**99UN9**	**99UN9**	**99UN9**
Rock Type	**And lava**	**And lava**	**And lava**	**And lava**	**And lava**	**And lava**	**And lava**	**And lava**
Line Number	**5**	**1**	**1**	**1**	**2**	**3**	**4**	**5**
SiO_2	53.17	50.95	48.03	49.03	48.30	46.61	45.94	53.00
Al_2O_3	28.56	30.56	32.51	32.58	33.37	34.68	33.92	29.67
CaO	11.57	13.05	14.26	15.33	16.15	17.38	17.25	14.01
Na_2O	5.02	3.88	3.00	2.82	2.41	1.59	1.61	3.34
K_2O	0.28	0.22	0.13	0.11	0.11	0.08	0.07	0.27
FeO	1.17	0.70	0.68	0.70	0.79	0.80	0.67	0.85
Total	99.77	99.37	98.61	100.57	101.13	101.14	99.46	101.15
An	55.1	64.1	71.9	74.6	78.2	85.4	85.2	68.7
Ab	43.3	34.6	27.3	24.8	21.2	14.1	14.4	29.7
Or	1.6	1.3	0.8	0.6	0.6	0.5	0.4	1.6
Sample	**99UN9**	**99UN9**	**99UN9**	**99UN9**	**99UN9**	**99UN9**	**99UN9**	**99UN9**
Rock Type	**And lava**	**And lava**	**And lava**	**And lava**	**And lava**	**And lava**	**And lava**	**And lava**
Line Number	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
SiO_2	49.97	51.25	49.53	48.45	49.51	47.88	45.91	45.69
Al_2O_3	31.28	30.91	32.12	32.97	31.90	32.42	34.07	33.59
CaO	14.74	13.55	14.49	16.46	14.63	15.40	17.24	16.91
Na_2O	3.20	4.02	3.19	2.47	3.15	2.69	1.40	1.74
K_2O	0.19	0.24	0.16	0.11	0.13	0.13	0.16	0.09
FeO	0.88	0.89	0.55	0.75	0.54	0.86	1.07	1.08
Total	100.25	100.86	100.05	101.21	99.86	99.39	99.85	99.10
An	71.0	64.2	70.8	78.2	71.4	75.4	86.4	83.9
Ab	27.9	34.5	28.2	21.2	27.8	23.9	12.7	15.6
Or	1.1	1.4	0.9	0.6	0.8	0.7	1.0	0.5

Sample	99UN9	99UN9	99UN9	99UN9	99UN9	99UN9	99UN9	99UN9
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	6	1	2	3	4	1	2	3
SiO_2	52.11	48.52	49.24	50.86	48.96	49.45	48.30	48.08
Al_2O_3	29.10	32.22	32.17	29.87	32.06	31.08	31.27	31.92
CaO	11.51	15.77	14.84	13.17	15.34	14.85	15.10	15.69
Na_2O	4.39	2.78	3.30	4.00	2.84	3.17	2.89	2.39
K_2O	0.30	0.10	0.15	0.26	0.12	0.26	0.22	0.15
FeO	1.14	0.64	0.91	0.84	0.86	0.67	0.81	0.66
Total	98.55	100.03	100.62	99.00	100.18	99.48	98.58	98.88
An	58.1	75.4	70.7	63.6	74.3	71.1	73.4	77.7
Ab	40.1	24.0	28.5	34.9	24.9	27.5	25.4	21.4
Or	1.8	0.6	0.9	1.5	0.7	1.5	1.3	0.9

Sample	99UN9	99UN9	99UN9	99UN9	99UN9	99UN9	99UN9	99UN9
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	1	2	3	4	1	2	3	4
SiO_2	48.57	48.85	49.38	49.90	51.54	49.73	61.31	49.64
Al_2O_3	33.50	33.33	33.52	31.94	31.71	32.38	24.37	31.24
CaO	15.80	15.25	15.51	14.81	13.74	14.57	10.42	13.83
Na_2O	2.79	2.75	2.78	3.51	3.91	3.57	3.29	3.99
K_2O	0.15	0.16	0.13	0.10	0.29	0.29	0.49	0.31
FeO	0.68	0.74	0.55	0.39	0.89	0.45	0.64	0.56
Total	101.49	101.06	101.87	100.65	102.08	100.98	100.52	99.57
An	75.2	74.7	74.9	69.6	64.9	68.2	61.4	64.6
Ab	24.0	24.4	24.3	29.8	33.4	30.2	35.1	33.7
Or	0.8	0.9	0.8	0.6	1.6	1.6	3.5	1.7

Sample	99UN9	99UN9	99UN9	99UN9	99UN9	99UN9	99UN9	99UN9
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	5	6	7	1	2	3	4	5
SiO_2	50.83	51.96	49.12	47.75	49.35	52.09	48.80	49.36
Al_2O_3	31.22	30.74	31.28	33.24	31.98	27.48	32.20	31.58
CaO	13.35	12.94	13.17	16.13	14.50	12.70	15.42	14.91
Na_2O	4.15	4.50	3.70	2.13	2.96	3.96	2.66	2.95
K_2O	0.26	0.20	0.21	0.18	0.24	0.70	0.25	0.28
FeO	0.62	0.59	0.53	0.83	0.79	1.41	0.71	0.80
Total	100.43	100.92	98.01	100.26	99.85	98.35	100.04	99.89
An	63.1	60.7	65.5	79.9	71.8	61.3	75.1	72.4
Ab	35.5	38.2	33.3	19.1	26.8	34.6	23.5	26.0
Or	1.4	1.1	1.3	1.1	1.4	4.0	1.4	1.6

Sample	99UN9	99UN9	99UN9	99UN9	99UN9	99UN9	99UN9	99UN9
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	6	1	2	3	4	5	1	2
SiO_2	56.16	52.25	52.96	52.41	48.99	52.38	62.46	53.77
Al_2O_3	27.07	30.04	28.99	29.36	31.55	30.02	23.31	28.34
CaO	10.63	12.74	12.05	12.46	14.98	12.94	9.03	11.46
Na_2O	4.74	4.04	4.32	4.50	2.75	3.93	3.97	4.74
K_2O	0.81	0.40	0.45	0.37	0.20	0.42	0.54	0.50
FeO	0.97	0.73	0.90	0.89	0.78	0.76	0.46	0.59
Total	100.38	100.21	99.68	100.01	99.26	100.46	99.77	99.40
An	52.7	62.1	59.0	59.2	74.2	63.0	53.6	55.6
Ab	42.5	35.6	38.3	38.7	24.6	34.6	42.6	41.6
Or	4.8	2.3	2.6	2.1	1.2	2.4	3.8	2.9

Sample	99UN9	99UN9	99UN9	99UN9	99UN9	99UN9	99UN9	99UN9
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	3	4	5	1	2	3	4	5
SiO_2	53.24	54.53	54.14	52.10	52.36	50.22	52.57	51.25
Al_2O_3	28.95	27.64	28.22	29.54	28.71	30.77	28.52	29.40
CaO	11.80	10.50	10.63	12.62	12.09	14.06	12.26	12.56
Na_2O	4.77	5.17	4.85	4.14	4.35	3.22	4.39	3.67
K_2O	0.46	0.45	0.58	0.43	0.36	0.29	0.50	0.80
FeO	0.63	0.54	0.82	0.82	0.89	0.67	0.74	0.63
Total	99.85	98.84	99.23	99.65	98.75	99.23	98.98	98.31
An	56.2	51.5	52.9	61.2	59.3	69.5	59.0	62.3
Ab	41.2	45.9	43.7	36.3	38.6	28.8	38.2	33.0
Or	2.6	2.6	3.4	2.5	2.1	1.7	2.8	4.7

Sample	99UN9	99UN9	99UN9	99UN9	99UN9	99UN9	99UN9	99UN9
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	6	1	2	3	4	5	6	7
SiO_2	51.56	53.62	54.67	52.39	54.11	53.48	49.84	50.60
Al_2O_3	30.23	28.02	27.60	29.89	27.89	28.21	30.81	30.15
CaO	13.27	11.43	10.79	12.73	11.03	11.23	14.15	13.81
Na_2O	3.80	4.93	5.04	4.17	5.18	4.77	3.32	3.53
K_2O	0.39	0.48	0.56	0.35	0.60	0.51	0.28	0.29
FeO	0.78	0.90	0.59	0.70	0.76	0.92	0.87	0.76
Total	100.03	99.38	99.25	100.22	99.58	99.13	99.27	99.14
An	64.4	54.6	52.4	61.5	52.2	54.9	69.0	67.3
Ab	33.4	42.6	44.3	36.5	44.4	42.2	29.3	31.1
Or	2.2	2.8	3.2	2.0	3.4	2.9	1.6	1.7

Sample	99UN9	99UN9	99UN9	99UN9	99UN9	99UN9	99UN9	99UN9
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	1	2	3	4	5	6	7	8
SiO_2	53.13	52.70	51.73	51.40	51.50	53.94	52.70	53.38
Al_2O_3	29.31	29.55	30.64	30.52	30.51	29.22	30.08	29.15
CaO	11.15	12.17	12.85	13.47	12.97	11.25	12.34	11.21
Na_2O	4.55	4.22	3.88	3.79	3.80	4.64	4.39	4.64
K_2O	0.54	0.45	0.40	0.39	0.37	0.47	0.42	0.52
FeO	0.72	0.54	0.69	0.76	0.70	0.67	0.86	0.89
Total	99.40	99.63	100.18	100.34	99.84	100.20	100.79	99.79
An	55.7	59.8	63.2	64.8	64.0	55.7	59.4	55.4
Ab	41.1	37.5	34.5	33.0	33.9	41.5	38.2	41.5
Or	3.2	2.6	2.3	2.2	2.1	2.8	2.4	3.1

Sample	99UN9	99UN9	99UN9	99UN9	99UN9	99UN9	99UN9	99UN9
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	1	2	3	4	5	6	7	8
SiO_2	51.57	50.62	61.42	52.60	51.58	52.98	52.99	52.61
Al_2O_3	30.19	30.00	24.55	29.77	29.94	28.99	29.20	29.15
CaO	12.78	13.17	5.32	12.34	12.54	11.82	11.59	11.94
Na_2O	3.74	3.56	8.41	4.24	4.16	4.52	4.57	3.91
K_2O	0.35	0.34	0.23	0.35	0.35	0.44	0.48	1.02
FeO	0.55	1.03	0.00	0.63	0.85	0.67	0.69	1.15
Total	99.19	98.72	99.93	99.92	99.41	99.43	99.52	99.78
An	64.0	65.7	25.6	60.4	61.2	57.6	56.7	59.0
Ab	33.9	32.2	73.1	37.5	36.7	39.8	40.5	35.0
Or	2.1	2.0	1.3	2.1	2.1	2.6	2.8	6.0

Sample	99UN9	99UN9	99UN37	99UN37	99UN37	99UN37	99UN37	99UN37
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	9	10	1	2	3	4	5	6
SiO_2	54.04	52.25	51.19	51.68	52.43	50.97	51.74	51.80
Al_2O_3	28.49	29.76	29.49	29.92	29.69	30.19	30.17	30.19
CaO	11.02	12.25	12.50	12.72	12.14	13.21	13.27	13.08
Na_2O	4.95	4.14	4.47	4.30	4.38	3.99	4.09	4.02
K_2O	0.58	0.35	0.19	0.21	0.21	0.21	0.19	0.19
FeO	0.86	0.54	1.14	1.03	0.80	0.82	0.93	0.75
Total	99.93	99.28	98.99	99.86	99.65	99.39	100.39	100.02
An	53.3	60.8	60.0	61.3	59.7	63.9	63.5	63.6
Ab	43.3	37.1	38.9	37.5	39.0	34.9	35.4	35.4
Or	3.3	2.1	1.1	1.2	1.2	1.2	1.1	1.1

Sample	99UN37	99UN37	99UN37	99UN37	99UN37	99UN37	99UN37	99UN37
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	7	8	9	1	2	3	4	5
SiO_2	51.02	51.07	52.26	51.37	50.52	49.55	52.88	51.16
Al_2O_3	30.14	29.96	29.60	29.37	30.47	30.80	28.84	30.35
CaO	12.98	12.95	12.23	12.25	13.63	14.18	11.62	13.13
Na_2O	3.99	3.99	4.67	4.41	3.75	3.55	5.06	3.95
K_2O	0.17	0.18	0.19	0.17	0.23	0.11	0.27	0.15
FeO	0.86	0.86	0.93	0.94	0.76	0.88	0.94	0.78
Total	99.16	99.01	99.86	98.50	99.36	99.07	99.60	99.52
An	63.6	63.5	58.5	60.0	65.9	68.4	55.1	64.2
Ab	35.4	35.4	40.4	39.1	32.8	31.0	43.4	34.9
Or	1.0	1.1	1.1	1.0	1.3	0.6	1.5	0.9

Sample	99UN37	99UN37	99UN37	99UN37	99UN37	99UN37	99UN37	99UN37
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	6	7	8	1	2	3	4	5
SiO_2	50.26	52.01	52.85	50.94	52.48	52.61	52.23	55.83
Al_2O_3	30.89	29.23	28.31	28.15	29.24	29.59	29.70	26.89
CaO	13.34	12.54	11.25	11.17	11.90	11.45	12.27	9.00
Na_2O	3.86	4.54	5.39	3.89	4.63	4.61	4.43	6.37
K_2O	0.22	0.23	0.24	0.27	0.14	0.17	0.18	0.31
FeO	0.81	0.86	0.80	0.89	0.84	0.90	0.58	0.74
Total	99.39	99.42	98.83	95.30	99.24	99.33	99.38	99.14
An	64.8	59.6	52.8	60.3	58.2	57.2	59.9	43.1
Ab	33.9	39.1	45.8	38.0	41.0	41.7	39.1	55.2
Or	1.3	1.3	1.3	1.7	0.8	1.0	1.0	1.8

Sample	99UN37	99UN37	99UN37	99UN37	99UN37	99UN37	99UN37	99UN37
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	1	2	3	4	5	6	1	1
SiO_2	50.23	55.91	55.55	52.08	51.77	51.76	54.04	54.72
Al_2O_3	29.41	27.86	27.78	29.48	30.33	29.64	27.70	28.06
CaO	12.90	9.66	9.98	12.07	12.85	12.36	10.27	10.58
Na_2O	5.34	4.47	5.82	4.51	4.21	4.35	5.48	5.27
K_2O	0.17	1.34	0.21	0.15	0.18	0.15	0.33	0.29
FeO	0.86	0.57	0.37	0.75	0.57	0.98	0.68	0.66
Total	98.90	99.81	99.70	99.05	99.92	99.25	98.50	99.57
An	56.7	50.0	48.1	59.1	62.1	60.6	49.9	51.7
Ab	42.5	41.8	50.8	40.0	36.8	38.5	48.2	46.6
Or	0.9	8.3	1.2	0.9	1.0	0.9	1.9	1.7

Sample	99UN37	99UN37	99UN37	99UN37	99UN37	99UN37	99UN37	99UN37
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	2	3	4	5	6	7	8	9
SiO_2	53.53	52.94	54.27	53.62	53.83	55.48	53.98	49.45
Al_2O_3	28.69	28.99	27.71	28.68	28.34	27.04	28.15	31.50
CaO	11.69	11.59	10.79	11.16	10.64	9.72	10.76	14.23
Na_2O	4.68	4.71	5.07	4.93	5.31	5.87	5.13	3.18
K_2O	0.30	0.28	0.39	0.32	0.35	0.34	0.23	0.19
FeO	0.71	0.69	0.73	0.79	0.93	0.92	0.93	0.72
Total	99.60	99.19	98.96	99.50	99.39	99.37	99.18	99.27
An	57.0	56.7	52.8	54.6	51.5	46.9	53.0	70.4
Ab	41.2	41.7	44.9	43.6	46.5	51.2	45.7	28.4
Or	1.8	1.6	2.3	1.9	2.0	1.9	1.4	1.1

Sample	99UN37	99UN37	99UN37	99UN37	99UN37	99UN37	99UN37	99UN37
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	1	2	3	4	5	6	7	8
SiO_2	52.92	51.42	53.98	54.01	54.80	55.12	53.66	53.93
Al_2O_3	28.11	30.39	28.15	28.31	27.70	27.84	28.52	28.14
CaO	10.83	12.75	10.96	10.59	10.02	10.22	11.09	10.74
Na_2O	5.35	4.11	5.17	5.32	5.45	5.42	5.01	5.19
K_2O	0.21	0.22	0.32	0.29	0.34	0.36	0.26	0.31
FeO	0.73	0.65	0.81	0.67	0.72	0.60	0.71	0.75
Total	98.15	99.55	99.40	99.20	99.03	99.56	99.25	99.06
An	52.2	62.3	52.9	51.5	49.4	50.0	54.2	52.4
Ab	46.7	36.4	45.2	46.8	48.6	47.9	44.3	45.8
Or	1.2	1.3	1.9	1.7	2.0	2.1	1.5	1.8

Sample	99UN37	99UN37	99UN37	99UN37	99UN37	99UN37	99UN37	99UN37
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	9	10	1	2	3	4	5	6
SiO_2	51.96	54.89	54.66	54.28	55.40	54.41	55.45	53.04
Al_2O_3	28.81	28.20	27.47	28.13	27.15	27.87	27.32	28.43
CaO	11.75	10.18	10.71	11.15	9.61	10.48	10.18	11.75
Na_2O	4.43	5.76	5.48	5.26	5.98	5.26	6.26	4.96
K_2O	0.23	0.24	0.31	0.30	0.30	0.33	0.33	0.32
FeO	0.90	0.67	0.71	0.79	0.78	0.66	0.68	0.77
Total	98.07	99.95	99.35	99.91	99.23	99.01	100.21	99.27
An	58.6	48.7	51.0	53.0	46.2	51.4	46.5	55.7
Ab	40.0	49.9	47.2	45.3	52.1	46.7	51.7	42.5
Or	1.4	1.4	1.8	1.7	1.7	1.9	1.8	1.8

Sample	99UN37	99UN37	99UN37	99UN37	99UN37	99UN37	99UN37	99UN37
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	1	2	3	4	5	6	7	8
SiO_2	54.48	52.50	52.72	55.29	53.99	55.81	54.98	52.02
Al_2O_3	28.12	29.49	29.18	27.07	28.55	27.46	27.17	29.65
CaO	10.43	12.02	11.81	10.25	10.52	9.69	10.03	12.44
Na_2O	5.54	4.72	4.70	5.63	5.31	6.24	5.62	4.39
K_2O	0.39	0.23	0.23	0.36	0.33	0.27	0.34	0.18
FeO	0.81	0.82	0.92	0.78	0.67	0.55	0.62	0.94
Total	99.78	99.78	99.57	99.37	99.39	100.02	98.75	99.61
An	49.9	57.7	57.4	49.1	51.2	45.5	48.7	60.4
Ab	47.9	41.0	41.3	48.9	46.8	53.0	49.3	38.6
Or	2.2	1.3	1.3	2.0	1.9	1.5	2.0	1.0

Sample	99UN37	99UN37	99UN37	99UN37	99UN37	99UN37	99UN37	99UN37
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	1	2	3	1	2	3	4	5
SiO_2	52.53	53.85	52.97	52.31	55.44	52.90	54.28	59.31
Al_2O_3	29.38	28.14	28.92	29.60	27.93	28.89	27.68	24.81
CaO	12.02	10.94	11.96	12.26	9.81	11.66	11.06	6.98
Na_2O	5.04	5.38	4.83	4.57	5.57	5.05	5.68	7.36
K_2O	0.20	0.29	0.24	0.16	0.50	0.31	0.29	0.18
FeO	0.69	0.98	0.83	0.94	0.82	0.54	0.84	0.47
Total	99.87	99.58	99.75	99.85	100.08	99.36	99.84	99.11
An	56.2	52.0	57.0	59.2	47.9	55.1	51.0	34.0
Ab	42.7	46.3	41.6	39.9	49.2	43.2	47.4	64.9
Or	1.1	1.7	1.4	0.9	2.9	1.7	1.6	1.0

Sample	99UN37	99UN37	99UN37	99UN37	99UN37	99UN37	99UN37	99UN37
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	6	1	2	3	4	5	1	2
SiO_2	52.90	53.16	52.75	56.16	53.78	52.87	53.58	55.45
Al_2O_3	29.05	28.80	28.32	26.72	28.54	29.31	27.98	27.65
CaO	12.21	11.67	11.06	9.20	11.40	12.11	10.91	10.06
Na_2O	5.07	4.96	4.89	6.27	5.16	4.76	5.20	5.95
K_2O	0.29	0.28	0.29	0.23	0.29	0.22	0.32	0.26
FeO	0.66	0.46	0.68	0.51	0.75	0.75	0.76	0.71
Total	100.18	99.33	98.00	99.09	99.92	100.02	98.76	100.08
An	56.2	55.6	54.6	44.2	54.1	57.7	52.7	47.6
Ab	42.2	42.8	43.7	54.5	44.3	41.1	45.5	51.0
Or	1.6	1.6	1.7	1.3	1.6	1.2	1.9	1.5

Sample	99UN37	99UN37	99UN37	99UN37	99UN37	99UN37	99UN37	99UN37
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	3	4	5	6	8	1	2	3
SiO_2	52.50	52.55	53.79	55.49	54.34	53.37	53.48	54.63
Al_2O_3	29.40	29.15	27.88	27.44	28.08	27.97	28.44	27.86
CaO	12.49	12.02	10.97	9.74	11.06	11.08	10.87	10.40
Na_2O	4.61	5.05	5.41	6.04	5.25	5.38	5.24	5.56
K_2O	0.18	0.21	0.31	0.28	0.30	0.31	0.37	0.34
FeO	0.82	0.74	0.73	0.51	0.81	0.95	0.96	0.75
Total	100.00	99.71	99.07	99.51	99.85	99.06	99.36	99.55
An	59.3	56.2	51.9	46.4	52.8	52.3	52.3	49.8
Ab	39.6	42.7	46.3	52.0	45.4	46.0	45.6	48.2
Or	1.0	1.1	1.7	1.6	1.7	1.8	2.1	2.0

Sample	99UN37	99UN37	99UN37	99UN37	99UN37	99UN37	99UN37	99UN37
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	4	5	7	8	1	2	4	5
SiO_2	54.42	52.86	53.30	57.50	57.50	54.73	52.92	51.81
Al_2O_3	27.70	28.75	28.89	26.53	27.19	27.69	28.80	29.56
CaO	10.86	11.66	11.63	8.56	8.38	10.25	11.13	12.41
Na_2O	5.36	4.73	4.95	6.50	6.68	5.36	4.95	4.35
K_2O	0.38	0.25	0.28	0.42	0.41	0.32	0.33	0.21
FeO	0.54	0.88	0.80	0.48	0.58	0.82	0.71	0.82
Total	99.27	99.13	99.84	100.00	100.74	99.17	98.85	99.16
An	51.7	56.9	55.6	41.1	40.0	50.4	54.3	60.4
Ab	46.2	41.7	42.8	56.5	57.7	47.7	43.7	38.3
Or	2.2	1.5	1.6	2.4	2.3	1.9	1.9	1.2

Sample	99UN37	99UN37	99UN37	99UN37	99UN37	99UN37	99UN37	99UN37
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	6	7	1	3	4	5	1	2
SiO_2	54.81	53.70	51.03	45.97	44.93	54.13	53.15	56.62
Al_2O_3	27.43	28.68	30.09	33.46	34.38	28.81	29.54	27.47
CaO	10.02	11.31	13.05	17.21	17.82	10.69	12.11	9.57
Na_2O	5.73	5.16	4.04	1.36	1.44	5.43	4.62	6.32
K_2O	0.47	0.18	0.12	0.75	0.02	0.24	0.27	0.37
FeO	0.67	0.60	0.59	0.74	0.95	0.71	0.68	0.70
Total	99.13	99.62	98.91	99.49	99.54	100.01	100.38	101.05
An	47.9	54.2	63.7	83.7	87.1	51.4	58.2	44.6
Ab	49.5	44.7	35.6	12.0	12.7	47.3	40.2	53.3
Or	2.6	1.0	0.7	4.4	0.1	1.4	1.5	2.1

Sample	99UN37	99UN37	99UN37	99UN37	99UN37	99UN37	99UN37	99UN37
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	3	4	5	6	7	8	9	1
SiO_2	52.70	53.51	55.86	54.30	51.66	54.00	54.30	54.38
Al_2O_3	28.82	28.90	27.85	28.61	30.09	28.45	28.25	28.28
CaO	11.36	11.39	9.95	10.93	12.99	11.06	10.92	10.72
Na_2O	4.75	4.87	5.88	5.10	4.34	5.47	5.40	5.27
K_2O	0.26	0.33	0.29	0.36	0.25	0.30	0.23	0.31
FeO	0.44	0.75	0.58	0.74	0.75	0.98	0.66	0.57
Total	98.34	99.75	100.42	100.04	100.08	100.25	99.74	99.53
An	56.0	55.3	47.6	53.1	61.5	51.9	52.1	51.9
Ab	42.4	42.8	50.8	44.8	37.1	46.4	46.6	46.2
Or	1.5	1.9	1.6	2.1	1.4	1.7	1.3	1.8

Sample	99UN37	99UN37	99UN37	99UN37	99UN37	99UN37	99UN37	99UN37
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	2	3	4	5	6	7	8	1
SiO_2	54.38	54.01	53.75	54.24	54.05	53.92	54.33	51.41
Al_2O_3	27.64	27.95	27.87	28.19	28.28	28.41	28.00	29.62
CaO	10.74	10.52	10.85	10.90	10.81	10.92	11.09	12.52
Na_2O	5.23	5.46	5.30	5.22	5.41	5.30	5.39	4.52
K_2O	0.39	0.31	0.39	0.33	0.37	0.32	0.33	0.19
FeO	0.79	0.66	0.67	0.87	0.91	0.81	0.80	0.91
Total	99.16	98.91	98.82	99.75	99.84	99.69	99.93	99.18
An	52.0	50.7	51.9	52.6	51.4	52.3	52.2	59.8
Ab	45.8	47.6	45.9	45.5	46.5	45.9	45.9	39.1
Or	2.2	1.8	2.2	1.9	2.1	1.9	1.8	1.1

Sample	99UN37	99UN37	99UN37	99UN37	99UN37	99UN37	99UN37	99UN37
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	2	3	4	5	6	7	8	9
SiO_2	53.48	53.76	53.64	54.03	54.15	54.30	53.15	54.27
Al_2O_3	28.78	28.72	27.98	27.87	28.16	28.26	28.53	27.58
CaO	11.44	11.02	10.96	11.02	11.17	11.10	11.04	10.43
Na_2O	5.04	5.23	5.24	5.16	5.32	5.19	5.13	5.60
K_2O	0.35	0.30	0.31	0.30	0.34	0.33	0.32	0.36
FeO	0.75	0.66	0.75	0.71	0.81	0.58	0.77	0.76
Total	99.84	99.69	98.89	99.10	99.95	99.76	98.94	99.00
An	54.5	52.9	52.7	53.2	52.7	53.1	53.3	49.7
Ab	43.5	45.4	45.5	45.1	45.4	45.0	44.9	48.3
Or	2.0	1.7	1.8	1.7	1.9	1.9	1.8	2.1

Sample	99UN37	99UN5	99UN5	99UN5	99UN5	99UN5	99UN5	99UN5
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	10	1	2	3	4	5	6	7
SiO_2	51.41	53.12	54.45	49.27	47.85	48.36	48.19	47.66
Al_2O_3	28.73	29.48	27.96	32.18	33.10	32.69	33.16	32.83
CaO	12.63	12.71	11.04	15.45	16.34	16.00	16.22	16.78
Na_2O	4.51	4.60	5.27	2.87	2.52	2.41	2.50	2.50
K_2O	0.25	0.26	0.40	0.15	0.08	0.08	0.07	0.09
FeO	0.91	0.92	0.86	0.70	0.80	0.47	0.60	0.58
Total	98.44	101.09	99.99	100.64	100.70	100.00	100.75	100.43
An	59.9	59.6	52.4	74.2	77.8	78.2	77.8	78.4
Ab	38.7	39.0	45.3	25.0	21.7	21.3	21.7	21.1
Or	1.4	1.4	2.3	0.9	0.5	0.5	0.4	0.5

Sample	99UN5	99UN5	99UN5	99UN5	99UN5	99UN5	99UN5	99UN5
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	8	9	10	1	2	3	4	5
SiO_2	51.02	47.79	53.64	49.96	50.55	49.05	46.30	57.02
Al_2O_3	31.33	33.10	28.71	31.20	30.99	31.21	33.92	25.97
CaO	14.60	16.45	11.91	14.28	14.17	15.24	17.55	7.97
Na_2O	3.71	2.52	4.62	3.79	3.58	2.84	1.87	7.08
K_2O	0.17	0.05	0.35	0.16	0.19	0.14	0.08	0.08
FeO	0.80	0.67	1.10	0.77	0.71	0.81	0.90	0.35
Total	101.63	100.60	100.33	100.16	100.20	99.29	100.63	98.46
An	67.9	78.0	57.6	66.9	67.9	74.2	83.4	38.1
Ab	31.2	21.7	40.4	32.1	31.1	25.0	16.1	61.4
Or	0.9	0.3	2.0	0.9	1.1	0.8	0.5	0.5

Sample	99UN5	99UN5	99UN5	99UN5	99UN5	99UN5	99UN5	99UN5
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	6	7	8	9	1	2	3	4
SiO_2	46.02	46.93	49.19	52.03	54.43	50.23	48.38	50.10
Al_2O_3	33.52	33.74	32.12	28.69	28.46	31.43	32.66	31.76
CaO	17.71	17.53	15.24	12.10	11.12	14.19	16.05	14.81
Na_2O	1.61	1.87	3.02	4.44	5.52	3.67	2.88	3.21
K_2O	0.10	0.07	0.11	0.28	0.35	0.14	0.14	0.16
FeO	0.80	0.90	0.70	0.97	1.04	0.81	0.91	0.78
Total	99.76	101.03	100.38	98.52	100.92	100.47	101.03	100.82
An	85.4	83.5	73.2	59.1	51.6	67.6	74.9	71.2
Ab	14.0	16.1	26.2	39.2	46.4	31.7	24.3	27.9
Or	0.6	0.4	0.6	1.7	1.9	0.8	0.8	0.9

Sample	99UN5	99UN5	99UN5	99UN5	99UN5	99UN5	99UN5	99UN5
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	5	6	7	9	1	2	3	4
SiO_2	54.83	48.74	49.43	48.76	61.61	51.98	49.10	48.90
Al_2O_3	27.81	32.67	31.81	32.33	23.30	30.17	31.78	31.62
CaO	10.25	15.88	14.58	15.43	5.12	13.23	15.51	15.29
Na_2O	5.44	2.70	3.44	2.86	7.76	4.48	3.17	3.03
K_2O	0.50	0.14	0.18	0.13	1.54	0.17	0.09	0.18
FeO	1.07	0.84	0.76	0.76	0.57	0.88	0.81	0.80
Total	99.90	100.97	100.20	100.27	99.89	100.92	100.47	99.82
An	49.5	75.9	69.4	74.3	24.4	61.4	72.7	72.8
Ab	47.6	23.3	29.6	24.9	66.9	37.6	26.8	26.1
Or	2.8	0.8	1.0	0.7	8.7	1.0	0.5	1.0

Sample	99UNS	99UNS	99UNS	99UNS	99UNS	99UNS	99UNS	99UNS
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	5	6	7	8	1	2	3	4
SiO_2	50.10	49.49	49.64	52.55	54.70	51.48	47.92	48.48
Al_2O_3	31.86	30.39	31.70	29.07	27.80	30.53	33.03	32.77
CaO	15.04	14.51	15.01	12.43	10.67	13.43	16.37	16.28
Na_2O	3.15	3.54	3.13	4.45	5.63	4.00	2.33	2.62
K_2O	0.15	0.17	0.15	0.30	0.40	0.17	0.05	0.13
FeO	0.75	1.28	0.74	0.90	1.24	0.85	0.54	0.58
Total	101.04	99.39	100.36	99.70	100.44	100.46	100.24	100.85
An	71.9	68.7	72.0	59.6	50.0	64.4	79.3	76.9
Ab	27.2	30.3	27.1	38.7	47.8	34.7	20.4	22.4
Or	0.9	1.0	0.9	1.7	2.2	1.0	0.3	0.7

Sample	99UNS	99UNS	99UNS	99UNS	99UNS	99UNS	99UNS	99UNS
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	5	6	7	8	9	1	2	3
SiO_2	48.30	48.49	51.17	48.82	54.08	55.41	52.59	50.61
Al_2O_3	32.18	32.14	30.38	32.14	28.10	27.71	29.87	30.97
CaO	15.77	15.35	13.74	15.67	10.94	10.50	13.18	14.49
Na_2O	2.96	2.81	4.03	2.84	5.53	5.96	4.33	3.83
K_2O	0.14	0.12	0.11	0.14	0.34	0.43	0.19	0.21
FeO	0.83	0.74	0.62	0.77	1.02	0.95	0.78	0.54
Total	100.19	99.64	100.05	100.39	100.01	100.96	100.93	100.66
An	74.0	74.6	64.9	74.7	51.2	48.2	62.1	66.9
Ab	25.1	24.7	34.5	24.5	46.9	49.4	36.9	32.0
Or	0.8	0.7	0.6	0.8	1.9	2.4	1.1	1.1

Sample	99UNS	99UNS	99UNS	99UNS	99UNS	99UNS	99UNS	99UNS
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	4	5	6	7	8	9	1	2
SiO_2	47.77	48.18	49.07	49.34	48.00	53.56	49.17	45.57
Al_2O_3	32.80	32.44	31.68	31.35	32.24	27.53	32.04	34.88
CaO	16.33	16.48	15.31	15.35	16.37	11.25	15.78	18.10
Na_2O	2.64	2.69	3.22	3.07	2.56	5.61	2.99	1.37
K_2O	0.07	0.11	0.10	0.14	0.06	0.40	0.15	0.06
FeO	0.78	0.60	0.83	0.70	0.57	1.25	0.67	0.73
Total	100.38	100.51	100.22	99.95	99.81	99.61	100.80	100.72
An	77.1	76.7	72.1	72.8	77.7	51.4	73.8	87.6
Ab	22.5	22.7	27.4	26.4	22.0	46.4	25.3	12.0
Or	0.4	0.6	0.5	0.8	0.3	2.2	0.8	0.4

Sample	99UNS	99UNS	99UNS	99UNS	99UNS	99UNS	99UNS	99UNS
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	3	4	5	6	7	8	9	1
SiO_2	46.70	46.41	47.74	45.91	46.42	48.37	49.39	51.50
Al_2O_3	33.77	34.22	32.97	34.38	34.08	32.01	31.68	30.48
CaO	17.65	17.59	16.94	17.80	17.65	15.59	14.84	13.48
Na_2O	1.98	1.85	2.49	1.60	1.93	2.69	3.13	4.27
K_2O	0.07	0.06	0.09	0.06	0.07	0.07	0.19	0.24
FeO	0.69	0.77	0.58	0.98	0.74	1.12	0.76	0.81
Total	100.87	100.89	100.82	100.74	100.89	99.87	99.99	100.77
An	82.8	83.8	78.6	85.7	83.1	75.9	71.6	62.7
Ab	16.8	15.9	20.9	14.0	16.5	23.7	27.3	36.0
Or	0.4	0.3	0.5	0.4	0.4	0.4	1.1	1.3

Sample	99UNS	99UNS	99UNS	99UNS	99UNS	99UNS	99UNS	99UNS
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	2	3	4	5	6	7	8	9
SiO_2	48.93	49.42	52.03	50.19	49.93	58.29	49.45	50.68
Al_2O_3	32.35	31.14	30.22	31.63	30.83	25.13	31.06	30.84
CaO	15.59	14.96	14.29	15.07	14.76	8.39	14.66	14.35
Na_2O	3.04	3.30	3.88	3.43	3.42	7.03	3.23	3.65
K_2O	0.11	0.17	0.19	0.14	0.19	0.76	0.20	0.23
FeO	0.85	0.55	0.81	0.72	0.74	0.91	0.64	0.73
Total	100.88	99.54	101.41	101.18	99.87	100.52	99.24	100.48
An	73.5	70.8	66.4	70.3	69.7	38.1	70.7	67.6
Ab	25.9	28.3	32.6	28.9	29.2	57.8	28.2	31.1
Or	0.6	1.0	1.0	0.8	1.1	4.1	1.2	1.3

Sample	99UNS	99UNS	99UNS	99UNS	99UNS	99UNS	99UNS	99UNS
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	10	1	2	3	4	5	6	7
SiO_2	48.22	53.58	48.22	48.59	48.82	48.58	47.74	49.63
Al_2O_3	32.21	28.98	32.68	32.28	31.82	32.13	32.71	31.34
CaO	16.03	12.35	15.94	15.94	15.35	15.96	16.67	14.73
Na_2O	2.68	5.05	2.64	2.90	3.16	2.65	2.47	3.21
K_2O	0.11	0.30	0.14	0.12	0.10	0.12	0.19	0.14
FeO	0.85	0.93	0.88	0.78	0.71	0.67	0.78	0.65
Total	100.11	101.18	100.50	100.60	99.96	100.12	100.56	99.69
An	76.3	56.6	76.3	74.7	72.5	76.4	78.0	71.1
Ab	23.1	41.8	22.9	24.6	27.0	23.0	20.9	28.0
Or	0.6	1.6	0.8	0.7	0.5	0.7	1.1	0.8

Sample	99UNS	99UNS	99UNS	99UNS	99UNS	99UNS	99UNS	99UNS
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	8	9	1	2	3	4	5	6
SiO_2	48.41	48.50	54.49	49.53	49.98	52.24	51.56	52.46
Al_2O_3	32.77	31.93	27.74	31.61	31.47	29.57	30.17	29.97
CaO	16.31	15.49	11.13	14.67	15.19	12.70	12.94	12.91
Na_2O	2.85	3.05	5.51	3.27	3.17	4.64	4.16	4.23
K_2O	0.12	0.18	0.42	0.11	0.17	0.24	0.19	0.21
FeO	0.95	1.37	1.28	0.54	0.87	0.89	0.64	0.56
Total	101.40	100.52	100.57	99.73	100.85	100.28	99.65	100.35
An	75.5	73.0	51.5	70.8	71.9	59.4	62.5	62.0
Ab	23.9	26.0	46.2	28.6	27.2	39.2	36.4	36.8
Or	0.7	1.0	2.3	0.6	1.0	1.4	1.1	1.2

Sample	99UNS	99UNS	99UNS	99UNS	99UNS	99UNS	99UNS	99UNS
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	7	8	9	10	1	2	3	4
SiO_2	51.97	49.93	51.43	48.33	50.18	48.59	47.78	48.19
Al_2O_3	30.45	31.39	30.30	31.72	31.23	31.97	33.16	32.70
CaO	13.69	14.84	13.84	15.14	14.19	15.54	16.37	16.29
Na_2O	3.85	3.43	3.94	2.74	3.53	3.31	2.47	2.75
K_2O	0.19	0.09	0.15	0.13	0.23	0.17	0.11	0.11
FeO	0.74	0.73	0.70	1.50	0.87	0.95	0.82	0.72
Total	100.89	100.41	100.36	99.56	100.24	100.54	100.71	100.76
An	65.5	70.1	65.4	74.7	68.0	71.5	78.1	76.1
Ab	33.4	29.4	33.7	24.5	30.7	27.6	21.3	23.3
Or	1.1	0.5	0.8	0.8	1.3	0.9	0.6	0.6

Sample	99UNS5	99UNS5	99UNS5	99UNS5	99UNS5	99UNS5	99UNS5	99UNS5
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	5	6	7	1	2	3	4	5
SiO_2	48.19	46.88	49.87	47.88	49.49	51.03	47.80	48.29
Al_2O_3	32.29	33.07	31.73	32.51	31.48	30.77	32.45	32.47
CaO	15.87	16.66	15.29	15.78	15.03	13.98	15.82	16.03
Na_2O	2.94	2.26	3.40	2.75	3.24	3.70	2.63	2.76
K_2O	0.09	0.12	0.20	0.09	0.15	0.21	0.11	0.15
FeO	0.79	0.74	0.74	0.79	0.86	0.69	0.61	0.81
Total	100.17	99.73	101.23	99.79	100.26	100.40	99.42	100.50
An	74.5	79.7	70.5	75.6	71.3	66.8	76.4	75.6
Ab	25.0	19.6	28.4	23.8	27.9	32.0	23.0	23.6
Or	0.5	0.7	1.1	0.5	0.9	1.2	0.6	0.8

Sample	99UNS5	99UNS5	99UNS5	99UNS5	99UNS5	99UNS5	99UNS5	99UNS5
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	6	7	8	9	1	2	3	4
SiO_2	48.03	49.06	51.14	55.99	54.96	46.32	44.62	52.51
Al_2O_3	32.47	32.14	31.22	26.81	27.57	33.78	32.93	28.73
CaO	15.90	15.77	14.24	9.75	10.69	17.97	18.21	12.32
Na_2O	2.55	2.75	3.88	5.75	5.72	1.88	1.44	4.88
K_2O	0.11	0.39	0.23	0.41	0.35	0.08	0.11	0.31
FeO	0.87	0.81	0.87	1.14	1.21	0.86	1.00	0.78
Total	99.93	100.92	101.59	99.85	100.50	100.90	98.31	99.52
An	77.0	74.3	66.1	47.2	49.8	83.7	86.9	57.2
Ab	22.3	23.5	32.6	50.4	48.2	15.9	12.5	41.1
Or	0.6	2.2	1.3	2.4	1.9	0.5	0.6	1.7

Sample	99UNS5	99UNS5	99UNS5	99UNS5	99UNS5	99UNS5	99UNS5	99UNS5
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	1	2	3	4	5	1	2	3
SiO_2	48.65	45.64	46.13	45.90	48.42	47.46	48.62	48.52
Al_2O_3	32.45	33.49	34.49	33.57	31.95	31.60	31.96	32.70
CaO	15.70	17.66	17.96	17.94	15.36	15.70	15.37	16.40
Na_2O	2.83	1.98	1.75	1.84	3.06	2.77	3.03	2.81
K_2O	0.12	0.05	0.04	0.07	0.15	0.15	0.17	0.11
FeO	0.85	0.89	0.74	0.80	1.01	1.67	0.68	0.86
Total	100.61	99.72	101.10	100.11	99.96	99.35	99.84	101.39
An	74.8	82.9	84.8	84.0	72.9	75.1	73.0	75.9
Ab	24.4	16.8	15.0	15.6	26.2	24.0	26.1	23.5
Or	0.7	0.3	0.2	0.4	0.9	0.9	0.9	0.6

Sample	99UNS5	99UNS5	99UNS5	99UNS5	99UNS5	99UNS5	99UNS5	99UNS5
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	4	5	1	2	3	4	5	6
SiO_2	48.19	48.92	48.56	50.86	48.62	47.80	46.53	46.22
Al_2O_3	32.59	31.93	32.71	31.47	32.17	33.31	34.30	34.29
CaO	16.10	15.44	15.86	14.22	15.77	16.89	17.58	17.77
Na_2O	2.79	3.04	2.56	3.69	3.04	2.37	1.83	1.80
K_2O	0.19	0.14	0.09	0.16	0.14	0.07	0.08	0.09
FeO	0.64	0.93	0.81	0.88	0.61	0.63	0.70	0.66
Total	100.48	100.41	100.59	101.28	100.34	101.08	101.03	100.83
An	75.4	73.1	77.0	67.5	73.6	79.4	83.8	84.1
Ab	23.6	26.1	22.5	31.6	25.6	20.2	15.8	15.4
Or	1.0	0.8	0.5	0.9	0.8	0.4	0.4	0.5

Sample	99UNS	99UNS	99UNS	99UNS	99UNS	99UNS	99UNS	99UNS
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	7	8	9	10	1	2	3	4
SiO_2	45.74	47.25	48.23	48.53	47.49	48.67	48.73	98.73
Al_2O_3	34.78	33.17	32.86	32.94	33.10	32.38	32.67	0.53
CaO	18.03	16.68	16.20	15.93	16.59	15.78	15.69	0.12
Na_2O	1.46	2.35	2.76	2.63	2.32	2.72	2.82	0.06
K_2O	0.01	0.11	0.08	0.13	0.14	0.16	0.16	0.00
FeO	0.59	0.92	0.96	0.78	0.73	0.67	0.81	0.02
Total	100.60	100.47	101.10	100.94	100.38	100.38	100.87	99.45
An	87.2	79.2	76.1	76.4	79.1	75.5	74.8	51.2
Ab	12.8	20.2	23.5	22.8	20.1	23.6	24.3	48.8
Or	0.1	0.6	0.4	0.8	0.8	0.9	0.9	0.0

Sample	99UNS	99UNS	99UNS	99UNS	99UNS	99UNS	99UNS	99UNS
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	5	6	7	8	1	2	3	4
SiO_2	45.65	45.87	48.72	60.14	48.87	45.13	45.73	48.60
Al_2O_3	34.67	35.18	32.21	22.95	31.61	34.24	34.50	32.05
CaO	18.15	18.24	15.56	8.50	15.63	18.14	17.54	15.80
Na_2O	1.48	1.28	2.84	5.20	2.93	1.35	1.62	3.28
K_2O	0.06	0.07	0.11	0.36	0.15	0.14	0.16	0.09
FeO	0.66	0.67	0.99	0.85	0.93	0.87	1.18	0.84
Total	100.67	101.30	100.45	98.01	100.12	99.86	100.72	100.66
An	86.8	88.4	74.7	46.3	74.0	87.5	84.9	72.3
Ab	12.8	11.2	24.7	51.3	25.1	11.7	14.2	27.2
Or	0.3	0.4	0.7	2.3	0.9	0.8	0.9	0.5

Sample	99UNS	99UNS	99UNS	99UNS	99UNS	99UNS	99UNS	99UNS
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	5	6	7	8	1	2	3	4
SiO_2	48.69	52.46	51.31	52.16	54.31	51.02	48.47	48.35
Al_2O_3	31.86	29.47	30.39	30.26	27.97	30.92	31.56	32.39
CaO	15.05	12.61	13.42	13.29	11.47	14.17	14.61	15.54
Na_2O	3.33	4.38	4.07	4.47	5.40	3.80	3.20	2.76
K_2O	0.17	0.20	0.20	0.17	0.38	0.17	0.18	0.12
FeO	0.67	0.91	0.73	0.75	0.93	0.76	0.90	0.62
Total	99.76	100.02	100.12	101.10	100.45	100.83	98.92	99.78
An	70.8	60.7	63.8	61.6	52.9	66.7	70.9	75.2
Ab	28.3	38.2	35.0	37.5	45.0	32.4	28.1	24.1
Or	0.9	1.1	1.2	0.9	2.1	0.9	1.0	0.7

Sample	99UNS	99UNS	99UNS	99UNS	99UNS	99UNS	99UNS	99UNS
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	5	6	7	1	2	3	4	5
SiO_2	54.86	48.76	54.98	50.20	49.12	48.60	48.32	48.38
Al_2O_3	27.66	32.45	27.38	31.51	31.60	32.44	32.48	32.04
CaO	10.42	15.43	10.26	14.90	14.94	15.70	16.02	15.59
Na_2O	5.53	2.97	5.91	3.44	3.23	2.71	2.55	2.87
K_2O	0.42	0.18	0.43	0.16	0.17	0.08	0.07	0.17
FeO	1.15	0.77	1.14	0.74	0.48	0.79	0.63	0.76
Total	100.05	100.56	100.10	100.96	99.55	100.31	100.08	99.81
An	49.8	73.4	47.8	69.9	71.2	75.9	77.3	74.3
Ab	47.8	25.6	49.8	29.2	27.8	23.7	22.2	24.7
Or	2.4	1.0	2.4	0.9	1.0	0.4	0.4	1.0

Sample	99UN5	99UN5	99UN5	99UN5	99UN5	99UN5	99UN5	99UN5
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	6	7	1	2	3	4	5	6
SiO_2	54.59	52.89	48.22	49.52	48.27	51.20	48.69	48.79
Al_2O_3	27.80	29.38	32.85	31.80	32.40	29.36	32.05	31.71
CaO	10.78	12.56	15.90	15.69	15.63	13.54	15.57	15.36
Na_2O	5.58	4.74	2.78	2.87	2.76	3.30	2.87	3.05
K_2O	0.32	0.31	0.11	0.15	0.06	0.17	0.16	0.13
FeO	1.07	0.97	0.83	0.86	0.75	0.67	0.83	0.93
Total	100.15	100.85	100.69	100.89	99.88	98.24	100.17	99.97
An	50.7	58.4	75.5	74.5	75.5	68.7	74.3	73.0
Ab	47.5	39.9	23.9	24.7	24.1	30.3	24.8	26.2
Or	1.8	1.7	0.6	0.9	0.4	1.0	0.9	0.8

Sample	99UN5	99UN5	99UN5	99UN5	99UN5	99UN5	99UN5	99UN5
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	7	8	9	10	1	2	3	4
SiO_2	51.01	47.16	46.39	52.58	48.78	50.13	48.93	50.42
Al_2O_3	30.15	33.38	34.08	29.33	32.73	30.75	31.91	31.02
CaO	13.58	16.96	17.08	12.47	15.59	14.16	15.50	14.04
Na_2O	3.98	2.17	1.91	4.71	2.96	3.67	2.93	3.75
K_2O	0.22	0.09	0.06	0.29	0.14	0.17	0.13	0.11
FeO	0.70	0.60	0.68	0.94	0.98	0.62	0.80	0.49
Total	99.64	100.36	100.20	100.33	101.17	99.50	100.20	99.83
An	64.5	80.8	82.9	58.4	73.8	67.4	74.0	67.0
Ab	34.2	18.7	16.8	39.9	25.4	31.6	25.3	32.4
Or	1.2	0.5	0.3	1.6	0.8	1.0	0.8	0.6

Sample	99UN5	99UN5	99UN5	99UN5	99UN5	99UN5	99UN5	99UN5
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	5	6	7	8	9	10	1	2
SiO_2	50.76	49.66	48.18	50.09	48.87	52.52	50.51	48.53
Al_2O_3	31.78	31.68	32.36	31.45	32.45	29.48	30.45	32.52
CaO	15.05	14.48	16.29	14.46	15.84	12.44	13.81	15.69
Na_2O	2.77	3.55	2.41	3.36	2.81	4.66	3.69	2.80
K_2O	0.12	0.18	0.10	0.18	0.11	0.28	0.24	0.13
FeO	0.80	0.68	0.66	0.71	0.64	0.83	0.85	0.80
Total	101.27	100.25	99.99	100.25	100.73	100.21	99.55	100.47
An	74.5	68.6	78.5	69.7	75.2	58.7	66.5	75.0
Ab	24.8	30.4	21.0	29.3	24.2	39.8	32.2	24.2
Or	0.7	1.0	0.6	1.0	0.6	1.6	1.4	0.7

Sample	99UN5	99UN5	99UN5	99UN5	99UN5	99UN5	99UN5	99UN19-1
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	Dacite tuff
Line Number	3	4	5	6	7	8	9	1
SiO_2	50.25	51.07	52.11	58.78	51.94	51.70	51.97	59.73
Al_2O_3	30.96	30.61	29.55	27.65	30.07	30.28	30.10	24.43
CaO	14.24	13.77	12.83	11.28	12.96	13.22	12.93	6.34
Na_2O	3.57	3.96	4.29	3.52	4.19	4.25	4.00	7.58
K_2O	0.15	0.21	0.24	0.23	0.21	0.21	0.19	0.59
FeO	0.62	0.56	0.56	0.52	0.68	0.53	0.60	0.22
Total	99.78	100.18	99.58	101.97	100.04	100.19	99.79	98.88
An	68.2	65.0	61.5	63.0	62.3	62.5	63.4	30.5
Ab	30.9	33.8	37.2	35.5	36.5	36.4	35.5	66.1
Or	0.9	1.2	1.3	1.5	1.2	1.2	1.1	3.4

Sample	99UN19-1	99UN19-1	99UN19-1	99UN19-1	99UN19-1	99UN19-1	99UN19-1	99UN19-1
Rock Type	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff
Line Number	2	3	4	1	2	3	4	5
SiO_2	59.06	59.10	57.48	59.48	58.83	58.65	57.84	58.24
Al_2O_3	24.74	24.44	25.17	24.19	24.58	24.66	25.16	24.84
CaO	6.89	6.07	7.32	6.22	6.75	6.63	6.96	6.62
Na_2O	7.30	7.85	7.29	7.90	7.48	7.63	7.44	7.59
K_2O	0.53	0.47	0.57	0.64	0.58	0.58	0.51	0.49
FeO	0.33	0.29	0.40	0.34	0.39	0.30	0.35	0.35
Total	98.85	98.22	98.23	98.76	98.61	98.45	98.27	98.13
An	33.2	29.1	34.5	29.2	32.1	31.4	33.1	31.6
Ab	63.7	68.2	62.3	67.2	64.5	65.4	64.0	65.6
Or	3.1	2.7	3.2	3.6	3.3	3.2	2.9	2.8

Sample	99UN19-1	99UN19-1	99UN19-1	99UN19-1	99UN19-1	99UN19-1	99UN19-1	99UN19-1
Rock Type	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff
Line Number	6	1	2	3	4	5	1	2
SiO_2	59.16	55.85	51.71	57.52	54.04	53.54	58.61	56.40
Al_2O_3	24.76	27.32	29.36	28.24	29.30	28.38	24.98	26.69
CaO	6.04	9.21	11.80	8.91	11.41	10.63	7.08	8.21
Na_2O	7.54	6.03	4.66	5.95	4.74	5.36	7.13	6.60
K_2O	0.60	0.29	0.16	0.36	0.23	0.28	0.43	0.42
FeO	0.43	0.52	0.75	0.52	0.29	0.24	0.31	0.48
Total	98.54	99.21	98.44	101.50	100.01	98.43	98.53	98.80
An	29.6	45.0	57.8	44.3	56.3	51.4	34.5	39.8
Ab	66.9	53.3	41.3	53.6	42.3	47.0	63.0	57.8
Or	3.5	1.7	0.9	2.2	1.4	1.6	2.5	2.4

Sample	99UN19-1	99UN19-1	99UN19-1	99UN19-1	99UN19-1	99UN19-1	99UN19-1	99UN19-1
Rock Type	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff
Line Number	1	2	3	1	2	1	1	2
SiO_2	57.92	58.45	59.72	58.34	58.87	58.85	57.98	57.52
Al_2O_3	25.94	25.40	24.72	24.89	24.83	24.99	25.11	25.47
CaO	7.99	7.66	6.47	6.69	6.35	6.84	7.05	7.12
Na_2O	6.96	7.21	7.63	7.33	7.39	7.07	7.17	6.99
K_2O	0.27	0.20	0.40	0.51	0.56	0.42	0.70	0.48
FeO	0.39	0.41	0.57	0.56	0.37	0.24	0.67	0.56
Total	99.49	99.34	99.51	98.32	98.38	98.42	98.67	98.14
An	38.2	36.6	31.2	32.5	31.1	34.0	33.8	35.0
Ab	60.2	62.3	66.5	64.5	65.6	63.5	62.2	62.2
Or	1.6	1.1	2.3	2.9	3.3	2.5	4.0	2.8

Sample	99UN19-1	99UN19-1	99UN19-1	99UN19-1	99UN19-1	99UN19-1	99UN19-1	99UN19-1
Rock Type	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff
Line Number	1	1	1	1	2	3	4	5
SiO_2	58.96	58.71	59.40	58.27	57.17	58.06	58.04	58.18
Al_2O_3	24.49	24.49	24.49	24.98	25.85	25.57	25.49	25.27
CaO	7.08	6.54	6.46	6.98	7.86	7.54	7.26	7.32
Na_2O	7.30	7.49	7.48	7.30	6.92	7.11	7.54	7.19
K_2O	0.53	0.48	0.44	0.47	0.37	0.43	0.40	0.48
FeO	0.34	0.46	0.34	0.34	0.31	0.38	0.47	0.38
Total	98.70	98.17	98.60	98.34	98.48	99.10	99.20	98.83
An	33.8	31.6	31.5	33.7	37.7	36.0	33.9	35.0
Ab	63.2	65.6	66.0	63.7	60.1	61.5	63.8	62.3
Or	3.0	2.8	2.5	2.7	2.1	2.5	2.2	2.7

Sample	99UN19-1	99UN19-1	99UN19-1	99UN19-1	99UN19-1	99UN19-1	99UN19-1	99UN19-1
Rock Type	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff
Line Number	6	7	8	1	2	3	4	1
SiO_2	58.53	58.85	58.25	59.29	58.67	58.28	57.13	59.49
Al_2O_3	25.46	25.35	25.44	25.32	25.23	24.94	26.15	24.87
CaO	7.40	6.94	7.07	7.11	7.42	7.07	8.07	6.38
Na_2O	7.17	7.50	7.59	7.11	7.23	7.33	6.96	7.39
K_2O	0.51	0.43	0.43	0.37	0.50	0.56	0.39	0.51
FeO	0.40	0.34	0.31	0.37	0.43	0.20	0.24	0.43
Total	99.47	99.42	99.09	99.57	99.48	98.38	98.94	99.08
An	35.3	33.0	33.2	34.8	35.2	33.6	38.2	31.3
Ab	61.8	64.6	64.4	63.0	62.0	63.2	59.6	65.7
Or	2.9	2.4	2.4	2.2	2.8	3.2	2.2	3.0

Sample	99UN19-1	99UN19-1	99UN19-1	99UN19-1	99UN19-1	99UN19-1	99UN19-1	99UN19-1
Rock Type	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff
Line Number	2	3	4	5	6	7	8	1
SiO_2	58.79	58.75	58.24	60.19	58.53	58.98	59.64	58.98
Al_2O_3	24.89	25.21	25.16	25.85	25.26	24.85	24.74	24.41
CaO	6.31	6.92	6.96	7.05	6.93	6.65	6.29	6.20
Na_2O	7.48	7.34	7.21	7.01	7.18	7.20	7.56	7.56
K_2O	0.51	0.46	0.47	0.51	0.47	0.40	0.45	0.49
FeO	0.36	0.38	0.46	0.26	0.23	0.34	0.29	0.46
Total	98.34	99.06	98.51	100.88	98.60	98.42	98.95	98.11
An	30.8	33.3	33.9	34.6	33.9	33.0	30.7	30.3
Ab	66.2	64.0	63.4	62.4	63.4	64.7	66.7	66.8
Or	3.0	2.6	2.7	3.0	2.7	2.3	2.6	2.9

Sample	99UN19-1	99UN19-1	99UN19-1	99UN19-1	99UN19-1	99UN19-1	99UN19-1	99UN19-1
Rock Type	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff
Line Number	2	1	2	3	1	2	3	4
SiO_2	59.14	59.33	57.99	58.87	58.33	59.80	58.72	59.44
Al_2O_3	24.56	24.99	25.36	25.31	26.17	25.32	25.64	25.53
CaO	6.58	6.81	7.07	6.97	7.59	6.97	7.06	6.65
Na_2O	7.40	7.52	7.32	7.25	7.31	7.90	7.74	7.75
K_2O	0.44	0.48	0.55	0.47	0.46	0.51	0.48	0.59
FeO	0.41	0.22	0.68	0.39	0.41	0.35	0.54	0.50
Total	98.53	99.35	98.97	99.26	100.26	100.84	100.19	100.46
An	32.1	32.5	33.7	33.8	35.5	31.8	32.6	31.1
Ab	65.3	64.8	63.2	63.5	61.9	65.4	64.7	65.6
Or	2.6	2.7	3.1	2.7	2.5	2.8	2.7	3.3

Sample	99UN19-1	99UN19-1	99UN19-1	99UN19-1	99UN19-1	99UN19-1	99UN19-1	99UN19-1
Rock Type	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff
Line Number	5	6	1	2	3	4	5	6
SiO_2	58.50	58.88	60.26	61.51	60.15	60.48	58.97	58.92
Al_2O_3	25.57	25.66	25.12	24.44	24.94	24.96	25.11	25.75
CaO	7.01	7.14	6.31	5.90	6.68	6.40	7.01	6.95
Na_2O	7.41	7.76	7.91	7.61	7.73	7.87	7.53	7.69
K_2O	0.57	0.48	0.50	0.43	0.53	0.64	0.61	0.51
FeO	0.38	0.50	0.40	0.19	0.32	0.32	0.19	0.33
Total	99.44	100.42	100.51	100.08	100.35	100.68	99.41	100.14
An	33.3	32.8	29.8	29.2	31.3	29.9	32.8	32.4
Ab	63.5	64.6	67.4	68.2	65.7	66.5	63.8	64.8
Or	3.2	2.6	2.8	2.6	3.0	3.6	3.4	2.8

Sample	99UN19-1	99UN19-1	99UN19-1	99UN19-1	99UN19-1	99UN19-1	99UN19-1	99UN19-1
Rock Type	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff
Line Number	7	8	9	1	2	3	4	5
SiO_2	59.21	59.21	61.18	59.20	57.70	57.53	58.67	59.19
Al_2O_3	25.49	25.77	25.05	25.61	25.96	26.23	25.74	25.74
CaO	6.66	7.28	6.52	7.46	7.69	8.11	7.31	7.36
Na_2O	7.78	7.48	7.93	7.17	7.16	6.94	7.25	7.18
K_2O	0.61	0.48	0.52	0.45	0.59	0.39	0.42	0.43
FeO	0.28	0.42	0.30	0.42	0.33	0.43	0.32	0.27
Total	100.03	100.64	101.51	100.32	99.42	99.63	99.72	100.17
An	31.0	34.1	30.3	35.6	36.0	38.4	34.9	35.3
Ab	65.6	63.3	66.8	61.9	60.7	59.4	62.7	62.3
Or	3.4	2.7	2.9	2.5	3.3	2.2	2.4	2.4

Sample	99UN19-1	99UN19-1	99UN19-1	99UN19-1	99UN19-1	99UN19-1	99UN19-1	99UN19-1
Rock Type	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff
Line Number	6	7	8	1	2	3	4	5
SiO_2	59.11	59.19	59.86	59.26	59.53	57.22	56.19	57.67
Al_2O_3	25.81	26.06	25.18	25.23	25.18	27.12	27.02	26.01
CaO	7.33	7.18	6.50	7.04	6.73	8.51	8.67	7.47
Na_2O	7.52	7.41	7.49	7.64	7.88	6.99	6.70	7.37
K_2O	0.53	0.44	0.51	0.57	0.52	0.44	0.56	0.51
FeO	0.26	0.37	0.39	0.19	0.29	0.28	0.35	0.50
Total	100.56	100.65	99.93	99.94	100.14	100.57	99.48	99.53
An	34.0	34.0	31.5	32.7	31.1	39.2	40.4	34.9
Ab	63.1	63.5	65.6	64.1	66.0	58.3	56.5	62.3
Or	2.9	2.5	2.9	3.2	2.9	2.4	3.1	2.8

Sample	99UN19-1	99UN19-1	99UN19-1	99UN19-1	99UN19-1	99UN19-1	99UN19-1	99UN19-1
Rock Type	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff
Line Number	1	2	3	1	2	3	1	2
SiO_2	59.42	58.61	59.19	57.52	58.33	57.78	58.50	57.52
Al_2O_3	25.38	26.11	25.36	26.79	26.10	26.27	26.05	26.57
CaO	6.72	7.26	7.32	8.18	7.98	7.96	7.31	8.28
Na_2O	7.79	7.66	7.63	6.85	7.33	7.06	7.26	6.96
K_2O	0.46	0.62	0.52	0.36	0.41	0.37	0.37	0.43
FeO	0.40	0.33	0.26	0.43	0.34	0.34	0.41	0.45
Total	100.17	100.60	100.28	100.14	100.49	99.78	99.90	100.21
An	31.4	33.2	33.7	38.9	36.7	37.6	35.0	38.7
Ab	66.0	63.4	63.5	59.0	61.1	60.3	62.9	58.9
Or	2.6	3.4	2.9	2.0	2.2	2.1	2.1	2.4

Sample	99UN19-1	99UN19-1	99UN19-1	99UN19-1	99UN19-1	99UN19-1	99UN19-1	99UN19-1
Rock Type	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff	Dacite tuff
Line Number	3	1	1	2	3	4	1	2
SiO_2	58.43	59.27	56.94	56.68	55.49	57.46	58.47	60.28
Al_2O_3	26.08	25.67	26.63	27.27	27.85	26.63	25.62	25.44
CaO	7.60	6.79	8.71	9.28	9.92	8.39	7.16	6.53
Na_2O	7.32	7.84	6.75	6.38	6.13	6.89	7.62	7.72
K_2O	0.46	0.47	0.38	0.33	0.23	0.45	0.51	0.53
FeO	0.47	0.36	0.47	0.37	0.65	0.52	0.41	0.61
Total	100.36	100.40	99.88	100.31	100.26	100.35	99.79	101.11
An	35.5	31.5	40.7	43.7	46.6	39.2	33.2	30.9
Ab	61.9	65.9	57.2	54.4	52.1	58.3	64.0	66.1
Or	2.6	2.6	2.1	1.8	1.3	2.5	2.8	3.0

Sample	**99UN19-1**	**99UN19-1**	**99UN19-1**	**99UN19-1**	**99UN19-1**	**99UN19-1**	**99UN19-1**	**99UN19-1**
Rock Type	**Dacite tuff**	**Dacite tuff**	**Dacite tuff**	**Dacite tuff**	**Dacite tuff**	**Dacite tuff**	**Dacite tuff**	**Dacite tuff**
Line Number	**3**	**4**	**5**	**6**	**7**	**1**	**2**	**3**
SiO_2	59.50	58.99	60.41	58.09	59.11	59.79	59.48	59.69
Al_2O_3	25.75	25.57	24.57	25.74	25.64	25.52	25.14	24.79
CaO	7.08	6.77	6.28	7.91	7.23	6.77	6.51	6.97
Na_2O	7.70	7.52	8.03	7.25	7.58	7.58	7.71	7.49
K_2O	0.54	0.55	0.51	0.41	0.44	0.56	0.53	0.46
FeO	0.15	0.43	0.34	0.35	0.34	0.43	0.53	0.40
Total	100.72	99.83	100.13	99.73	100.33	100.65	99.91	99.79
An	32.7	32.2	29.3	36.8	33.6	32.0	30.9	33.1
Ab	64.3	64.7	67.9	61.0	63.9	64.9	66.2	64.3
Or	3.0	3.1	2.8	2.2	2.5	3.1	3.0	2.6

Sample	**99UN19-1**	**99UN19-1**	**99UN19-1**	**99UN19-1**	**99UN19-1**	**99UN19-1**	**99UN19-1**	**99UN19-1**
Rock Type	**Dacite tuff**	**Dacite tuff**	**Dacite tuff**	**Dacite tuff**	**Dacite tuff**	**Dacite tuff**	**Dacite tuff**	**Dacite tuff**
Line Number	**4**	**5**	**6**	**7**	**1**	**2**	**3**	**4**
SiO_2	59.21	58.19	57.92	59.48	59.83	59.90	59.41	58.33
Al_2O_3	25.79	26.23	26.25	25.36	25.61	24.66	25.12	26.58
CaO	7.09	8.19	8.00	6.61	6.74	7.07	7.12	8.11
Na_2O	7.64	7.01	7.27	7.84	7.81	7.42	7.67	7.36
K_2O	0.55	0.41	0.43	0.52	0.53	0.43	0.56	0.44
FeO	0.40	0.55	0.45	0.36	0.35	0.48	0.37	0.44
Total	100.68	100.57	100.31	100.17	100.86	99.96	100.25	101.25
An	32.9	38.3	36.9	30.8	31.3	33.7	32.8	37.0
Ab	64.1	59.4	60.7	66.3	65.7	63.9	64.1	60.7
Or	3.0	2.3	2.3	2.9	2.9	2.4	3.1	2.4

Sample	**99UN19-1**	**MH-8G**	**MH-8G**	**MH-8G**	**MH-8G**	**MH-8G**	**MH-8G**	**MH-8G**
Rock Type	**Dacite tuff**	**And encl**	**And encl**	**And encl**	**And encl**	**And encl**	**And encl**	**And encl**
Line Number	**5**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
SiO_2	58.04	53.84	53.72	55.11	54.21	54.25	53.71	51.19
Al_2O_3	26.13	28.59	30.40	27.87	29.17	28.48	30.00	31.49
CaO	7.74	10.67	10.80	10.12	10.39	10.74	11.33	12.87
Na_2O	7.48	5.39	4.90	5.91	5.58	5.22	5.44	4.07
K_2O	0.49	0.42	0.27	0.36	0.33	0.48	0.38	0.24
FeO	0.41	0.39	0.38	0.50	0.42	0.46	0.44	0.31
Total	100.28	99.30	100.47	99.88	100.08	99.63	101.30	100.18
An	35.4	51.0	54.0	47.6	49.8	51.7	52.4	62.7
Ab	61.9	46.6	44.3	50.4	48.3	45.5	45.5	35.9
Or	2.6	2.4	1.6	2.0	1.9	2.8	2.1	1.4

Sample	**MH-8G**	**MH-8G**	**MH-8G**	**MH-8G**	**MH-8G**	**MH-8G**	**MH-8G**	**MH-8G**
Rock Type	**And encl**	**And encl**	**And encl**	**And encl**	**And encl**	**And encl**	**And encl**	**And encl**
Line Number	**8**	**9**	**10**	**11**	**12**	**13**	**1**	**2**
SiO_2	52.53	53.10	52.62	57.61	59.99	54.24	54.35	50.63
Al_2O_3	31.51	31.24	30.08	26.96	25.09	29.35	28.92	32.25
CaO	12.74	11.96	12.18	8.29	6.60	10.82	10.39	13.07
Na_2O	3.57	4.24	4.21	6.68	7.60	5.38	5.55	3.23
K_2O	0.25	0.28	0.32	0.47	0.83	0.34	0.44	0.14
FeO	1.12	0.83	0.53	0.27	0.40	0.36	0.37	0.29
Total	101.70	101.65	99.95	100.29	100.51	100.50	100.02	99.62
An	65.3	59.9	60.3	39.6	30.9	51.6	49.6	68.5
Ab	33.1	38.4	37.8	57.7	64.4	46.4	47.9	30.6
Or	1.5	1.6	1.9	2.7	4.6	1.9	2.5	0.9

Sample	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	3	4	5	6	7	8	9	10
SiO_2	54.45	56.49	60.65	54.63	53.65	59.41	55.89	53.64
Al_2O_3	28.46	27.26	24.43	29.65	28.71	26.11	27.98	29.61
CaO	10.65	8.84	5.71	10.65	11.00	6.95	9.35	10.94
Na_2O	5.72	6.74	8.58	5.52	5.33	7.25	6.24	5.50
K_2O	0.29	0.40	0.69	0.32	0.27	0.56	0.61	0.39
FeO	0.32	0.38	0.27	0.42	0.43	0.35	0.38	0.41
Total	99.89	100.10	100.34	101.18	99.41	100.64	100.45	100.48
An	49.9	41.1	25.9	50.7	52.4	33.5	43.7	51.3
Ab	48.5	56.7	70.4	47.5	46.0	63.3	52.8	46.6
Or	1.6	2.2	3.7	1.8	1.6	3.2	3.4	2.2
Sample	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	11	1	2	3	4	5	6	7
SiO_2	53.43	58.57	58.60	59.99	59.32	56.13	58.94	59.74
Al_2O_3	28.89	25.58	26.07	25.80	25.22	28.59	26.68	25.53
CaO	11.15	7.05	7.24	6.72	6.10	9.12	7.29	6.43
Na_2O	5.03	7.51	7.49	7.74	7.95	6.48	7.01	7.95
K_2O	0.26	0.74	0.60	0.50	0.85	0.43	0.58	0.98
FeO	0.38	0.51	0.54	0.42	0.33	0.70	0.46	0.25
Total	99.13	99.96	100.54	101.17	99.77	101.45	100.95	100.88
An	54.2	32.8	33.7	31.5	28.4	42.7	35.3	29.3
Ab	44.3	63.2	63.0	65.7	66.9	54.9	61.4	65.4
Or	1.5	4.1	3.3	2.8	4.7	2.4	3.3	5.3
Sample	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	8	9	10	11	12	13	1	2
SiO_2	60.11	60.45	54.29	57.12	58.84	61.68	54.11	53.94
Al_2O_3	25.21	25.65	29.30	27.83	26.08	23.61	28.72	29.90
CaO	6.66	6.28	10.87	8.92	7.34	6.05	10.53	10.94
Na_2O	7.74	7.66	5.36	6.40	7.14	7.43	5.17	5.55
K_2O	0.93	0.68	0.21	0.52	0.56	0.54	0.38	0.33
FeO	0.26	0.35	0.35	0.30	0.41	0.34	0.45	0.38
Total	100.91	101.08	100.38	101.09	100.36	99.65	99.36	101.04
An	30.6	30.0	52.2	42.3	35.1	30.0	51.8	51.2
Ab	64.3	66.2	46.6	54.8	61.7	66.8	46.0	47.0
Or	5.1	3.8	1.2	2.9	3.2	3.2	2.2	1.8
Sample	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	3	4	5	6	7	8	9	10
SiO_2	54.13	52.64	54.84	54.97	55.25	56.33	56.53	56.47
Al_2O_3	28.43	30.77	29.46	28.69	28.65	28.02	27.61	28.39
CaO	10.94	12.05	10.34	10.30	10.01	9.33	9.67	9.45
Na_2O	5.43	4.51	5.67	5.66	6.05	6.08	6.40	5.12
K_2O	0.43	0.34	0.32	0.56	0.34	0.61	0.41	0.42
FeO	0.44	0.39	0.38	0.42	0.35	0.30	0.36	0.32
Total	99.79	100.69	101.00	100.59	100.66	100.66	100.97	101.18
An	51.4	58.4	49.3	48.5	46.8	44.3	44.5	45.0
Ab	46.2	39.6	48.9	48.3	51.2	52.2	53.2	52.6
Or	2.4	1.9	1.8	3.1	1.9	3.4	2.3	2.4

Sample	**MH-8G**	**MH-8G**	**99CB-6**	**99CB-6**	**99CB-6**	**99CB-6**	**99CB-6**	**99CB-6**
Rock Type	**And encl**	**And encl**	**Qtz diorite**	**Qtz diorite**	**Qtz diorite**	**Qtz diorite**	**Qtz diorite**	**Qtz diorite**
Line Number	**11**	**12**	**2**	**3**	**4**	**5**	**6**	**7**
SiO_2	55.02	55.10	54.82	54.61	56.78	54.77	51.99	55.14
Al_2O_3	28.14	28.04	29.01	27.84	27.50	28.56	30.86	29.40
CaO	10.14	9.93	10.25	10.68	9.66	10.34	12.39	10.67
Na_2O	5.65	5.61	5.52	5.52	6.33	5.55	4.32	5.94
K_2O	0.47	0.35	0.27	0.27	0.24	0.34	0.27	0.40
FeO	0.45	0.34	0.29	0.33	0.44	0.34	0.36	0.26
Total	99.86	99.36	100.15	99.25	100.95	99.91	100.19	101.80
An	48.4	48.5	49.8	50.9	45.1	49.7	60.3	48.7
Ab	48.9	49.5	48.6	47.6	53.6	48.3	38.1	49.1
Or	2.7	2.0	1.6	1.6	1.3	2.0	1.6	2.2

Sample	**99CB-6**	**99CB-6**	**99CB-6**	**99CB-6**	**99CB-6**	**99CB-6**	**99CB-6**	**99CB-6**
Rock Type	**Qtz diorite**	**Qtz diorite**	**Qtz diorite**	**Qtz diorite**	**Qtz diorite**	**Qtz diorite**	**Qtz diorite**	**Qtz diorite**
Line Number	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
SiO_2	55.00	55.22	56.44	53.10	53.37	52.70	54.46	55.09
Al_2O_3	29.35	29.42	26.81	29.15	30.33	30.53	29.62	28.58
CaO	10.34	10.25	8.73	11.49	11.57	12.25	10.55	10.42
Na_2O	5.80	5.85	5.03	4.97	4.99	4.60	5.62	5.97
K_2O	0.31	0.48	3.12	0.21	0.18	0.25	0.30	0.38
FeO	0.36	0.38	0.27	0.35	0.32	0.18	0.41	0.45
Total	101.15	101.60	100.39	99.28	100.75	100.50	100.97	100.88
An	48.7	47.9	40.5	55.4	55.6	58.7	50.1	48.1
Ab	49.5	49.4	42.2	43.4	43.4	39.9	48.2	49.8
Or	1.7	2.7	17.2	1.2	1.1	1.4	1.7	2.1

Sample	**99CB-6**	**99CB-6**	**99CB-6**	**99CB-6**	**99CB-6**	**99CB-6**	**99CB-6**	**99CB-6**
Rock Type	**Qtz diorite**	**Qtz diorite**	**Qtz diorite**	**Qtz diorite**	**Qtz diorite**	**Qtz diorite**	**Qtz diorite**	**Qtz diorite**
Line Number	**16**	**17**	**18**	**1**	**2**	**3**	**4**	**5**
SiO_2	58.68	58.31	59.86	54.68	53.49	54.68	55.41	55.06
Al_2O_3	26.76	25.42	25.24	28.94	29.47	28.28	28.46	28.61
CaO	7.56	7.05	6.01	10.65	11.22	10.06	9.70	10.30
Na_2O	7.52	7.23	8.11	5.52	5.48	5.58	6.14	5.63
K_2O	0.39	0.39	0.50	0.25	0.33	0.34	0.25	0.30
FeO	0.42	0.51	0.44	0.37	0.21	0.36	0.47	0.27
Total	101.34	98.91	100.16	100.41	100.20	99.29	100.43	100.17
An	34.9	34.2	28.3	50.8	52.1	49.0	46.0	49.4
Ab	62.9	63.0	69.0	47.7	46.1	49.1	52.6	48.8
Or	2.2	2.2	2.8	1.4	1.8	1.9	1.4	1.7

Sample	**99CB-6**	**99CB-6**	**99CB-6**	**99CB-6**	**99CB-6**	**99CB-6**	**99CB-6**	**99CB-6**
Rock Type	**Qtz diorite**	**Qtz diorite**	**Qtz diorite**	**Qtz diorite**	**Qtz diorite**	**Qtz diorite**	**Qtz diorite**	**Qtz diorite**
Line Number	**6**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
SiO_2	54.14	52.92	54.67	54.37	53.86	54.23	54.63	55.16
Al_2O_3	28.57	30.35	29.53	29.43	29.72	28.79	28.31	27.97
CaO	10.33	12.33	10.89	10.53	11.33	11.33	10.59	10.26
Na_2O	5.33	4.86	5.34	5.55	5.20	5.03	5.49	5.91
K_2O	0.38	0.26	0.38	0.25	0.26	0.30	0.30	0.31
FeO	0.27	0.34	0.67	0.30	0.23	0.28	0.48	0.34
Total	99.01	101.05	101.48	100.42	100.60	99.96	99.81	99.93
An	50.6	57.6	51.8	50.4	53.8	54.5	50.7	48.1
Ab	47.2	41.0	46.0	48.1	44.7	43.8	47.6	50.2
Or	2.2	1.4	2.2	1.4	1.4	1.7	1.7	1.7

Sample	99CB-6	99CB-6	99CB-6	99CB-6	99CB-6	99CB-6	99CB-6	99CB-6
Rock Type	Qtz diorite	Qtz diorite	Qtz diorite	Qtz diorite	Qtz diorite	Qtz diorite	Qtz diorite	Qtz diorite
Line Number	15	16	1	2	3	4	5	6
SiO_2	55.47	57.31	61.86	60.71	55.86	55.32	54.35	54.37
Al_2O_3	27.88	27.49	23.93	25.13	28.71	28.36	29.67	30.65
CaO	9.58	8.34	4.86	5.79	9.97	10.07	10.96	10.89
Na_2O	6.22	6.78	9.22	8.63	5.99	5.66	5.21	5.38
K_2O	0.30	0.36	0.45	0.38	0.25	0.20	0.17	0.26
FeO	0.29	0.49	0.19	0.20	0.20	0.19	0.28	0.43
Total	99.74	100.77	100.51	100.84	100.98	99.80	100.63	101.98
An	45.2	39.6	22.0	26.5	47.2	49.0	53.2	52.0
Ab	53.1	58.3	75.6	71.4	51.4	49.8	45.8	46.5
Or	1.7	2.1	2.4	2.1	1.4	1.2	1.0	1.5

Sample	99CB-6	99CB-6	99CB-6	99CB-6	99CB-6	99CB-6	99CB-6	99CB-6
Rock Type	Qtz diorite	Qtz diorite	Qtz diorite	Qtz diorite	Qtz diorite	Qtz diorite	Qtz diorite	Qtz diorite
Line Number	7	8	9	10	11	12	13	14
SiO_2	54.01	53.68	52.52	54.00	54.64	53.91	53.38	53.88
Al_2O_3	28.83	28.54	29.32	29.68	29.47	29.68	29.50	28.11
CaO	10.98	11.27	11.73	11.11	10.88	11.38	11.59	10.45
Na_2O	5.38	5.85	4.80	5.26	5.52	5.51	5.04	5.22
K_2O	0.24	0.20	0.30	0.21	0.12	0.22	0.20	0.29
FeO	0.22	0.35	0.34	0.41	0.31	0.27	0.49	1.15
Total	99.65	99.88	99.01	100.67	100.94	100.96	100.20	99.11
An	52.3	51.0	56.5	53.2	51.8	52.7	55.3	51.6
Ab	46.3	47.9	41.8	45.6	47.5	46.1	43.5	46.7
Or	1.4	1.1	1.7	1.2	0.7	1.2	1.1	1.7

Sample	99CB-6	99CB-6	99CB-6	99CB-6	99CB-5	99CB-5	99CB-5	99CB-5
Rock Type	Qtz diorite	Qtz diorite	Qtz diorite	Qtz diorite	Gabbro	Gabbro	Gabbro	Gabbro
Line Number	15	16	17	18	1	2	3	4
SiO_2	55.30	55.57	67.71	59.64	50.77	52.84	52.67	55.08
Al_2O_3	28.89	27.98	20.31	26.21	32.19	30.59	29.46	28.74
CaO	10.19	9.68	0.61	7.07	13.77	11.92	11.72	9.89
Na_2O	5.52	6.03	11.51	7.73	3.98	4.65	4.93	5.85
K_2O	0.22	0.23	0.52	0.43	0.07	0.15	0.27	0.29
FeO	0.18	0.12	0.15	0.18	0.27	0.49	0.50	0.34
Total	100.29	99.61	100.80	101.27	101.04	100.64	99.55	100.19
An	49.9	46.4	2.8	32.8	65.4	58.1	55.9	47.5
Ab	48.9	52.3	94.4	64.8	34.2	41.0	42.5	50.9
Or	1.3	1.3	2.8	2.4	0.4	0.9	1.5	1.7

Sample	99CB-5	99CB-5	99CB-5	99CB-5	99CB-5	99CB-5	99CB-5	99CB-5
Rock Type	Gabbro	Gabbro	Gabbro	Gabbro	Gabbro	Gabbro	Gabbro	Gabbro
Line Number	5	6	7	8	9	10	11	12
SiO_2	54.81	52.66	55.28	51.35	52.97	53.05	55.66	55.11
Al_2O_3	28.21	30.93	28.50	30.04	30.23	29.38	27.86	29.02
CaO	10.16	11.84	10.07	13.40	11.62	11.16	10.28	10.06
Na_2O	5.96	5.02	5.81	4.20	5.16	5.01	5.69	5.68
K_2O	0.28	0.24	0.29	0.12	0.14	0.21	0.18	0.18
FeO	0.16	0.53	0.20	0.29	0.52	0.35	0.20	0.54
Total	99.59	101.21	100.15	99.40	100.63	99.15	99.96	100.59
An	47.7	55.8	48.1	63.4	55.0	54.5	49.4	49.0
Ab	50.7	42.8	50.2	36.0	44.2	44.3	49.5	50.0
Or	1.5	1.3	1.7	0.7	0.8	1.2	1.0	1.0

Sample	99CB-5	99CB-5	99CB-5	99CB-5	99CB-5	99CB-5	99CB-5	99CB-5
Rock Type	Gabbro	Gabbro	Gabbro	Gabbro	Gabbro	Gabbro	Gabbro	Gabbro
Line Number	13	14	15	16	17	1	2	3
SiO_2	54.47	54.92	55.53	55.18	55.73	52.63	54.02	53.61
Al_2O_3	29.54	28.30	28.59	28.84	28.30	28.97	29.97	28.60
CaO	10.89	10.44	10.29	10.43	9.78	11.59	11.47	11.05
Na_2O	5.19	5.67	6.06	5.73	6.12	5.16	5.62	5.30
K_2O	0.31	0.42	0.34	0.41	0.34	0.14	0.16	0.26
FeO	0.45	0.33	0.16	0.21	0.45	0.48	0.48	0.36
Total	100.85	100.07	100.98	100.80	100.71	98.97	101.72	99.18
An	52.7	49.3	47.5	49.0	46.0	55.0	52.5	52.7
Ab	45.5	48.4	50.6	48.7	52.1	44.2	46.6	45.8
Or	1.8	2.4	1.9	2.3	1.9	0.8	0.9	1.5

Sample	99CB-5	99CB-5	99CB-5	99CB-5	99CB-5	99CB-5	99CB-5	99CB-5
Rock Type	Gabbro	Gabbro	Gabbro	Gabbro	Gabbro	Gabbro	Gabbro	Gabbro
Line Number	4	5	6	7	8	9	10	11
SiO_2	53.90	54.15	55.26	51.76	50.88	50.46	53.94	51.69
Al_2O_3	30.58	27.79	29.54	30.65	30.68	31.64	30.23	31.12
CaO	11.34	10.92	10.27	13.40	13.44	14.29	10.92	13.28
Na_2O	5.26	4.62	5.71	4.27	4.08	3.66	5.13	3.99
K_2O	0.27	0.16	0.21	0.12	0.19	0.04	0.23	0.06
FeO	0.31	0.72	0.25	0.32	0.44	0.61	0.22	0.56
Total	101.66	98.35	101.24	100.52	99.71	100.69	100.67	100.70
An	53.6	56.1	49.3	63.0	63.8	68.2	53.4	64.5
Ab	44.9	42.9	49.5	36.3	35.1	31.6	45.3	35.1
Or	1.5	1.0	1.2	0.7	1.1	0.2	1.3	0.3

Sample	99CB-5	99CB-5	99CB-5	99CB-5	99CB-5	99CB-5	99CB-5	99CB-5
Rock Type	Gabbro	Gabbro	Gabbro	Gabbro	Gabbro	Gabbro	Gabbro	Gabbro
Line Number	12	13	14	15	16	17	18	19
SiO_2	53.34	54.21	54.20	55.65	55.22	55.45	56.30	55.24
Al_2O_3	30.56	29.29	29.43	28.37	29.47	29.32	28.33	28.46
CaO	11.85	11.00	10.83	10.45	10.80	10.25	9.27	10.05
Na_2O	5.07	4.90	5.15	5.24	5.49	5.90	6.01	6.06
K_2O	0.15	0.12	0.12	0.26	0.15	0.23	0.29	0.30
FeO	0.51	0.36	0.34	0.30	0.43	0.19	0.29	0.40
Total	101.48	99.88	100.07	100.27	101.56	101.34	100.49	100.51
An	55.9	54.9	53.4	51.6	51.6	48.3	45.2	47.0
Ab	43.2	44.3	45.9	46.8	47.5	50.4	53.1	51.3
Or	0.9	0.7	0.7	1.5	0.8	1.3	1.7	1.7

Sample	99CB-5	99CB-5	99CB-5	99CB-5	99CB-5	99CB-5	99CB-5	99CB-5
Rock Type	Gabbro	Gabbro	Gabbro	Gabbro	Gabbro	Gabbro	Gabbro	Gabbro
Line Number	1	2	3	4	5	6	7	8
SiO_2	55.79	53.88	52.87	52.88	52.73	52.38	53.16	54.29
Al_2O_3	28.50	29.54	29.34	30.42	30.03	30.71	30.96	29.20
CaO	10.15	11.20	11.86	12.06	11.83	12.59	12.04	10.47
Na_2O	5.75	5.60	5.47	4.33	4.97	4.51	4.92	5.28
K_2O	0.28	0.19	0.18	0.13	0.11	0.13	0.13	0.23
FeO	0.33	0.34	0.32	0.29	0.23	0.30	0.30	0.99
Total	100.78	100.75	100.06	100.11	99.91	100.63	101.52	100.46
An	48.6	52.0	53.9	60.2	56.4	60.2	57.1	51.6
Ab	49.8	47.0	45.1	39.1	42.9	39.1	42.2	47.1
Or	1.6	1.0	1.0	0.8	0.6	0.7	0.8	1.3

Sample	99CB-5	99CB-5	99CB-5	99CB-5	99CB-5	99CB-5	99CB-5	99CB-5
Rock Type	Gabbro	Gabbro	Gabbro	Gabbro	Gabbro	Gabbro	Gabbro	Gabbro
Line Number	9	10	11	12	13	14	15	16
SiO_2	55.37	54.88	56.29	53.95	54.80	97.15	55.95	55.27
Al_2O_3	28.36	27.99	27.88	29.66	28.97	0.37	28.26	28.84
CaO	9.29	9.96	9.33	11.14	10.11	0.63	10.12	10.26
Na_2O	6.27	5.94	6.36	5.38	5.88	0.18	5.88	5.58
K_2O	0.28	0.33	0.28	0.24	0.22	0.04	0.23	0.22
FeO	0.34	0.33	0.15	0.25	0.32	0.36	0.28	0.19
Total	99.92	99.44	100.30	100.63	100.29	98.72	100.73	100.37
An	44.3	47.2	44.1	52.6	48.1	63.3	48.1	49.8
Ab	54.1	50.9	54.4	46.0	50.7	32.3	50.6	49.0
Or	1.6	1.9	1.6	1.4	1.2	4.4	1.3	1.3

Sample	99CB-5	99CB-5	99CB-5	99CB-5	99CB-5	99CB-5	99CB-5	99CB-5
Rock Type	Gabbro	Gabbro	Gabbro	Gabbro	Gabbro	Gabbro	Gabbro	Gabbro
Line Number	17	18	19	20	1	2	3	4
SiO_2	55.89	55.33	55.07	55.53	55.36	53.63	53.03	53.50
Al_2O_3	28.01	28.90	28.65	28.23	29.72	29.28	30.28	30.21
CaO	9.78	10.19	10.54	10.10	10.49	11.39	12.10	12.15
Na_2O	5.95	5.74	5.89	6.08	5.42	5.41	5.27	4.71
K_2O	0.26	0.21	0.20	0.18	0.28	0.21	0.14	0.14
FeO	0.16	0.20	0.27	0.71	0.45	0.29	0.30	0.38
Total	100.04	100.58	100.61	100.83	101.72	100.20	101.12	101.09
An	46.9	48.9	49.2	47.4	50.8	53.2	55.5	58.3
Ab	51.6	49.9	49.7	51.6	47.5	45.7	43.7	40.9
Or	1.5	1.2	1.1	1.0	1.6	1.2	0.8	0.8

Sample	99CB-5	99CB-5	99CB-5	99CB-5	99CB-5	99CB-5	99CB-5	99CB-5
Rock Type	Gabbro	Gabbro	Gabbro	Gabbro	Gabbro	Gabbro	Gabbro	Gabbro
Line Number	5	6	7	8	9	10	11	12
SiO_2	54.60	53.98	58.35	54.20	54.55	54.02	54.73	53.74
Al_2O_3	29.82	29.21	25.23	29.25	29.02	28.85	28.71	29.48
CaO	10.90	10.86	6.69	11.45	11.23	10.98	10.69	11.53
Na_2O	5.31	5.48	6.65	5.72	5.47	5.20	5.51	5.07
K_2O	0.11	0.15	0.86	0.22	0.14	0.20	0.27	0.20
FeO	0.44	0.35	1.35	0.50	0.24	0.22	0.38	0.14
Total	101.18	100.02	99.12	101.34	100.65	99.47	100.30	100.17
An	52.8	51.8	33.9	51.9	52.7	53.2	50.9	55.0
Ab	46.6	47.3	60.9	46.9	46.5	45.6	47.5	43.8
Or	0.6	0.9	5.2	1.2	0.8	1.1	1.6	1.1

Sample	99CB-5	99CB-5	99CB-5	99CB-5	99CB-5	99CB-5	99CB-5	99CB-5
Rock Type	Gabbro	Gabbro	Gabbro	Gabbro	Gabbro	Gabbro	Gabbro	Gabbro
Line Number	13	14	15	16	17	18	19	20
SiO_2	52.39	55.49	54.89	53.98	53.59	54.06	54.35	54.64
Al_2O_3	31.07	28.90	29.74	29.78	29.93	29.49	30.31	27.96
CaO	12.42	10.31	10.78	11.57	11.17	11.10	11.35	10.52
Na_2O	4.45	5.89	5.24	5.31	5.24	5.11	5.09	5.71
K_2O	0.19	0.27	0.12	0.24	0.21	0.28	0.25	0.17
FeO	0.42	0.43	0.47	0.47	0.30	0.29	0.41	0.31
Total	100.93	101.30	101.25	101.35	100.45	100.31	101.75	99.32
An	60.0	48.4	52.8	53.9	53.4	53.7	54.4	50.0
Ab	38.9	50.0	46.5	44.8	45.4	44.7	44.2	49.1
Or	1.1	1.5	0.7	1.3	1.2	1.6	1.4	1.0

Sample	99CB-5	99CB-5	99CB-5	99CB-5	99CB-5	99CB-5	99CB-5	99CB-5
Rock Type	Gabbro	Gabbro	Gabbro	Gabbro	Gabbro	Gabbro	Gabbro	Gabbro
Line Number	1	2	3	4	5	6	7	8
SiO_2	55.13	55.36	54.98	52.62	52.95	53.04	54.30	53.47
Al_2O_3	28.16	28.32	28.37	30.38	31.11	30.68	29.77	30.20
CaO	9.82	10.15	10.29	12.24	12.25	12.09	11.65	11.61
Na_2O	6.54	5.66	5.64	4.47	4.81	5.03	5.32	4.66
K_2O	0.19	0.34	0.12	0.17	0.21	0.15	0.22	0.23
FeO	0.36	0.23	0.19	0.41	0.35	0.45	0.56	0.27
Total	100.19	100.04	99.60	100.30	101.67	101.45	101.82	100.45
An	44.9	48.8	49.9	59.6	57.8	56.5	54.1	57.1
Ab	54.1	49.3	49.4	39.4	41.0	42.6	44.7	41.5
Or	1.0	1.9	0.7	1.0	1.2	0.9	1.2	1.3

Sample	99CB-5	99CB-5	99CB-5	99CB-5	99CB-5	99CB-5	99CB-5	99CB-5
Rock Type	Gabbro	Gabbro	Gabbro	Gabbro	Gabbro	Gabbro	Gabbro	Gabbro
Line Number	9	10	11	12	13	14	15	16
SiO_2	54.81	54.14	52.37	53.17	49.72	48.15	49.72	50.29
Al_2O_3	28.96	30.32	31.42	29.50	32.38	32.26	32.14	33.23
CaO	10.97	11.32	12.66	11.92	14.06	15.78	15.02	14.34
Na_2O	5.16	5.37	4.51	4.91	3.54	2.88	3.28	3.68
K_2O	0.18	0.29	0.20	0.23	0.23	0.04	0.08	0.14
FeO	0.36	0.34	0.38	0.21	0.34	0.40	0.22	0.30
Total	100.44	101.77	101.54	99.93	100.27	99.51	100.47	101.98
An	53.5	53.0	60.1	56.6	67.8	75.0	71.3	67.8
Ab	45.5	45.4	38.8	42.2	30.9	24.8	28.2	31.5
Or	1.0	1.6	1.1	1.3	1.3	0.2	0.5	0.8

Sample	99CB-5	99CB-5	99CB-5	MH-8B	MH-8B	MH-8B	MH-8B	MH-8B
Rock Type	Gabbro	Gabbro	Gabbro	Grd	Grd	Grd	Grd	Grd
Line Number	17	18	19	1	2	3	4	5
SiO_2	47.06	48.07	52.62	58.96	55.35	55.90	55.98	55.51
Al_2O_3	35.04	32.42	30.66	26.58	27.93	28.89	27.99	28.27
CaO	16.80	16.09	12.16	7.47	9.36	9.91	9.70	9.82
Na_2O	2.07	2.66	4.52	7.45	5.99	5.82	6.41	5.98
K_2O	0.05	0.07	0.11	0.53	0.47	0.42	0.44	0.37
FeO	0.39	0.40	0.42	0.27	0.16	0.44	0.26	0.23
Total	101.41	99.71	100.49	101.25	99.27	101.39	100.78	100.18
An	81.5	76.7	59.4	34.6	45.1	47.3	44.4	46.6
Ab	18.2	22.9	40.0	62.5	52.2	50.3	53.2	51.3
Or	0.3	0.4	0.7	2.9	2.7	2.4	2.4	2.1

Sample	MH-8B	MH-8B	MH-8B	MH-8B	MH-8B	MH-8B	MH-8B	MH-8B
Rock Type	Grd	Grd	Grd	Grd	Grd	Grd	Grd	Grd
Line Number	6	7	8	9	10	11	12	13
SiO_2	55.48	56.20	51.47	59.13	51.14	53.42	52.88	55.49
Al_2O_3	27.46	28.33	28.25	25.63	31.05	30.15	30.50	28.13
CaO	9.77	9.59	12.89	6.75	12.89	11.62	11.90	10.21
Na_2O	6.24	6.27	4.62	7.89	4.57	4.90	5.26	5.93
K_2O	0.37	0.31	0.26	0.25	0.24	0.31	0.31	0.45
FeO	0.25	0.42	0.90	0.00	0.37	0.44	0.20	0.20
Total	99.58	101.11	98.38	99.65	100.26	100.84	101.05	100.42
An	45.5	45.0	59.8	31.6	60.1	55.7	54.6	47.5
Ab	52.5	53.2	38.8	67.0	38.6	42.5	43.7	50.0
Or	2.1	1.7	1.4	1.4	1.3	1.8	1.7	2.5

Sample	MH-8B	MH-8B	MH-8B	MH-8B	MH-8B	MH-8B	MH-8B	MH-8B
Rock Type	Grd	Grd	Grd	Grd	Grd	Grd	Grd	Grd
Line Number	14	15	16	17	18	19	1	2
SiO_2	55.43	55.75	60.83	61.31	61.57	61.05	59.07	55.99
Al_2O_3	27.87	27.31	24.60	23.47	24.41	24.08	26.06	27.92
CaO	9.79	9.40	5.31	4.79	5.38	5.35	7.39	9.57
Na_2O	6.09	6.67	8.87	8.61	8.57	8.09	7.31	5.83
K_2O	0.36	0.36	0.57	0.76	0.89	0.82	0.73	0.32
FeO	0.28	0.27	0.14	0.24	0.27	0.22	0.21	0.28
Total	99.82	99.77	100.32	99.17	101.09	99.59	100.77	99.90
An	46.1	42.9	24.1	22.5	24.5	25.5	34.4	46.7
Ab	51.9	55.1	72.8	73.3	70.7	69.8	61.6	51.5
Or	2.0	2.0	3.1	4.2	4.8	4.6	4.0	1.8

Sample	MH-8B	MH-8B	MH-8B	MH-8B	MH-8B	MH-8B	MH-8B	MH-8B
Rock Type	Grd	Grd	Grd	Grd	Grd	Grd	Grd	Grd
Line Number	3	4	5	6	7	8	9	10
SiO_2	55.90	56.76	55.59	55.57	60.88	54.72	55.79	54.08
Al_2O_3	27.28	27.66	27.35	27.85	23.38	29.23	28.74	27.98
CaO	9.19	8.51	9.49	9.39	4.69	10.34	10.06	10.23
Na_2O	6.55	7.09	6.13	6.09	9.75	6.47	6.10	5.94
K_2O	0.47	0.40	0.48	0.33	0.22	0.51	0.42	0.40
FeO	0.14	0.22	0.19	0.27	0.07	0.21	0.27	0.41
Total	99.53	100.64	99.24	99.49	98.98	101.48	101.39	99.04
An	42.6	39.0	44.9	45.2	20.7	45.6	46.6	47.7
Ab	54.9	58.8	52.4	52.9	78.1	51.7	51.1	50.1
Or	2.6	2.2	2.7	1.9	1.2	2.7	2.3	2.2

Sample	MH-8B	MH-8B	MH-8B	MH-8B	MH-8B	MH-8B	MH-8B	MH-8B
Rock Type	Grd	Grd	Grd	Grd	Grd	Grd	Grd	Grd
Line Number	11	12	13	14	15	16	17	18
SiO_2	53.04	54.29	54.95	55.71	55.18	55.64	54.74	56.05
Al_2O_3	30.72	28.14	28.69	27.09	28.02	27.89	27.54	27.07
CaO	12.14	10.72	10.09	9.43	9.75	9.49	9.61	9.23
Na_2O	4.94	5.24	6.02	6.29	6.05	6.17	6.04	6.34
K_2O	0.27	0.30	0.48	0.44	0.33	0.40	0.39	0.44
FeO	0.67	0.33	0.30	0.20	0.27	0.38	0.24	0.18
Total	101.79	99.02	100.54	99.17	99.61	99.96	98.57	99.32
An	56.7	52.2	46.8	44.2	46.2	44.9	45.8	43.5
Ab	41.8	46.1	50.5	53.3	51.9	52.8	52.0	54.0
Or	1.5	1.7	2.7	2.5	1.9	2.2	2.2	2.5

Sample	MH-8B	MH-8B	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G
Rock Type	Grd	Grd	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	19	20	1	2	3	4	5	6
SiO_2	59.41	62.39	51.76	59.34	60.28	54.36	59.94	59.69
Al_2O_3	25.63	23.31	29.76	25.59	25.51	29.37	25.61	25.68
CaO	6.79	4.70	12.39	6.71	6.55	10.63	6.41	6.46
Na_2O	7.69	8.78	4.49	7.43	7.51	5.50	7.60	7.54
K_2O	0.59	0.91	0.29	0.77	0.73	0.29	0.78	1.00
FeO	0.24	0.34	0.56	0.32	0.32	0.24	0.65	0.40
Total	100.35	100.41	99.26	100.15	100.89	100.39	100.99	100.77
An	31.7	21.7	59.4	31.9	31.2	50.8	30.4	30.4
Ab	65.0	73.3	38.9	63.8	64.7	47.5	65.2	64.1
Or	3.3	5.0	1.7	4.3	4.1	1.7	4.4	5.6

Sample	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	7	8	9	10	11	12	13	14
SiO_2	54.23	55.44	59.19	58.01	58.20	59.93	59.57	58.79
Al_2O_3	29.33	28.21	25.31	26.36	26.50	26.60	25.39	25.47
CaO	10.70	9.55	6.89	7.51	8.26	6.38	6.70	6.87
Na_2O	5.41	5.82	7.62	7.01	6.78	7.57	7.47	7.28
K_2O	0.25	0.37	0.65	0.62	0.62	0.57	0.75	0.61
FeO	0.34	0.44	0.27	0.48	0.62	0.42	0.23	0.25
Total	100.26	99.83	99.94	99.99	100.97	101.47	100.12	99.27
An	51.5	46.5	32.1	35.9	38.8	30.7	31.7	33.1
Ab	47.1	51.3	64.3	60.6	57.7	66.0	64.0	63.5
Or	1.4	2.1	3.6	3.5	3.5	3.3	4.3	3.5

Sample	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	15	16	17	18	1	2	3	4
SiO_2	59.20	59.58	54.52	54.54	58.61	55.23	55.22	55.14
Al_2O_3	25.75	25.31	29.82	29.31	27.09	29.24	28.50	29.66
CaO	6.76	6.71	10.74	10.49	6.93	9.82	10.13	10.43
Na_2O	7.15	7.57	5.29	5.46	7.18	5.74	5.56	5.65
K_2O	0.80	0.67	0.51	0.35	0.49	0.43	0.49	0.33
FeO	0.59	0.60	0.65	0.32	0.28	0.42	0.49	0.46
Total	100.25	100.44	101.52	100.47	100.58	100.88	100.38	101.68
An	32.7	31.6	51.3	50.4	33.8	47.4	48.8	49.6
Ab	62.7	64.6	45.8	47.5	63.4	50.1	48.4	48.5
Or	4.6	3.8	2.9	2.0	2.8	2.5	2.8	1.9

Sample	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	5	6	7	8	9	10	11	12
SiO_2	53.59	54.79	54.36	54.44	54.68	54.40	54.73	54.49
Al_2O_3	29.08	29.40	29.30	28.44	28.95	29.48	29.81	29.34
CaO	9.72	10.22	9.87	10.44	10.45	10.31	10.42	10.11
Na_2O	5.27	5.55	5.60	5.43	5.46	5.44	5.43	5.68
K_2O	0.29	0.42	0.34	0.50	0.39	0.43	0.39	0.39
FeO	0.46	0.40	0.22	0.31	0.33	0.54	0.35	0.40
Total	98.41	100.77	99.68	99.55	100.26	100.60	101.12	100.40
An	49.6	49.2	48.4	50.1	50.3	49.9	50.3	48.5
Ab	48.7	48.4	49.6	47.1	47.5	47.6	47.4	49.3
Or	1.7	2.4	2.0	2.8	2.2	2.5	2.2	2.2

Sample	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	13	14	1	2	3	4	5	6
SiO_2	56.67	58.55	58.60	57.12	54.56	59.30	60.10	59.88
Al_2O_3	27.23	26.17	25.98	27.89	29.87	25.60	25.52	24.80
CaO	8.80	7.73	7.09	8.9[illegible]	10.82	6.97	6.55	6.25
Na_2O	6.38	6.80	7.06	6.10	5.36	6.9[illegible]	7.58	7.58
K_2O	0.44	0.64	0.73	0.62	0.35	0.77	0.83	0.98
FeO	0.56	0.40	0.33	0.18	0.37	0.35	0.42	0.37
Total	100.07	100.28	99.78	100.89	101.34	99.91	100.99	99.86
An	42.2	37.2	34.2	43.3	51.7	34.2	30.8	29.6
Ab	55.3	59.2	61.6	53.2	46.3	61.3	64.5	64.9
Or	2.5	3.7	4.2	3.5	2.0	4.5	4.6	5.5

Sample	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	7	8	9	10	11	12	1	2
SiO_2	53.87	55.18	55.14	55.31	54.20	54.76	53.82	53.55
Al_2O_3	29.70	28.59	28.08	28.49	29.21	28.52	28.69	28.71
CaO	11.18	9.86	10.04	10.02	10.84	10.22	10.73	10.93
Na_2O	5.12	5.83	5.80	5.75	5.28	5.68	5.44	5.31
K_2O	0.33	0.47	0.44	0.48	0.33	0.42	0.41	0.30
FeO	0.39	0.29	0.20	0.38	0.36	0.56	0.54	0.42
Total	100.59	100.23	99.69	100.43	100.22	100.16	99.63	99.21
An	53.7	47.0	47.7	47.7	52.1	48.7	50.9	52.3
Ab	44.5	50.3	49.8	49.6	46.0	48.9	46.7	46.0
Or	1.9	2.7	2.5	2.7	1.9	2.4	2.3	1.7

Sample	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	3	4	5	6	7	8	9	10
SiO_2	54.35	53.98	54.24	54.36	54.48	54.10	55.03	57.59
Al_2O_3	29.35	29.55	28.37	28.77	28.68	28.59	28.85	26.47
CaO	10.56	10.54	10.54	10.37	10.26	10.48	10.20	7.98
Na_2O	5.29	5.45	5.37	5.47	5.15	5.38	5.71	6.84
K_2O	0.33	0.39	0.46	0.38	0.43	0.50	0.42	0.65
FeO	0.42	0.53	0.47	0.64	0.32	0.32	0.39	0.23
Total	100.30	100.44	99.44	99.99	99.32	99.37	100.61	99.75
An	51.4	50.5	50.7	50.1	51.0	50.4	48.5	37.8
Ab	46.7	47.3	46.7	47.8	46.4	46.8	49.1	58.6
Or	1.9	2.2	2.6	2.2	2.6	2.8	2.4	3.6

Sample	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	11	12	13	14	1	2	3	4
SiO_2	57.99	58.16	59.64	59.09	59.86	59.61	55.25	55.12
Al_2O_3	26.68	25.95	25.18	25.03	24.79	25.36	28.77	28.34
CaO	7.39	7.52	6.31	6.39	6.82	6.30	9.86	9.51
Na_2O	6.88	7.11	7.68	7.40	7.46	7.17	5.82	5.79
K_2O	0.58	0.69	1.01	0.93	0.70	0.93	0.44	0.78
FeO	0.47	0.32	0.33	0.33	0.30	0.23	0.32	0.68
Total	99.99	99.75	100.15	99.17	99.93	99.61	100.46	100.22
An	36.0	35.4	29.5	30.6	32.3	30.9	47.2	45.5
Ab	60.6	60.7	64.9	64.1	63.8	63.7	50.3	50.1
Or	3.4	3.9	5.6	5.3	3.9	5.4	2.5	4.4

Sample	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	5	6	7	8	9	10	11	12
SiO_2	56.02	56.90	57.91	59.66	60.39	56.40	59.44	59.80
Al_2O_3	27.11	27.17	27.21	25.43	24.29	28.36	25.33	24.98
CaO	8.93	8.36	8.14	6.72	5.65	9.39	6.59	6.39
Na_2O	6.00	6.45	6.85	7.44	7.83	5.99	7.59	7.46
K_2O	0.47	0.59	0.62	0.62	1.08	0.39	0.71	1.03
FeO	0.29	0.21	0.43	0.42	0.36	0.25	0.41	0.21
Total	98.82	99.69	101.16	100.30	99.61	100.79	100.07	99.87
An	43.9	40.3	38.2	32.1	26.8	45.4	31.1	30.3
Ab	53.4	56.3	58.3	64.4	67.1	52.4	64.9	63.9
Or	2.7	3.4	3.5	3.5	6.1	2.2	4.0	5.8

Sample	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	13	14	1	2	3	4	5	6
SiO_2	59.02	60.39	54.43	60.13	59.45	55.62	57.10	58.02
Al_2O_3	25.44	25.19	28.22	23.94	25.86	27.80	26.97	26.00
CaO	6.87	6.41	10.74	6.32	6.65	9.73	8.41	7.72
Na_2O	7.34	7.45	5.42	7.35	7.32	5.82	6.62	6.84
K_2O	0.72	0.80	0.26	0.89	0.69	0.34	0.52	0.83
FeO	0.40	0.41	0.62	0.36	0.49	0.46	0.49	0.43
Total	99.79	100.65	99.70	98.99	100.46	99.76	100.11	99.85
An	32.7	30.7	51.5	30.6	32.1	47.1	40.0	36.6
Ab	63.2	64.7	47.0	64.3	63.9	51.0	57.0	58.7
Or	4.1	4.6	1.5	5.1	4.0	2.0	2.9	4.7

Sample	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	7	8	9	10	11	12	13	14
SiO_2	57.03	58.30	54.66	60.04	59.39	56.73	60.12	59.81
Al_2O_3	27.30	27.02	29.13	23.68	25.01	26.87	24.81	25.51
CaO	8.88	7.87	10.73	6.10	6.59	8.67	6.32	6.36
Na_2O	6.48	6.79	5.20	7.78	7.26	6.49	7.64	7.57
K_2O	0.58	0.72	0.25	0.43	0.70	0.56	0.79	0.70
FeO	0.24	0.38	0.32	0.30	0.48	0.41	0.40	0.35
Total	100.52	101.08	100.29	98.33	99.43	99.73	100.07	100.31
An	41.7	37.5	52.5	29.5	32.1	41.1	30.0	30.4
Ab	55.1	58.5	46.0	68.1	63.9	55.7	65.6	65.6
Or	3.2	4.1	1.5	2.5	4.1	3.2	4.5	4.0

Sample	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	15	16	17	18	19	20	21	22
SiO_2	60.05	59.53	59.64	58.92	55.46	54.56	58.17	61.21
Al_2O_3	24.86	25.86	24.95	25.31	28.42	28.43	26.67	24.26
CaO	6.47	6.64	6.35	7.15	9.94	10.38	7.77	5.69
Na_2O	7.98	7.46	7.33	6.96	5.90	5.34	6.89	7.76
K_2O	0.40	0.74	0.74	0.68	0.43	0.30	0.66	1.03
FeO	0.17	0.22	0.57	0.32	0.33	0.47	0.36	0.36
Total	99.93	100.46	99.57	99.34	100.48	99.48	100.52	100.31
An	30.3	31.6	31.0	34.8	47.0	50.9	36.9	27.2
Ab	67.5	64.2	64.7	61.3	50.5	47.4	59.3	67.0
Or	2.2	4.2	4.3	3.9	2.4	1.7	3.7	5.8

Sample	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	23	1	2	3	4	5	6	7
SiO_2	61.54	52.16	54.05	55.27	58.63	54.47	57.99	99.32
Al_2O_3	24.69	29.85	29.60	27.42	24.57	29.52	26.20	0.35
CaO	5.22	11.72	10.93	9.93	7.05	10.58	7.64	0.05
Na_2O	7.43	4.66	5.29	5.92	7.10	5.42	6.91	0.16
K_2O	1.42	0.24	0.35	0.41	0.75	0.41	0.65	0.01
FeO	0.33	0.45	0.41	0.47	0.52	0.47	0.38	0.08
Total	100.62	99.09	100.63	99.42	98.61	100.88	99.78	99.98
An	25.6	57.3	52.3	47.0	33.9	50.6	36.5	14.6
Ab	66.1	41.3	45.7	50.7	61.8	47.0	59.8	82.9
Or	8.3	1.4	2.0	2.3	4.3	2.4	3.7	2.5

Sample	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	8	9	10	11	12	13	14	15
SiO_2	54.15	53.53	53.76	54.36	54.63	59.60	57.56	59.86
Al_2O_3	28.86	28.97	28.57	28.48	29.29	24.78	27.55	25.26
CaO	10.60	10.70	10.68	9.70	10.46	6.47	8.73	6.79
Na_2O	5.21	5.32	5.30	5.43	5.26	7.40	6.63	7.34
K_2O	0.30	0.33	0.38	0.40	0.27	0.78	0.58	0.62
FeO	0.19	0.30	0.31	0.80	0.24	0.30	0.36	0.40
Total	99.31	99.15	99.00	99.17	100.16	99.34	101.41	100.27
An	52.0	51.7	51.5	48.5	51.5	31.1	40.8	32.6
Ab	46.2	46.5	46.3	49.1	46.9	64.4	56.0	63.8
Or	1.7	1.9	2.2	2.4	1.6	4.5	3.2	3.5

Sample	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	16	17	18	19	20	21	22	23
SiO_2	54.81	59.69	59.96	58.41	60.25	54.96	59.36	55.30
Al_2O_3	28.81	25.17	25.35	25.41	24.34	28.82	24.98	27.69
CaO	10.00	6.46	6.19	6.70	6.44	10.39	6.89	9.68
Na_2O	5.74	7.41	7.61	7.07	7.73	5.58	7.37	5.61
K_2O	0.48	0.64	0.64	0.56	0.73	0.32	0.78	0.42
FeO	0.24	0.45	0.23	0.45	0.59	0.36	0.41	0.27
Total	100.08	99.82	99.98	98.60	100.08	100.43	99.80	98.97
An	47.7	31.3	29.9	33.2	30.2	49.8	32.6	47.6
Ab	49.6	65.0	66.4	63.5	65.7	48.4	63.0	49.9
Or	2.7	3.7	3.7	3.3	4.1	1.8	4.4	2.5

Sample	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	24	25	26	27	1	2	3	4
SiO_2	59.81	53.31	54.35	53.93	57.20	60.21	58.84	57.90
Al_2O_3	25.71	30.41	29.10	29.59	27.37	24.53	25.15	25.31
CaO	6.42	11.32	10.19	11.03	8.46	6.33	6.72	6.87
Na_2O	7.45	4.93	5.37	4.99	6.64	7.68	7.24	6.99
K_2O	0.89	0.29	0.27	0.29	0.49	0.68	0.62	1.09
FeO	0.28	0.25	0.33	0.46	0.40	0.31	0.37	0.25
Total	100.56	100.51	99.61	100.29	100.55	99.75	98.94	98.41
An	30.6	55.0	50.4	54.0	40.2	30.1	32.7	33.0
Ab	64.3	43.3	48.1	44.3	57.1	66.1	63.7	60.7
Or	5.0	1.7	1.6	1.7	2.8	3.8	3.6	6.2

Sample	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	5	6	7	8	9	10	11	1
SiO_2	59.95	61.02	60.40	53.92	54.28	58.45	59.88	54.23
Al_2O_3	24.28	24.21	25.14	28.04	28.94	25.62	24.69	27.05
CaO	6.30	5.59	6.58	9.75	10.65	7.44	5.91	10.34
Na_2O	7.66	8.18	7.78	5.81	5.39	7.00	7.83	5.61
K_2O	0.72	0.36	0.66	0.38	0.35	0.70	0.81	0.54
FeO	0.32	0.19	0.49	0.70	0.38	0.56	0.63	0.48
Total	99.23	99.56	101.05	98.60	100.00	99.77	99.75	98.25
An	30.0	26.9	30.7	47.1	51.1	35.6	28.1	48.9
Ab	65.9	71.1	65.7	50.7	46.9	60.5	67.3	48.1
Or	4.1	2.0	3.7	2.2	2.0	4.0	4.6	3.0

Sample	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	2	3	4	5	6	7	8	9
SiO_2	53.93	53.79	53.18	53.85	52.86	54.83	53.80	54.60
Al_2O_3	27.86	28.39	28.32	27.81	28.05	27.22	28.85	28.20
CaO	10.76	10.69	10.96	10.27	11.16	10.20	10.99	10.65
Na_2O	5.43	5.40	5.19	5.58	5.04	5.86	5.29	5.43
K_2O	0.38	0.35	0.35	0.35	0.42	0.32	0.32	0.45
FeO	0.32	0.39	0.47	0.33	0.58	0.27	0.26	0.22
Total	98.68	99.02	98.47	98.19	98.11	98.70	99.52	99.54
An	51.1	51.2	52.8	49.4	53.7	48.1	52.5	50.7
Ab	46.7	46.8	45.2	48.6	43.9	50.1	45.7	46.8
Or	2.2	2.0	2.0	2.0	2.4	1.8	1.8	2.6

Sample	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	10	11	12	13	14	15	16	17
SiO_2	52.45	51.48	51.01	51.33	50.84	51.00	50.48	53.21
Al_2O_3	29.33	30.32	29.97	29.29	29.73	31.11	30.70	28.74
CaO	12.24	12.95	12.87	13.08	13.42	13.20	13.32	11.32
Na_2O	4.61	4.20	4.22	4.19	3.91	3.97	3.84	5.14
K_2O	0.26	0.30	0.18	0.18	0.25	0.17	0.23	0.38
FeO	0.32	0.51	0.45	0.28	0.62	0.37	0.40	0.30
Total	99.21	99.75	98.70	98.35	98.76	99.82	98.96	99.10
An	58.6	62.0	62.1	62.7	64.6	64.1	64.9	53.7
Ab	39.9	36.4	36.9	36.3	34.0	34.9	33.8	44.1
Or	1.5	1.7	1.0	1.0	1.4	1.0	1.3	2.2

Sample	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G	MH-8G
Rock Type	And encl	And encl	And encl	And encl	And encl	And encl	And encl	And encl
Line Number	18	19	20	21	1	2	3	4
SiO_2	52.53	51.79	53.87	54.04	59.53	54.79	54.29	54.40
Al_2O_3	29.14	29.20	28.12	27.66	25.73	28.37	28.98	29.22
CaO	11.73	12.45	10.82	10.58	6.70	9.71	10.46	10.66
Na_2O	5.00	4.51	5.41	5.59	7.27	5.62	5.23	5.20
K_2O	0.27	0.30	0.30	0.23	0.79	0.51	0.35	0.37
FeO	0.41	0.44	0.46	0.37	0.40	0.34	0.40	0.41
Total	99.08	98.68	98.98	98.47	100.43	99.34	99.72	100.26
An	55.6	59.4	51.6	50.5	32.2	47.4	51.4	52.0
Ab	42.9	38.9	46.7	48.3	63.2	49.6	46.5	45.9
Or	1.5	1.7	1.7	1.3	4.5	3.0	2.1	2.2

Sample	MH-8G	MH-8G	MH-8G	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9
Rock Type	And encl	And encl	And encl	And lava	And lava	And lava	And lava	And lava
Line Number	5	6	7	1	2	3	4	5
SiO_2	53.79	54.17	51.67	54.50	54.65	54.54	53.63	55.35
Al_2O_3	29.03	28.61	31.59	28.70	29.06	29.73	29.18	28.93
CaO	10.22	10.43	12.42	11.17	10.95	11.37	11.52	10.69
Na_2O	5.26	5.43	4.08	5.19	4.86	4.95	4.80	5.15
K_2O	0.44	0.39	0.21	0.36	0.41	0.34	0.33	0.42
FeO	0.30	0.31	0.38	1.07	0.65	0.55	0.17	0.57
Total	99.03	99.34	100.36	101.00	100.59	101.47	99.63	101.13
An	50.5	50.3	61.9	53.2	54.1	54.8	55.9	52.1
Ab	47.0	47.4	36.8	44.8	43.4	43.2	42.2	45.4
Or	2.6	2.2	1.3	2.0	2.4	2.0	1.9	2.5

Sample	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	6	7	1	2	3	4	5	6
SiO_2	55.42	55.56	54.38	54.27	54.51	54.85	55.05	54.92
Al_2O_3	29.27	28.78	29.31	29.16	29.33	29.22	28.57	29.03
CaO	10.63	10.62	11.64	11.14	11.18	10.70	10.53	10.92
Na_2O	5.25	5.29	4.67	4.84	5.16	4.88	5.04	4.97
K_2O	0.32	0.46	0.46	0.34	0.49	0.30	0.36	0.52
FeO	0.30	0.27	0.40	0.77	0.00	0.52	0.30	0.27
Total	101.19	100.98	100.85	100.52	100.67	100.49	99.85	100.63
An	51.8	51.2	56.4	54.9	53.0	53.8	52.5	53.2
Ab	46.3	46.1	41.0	43.1	44.3	44.4	45.4	43.8
Or	1.9	2.7	2.6	2.0	2.7	1.8	2.1	3.0

Sample	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	7	1	2	3	4	1	2	3
SiO_2	56.45	55.76	55.12	55.24	55.44	53.90	55.64	55.25
Al_2O_3	27.71	28.85	26.88	28.80	28.22	29.17	27.92	27.90
CaO	9.43	10.79	10.49	10.85	10.27	10.83	10.00	10.09
Na_2O	5.90	5.32	4.67	5.45	5.28	5.15	5.57	5.52
K_2O	0.35	0.44	0.33	0.39	0.41	0.40	0.39	0.46
FeO	0.72	0.55	0.60	0.55	0.57	0.37	0.22	0.52
Total	100.56	101.71	98.10	101.27	100.19	99.83	99.75	99.74
An	46.0	51.5	54.2	51.3	50.6	52.5	48.7	48.9
Ab	52.0	46.0	43.7	46.6	47.0	45.2	49.1	48.4
Or	2.0	2.5	2.0	2.2	2.4	2.3	2.2	2.6

Sample	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	1	2	3	4	1	2	3	4
SiO_2	52.01	54.30	52.10	54.38	55.27	54.69	55.58	57.60
Al_2O_3	31.50	27.59	30.70	29.20	28.58	29.33	28.82	27.41
CaO	13.28	10.93	12.90	11.09	10.50	11.38	10.33	8.81
Na_2O	3.90	5.71	4.09	4.94	5.17	5.03	5.48	6.30
K_2O	0.22	0.16	0.22	0.45	0.49	0.36	0.30	0.32
FeO	0.62	1.20	0.62	0.45	0.05	0.47	0.20	0.40
Total	101.52	99.88	100.64	100.50	100.06	101.26	100.71	100.84
An	64.5	51.0	62.7	53.9	51.3	54.4	50.1	42.8
Ab	34.2	48.2	36.0	43.5	45.8	43.5	48.1	55.4
Or	1.2	0.9	1.3	2.6	2.9	2.0	1.7	1.9

Sample	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	5	6	7	8	1	2	3	4
SiO_2	54.88	57.08	58.84	55.67	53.03	54.66	64.76	53.51
Al_2O_3	28.72	27.72	26.66	28.65	30.53	28.99	22.57	29.65
CaO	10.92	9.21	8.21	10.55	12.89	11.64	3.12	11.79
Na_2O	5.04	6.29	7.43	5.28	4.04	4.26	9.76	4.82
K_2O	0.31	0.32	0.25	0.49	0.27	0.25	0.12	0.29
FeO	0.40	0.45	0.32	0.62	0.52	0.27	0.15	0.50
Total	100.27	101.06	101.72	101.27	101.28	100.08	100.48	100.56
An	53.5	43.9	37.4	51.0	62.8	59.2	14.9	56.5
Ab	44.7	54.3	61.3	46.2	35.6	39.2	84.4	41.8
Or	1.8	1.8	1.3	2.8	1.6	1.5	0.7	1.7

Sample	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	5	6	7	8	9	10	1	1
SiO_2	57.16	54.13	56.27	61.17	55.82	59.58	53.30	55.67
Al_2O_3	28.24	29.81	28.02	25.31	28.46	25.93	30.67	28.91
CaO	9.93	11.71	10.01	8.70	10.42	7.19	12.59	10.59
Na_2O	5.96	4.72	5.73	4.74	5.56	7.28	4.65	5.14
K_2O	0.28	0.27	0.40	0.26	0.40	0.19	0.32	0.54
FeO	0.45	0.65	0.27	0.62	0.30	0.42	0.40	0.70
Total	102.03	101.29	100.69	100.81	100.96	100.60	101.91	101.54
An	47.2	56.9	48.0	49.5	49.7	34.9	58.9	51.6
Ab	51.2	41.5	49.7	48.8	48.0	64.0	39.3	45.3
Or	1.6	1.6	2.3	1.7	2.3	1.1	1.8	3.1

Sample	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	2	3	4	5	6	7	8	1
SiO_2	57.67	52.57	55.14	54.52	54.79	52.07	55.01	58.77
Al_2O_3	27.71	30.87	29.15	29.29	29.39	31.08	29.09	24.90
CaO	9.02	12.99	10.98	11.30	10.97	13.29	10.65	6.11
Na_2O	6.46	4.17	5.06	4.98	5.31	3.91	5.47	7.78
K_2O	0.44	0.31	0.38	0.32	0.39	0.27	0.48	0.24
FeO	0.37	0.70	0.55	0.67	0.55	0.47	0.50	2.34
Total	101.68	101.61	101.26	101.08	101.39	101.09	101.20	100.14
An	42.5	62.2	53.4	54.6	52.1	64.3	50.4	29.8
Ab	55.1	36.1	44.5	43.6	45.7	34.2	46.9	68.7
Or	2.5	1.8	2.2	1.8	2.2	1.6	2.7	1.4

Sample	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	2	3	4	5	6	7	8	1
SiO_2	58.63	54.05	55.45	54.95	56.26	55.67	55.46	57.54
Al_2O_3	26.15	23.64	28.04	29.06	28.28	28.45	28.73	27.40
CaO	7.26	11.63	9.92	10.90	9.95	10.64	10.57	9.05
Na_2O	7.55	5.62	5.44	5.13	5.79	5.55	5.24	6.25
K_2O	0.26	0.02	0.37	0.34	0.42	0.49	0.44	0.36
FeO	0.17	4.19	0.70	0.55	0.32	0.12	0.57	0.40
Total	100.03	99.15	99.91	100.92	101.02	100.92	101.01	101.01
An	34.2	53.3	49.1	53.0	47.6	50.0	51.4	43.6
Ab	64.3	46.6	48.7	45.1	50.0	47.2	46.1	54.4
Or	1.5	0.1	2.2	2.0	2.4	2.7	2.5	2.1

Sample	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	2	3	4	5	6	1	2	3
SiO_2	55.18	55.94	57.67	57.79	54.69	54.29	55.68	54.70
Al_2O_3	28.75	29.04	25.75	27.42	28.16	29.84	28.95	29.25
CaO	10.23	10.26	7.25	8.81	9.61	11.66	10.77	11.03
Na_2O	5.78	5.50	7.09	6.60	5.47	4.86	5.14	5.12
K_2O	0.45	0.25	0.25	0.28	0.33	0.36	0.41	0.42
FeO	0.67	0.50	1.07	0.42	1.54	0.70	0.30	0.87
Total	101.07	101.48	99.08	101.32	99.80	101.71	101.25	101.40
An	48.2	50.0	35.6	41.8	48.3	55.8	52.4	53.0
Ab	49.3	48.5	62.9	56.7	49.7	42.1	45.2	44.5
Or	2.5	1.5	1.5	1.6	2.0	2.1	2.4	2.4

Sample	99UN-9	99UN-9	99UN-9	99UN-9	MH-8B	MH-8B	MH-8B	MH-8B
Rock Type	And lava	And lava	And lava	And lava	Grd	Grd	Grd	Grd
Line Number	4	5	6	7	1	2	3	4
SiO_2	55.84	55.73	59.77	53.71	59.07	60.75	59.48	60.45
Al_2O_3	28.26	28.94	24.92	29.17	26.67	25.27	25.93	25.80
CaO	10.25	10.54	6.02	11.70	7.79	6.50	7.34	6.91
Na_2O	5.62	5.39	8.14	4.54	7.01	7.45	7.04	7.47
K_2O	0.48	0.57	0.19	0.38	0.43	0.56	0.75	0.52
FeO	0.65	0.50	0.97	0.70	0.07	0.25	0.52	0.20
Total	101.09	101.66	100.02	100.19	101.05	100.79	101.06	101.36
An	48.9	50.3	28.7	57.5	37.1	31.5	35.0	32.8
Ab	48.4	46.5	70.2	40.3	60.4	65.3	60.7	64.2
Or	2.7	3.2	1.1	2.2	2.5	3.2	4.3	2.9

Sample	MH-8B	MH-8B	MH-8B	MH-8B	MH-8B	MH-8B	MH-8B	MH-8B
Rock Type	Grd	Grd	Grd	Grd	Grd	Grd	Grd	Grd
Line Number	5	1	2	1	2	1	2	3
SiO_2	61.06	59.92	59.06	60.43	59.81	59.48	61.19	63.43
Al_2O_3	24.87	25.56	25.99	25.49	25.82	26.23	25.17	22.32
CaO	6.32	6.97	7.36	7.01	7.01	7.69	6.62	5.31
Na_2O	7.96	7.30	7.43	7.21	7.46	6.94	7.59	6.66
K_2O	0.49	0.60	0.30	0.59	0.62	0.49	0.61	0.63
FeO	0.00	0.45	0.35	0.50	0.22	0.55	0.55	1.50
Total	100.70	100.80	100.50	101.22	100.94	101.38	101.74	99.84
An	29.7	33.4	34.8	33.8	33.0	36.9	31.4	29.3
Ab	67.6	63.2	63.6	62.8	63.6	60.3	65.2	66.5
Or	2.7	3.4	1.7	3.4	3.5	2.8	3.4	4.1

Sample	MH-8B	MH-8B	MH-8B	MH-8B	MH-8B	MH-8B	MH-8B	MH-8B
Rock Type	Grd	Grd	Grd	Grd	Grd	Grd	Grd	Grd
Line Number	4	1	2	1	2	3	1	2
SiO_2	57.73	59.88	60.45	61.66	60.85	59.87	59.57	59.75
Al_2O_3	25.31	26.08	25.54	24.79	25.55	26.03	26.69	25.46
CaO	5.93	7.02	6.62	5.83	6.35	7.11	7.68	7.02
Na_2O	6.71	7.22	7.61	7.96	7.27	7.39	6.99	7.79
K_2O	1.18	0.55	0.57	0.55	0.49	0.48	0.52	0.53
FeO	1.35	0.62	0.05	0.47	0.25	0.42	0.20	0.42
Total	98.22	101.37	100.84	101.25	100.74	101.30	101.64	100.98
An	30.4	33.8	31.4	27.9	31.6	33.8	36.7	32.3
Ab	62.3	63.0	65.4	69.0	65.5	63.5	60.4	64.8
Or	7.2	3.2	3.2	3.1	2.9	2.7	2.9	2.9

Sample	MH-8B	MH-8B	MH-8B	MH-8B	MH-8B	MH-8B	MH-8B	MH-8B
Rock Type	Grd	Grd	Grd	Grd	Grd	Grd	Grd	Grd
Line Number	3	1	2	1	2	3	1	2
SiO_2	60.55	59.99	59.85	59.02	59.21	59.47	59.33	59.90
Al_2O_3	25.48	26.05	26.05	26.42	25.91	25.91	26.00	26.26
CaO	6.14	6.53	7.12	7.54	7.17	6.95	6.87	7.46
Na_2O	5.37	7.58	7.04	7.11	7.22	7.09	7.09	6.91
K_2O	0.62	0.55	0.67	0.48	0.43	0.54	0.44	0.44
FeO	0.37	0.47	0.30	0.00	0.07	0.00	0.82	0.80
Total	98.53	101.18	101.04	100.57	100.01	99.96	100.54	101.77
An	37.0	31.2	34.5	36.0	34.6	34.0	34.0	36.4
Ab	58.5	65.6	61.7	61.3	63.0	62.8	63.4	61.0
Or	4.5	3.1	3.9	2.7	2.5	3.1	2.6	2.6

Sample	MH-8B	MH-8B	MH-8B	MH-8B	MH-8B	MH-8B	MH-8B	MH-8B
Rock Type	Grd	Grd	Grd	Grd	Grd	Grd	Grd	Grd
Line Number	1	2	3	1	1	2	3	5
SiO_2	60.53	60.32	60.48	60.23	60.81	58.21	57.57	58.71
Al_2O_3	25.34	25.18	25.34	26.01	25.40	27.27	27.06	26.61
CaO	6.32	6.47	6.43	7.06	6.13	8.58	8.79	7.71
Na_2O	7.71	7.69	7.38	7.38	7.49	6.46	6.41	6.97
K_2O	0.56	0.47	0.59	0.60	0.55	0.36	0.32	0.38
FeO	0.45	0.60	0.20	0.30	0.57	0.07	0.42	0.47
Total	100.90	100.73	100.42	101.57	100.96	100.94	100.57	100.85
An	30.2	30.9	31.4	33.4	30.1	41.5	42.3	37.1
Ab	66.6	66.4	65.2	63.2	66.6	56.5	55.9	60.7
Or	3.2	2.7	3.5	3.4	3.2	2.1	1.8	2.2
Sample	MH-8B	MH-8B	MH-8B	MH-8B	MH-8B	MH-8B	MH-8B	MH-8B
Rock Type	Grd	Grd	Grd	Grd	Grd	Grd	Grd	Grd
Line Number	6	1	2	1	2	3	1	1
SiO_2	58.19	60.11	60.58	59.39	60.15	59.61	59.59	62.21
Al_2O_3	26.84	25.56	25.95	26.05	25.97	26.16	25.47	24.48
CaO	8.26	7.22	7.51	7.54	7.05	7.20	7.10	6.82
Na_2O	6.84	7.32	7.01	6.91	7.33	7.07	7.32	6.33
K_2O	0.33	0.56	0.49	0.56	0.45	0.57	0.60	0.71
FeO	0.32	0.87	0.30	0.07	0.20	0.55	0.57	0.38
Total	100.79	101.65	101.84	100.53	101.15	101.16	100.65	100.91
An	39.3	34.1	36.1	36.4	33.8	34.8	33.7	35.7
Ab	58.8	62.7	61.0	60.4	63.6	61.9	62.9	59.9
Or	1.9	3.2	2.8	3.2	2.6	3.3	3.4	4.4
Sample	MH-8B	MH-8B	MH-8B	MH-8B	MH-8B	99UN-9	99UN-9	99UN-9
Rock Type	Grd	Grd	Grd	Grd	Grd	And lava	And lava	And lava
Line Number	1	1	2	3	4	1	2	3
SiO_2	61.25	59.79	58.85	60.61	61.61	54.52	63.54	54.15
Al_2O_3	24.83	25.99	26.60	25.65	25.33	29.32	24.24	28.97
CaO	6.10	6.99	8.14	7.14	6.24	0.33	0.09	0.38
Na_2O	7.94	7.25	6.79	7.47	7.62	11.20	4.80	10.64
K_2O	0.53	0.53	0.43	0.48	0.72	5.10	9.09	5.05
FeO	0.55	0.43	0.55	0.30	0.28	0.51	0.02	0.49
Total	101.19	100.97	101.35	101.66	101.81	100.97	101.77	99.69
An	28.9	33.7	38.9	33.6	29.9	53.8	22.5	52.6
Ab	68.1	63.3	58.7	63.7	66.0	44.3	77.0	45.2
Or	3.0	3.0	2.4	2.7	4.1	1.9	0.5	2.2
Sample	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	4	1	2	1	2	3	4	5
SiO_2	54.14	54.31	54.50	53.03	52.73	51.36	53.92	51.47
Al_2O_3	28.93	29.57	28.97	30.62	29.55	31.13	28.82	31.57
CaO	0.43	0.32	0.28	0.30	0.30	0.23	0.29	0.14
Na_2O	10.87	11.31	11.06	12.58	11.89	13.34	11.24	13.44
K_2O	5.22	5.05	5.05	4.57	4.84	4.03	5.25	3.63
FeO	0.57	0.48	0.47	0.64	0.61	0.69	0.57	0.52
Total	100.15	101.04	100.33	101.75	99.92	100.79	100.09	100.77
An	52.2	54.3	53.9	59.3	56.6	63.8	53.3	66.6
Ab	45.4	43.8	44.5	39.0	41.7	34.9	45.1	32.6
Or	2.5	1.8	1.6	1.7	1.7	1.3	1.7	0.8

Sample	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	6	7	8	1	2	3	4	5
SiO_2	55.33	52.59	53.60	54.19	51.54	55.13	55.20	54.92
Al_2O_3	28.55	30.61	29.39	29.34	31.70	28.60	28.45	28.73
CaO	0.30	0.19	0.32	0.34	0.20	0.33	0.35	0.36
Na_2O	9.99	13.03	11.27	11.11	13.12	10.67	10.30	10.68
K_2O	5.58	4.36	4.93	5.08	4.03	5.41	5.44	5.49
FeO	0.43	0.58	0.62	0.66	0.47	0.57	0.44	0.51
Total	100.19	101.36	100.14	100.72	101.05	100.71	100.17	100.69
An	48.9	61.6	54.8	53.7	63.5	51.2	50.1	50.7
Ab	49.4	37.3	43.4	44.4	35.3	46.9	47.9	47.2
Or	1.8	1.1	1.9	1.9	1.1	1.9	2.0	2.1

Sample	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	6	7	8	1	2	3	4	5
SiO_2	55.17	53.06	53.75	54.16	53.47	54.04	52.12	51.76
Al_2O_3	28.50	28.35	29.49	28.87	29.81	29.11	30.59	31.34
CaO	0.29	0.20	0.26	0.41	0.32	0.25	0.29	0.26
Na_2O	10.23	10.71	11.39	11.33	12.08	10.78	12.60	13.25
K_2O	5.56	5.73	4.86	5.14	4.17	5.09	4.28	3.92
FeO	0.56	0.59	0.38	0.75	0.61	0.31	0.51	0.62
Total	100.32	98.65	100.14	100.66	100.46	99.59	100.40	101.15
An	49.6	50.2	55.6	53.7	60.4	53.1	60.9	64.2
Ab	48.8	48.6	42.9	44.1	37.7	45.4	37.4	34.3
Or	1.7	1.1	1.5	2.3	1.9	1.5	1.7	1.5

Sample	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	6	7	8	1	2	3	4	5
SiO_2	51.97	57.96	54.09	54.68	53.17	53.02	52.41	50.03
Al_2O_3	30.56	26.80	29.04	29.49	29.07	29.56	30.45	30.42
CaO	0.29	0.19	0.40	0.41	0.38	0.33	0.19	0.26
Na_2O	13.04	8.31	11.27	11.22	11.36	11.96	12.75	13.09
K_2O	4.17	7.06	5.12	5.17	5.00	4.73	4.18	3.92
FeO	0.67	0.29	0.46	0.57	0.87	0.57	0.64	1.08
Total	100.70	100.61	100.37	101.54	99.85	100.16	100.62	98.79
An	62.3	39.0	53.7	53.3	54.4	57.2	62.1	63.9
Ab	36.1	59.9	44.1	44.4	43.4	40.9	36.8	34.6
Or	1.7	1.1	2.3	2.3	2.2	1.9	1.1	1.5

Sample	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	6	1	2	3	4	5	6	1
SiO_2	53.65	53.71	53.96	52.32	51.08	53.09	55.19	52.05
Al_2O_3	29.48	29.57	29.20	30.44	31.05	29.65	28.68	29.53
CaO	0.36	0.37	0.38	0.22	0.26	0.32	0.25	0.34
Na_2O	11.89	11.34	11.37	12.40	13.15	11.42	10.78	12.13
K_2O	4.77	4.96	4.95	4.38	3.98	4.89	5.73	4.70
FeO	0.66	0.42	0.38	0.52	0.52	0.48	0.75	0.43
Total	100.81	100.37	100.23	100.27	100.04	99.85	101.38	99.17
An	56.7	54.7	54.7	60.2	63.6	55.3	50.2	57.7
Ab	41.2	43.2	43.1	38.5	34.9	42.9	48.4	40.4
Or	2.0	2.1	2.1	1.3	1.5	1.8	1.4	1.9

Sample	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	2	3	4	1	2	3	4	5
SiO_2	52.54	52.99	53.80	53.84	54.31	54.95	64.32	54.58
Al_2O_3	30.32	29.80	29.47	29.55	29.34	28.77	22.85	28.83
CaO	0.26	0.26	0.47	0.36	0.27	0.33	0.07	0.30
Na_2O	12.42	11.91	11.54	11.16	11.59	10.85	3.26	11.23
K_2O	4.36	4.74	5.13	5.00	5.07	5.43	9.74	5.36
FeO	0.64	0.45	0.67	0.41	0.52	0.79	0.17	0.53
Total	100.55	100.16	101.07	100.32	101.08	101.12	100.41	100.83
An	60.2	57.2	54.0	54.1	55.0	51.5	15.6	52.8
Ab	38.2	41.3	43.4	43.9	43.5	46.6	84.1	45.6
Or	1.5	1.5	2.6	2.0	1.5	1.9	0.4	1.7

Sample	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	6	7	8	1	3	4	5	6
SiO_2	53.84	54.86	55.28	54.53	55.31	54.52	55.17	51.02
Al_2O_3	29.56	29.10	27.77	28.78	28.69	28.86	28.63	31.45
CaO	0.28	0.43	0.53	0.38	0.40	0.34	0.43	0.24
Na_2O	11.41	10.63	10.09	10.84	10.54	10.88	10.08	13.57
K_2O	5.03	5.49	5.50	5.37	5.76	5.26	5.48	3.83
FeO	0.47	0.49	0.60	0.58	0.40	0.61	0.44	0.48
Total	100.59	100.99	99.76	100.48	101.10	100.46	100.24	100.59
An	54.7	50.4	48.8	51.6	49.2	52.3	49.2	65.3
Ab	43.6	47.1	48.1	46.3	48.6	45.7	48.3	33.4
Or	1.6	2.4	3.1	2.1	2.2	2.0	2.5	1.4

Sample	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	7	8	9	10	1	2	3	4
SiO_2	55.12	55.58	55.18	56.49	50.81	53.81	54.50	54.42
Al_2O_3	28.29	28.16	28.41	27.18	30.91	28.35	28.80	29.10
CaO	0.30	0.41	0.37	0.42	0.30	0.42	0.35	0.44
Na_2O	10.69	10.17	10.18	8.91	13.66	11.01	11.11	11.30
K_2O	5.50	5.51	5.71	6.07	3.85	5.06	4.78	5.19
FeO	0.46	0.43	0.46	0.52	0.92	0.37	0.51	0.37
Total	100.37	100.26	100.30	99.59	100.44	99.02	100.04	100.82
An	50.9	49.3	48.6	43.7	65.1	53.3	55.1	53.2
Ab	47.4	48.3	49.3	53.9	33.2	44.3	42.9	44.3
Or	1.7	2.4	2.1	2.5	1.7	2.4	2.0	2.4

Sample	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	5	6	7	8	9	1	2	3
SiO_2	54.77	55.24	54.52	57.39	52.95	53.08	53.44	55.47
Al_2O_3	29.25	28.90	29.08	27.60	28.53	29.52	29.09	27.74
CaO	0.33	0.40	0.43	0.28	0.38	0.40	0.37	0.49
Na_2O	11.23	10.53	10.79	9.05	10.57	11.72	11.93	10.10
K_2O	5.11	5.37	5.57	6.24	5.22	4.66	5.03	5.62
FeO	0.40	0.71	0.67	0.50	0.96	0.52	0.52	0.61
Total	101.09	101.15	101.07	101.05	98.60	99.90	100.38	100.03
An	53.8	50.8	50.5	43.8	51.7	56.8	55.6	48.4
Ab	44.3	46.9	47.1	54.6	46.2	40.9	42.4	48.8
Or	1.9	2.3	2.4	1.6	2.2	2.3	2.0	2.8

Sample	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	4	5	6	1	2	3	4	1
SiO_2	54.69	56.45	55.69	53.54	52.91	57.09	54.38	52.63
Al_2O_3	28.65	27.81	28.56	29.60	28.54	26.64	29.06	29.01
CaO	0.48	0.58	0.46	0.38	0.34	0.38	0.44	0.29
Na_2O	10.62	9.51	10.34	11.51	12.34	8.07	11.15	11.91
K_2O	5.31	6.12	5.65	4.96	4.69	7.13	5.19	4.82
FeO	0.53	0.56	0.42	0.70	1.10	0.62	0.53	0.86
Total	100.29	101.04	101.12	100.69	99.93	99.94	100.74	99.52
An	51.1	44.7	49.0	55.0	58.1	37.7	52.9	56.8
Ab	46.2	52.0	48.4	42.9	40.0	60.2	44.6	41.6
Or	2.7	3.3	2.6	2.1	1.9	2.1	2.5	1.6

Sample	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	2	3	1	2	3	4	5	6
SiO_2	55.43	64.63	54.35	54.77	54.88	55.55	54.92	54.63
Al_2O_3	27.82	23.12	28.97	28.44	28.64	28.46	28.76	28.59
CaO	0.38	0.06	0.40	0.41	0.35	0.34	0.31	0.42
Na_2O	9.88	3.33	10.86	10.54	10.27	10.27	10.83	10.88
K_2O	5.98	10.22	5.37	5.48	5.41	5.82	5.24	5.39
FeO	0.44	0.09	0.53	0.34	0.57	0.43	0.61	0.62
Total	99.93	101.46	100.48	99.99	100.12	100.89	100.67	100.54
An	46.7	15.2	51.6	50.3	50.2	48.4	52.4	51.5
Ab	51.1	84.4	46.1	47.3	47.8	49.7	45.9	46.2
Or	2.1	0.3	2.2	2.3	2.0	1.9	1.8	2.4

Sample	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	7	8	1	2	3	4	5	6
SiO_2	54.96	55.09	54.51	54.77	54.60	54.96	54.40	54.53
Al_2O_3	28.59	28.60	28.75	28.63	29.09	28.65	28.56	28.79
CaO	0.32	0.35	0.49	0.36	0.34	0.37	0.30	0.35
Na_2O	10.95	10.04	10.63	10.68	10.87	10.70	10.66	10.54
K_2O	5.51	5.41	5.21	5.58	5.45	5.34	5.38	5.43
FeO	0.50	0.73	0.54	0.60	0.38	0.50	0.36	0.47
Total	100.84	100.23	100.13	100.62	100.72	100.52	99.67	100.11
An	51.4	49.6	51.5	50.4	51.4	51.4	51.4	50.7
Ab	46.8	48.4	45.7	47.6	46.6	46.4	46.9	47.3
Or	1.8	2.1	2.8	2.0	1.9	2.1	1.7	2.0

Sample	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	7	8	9	10	1	2	3	4
SiO_2	54.67	56.19	56.43	54.42	53.83	55.14	53.54	58.66
Al_2O_3	28.37	28.15	27.60	28.76	29.49	28.63	29.19	25.83
CaO	0.31	0.42	0.45	0.34	0.31	0.43	0.35	0.24
Na_2O	10.22	9.98	9.47	11.16	11.60	10.47	11.56	6.91
K_2O	5.36	5.83	6.06	5.15	4.80	5.37	4.77	7.43
FeO	0.53	0.46	0.38	0.66	0.60	0.72	0.36	0.40
Total	99.46	101.03	100.38	100.49	100.62	100.75	99.76	99.45
An	50.4	47.4	45.2	53.4	56.2	50.6	56.1	33.5
Ab	47.8	50.2	52.3	44.6	42.0	46.9	41.9	65.1
Or	1.8	2.4	2.5	1.9	1.8	2.5	2.0	1.4

Sample	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	5	1	2	3	4	5	1	2
SiO_2	59.34	52.21	57.33	53.62	52.83	54.31	54.85	53.59
Al_2O_3	24.72	30.65	27.08	29.70	29.94	28.55	28.90	29.12
CaO	0.28	0.32	0.30	0.32	0.31	0.40	0.43	0.35
Na_2O	5.99	12.79	8.14	11.42	11.95	10.89	10.87	11.29
K_2O	7.97	4.32	7.02	5.08	4.76	5.16	5.29	5.05
FeO	0.15	0.72	0.23	0.50	0.65	0.50	0.54	0.57
Total	98.45	101.01	100.11	100.64	100.44	99.81	100.89	99.97
An	28.9	60.9	38.4	54.4	57.1	52.6	51.9	54.1
Ab	69.5	37.2	59.9	43.8	41.1	45.1	45.7	43.9
Or	1.6	1.8	1.7	1.8	1.8	2.3	2.5	2.0

Sample	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	3	1	2	3	4	5	6	7
SiO_2	53.36	53.70	53.62	53.81	54.18	54.36	54.37	54.48
Al_2O_3	28.98	29.11	29.59	29.18	29.18	29.05	28.99	29.29
CaO	0.35	0.32	0.29	0.27	0.25	0.32	0.34	0.43
Na_2O	11.22	11.39	11.21	11.13	11.34	11.09	10.93	10.93
K_2O	5.15	4.93	5.04	5.13	5.09	5.05	5.08	5.33
FeO	0.46	0.60	0.57	0.53	0.54	0.50	0.57	0.66
Total	99.52	100.04	100.33	100.05	100.58	100.38	100.28	101.12
An	53.5	55.1	54.2	53.7	54.4	53.8	53.2	51.8
Ab	44.5	43.1	44.1	44.8	44.2	44.3	44.8	45.7
Or	2.0	1.8	1.7	1.5	1.4	1.9	2.0	2.4

Sample	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	1	2	3	4	5	6	7	8
SiO_2	56.33	54.07	54.92	51.93	51.20	51.39	52.87	51.64
Al_2O_3	27.59	28.82	28.24	30.40	30.99	31.09	30.36	30.06
CaO	0.25	0.23	0.22	0.18	0.11	0.07	0.13	0.11
Na_2O	9.17	11.51	10.40	12.91	13.60	13.46	12.58	12.97
K_2O	6.22	5.36	5.43	4.20	3.72	4.03	4.65	4.36
FeO	0.60	0.73	0.93	0.91	0.98	0.61	0.77	0.87
Total	100.16	100.71	100.15	100.53	100.60	100.65	101.36	100.01
An	44.2	53.6	50.7	62.3	66.5	64.6	59.5	61.8
Ab	54.3	45.1	48.0	36.7	32.9	35.0	39.8	37.6
Or	1.4	1.3	1.3	1.0	0.7	0.4	0.7	0.6

Sample	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	1	1	2	3	4	1	2	3
SiO_2	55.11	53.95	50.89	50.38	49.09	49.67	48.71	50.91
Al_2O_3	29.03	28.44	31.40	31.41	32.09	31.83	32.13	30.41
CaO	0.15	0.23	0.13	0.09	0.08	0.08	0.07	0.15
Na_2O	11.29	11.13	13.99	14.07	15.33	14.59	15.04	13.33
K_2O	5.27	5.45	3.59	3.72	3.03	3.40	2.93	3.96
FeO	0.84	0.64	0.98	0.97	0.72	0.93	0.68	0.93
Total	101.70	99.83	100.98	100.63	100.35	100.51	99.56	99.69
An	53.7	52.3	67.8	67.3	73.3	70.0	73.6	64.5
Ab	45.4	46.4	31.5	32.2	26.2	29.5	25.9	34.7
Or	0.9	1.3	0.8	0.5	0.5	0.5	0.4	0.9

Sample	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	4	1	2	3	4	5	6	7
SiO_2	57.02	54.84	54.65	53.71	54.86	52.64	53.00	53.13
Al_2O_3	26.98	26.53	28.19	29.28	28.50	29.77	29.21	29.38
CaO	0.34	0.15	0.27	0.28	0.24	0.17	0.21	0.20
Na_2O	9.23	9.86	11.11	11.55	11.37	12.48	11.91	12.20
K_2O	6.27	5.63	5.16	4.74	5.34	4.80	5.02	4.60
FeO	0.43	1.54	0.59	0.69	0.88	0.82	1.02	0.65
Total	100.28	98.54	99.98	100.25	101.19	100.68	100.38	100.17
An	44.0	48.7	53.5	56.4	53.3	58.4	56.0	58.8
Ab	54.1	50.3	44.9	41.9	45.3	40.7	42.8	40.1
Or	2.0	0.9	1.6	1.6	1.4	0.9	1.2	1.1

Sample	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	8	1	2	3	4	5	6	7
SiO_2	52.98	57.26	53.03	54.66	54.65	52.20	54.01	53.88
Al_2O_3	29.95	27.11	29.73	28.59	28.60	30.12	29.06	29.21
CaO	0.23	0.34	0.18	0.30	0.35	0.19	0.29	0.27
Na_2O	12.57	8.92	12.25	10.90	10.89	12.89	11.69	11.55
K_2O	4.35	6.41	4.35	5.23	5.32	4.31	4.90	4.95
FeO	0.71	0.64	0.76	0.97	0.65	0.82	0.73	0.73
Total	100.79	100.67	100.32	100.65	100.46	100.54	100.68	100.59
An	60.7	42.6	60.2	52.6	52.0	61.6	55.9	55.5
Ab	38.0	55.5	38.7	45.7	46.0	37.3	42.4	43.0
Or	1.3	1.9	1.1	1.7	2.0	1.1	1.6	1.5

Sample	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	8	9	1	2	4	5	6	1
SiO_2	54.48	55.02	52.03	52.72	53.75	52.51	53.31	53.96
Al_2O_3	28.73	29.11	29.85	29.99	28.91	29.78	29.65	29.02
CaO	0.24	0.22	0.20	0.15	0.18	0.18	0.21	0.24
Na_2O	10.83	10.70	12.75	12.67	11.53	12.44	12.00	11.97
K_2O	5.45	5.43	4.24	4.50	5.07	4.49	4.88	5.02
FeO	0.84	0.76	0.98	0.81	0.87	0.84	0.64	0.90
Total	100.56	101.23	100.03	100.83	100.31	100.24	100.69	101.11
An	51.6	51.5	61.7	60.4	55.1	59.9	56.9	56.1
Ab	47.0	47.3	37.1	38.8	43.8	39.1	41.9	42.6
Or	1.3	1.3	1.1	0.8	1.0	1.0	1.2	1.3

Sample	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9	99UN-9
Rock Type	And lava	And lava	And lava	And lava	And lava	And lava
Line Number	2	3	4	5	6	7
SiO_2	54.44	54.70	56.19	60.74	52.84	52.46
Al_2O_3	28.90	28.59	28.03	25.02	30.13	29.96
CaO	0.22	0.31	0.31	0.14	0.20	0.21
Na_2O	11.02	10.73	9.72	5.64	12.66	12.40
K_2O	5.21	5.53	6.05	8.50	4.42	4.50
FeO	0.77	0.68	0.56	0.15	0.80	0.97
Total	100.56	100.54	100.85	100.18	101.11	100.50
An	53.2	50.8	46.2	26.6	60.6	59.6
Ab	45.5	47.4	52.0	72.6	38.3	39.2
Or	1.3	1.8	1.8	0.8	1.2	1.2

APPENDIX D1

Pyroxene analyses: Mt. Dutton volcano, Alaska

Pyroxene analyses were obtained using a Cameca SX-50 electron microprobe at the University of Alaska Fairbanks, under the following analytical conditions: an accelerating voltage of 15 KeV, beam current of 10 nA, and a focused beam with a spot size of 1-3 μm. Major oxides reported in weight percent (wt.%) with all Fe reported as FeO. "Line number" refers to the analysis number during a particular analytical transect. "Rock type" refers to the host rock, which contained the pyroxene that was analyzed. Abbreviations as follows: **DB** - Dome-building; **En** – enstatite content (mol.%); **Fs** ferrosilite content (mol.%); **Wo** wollastonite content (mol.%). Standards, counting times, and analytical errors are summarized in the table below:

Element	Counting Times (seconds)		Standard	Typical Analytical Error (wt.%, 1σ)
	Peak	Bkgd.		
Si	10	5	Diopside (CM Taylor)	.122
Ti	10	5	Sphene (CM Taylor)	.044
Al	10	5	Garnet (USNM 85276)	.047
Fe	10	5	Fayalite (USNM 85276)	.162
Mn	10	5	Fayalite (USNM 85276)	.020
Mg	10	5	Diopside (CM Taylor)	.179
Ca	10	5	Diopside (CM Taylor)	.027
Na	10	5	Tiburon albite (TALBITE)	.057

Sample	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1
Rock Type	DB dacite	DB dacite	DB dacite	DB dacite	DB dacite	DB dacite	DB dacite	DB dacite
Line Number	1	2	3	4	1	2	3	1
SiO_2	52.44	52.29	52.46	52.39	52.36	52.52	52.52	52.18
TiO_2	0.09	0.13	0.04	0.10	0.14	0.21	0.17	0.12
Al_2O_3	0.47	0.47	0.42	0.42	0.97	0.84	0.84	0.51
FeO	22.59	23.25	23.35	22.95	8.69	7.98	8.80	21.95
MnO	0.99	1.10	1.20	1.06	0.51	0.54	0.56	1.05
MgO	21.22	20.76	20.76	21.03	13.69	14.09	14.00	21.24
CaO	1.04	1.00	0.94	0.95	21.59	21.95	21.37	1.10
Na_2O	0.01	0.00	0.00	0.00	0.32	0.27	0.27	0.05
Total	98.85	98.99	99.16	98.91	98.24	98.39	98.51	98.20
En	61.2	60.2	60.1	60.8	40.1	41.0	40.8	61.8
Fs	36.6	37.8	37.9	37.2	14.3	13.0	14.4	35.8
Wo	2.2	2.1	2.0	2.0	45.5	45.9	44.8	2.3

Sample	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1
Rock Type	DB dacite	DB dacite	DB dacite	DB dacite	DB dacite	DB dacite	DB dacite	DB dacite
Line Number	2	3	1	2	1	2	3	4
SiO_2	52.66	51.97	52.39	52.56	52.65	53.28	52.70	52.57
TiO_2	0.14	0.14	0.14	0.17	0.22	0.26	0.05	0.15
Al_2O_3	0.54	0.49	0.93	0.86	1.58	1.47	0.31	0.44
FeO	23.29	22.46	8.64	8.76	17.33	17.80	23.33	23.56
MnO	0.88	1.22	0.32	0.55	0.65	0.51	1.19	1.26
MgO	21.01	20.86	13.99	14.11	24.15	24.58	20.86	20.77
CaO	1.00	0.98	21.37	21.25	1.53	1.42	1.05	0.89
Na_2O	0.04	0.04	0.32	0.29	0.04	0.00	0.00	0.00
Total	99.56	98.12	98.09	98.53	98.14	99.31	99.49	99.56
En	60.4	61.1	40.9	41.1	69.0	69.1	60.1	60.0
Fs	37.6	36.9	14.2	14.3	27.8	28.1	37.7	38.2
Wo	2.1	2.0	44.9	44.5	3.1	2.9	2.2	1.9

Sample	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1
Rock Type	DB dacite	DB dacite	DB dacite	DB dacite	DB dacite	DB dacite	DB dacite	DB dacite
Line Number	1	2	3	1	2	3	1	2
SiO_2	51.90	51.79	51.68	51.72	52.59	52.68	52.48	52.33
TiO_2	0.13	0.17	0.10	0.11	0.06	0.11	0.13	0.14
Al_2O_3	0.47	0.42	0.67	0.49	0.47	0.41	0.61	0.47
FeO	24.48	23.86	23.61	23.94	23.86	23.60	22.05	22.01
MnO	1.29	1.29	1.20	1.07	1.20	1.29	0.97	1.1[illegible]
MgO	19.70	20.07	20.30	19.92	20.56	20.73	21.39	21.44
CaO	0.93	0.89	0.61	0.87	0.96	0.96	1.11	1.06
Na_2O	0.02	0.00	0.02	0.07	0.00	0.00	0.06	0.00
Total	98.91	98.51	98.26	98.18	99.70	99.78	98.80	98.55
En	57.8	58.9	59.7	58.6	59.3	59.8	61.9	62.0
Fs	40.3	39.3	39.0	39.6	38.7	38.2	35.8	35.8
Wo	2.0	1.9	1.3	1.8	2.0	2.0	2.3	2.2

Sample	DC-3D-1	DC-3D-1	DC-21	DC-21	DC-21	DC-21	DC-4A	DC-4A
Rock Type	DB dacite	DB dacite	enclave	enclave	enclave	enclave	enclave	enclave
Line Number	3	4	1	2	3	1	1	1
SiO_2	52.44	52.20	53.46	53.87	53.22	51.96	53.28	52.30
TiO_2	0.10	0.12	0.13	0.09	0.23	0.26	0.23	0.57
Al_2O_3	0.57	0.50	0.18	0.18	0.79	2.03	1.08	2.96
FeO	23.39	21.97	7.65	8.40	8.14	7.21	6.83	6.65
MnO	1.02	1.12	0.40	0.44	0.35	0.49	0.31	0.24
MgO	20.77	21.23	15.33	14.84	14.82	14.15	16.21	15.43
CaO	1.02	1.03	21.54	21.97	21.49	21.66	21.06	21.35
Na_2O	0.01	0.05	0.23	0.22	0.30	0.36	0.19	0.28
Total	99.33	98.23	98.92	100.02	99.33	98.12	99.20	99.78
En	60.0	61.9	43.6	42.0	42.5	41.9	46.0	44.7
Fs	37.9	35.9	12.2	13.3	13.1	12.0	10.9	10.8
Wo	2.1	2.2	44.1	44.7	44.4	46.1	43.0	44.5

Sample	DC-4A	DC-6	DC-6	DC-6	DC-6	DC-6	DC-6	DC-6
Rock Type	enclave	DB dacite	DB dacite	DB dacite	DB dacite	DB dacite	DB dacite	DB dacite
Line Number	2	1	2	3	4	5	6	7
SiO_2	52.31	52.96	53.91	53.16	52.59	52.25	52.47	52.70
TiO_2	0.46	0.21	0.23	0.18	0.06	0.11	0.08	0.11
Al_2O_3	2.78	1.19	1.16	1.89	0.43	0.45	0.43	0.39
FeO	3.70	18.17	19.38	16.05	23.60	22.25	23.79	24.04
MnO	0.31	1.35	0.73	0.43	1.07	1.23	1.08	1.31
MgO	16.21	23.78	24.03	25.40	20.69	21.04	20.48	20.43
CaO	22.75	1.21	1.26	1.42	0.98	0.96	0.96	0.96
Na_2O	0.20	0.02	0.02	0.04	0.03	0.07	0.05	0.00
Total	98.72	98.85	100.71	98.55	99.44	98.36	99.34	99.94
En	46.8	68.2	67.1	71.7	59.8	61.5	59.3	59.0
Fs	6.0	29.3	30.4	25.4	38.2	36.5	38.7	39.0
Wo	47.2	2.5	2.8	2.9	2.0	2.0	2.0	2.0

Sample	DC-6	DC-6	DC-6	DC-6	DC-6	DC-6	DC-6	DC-6
Rock Type	DB dacite	DB dacite	DB dacite	DB dacite	DB dacite	DB dacite	DB dacite	DB dacite
Line Number	8	9	1	2	3	4	5	6
SiO_2	52.49	52.28	53.18	51.98	54.12	53.41	53.89	52.63
TiO_2	0.12	0.08	0.10	0.16	0.15	0.16	0.16	0.09
Al_2O_3	0.53	0.48	0.52	0.51	0.52	0.58	0.48	0.80
FeO	23.74	23.30	23.06	23.45	17.40	17.20	17.86	22.80
MnO	1.15	0.97	1.04	1.04	1.00	0.86	0.81	1.09
MgO	20.62	20.62	20.91	20.46	25.08	24.73	24.58	21.33
CaO	0.94	1.00	0.96	0.97	1.18	1.28	1.22	1.08
Na_2O	0.00	0.08	0.04	0.02	0.05	0.05	0.11	0.01
Total	99.60	98.78	100.70	98.58	99.50	98.24	99.11	99.22
En	59.6	59.9	59.7	59.6	70.3	70.1	69.3	61.4
Fs	38.5	38.0	38.4	38.3	27.4	27.3	28.2	36.4
Wo	2.0	2.1	1.9	2.0	2.4	2.6	2.5	2.2

Sample	DC-6
Rock Type	DB dacite
Line Number	7
SiO_2	52.39
TiO_2	0.08
Al_2O_3	0.20
FeO	22.00
MnO	0.98
MgO	21.44
CaO	1.09
Na_2O	0.00
Total	98.53
En	61.9
Fs	35.8
Wo	2.3

APPENDIX D2

Pyroxene analyses: Volcán Ceboruco, Mexico

Pyroxene analyses were obtained using a Cameca SX-50 electron microprobe at the University of Alaska Fairbanks or a Cameca Camebax electron microprobe at Brown University, under the following analytical conditions: an accelerating voltage of 15 KeV, beam current of 10 nA, and a focused beam with a spot size of 1-3 μm. Major oxides reported in weight percent (wt.%) with all Fe reported as FeO. "Line number" refers to the analysis number during a particular analytical transect. "Rock type" refers to the host rock, which contained the pyroxene that was analyzed. Abbreviations as follows: **Rd** rhyodacite; **DE** Dos Equis; **En** enstatite content (mol.%); **Fs** ferrosilite content (mol.%); **Wo** wollastonite content (mol.%). Standards, counting times, and analytical errors are summarized in the table below:

Element	Counting Times (seconds)		Standard	Typical Analytical Error (wt.%, 1σ)
	Peak	Bkgd.		
Si	10	5	Diopside (CM Taylor)	.129
Ti	10	5	Sphene (CM Taylor)	.028
Al	10	5	Garnet (USNM 85276)	.029
Fe	10	5	Fayalite (USNM 85276)	.173
Mn	10	5	Fayalite (USNM 85276)	.023
Mg	10	5	Diopside (CM Taylor)	.096
Ca	10	5	Diopside (CM Taylor)	.038
Na	10	5	Tiburon albite (TALBITE)	.018

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite
Line Number	1	2	3	4	5	6	7	8
SiO_2	52.24	52.81	52.77	52.52	52.90	52.98	52.46	53.49
TiO_2	0.24	0.31	0.55	0.36	0.57	0.36	0.36	0.19
Al_2O_3	1.08	1.33	1.45	1.48	1.56	1.47	1.33	1.32
Cr_2O_3	0.00	0.03	0.12	0.01	0.05	0.01	0.00	0.05
FeO	21.05	18.99	17.08	17.15	17.41	16.59	17.68	17.40
MnO	1.34	0.84	0.92	0.80	0.93	0.71	0.91	0.82
MgO	21.87	23.82	24.34	24.76	24.61	24.78	24.42	24.67
CaO	1.14	1.29	1.16	1.20	1.27	1.32	1.17	1.18
Na_2O	0.07	0.01	0.06	0.05	0.04	0.03	0.08	0.02
Oxide Totals	99.03	99.44	98.45	98.32	99.29	98.26	98.40	99.14
En	63.4	67.3	70.0	70.2	69.7	70.7	69.4	69.9
Fs	34.2	30.1	27.6	27.3	27.7	26.6	28.2	27.7
Wo	2.4	2.6	2.4	2.4	2.6	2.7	2.4	2.4

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite
Line Number	9	1	2	3	4	5	6	7
SiO_2	52.43	52.78	53.04	52.92	53.30	53.32	52.44	52.99
TiO_2	0.40	0.19	0.21	0.14	0.33	0.14	0.33	0.36
Al_2O_3	0.90	0.93	1.34	1.35	1.45	1.52	1.64	1.34
Cr_2O_3	0.09	0.06	0.00	0.00	0.04	0.06	0.03	0.00
FeO	20.91	20.67	17.38	17.31	17.52	17.82	17.26	17.12
MnO	1.23	1.21	0.89	0.65	0.87	0.87	0.71	0.75
MgO	22.15	21.84	24.93	25.05	24.98	24.68	24.76	24.60
CaO	1.23	1.27	1.13	1.22	1.26	1.11	1.12	1.58
Na_2O	0.08	0.04	0.04	0.04	0.05	0.08	0.05	0.07
Oxide Totals	99.42	98.99	98.98	98.68	99.81	99.60	98.34	98.79
En	63.7	63.6	70.2	70.3	69.9	69.6	70.2	[illegible]
Fs	33.7	33.8	27.5	27.3	27.5	28.2	27.5	27.2
Wo	2.5	2.7	2.3	2.5	2.5	2.2	2.3	3.2

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite
Line Number	8	1	2	3	4	5	1	2
SiO_2	52.94	53.04	51.89	53.05	52.84	52.71	52.50	53.52
TiO_2	0.50	0.48	0.24	0.45	0.53	0.43	0.07	0.43
Al_2O_3	1.40	1.32	1.58	1.59	1.49	1.41	1.35	1.58
Cr_2O_3	0.00	0.00	0.01	0.00	0.00	0.01	0.05	0.00
FeO	17.51	18.65	17.27	17.41	16.98	18.11	18.10	17.29
MnO	0.67	1.12	0.79	0.74	1.16	0.93	0.79	0.84
MgO	24.73	23.25	25.04	24.87	24.95	24.94	23.81	24.70
CaO	1.17	1.12	1.24	1.45	1.35	1.29	1.39	1.17
Na_2O	0.04	0.02	0.05	0.06	0.05	0.04	0.08	0.04
Oxide Totals	98.95	98.99	98.11	99.64	99.34	99.88	98.15	99.57
En	69.9	67.4	70.3	69.7	70.4	69.2	68.1	70.1
Fs	27.8	30.3	27.2	27.4	26.9	28.2	29.0	27.5
Wo	2.4	2.3	2.5	2.9	2.7	2.6	2.9	2.4

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite
Line Number	3	4	5	6	7	8	9	1
SiO_2	53.03	52.71	52.92	53.14	52.88	52.85	52.41	53.55
TiO_2	0.07	0.26	0.26	0.41	0.36	0.36	0.29	0.10
Al_2O_3	1.58	1.59	1.45	1.57	1.54	1.43	1.22	0.78
Cr_2O_3	0.07	0.00	0.03	0.00	0.02	0.00	0.00	0.00
FeO	16.83	17.38	17.85	17.90	19.65	20.00	19.48	17.88
MnO	0.83	0.92	0.98	0.94	0.91	0.98	0.79	0.86
MgO	24.69	24.39	24.39	24.59	23.41	22.36	22.93	24.27
CaO	1.16	1.35	1.36	1.08	1.26	1.12	1.13	1.43
Na_2O	0.01	0.03	0.02	0.04	0.01	0.00	0.04	0.20
Oxide Totals	98.29	98.63	99.27	99.67	99.44	99.11	98.29	99.07
En	70.6	69.5	68.9	69.5	66.9	65.0	66.1	68.7
Fs	27.0	27.8	28.3	28.4	30.5	32.6	31.5	28.4
Wo	2.4	2.8	2.8	2.2	2.6	2.3	2.3	2.9

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite
Line Number	2	3	4	5	6	7	8	9
SiO_2	53.63	53.90	53.67	54.34	53.57	53.04	51.87	52.81
TiO_2	0.10	0.31	0.06	0.24	0.22	0.53	0.57	0.36
Al_2O_3	0.62	0.77	0.78	0.81	0.64	0.97	1.34	1.17
Cr_2O_3	0.00	0.00	0.00	0.06	0.00	0.05	0.01	0.00
FeO	17.87	18.75	17.47	17.37	17.21	17.37	17.75	19.07
MnO	0.76	0.58	0.81	0.71	0.73	0.66	0.79	0.65
MgO	24.73	25.51	25.09	25.02	25.16	25.09	23.89	22.75
CaO	1.64	1.42	1.54	1.42	1.55	1.69	1.56	1.39
Na_2O	0.21	0.03	0.05	0.09	0.08	0.51	0.62	0.41
Oxide Totals	99.54	101.28	99.40	100.01	99.16	99.91	98.39	98.61
En	68.8	68.9	69.7	69.9	70.0	69.6	68.3	66.0
Fs	27.9	28.4	27.2	27.2	26.9	27.0	28.5	31.1
Wo	3.3	2.8	3.1	2.9	3.1	3.4	3.2	2.9

Sample	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B
Rock Type	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite
Line Number	1	2	3	4	5	6	7	8
SiO_2	52.82	53.01	53.36	53.02	53.24	53.23	52.54	52.31
TiO_2	0.43	0.45	0.41	0.67	0.29	0.24	0.45	0.24
Al_2O_3	1.30	1.38	1.34	1.29	1.21	1.27	1.27	0.46
Cr_2O_3	0.09	0.00	0.01	0.00	0.00	0.05	0.00	0.00
FeO	19.14	17.97	16.75	17.88	16.86	17.22	17.30	22.63
MnO	0.67	0.73	0.95	0.85	0.75	1.00	0.80	1.21
MgO	23.56	25.13	24.79	24.14	24.77	24.98	25.19	20.66
CaO	1.20	1.28	1.11	1.17	1.19	1.23	1.21	1.79
Na_2O	0.09	0.05	0.07	0.06	0.05	0.04	0.05	0.12
Oxide Totals	99.30	100.01	98.40	99.08	98.35	99.27	98.81	99.34
En	67.0	69.6	70.9	68.9	70.6	70.3	70.4	59.6
Fs	30.5	27.9	26.9	28.7	27.0	27.2	27.1	36.6
Wo	2.5	2.6	2.3	2.4	2.4	2.5	2.4	3.7

Sample	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B
Rock Type	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite
Line Number	1	2	3	4	5	1	2	3
SiO_2	52.78	52.41	53.09	53.03	52.10	51.90	53.62	53.39
TiO_2	0.40	0.21	0.38	0.19	0.48	0.35	0.31	0.53
Al_2O_3	1.35	1.32	1.27	1.36	1.39	0.78	0.54	0.92
Cr_2O_3	0.06	0.00	0.02	0.00	0.00	0.00	0.06	0.15
FeO	19.18	20.43	20.12	19.23	18.03	21.74	19.42	17.03
MnO	0.96	1.01	0.86	0.89	0.85	1.24	0.93	0.65
MgO	22.98	22.32	22.58	23.08	24.07	21.86	23.19	25.23
CaO	1.19	1.23	1.23	1.15	1.18	1.17	1.32	1.43
Na_2O	0.05	0.05	0.05	0.04	0.08	0.04	0.03	0.00
Oxide Totals	98.95	98.99	99.58	98.92	98.18	99.08	99.43	99.32
En	66.4	64.4	65.0	66.5	68.7	62.6	66.2	70.4
Fs	31.1	33.1	32.5	31.1	28.9	35.0	31.1	26.7
Wo	2.5	2.6	2.5	2.4	2.4	2.4	2.7	2.9

Sample	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B
Rock Type	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite
Line Number	4	5	6	7	1	2	3	4
SiO_2	53.61	52.89	52.77	53.63	52.92	52.77	53.48	53.13
TiO_2	0.00	0.48	0.12	0.12	0.43	0.29	0.29	0.33
Al_2O_3	0.96	2.08	2.81	0.87	1.13	1.17	1.18	1.25
Cr_2O_3	0.00	0.00	0.03	0.00	0.06	0.00	0.00	0.03
FeO	18.48	17.12	17.80	18.80	18.82	17.48	18.06	17.26
MnO	0.61	0.36	0.45	0.88	0.80	0.77	0.92	0.82
MgO	24.95	25.35	24.51	24.41	23.44	24.12	24.81	24.56
CaO	1.21	1.37	1.55	1.11	1.28	1.45	1.51	1.61
Na_2O	0.05	0.01	0.00	0.08	0.04	0.02	0.05	0.05
Oxide Totals	99.88	99.66	100.04	99.90	98.91	98.07	100.29	99.04
En	68.9	70.5	68.8	68.3	67.1	69.0	68.9	69.4
Fs	28.6	26.7	28.0	29.5	30.2	28.0	28.1	27.4
Wo	2.4	2.7	3.1	2.2	2.6	3.0	3.0	3.3

Sample	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B
Rock Type	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite
Line Number	5	6	7	8	9	10	11	12
SiO_2	52.78	52.97	53.76	52.71	52.87	53.53	53.71	52.95
TiO_2	0.33	0.55	0.50	0.22	0.57	0.24	0.31	0.29
Al_2O_3	1.17	1.23	1.21	1.39	1.24	1.17	1.29	1.24
Cr_2O_3	0.00	0.00	0.02	0.01	0.00	0.00	0.00	0.00
FeO	17.62	18.04	18.06	17.40	17.60	17.71	18.06	18.18
MnO	0.87	0.73	0.83	0.62	0.93	0.74	0.81	1.01
MgO	24.04	24.67	24.29	24.39	24.35	24.23	24.60	24.64
CaO	1.70	1.66	1.53	1.79	1.65	1.63	1.36	1.61
Na_2O	0.05	0.00	0.04	0.05	0.04	0.01	0.02	0.03
Oxide Totals	98.56	99.86	100.24	98.58	99.25	99.27	100.23	99.95
En	68.4	68.5	68.4	68.8	68.8	68.6	68.9	68.5
Fs	28.1	28.1	28.5	27.5	27.9	28.1	28.3	28.3
Wo	3.5	3.3	3.1	3.6	3.3	3.3	2.7	3.2

Sample	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B
Rock Type	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite
Line Number	13	14	15	16	17	18	1	2
SiO_2	53.14	52.34	52.63	52.99	52.68	52.45	53.26	53.14
TiO_2	0.19	0.19	0.31	0.24	0.45	0.54	0.10	0.29
Al_2O_3	1.24	1.30	1.38	1.26	1.22	1.22	1.00	1.15
Cr_2O_3	0.00	0.00	0.00	0.02	0.05	0.00	0.09	0.04
FeO	18.16	18.34	20.10	20.62	19.15	21.20	17.57	17.33
MnO	0.56	0.86	1.15	0.72	0.76	0.93	0.71	0.99
MgO	24.96	23.60	22.44	23.31	23.42	22.35	25.02	24.59
CaO	1.55	1.51	1.53	1.38	1.35	1.37	1.28	1.57
Na_2O	0.02	0.03	0.01	0.08	0.07	0.04	0.02	0.00
Oxide Totals	99.82	98.18	99.56	100.58	99.15	100.10	98.96	99.09
En	68.8	67.5	64.4	65.0	66.7	63.5	69.9	69.4
Fs	28.1	29.4	32.4	32.2	30.6	33.8	27.5	27.4
Wo	3.1	3.1	3.2	2.8	2.8	2.8	2.6	3.2

Sample	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B
Rock Type	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite
Line Number	3	4	5	6	7	8	9	10
SiO_2	52.79	52.89	53.43	53.14	53.47	52.67	52.76	52.87
TiO_2	0.26	0.50	0.19	0.10	0.38	0.24	0.43	0.52
Al_2O_3	1.18	1.33	1.28	1.24	1.15	1.41	1.41	1.13
Cr_2O_3	0.00	0.00	0.02	0.00	0.04	0.00	0.05	0.00
FeO	17.35	17.29	17.36	17.76	18.87	18.51	18.99	19.43
MnO	0.97	0.93	0.84	0.70	1.01	0.92	0.92	0.90
MgO	24.78	24.36	24.31	24.53	24.24	23.20	22.91	23.73
CaO	1.73	1.66	1.70	1.62	1.18	1.81	1.96	1.25
Na_2O	0.03	0.02	0.01	0.03	0.04	0.01	0.04	0.03
Oxide Totals	99.09	98.98	99.14	99.11	100.39	98.76	99.47	99.87
En	69.3	69.1	68.9	68.8	67.9	66.5	65.5	66.8
Fs	27.2	27.5	27.6	27.9	29.7	29.8	30.5	30.7
Wo	3.5	3.4	3.5	3.3	2.4	3.7	4.0	2.5

Sample	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B
Rock Type	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite
Line Number	1	2	3	4	5	1	2	3
SiO_2	52.86	52.25	52.25	52.05	52.10	49.53	51.79	51.59
TiO_2	0.31	0.33	0.43	0.19	0.35	0.85	0.14	0.29
Al_2O_3	1.31	1.54	1.38	1.47	0.91	0.67	1.58	1.43
Cr_2O_3	0.01	0.02	0.00	0.07	0.06	0.00	0.00	0.00
FeO	18.50	19.65	19.27	20.48	22.09	26.48	23.24	21.89
MnO	0.85	0.97	1.18	1.10	1.17	1.63	1.16	1.13
MgO	23.95	23.57	22.48	22.30	21.18	19.32	20.87	21.18
CaO	1.27	1.39	1.75	1.64	1.12	1.88	1.46	1.30
Na_2O	0.03	0.01	0.02	0.01	0.03	0.08	0.06	0.09
Oxide Totals	99.10	99.73	98.76	99.31	99.02	100.46	100.20	98.89
En	68.0	66.2	65.1	63.8	61.6	54.4	59.7	61.6
Fs	29.4	31.0	31.3	32.9	36.0	41.8	37.3	35.7
Wo	2.6	2.8	3.6	3.4	2.3	3.8	3.0	2.7

Sample	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B	CBV-XX-1B
Rock Type	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite
Line Number	4	5	6	7	1	2	3	4
SiO_2	52.52	52.86	50.63	51.66	51.48	51.95	52.11	52.03
TiO_2	0.14	0.00	0.36	0.07	0.43	0.41	0.48	0.41
Al_2O_3	0.92	0.89	2.35	0.87	0.83	1.53	1.32	0.83
Cr_2O_3	0.00	0.12	0.00	0.05	0.01	0.02	0.08	0.00
FeO	22.13	21.66	23.49	24.62	24.80	20.30	22.06	22.48
MnO	1.56	1.48	1.32	1.55	1.39	0.95	1.21	1.40
MgO	21.48	22.05	19.36	19.05	19.43	22.62	21.30	20.83
CaO	1.01	0.96	1.51	1.12	1.16	1.35	1.16	1.06
Na_2O	0.05	0.05	0.02	0.08	0.02	0.05	0.00	0.00
Oxide Totals	99.81	100.07	99.65	99.08	99.55	99.18	99.74	99.03
En	62.1	63.2	57.6	56.6	56.9	64.7	61.7	60.9
Fs	35.9	34.8	39.2	41.0	40.7	32.6	35.9	36.9
Wo	2.1	2.0	3.2	2.4	2.4	2.8	2.4	2.2

Sample	CBV-XX-1B	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A
Rock Type	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite
Line Number	5	1	2	3	4	5	1	2
SiO_2	51.85	52.20	51.54	51.07	51.70	51.93	51.57	51.99
TiO_2	0.07	0.26	0.26	0.10	0.31	0.45	0.52	0.41
Al_2O_3	0.77	2.22	0.69	1.04	0.40	0.84	0.46	0.98
Cr_2O_3	0.05	0.08	0.00	0.00	0.00	0.00	0.02	0.00
FeO	23.63	23.86	24.34	24.44	24.42	26.00	24.63	23.28
MnO	1.35	1.32	1.54	1.44	1.54	1.32	1.56	1.28
MgO	20.28	16.20	18.76	18.74	19.06	18.05	18.68	19.73
CaO	1.39	1.23	1.20	1.19	1.13	1.28	1.30	1.34
Na_2O	0.06	0.31	0.07	0.06	0.04	0.20	0.07	0.13
Oxide Totals	99.46	97.69	98.42	98.08	98.60	100.07	98.82	99.14
En	58.7	53.2	56.4	56.3	56.8	53.8	55.9	58.5
Fs	38.4	43.9	41.0	41.2	40.8	43.5	41.3	38.7
Wo	2.9	2.9	2.6	2.6	2.4	2.7	2.8	2.8

Sample	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A
Rock Type	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite
Line Number	3	4	5	6	7	8	9	1
SiO_2	52.30	52.26	52.71	52.53	52.21	51.10	51.40	51.83
TiO_2	0.22	0.24	0.39	0.19	0.14	0.57	0.17	0.26
Al_2O_3	1.08	0.96	0.97	1.07	1.04	1.14	0.98	0.44
Cr_2O_3	0.06	0.00	0.00	0.02	0.00	0.06	0.00	0.00
FeO	22.01	21.52	20.25	22.24	21.26	23.86	25.41	24.39
MnO	1.17	1.02	0.96	1.05	1.36	1.46	1.57	1.56
MgO	21.10	21.70	22.24	21.46	21.33	19.39	18.46	18.55
CaO	1.21	1.13	1.06	1.13	1.09	1.20	1.29	1.18
Na_2O	0.06	0.06	0.04	0.06	0.13	0.05	0.05	0.10
Oxide Totals	99.13	98.88	98.61	99.75	98.56	98.76	99.74	98.31
En	61.5	62.7	64.7	61.8	62.7	57.7	54.9	56.1
Fs	36.0	34.9	33.1	35.9	35.0	39.8	42.4	41.4
Wo	2.5	2.3	2.2	2.3	2.3	2.6	2.8	2.6

Sample	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A
Rock Type	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite
Line Number	2	1	2	3	4	5	6	1
SiO_2	51.30	51.95	52.11	52.73	52.83	51.36	52.71	51.72
TiO_2	0.55	0.29	0.34	0.22	0.53	0.19	0.14	0.21
Al_2O_3	0.84	0.79	1.37	1.36	3.92	0.74	1.11	0.56
Cr_2O_3	0.02	0.00	0.03	0.00	0.00	0.00	0.08	0.00
FeO	24.17	22.59	19.18	20.61	21.52	24.73	21.85	25.34
MnO	1.43	1.52	0.93	0.91	1.27	1.47	1.37	1.50
MgO	18.94	20.00	22.12	22.03	17.89	18.30	21.08	19.28
CaO	1.47	1.33	2.00	1.08	1.88	1.30	1.16	1.20
Na_2O	0.02	0.00	0.00	0.03	1.35	0.08	0.01	0.12
Oxide Totals	98.75	98.47	98.08	98.97	101.17	98.67	99.51	99.94
En	56.4	59.5	64.5	64.1	57.1	55.9	61.7	56.1
Fs	40.4	37.7	31.4	33.6	38.6	41.3	35.9	41.4
Wo	3.2	2.8	4.2	2.3	4.3	2.8	2.4	2.5

Sample	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A
Rock Type	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite
Line Number	2	3	4	5	6	7	1	2
SiO_2	52.37	52.24	51.50	52.25	53.27	51.79	51.55	51.74
TiO_2	0.22	0.00	0.36	0.21	0.19	0.50	0.33	0.14
Al_2O_3	0.99	0.93	1.95	0.25	1.08	0.43	0.38	0.78
Cr_2O_3	0.02	0.00	0.00	0.01	0.02	0.05	0.00	0.00
FeO	22.43	21.48	21.99	26.22	22.90	22.56	25.60	23.86
MnO	1.14	1.01	0.92	1.95	1.11	1.21	1.24	1.31
MgO	20.70	21.88	20.35	17.54	19.96	19.67	18.34	19.61
CaO	1.19	1.28	2.05	1.30	1.71	1.46	1.14	1.18
Na_2O	0.07	0.03	0.04	0.00	0.00	0.06	0.02	0.05
Oxide Totals	99.14	98.85	99.15	99.73	100.26	97.75	98.60	98.66
En	60.6	62.8	59.6	52.9	58.6	58.9	54.7	57.9
Fs	36.9	34.6	36.1	44.3	37.7	37.9	42.8	39.6
Wo	2.5	2.6	4.3	2.8	3.6	3.2	2.4	2.5

Sample	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A
Rock Type	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite
Line Number	3	4	5	6	1	2	3	4
SiO_2	51.88	51.37	50.85	51.21	50.72	52.31	51.82	52.23
TiO_2	0.24	0.31	0.24	0.43	0.43	0.26	0.31	0.48
Al_2O_3	1.75	1.45	0.99	0.92	1.72	0.84	1.48	1.78
Cr_2O_3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05
FeO	21.32	23.19	22.91	23.28	24.36	22.28	21.98	21.31
MnO	1.11	1.01	1.35	1.42	1.36	1.25	0.93	1.13
MgO	20.41	20.44	20.18	20.35	19.29	21.00	20.86	19.48
CaO	1.28	1.42	1.65	1.06	1.33	1.08	1.34	1.41
Na_2O	0.12	0.11	0.04	0.00	0.08	0.00	0.07	0.37
Oxide Totals	98.11	99.30	98.16	98.67	99.29	99.02	98.79	98.24
En	61.3	59.3	58.9	59.6	56.9	61.3	61.2	60.0
Fs	35.9	37.7	37.6	38.2	40.3	36.5	36.0	36.9
Wo	2.8	3.0	3.5	2.2	2.8	2.3	2.8	3.1

Sample	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A
Rock Type	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite
Line Number	5	1	2	3	4	5	6	7
SiO_2	46.93	52.56	51.88	51.83	52.36	52.76	52.47	52.06
TiO_2	1.49	0.56	0.29	0.36	0.54	0.34	0.29	0.29
Al_2O_3	1.04	1.05	2.96	3.18	2.49	2.34	2.16	1.95
Cr_2O_3	0.08	0.00	0.02	0.06	0.08	0.09	0.03	0.06
FeO	28.85	19.88	18.52	18.38	17.36	17.71	18.86	17.81
MnO	1.05	1.20	0.94	0.78	0.67	0.64	0.80	1.01
MgO	19.26	22.60	23.12	23.42	23.47	23.84	22.93	22.94
CaO	1.21	1.24	1.55	1.56	2.35	1.89	1.96	1.81
Na_2O	0.05	0.00	0.01	0.04	0.03	0.09	0.08	0.06
Oxide Totals	99.96	98.79	99.28	99.52	99.72	99.40	99.58	98.46
En	53.0	65.6	66.8	67.2	67.6	67.6	65.7	67.0
Fs	44.6	31.9	30.0	29.6	27.6	28.5	30.3	29.2
Wo	2.4	2.6	3.2	3.2	4.8	3.9	4.0	3.8

Sample	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A
Rock Type	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite
Line Number	8	1	2	3	4	5	6	7
SiO_2	53.19	52.78	53.26	52.65	53.09	52.89	53.82	52.76
TiO_2	0.12	0.24	0.36	0.12	0.34	0.29	0.39	0.53
Al_2O_3	1.05	1.02	0.61	1.24	0.76	1.27	1.23	1.26
Cr_2O_3	0.11	0.00	0.07	0.00	0.00	0.06	0.02	0.01
FeO	17.97	19.23	20.36	18.69	17.45	17.87	16.89	17.52
MnO	0.80	1.08	1.32	0.81	0.84	0.78	0.77	0.74
MgO	24.09	23.35	22.45	23.38	24.29	25.27	24.56	24.56
CaO	1.17	1.17	1.11	1.46	1.24	1.44	1.55	1.55
Na_2O	0.04	0.03	0.04	0.01	0.01	0.07	0.01	0.03
Oxide Totals	98.55	98.92	99.59	98.35	98.02	99.94	99.24	98.98
En	68.8	66.8	64.8	67.0	69.5	69.6	69.9	69.2
Fs	28.8	30.8	32.9	30.0	28.0	27.6	27.0	27.7
Wo	2.4	2.4	2.3	3.0	2.6	2.9	3.2	3.1

Sample	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A
Rock Type	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite
Line Number	8	9	10	11	12	13	14	15
SiO_2	53.16	53.14	53.27	53.35	52.94	53.07	53.49	52.28
TiO_2	0.36	0.07	0.22	0.15	0.49	0.44	0.22	0.51
Al_2O_3	1.14	1.25	1.23	1.23	1.29	1.24	1.23	1.06
Cr_2O_3	0.00	0.00	0.08	0.04	0.16	0.11	0.13	0.09
FeO	17.42	17.29	17.48	17.34	17.36	17.19	18.33	19.84
MnO	0.86	0.88	1.07	0.69	0.67	0.58	0.90	0.89
MgO	25.09	24.74	25.04	24.54	24.87	24.89	24.88	23.81
CaO	1.46	1.81	1.54	1.74	1.59	1.40	1.35	1.28
Na_2O	0.01	0.03	0.06	0.06	0.02	0.06	0.04	0.06
Oxide Totals	99.50	99.23	99.98	99.12	99.38	98.98	100.57	99.81
En	69.9	69.2	69.6	69.1	69.6	70.0	68.9	66.4
Fs	27.2	27.1	27.3	27.4	27.2	27.1	28.5	31.0
Wo	2.9	3.6	3.1	3.5	3.2	2.8	2.7	2.6

Sample	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A
Rock Type	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite
Line Number	16	1	2	3	4	1	2	3
SiO_2	52.37	51.23	52.05	49.93	51.37	52.05	51.45	52.88
TiO_2	0.22	0.55	0.33	0.43	0.57	0.19	0.43	0.29
Al_2O_3	0.65	0.87	0.45	1.86	0.69	0.44	1.42	0.84
Cr_2O_3	0.00	0.00	0.02	0.04	0.03	0.00	0.12	0.02
FeO	21.41	25.57	25.43	25.04	25.62	24.21	21.53	20.66
MnO	1.06	1.70	1.36	1.59	1.53	1.49	1.09	0.84
MgO	22.05	18.67	17.96	18.30	18.18	19.24	20.48	23.01
CaO	1.01	1.17	1.08	1.24	1.36	1.15	1.43	1.37
Na_2O	0.02	0.05	0.02	0.06	0.08	0.13	0.09	0.06
Oxide Totals	98.78	99.80	98.71	98.48	99.42	98.89	98.04	99.96
En	63.4	55.1	54.4	55.1	54.2	57.2	61.0	64.7
Fs	34.5	42.4	43.2	42.3	42.9	40.4	36.0	32.6
Wo	2.1	2.5	2.4	2.7	2.9	2.4	3.1	2.8

Sample	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A
Rock Type	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite
Line Number	4	1	2	3	4	5	6	7
SiO_2	52.70	52.94	52.29	53.30	52.85	54.79	52.14	53.52
TiO_2	0.29	0.27	0.31	0.32	0.24	0.27	0.34	0.24
Al_2O_3	1.06	1.24	1.58	1.14	0.73	1.85	1.71	1.40
Cr_2O_3	0.00	0.00	0.07	0.03	0.00	0.03	0.00	0.04
FeO	21.32	20.35	19.14	18.98	20.76	20.92	18.92	17.80
MnO	0.72	0.94	0.92	0.88	1.17	0.93	0.80	1.11
MgO	21.52	23.29	23.87	23.70	21.88	20.93	23.54	24.69
CaO	1.27	1.06	1.04	1.03	0.99	1.06	1.38	1.29
Na_2O	0.01	0.00	0.06	0.04	0.05	0.45	0.07	0.07
Oxide Totals	98.90	100.09	99.21	99.40	98.68	101.23	98.90	100.23
En	62.6	65.7	67.5	67.5	63.9	62.6	67.0	69.3
Fs	34.8	32.2	30.4	30.3	34.0	35.1	30.2	28.1
Wo	2.7	2.2	2.1	2.1	2.1	2.3	2.8	2.6

Sample	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A
Rock Type	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite
Line Number	8	1	2	3	4	5	6	1
SiO_2	53.07	52.65	53.21	53.34	53.40	53.30	53.36	53.47
TiO_2	0.34	0.27	0.44	0.56	0.19	0.29	0.44	0.51
Al_2O_3	1.47	1.24	1.32	1.33	1.00	1.04	0.86	1.09
Cr_2O_3	0.03	0.04	0.00	0.00	0.00	0.04	0.01	0.00
FeO	17.34	19.08	19.31	18.30	17.63	18.62	18.78	19.22
MnO	0.75	0.70	0.80	0.66	0.88	0.74	0.67	0.95
MgO	25.20	24.14	23.84	24.73	24.49	24.06	23.82	23.67
CaO	1.26	1.45	1.40	1.41	1.60	1.54	1.38	1.43
Na_2O	0.01	0.07	0.05	0.04	0.06	0.04	0.03	0.02
Oxide Totals	99.48	99.65	100.36	100.36	99.25	99.67	99.35	100.37
En	70.3	67.3	66.8	68.7	68.9	67.6	67.4	66.7
Fs	27.2	29.8	30.4	28.5	27.8	29.3	29.8	30.4
Wo	2.5	2.9	2.8	2.8	3.2	3.1	2.8	2.9

Sample	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A
Rock Type	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite
Line Number	2	3	4	5	6	7	8	9
SiO_2	52.91	53.26	53.53	53.52	53.04	52.62	52.44	52.33
TiO_2	0.41	0.22	0.12	0.27	0.31	0.56	0.61	0.36
Al_2O_3	0.85	0.68	0.72	0.84	1.05	1.54	1.65	1.66
Cr_2O_3	0.00	0.09	0.00	0.00	0.00	0.04	0.04	0.00
FeO	17.69	17.87	17.75	18.96	19.74	18.67	19.00	19.90
MnO	0.56	0.84	0.59	0.77	0.92	0.59	0.87	0.87
MgO	24.15	24.98	24.84	24.65	23.66	24.21	24.54	23.45
CaO	1.52	1.52	1.49	1.46	1.21	1.50	1.57	1.61
Na_2O	0.05	0.04	0.02	0.01	0.03	0.00	0.02	0.06
Oxide Totals	98.14	99.50	99.08	100.47	99.96	99.73	100.74	100.24
En	68.7	69.2	69.2	67.8	66.5	67.7	67.5	65.6
Fs	28.2	27.8	27.8	29.3	31.1	29.3	29.3	31.2
Wo	3.1	3.0	3.0	2.9	2.4	3.0	3.1	3.2

Sample	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A
Rock Type	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite
Line Number	10	1	2	3	4	5	6	7
SiO_2	52.74	52.75	53.43	53.37	53.29	53.57	52.90	51.90
TiO_2	0.31	0.17	0.22	0.37	0.16	0.17	0.29	0.46
Al_2O_3	0.84	1.12	1.11	0.77	0.70	0.79	0.74	0.73
Cr_2O_3	0.03	0.05	0.00	0.02	0.00	0.06	0.02	0.07
FeO	22.11	22.52	18.90	17.63	18.59	19.06	21.48	23.05
MnO	0.84	1.12	0.74	0.59	0.50	0.56	0.75	1.20
MgO	21.82	21.63	24.67	24.84	24.52	24.19	22.01	20.69
CaO	1.35	1.59	1.36	1.61	1.45	1.61	1.48	1.48
Na_2O	0.02	0.08	0.03	0.06	0.08	0.05	0.02	0.03
Oxide Totals	100.06	101.03	100.45	99.26	99.23	100.06	99.63	99.62
En	62.0	61.1	68.1	69.2	68.1	67.1	62.7	59.6
Fs	35.2	35.7	29.3	27.6	29.0	29.7	34.3	37.3
Wo	2.8	3.2	2.7	3.2	2.9	3.2	3.0	3.1

Sample	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A
Rock Type	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite
Line Number	8	9	1	2	3	4	5	6
SiO_2	51.87	51.59	52.64	52.42	52.61	52.72	53.54	52.45
TiO_2	0.41	0.45	0.05	0.12	0.29	0.15	0.27	0.44
Al_2O_3	0.75	0.40	0.58	0.71	0.74	0.79	0.79	1.28
Cr_2O_3	0.00	0.09	0.01	0.00	0.00	0.00	0.02	0.00
FeO	24.73	26.11	22.77	22.19	20.92	19.95	19.92	19.60
MnO	1.13	1.32	1.25	0.85	0.80	0.84	0.97	0.76
MgO	19.98	17.85	20.64	21.92	22.15	22.61	23.68	23.83
CaO	1.45	1.58	1.48	1.47	1.37	1.35	1.48	1.49
Na_2O	0.05	0.08	0.06	0.04	0.04	0.03	0.07	0.06
Oxide Totals	100.36	99.46	99.46	100.13	98.92	98.44	100.73	99.94
En	57.3	53.1	59.9	61.9	63.5	65.0	65.9	66.4
Fs	39.8	43.5	37.1	35.1	33.7	32.2	31.1	30.6
Wo	3.0	3.4	3.1	3.0	2.8	2.8	3.0	3.0

Sample	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A
Rock Type	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite
Line Number	7	8	9	1	2	3	4	5
SiO_2	52.61	53.10	53.57	52.84	53.97	54.37	53.65	53.19
TiO_2	0.61	0.48	0.41	0.17	0.34	0.17	0.37	0.37
Al_2O_3	1.21	1.48	1.04	0.62	0.73	0.89	1.38	1.70
Cr_2O_3	0.01	0.06	0.04	0.07	0.02	0.00	0.01	0.00
FeO	19.79	19.21	18.93	23.71	20.51	16.92	17.46	17.31
MnO	0.73	0.79	0.79	1.02	0.95	0.68	0.81	0.56
MgO	23.85	23.44	24.11	20.51	23.70	25.93	25.76	25.27
CaO	1.36	1.49	1.36	1.52	1.49	1.46	1.53	1.53
Na_2O	0.03	0.04	0.03	0.09	0.03	0.09	0.04	0.00
Oxide Totals	100.19	100.09	100.27	100.55	101.75	100.51	100.99	99.92
En	66.4	66.4	67.5	58.8	65.3	71.1	70.3	70.0
Fs	30.9	30.5	29.7	38.1	31.7	26.0	26.7	26.9
Wo	2.7	3.0	2.7	3.1	3.0	2.9	3.0	3.0

Sample	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A
Rock Type	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite
Line Number	6	7	1	2	3	4	5	6
SiO_2	53.02	53.12	53.52	53.53	53.49	53.74	52.84	53.68
TiO_2	0.10	0.05	0.31	0.15	0.02	0.39	0.36	0.19
Al_2O_3	1.38	0.86	1.52	1.05	0.86	1.09	1.13	0.93
Cr_2O_3	0.01	0.09	0.04	0.00	0.00	0.00	0.01	0.00
FeO	18.83	19.52	21.26	18.34	19.89	18.72	19.36	19.19
MnO	0.83	0.86	1.27	0.84	0.91	0.92	0.84	0.91
MgO	24.22	24.03	20.92	24.22	23.28	24.41	24.43	24.49
CaO	1.54	1.36	1.55	1.25	1.50	1.31	1.23	1.40
Na_2O	0.03	0.01	0.30	0.02	0.01	0.02	0.07	0.06
Oxide Totals	99.95	99.90	100.70	99.40	99.96	100.61	100.27	100.86
En	67.5	66.8	61.6	68.4	65.5	68.1	67.5	67.5
Fs	29.4	30.4	35.1	29.1	31.4	29.3	30.0	29.7
Wo	3.1	2.7	3.3	2.5	3.0	2.6	2.4	2.8

Sample	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A
Rock Type	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite
Line Number	7	8	9	1	2	3	4	5
SiO_2	53.30	53.38	52.38	52.99	53.23	53.60	53.09	53.27
TiO_2	0.46	0.22	0.36	0.05	0.44	0.39	0.12	0.63
Al_2O_3	1.05	1.02	1.01	1.15	1.69	1.64	1.37	1.58
Cr_2O_3	0.00	0.02	0.00	0.00	0.08	0.00	0.00	0.00
FeO	18.89	18.77	21.09	19.63	17.14	17.14	17.08	18.48
MnO	0.80	0.83	0.63	0.72	0.55	0.66	0.48	0.53
MgO	24.12	24.53	22.34	23.48	25.03	25.04	25.26	24.33
CaO	1.41	1.38	1.44	1.27	1.48	1.55	1.55	1.45
Na_2O	0.01	0.03	0.02	0.00	0.03	0.06	0.05	0.03
Oxide Totals	100.13	99.88	99.26	99.28	99.66	100.08	99.01	100.31
En	67.5	68.0	63.5	66.3	70.1	70.0	70.3	68.1
Fs	29.7	29.2	33.6	31.1	26.9	26.9	26.7	29.0
Wo	2.8	2.8	2.9	2.6	3.0	3.1	3.1	2.9

Sample	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A
Rock Type	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite
Line Number	6	7	8	9	10	11	12	13
SiO_2	53.34	53.67	52.83	53.41	53.08	53.17	52.21	53.46
TiO_2	0.27	0.18	0.39	0.29	0.17	0.00	0.14	0.07
Al_2O_3	0.93	1.03	1.86	0.93	0.88	0.44	1.97	1.02
Cr_2O_3	0.02	0.00	0.03	0.10	0.00	0.00	0.00	0.00
FeO	18.07	18.28	19.70	19.00	19.52	20.40	20.59	19.71
MnO	1.06	0.93	0.93	1.06	1.17	1.37	1.22	1.02
MgO	24.86	24.37	23.88	23.83	24.86	23.56	23.09	23.98
CaO	1.32	1.20	1.24	1.11	0.98	0.94	1.17	1.22
Na_2O	0.01	0.04	0.08	0.01	0.00	0.03	0.00	0.08
Oxide Totals	99.88	99.63	100.31	99.74	100.63	100.30	100.39	100.44
En	69.2	68.7	66.4	67.5	68.1	66.0	65.1	66.7
Fs	28.2	28.9	31.1	30.2	30.0	32.1	32.6	30.9
Wo	2.6	2.4	2.5	2.3	1.9	1.9	2.4	2.5

Sample	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A
Rock Type	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite
Line Number	14	15	16	1	2	3	4	5
SiO_2	53.46	54.14	53.59	53.24	52.70	53.02	53.66	52.74
TiO_2	0.19	0.34	0.36	0.17	0.46	0.02	0.07	0.29
Al_2O_3	0.97	0.91	0.99	1.52	1.26	0.88	1.40	1.28
Cr_2O_3	0.05	0.06	0.00	0.00	0.00	0.07	0.01	0.00
FeO	18.70	17.83	18.67	17.03	17.95	18.14	18.48	19.81
MnO	0.92	0.59	0.64	0.46	0.74	0.85	0.60	0.71
MgO	24.29	25.03	24.56	25.22	24.10	24.46	24.58	23.89
CaO	1.14	1.37	1.51	1.51	1.34	1.32	1.62	1.41
Na_2O	0.07	0.03	0.02	0.06	0.09	0.01	0.00	0.06
Oxide Totals	99.80	100.22	100.35	99.21	98.63	98.78	100.42	100.19
En	68.2	69.5	68.0	70.3	68.6	68.7	68.1	66.3
Fs	29.5	27.8	29.0	26.6	28.7	28.6	28.7	30.9
Wo	2.3	2.7	3.0	3.0	2.7	2.7	3.2	2.8

Sample	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A
Rock Type	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite
Line Number	6	7	1	2	3	4	5	6
SiO_2	52.83	52.25	52.68	53.88	53.68	52.76	53.27	53.09
TiO_2	0.46	0.34	0.29	0.24	0.32	0.31	0.44	0.41
Al_2O_3	1.56	1.37	1.06	0.90	1.20	1.46	1.32	1.43
Cr_2O_3	0.00	0.00	0.15	0.01	0.07	0.00	0.00	0.03
FeO	19.69	20.56	21.88	18.07	18.49	19.22	18.01	18.51
MnO	0.80	0.88	0.89	0.83	0.85	0.73	0.92	0.71
MgO	23.71	23.17	21.28	24.08	23.86	24.15	23.95	23.92
CaO	1.47	1.49	1.40	1.41	1.40	1.11	1.46	1.32
Na_2O	0.06	0.02	0.02	0.07	0.01	0.00	0.05	0.05
Oxide Totals	100.60	99.80	99.64	99.50	99.87	99.74	99.42	99.47
En	66.2	64.8	61.6	68.3	67.7	67.6	68.2	67.9
Fs	30.8	32.2	35.5	28.8	29.4	30.2	28.8	29.5
Wo	3.0	3.0	2.9	2.9	2.8	2.2	3.0	2.7

Sample	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-3A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite
Line Number	7	8	9	10	1	2	3	4
SiO_2	53.22	52.98	53.38	53.34	52.05	52.09	51.43	51.19
TiO_2	0.36	0.00	0.27	0.07	0.45	0.56	0.75	1.00
Al_2O_3	1.38	1.33	1.46	0.88	2.53	2.13	2.83	2.84
Cr_2O_3	0.03	0.00	0.03	0.10	0.00	0.00	0.03	0.00
FeO	18.31	18.07	19.30	18.60	8.82	8.38	8.59	8.00
MnO	0.70	0.86	0.80	1.10	0.34	0.41	0.30	0.37
MgO	23.85	24.11	23.24	23.66	13.64	13.72	13.22	14.15
CaO	1.35	1.22	1.14	1.24	20.18	20.26	20.27	20.48
Na_2O	0.06	0.00	0.07	0.03	0.41	0.33	0.40	0.42
Oxide Totals	99.24	98.58	99.68	99.01	98.83	98.06	98.81	99.91
En	68.0	68.6	66.6	67.6	41.2	40.9	39.9	41.7
Fs	29.3	28.9	31.0	29.8	14.9	15.7	16.2	14.9
Wo	2.8	2.5	2.3	2.5	43.8	43.4	43.9	43.4

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite
Line Number	5	6	7	1	2	3	4	5
SiO_2	51.46	52.12	51.91	50.12	50.87	50.23	51.68	49.92
TiO_2	0.77	0.64	0.85	1.30	0.97	1.49	0.73	1.55
Al_2O_3	2.39	2.45	2.52	3.85	3.41	3.87	2.71	3.90
Cr_2O_3	0.02	0.06	0.04	0.00	0.00	0.00	0.00	0.04
FeO	8.36	8.87	8.90	9.35	9.41	9.27	7.92	8.59
MnO	0.20	0.29	0.31	0.34	0.42	0.37	0.48	0.29
MgO	13.68	13.53	13.77	13.54	13.52	13.09	13.99	13.29
CaO	20.00	20.23	20.19	19.62	19.34	20.07	20.06	19.62
Na_2O	0.42	0.46	0.41	0.42	0.47	0.39	0.61	0.49
Oxide Totals	98.10	98.60	98.93	98.65	99.18	98.80	98.29	98.77
En	41.2	41.0	41.4	41.2	41.3	40.0	42.6	40.6
Fs	14.1	15.1	15.0	15.9	16.1	15.9	13.5	16.4
Wo	44.7	44.0	43.6	42.9	42.5	44.1	43.9	43.0

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite
Line Number	6	7	1	2	3	4	5	6
SiO_2	50.04	51.32	52.01	51.17	50.08	50.28	51.27	51.21
TiO_2	1.34	0.60	0.56	1.29	1.37	1.10	1.00	1.02
Al_2O_3	4.05	2.45	2.49	3.14	4.22	3.95	3.20	3.30
Cr_2O_3	0.04	0.00	0.00	0.00	0.00	0.04	0.00	0.00
FeO	9.87	9.61	9.26	8.96	9.66	9.59	8.81	8.52
MnO	0.47	0.43	0.35	0.40	0.26	0.26	0.28	0.27
MgO	13.26	13.75	14.14	13.54	13.06	13.24	13.83	13.68
CaO	19.75	19.77	19.94	19.90	20.06	19.88	20.49	19.74
Na_2O	0.40	0.39	0.41	0.45	0.37	0.45	0.37	0.49
Oxide Totals	99.27	98.57	99.16	98.92	99.16	98.87	99.47	98.30
En	40.2	41.2	42.0	41.2	39.7	40.2	41.3	41.9
Fs	16.8	16.2	15.4	15.3	16.5	16.4	14.8	14.6
Wo	43.0	42.6	42.6	43.5	43.8	43.4	44.0	43.5

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite
Line Number	7	8	9	1	2	3	4	5
SiO_2	50.49	52.43	52.02	51.96	52.86	52.32	52.61	51.94
TiO_2	1.25	0.81	0.89	0.22	0.50	0.22	0.40	0.55
Al_2O_3	3.42	2.27	2.46	0.25	0.34	0.26	0.29	0.34
Cr_2O_3	0.07	0.00	0.05	0.00	0.04	0.00	0.00	0.02
FeO	8.78	8.07	9.25	24.66	23.51	25.21	23.16	24.60
MnO	0.35	0.42	0.40	1.09	1.27	1.13	1.23	1.26
MgO	13.47	13.87	13.98	16.69	17.16	15.96	16.91	17.60
CaO	20.08	20.31	19.77	3.25	3.29	3.10	3.38	1.68
Na_2O	0.43	0.36	0.41	0.11	0.08	0.08	0.10	0.06
Oxide Totals	98.39	98.54	99.31	98.23	99.22	98.31	98.26	98.01
En	41.0	42.0	41.9	50.8	52.5	49.4	52.3	54.0
Fs	15.0	13.7	15.5	42.1	40.3	43.7	40.2	42.3
Wo	44.0	44.2	42.6	7.1	7.2	6.9	7.5	3.7

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite
Line Number	6	7	8	9	10	1	2	3
SiO_2	52.73	52.52	52.53	52.40	53.33	53.42	53.69	53.78
TiO_2	0.61	0.55	0.10	0.26	0.18	0.18	0.32	0.28
Al_2O_3	0.39	0.32	0.32	0.63	2.22	0.66	0.71	0.70
Cr_2O_3	0.03	0.03	0.00	0.06	0.01	0.02	0.00	0.04
FeO	24.11	23.34	24.26	25.88	24.02	20.97	20.12	19.53
MnO	1.16	1.13	1.17	1.50	1.50	0.89	0.67	0.89
MgO	17.78	18.22	16.37	16.91	14.77	21.00	21.55	21.69
CaO	1.66	1.78	3.25	1.41	3.04	1.19	1.27	1.24
Na_2O	0.03	0.05	0.04	0.06	1.02	0.03	0.05	0.01
Oxide Totals	98.52	98.64	98.19	99.11	100.23	98.50	98.49	98.17
En	54.7	55.9	50.7	52.2	48.5	62.5	64.0	64.7
Fs	41.6	40.2	42.1	44.7	44.3	35.0	33.3	32.7
Wo	3.7	3.9	7.2	3.1	7.2	2.5	2.7	2.6

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite
Line Number	4	5	6	1	2	3	4	5
SiO_2	53.83	53.41	53.20	53.19	53.69	54.20	54.17	54.36
TiO_2	0.20	0.26	0.40	0.50	0.20	0.36	0.10	0.34
Al_2O_3	0.78	1.11	0.99	0.64	0.81	0.70	0.59	0.65
Cr_2O_3	0.00	0.00	0.08	0.03	0.03	0.00	0.06	0.08
FeO	19.10	19.57	20.89	21.92	19.42	19.43	18.09	18.18
MnO	0.93	0.85	0.86	1.03	0.88	0.63	0.84	0.74
MgO	22.23	22.43	20.76	20.16	22.41	22.05	23.14	23.19
CaO	1.25	1.39	1.23	1.42	1.28	1.12	1.19	1.19
Na_2O	0.05	0.01	0.03	0.05	0.05	1.06	0.00	0.02
Oxide Totals	98.35	99.22	98.49	98.98	98.76	98.62	99.07	98.76
En	65.7	65.2	62.2	60.2	65.5	65.3	66.8	67.8
Fs	31.7	31.9	35.1	36.7	31.8	32.3	30.7	29.7
Wo	2.6	2.9	2.7	3.0	2.7	2.4	2.5	2.5

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite
Line Number	6	7	8	1	2	3	4	5
SiO_2	54.26	54.01	53.57	54.30	54.22	54.63	54.30	53.71
TiO_2	0.14	0.24	0.00	0.26	0.02	0.08	0.14	0.14
Al_2O_3	0.66	0.61	0.61	0.64	0.74	0.68	0.87	0.64
Cr_2O_3	0.00	0.06	0.13	0.08	0.00	0.03	0.06	0.14
FeO	18.56	18.62	20.15	18.05	17.71	17.82	18.31	18.87
MnO	0.69	0.79	0.96	0.96	1.00	0.88	0.67	0.90
MgO	22.40	22.27	21.50	22.93	23.39	23.40	23.10	22.25
CaO	1.29	1.27	1.23	1.33	1.32	1.29	1.18	1.23
Na_2O	0.00	0.07	0.02	0.03	0.08	0.03	0.06	0.02
Oxide Totals	98.11	98.12	98.20	98.71	98.52	99.10	98.70	98.07
En	66.4	66.2	63.8	67.4	68.2	68.2	67.5	66.0
Fs	30.9	31.1	33.5	29.8	29.0	29.1	30.0	31.4
Wo	2.7	2.7	2.6	2.8	2.8	2.7	2.5	2.6

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite	DE Dacite
Line Number	6	1	2	3	4	5	6	7
SiO_2	53.18	52.40	53.31	53.74	53.58	52.82	53.22	53.79
TiO_2	0.28	0.64	0.32	0.16	0.50	0.28	0.16	0.14
Al_2O_3	0.61	1.33	1.32	1.08	1.09	0.89	0.88	0.79
Cr_2O_3	0.03	0.03	0.08	0.08	0.09	0.00	0.11	0.05
FeO	22.28	21.21	19.75	18.26	19.27	20.94	22.11	20.12
MnO	1.12	0.82	0.83	0.90	0.98	0.86	0.58	0.96
MgO	20.49	20.20	21.55	23.00	22.06	20.96	20.66	21.90
CaO	1.44	1.27	1.29	1.29	1.21	1.15	1.28	1.17
Na_2O	0.04	0.03	0.08	0.09	0.05	0.06	0.02	0.07
Oxide Totals	99.46	98.04	98.61	98.63	99.00	98.23	99.01	99.90
En	60.2	61.2	64.2	67.3	65.4	62.5	60.7	64.4
Fs	36.7	36.0	33.0	30.0	32.0	35.0	36.6	33.2
Wo	3.0	2.8	2.8	2.7	2.6	2.5	2.7	2.5

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	P1B-A	P1B-A	P1B-A	P1B-A
Rock Type	DE Dacite	DE Dacite	DE Dacite	DE Dacite	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line Number	8	9	10	11	1	2	1	2
SiO_2	53.34	53.45	53.14	53.33	51.01	52.43	51.62	52.00
TiO_2	0.34	0.20	0.16	0.32	0.17	0.12	0.18	0.15
Al_2O_3	1.19	0.66	0.56	0.69	1.27	0.84	0.81	0.74
Cr_2O_3	0.12	0.00	0.00	0.06	0.02	0.03	0.01	0.03
FeO	19.41	20.83	22.66	20.97	24.13	23.83	23.83	23.89
MnO	0.75	0.96	0.82	0.81	1.93	1.74	1.72	1.80
MgO	21.99	21.00	19.92	20.64	19.96	20.34	20.29	19.85
CaO	1.31	1.10	1.52	1.19	1.10	0.88	0.86	1.00
Na_2O	0.05	0.05	0.03	0.01	0.04	0.03	0.01	0.03
Oxide Totals	98.48	98.27	98.80	98.15	99.63	100.24	99.33	99.19
En	65.0	62.7	59.1	62.0	60.3	59.6	60.2	58.7
Fs	32.2	34.9	37.7	35.4	37.3	38.6	38.0	39.2
Wo	2.8	2.4	3.2	2.6	2.4	1.9	1.8	2.1

Sample	P1B-A	P1B-A	P1B-A	P1B-A	P1B-A	P1T-C	P1T-C	P1T-C
Rock Type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line Number	3	4	5	6	7	1	2	3
SiO_2	52.43	51.86	51.42	52.02	51.21	51.99	51.63	51.78
TiO_2	0.16	0.17	0.20	0.18	0.15	0.17	0.18	0.11
Al_2O_3	0.85	0.95	1.27	0.91	1.09	0.93	0.83	0.86
Cr_2O_3	0.00	0.00	0.00	0.00	0.01	0.04	0.01	0.00
FeO	23.32	24.19	24.29	23.88	24.38	23.63	23.44	24.37
MnO	1.72	1.80	2.09	1.91	1.86	1.80	1.84	1.82
MgO	20.70	20.48	19.04	20.43	19.55	20.40	20.58	19.83
CaO	0.87	0.85	1.17	0.79	1.24	1.13	0.83	0.97
Na_2O	0.02	0.02	0.02	0.00	0.04	0.02	0.00	0.03
Oxide Totals	100.07	100.32	99.80	100.12	99.53	100.11	99.34	99.77
En	60.6	60.7	57.2	60.3	58.8	60.3	61.1	58.9
Fs	37.6	37.5	40.3	38.0	38.5	37.3	37.1	39.0
Wo	1.8	1.8	2.5	1.7	2.7	2.4	1.8	2.1

Sample	P1T-C	P1T-C	P1T-C	P1T-C	P2B-E	P2B-E	P2B-E	P2B-E
Rock Type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite
Line Number	4	5	6	7	1	2	3	1
SiO_2	51.53	51.33	52.38	51.94	50.99	50.19	51.16	49.06
TiO_2	0.19	0.14	0.15	0.16	0.67	1.10	0.68	1.30
Al_2O_3	0.95	0.99	0.80	0.80	2.90	3.65	2.49	4.71
Cr_2O_3	0.05	0.00	0.00	0.00	0.00	0.03	0.00	0.06
FeO	23.87	23.70	24.15	24.08	9.17	8.52	8.33	8.37
MnO	1.78	1.66	1.73	1.97	0.36	0.26	0.27	0.27
MgO	20.36	20.09	20.56	20.61	14.66	14.58	14.68	14.15
CaO	0.82	0.84	0.83	1.00	20.53	20.58	20.84	20.66
Na_2O	0.04	0.01	0.00	0.02	0.40	0.35	0.42	0.43
Oxide Totals	99.59	98.76	100.60	100.58	99.68	99.26	98.87	99.01
En	60.7	59.9	60.1	61.1	44.0	44.0	43.9	43.8
Fs	37.6	38.3	38.2	36.8	11.7	11.4	11.2	10.2
Wo	1.8	1.8	1.7	2.1	44.3	44.6	44.8	46.0

Sample	P2B-E	P2B-E	P2B-E	P2B-E	P2B-E	P2B-E	P2B-E	P2B-E
Rock Type	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite
Line Number	2	1	2	1	2	3	1	2
SiO_2	49.79	49.68	49.38	48.02	45.69	43.40	50.34	50.74
TiO_2	1.18	1.34	1.06	1.98	2.67	4.12	1.13	0.75
Al_2O_3	4.18	4.69	4.38	5.73	6.13	7.80	4.49	3.74
Cr_2O_3	0.00	0.07	0.03	0.05	0.14	0.05	0.04	0.00
FeO	8.15	8.70	9.29	9.60	11.10	11.66	10.55	8.69
MnO	0.31	0.28	0.46	0.28	0.22	0.28	0.32	0.30
MgO	14.47	14.24	13.85	13.29	14.97	11.00	16.49	14.79
CaO	20.64	20.28	20.19	19.80	18.26	19.65	16.55	20.04
Na_2O	0.37	0.41	0.36	0.43	0.42	0.53	0.44	0.45
Oxide Totals	99.09	99.69	99.00	99.18	99.60	98.49	100.35	99.50
En	44.1	43.5	42.7	41.7	48.6	37.1	50.0	44.8
Fs	10.7	12.0	12.5	13.6	8.7	15.2	14.0	11.6
Wo	45.2	44.5	44.8	44.7	42.6	47.7	36.0	43.6

Sample	P2B-E	P2B-E	P2B-E	P2B-E	P2B-E	P2B-E	P2B-E	P2B-E
Rock Type	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite	Jala Dacite
Line Number	3	4	1	1	2	3	4	1
SiO_2	48.18	50.83	50.74	51.01	51.03	49.04	50.74	48.16
TiO_2	1.63	1.22	1.54	1.30	1.56	1.88	0.91	1.66
Al_2O_3	4.98	3.94	4.12	3.96	4.76	5.38	3.09	5.96
Cr_2O_3	0.05	0.00	0.07	0.00	0.08	0.00	0.12	0.16
FeO	8.98	9.30	7.91	7.43	7.78	6.88	8.13	8.65
MnO	0.27	0.36	0.28	0.33	0.27	0.20	0.20	0.26
MgO	13.90	17.96	18.88	19.24	19.25	16.71	15.11	13.60
CaO	20.09	16.28	15.99	15.55	16.12	18.83	20.91	20.69
Na_2O	0.41	0.38	0.31	0.33	0.32	0.40	0.40	0.46
Oxide Totals	98.49	100.27	99.84	99.11	101.17	99.32	99.61	99.60
En	43.6	53.6	55.8	56.9	56.7	51.1	45.3	42.8
Fs	11.2	11.5	10.3	10.2	9.3	7.5	9.6	10.4
Wo	45.3	34.9	34.0	33.0	34.1	41.4	45.1	46.8

Sample	P2B-E	P2B-E	P2B-E
Rock Type	Jala Dacite	Jala Dacite	Jala Dacite
Line Number	2	3	4
SiO_2	51.76	50.54	50.01
TiO_2	0.53	1.01	1.13
Al_2O_3	2.12	3.49	3.78
Cr_2O_3	0.00	0.00	0.03
FeO	10.29	8.16	8.13
MnO	0.42	0.24	0.17
MgO	15.55	14.89	14.66
CaO	18.22	20.58	21.03
Na_2O	0.42	0.33	0.39
Oxide Totals	99.31	99.24	99.33
En	46.3	44.6	44.4
Fs	14.7	11.1	9.7
Wo	39.0	44.3	45.8

APPENDIX E1

Olivine analyses: Mt. Dutton volcano, Alaska

Olivine analyses were obtained using a Cameca SX-50 electron microprobe at the University of Alaska Fairbanks, under the following analytical conditions: an accelerating voltage of 15 KeV, beam current of 10 nA, and a focused beam with a spot size of 1-3 μm. Major oxides are reported in weight percent (wt.%) with total Fe reported as FeO. "Line number" refers to the analysis number during a particular analytical transect. "Rock type" refers to the host rock, which contained the olivine that was analyzed. Abbreviations as follows: **DB Dac** - Dome-building dacite; **CB And** Cone-building andesite; **Encl** enclave; **Fo** - forsterite content (mol.%). Standards, counting times, and analytical errors are summarized in the table below:

Element	Counting Times (seconds)		Standard	Typical Analytical Error (wt.%, 1σ)
	Peak	Bkgd.		
Si	10	5	Diopside (CM Taylor)	.192
Al	10	5	Kyanite (CM Taylor)	.004
Fe	10	5	Fayalite (USNM 85276)	.317
Mg	10	5	Diopside (CM Taylor)	.206
Ca	20	10	Diopside (CM Taylor)	.009
Ti	10	5	Sphene (CM Taylor)	.002
Mn	20	10	Olivine (USNM 1113127444)	.043
Cr	20	10	Chromite (CM Taylor)	.001
Ni	20	10	NIAS	.001

Sample	DC-8-B	DC-8-B	DC-8-B	DC-8-B	DC-8-B	DC-8-B	DC-8-B	DC-8-B
Rock Type	CB And	CB And	CB And	CB And	CB And	CB And	CB And	CB And
Line Number	1	2	1	2	1	2	1	2
SiO_2	38.34	38.44	38.89	38.28	38.25	38.60	38.59	38.26
Al_2O_3	0.03	0.01	0.00	0.06	0.00	0.03	0.01	0.04
FeO	21.98	19.56	20.07	21.44	20.91	20.36	20.39	22.22
MgO	39.87	40.73	40.83	39.89	40.57	41.47	40.80	38.93
CaO	0.16	0.18	0.17	0.19	0.18	0.10	0.15	0.17
TiO_2	0.00	0.00	0.00	0.05	0.03	0.04	0.02	0.03
MnO	0.34	0.28	0.41	0.31	0.28	0.39	0.21	0.43
Cr_2O_3	0.00	0.13	0.01	0.04	0.01	0.02	0.00	0.03
NiO	0.04	0.07	0.10	0.05	0.05	0.10	0.02	0.00
Oxide Totals	100.76	99.39	100.48	100.31	100.27	101.12	100.18	100.12
Fo	75.9	78.2	77.8	76.2	77.1	77.8	77.7	75.1

Sample	DC-8-B	DC-8-B	DC-8-B	DC-8-B	DC-8-B	DC-8-B	DC-8-B	DC-8-B
Rock Type	CB And	CB And	CB And	CB And	CB And	CB And	CB And	CB And
Line Number	1	2	1	2	1	2	1	2
SiO_2	38.30	37.87	38.08	37.36	37.91	38.02	38.16	37.60
Al_2O_3	0.03	0.00	0.10	0.09	0.02	0.03	0.00	0.05
FeO	21.69	24.32	22.62	25.32	21.68	22.25	22.73	23.28
MgO	39.36	37.42	39.04	36.64	39.66	39.20	39.23	38.10
CaO	0.20	0.18	0.21	0.14	0.13	0.19	0.17	0.18
TiO_2	0.05	0.05	0.00	0.00	0.02	0.03	0.09	0.00
MnO	0.32	0.37	0.32	0.52	0.28	0.41	0.36	0.33
Cr_2O_3	0.00	0.04	0.00	0.00	0.00	0.03	0.00	0.00
NiO	0.00	0.00	0.00	0.12	0.00	0.00	0.05	0.08
Oxide Totals	99.95	100.23	100.37	100.18	99.68	100.15	100.80	99.60
Fo	75.8	72.7	74.9	71.3	76.2	75.2	74.9	73.9

Sample	DC-8-B	DC-8-B	DC-8-B	DC-8-B	DC-8-B	DC-8-B	DC-8-B	DC-8-B
Rock Type	CB And	CB And	CB And	CB And	CB And	CB And	CB And	CB And
Line Number	1	2	1	2	1	2	1	2
SiO_2	38.79	37.87	38.37	38.12	37.90	38.63	37.53	38.43
Al_2O_3	0.02	0.03	0.03	0.01	0.52	0.01	0.00	0.01
FeO	20.80	22.85	22.46	21.53	21.19	20.44	25.84	20.99
MgO	40.00	38.47	39.48	40.25	39.00	40.54	36.14	39.90
CaO	0.16	0.16	0.13	0.14	0.17	0.20	0.12	0.17
TiO_2	0.05	0.04	0.00	0.02	0.01	0.00	0.02	0.02
MnO	0.42	0.32	0.39	0.33	0.32	0.32	0.43	0.34
Cr_2O_3	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.04
NiO	0.02	0.02	0.03	0.00	0.08	0.00	0.05	0.07
Oxide Totals	100.25	99.76	100.88	100.39	99.19	100.13	100.13	99.97
Fo	76.8	74.5	75.3	76.5	75.5	77.5	70.9	76.7

Sample	DC-8-B	DC-8-B	DC-8-B	DC-8-B	DC-6-D	DC-6-D	DC-6-D	DC-6-D
Rock Type	CB And	CB And	CB And	CB And	DB Dac	DB Dac	DB Dac	DB Dac
Line Number	1	2	1	2	1	2	1	2
SiO_2	38.15	38.28	37.92	38.81	38.85	38.92	38.85	38.26
Al_2O_3	0.02	0.04	0.05	0.04	0.00	0.05	0.00	0.03
FeO	22.65	21.90	24.10	21.42	19.20	19.43	20.00	20.85
MgO	38.75	39.79	37.16	40.39	41.93	41.47	41.92	40.40
CaO	0.17	0.18	0.19	0.17	0.24	0.22	0.19	0.20
TiO_2	0.01	0.00	0.01	0.04	0.03	0.01	0.00	0.03
MnO	0.37	0.34	0.40	0.31	0.34	0.31	0.34	0.29
Cr_2O_3	0.00	0.00	0.02	0.04	0.03	0.00	0.05	0.04
NiO	0.09	0.03	0.00	0.03	0.00	0.01	0.00	0.05
Oxide Totals	100.21	100.57	99.85	101.25	100.61	100.42	101.36	100.15
Fo	74.7	75.9	72.7	76.5	79.0	78.6	78.4	76.9

Sample	DC-6-D	DC-6-D	DC-6-D	DC-6-D	DC-6-D	DC-3D-2	DC-3D-2	DC-3D-2
Rock Type	DB Dac	DB Dac	DB Dac	DB Dac	DB Dac	DB Dac	DB Dac	DB Dac
Line Number	1	2	1	2	1	1	2	3
SiO_2	39.06	37.95	39.89	40.67	38.02	38.22	39.51	39.55
Al_2O_3	0.07	0.06	0.06	0.04	0.02	0.00	0.03	0.03
FeO	17.99	24.33	15.71	13.44	24.66	20.13	16.33	13.42
MgO	42.76	36.84	44.72	46.56	37.48	40.72	43.94	46.17
CaO	0.23	0.13	0.17	0.48	0.15	0.15	0.18	0.19
TiO_2	0.03	0.06	0.00	0.00	0.02	0.05	0.00	0.06
MnO	0.29	0.44	0.21	0.13	0.46	0.44	0.25	0.20
Cr_2O_3	0.00	0.01	0.03	0.09	0.03	0.00	0.00	0.01
NiO	0.09	0.03	0.06	0.05	0.00	0.12	0.12	0.18
Oxide Totals	100.52	99.85	100.84	101.45	100.82	99.83	100.35	99.82
Fo	80.2	72.3	83.0	85.1	72.5	77.6	82.2	85.3

Sample	DC-3D-2	DC-3D-2	DC-3D-2	DC-3D-2	DC-3D-2	DC-3D-2	DC-3D-2	DC-3D-2
Rock Type	DB Dac	DB Dac	DB Dac	DB Dac	DB Dac	DB Dac	DB Dac	DB Dac
Line Number	4	1	2	3	4	1	2	3
SiO_2	39.75	39.90	38.57	38.64	39.47	38.09	38.50	39.18
Al_2O_3	0.00	0.08	0.02	0.02	0.02	0.05	0.01	0.00
FeO	13.27	16.15	16.99	15.81	14.71	19.30	17.91	18.15
MgO	46.52	44.69	43.50	43.51	45.39	41.30	41.91	42.66
CaO	0.16	0.13	0.10	0.17	0.12	0.09	0.11	0.17
TiO_2	0.00	0.01	0.00	0.02	0.02	0.01	0.02	0.03
MnO	0.19	0.23	0.31	0.21	0.24	0.32	0.30	0.39
Cr_2O_3	0.08	0.00	0.05	0.00	0.00	0.00	0.00	0.02
NiO	0.14	0.26	0.08	0.14	0.07	0.06	0.17	0.12
Oxide Totals	100.10	101.46	99.63	98.50	100.04	99.23	98.91	100.72
Fo	85.7	82.5	81.4	82.5	84.2	78.8	80.1	80.1

Sample	DC-3D-2	DC-3D-2	DC-3D-2	DC-3D-2	DC-3D-2	DC-3D-2	DC-3D-2	DC-3D-2
Rock Type	DB Dac	DB Dac	DB Dac	DB Dac	DB Dac	DB Dac	DB Dac	DB Dac
Line Number	1	2	1	2	1	2	1	2
SiO_2	38.94	38.82	38.82	38.46	39.01	37.44	38.34	37.58
Al_2O_3	0.00	0.00	0.02	0.00	0.07	0.02	0.00	0.02
FeO	17.19	17.70	17.40	22.55	18.81	24.78	19.77	24.42
MgO	43.54	42.63	42.89	39.31	42.27	36.30	41.39	37.22
CaO	0.15	0.18	0.12	0.13	0.16	0.10	0.20	0.10
TiO_2	0.02	0.00	0.01	0.00	0.04	0.04	0.00	0.02
MnO	0.23	0.41	0.30	0.41	0.35	0.57	0.38	0.50
Cr_2O_3	0.07	0.00	0.00	0.00	0.00	0.02	0.02	0.05
NiO	0.13	0.11	0.14	0.16	0.00	0.13	0.14	0.06
Oxide Totals	100.27	99.85	99.70	101.01	100.72	99.39	100.23	99.96
Fo	81.4	80.5	80.9	75.0	79.4	71.5	78.2	72.5

Sample	DC-3D-2	DC-3D-2	DC-3D-2	DC-3D-2	DC-3D-2	DC-3D-2	DC-3D-2	DC-3D-2
Rock Type	DB Dac	DB Dac	DB Dac	DB Dac	DB Dac	DB Dac	DB Dac	DB Dac
Line Number	1	2	3	1	2	3	1	2
SiO_2	38.46	38.21	38.14	39.37	39.47	39.40	39.88	38.68
Al_2O_3	0.00	0.02	0.03	0.06	0.03	0.02	0.05	0.05
FeO	17.55	19.62	19.40	19.62	16.03	16.18	16.01	18.80
MgO	42.68	40.77	41.38	42.45	44.47	44.64	45.20	42.60
CaO	0.17	0.19	0.16	0.12	0.19	0.17	0.17	0.17
TiO_2	0.00	0.01	0.00	0.00	0.01	0.03	0.04	0.03
MnO	0.27	0.40	0.40	0.17	0.20	0.29	0.28	0.26
Cr_2O_3	0.02	0.00	0.00	0.05	0.00	0.01	0.04	0.00
NiO	0.15	0.04	0.00	0.18	0.11	0.19	0.18	0.07
Oxide Totals	99.31	99.25	99.50	102.01	100.52	100.92	101.85	100.66
Fo	80.7	78.1	78.6	78.9	82.7	82.4	82.6	79.6

Sample	DC-3D-2	DC-3D-2	DC-3D-2	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1	DC-3D-1
Rock Type	DB Dac	DB Dac	DB Dac	DB Dac	DB Dac	DB Dac	DB Dac	DB Dac
Line Number	1	2	3	1	2	1	2	1
SiO_2	38.99	38.52	39.17	39.17	38.27	39.07	38.38	39.66
Al_2O_3	0.02	0.00	0.04	0.01	0.00	0.04	0.06	0.06
FeO	17.69	19.55	18.51	16.57	22.04	18.68	21.35	14.46
MgO	43.26	42.26	42.74	43.41	39.88	41.84	40.00	45.14
CaO	0.22	0.17	0.16	0.16	0.19	0.21	0.19	0.19
TiO_2	0.00	0.03	0.00	0.03	0.00	0.00	0.01	0.01
MnO	0.29	0.27	0.23	0.28	0.35	0.32	0.39	0.18
Cr_2O_3	0.03	0.00	0.00	0.00	0.06	0.00	0.02	0.08
NiO	0.08	0.03	0.14	0.11	0.04	0.10	0.10	0.03
Oxide Totals	100.56	100.83	100.98	99.74	100.84	100.26	100.51	99.81
Fo	80.7	78.9	79.9	81.8	75.8	79.3	76.3	84.2

Sample	DC-3D-1	DC-3D-1	DC-21-2	DC-21-2	DC-21-2	DC-21-2	DC-21-2	DC-21-2
Rock Type	DB Dac	DB Dac	Encl	Encl	Encl	Encl	Encl	Encl
Line Number	2	3	1	2	3	4	1	2
SiO_2	38.72	39.29	37.79	37.81	37.46	37.98	37.05	37.51
Al_2O_3	0.00	0.04	-	-	-	-	-	-
FeO	18.16	17.39	22.23	22.25	22.34	22.87	23.99	23.25
MgO	42.22	43.11	38.83	38.23	37.66	38.15	36.73	36.91
CaO	0.17	0.19	0.19	0.18	0.11	0.14	0.14	0.11
TiO_2	0.00	0.03	0.00	0.00	0.00	0.01	0.01	0.00
MnO	0.33	0.35	0.36	0.34	0.42	0.41	0.50	0.49
Cr_2O_3	0.00	0.05	0.01	0.00	0.01	0.02	0.11	0.00
NiO	0.04	0.13	0.00	0.01	0.01	0.02	0.00	0.00
Oxide Totals	99.64	100.57	99.40	98.81	98.00	99.59	98.53	98.28
Fo	80.0	80.8	75.2	74.9	74.6	74.3	72.6	73.4

Sample	DC-21-2	DC-21-2	DC-21-2	DC-21-2	DC-21-2	DC-21-2	DC-21-2	DC-21-2
Rock Type	Encl	Encl	Encl	Encl	Encl	Encl	Encl	Encl
Line Number	3	4	0	1	2	3	1	2
SiO_2	37.34	37.59	38.38	37.78	37.34	37.74	37.85	37.64
Al_2O_3	-	-	-	-	-	-	-	-
FeO	24.91	24.43	19.69	20.42	22.18	22.53	22.94	22.57
MgO	35.12	36.57	41.05	39.77	38.62	37.87	38.23	37.57
CaO	0.14	0.15	0.16	0.23	0.18	0.20	0.17	0.16
TiO_2	0.01	0.02	0.06	0.04	0.02	0.03	0.00	0.00
MnO	0.42	0.45	0.35	0.39	0.34	0.43	0.42	0.36
Cr_2O_3	0.00	0.02	0.00	0.05	0.03	0.00	0.00	0.00
NiO	0.04	0.04	0.10	0.08	0.04	0.06	0.01	0.02
Oxide Totals	97.99	99.26	99.75	98.72	98.75	98.85	99.62	98.32
Fo	71.0	72.2	78.2	76.9	75.1	74.3	74.3	74.3

Sample	DC-21-2	DC-21-2	DC-21-2	DC-21-2	DC-21-2	DC-21-2	DC-21-2	DC-21-2
Rock Type	Encl	Encl	Encl	Encl	Encl	Encl	Encl	Encl
Line Number	1	2	3	1	2	1	2	3
SiO_2	38.00	37.80	38.75	38.47	37.68	37.95	37.30	37.67
Al_2O_3	-	-	-	-	-	-	-	-
FeO	20.54	22.46	17.03	17.86	22.76	21.30	24.87	24.90
MgO	39.58	38.01	42.68	41.93	38.17	39.39	36.68	37.34
CaO	0.21	0.10	0.18	0.18	0.18	0.22	0.18	0.15
TiO_2	0.01	0.00	0.05	0.02	0.05	0.00	0.06	0.00
MnO	0.43	0.39	0.19	0.30	0.49	0.36	0.49	0.36
Cr_2O_3	0.00	0.08	0.01	0.03	0.02	0.00	0.00	0.01
NiO	0.00	0.09	0.08	0.01	0.21	0.02	0.00	0.00
Oxide Totals	98.76	98.93	98.96	98.78	99.56	99.24	99.57	100.43
Fo	76.9	74.5	81.2	80.2	74.2	76.2	71.8	72.3

Sample	DC-21-2	DC-21-2	DC-21-2	DC-21-2	DC-21-2	DC-21-2	DC-21-2	DC-21-2
Rock Type	Encl	Encl	Encl	Encl	Encl	Encl	Encl	Encl
Line Number	1	2	1	2	1	2	1	2
SiO_2	38.09	39.04	38.94	38.53	38.17	37.46	37.20	37.75
Al_2O_3	-	-	-	-	-	-	-	-
FeO	24.39	18.61	19.66	19.99	20.49	24.93	24.57	23.90
MgO	37.39	42.33	41.45	40.93	39.68	37.77	36.09	37.68
CaO	0.17	0.26	0.12	0.22	0.23	0.15	0.14	0.13
TiO_2	0.05	0.03	0.02	0.02	0.03	0.04	0.02	0.04
MnO	0.36	0.31	0.31	0.41	0.37	0.38	0.48	0.40
Cr_2O_3	0.00	0.00	0.00	0.00	0.00	0.02	0.01	0.00
NiO	0.00	0.08	0.07	0.00	0.00	0.04	0.06	0.07
Oxide Totals	100.44	100.67	100.57	100.11	98.96	100.79	98.57	99.97
Fo	72.7	79.6	78.5	77.9	77.0	72.5	71.8	73.2

Sample	DC-4B	DC-4B	DC-4B	DC-4B	DC-4B	DC-4B	DC-4B	DC-4B
Rock Type	Encl	Encl	Encl	Encl	Encl	Encl	Encl	Encl
Line Number	1	2	1	2	1	2	1	2
SiO_2	39.15	39.47	39.57	39.21	39.44	39.85	39.44	39.24
Al_2O_3	-	-	-	-	-	-	-	-
FeO	17.14	16.22	15.97	15.70	17.26	15.01	15.62	16.23
MgO	44.15	43.54	44.35	43.97	43.58	44.78	45.22	44.56
CaO	0.18	0.16	0.16	0.18	0.18	0.19	0.32	0.14
TiO_2	0.04	0.00	0.00	0.02	0.01	0.00	0.02	0.00
MnO	0.31	0.28	0.28	0.31	0.40	0.20	0.19	0.21
Cr_2O_3	0.00	0.00	0.02	0.04	0.04	0.00	0.10	0.04
NiO	0.03	0.11	0.09	0.00	0.11	0.06	0.08	0.12
Oxide Totals	101.01	99.76	100.42	99.42	101.02	100.08	100.99	100.54
Fo	81.5	82.2	82.7	82.8	81.1	83.8	83.0	82.6

Sample	DC-3C-1	DC-3C-1	DC-3C-1	DC-3C-1	DC-3C-1	DC-3C-1	DC-3C-1	DC-3C-1
Rock Type	Encl	Encl	Encl	Encl	Encl	Encl	Encl	Encl
Line Number	1	2	1	2	1	2	1	2
SiO_2	37.78	37.89	38.24	37.93	36.71	38.47	38.59	38.79
Al_2O_3	-	-	-	-	-	-	-	-
FeO	23.31	23.98	23.39	24.24	23.69	19.43	19.59	19.70
MgO	37.70	37.19	38.42	38.08	36.72	40.72	41.11	40.81
CaO	0.15	0.18	0.19	0.18	0.22	0.23	0.22	0.19
TiO_2	0.07	0.02	0.00	0.04	0.00	0.01	0.04	0.01
MnO	0.33	0.46	0.32	0.32	0.36	0.28	0.23	0.25
Cr_2O_3	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.06
NiO	0.04	0.01	0.05	0.01	0.02	0.07	0.01	0.07
Oxide Totals	99.37	99.73	100.60	100.81	97.75	99.22	99.79	99.88
Fo	73.8	72.9	74.0	73.2	72.9	78.4	78.4	78.2

Sample	DC-3C-1	DC-3C-1	DC-3C-1	DC-3C-1	DC-3C-1	DC-3C-1	DC-3C-1	DC-3C-1
Rock Type	Encl	Encl	Encl	Encl	Encl	Encl	Encl	Encl
Line Number	1	2	1	2	1	2	1	1
SiO_2	38.43	38.59	38.96	38.44	38.16	37.52	37.85	37.92
Al_2O_3	-	-	-	-	-	-	-	-
FeO	19.99	20.96	19.18	23.46	23.73	24.72	25.34	23.72
MgO	41.21	39.56	41.81	38.92	38.01	36.81	36.81	37.25
CaO	0.19	0.20	0.19	0.18	0.18	0.12	0.20	0.22
TiO_2	0.00	0.04	0.00	0.02	0.00	0.00	0.01	0.06
MnO	0.29	0.29	0.20	0.33	0.32	0.42	0.47	0.28
Cr_2O_3	0.03	0.04	0.00	0.01	0.04	0.02	0.00	0.00
NiO	0.03	0.05	0.08	0.06	0.05	0.00	0.00	0.02
Oxide Totals	100.15	99.73	100.42	101.41	100.49	99.60	100.68	99.46
Fo	78.1	76.5	79.1	74.3	73.5	72.2	71.6	73.2

APPENDIX E2

Olivine analyses: Volcán Ceboruco, Mexico

Olivine analyses were obtained using a Cameca SX-50 electron microprobe at the University of Alaska Fairbanks or a Cameca Camebax electron microprobe at Brown University, under the following analytical conditions: an accelerating voltage of 15 KeV, beam current of 10 nA, and a focused beam with a spot size of 1-3 μm. Major oxides are reported in weight percent (wt.%) with total Fe reported as FeO. "Line number" refers to the analysis number during a particular analytical transect. "Rock type" refers to the host rock, which contained the olivine that was analyzed. Abbreviations as follows: **DE** Dos Equis; **Fo** - forsterite content (mol.%). Standards, counting times, and analytical errors are summarized in the table below:

Element	Counting Times (seconds)		Standard	Typical Analytical Error (wt.%, 1σ)
	Peak	Bkgd.		
Si	10	5	Diopside (CM Taylor)	.132
Al	10	5	Kyanite (CM Taylor)	.002
Fe	10	5	Fayalite (USNM 85276)	.295
Mg	10	5	Diopside (CM Taylor)	.206
Ca	20	10	Diopside (CM Taylor)	.009
Ti	10	5	Sphene (CM Taylor)	.005
Mn	20	10	Olivine (USNM 1113127444)	.048
Cr	20	10	Chromite (CM Taylor)	.002
Ni	20	10	NIAS	.002

Sample	77 P2B-E	77 P2B-E	77 P2B-E	77 P2B-E	77 P2B-E	77 P2B-E	77 P2B-E	77 P2B-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	1	2	1	2	1	2	1	2
SiO_2	37.86	38.16	37.98	37.89	38.42	38.70	37.86	38.14
Al_2O_3	0.04	0.03	0.08	0.04	0.01	0.05	0.00	0.05
FeO	23.78	24.02	23.12	21.55	21.03	20.05	24.28	23.56
MgO	37.98	37.67	37.86	38.85	40.29	40.68	37.07	37.26
CaO	0.24	0.21	0.22	0.31	0.18	0.18	0.13	0.14
TiO_2	0.09	0.09	0.10	0.11	0.03	0.00	0.02	0.01
MnO	0.49	0.53	0.42	0.28	0.32	0.23	0.38	0.41
Cr_2O_3	0.05	0.01	0.03	0.00	0.05	0.05	0.00	0.00
NiO	-	-	-	-	0.07	0.00	-	-
Oxide Totals	100.53	100.72	99.81	99.03	100.38	99.93	99.74	99.57
Fo	74.0	73.7	74.5	76.3	76.8	77.8	73.1	73.8

Sample	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A	CBV-XX-2A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	1	1	2	3	1	2	1	2
SiO_2	38.10	38.14	38.22	38.44	39.38	38.32	38.55	38.58
Al_2O_3	0.07	0.03	0.01	0.08	0.01	0.03	0.04	0.01
FeO	22.55	24.24	21.99	19.89	23.49	20.43	21.16	20.68
MgO	38.08	37.29	38.98	40.21	39.52	40.22	39.60	40.45
CaO	0.20	0.20	0.16	0.16	0.16	0.16	0.17	0.12
TiO_2	0.14	0.01	0.00	0.03	0.02	0.05	0.00	0.01
MnO	0.50	0.41	0.36	0.28	0.44	0.31	0.40	0.25
Cr_2O_3	0.00	0.06	0.00	0.00	0.02	0.00	0.09	0.00
NiO	-	-	0.07	0.03	0.00	0.12	0.00	0.00
Oxide Totals	99.64	100.38	99.78	99.12	103.03	99.62	100.01	100.11
Fo	75.1	73.3	75.5	77.7	74.5	77.2	76.3	77.4

Sample	77 P2B-A	77 P2B-A	77 P2B-A	77 P2B-A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	1	2	1	2	3	1	2	1
SiO_2	37.60	38.00	37.72	37.42	38.01	37.93	38.11	38.76
Al_2O_3	0.00	0.03	0.04	0.03	0.04	0.01	0.04	0.00
FeO	22.74	21.73	22.67	25.57	21.26	22.42	23.52	20.67
MgO	38.37	39.32	38.45	36.51	39.71	38.53	38.39	40.00
CaO	0.16	0.16	0.14	0.15	0.14	0.16	0.14	0.14
TiO_2	0.01	0.01	0.00	0.00	0.01	0.02	0.02	0.04
MnO	0.41	0.34	0.33	0.45	0.30	0.30	0.30	0.30
Cr_2O_3	0.00	0.01	0.04	0.02	0.01	0.00	0.00	0.02
NiO	0.06	0.00	0.01	0.00	0.03	0.04	0.14	0.01
Oxide Totals	99.35	99.60	99.40	100.14	99.50	99.41	100.67	99.93
Fo	74.5	75.9	74.7	71.3	76.4	74.9	73.9	77.1

Sample	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A	CBV-XX-1A
Rock Type	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite	DE dacite
Line Number	1	2	1	2	1	2	1	2
SiO_2	37.48	38.18	38.14	38.11	37.79	37.45	39.27	38.32
Al_2O_3	0.06	0.00	0.00	0.02	0.02	0.00	0.01	0.03
FeO	24.59	20.90	21.16	21.42	23.68	22.17	20.30	23.39
MgO	37.14	40.12	40.44	39.79	38.45	38.65	41.16	38.16
CaO	0.15	0.16	0.15	0.14	0.17	0.20	0.16	0.14
TiO_2	0.03	0.00	0.02	0.01	0.01	0.06	0.02	0.01
MnO	0.40	0.32	0.29	0.29	0.36	0.36	0.36	0.33
Cr_2O_3	0.00	0.00	0.00	0.02	0.04	0.02	0.02	0.05
NiO	0.06	0.00	0.03	0.06	0.04	0.08	0.09	0.08
Oxide Totals	99.90	99.69	100.23	99.86	100.55	99.00	101.38	100.50
Fo	72.3	76.9	76.9	76.4	73.8	75.0	77.8	73.9

APPENDIX F1

Amphibole analyses: Mt. Dutton volcano, Alaska

Amphibole analyses were obtained using a Cameca SX-50 electron microprobe at the University of Alaska Fairbanks, under the following analytical conditions: an accelerating voltage of 15 KeV, beam current of 10 nA, and a focused beam with a spot size of 1-3 μm. Major oxides are reported in weight percent (wt.%) with total Fe reported as FeO. "Line number" refers to the analysis number during a particular analytical transect. "Rock type" refers to the host rock, which contained the amphibole that was analyzed. Abbreviations as follows: **DB Dac** - Dome-building dacite; **CB And** - Cone-building andesite; **Encl** - enclave. Standards, counting times and analytical errors are summarized in the table below:

Element	Counting Times (seconds)		Standard	Typical Analytical Error (wt.%, 1σ)
	Peak	Bkgd.		
Si	20	5	Orthoclase (CM Taylor)	.229
Ti	10	5	Sphene (CM Taylor)	.058
Al	20	5	Orthoclase (CM Taylor)	.129
Fe	10	5	Synthetic almandine (SALM)	.357
Mn	10	5	Willimite (CM Taylor)	.032
Mg	10	5	Hypersthene (USNM 746)	.087
Ca	10	5	Sphene (CM Taylor)	.001
Na	10	5	Tiburon albite (TALBITE)	.028
K	10	5	Orthoclase (CM Taylor)	.017
F	10	5	Fluorite (CM Taylor)	.105
Cl	10	5	Scapolite (USNM R6600-1)	.007

Sample	DC-2D-1	DC-2D-1	DC-2D-1	DC-2D-1	DC-2D-1	DC-2D-1	DC-2D-1	DC-2D-1
Rock type	DB dac	DB dac	DB dac	DB dac	DB dac	DB dac	DB dac	DB dac
Line number	1	2	3	1	2	3	4	1
SiO_2	47.44	47.88	47.90	47.49	44.30	47.34	47.63	47.03
TiO_2	1.27	1.60	1.42	2.12	1.79	1.23	1.52	1.52
Al_2O_3	6.71	6.73	6.81	6.93	6.54	6.80	6.31	7.00
FeO	15.15	14.97	14.14	15.23	14.81	14.84	14.83	15.17
MnO	0.28	0.21	0.42	0.34	0.34	0.34	0.32	0.50
MgO	14.24	14.05	14.24	14.37	14.46	13.58	14.25	13.76
CaO	11.08	11.24	11.10	11.17	10.70	10.84	10.90	10.87
Na_2O	1.22	1.42	1.37	1.41	1.48	1.39	1.41	1.52
K_2O	0.28	0.25	0.32	0.29	0.31	0.28	0.29	0.31
F	0.32	0.00	0.04	0.18	0.86	0.14	0.18	0.53
Cl	0.15	0.11	0.13	0.16	0.19	0.14	0.14	0.13
Total	98.14	98.45	97.87	99.68	95.77	96.92	97.78	98.35

Sample	DC-2D-1	DC-2D-1	DC-2D-1	DC-2D-1	DC-2D-1	DC-2D-1	DC-2D-1	DC-2D-1
Rock type	DB dac	DB dac	DB dac	DB dac	DB dac	DB dac	DB dac	DB dac
Line number	2	3	4	5	6	7	8	9
SiO_2	47.14	47.54	46.37	47.58	47.32	47.84	46.70	47.10
TiO_2	1.59	1.44	1.09	1.57	1.32	1.34	1.32	1.05
Al_2O_3	7.02	7.07	6.72	6.77	6.73	6.83	7.20	7.23
FeO	15.40	15.50	15.45	14.90	14.82	15.37	15.22	15.58
MnO	0.39	0.38	0.28	0.41	0.38	0.37	0.26	0.43
MgO	13.47	13.73	14.37	13.84	13.92	13.57	13.45	13.36
CaO	11.10	10.70	11.03	11.11	11.31	10.69	10.93	11.17
Na_2O	1.34	1.29	1.45	1.41	1.47	1.38	1.46	1.36
K_2O	0.31	0.33	0.34	0.30	0.29	0.27	0.35	0.35
F	0.07	0.18	0.25	0.04	0.14	0.07	0.00	0.00
Cl	0.15	0.11	0.12	0.14	0.18	0.16	0.14	0.20
Total	97.98	98.26	97.45	98.05	97.85	97.89	97.02	97.82

Sample	DC-2D-1	DC-2D-1	DC-2D-1	DC-2D-1	DC-2D-1	DC-2D-1	DC-2D-1	DC-2D-1
Rock type	DB dac	DB dac	DB dac	DB dac	DB dac	DB dac	DB dac	DB dac
Line number	10	1	2	3	4	5	6	7
SiO_2	46.90	47.07	47.33	47.83	47.53	47.19	47.99	47.39
TiO_2	1.55	1.57	1.39	1.80	1.51	1.65	1.09	1.61
Al_2O_3	7.22	6.81	6.63	6.64	6.91	6.74	6.47	6.76
FeO	15.14	15.68	14.45	15.17	14.86	14.71	14.67	15.52
MnO	0.22	0.33	0.36	0.39	0.46	0.46	0.21	0.41
MgO	13.09	13.57	13.88	13.78	13.93	14.05	14.20	13.90
CaO	11.00	10.93	11.06	11.20	11.27	10.90	11.15	11.06
Na_2O	1.35	1.53	1.23	1.19	1.32	1.23	1.14	1.45
K_2O	0.32	0.31	0.23	0.25	0.30	0.29	0.23	0.22
F	0.25	0.43	0.18	0.07	0.55	0.11	0.51	0.21
Cl	0.19	0.14	0.15	0.11	0.14	0.13	0.13	0.15
Total	97.21	98.36	96.89	98.42	98.77	97.46	97.79	98.68

Sample	DC-2D-1	DC-2D-1	DC-2D-1	DC-2D-1	DC-2D-1	DC-2D-1	DC-2D-1	DC-2D-1
Rock type	DB dac	DB dac	DB dac	DB dac	DB dac	DB dac	DB dac	DB dac
Line number	8	9	10	1	2	1	2	3
SiO_2	47.45	47.52	47.20	48.33	47.13	46.89	47.53	47.60
TiO_2	1.77	1.30	1.41	1.66	1.71	1.66	1.47	1.47
Al_2O_3	6.87	6.74	6.79	7.07	7.05	7.25	7.54	6.83
FeO	15.44	14.62	14.69	15.00	14.36	14.87	14.39	14.55
MnO	0.27	0.32	0.49	0.25	0.27	0.51	0.33	0.36
MgO	13.98	14.15	13.96	13.40	13.81	13.79	14.22	14.36
CaO	10.90	10.93	11.01	11.04	11.00	11.41	11.03	11.20
Na_2O	1.29	1.28	1.23	1.33	1.48	1.34	1.48	1.46
K_2O	0.27	0.27	0.25	0.27	0.28	0.32	0.32	0.28
F	0.26	0.07	0.00	0.22	0.26	0.36	0.11	0.07
Cl	0.12	0.10	0.14	0.17	0.15	0.18	0.14	0.10
Total	98.61	97.28	97.16	98.74	97.58	98.58	98.55	98.28

Sample	DC-2D-1	DC-2D-1	DC-2D-1	DC-2D-1	DC-2D-1	DC-2D-1	DC-2D-1	DC-2D-1
Rock type	DB dac	DB dac	DB dac	DB dac	DB dac	DB dac	DB dac	DB dac
Line number	4	5	6	7	8	9	10	1
SiO_2	47.61	46.95	47.50	47.39	46.85	47.14	47.25	47.77
TiO_2	1.41	1.49	1.39	1.58	2.21	1.30	1.28	1.47
Al_2O_3	6.74	7.19	7.18	7.08	7.19	7.20	7.00	6.80
FeO	14.72	14.97	15.00	14.92	14.70	15.55	14.70	15.07
MnO	0.28	0.06	0.23	0.55	0.38	0.24	0.30	0.20
MgO	14.47	14.43	14.12	14.10	13.44	13.57	13.62	13.79
CaO	11.00	11.28	11.12	11.12	11.11	10.82	10.92	10.83
Na_2O	1.41	1.35	1.53	1.42	1.50	1.58	1.40	1.38
K_2O	0.20	0.23	0.30	0.26	0.32	0.33	0.26	0.24
F	0.15	0.11	0.19	0.25	0.19	0.25	0.00	0.00
Cl	0.08	0.12	0.13	0.13	0.10	0.15	0.14	0.08
Total	98.07	98.17	98.67	98.80	97.98	98.12	96.87	97.63

Sample	DC-2D-1	DC-2D-1	DC-2D-1	DC-2D-1	DC-2D-1	DC-2D-1	DC-2D-1	DC-2D-1
Rock type	DB dac	DB dac	DB dac	DB dac	DB dac	DB dac	DB dac	DB dac
Line number	2	3	4	5	6	1	2	3
SiO_2	48.03	47.79	47.29	47.24	47.39	47.32	47.21	46.94
TiO_2	1.94	1.18	1.41	1.18	1.32	1.58	1.30	1.66
Al_2O_3	6.86	7.12	7.25	7.13	6.22	6.98	6.76	6.90
FeO	15.19	14.38	15.38	15.48	14.55	15.30	14.96	14.64
MnO	0.51	0.31	0.46	0.45	0.31	0.26	0.47	0.19
MgO	13.82	13.05	13.57	14.20	13.99	13.84	13.50	14.33
CaO	10.76	10.66	11.35	11.15	10.83	10.90	10.73	10.99
Na_2O	1.35	2.25	1.37	1.40	1.52	1.33	1.40	1.39
K_2O	0.24	0.35	0.29	0.29	0.24	0.27	0.24	0.23
F	0.07	0.79	0.07	0.32	0.36	0.46	0.43	0.25
Cl	0.14	0.16	0.13	0.19	0.14	0.12	0.13	0.10
Total	98.90	98.04	98.57	99.03	96.86	98.36	97.13	97.62

Sample	DC-2D-1	DC-6A	DC-6A	DC-6A	DC-6A	DC-6A	DC-6A	DC-6A
Rock type	DB dac	DB dac	DB dac	DB dac	DB dac	DB dac	DB dac	DB dac
Line number	4	1	2	3	4	5	6	7
SiO_2	47.29	46.78	46.63	46.94	46.70	46.58	48.15	47.73
TiO_2	1.34	1.50	1.92	1.77	1.59	1.65	1.55	1.29
Al_2O_3	6.86	7.47	7.47	7.63	7.54	7.66	6.65	6.74
FeO	14.69	14.53	14.25	15.17	14.59	14.31	14.19	14.53
MnO	0.45	0.31	0.32	0.27	0.25	0.29	0.21	0.24
MgO	13.78	13.92	14.00	13.84	13.92	14.49	14.73	14.67
CaO	11.05	11.03	11.49	11.11	11.23	11.29	11.15	10.98
Na_2O	1.35	1.58	1.57	1.45	1.65	1.51	1.37	1.41
K_2O	0.26	0.30	0.33	0.31	0.32	0.30	0.23	0.20
F	0.11	0.00	0.25	0.35	0.00	0.60	0.40	0.00
Cl	0.15	0.14	0.17	0.11	0.15	0.13	0.16	0.16
Total	97.34	97.56	98.37	98.96	97.95	98.80	98.78	97.95

Sample	DC-6A	DC-6A	DC-6A	DC-6A	DC-6A	DC-6A	DC-6A	DC-6A
Rock type	DB dac	DB dac	DB dac	DB dac	DB dac	DB dac	DB dac	DB dac
Line number	8	9	10	1	2	3	4	5
SiO_2	47.73	47.86	48.05	43.86	43.66	43.47	41.82	42.98
TiO_2	1.32	1.42	1.55	1.86	2.07	2.68	3.24	3.14
Al_2O_3	6.70	6.72	6.81	10.78	11.00	11.14	12.02	11.64
FeO	14.75	14.37	14.78	12.90	12.99	12.47	12.38	12.13
MnO	0.35	0.12	0.35	0.42	0.34	0.27	0.12	0.29
MgO	14.83	14.77	14.77	14.69	14.47	14.53	14.17	14.67
CaO	11.16	11.15	11.04	11.02	10.96	11.18	11.24	10.79
Na_2O	1.28	1.49	1.34	2.08	2.32	2.47	2.47	2.64
K_2O	0.26	0.28	0.27	0.23	0.25	0.27	0.27	0.28
F	0.61	0.14	0.32	0.40	0.07	0.00	0.00	0.14
Cl	0.12	0.21	0.12	0.07	0.07	0.09	0.00	0.02
Total	99.08	98.53	99.40	98.30	98.21	98.56	97.75	98.71

Sample	DC-6A	DC-6A	DC-6A	DC-6A	DC-6A	DC-6A	DC-6A	DC-6A
Rock type	DB dac	DB dac	DB dac	DB dac	DB dac	DB dac	DB dac	DB dac
Line number	6	7	8	1	2	3	4	5
SiO_2	42.48	43.02	43.08	46.97	47.37	47.64	47.06	47.40
TiO_2	3.31	2.95	2.91	1.92	1.30	1.57	1.70	1.32
Al_2O_3	11.88	11.45	11.61	7.02	7.12	6.88	6.94	7.07
FeO	12.64	13.05	13.26	14.82	14.99	15.26	14.40	15.41
MnO	0.24	0.34	0.38	0.39	0.28	0.27	0.49	0.42
MgO	14.49	14.57	14.20	13.94	13.83	14.03	13.77	13.79
CaO	11.39	11.06	11.36	10.86	11.17	11.25	11.18	11.07
Na_2O	2.62	2.46	2.33	1.43	1.33	1.43	1.32	1.60
K_2O	0.29	0.30	0.30	0.27	0.32	0.28	0.31	0.31
F	0.07	0.00	0.18	0.18	0.57	0.14	0.00	0.36
Cl	0.05	0.03	0.07	0.12	0.14	0.12	0.17	0.13
Total	99.45	99.23	99.68	97.90	98.41	98.86	97.33	98.88

Sample	DC-6A	DC-6A	DC-6A	DC-6A	DC-6A	DC-6A	DC-6A	DC-6A
Rock type	DB dac	DB dac	DB dac	DB dac	DB dac	DB dac	DB dac	DB dac
Line number	6	7	8	9	10	1	2	3
SiO_2	47.30	46.91	47.29	47.41	47.31	47.08	47.82	47.56
TiO_2	1.61	1.40	1.32	1.65	1.82	1.78	1.13	1.36
Al_2O_3	7.21	7.46	7.11	7.12	7.18	7.04	6.88	7.31
FeO	15.50	15.46	15.50	13.99	14.88	14.76	14.27	15.05
MnO	0.42	0.39	0.39	0.38	0.33	0.31	0.52	0.40
MgO	13.95	14.00	13.95	14.09	13.75	14.12	14.23	14.01
CaO	11.31	11.21	11.36	11.02	11.20	10.98	11.00	11.16
Na_2O	1.53	1.48	1.31	1.46	1.56	1.50	1.43	1.29
K_2O	0.31	0.35	0.30	0.34	0.30	0.29	0.35	0.27
F	0.71	0.18	0.18	0.29	0.14	0.25	0.36	0.18
Cl	0.15	0.15	0.18	0.19	0.13	0.13	0.16	0.08
Total	100.00	98.98	98.68	97.95	98.59	98.25	98.14	98.68

Sample	DC-6A	DC-6A	DC-6A	DC-6A	DC-6A	DC-6A	DC-6A	DC-6A
Rock type	DB dac	DB dac	DB dac	DB dac	DB dac	DB dac	DB dac	DB dac
Line number	4	5	6	7	1	2	3	4
SiO_2	47.22	46.96	47.30	47.36	47.58	47.65	47.38	47.87
TiO_2	1.45	1.70	1.93	1.58	1.17	1.39	1.09	1.60
Al_2O_3	7.21	7.28	6.93	6.81	6.83	7.03	6.76	6.90
FeO	15.33	15.28	14.14	14.48	14.75	14.81	14.61	14.21
MnO	0.58	0.51	0.30	0.30	0.31	0.25	0.36	0.37
MgO	13.67	13.40	14.10	14.29	13.97	14.36	13.84	14.49
CaO	11.20	10.78	11.07	10.95	11.29	11.16	10.83	10.88
Na_2O	1.29	1.45	1.51	1.33	1.43	1.46	1.34	1.45
K_2O	0.40	0.28	0.29	0.26	0.25	0.24	0.24	0.23
F	0.29	0.47	0.39	0.25	0.07	0.00	0.00	0.07
Cl	0.15	0.22	0.09	0.13	0.18	0.14	0.17	0.13
Total	98.78	98.31	98.04	97.74	97.83	98.46	96.61	98.20

Sample	DC-6A	DC-6A	DC-6A	DC-6A	DC-6A	DC-6A	DC-6A	DC-6A
Rock type	DB dac	DB dac	DB dac	DB dac	DB dac	DB dac	DB dac	DB dac
Line number	5	6	7	8	9	10	1	2
SiO_2	47.96	47.95	45.63	47.39	47.38	47.77	47.59	44.92
TiO_2	1.55	1.30	1.52	1.60	1.56	1.33	1.85	1.32
Al_2O_3	6.86	6.99	6.04	6.98	7.11	6.92	7.10	6.78
FeO	13.80	14.59	12.64	15.18	14.48	14.80	14.93	17.42
MnO	0.39	0.32	0.38	0.44	0.29	0.12	0.35	0.33
MgO	14.46	14.28	15.33	14.47	14.55	14.61	14.34	14.30
CaO	11.35	11.29	11.87	11.25	11.24	11.51	11.25	11.37
Na_2O	1.26	1.50	2.13	1.42	1.43	1.35	1.40	1.36
K_2O	0.25	0.28	0.20	0.27	0.30	0.21	0.29	0.25
F	0.18	0.15	0.62	0.22	0.32	0.25	0.54	0.00
Cl	0.11	0.15	0.08	0.13	0.14	0.15	0.15	0.15
Total	98.17	98.78	96.43	99.34	98.79	99.01	99.78	98.18

Sample	DC-6A	DC-6A	DC-6A	DC-6A	DC-6A	DC-6A	DC-3M-1	DC-3M-1
Rock type	DB dac	DB dac	DB dac	DB dac	DB dac	DB dac	Encl	Encl
Line number	3	4	5	6	7	8	1	2
SiO_2	47.23	47.42	47.59	47.02	47.87	47.30	41.11	40.63
TiO_2	1.35	1.58	1.20	1.35	1.56	1.73	2.79	2.70
Al_2O_3	7.35	7.17	7.03	7.08	6.96	7.12	13.08	13.69
FeO	14.76	14.64	14.85	13.66	14.22	14.80	12.77	13.50
MnO	0.34	0.47	0.42	0.29	0.23	0.11	0.19	0.07
MgO	13.73	14.43	14.51	13.98	14.53	14.26	13.62	13.77
CaO	10.91	11.06	10.92	10.89	11.13	11.33	11.39	11.58
Na_2O	1.49	1.60	1.49	2.77	1.49	1.42	2.48	2.58
K_2O	0.34	0.26	0.27	0.26	0.25	0.24	0.37	0.39
F	0.36	0.00	0.04	0.29	0.18	0.18	0.00	0.00
Cl	0.21	0.13	0.16	0.13	0.15	0.15	0.00	0.04
Total	98.06	98.76	98.48	97.71	98.56	98.64	97.80	98.93

Sample	DC-3M-1	DC-3M-1	DC-3M-1	DC-3M-1	DC-3M-1	DC-3M-1	DC-3M-1	DC-3M-1
Rock type	Encl	Encl	Encl	Encl	Encl	Encl	Encl	Encl
Line number	3	4	5	6	7	8	9	10
SiO_2	40.56	40.40	40.84	40.61	40.27	40.70	42.12	42.01
TiO_2	3.22	2.73	2.50	2.97	2.56	3.24	2.47	2.06
Al_2O_3	13.90	13.73	13.58	13.92	13.93	13.64	12.76	12.64
FeO	13.05	13.06	13.22	13.85	13.28	12.96	12.03	12.85
MnO	0.25	0.16	0.34	0.07	0.05	0.11	0.17	0.19
MgO	13.89	13.81	13.57	13.32	13.37	13.72	14.23	13.81
CaO	11.41	11.29	11.22	11.39	11.39	11.77	11.69	11.73
Na_2O	2.44	2.41	2.58	2.40	2.53	2.61	2.67	2.35
K_2O	0.41	0.42	0.42	0.38	0.35	0.39	0.37	0.42
F	0.21	0.32	0.00	0.32	0.00	0.00	0.11	0.14
Cl	0.00	0.00	0.05	0.03	0.03	0.01	0.03	0.06
Total	99.34	98.34	98.31	99.24	97.76	99.15	98.64	98.27

Sample	DC-3M-1	DC-3M-1	DC-3M-1	DC-3M-1	DC-3M-1	DC-3M-1	DC-3M-1	DC-3M-1
Rock type	Encl	Encl	Encl	Encl	Encl	Encl	Encl	Encl
Line number	1	2	3	4	5	6	7	8
SiO_2	41.51	41.52	40.03	40.61	41.30	41.18	41.97	42.28
TiO_2	2.38	2.27	3.14	3.35	2.78	3.19	2.83	2.71
Al_2O_3	12.96	13.04	13.71	13.72	13.32	13.23	13.00	12.76
FeO	12.76	12.66	13.01	13.33	12.86	13.01	12.01	12.51
MnO	0.26	0.19	0.28	0.24	0.00	0.14	0.03	0.05
MgO	13.68	14.05	13.23	13.46	13.86	13.71	14.03	14.14
CaO	11.61	11.58	11.59	11.51	12.05	11.93	12.01	11.79
Na_2O	2.43	2.50	2.50	2.52	2.48	2.53	2.35	2.40
K_2O	0.43	0.45	0.39	0.40	0.38	0.43	0.40	0.40
F	0.61	0.00	0.00	0.11	0.00	0.46	0.15	0.21
Cl	0.04	0.04	0.07	0.03	0.02	0.03	0.02	0.04
Total	98.66	98.29	97.94	99.29	99.05	99.84	98.79	99.30

Sample	DC-3M-1	DC-3M-1	DC-3M-1	DC-3M-1	DC-3M-1	DC-3M-1	DC-3M-1	DC-3M-1
Rock type	Encl	Encl	Encl	Encl	Encl	Encl	Encl	Encl
Line number	9	10	1	2	3	4	5	6
SiO_2	42.53	43.30	41.83	40.38	40.90	40.39	40.60	43.25
TiO_2	2.14	1.80	2.43	2.81	2.87	2.03	2.71	1.99
Al_2O_3	12.11	11.38	12.57	13.17	13.76	13.77	13.66	14.13
FeO	13.36	13.80	12.83	12.53	12.94	12.77	13.24	12.57
MnO	0.22	0.44	0.08	0.21	0.14	0.17	0.14	0.06
MgO	13.74	13.95	14.13	13.76	13.79	13.21	13.42	12.83
CaO	11.38	11.60	11.45	12.01	11.60	11.65	11.64	11.32
Na_2O	2.39	2.28	2.44	2.47	2.52	2.47	2.43	2.29
K_2O	0.39	0.38	0.37	0.37	0.42	0.35	0.40	0.48
F	0.00	0.14	0.00	0.29	0.22	0.25	0.40	0.32
Cl	0.01	0.05	0.05	0.03	0.06	0.02	0.01	0.05
Total	98.27	99.10	98.19	98.03	99.23	97.08	98.65	99.31

Sample	DC-3M-1	DC-3M-1	DC-3M-1	DC-3M-1	DC-3M-1	DC-3M-1	DC-3M-1	DC-3M-1
Rock type	Encl	Encl	Encl	Encl	Encl	Encl	Encl	Encl
Line number	7	9	10	1	2	3	4	5
SiO_2	41.35	42.86	43.69	41.82	42.02	42.16	42.27	39.44
TiO_2	2.64	2.37	1.95	2.17	2.22	2.31	2.35	2.21
Al_2O_3	12.86	11.80	11.12	11.78	13.03	12.83	12.83	13.91
FeO	12.19	12.77	13.41	12.65	12.66	12.92	11.62	16.95
MnO	0.09	0.44	0.42	0.40	0.22	0.16	0.17	0.11
MgO	14.16	14.05	14.03	14.81	14.32	14.66	14.22	12.63
CaO	11.06	11.60	11.30	11.57	11.71	11.75	11.81	10.61
Na_2O	2.42	2.28	2.30	2.63	2.45	2.42	2.44	2.41
K_2O	0.35	0.37	0.36	0.33	0.38	0.37	0.42	0.38
F	0.00	0.44	0.00	0.00	0.36	0.22	0.00	0.17
Cl	0.00	0.03	0.05	0.06	0.03	0.02	0.01	0.05
Total	97.12	99.01	98.62	98.20	99.40	99.82	98.15	98.86

Sample	DC-3M-1	DC-3M-1	DC-3M-1	DC-3M-1	DC-3M-1	DC-3M-1	DC-3M-1	DC-3M-1
Rock type	Encl	Encl	Encl	Encl	Encl	Encl	Encl	Encl
Line number	6	7	8	9	10	1	2	3
SiO_2	40.87	40.79	39.89	39.93	42.23	42.22	40.90	40.53
TiO_2	2.69	3.10	3.05	3.21	2.67	2.23	1.96	2.46
Al_2O_3	13.60	13.79	13.81	14.11	12.58	12.39	13.44	13.76
FeO	12.93	13.33	13.57	13.78	13.36	13.03	12.84	12.58
MnO	0.24	0.12	0.14	0.13	0.21	0.15	0.13	0.16
MgO	13.57	13.31	12.90	12.73	14.07	13.96	13.23	13.72
CaO	11.90	11.60	11.61	11.77	11.84	11.38	11.45	11.52
Na_2O	2.60	2.71	2.47	2.38	2.47	2.44	2.51	2.55
K_2O	0.42	0.42	0.48	0.38	0.43	0.37	0.43	0.42
F	0.07	0.18	0.40	0.14	0.00	0.07	0.32	0.11
Cl	0.00	0.02	0.05	0.02	0.05	0.02	0.03	0.03
Total	98.88	99.38	98.36	98.58	99.90	98.25	97.25	97.84

Sample	DC-3M-1	DC-3M-1	DC-3M-1	DC-3M-1	DC-3M-1	DC-3M-1	DC-3M-1	DC-3M-1
Rock type	Encl	Encl	Encl	Encl	Encl	Encl	Encl	Encl
Line number	4	5	6	7	8	10	1	2
SiO_2	41.20	41.00	42.04	42.21	42.36	43.37	42.37	40.55
TiO_2	3.03	2.73	2.76	2.71	2.25	2.27	2.23	2.84
Al_2O_3	13.92	13.67	13.47	12.58	12.70	11.69	12.01	13.05
FeO	13.46	12.97	12.23	12.90	13.79	14.07	12.64	12.40
MnO	0.17	0.08	0.26	0.20	0.20	0.42	0.31	0.21
MgO	13.24	13.52	13.94	13.76	13.66	13.48	13.96	13.40
CaO	11.53	11.70	11.71	11.09	11.44	11.45	11.41	11.43
Na_2O	2.55	2.52	2.33	2.49	2.38	2.26	2.46	2.46
K_2O	0.37	0.42	0.37	0.35	0.32	0.37	0.35	0.39
F	0.32	0.29	0.00	0.07	0.00	0.00	0.15	0.29
Cl	0.06	0.01	0.07	0.02	0.03	0.04	0.03	0.00
Total	99.85	98.91	99.17	98.38	99.12	99.42	97.92	97.02

Sample	DC-3M-1	DC-3M-1	DC-3M-1	DC-3M-1	DC-3M-1	DC-3M-1	DC-3M-1	DC-3M-1
Rock type	Encl	Encl	Encl	Encl	Encl	Encl	Encl	Encl
Line number	3	4	5	6	7	8	9	10
SiO_2	40.69	40.62	40.35	40.68	40.59	41.46	42.78	43.75
TiO_2	2.76	2.97	2.82	2.95	2.45	2.59	2.38	2.34
Al_2O_3	13.18	13.14	13.03	12.95	13.18	13.08	12.10	11.13
FeO	12.98	12.81	12.81	12.58	13.14	13.25	12.51	12.87
MnO	0.20	0.24	0.25	0.19	0.12	0.25	0.24	0.35
MgO	13.83	13.54	13.97	13.89	13.90	13.88	14.01	13.52
CaO	11.11	11.57	11.35	11.51	11.41	11.72	11.45	11.23
Na_2O	2.43	2.42	2.60	2.63	2.60	2.47	2.47	2.15
K_2O	0.35	0.36	0.36	0.33	0.35	0.38	0.36	0.35
F	0.15	0.00	0.15	0.11	0.07	0.00	0.22	0.00
Cl	0.01	0.00	0.04	0.01	0.03	0.02	0.02	0.02
Total	97.69	97.66	97.74	97.83	97.84	99.10	98.54	97.72

Sample	DC-4-A	DC-4-A	DC-4-A	DC-4-A	DC-4-A	DC-4-A	DC-4-A	DC-4-A
Rock type	Encl	Encl	Encl	Encl	Encl	Encl	Encl	Encl
Line number	1	2	3	4	5	6	7	1
SiO_2	41.75	39.35	39.28	42.27	42.67	42.88	43.22	40.04
TiO_2	1.75	2.05	2.33	2.04	1.81	1.83	2.13	2.17
Al_2O_3	11.84	14.16	15.52	11.54	11.26	11.08	10.70	13.80
FeO	13.44	13.20	11.51	14.04	13.81	13.75	13.90	12.95
MnO	0.50	0.00	0.00	0.37	0.36	0.38	0.25	0.10
MgO	13.16	12.67	13.37	12.85	13.15	13.28	13.50	12.94
CaO	11.75	11.99	12.02	11.46	11.43	11.31	11.75	12.17
Na_2O	2.32	2.43	2.45	2.15	1.98	2.11	2.07	2.46
K_2O	0.33	0.40	0.34	0.48	0.45	0.38	0.44	0.41
F	0.15	0.22	0.00	0.00	0.00	0.00	0.07	0.04
Cl	0.06	0.05	0.01	0.12	0.10	0.09	0.05	0.02
Total	97.05	96.51	96.83	97.35	97.01	97.07	98.08	97.11

Sample	DC-4-A	DC-4-A	DC-4-A	DC-4-A	DC-4-A	DC-4-A	DC-4-A	DC-4-A
Rock type	Encl	Encl	Encl	Encl	Encl	Encl	Encl	Encl
Line number	2	3	4	5	6	7	8	1
SiO_2	39.50	39.58	40.33	39.87	39.85	39.99	41.45	43.65
TiO_2	2.32	2.39	2.25	1.97	2.16	2.31	2.43	1.58
Al_2O_3	14.82	15.56	15.79	15.47	15.32	14.22	13.17	10.62
FeO	13.41	12.24	10.92	11.02	11.85	12.53	13.09	13.45
MnO	0.22	0.21	0.18	0.12	0.08	0.20	0.31	0.36
MgO	12.52	12.49	13.99	13.82	13.35	12.79	13.08	13.81
CaO	11.45	12.10	12.39	12.15	12.19	12.03	12.19	11.53
Na_2O	2.88	2.39	2.49	2.45	2.59	2.43	2.31	2.13
K_2O	0.53	0.40	0.45	0.34	0.39	0.38	0.40	0.34
F	0.11	0.00	0.00	0.07	0.29	0.37	0.04	0.18
Cl	0.06	0.05	0.01	0.01	0.00	0.03	0.03	0.12
Total	97.81	97.39	98.78	97.31	98.08	97.28	98.50	97.77

Sample	DC-4-A	DC-4-A	DC-4-A	DC-4-A	DC-4-A	DC-4-A	DC-4-A	DC-4-A
Rock type	Encl	Encl	Encl	Encl	Encl	Encl	Encl	Encl
Line number	2	3	4	5	6	7	8	9
SiO_2	39.91	39.23	40.01	39.28	40.75	40.07	40.31	44.07
TiO_2	2.25	2.53	1.91	2.06	1.95	1.91	2.38	2.18
Al_2O_3	13.78	15.04	15.29	15.50	16.03	14.91	15.18	10.15
FeO	14.38	12.30	10.67	10.89	10.48	10.71	11.76	12.87
MnO	0.20	0.06	0.21	0.16	0.04	0.15	0.18	0.42
MgO	12.37	13.95	14.23	14.45	14.04	14.04	13.61	14.74
CaO	11.95	12.18	12.07	11.41	11.89	12.01	12.36	11.32
Na_2O	2.58	2.28	2.29	2.42	2.24	2.34	2.40	2.20
K_2O	0.36	0.28	0.35	0.32	0.40	0.28	0.29	0.43
F	0.00	0.04	0.11	0.48	0.22	0.15	0.07	0.00
Cl	0.07	0.00	0.01	0.00	0.00	0.04	0.03	0.11
Total	97.84	97.88	97.13	96.95	98.04	96.60	98.56	98.47

Sample	DC-4-A	DC-4-A	DC-4-A	DC-4-A	DC-4-A	DC-4-A	DC-4-A	DC-4-A
Rock type	Encl	Encl	Encl	Encl	Encl	Encl	Encl	Encl
Line number	1	2	3	1	2	3	4	5
SiO_2	38.50	39.26	39.17	44.43	39.13	39.62	39.67	39.96
TiO_2	3.06	2.25	2.35	1.65	2.07	2.37	1.91	1.43
Al_2O_3	13.49	15.15	15.55	10.54	15.07	15.10	15.39	15.58
FeO	15.72	11.21	11.33	11.85	13.76	11.24	10.57	10.40
MnO	0.21	0.06	0.15	0.42	0.14	0.19	0.18	0.12
MgO	12.15	13.65	13.59	14.22	12.35	13.75	14.60	14.05
CaO	11.32	11.94	11.81	10.88	11.69	11.45	11.71	11.82
Na_2O	2.45	2.50	2.34	2.15	2.40	2.64	2.34	2.46
K_2O	0.29	0.29	0.34	0.31	0.47	0.39	0.41	0.33
F	0.00	0.41	0.04	0.26	0.11	0.00	0.00	0.00
Cl	0.01	0.02	0.03	0.09	0.03	0.06	0.01	0.04
Total	97.19	96.73	96.70	96.79	97.22	96.79	96.78	96.18

Sample	DC-4-A	DC-4-A	DC-4-A	DC-4-A	DC-4-A	DC-4-A	DC-4-A	DC-4-A
Rock type	Encl	Encl	Encl	Encl	Encl	Encl	Encl	Encl
Line number	6	1	2	3	4	8	9	10
SiO_2	43.56	44.40	39.34	39.80	41.27	40.49	39.20	39.99
TiO_2	2.63	3.20	1.61	1.93	2.23	1.76	2.14	2.14
Al_2O_3	10.05	9.84	15.86	15.59	15.81	15.46	15.71	14.23
FeO	11.60	12.09	11.16	10.37	10.12	11.30	12.04	11.40
MnO	0.37	0.36	0.12	0.11	0.12	0.18	0.08	0.03
MgO	14.40	14.54	13.54	13.97	13.96	13.72	13.14	13.49
CaO	10.81	11.72	12.10	11.97	11.84	11.93	12.25	12.32
Na_2O	2.22	2.23	2.42	2.44	2.30	2.56	2.51	2.38
K_2O	0.39	0.47	0.34	0.39	0.38	0.37	0.36	0.35
F	0.19	0.34	0.00	0.11	0.00	0.00	0.00	0.04
Cl	0.12	0.12	0.01	0.03	0.01	0.02	0.02	0.05
Total	96.32	99.29	96.51	96.72	98.04	97.78	97.46	96.41

APPENDIX F2

Amphibole analyses: Volcán Ceboruco, Mexico

Amphibole analyses were obtained using a Cameca SX-50 electron microprobe at the University of Alaska Fairbanks or a Cameca Camebax electron microprobe at Brown University, under the following analytical conditions: an accelerating voltage of 15 KeV, beam current of 10 nA, and a focused beam with a spot size of 1-3 μm. Major oxides are reported in weight percent (wt.%) with total Fe reported as FeO. "Line number" refers to the analysis number during a particular analytical transect. "Rock type" refers to the host rock, which contained the amphibole that was analyzed. Abbreviations as follows: **Rd** rhyodacite. Standards, counting times, and analytical errors are summarized in the table below:

Element	Counting Times (seconds)		Standard	Typical Analytical Error (wt.%, 1σ)
	Peak	Bkgd.		
Si	20	5	Orthoclase (CM Taylor)	.209
Ti	10	5	Sphene (CM Taylor)	.065
Al	20	5	Orthoclase (CM Taylor)	.119
Fe	10	5	Synthetic almandine (SALM)	.369
Mn	10	5	Willimite (CM Taylor)	.024
Mg	10	5	Hypersthene (USNM 746)	.094
Ca	10	5	Sphene (CM Taylor)	.002
Na	10	5	Tiburon albite (TALBITE)	.035
K	10	5	Orthoclase (CM Taylor)	.016
Cr	10	5	Chromite (USNM 117075)	.008

Sample	77 P2B-E	77 P2B-E	77 P2B-E	77 P2B-E	77 P2B-E	77 P2B-E	77 P2B-E	77 P2B-E
Rock type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line number	1	2	1	2	1	2	1	2
SiO_2	43.65	42.24	42.29	42.35	42.01	41.69	43.36	42.51
TiO_2	3.13	3.77	3.45	3.05	3.43	4.21	2.50	3.36
Al_2O_3	12.30	12.13	11.96	11.83	12.11	12.35	11.18	11.98
FeO	12.58	12.50	12.47	12.46	12.77	12.37	14.28	12.78
MnO	0.29	0.27	0.23	0.27	0.17	0.14	0.53	0.27
MgO	13.42	13.78	13.67	13.92	13.61	13.82	13.66	13.70
CaO	10.84	11.39	11.51	11.22	11.16	11.58	10.74	11.21
Na_2O	2.42	2.55	2.59	2.53	2.58	2.66	2.47	2.54
K_2O	0.55	0.51	0.48	0.44	0.43	0.41	0.47	0.47
Cr_2O_3	0.01	0.00	0.01	0.00	0.00	0.03	0.05	0.01
Total	99.19	99.14	98.66	98.07	98.27	99.26	99.24	98.83

Sample	77 P2B-B	77 P2B-B	77 P2B-B	77 P2B-B	77 P2B-B	77 P2B-B	77 P2B-B	77 P2B-A
Rock type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line number	1	2	1	2	1	2	1	2
SiO_2	42.13	42.42	42.64	42.04	42.57	42.70	42.42	41.60
TiO_2	2.78	2.96	2.66	3.30	2.88	3.19	2.96	3.36
Al_2O_3	11.39	11.66	11.71	12.03	11.49	11.48	11.63	12.78
FeO	13.85	12.67	13.37	12.87	12.23	12.56	12.92	11.97
MnO	0.38	0.34	0.36	0.12	0.29	0.31	0.30	0.17
MgO	13.54	14.08	13.88	14.28	14.01	14.46	14.04	14.64
CaO	10.93	11.01	11.22	11.48	11.25	11.56	11.24	11.19
Na_2O	2.55	2.54	2.61	2.62	2.49	2.66	2.58	2.67
K_2O	0.43	0.45	0.48	0.51	0.52	0.43	0.47	0.35
Cr_2O_3	0.00	0.00	0.08	0.00	0.00	0.03	0.02	0.05
Total	97.98	98.13	99.01	99.25	97.73	99.38	98.58	98.78

Sample	77 P2B-A	77 P2B-A	77 P2B-A	77 P2B-A	77 P2B-A	18-P1T-C	18-P1T-C	18-P1T-C
Rock type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala Rd	Jala Rd	Jala Rd
Line number	1	2	1	2	1	1	1	1
SiO_2	43.33	42.77	41.62	43.02	42.47	43.62	42.78	42.94
TiO_2	2.74	2.68	2.73	2.72	2.85	3.44	3.94	3.60
Al_2O_3	11.39	11.64	11.59	11.40	11.76	10.77	11.47	11.33
FeO	13.39	13.59	13.71	13.62	13.26	13.01	12.94	12.74
MnO	0.33	0.35	0.41	0.42	0.34	0.25	0.25	0.31
MgO	13.80	13.81	13.35	13.61	13.84	13.78	13.82	13.92
CaO	11.09	11.25	11.13	11.07	11.15	11.48	11.05	11.28
Na_2O	2.52	2.57	2.53	2.53	2.56	2.49	2.54	2.67
K_2O	0.48	0.50	0.47	0.47	0.45	0.55	0.51	0.40
Cr_2O_3	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.06
Total	99.08	99.16	97.54	98.86	98.69	99.39	99.30	99.25

APPENDIX G1

Fe-Ti oxide analyses: Mt. Dutton volcano, Alaska

Fe-Ti oxide analyses were obtained using a Cameca SX-50 electron microprobe at the University of Alaska Fairbanks, under the following analytical conditions: an accelerating voltage of 15 KeV, beam current of 10 nA, and a focused beam with a spot size of 1-3 μm. Magnetite-ilmenite pairs are located next to each other in the table. Major oxides are reported in weight percent (wt.%) with Fe_2O_3 and FeO calculated using the mineral formula calculation of Stormer (1983). "Line number" refers to the analysis number during a particular analytical transect. "Rock type" refers to the host rock, which contained the hornblende that was analyzed. Standards, counting times, and analytical errors are summarized in the table below:

Element	Counting Times (seconds)		Standard	Typical Analytical Error (wt.%, 1σ)
	Peak	Bkgd.		
Ti	10	5	Ilmenite (USNM 96189)	.099
Al	10	5	Chromite (USNM 117075)	.098
Cr	10	5	Chromite (USNM 117075)	.021
Fe	10	5	Ilmenite (USNM 96189)	.218
Mn	10	5	Ilmenite (USNM 96189)	.001
Mg	10	5	Chromite (USNM 117075)	.055

Sample	DC-6-D	DC-6-D	DC-6-D	DC-6-D	DC-6-D	DC-6-D	DC-6-D	DC-6-D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	1	2	3	4	5	6	7	1
TiO_2	39.43	38.88	39.04	38.48	38.42	38.21	15.86	11.37
Al_2O_3	0.14	0.23	0.34	0.36	0.33	0.36	1.78	2.38
Cr_2O_3	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.13
Fe_2O_3	22.63	23.60	24.32	25.62	25.53	26.99	35.08	43.13
FeO	32.36	31.74	31.59	31.51	31.28	31.15	42.48	38.95
MnO	0.46	0.48	0.71	0.53	0.63	0.71	0.74	0.56
MgO	1.48	1.54	1.57	1.44	1.48	1.40	1.31	1.17
Total	96.52	96.47	97.57	97.94	97.67	98.84	97.27	97.69

Sample	DC-6-D	DC-6-D	DC-6-D	DC-6-D	DC-6-D	DC-6-D	DC-6-D	DC-6-D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	2	3	4	1	2	3	4	1
TiO_2	9.81	9.21	9.11	10.44	9.94	10.16	12.08	38.78
Al_2O_3	2.51	2.80	2.96	2.05	1.86	1.81	2.12	0.32
Cr_2O_3	0.05	0.14	0.00	0.00	0.03	0.13	0.08	0.00
Fe_2O_3	46.26	47.53	46.19	45.84	45.61	45.71	42.67	23.93
FeO	37.56	37.27	37.08	38.66	37.42	38.15	39.61	31.85
MnO	0.59	0.58	0.42	0.34	0.41	0.47	0.71	0.49
MgO	1.17	1.20	0.98	1.04	1.07	0.88	1.20	1.42
Total	97.95	98.74	96.74	98.37	96.33	97.32	98.46	96.80

Sample	DC-6-D	DC-6-D	DC-6-D	DC-6-D	DC-6-D	DC-6-D	DC-6-D	DC-6-D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	2	3	1	2	1	2	3	4
TiO_2	39.12	39.41	38.61	38.09	9.51	9.22	9.72	9.24
Al_2O_3	0.41	0.37	0.23	0.29	2.61	2.54	2.59	2.63
Cr_2O_3	0.00	0.03	0.00	0.03	0.12	0.01	0.02	0.22
Fe_2O_3	23.28	23.83	24.89	26.40	46.39	46.75	45.44	47.26
FeO	31.76	32.18	31.74	31.09	36.91	36.18	36.64	36.61
MnO	0.52	0.59	0.54	0.57	0.46	0.47	0.49	0.35
MgO	1.63	1.50	1.37	1.45	1.40	1.55	1.40	1.61
Total	96.71	97.91	97.39	97.92	97.41	96.70	96.40	97.92

Sample	DC-6-D	DC-6-D	DC-6-D	DC-6-D	DC-6-D	DC-6-D	DC-6-D	DC-6-D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	1	2	3	4	5	6	7	8
TiO_2	10.54	10.03	10.54	9.70	9.98	10.68	10.30	10.07
Al_2O_3	2.35	2.23	2.28	2.25	2.27	2.21	2.20	2.02
Cr_2O_3	0.13	0.12	0.08	0.12	0.01	0.00	0.07	0.06
Fe_2O_3	45.76	42.76	44.43	44.27	44.27	43.74	45.44	45.77
FeO	38.53	36.17	37.96	36.16	36.70	37.92	37.47	37.50
MnO	0.56	0.41	0.54	0.61	0.63	0.42	0.81	0.63
MgO	1.22	1.30	1.17	1.25	1.20	1.18	1.27	1.13
Total	99.08	93.01	97.01	94.35	95.05	96.14	97.56	97.18

Sample	DC-6-D	DC-6-D	DC-6-D	DC-6-D	DC-6-D	DC-6-D	DC-6-D	DC-6-D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	9	1	2	3	1	2	3	1
TiO_2	10.24	44.57	44.34	43.70	10.35	10.07	10.84	45.20
Al_2O_3	2.06	0.34	0.28	0.31	2.65	2.48	2.45	0.14
Cr_2O_3	0.00	0.03	0.00	0.00	0.00	0.05	0.00	0.00
Fe_2O_3	46.20	14.82	14.11	16.74	43.93	45.81	42.82	12.61
FeO	37.83	35.57	35.17	34.68	38.35	38.48	38.08	37.31
MnO	0.63	0.88	0.95	0.87	0.41	0.51	0.74	0.80
MgO	1.23	2.04	2.11	2.10	0.84	0.85	0.93	1.42
Total	98.19	98.25	96.96	98.40	96.53	98.25	95.88	97.49

Sample	DC-6-D	DC-6-D	DC-6-D	DC-6-D	DC-6-D	DC-6-D	DC-6-D	DC-6-D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	2	3	4	5	1	2	3	1
TiO_2	44.55	43.59	44.27	43.84	10.08	10.11	10.03	10.34
Al_2O_3	0.16	0.21	0.19	0.22	1.84	2.13	1.87	1.95
Cr_2O_3	0.01	0.07	0.02	0.00	0.01	0.02	0.10	0.05
Fe_2O_3	15.09	16.17	14.48	13.92	45.08	45.95	45.98	45.39
FeO	35.87	34.77	35.59	35.17	36.99	37.83	37.46	37.73
MnO	0.81	0.90	0.71	0.84	0.70	0.63	0.53	0.69
MgO	1.90	1.98	1.97	1.92	1.13	1.07	1.18	1.11
Total	98.38	97.68	97.23	95.91	95.83	97.73	97.14	97.25

Sample	DC-6-D	DC-6-D	DC-6-D	DC-6-D	DC-6-D	DC-6-D	DC-6-D	DC-6-D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	2	1	2	3	1	2	1	2
TiO_2	9.83	9.55	9.29	9.04	9.50	9.16	39.71	39.27
Al_2O_3	2.08	1.92	2.19	2.14	1.94	2.19	0.18	0.30
Cr_2O_3	0.06	0.00	0.11	0.12	0.07	0.16	0.08	0.00
Fe_2O_3	47.27	46.40	47.30	47.45	45.71	46.22	21.81	24.76
FeO	37.55	37.48	37.32	37.04	37.31	36.67	32.27	32.15
MnO	0.78	0.72	0.64	0.67	0.50	0.68	0.35	0.44
MgO	1.18	0.67	0.90	0.82	0.70	0.86	1.73	1.53
Total	98.75	96.75	97.74	97.30	95.74	95.94	96.13	98.45

Sample	DC-6-D	DC-6-D	DC-6-D	DC-6-D	DC-6-D	DC-6-D	DC-6-D	DC-6-D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	1	2	1	2	3	4	5	6
TiO_2	9.23	9.15	8.92	8.89	8.59	8.92	8.78	9.10
Al_2O_3	2.07	1.90	1.96	2.50	2.42	2.31	2.29	2.26
Cr_2O_3	0.15	0.21	0.06	0.09	0.07	0.00	0.21	0.03
Fe_2O_3	47.22	46.75	47.13	47.94	48.04	48.26	47.74	48.01
FeO	37.07	36.51	36.50	36.99	35.94	36.71	36.43	36.61
MnO	0.56	0.86	0.39	0.46	0.57	0.56	0.45	0.73
MgO	0.98	0.87	0.99	1.07	1.28	1.18	1.18	1.25
Total	97.28	96.25	95.94	97.94	96.91	97.94	97.09	97.99

Sample	DC-6-D	DC-6-D	DC-6-D	DC-6-D	DC-6-D	DC-6-D	DC-6-D	DC-6-D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	7	8	1	2	3	4	5	6
TiO_2	9.12	9.42	8.70	8.57	8.72	8.61	8.44	8.50
Al_2O_3	2.24	1.97	1.81	1.90	2.03	1.84	2.02	1.94
Cr_2O_3	0.04	0.13	0.15	0.06	0.12	0.15	0.00	0.06
Fe_2O_3	47.57	47.77	47.27	48.81	47.90	47.57	48.02	47.66
FeO	36.88	37.25	36.17	36.10	36.35	35.94	35.98	36.08
MnO	0.52	0.73	0.60	0.74	0.69	0.62	0.70	0.54
MgO	1.12	1.06	0.83	1.06	0.94	0.94	0.85	0.84
Total	97.49	98.34	95.52	97.23	96.76	95.67	96.01	95.61

Sample	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	1	2	3	4	5	6	5	6
TiO_2	8.65	8.85	8.82	8.90	8.56	8.89	8.75	8.65
Al_2O_3	2.76	2.65	2.56	2.70	2.77	2.90	2.70	2.57
Cr_2O_3	0.09	0.00	0.13	0.14	0.17	0.12	0.03	0.11
Fe_2O_3	47.75	47.08	48.27	46.45	47.57	47.41	48.26	47.56
FeO	36.24	35.96	36.37	35.73	35.52	35.91	35.85	35.90
MnO	0.58	0.47	0.51	0.52	0.71	0.55	0.48	0.57
MgO	1.24	1.42	1.44	1.47	1.46	1.65	1.71	1.31
Total	97.31	96.43	98.10	95.90	96.77	97.42	97.79	96.68

Sample	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	7	8	1	2	3	4	5	1
TiO_2	8.64	42.30	38.66	38.94	38.33	38.53	38.34	9.14
Al_2O_3	2.46	0.38	0.36	0.33	0.43	0.33	0.35	2.05
Cr_2O_3	0.15	0.04	0.08	0.00	0.07	0.06	0.00	0.10
Fe_2O_3	46.29	17.96	24.54	25.25	26.18	25.34	26.36	47.82
FeO	35.70	33.25	31.42	31.55	30.71	31.24	31.21	36.81
MnO	0.32	0.74	0.27	0.34	0.51	0.50	0.51	0.53
MgO	1.20	2.27	1.73	1.75	1.82	1.64	1.54	1.18
Total	94.75	96.95	97.05	98.16	98.05	97.63	98.32	97.63

Sample	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	2	3	4	5	6	7	8	9
TiO_2	8.63	8.56	8.08	8.17	8.27	8.33	8.13	8.61
Al_2O_3	2.06	2.15	1.96	2.00	1.79	1.95	2.06	2.06
Cr_2O_3	0.08	0.00	0.00	0.12	0.07	0.06	0.07	0.03
Fe_2O_3	47.04	47.49	48.85	48.68	49.32	47.97	47.76	46.68
FeO	35.38	35.38	35.00	35.06	35.41	34.95	34.68	35.54
MnO	0.47	0.56	0.48	0.45	0.47	0.49	0.39	0.54
MgO	1.30	1.31	1.35	1.43	1.39	1.41	1.42	1.05
Total	94.96	95.45	95.73	95.91	96.74	95.17	94.51	94.53

Sample	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	10	1	2	3	1	2	1	2
TiO_2	8.76	26.31	38.98	39.68	9.02	9.23	16.63	8.44
Al_2O_3	2.06	0.74	0.30	0.31	2.43	2.35	1.54	2.61
Cr_2O_3	0.00	0.02	0.00	0.01	0.12	0.07	0.04	0.08
Fe_2O_3	46.88	14.30	21.93	22.27	45.35	45.79	33.40	46.30
FeO	36.12	51.11	31.80	32.07	36.07	36.52	43.03	35.62
MnO	0.59	0.58	0.50	0.65	0.46	0.40	0.79	0.42
MgO	0.89	1.46	1.55	1.66	1.05	1.10	1.25	1.03
Total	95.30	94.52	95.05	96.65	94.50	95.46	96.68	94.50

Sample	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	3	4	1	2	3	1	2	3
TiO_2	8.56	8.22	43.15	43.37	41.72	11.98	8.26	8.28
Al_2O_3	2.45	2.79	0.16	0.21	0.21	1.52	1.69	1.66
Cr_2O_3	0.01	0.11	0.08	0.00	0.07	0.00	0.03	0.04
Fe_2O_3	47.53	48.09	15.74	14.09	16.44	41.81	47.99	49.58
FeO	36.22	36.24	35.53	35.20	33.83	38.98	35.04	35.78
MnO	0.37	0.44	0.45	0.83	0.78	0.49	0.42	0.33
MgO	1.08	0.99	1.58	1.67	1.63	1.10	1.22	1.28
Total	96.21	96.89	96.69	95.36	94.68	95.88	94.65	96.95

Sample	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	3	4	5	1	2	3	4	1
TiO_2	8.09	8.58	8.40	8.68	8.48	8.12	8.24	42.91
Al_2O_3	1.72	1.72	1.92	2.03	2.34	2.27	2.17	0.08
Cr_2O_3	0.11	0.04	0.02	0.04	0.07	0.07	0.20	0.15
Fe_2O_3	49.75	49.08	49.20	46.77	47.71	49.33	49.19	15.26
FeO	35.22	36.00	35.78	35.53	35.58	35.57	35.64	35.21
MnO	0.49	0.44	0.58	0.54	0.65	0.44	0.43	0.78
MgO	1.39	1.29	1.26	1.14	1.22	1.36	1.40	1.46
Total	96.76	97.15	97.17	94.72	96.06	97.15	97.26	95.85

Sample	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	2	1	2	3	4	5	6	1
TiO_2	42.25	38.81	38.43	39.57	39.36	38.82	39.37	9.26
Al_2O_3	0.15	0.35	0.21	0.30	0.29	0.28	0.29	2.57
Cr_2O_3	0.07	0.01	0.05	0.01	0.03	0.07	0.06	0.07
Fe_2O_3	16.16	23.72	24.96	22.52	23.07	23.51	22.73	46.24
FeO	34.99	31.54	31.41	31.82	31.77	31.59	32.36	36.37
MnO	0.79	0.53	0.55	0.80	0.74	0.43	0.51	0.56
MgO	1.24	1.58	1.46	1.66	1.62	1.62	1.42	1.33
Total	95.65	96.54	97.07	96.68	96.89	96.32	96.75	96.40

Sample	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	2	3	4	5	6	7	1	2
TiO_2	8.58	8.86	8.54	9.28	9.31	10.66	9.41	8.95
Al_2O_3	2.68	2.70	2.78	2.56	2.21	2.77	2.38	2.67
Cr_2O_3	0.16	0.16	0.02	0.13	0.06	0.02	0.13	0.07
Fe_2O_3	45.95	47.53	46.92	46.19	45.30	42.38	45.88	45.63
FeO	34.94	36.31	35.59	36.49	36.32	37.41	36.34	35.68
MnO	0.53	0.65	0.74	0.54	0.40	0.42	0.52	0.66
MgO	1.45	1.30	1.18	1.29	1.12	1.33	1.37	1.23
Total	94.28	97.51	95.78	96.49	94.72	94.99	96.04	94.87

Sample	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	3	4	4	5	1	1	2	1
TiO_2	8.99	8.76	9.03	9.20	40.83	9.12	8.81	40.71
Al_2O_3	2.64	2.73	2.68	2.44	0.17	2.21	2.43	0.28
Cr_2O_3	0.05	0.07	0.07	0.19	0.04	0.14	0.02	0.00
Fe_2O_3	47.10	47.46	46.19	46.72	18.38	45.72	46.42	18.48
FeO	36.18	36.24	35.77	36.78	32.71	36.37	36.18	32.37
MnO	0.67	0.43	0.76	0.45	0.85	0.46	0.54	0.61
MgO	1.34	1.34	1.35	1.21	1.77	0.98	0.96	2.04
Total	96.97	97.04	95.86	97.00	94.74	95.01	95.36	94.47

Sample	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	2	1	2	3	1	2	3	4
TiO_2	42.03	8.30	8.47	8.56	8.99	8.37	8.31	8.34
Al_2O_3	0.33	2.87	2.65	2.14	2.18	2.30	2.42	2.35
Cr_2O_3	0.05	0.14	0.10	0.00	0.07	0.12	0.07	0.13
Fe_2O_3	18.39	46.84	46.99	46.25	47.33	47.08	48.44	47.83
FeO	33.47	35.36	35.24	35.12	36.17	35.13	35.74	35.39
MnO	0.48	0.50	0.74	0.51	0.76	0.46	0.55	0.51
MgO	2.16	1.25	1.29	1.16	1.17	1.29	1.23	1.31
Total	96.91	95.27	95.48	93.74	96.68	94.77	96.76	95.86

Sample	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	5	6	7	1	1	1	1	2
TiO_2	8.43	8.68	9.36	38.58	15.57	40.44	17.23	13.22
Al_2O_3	2.30	2.26	1.95	0.30	1.51	0.23	1.31	1.81
Cr_2O_3	0.01	0.09	0.13	0.21	0.00	0.10	0.03	0.13
Fe_2O_3	47.28	47.19	46.30	22.84	34.14	20.42	32.88	39.34
FeO	35.45	35.58	36.48	31.85	42.26	33.14	44.03	40.44
MnO	0.40	0.62	0.58	0.48	0.64	0.86	0.52	0.65
MgO	1.23	1.28	1.15	1.32	0.85	1.32	1.22	0.96
Total	95.09	95.69	95.95	95.59	94.96	96.51	97.21	96.54

Sample	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	1	1	2	3	4	5	1	2
TiO_2	39.03	10.63	9.66	9.67	9.74	14.79	40.56	39.57
Al_2O_3	0.34	2.27	1.83	2.19	2.21	1.75	0.27	0.26
Cr_2O_3	0.00	0.09	0.02	0.02	0.02	0.00	0.15	0.10
Fe_2O_3	24.19	44.83	46.66	45.50	46.15	37.56	20.62	22.35
FeO	32.22	38.02	36.95	36.52	36.88	41.76	32.52	31.95
MnO	0.56	0.81	0.58	0.56	0.67	0.64	0.56	0.57
MgO	1.30	1.17	1.19	1.31	1.28	1.30	1.91	1.72
Total	97.64	97.83	96.90	95.77	96.95	97.80	96.59	96.51

Sample	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	3	1	1	1	2	3	4	5
TiO_2	39.34	9.82	39.52	9.85	9.06	8.66	8.77	9.24
Al_2O_3	0.33	2.08	0.23	1.70	2.16	2.08	2.20	2.25
Cr_2O_3	0.09	0.11	0.07	0.00	0.06	0.00	0.11	0.07
Fe_2O_3	23.14	45.70	21.93	46.81	47.37	48.26	46.36	47.19
FeO	31.67	37.23	31.88	37.89	36.63	36.26	35.86	36.80
MnO	0.62	0.52	0.52	0.50	0.73	0.60	0.51	0.58
MgO	1.73	1.12	1.76	0.89	1.00	1.06	1.04	1.17
Total	96.93	96.57	95.91	97.65	97.02	96.91	94.86	97.30

Sample	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	6	7	8	9	1	2	3	1
TiO_2	9.20	9.11	9.41	9.35	43.40	42.76	43.58	9.48
Al_2O_3	2.15	1.99	1.91	1.79	0.25	0.16	0.21	2.06
Cr_2O_3	0.12	0.23	0.07	0.00	0.05	0.01	0.12	0.06
Fe_2O_3	47.93	48.00	48.89	46.09	16.45	16.74	15.91	45.55
FeO	37.02	36.93	37.77	36.33	34.84	34.79	35.00	36.92
MnO	0.58	0.71	0.68	0.81	1.13	0.74	0.89	0.49
MgO	1.16	1.03	1.04	0.93	1.71	1.64	1.85	0.91
Total	98.17	98.00	99.78	95.30	97.83	96.84	97.55	95.46

Sample	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	2	3	4	5	6	1	2	3
TiO_2	9.32	9.01	9.13	9.33	12.18	41.80	42.13	42.12
Al_2O_3	2.38	2.72	2.52	2.36	2.21	0.20	0.32	0.20
Cr_2O_3	0.04	0.02	0.00	0.20	0.00	0.05	0.00	0.00
Fe_2O_3	46.09	46.88	47.62	44.91	41.77	20.66	17.53	17.41
FeO	36.69	36.64	36.77	36.29	39.70	33.88	33.92	34.05
MnO	0.58	0.53	0.74	0.44	0.72	0.71	0.84	0.79
MgO	1.07	1.15	1.18	1.12	1.03	1.69	1.75	1.70
Total	96.18	96.95	97.96	94.65	97.61	98.97	96.49	96.28

Sample	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	4	1	2	3	4	5	6	1
TiO_2	41.02	9.35	8.93	8.80	8.56	8.79	12.34	38.33
Al_2O_3	0.28	1.92	2.20	2.37	2.48	2.42	2.31	0.50
Cr_2O_3	0.05	0.07	0.04	0.14	0.02	0.00	0.00	0.07
Fe_2O_3	19.89	45.28	47.63	47.54	48.65	47.97	41.76	24.86
FeO	33.48	36.51	36.76	36.31	36.19	36.58	39.68	30.11
MnO	0.72	0.37	0.36	0.52	0.57	0.38	0.66	0.66
MgO	1.51	0.96	1.10	1.19	1.27	1.20	1.27	2.07
Total	96.93	94.47	97.02	96.86	97.74	97.35	98.02	96.61

Sample	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	2	1	3	4	5	1	2	3
TiO_2	38.79	39.34	38.86	39.35	39.06	16.50	9.55	8.81
Al_2O_3	0.40	0.30	0.27	0.40	0.40	1.85	2.87	2.69
Cr_2O_3	0.01	0.07	0.00	0.04	0.00	0.23	0.04	0.10
Fe_2O_3	22.95	23.05	23.20	22.72	23.19	32.76	47.08	48.23
FeO	31.19	32.75	31.72	32.14	31.74	42.30	37.41	36.30
MnO	0.46	0.73	0.52	0.50	0.62	0.84	0.38	0.66
MgO	1.82	1.06	1.52	1.54	1.55	1.51	1.47	1.42
Total	95.60	97.31	96.10	96.69	96.56	95.99	98.80	98.21

Sample	DC-2D	DC-2D	DC-2D	DC-4A	DC-4A	DC-4A	DC-4A	DC-4A
Rock Type	dacite	dacite	dacite	enclave	enclave	enclave	enclave	enclave
Line Number	4	5	6	1	2	3	4	5
TiO_2	9.12	9.18	9.69	16.14	10.93	9.55	9.36	9.11
Al_2O_3	2.51	2.52	2.08	1.62	1.98	2.31	2.49	2.66
Cr_2O_3	0.08	0.07	0.12	0.00	0.00	0.07	0.02	0.07
Fe_2O_3	47.75	46.76	44.90	32.33	43.78	44.76	47.23	48.45
FeO	36.62	36.51	36.81	42.92	38.56	35.98	36.86	37.36
MnO	0.75	0.60	0.63	0.75	0.69	0.89	0.87	0.64
MgO	1.30	1.26	0.95	0.58	0.84	1.18	1.18	1.17
Total	98.15	96.91	95.17	94.34	96.78	94.74	98.01	99.44

Sample	DC-4A	DC-4A	DC-4A	DC-4A	DC-4A	DC-4A	DC-4A	DC-4A
Rock Type	enclave	enclave	enclave	enclave	enclave	enclave	enclave	enclave
Line Number	6	7	8	9	10	1	2	3
TiO_2	8.39	8.53	8.66	8.77	8.73	10.16	9.74	9.09
Al_2O_3	3.00	2.59	2.43	2.47	2.13	2.18	2.26	2.60
Cr_2O_3	0.02	0.04	0.04	0.00	0.05	0.02	0.00	0.06
Fe_2O_3	46.34	48.40	48.36	47.83	48.83	45.16	46.89	43.36
FeO	35.28	36.04	36.00	36.13	36.77	37.69	37.55	34.78
MnO	0.81	0.60	0.81	0.73	0.63	0.86	0.90	1.21
MgO	1.10	1.27	1.26	1.21	1.00	0.88	0.98	0.96
Total	94.94	97.53	97.57	97.14	98.14	96.95	98.32	92.04

Sample	DC-4A	DC-4A	DC-4A	DC-4A	DC-4A	DC-4A	DC-4A	DC-2D
Rock Type	enclave	enclave	enclave	enclave	enclave	enclave	enclave	dacite
Line Number	4	5	6	7	8	9	10	1
TiO_2	9.38	9.37	9.16	9.27	9.38	9.40	10.27	11.10
Al_2O_3	2.51	2.43	2.35	2.15	2.27	2.21	2.25	1.28
Cr_2O_3	0.00	0.02	0.07	0.03	0.01	0.00	0.00	0.04
Fe_2O_3	47.94	47.93	47.52	47.72	47.52	47.74	45.27	42.87
FeO	37.12	36.87	36.47	37.13	37.10	37.26	38.07	37.20
MnO	0.97	1.17	1.05	0.79	0.85	0.99	0.92	0.82
MgO	1.18	1.17	1.13	0.98	1.07	0.94	0.80	1.21
Total	99.10	98.97	97.75	98.07	98.19	98.53	97.58	94.53

Sample	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D	DC-2D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	2	3	4	5	1	3	4	5
TiO_2	10.80	10.86	11.40	13.91	43.40	42.87	42.77	42.03
Al_2O_3	1.31	1.48	1.69	1.59	0.22	0.24	0.21	0.16
Cr_2O_3	0.05	0.16	0.15	0.02	0.00	0.00	0.02	0.03
Fe_2O_3	46.14	43.37	42.21	39.51	17.14	18.50	16.62	18.69
FeO	37.68	37.36	37.25	40.61	34.69	33.51	33.78	33.11
MnO	0.82	0.79	0.87	0.79	0.92	0.94	0.77	0.87
MgO	1.48	1.13	1.48	1.41	1.92	2.30	2.20	2.14
Total	98.27	95.17	95.04	97.85	98.29	98.38	96.36	97.02

Sample	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	1	2	3	4	1	2	3	4
TiO_2	11.14	10.97	10.83	12.90	42.25	42.72	42.48	42.25
Al_2O_3	1.21	1.41	1.59	1.52	0.25	0.15	0.23	0.22
Cr_2O_3	0.12	0.07	0.11	0.14	0.00	0.01	0.04	0.04
Fe_2O_3	43.28	44.52	43.14	40.76	19.15	17.44	17.54	18.38
FeO	37.79	37.84	36.89	39.69	33.52	33.65	33.59	33.40
MnO	0.60	0.74	0.75	0.82	0.83	0.84	0.90	0.91
MgO	1.13	1.23	1.35	1.20	2.04	2.20	2.08	2.06
Total	95.26	96.78	94.67	97.02	98.04	97.01	96.86	97.27

Sample	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	1	2	3	4	1	2	3	4
TiO_2	11.03	11.59	12.25	13.82	42.47	43.19	43.62	41.71
Al_2O_3	1.39	1.46	1.46	1.36	0.26	0.14	0.21	0.21
Cr_2O_3	0.09	0.12	0.18	0.16	0.00	0.02	0.00	0.00
Fe_2O_3	45.51	44.28	42.30	39.00	16.51	17.51	18.41	17.81
FeO	38.55	38.97	39.22	40.13	33.67	34.08	34.27	32.77
MnO	0.63	0.49	0.63	0.88	0.97	0.83	0.80	0.86
MgO	1.20	1.34	1.31	1.36	1.99	2.20	2.33	2.18
Total	98.40	98.25	97.34	96.70	95.87	97.97	99.65	95.53

Sample	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	5	1	2	3	1	2	3	4
TiO_2	43.13	9.25	11.26	15.06	38.76	39.21	38.97	39.89
Al_2O_3	0.08	1.99	1.80	1.40	0.28	0.28	0.31	0.24
Cr_2O_3	0.00	0.08	0.11	0.03	0.13	0.05	0.00	0.00
Fe_2O_3	16.00	48.40	42.75	37.32	22.83	23.29	24.50	24.28
FeO	34.13	36.89	37.88	41.47	30.91	31.63	31.70	32.29
MnO	0.78	0.60	0.63	0.76	0.61	0.49	0.51	0.65
MgO	2.17	1.32	1.29	1.48	1.87	1.77	1.59	1.64
Total	96.29	98.52	95.71	97.54	95.38	96.71	97.59	98.99

Sample	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	5	1	2	3	1	2	3	4
TiO_2	41.43	8.99	10.05	13.64	39.94	39.87	39.45	42.29
Al_2O_3	0.11	2.16	2.02	1.59	0.24	0.25	0.25	0.30
Cr_2O_3	0.01	0.11	0.08	0.03	0.05	0.03	0.10	0.01
Fe_2O_3	18.95	47.45	46.67	40.18	23.10	24.35	24.25	18.65
FeO	32.87	36.37	37.59	40.41	32.31	32.15	31.78	34.13
MnO	0.75	0.55	0.43	0.84	0.63	0.59	0.75	0.80
MgO	2.04	1.22	1.41	1.40	1.66	1.75	1.65	1.74
Total	96.16	96.85	98.25	98.09	97.94	98.98	98.24	97.91

Sample	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	1	2	1	2	3	4	5	1
TiO_2	11.74	12.48	41.95	42.46	42.31	41.95	43.79	11.64
Al_2O_3	1.36	1.21	0.20	0.17	0.21	0.26	0.10	1.26
Cr_2O_3	0.10	0.10	0.07	0.00	0.01	0.00	0.04	0.13
Fe_2O_3	44.19	42.60	20.49	18.46	19.20	19.33	16.07	44.59
FeO	39.13	39.46	33.69	34.37	34.32	33.44	35.02	38.98
MnO	0.72	0.99	0.85	0.69	0.69	0.95	0.96	0.71
MgO	1.21	1.15	1.78	1.76	1.71	1.87	1.90	1.27
Total	98.45	97.99	99.03	97.91	98.45	97.79	97.88	98.58

Sample	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	2	1	2	3	4	5	6	7
TiO_2	12.69	43.16	42.57	42.75	42.52	41.96	43.03	44.09
Al_2O_3	1.16	0.24	0.17	0.10	0.19	0.24	0.18	0.16
Cr_2O_3	0.10	0.01	0.00	0.00	0.05	0.01	0.05	0.03
Fe_2O_3	42.27	16.94	18.50	19.61	17.87	21.95	17.17	15.42
FeO	39.76	34.37	34.40	34.34	34.36	33.94	34.73	34.58
MnO	0.78	1.06	0.76	1.07	0.83	0.69	0.87	1.07
MgO	1.21	1.89	1.75	1.70	1.71	1.74	1.74	2.24
Total	97.97	97.68	98.15	99.56	97.54	100.53	97.77	97.60

Sample	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	8	9	1	2	3	4	5	1
TiO_2	44.59	44.59	14.04	9.36	9.76	9.54	10.04	44.19
Al_2O_3	0.19	0.18	1.34	1.69	1.65	1.67	1.68	0.43
Cr_2O_3	0.05	0.00	0.01	0.04	0.12	0.11	0.11	0.00
Fe_2O_3	14.41	15.49	40.69	48.69	47.43	48.20	47.27	13.52
FeO	35.48	35.36	40.89	37.01	37.13	37.18	38.09	34.82
MnO	0.85	0.87	0.91	0.45	0.50	0.70	0.65	0.99
MgO	2.11	2.16	1.51	1.40	1.39	1.23	1.02	2.20
Total	97.68	98.66	99.39	98.64	97.97	98.63	98.86	96.16

Sample	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	2	1	2	3	4	5	6	7
TiO_2	44.33	10.63	9.80	9.35	9.57	9.25	9.11	9.74
Al_2O_3	0.10	1.58	1.66	1.74	1.82	1.74	2.02	1.74
Cr_2O_3	0.00	0.09	0.11	0.06	0.15	0.15	0.06	0.15
Fe_2O_3	15.71	46.04	47.40	47.70	48.04	47.12	46.45	48.05
FeO	35.33	37.80	37.40	36.42	36.94	36.49	35.89	37.56
MnO	0.96	0.66	0.48	0.73	0.52	0.51	0.49	0.59
MgO	2.00	1.42	1.28	1.33	1.52	1.20	1.31	1.28
Total	98.44	98.22	98.12	97.33	98.56	96.46	95.33	99.11

Sample	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	8	9	10	11	12	13	14	15
TiO_2	10.49	9.78	9.16	8.67	9.16	9.35	9.90	15.06
Al_2O_3	1.47	1.70	1.78	1.76	1.85	1.72	1.63	1.11
Cr_2O_3	0.17	0.16	0.10	0.11	0.07	0.14	0.12	0.00
Fe_2O_3	46.47	47.92	49.26	47.00	49.04	48.80	48.01	37.57
FeO	38.08	37.58	37.05	35.33	37.04	37.07	37.36	41.69
MnO	0.55	0.58	0.63	0.51	0.41	0.65	0.69	0.62
MgO	1.27	1.26	1.27	1.23	1.36	1.30	1.43	1.38
Total	98.50	98.97	99.25	94.61	98.93	99.04	99.14	97.43

Sample	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	1	2	3	1	2	3	4	5
TiO_2	40.77	42.33	42.35	14.15	10.57	8.90	8.35	9.05
Al_2O_3	0.23	0.26	0.27	1.71	2.05	2.27	2.16	2.12
Cr_2O_3	0.07	0.01	0.09	0.13	0.14	0.08	0.11	0.16
Fe_2O_3	22.65	20.46	21.03	38.22	46.01	49.62	50.36	49.18
FeO	31.72	33.19	32.90	39.95	37.72	36.27	35.84	36.74
MnO	0.44	0.66	0.82	0.81	0.58	0.65	0.57	0.45
MgO	2.53	2.36	2.45	1.77	1.64	1.71	1.59	1.56
Total	98.41	99.28	99.90	96.74	98.72	99.50	98.97	99.27

Sample	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	1	2	3	1	2	3	4	5
TiO_2	41.64	43.47	42.07	13.65	10.65	9.10	8.72	8.45
Al_2O_3	0.28	0.26	0.21	1.81	2.17	2.06	2.30	2.31
Cr_2O_3	0.06	0.01	0.01	0.11	0.09	0.12	0.14	0.12
Fe_2O_3	20.53	18.47	20.08	39.26	44.93	48.25	48.86	48.53
FeO	32.31	34.43	32.91	39.98	37.59	36.27	36.29	35.69
MnO	0.63	0.65	0.72	0.53	0.45	0.50	0.55	0.41
MgO	2.53	2.25	2.36	1.70	1.63	1.58	1.41	1.47
Total	97.97	99.55	98.36	97.05	97.50	97.87	98.27	96.97

Sample	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	6	7	1	2	3	4	5	6
TiO_2	8.68	8.36	8.24	8.54	8.38	2.34	8.44	8.60
Al_2O_3	2.31	2.52	2.31	2.32	2.34	0.82	2.29	2.21
Cr_2O_3	0.18	0.11	0.16	0.11	0.09	0.04	0.10	0.18
Fe_2O_3	49.20	47.73	49.62	49.80	50.75	24.89	48.13	49.82
FeO	35.99	35.45	35.56	36.61	36.42	1.20	35.33	36.18
MnO	0.75	0.56	0.39	0.38	0.55	0.26	0.36	0.42
MgO	1.52	1.30	1.63	1.38	1.47	0.36	1.57	1.65
Total	98.63	96.03	97.90	99.15	99.99	29.90	96.22	99.05

Sample	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	7	8	9	10	1	2	3	4
TiO_2	9.18	10.29	11.63	14.14	10.77	10.74	11.20	11.64
Al_2O_3	2.16	2.07	2.09	1.83	1.58	1.56	1.52	1.67
Cr_2O_3	0.09	0.10	0.12	0.11	0.13	0.15	0.17	0.10
Fe_2O_3	47.79	46.98	43.70	37.99	44.46	44.10	45.01	43.77
FeO	36.29	37.65	38.53	40.48	37.74	37.53	38.77	38.97
MnO	0.60	0.65	0.60	0.38	0.70	0.67	0.62	0.75
MgO	1.50	1.59	1.67	1.68	1.18	1.20	1.20	1.19
Total	97.61	99.34	98.33	96.63	96.55	95.95	98.48	98.08

Sample	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	5	6	1	2	1	2	3	1
TiO_2	13.45	15.07	42.48	41.64	42.17	42.15	41.29	13.72
Al_2O_3	1.50	1.35	0.20	0.23	0.18	0.15	0.24	1.70
Cr_2O_3	0.08	0.05	0.01	0.04	0.00	0.05	0.05	0.11
Fe_2O_3	40.48	38.61	20.09	20.61	19.56	19.45	22.16	38.99
FeO	40.30	42.18	33.60	33.18	33.97	33.83	33.03	40.33
MnO	0.64	0.71	0.77	0.63	0.91	0.63	0.59	0.62
MgO	1.44	1.43	2.15	2.03	1.71	1.93	1.97	1.42
Total	97.88	99.40	99.30	98.37	98.49	98.20	99.34	96.89

Sample	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	2	3	4	5	6	1	2	3
TiO_2	10.49	8.84	8.48	8.84	9.33	11.76	13.26	15.49
Al_2O_3	2.31	2.26	2.32	2.19	1.66	1.44	1.46	1.32
Cr_2O_3	0.16	0.12	0.09	0.18	0.09	0.09	0.15	0.06
Fe_2O_3	45.95	48.84	49.79	49.08	47.47	43.74	40.73	36.86
FeO	37.70	35.77	36.13	36.53	36.69	39.17	40.67	42.25
MnO	0.64	0.66	0.47	0.69	0.49	0.70	0.71	0.92
MgO	1.63	1.73	1.53	1.33	1.22	1.13	1.06	1.25
Total	98.87	98.22	98.81	98.84	96.95	98.04	98.05	98.15

Sample	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	1	2	3	4	5	1	2	3
TiO_2	42.80	42.10	42.36	42.55	42.80	44.30	42.83	31.53
Al_2O_3	0.16	0.26	0.23	0.10	0.15	0.24	0.16	0.69
Cr_2O_3	0.00	0.00	0.04	0.09	0.03	0.00	0.10	0.03
Fe_2O_3	18.99	18.37	19.06	18.61	16.46	16.28	19.20	40.07
FeO	34.50	34.16	33.80	34.28	34.57	34.43	33.59	23.60
MnO	0.63	0.76	1.00	0.66	0.68	0.60	0.81	0.84
MgO	1.88	1.65	1.84	1.86	1.82	2.70	2.30	2.19
Total	98.96	97.29	98.34	98.16	96.50	98.56	99.00	98.96

Sample	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	1	2	3	4	5	6	7	1
TiO_2	15.85	14.58	14.42	14.09	13.91	14.30	13.84	11.42
Al_2O_3	1.27	1.44	1.35	2.01	1.62	1.60	1.68	1.48
Cr_2O_3	0.04	0.01	0.03	0.05	0.09	0.06	0.08	0.18
Fe_2O_3	37.37	37.79	39.31	36.78	39.25	37.71	37.60	44.92
FeO	42.79	41.25	41.24	39.96	40.49	40.32	39.83	39.14
MnO	0.58	0.54	0.67	0.57	0.78	0.80	0.69	0.85
MgO	1.60	1.38	1.49	1.57	1.45	1.53	1.40	1.06
Total	99.51	96.99	98.51	95.05	97.58	96.32	95.13	99.05

Sample	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	2	3	4	5	1	2	3	4
TiO_2	11.52	12.00	13.53	14.19	42.12	42.25	42.38	42.49
Al_2O_3	1.51	1.55	1.38	1.15	0.51	0.16	0.14	0.18
Cr_2O_3	0.08	0.12	0.10	0.03	0.00	0.01	0.00	0.07
Fe_2O_3	44.24	44.25	40.61	39.40	18.94	19.79	18.78	18.51
FeO	38.84	39.74	40.70	41.15	33.83	34.23	34.02	34.20
MnO	0.64	0.80	0.84	0.81	0.91	0.72	0.73	0.98
MgO	1.25	1.17	1.17	1.18	1.76	1.71	1.88	1.70
Total	98.08	99.62	98.33	97.91	98.06	98.87	97.94	98.13

Sample	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	1	2	1	2	3	4	5	6
TiO_2	39.10	39.06	14.67	12.50	10.83	10.19	9.73	9.73
Al_2O_3	0.27	0.29	1.46	1.63	1.78	1.95	1.91	1.75
Cr_2O_3	0.03	0.03	0.11	0.12	0.03	0.16	0.11	0.08
Fe_2O_3	24.40	24.65	38.12	41.44	43.43	45.06	46.95	47.05
FeO	31.51	31.11	41.10	39.38	37.16	36.98	36.98	36.92
MnO	0.74	0.82	0.94	0.80	0.68	0.66	0.55	0.62
MgO	1.63	1.79	1.44	1.20	1.36	1.35	1.40	1.34
Total	97.68	97.76	97.83	97.07	95.28	96.36	97.64	97.48

Sample	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	1	2	3	4	1	2	3	4
TiO_2	43.14	43.01	43.91	42.29	14.48	11.50	10.62	9.78
Al_2O_3	0.23	0.22	0.20	0.24	1.35	1.98	1.83	1.64
Cr_2O_3	0.00	0.00	0.06	0.09	0.05	0.11	0.10	0.04
Fe_2O_3	17.10	19.16	17.65	18.42	38.64	42.58	44.60	46.89
FeO	34.72	34.13	34.80	33.76	41.31	37.93	37.76	37.08
MnO	0.83	0.77	0.85	0.82	0.48	0.64	0.51	0.55
MgO	1.82	2.11	2.15	1.94	1.46	1.53	1.25	1.26
Total	97.84	99.41	99.61	97.56	97.76	96.28	96.67	97.23

Sample	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	1	2	3	4	1	2	3	4
TiO_2	42.27	41.99	43.22	41.97	14.47	12.80	11.85	10.52
Al_2O_3	0.16	0.21	0.20	0.33	1.42	1.71	1.94	1.74
Cr_2O_3	0.04	0.06	0.07	0.06	0.01	0.11	0.12	0.15
Fe_2O_3	19.18	20.35	17.03	19.36	38.75	41.92	42.96	45.49
FeO	33.60	33.10	34.70	33.51	41.31	39.92	39.08	37.77
MnO	0.93	0.86	0.68	0.99	0.83	0.79	0.70	0.91
MgO	1.95	2.13	1.95	1.81	1.30	1.36	1.28	1.12
Total	98.12	98.70	97.86	98.03	98.08	98.61	97.94	97.70

Sample	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	1	2	3	4	1	2	3	4
TiO_2	12.32	12.63	13.55	14.20	41.71	40.22	40.99	41.79
Al_2O_3	1.30	1.22	1.18	1.21	0.19	0.17	0.16	0.12
Cr_2O_3	0.20	0.19	0.13	0.12	0.05	0.05	0.09	0.03
Fe_2O_3	42.44	41.58	40.14	38.36	19.62	21.40	20.68	18.77
FeO	39.23	39.09	40.37	40.62	33.38	32.69	32.77	33.44
MnO	0.84	0.85	0.91	0.88	0.99	0.61	0.89	0.87
MgO	1.23	1.36	1.14	1.23	1.76	1.61	1.80	1.83
Total	97.56	96.92	97.42	96.64	97.70	96.75	97.37	96.86

Sample	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	1	2	3	4	1	2	3	1
TiO_2	9.62	10.26	10.03	11.07	42.59	41.62	40.10	40.72
Al_2O_3	2.70	2.68	2.63	2.49	0.26	0.30	0.33	0.26
Cr_2O_3	0.11	0.08	0.12	0.12	0.01	0.07	0.06	0.00
Fe_2O_3	46.71	46.12	45.48	43.22	19.40	20.17	23.47	23.14
FeO	37.11	37.71	36.78	37.72	32.80	32.79	31.43	32.04
MnO	0.30	0.76	0.72	0.67	0.61	0.45	0.47	0.46
MgO	1.60	1.48	1.63	1.55	2.74	2.35	2.34	2.31
Total	98.16	99.09	97.39	96.84	98.41	97.74	98.19	98.92

Sample	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	2	3	4	5	6	1	2	1
TiO_2	39.28	41.29	41.12	40.91	39.99	10.25	10.29	38.95
Al_2O_3	0.33	0.33	0.28	0.31	0.34	2.26	2.27	0.19
Cr_2O_3	0.00	0.05	0.04	0.04	0.09	0.16	0.12	0.00
Fe_2O_3	22.21	21.76	18.92	22.13	23.67	45.62	45.33	26.16
FeO	31.10	32.26	32.76	31.71	31.27	36.26	37.29	31.42
MnO	0.55	0.57	0.47	0.58	0.46	0.68	0.60	0.50
MgO	2.07	2.41	2.11	2.52	2.38	2.06	1.50	1.74
Total	95.53	98.67	95.69	98.19	98.19	97.29	97.39	98.97

Sample	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	2	3	4	5	6	7	1	2
TiO_2	39.43	39.52	42.21	39.43	39.33	38.97	10.56	11.89
Al_2O_3	0.26	0.25	0.22	0.29	0.28	0.28	2.23	2.23
Cr_2O_3	0.09	0.05	0.01	0.01	0.00	0.03	0.06	0.00
Fe_2O_3	23.72	22.99	19.02	24.31	23.65	25.68	44.49	41.75
FeO	31.40	31.45	33.41	31.17	31.32	31.05	38.48	38.88
MnO	0.71	0.67	0.60	0.76	0.53	0.60	0.59	0.70
MgO	1.87	1.92	2.22	1.98	1.97	1.91	0.86	1.21
Total	97.48	96.85	97.69	97.93	97.07	98.52	97.27	96.65

Sample	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	3	1	2	1	2	3	4	5
TiO_2	18.99	39.09	40.38	19.60	13.88	10.73	10.41	11.78
Al_2O_3	1.70	0.36	0.29	1.45	2.22	2.59	2.40	2.43
Cr_2O_3	0.08	0.10	0.02	0.02	0.12	0.04	0.06	0.09
Fe_2O_3	28.08	22.82	22.32	29.26	38.96	44.27	45.56	40.80
FeO	44.47	31.16	32.03	45.11	40.70	38.05	38.49	39.57
MnO	1.08	0.57	0.77	1.06	0.83	0.66	0.57	0.49
MgO	1.39	1.92	1.96	1.84	1.45	1.32	1.05	0.69
Total	95.79	96.02	97.77	98.33	98.16	97.66	98.53	95.85

Sample	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	1	2	3	4	1	2	3	4
TiO_2	40.45	39.44	39.32	39.74	18.71	11.70	9.79	9.43
Al_2O_3	0.39	0.39	0.28	0.41	1.55	2.33	2.30	2.08
Cr_2O_3	0.00	0.07	0.02	0.02	0.00	0.08	0.11	0.13
Fe_2O_3	20.20	24.82	22.22	22.34	31.26	43.11	46.26	46.02
FeO	32.27	31.45	31.64	31.41	44.60	38.81	37.13	36.47
MnO	0.87	0.78	0.58	0.85	1.20	0.69	0.73	0.58
MgO	1.81	1.81	1.76	1.95	1.68	1.46	1.25	1.19
Total	96.00	98.77	95.82	96.71	99.00	98.20	97.57	95.89

Sample	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	1	2	3	1	2	3	4	5
TiO_2	12.23	11.51	19.92	41.28	42.53	42.16	40.97	43.11
Al_2O_3	2.27	2.25	1.71	0.28	0.35	0.37	0.34	0.28
Cr_2O_3	0.08	0.03	0.00	0.07	0.01	0.00	0.10	0.00
Fe_2O_3	41.63	43.90	28.09	21.99	19.73	19.21	20.26	17.67
FeO	40.36	39.36	45.69	32.59	33.32	33.25	32.43	33.59
MnO	0.64	0.83	1.20	0.82	0.91	0.83	0.74	1.01
MgO	0.76	1.04	1.56	2.08	2.25	2.15	2.06	2.34
Total	97.96	98.92	98.17	99.11	99.10	97.98	96.89	98.01

Sample	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	1	2	3	4	5	6	7	1
TiO_2	18.17	41.24	41.42	41.34	41.51	41.66	41.21	19.96
Al_2O_3	3.19	0.34	0.33	0.37	0.38	0.31	0.47	1.42
Cr_2O_3	0.05	0.04	0.00	0.04	0.01	0.04	0.06	0.00
Fe_2O_3	28.02	20.67	21.06	19.88	21.11	19.04	20.80	27.69
FeO	44.15	32.51	31.76	32.21	32.43	32.98	32.74	45.41
MnO	0.60	0.75	1.20	1.05	1.09	0.85	0.92	0.98
MgO	1.58	2.15	2.40	2.19	2.13	2.04	1.90	1.66
Total	95.77	97.70	98.17	97.07	98.66	96.92	98.10	97.11

Sample	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	2	3	1	2	3	4	5	6
TiO_2	12.06	11.13	40.11	41.60	41.99	42.33	42.15	42.68
Al_2O_3	2.05	2.37	0.37	0.36	0.31	0.38	0.34	0.44
Cr_2O_3	0.01	0.00	0.03	0.04	0.05	0.09	0.02	0.10
Fe_2O_3	39.96	42.62	22.75	21.44	20.12	18.61	21.23	18.80
FeO	38.88	38.71	32.60	32.54	33.02	33.16	32.99	33.71
MnO	0.77	0.75	0.74	0.93	0.79	0.93	1.01	0.86
MgO	0.82	0.78	1.53	2.21	2.22	2.22	2.19	2.14
Total	94.55	96.37	98.14	99.12	98.48	97.74	99.92	98.73

Sample	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	1	2	1	2	3	4	5	1
TiO_2	40.08	40.41	16.74	10.16	9.25	9.03	8.87	9.42
Al_2O_3	0.33	0.37	2.13	2.77	2.76	2.37	2.50	2.28
Cr_2O_3	0.08	0.00	0.07	0.12	0.10	0.05	0.06	0.10
Fe_2O_3	21.47	21.42	31.24	44.94	47.90	46.76	47.82	46.28
FeO	33.09	32.93	42.66	37.60	37.74	36.69	36.72	37.16
MnO	0.65	0.63	0.77	0.71	0.65	0.63	0.50	0.70
MgO	1.30	1.56	1.27	1.22	1.01	0.93	1.14	0.88
Total	96.99	97.31	94.88	97.51	99.41	96.45	97.61	96.82

Sample	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	2	3	1	2	3	4	5	6
TiO_2	9.33	9.68	41.56	41.55	42.26	40.20	41.56	42.02
Al_2O_3	2.51	2.44	0.27	0.30	0.29	1.10	0.25	0.31
Cr_2O_3	0.08	0.14	0.09	0.04	0.08	0.02	0.00	0.08
Fe_2O_3	46.49	45.79	19.51	19.66	17.87	19.97	19.53	17.97
FeO	36.39	36.51	32.82	32.88	33.00	31.24	32.98	33.21
MnO	0.88	0.93	0.83	0.85	1.05	1.17	0.95	1.19
MgO	1.25	1.32	2.04	2.03	2.22	2.09	1.93	1.89
Total	96.92	96.81	97.14	97.30	96.77	95.79	97.21	96.68

Sample	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D	DC-3D
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	1	2	3	4	5	6	7	8
TiO_2	9.13	9.02	8.97	8.78	8.71	8.44	8.50	8.83
Al_2O_3	2.62	2.59	2.63	2.85	2.69	2.66	2.86	2.73
Cr_2O_3	0.11	0.17	0.09	0.14	0.13	0.08	0.07	0.07
Fe_2O_3	46.91	47.89	47.69	48.24	48.00	48.52	47.07	47.73
FeO	36.20	36.00	35.75	35.84	35.55	35.21	35.09	35.89
MnO	0.73	0.50	0.71	0.78	0.61	0.73	0.51	0.61
MgO	1.40	1.44	1.69	1.65	1.72	1.66	1.63	1.57
Total	97.09	98.21	97.54	98.28	97.41	97.30	95.72	97.44

Sample	DC-6-A	DC-6-A	DC-6-A	DC-6-A	DC-6-A	DC-6-A	DC-6-A	DC-6-A
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	1	2	3	4	5	6	7	1
TiO_2	10.08	8.88	8.90	8.95	8.68	8.74	8.67	14.65
Al_2O_3	2.63	2.75	2.68	2.69	2.81	2.80	2.82	1.68
Cr_2O_3	0.01	0.09	0.16	0.06	0.09	0.10	0.15	0.12
Fe_2O_3	45.31	48.05	48.17	47.67	49.65	48.52	46.69	37.69
FeO	38.00	35.74	36.05	36.05	36.42	35.84	35.51	42.20
MnO	0.86	0.98	0.72	0.62	0.66	0.79	0.70	0.54
MgO	0.85	1.59	1.61	1.56	1.62	1.64	1.37	1.01
Total	97.74	98.09	98.28	97.59	99.92	98.43	95.92	97.88

Sample	DC-6-A	DC-6-A	DC-6-A	DC-6-A	DC-6-A	DC-6-A	DC-6-A	DC-6-A
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	2	3	1	2	3	1	2	3
TiO_2	15.10	18.82	43.25	39.44	36.79	12.80	9.01	8.61
Al_2O_3	1.76	1.09	0.18	0.35	0.42	2.00	2.40	2.17
Cr_2O_3	0.13	0.04	0.00	0.03	0.02	0.02	0.17	0.09
Fe_2O_3	36.47	28.11	15.91	23.60	29.55	40.83	48.24	49.74
FeO	42.35	45.02	35.29	31.92	29.10	39.85	36.52	36.03
MnO	0.80	0.66	0.72	0.41	0.72	0.77	0.71	0.72
MgO	0.95	0.90	1.62	1.77	1.83	1.23	1.38	1.50
Total	97.57	94.64	96.96	97.52	98.42	97.50	98.44	98.85

Sample	DC-6-A	DC-6-A	DC-6-A	DC-6-A	DC-6-A	DC-6-A	DC-6-A	DC-6-A
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	4	5	6	7	8	9	10	11
TiO_2	8.25	8.52	8.19	8.00	8.21	7.78	7.93	7.82
Al_2O_3	2.05	2.24	1.95	2.06	2.02	2.14	2.07	2.08
Cr_2O_3	0.14	0.11	0.09	0.06	0.11	0.16	0.14	0.16
Fe_2O_3	49.25	49.01	49.57	49.57	49.91	50.47	51.04	49.36
FeO	35.04	35.83	35.12	34.61	35.11	34.56	35.55	34.29
MnO	0.66	0.43	0.40	0.58	0.73	0.57	0.42	0.49
MgO	1.57	1.54	1.64	1.67	1.59	1.76	1.55	1.71
Total	96.95	97.68	96.95	96.56	97.68	97.44	98.70	95.91

Sample	DC-6-A	DC-6-A	DC-6-A	DC-6-A	DC-6-A	DC-6-A	DC-6-A	DC-6-A
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	12	1	2	1	2	3	4	5
TiO_2	8.32	39.07	39.96	19.05	12.11	9.88	9.15	8.97
Al_2O_3	2.15	0.34	0.28	1.64	2.75	2.82	2.91	2.72
Cr_2O_3	0.12	0.00	0.03	0.00	0.13	0.17	0.13	0.08
Fe_2O_3	48.94	22.58	23.74	30.39	42.82	45.83	47.95	47.59
FeO	35.64	30.56	31.79	44.64	39.39	37.01	36.78	36.49
MnO	0.45	0.69	0.66	1.07	0.87	0.65	0.69	0.72
MgO	1.38	2.18	1.96	1.90	1.56	1.56	1.49	1.28
Total	97.00	95.41	98.42	98.68	99.63	97.92	99.09	97.85

Sample	DC-6-A	DC-6-A	DC-6-A	DC-6-A	DC-6-A	DC-6-A	DC-6-A	DC-6-A
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	6	7	8	9	10	11	12	1
TiO_2	8.84	8.91	8.66	8.78	8.71	8.90	9.25	41.90
Al_2O_3	2.76	2.81	2.75	2.71	2.57	2.43	2.31	0.51
Cr_2O_3	0.22	0.10	0.10	0.09	0.20	0.20	0.10	0.05
Fe_2O_3	47.86	47.99	47.55	47.95	47.93	46.64	47.98	18.46
FeO	36.32	36.49	35.92	35.99	36.07	36.10	36.86	34.50
MnO	0.74	0.71	0.65	0.82	0.81	0.72	0.95	0.85
MgO	1.36	1.37	1.34	1.41	1.26	1.10	1.17	1.30
Total	98.10	98.38	96.97	97.75	97.55	96.09	98.61	97.57

Sample	DC-6-A	DC-6-A	DC-6-A	DC-6-A	DC-6-A	DC-6-A	DC-6-A	DC-6-A
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	1	1	2	3	4	5	6	7
TiO_2	34.47	12.37	10.75	10.28	10.08	9.53	9.78	9.66
Al_2O_3	0.93	2.34	2.36	2.24	2.35	2.45	2.14	2.17
Cr_2O_3	0.05	0.10	0.08	0.05	0.08	0.04	0.02	0.08
Fe_2O_3	32.65	40.69	44.21	44.78	44.64	45.15	45.81	46.93
FeO	26.03	40.15	38.62	38.26	37.76	37.57	37.87	37.48
MnO	1.26	0.45	0.78	0.68	0.74	0.59	0.55	0.85
MgO	2.07	0.93	0.85	0.72	0.78	0.58	0.73	0.97
Total	97.46	97.04	97.65	97.00	96.42	95.91	96.90	98.15

Sample	DC-6-A	DC-6-A	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21
Rock Type	dacite	dacite	enclave	enclave	enclave	enclave	enclave	enclave
Line Number	8	9	1	2	3	1	2	3
TiO_2	9.79	10.21	9.61	9.14	8.42	9.38	8.89	8.58
Al_2O_3	2.13	2.34	1.98	2.24	2.69	1.90	2.22	2.76
Cr_2O_3	0.04	0.04	0.04	0.00	0.00	0.05	0.06	0.01
Fe_2O_3	45.52	46.14	45.86	46.46	47.39	45.81	46.52	47.58
FeO	37.10	37.98	37.45	37.19	36.57	37.30	37.00	36.98
MnO	0.61	1.03	0.99	0.81	0.92	0.79	0.62	0.87
MgO	1.06	1.00	1.26	1.29	1.23	1.06	1.33	1.32
Total	96.25	98.73	97.18	97.13	97.24	96.29	96.75	98.10

Sample	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21
Rock Type	enclave	enclave	enclave	enclave	enclave	enclave	enclave	enclave
Line Number	4	5	6	7	8	9	10	1
TiO_2	8.41	8.26	8.59	9.02	9.06	9.20	8.81	8.88
Al_2O_3	2.78	2.64	2.51	2.23	2.26	2.14	2.64	1.75
Cr_2O_3	0.00	0.01	0.02	0.00	0.00	0.02	0.05	0.01
Fe_2O_3	45.54	46.53	47.20	47.78	46.94	45.40	45.58	46.47
FeO	35.86	35.48	36.72	37.31	37.13	37.06	36.61	36.43
MnO	0.78	1.04	0.75	1.09	0.97	0.68	0.71	0.93
MgO	1.30	1.61	1.39	1.26	1.27	1.04	1.28	1.07
Total	94.67	95.59	97.19	98.68	97.63	95.55	95.68	95.53

Sample	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21
Rock Type	enclave	enclave	enclave	enclave	enclave	enclave	enclave	enclave
Line Number	2	3	4	5	6	7	8	9
TiO_2	8.35	8.12	8.22	8.01	7.91	8.37	9.39	8.72
Al_2O_3	2.31	2.31	2.27	2.30	2.55	2.11	2.04	2.03
Cr_2O_3	0.00	0.01	0.04	0.02	0.00	0.00	0.03	0.00
Fe_2O_3	49.34	48.73	47.84	48.36	47.16	48.18	46.27	47.76
FeO	37.07	36.33	36.35	36.31	35.73	36.93	37.68	37.19
MnO	0.93	1.01	0.80	0.67	0.78	0.57	0.86	0.62
MgO	1.20	1.14	1.10	1.14	1.03	1.02	0.88	1.12
Total	99.19	97.64	96.62	96.81	95.17	97.18	97.14	97.44

Sample	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21
Rock Type	enclave	enclave	enclave	enclave	enclave	enclave	enclave	enclave
Line Number	10	1	2	3	4	5	6	7
TiO_2	8.57	8.51	7.87	7.98	7.86	7.73	7.65	7.67
Al_2O_3	2.37	2.32	2.64	2.58	2.84	2.95	2.88	3.01
Cr_2O_3	0.00	0.00	0.00	0.09	0.01	0.10	0.11	0.08
Fe_2O_3	47.84	47.13	47.54	47.63	48.58	48.63	48.73	48.57
FeO	36.86	36.57	35.89	35.68	36.17	35.88	36.10	35.87
MnO	0.90	0.82	0.65	0.94	0.81	0.91	0.63	0.87
MgO	1.19	1.06	1.22	1.45	1.44	1.57	1.46	1.51
Total	97.73	96.40	95.81	96.34	97.71	97.76	97.56	97.59

Sample	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21
Rock Type	enclave	enclave	enclave	enclave	enclave	enclave	enclave	enclave
Line Number	8	9	10	1	2	3	4	5
TiO_2	7.54	7.58	7.89	7.41	7.59	7.42	7.65	7.56
Al_2O_3	2.67	2.94	3.15	2.28	2.29	2.33	2.36	2.33
Cr_2O_3	0.00	0.02	0.08	0.00	0.04	0.00	0.05	0.00
Fe_2O_3	48.93	48.19	47.05	49.19	48.91	49.22	48.49	49.91
FeO	35.38	35.38	35.80	35.30	35.49	35.50	35.40	35.72
MnO	1.01	1.03	0.81	0.85	0.86	0.75	0.96	1.01
MgO	1.51	1.38	1.41	1.29	1.32	1.25	1.27	1.37
Total	97.04	96.51	96.19	96.32	96.51	96.47	96.19	97.91

Sample	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21
Rock Type	enclave	enclave	enclave	enclave	enclave	enclave	enclave	enclave
Line Number	6	7	8	9	10	1	2	3
TiO_2	7.79	7.95	8.41	8.68	7.71	8.02	7.97	7.86
Al_2O_3	2.29	2.16	1.93	1.74	2.26	1.89	1.78	2.03
Cr_2O_3	0.02	0.03	0.05	0.04	0.00	0.00	0.04	0.01
Fe_2O_3	47.91	47.60	48.04	46.51	49.49	48.37	48.84	48.00
FeO	35.44	35.50	36.55	36.11	36.13	36.30	36.17	36.24
MnO	0.86	0.85	0.71	0.79	0.65	0.66	0.81	0.44
MgO	1.25	1.28	1.23	1.24	1.32	0.78	0.84	0.68
Total	95.54	95.36	96.92	95.11	97.55	96.01	96.45	95.25

Sample	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21
Rock Type	enclave	enclave	enclave	enclave	enclave	enclave	enclave	enclave
Line Number	4	5	6	7	8	9	10	1
TiO_2	8.64	8.07	8.17	8.37	8.63	11.53	8.29	9.56
Al_2O_3	2.45	2.09	2.17	1.92	1.83	1.90	2.22	2.01
Cr_2O_3	0.09	0.03	0.01	0.02	0.05	0.04	0.08	0.04
Fe_2O_3	46.13	48.91	49.54	48.66	47.26	41.96	47.71	45.67
FeO	36.72	36.83	36.80	36.75	36.66	39.97	36.95	37.79
MnO	0.81	0.57	0.94	0.82	0.76	0.62	0.52	0.70
MgO	0.75	0.85	1.09	1.03	0.96	0.54	0.72	0.97
Total	95.58	97.34	98.73	97.57	96.15	96.57	96.49	96.74

Sample	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21
Rock Type	enclave	enclave	enclave	enclave	enclave	enclave	enclave	enclave
Line Number	2	3	4	5	6	7	8	9
TiO_2	9.47	9.25	9.07	8.96	8.51	8.72	8.68	9.34
Al_2O_3	2.14	2.33	2.49	2.68	2.63	2.52	2.35	1.84
Cr_2O_3	0.04	0.02	0.03	0.07	0.05	0.02	0.03	0.04
Fe_2O_3	46.58	46.80	45.71	46.28	46.72	47.60	45.48	45.90
FeO	37.75	37.66	37.31	36.96	36.40	37.33	36.14	37.39
MnO	0.89	0.87	0.54	0.98	0.88	0.75	0.91	0.69
MgO	1.24	1.16	1.13	1.31	1.31	1.13	0.97	0.96
Total	98.11	98.09	96.28	97.23	96.50	98.09	94.56	96.17

Sample	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21
Rock Type	enclave	enclave	enclave	enclave	enclave	enclave	enclave	enclave
Line Number	1	2	3	4	5	6	7	8
TiO_2	8.63	8.96	8.60	9.07	8.65	8.55	8.94	8.78
Al_2O_3	1.86	1.85	2.10	2.28	2.06	2.09	1.96	1.61
Cr_2O_3	0.06	0.02	0.00	0.09	0.06	0.02	0.01	0.04
Fe_2O_3	48.40	48.11	48.34	46.75	47.18	46.53	48.69	46.89
FeO	37.32	37.66	37.36	37.86	37.06	36.35	37.95	36.61
MnO	0.84	0.84	0.72	0.63	0.60	0.72	0.70	0.74
MgO	0.66	0.80	0.85	0.72	0.86	1.03	1.03	0.96
Total	97.76	98.24	97.97	97.40	96.47	95.29	99.29	95.63

Sample	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21
Rock Type	enclave	enclave	enclave	enclave	enclave	enclave	enclave	enclave
Line Number	9	10	1	2	3	4	5	6
TiO_2	11.37	8.77	9.65	8.78	8.79	8.85	8.90	8.59
Al_2O_3	1.93	2.20	2.39	2.13	2.37	2.60	2.68	2.67
Cr_2O_3	0.09	0.03	0.02	0.04	0.04	0.05	0.07	0.00
Fe_2O_3	42.18	47.73	44.27	46.82	46.82	46.69	46.01	46.86
FeO	40.00	37.76	37.50	36.59	36.56	36.98	36.65	36.29
MnO	0.45	0.54	0.89	0.89	1.02	0.76	0.96	1.04
MgO	0.53	0.72	0.82	1.24	1.38	1.46	1.43	1.53
Total	96.55	97.76	95.54	96.49	96.97	97.40	96.71	96.98

Sample	DC-21	DC-21	DC-21	DC-21	DC-21	DC-7-A	DC-7-A	DC-7-A
Rock Type	enclave	enclave	enclave	enclave	enclave	dacite	dacite	dacite
Line Number	7	8	9	10	11	1	2	3
TiO_2	8.60	8.71	9.02	8.24	8.45	9.63	11.40	19.10
Al_2O_3	2.71	2.28	1.91	2.95	2.51	2.60	2.31	1.71
Cr_2O_3	0.03	0.01	0.02	0.01	0.05	0.07	0.09	0.00
Fe_2O_3	45.70	47.70	47.09	46.84	47.60	45.80	43.60	29.68
FeO	35.94	36.92	36.95	36.14	36.43	38.08	39.86	46.59
MnO	1.06	0.84	1.01	0.78	0.86	0.72	0.77	0.88
MgO	1.34	1.38	1.14	1.50	1.58	1.41	1.66	2.05
Total	95.39	97.83	97.14	96.46	97.48	98.31	99.70	100.00

Sample	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	1	2	3	4	1	2	3	1
TiO_2	42.44	42.68	42.14	39.30	17.44	11.54	9.92	9.67
Al_2O_3	0.25	0.18	0.29	0.99	1.95	2.42	2.41	2.05
Cr_2O_3	0.05	0.01	0.07	0.01	0.07	0.06	0.00	0.13
Fe_2O_3	18.78	18.24	18.60	19.86	33.42	43.38	46.81	47.57
FeO	35.49	35.51	35.21	32.51	45.62	40.06	38.70	39.12
MnO	0.86	0.96	0.86	0.69	0.63	0.74	0.76	0.54
MgO	2.58	2.71	2.59	3.03	2.21	1.70	1.61	0.90
Total	100.44	100.29	99.76	96.39	101.34	99.90	100.21	99.98

Sample	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	2	3	4	1	2	3	1	2
TiO_2	9.84	11.16	18.66	43.51	42.91	31.13	11.72	10.19
Al_2O_3	2.19	2.28	1.58	0.15	0.32	0.75	2.55	2.90
Cr_2O_3	0.08	0.05	0.01	0.06	0.02	0.01	0.01	0.06
Fe_2O_3	47.95	43.81	29.82	15.54	16.38	5.63	40.89	43.92
FeO	39.45	39.90	45.82	36.54	36.15	56.24	39.29	38.39
MnO	0.53	0.66	0.95	0.84	0.65	1.12	0.80	0.69
MgO	1.23	1.20	1.89	2.47	2.53	2.39	1.67	1.52
Total	101.27	99.06	98.72	99.11	98.97	97.28	96.94	97.68

Sample	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	1	2	1	2	3	4	5	1
TiO_2	9.81	13.78	42.52	43.21	42.70	43.32	42.96	16.39
Al_2O_3	2.43	2.20	0.24	0.27	0.28	0.36	0.35	2.07
Cr_2O_3	0.11	0.06	0.02	0.02	0.01	0.03	0.02	0.03
Fe_2O_3	46.43	39.87	18.35	17.82	16.75	17.03	16.69	33.80
FeO	38.67	42.31	35.61	36.15	35.84	36.36	36.04	43.74
MnO	0.74	0.70	0.73	1.00	0.73	0.74	0.75	1.05
MgO	1.26	1.82	2.69	2.41	2.58	2.64	2.61	1.93
Total	99.44	100.73	100.17	100.89	98.89	100.47	99.42	99.01

Sample	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	2	1	2	3	4	1	2	3
TiO_2	11.12	10.67	9.87	9.70	13.38	43.42	43.69	42.93
Al_2O_3	2.55	2.47	2.10	2.12	2.44	0.26	0.24	0.35
Cr_2O_3	0.09	0.07	0.04	0.12	0.08	0.06	0.00	0.00
Fe_2O_3	43.09	43.17	46.46	47.11	39.46	17.31	15.16	16.69
FeO	40.23	39.20	39.16	38.81	41.95	36.32	36.45	36.01
MnO	0.30	0.45	0.54	0.62	0.55	0.89	0.81	0.75
MgO	0.99	1.04	0.64	1.06	1.53	2.61	2.89	2.62
Total	98.37	97.06	98.83	99.54	99.38	100.87	99.25	99.35

Sample	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	4	5	1	2	3	1	2	3
TiO_2	43.31	42.37	15.70	9.76	9.13	10.65	9.26	7.76
Al_2O_3	0.30	0.29	2.26	2.67	2.95	2.00	2.51	2.98
Cr_2O_3	0.00	0.02	0.00	0.07	0.11	0.09	0.10	0.06
Fe_2O_3	16.70	16.65	35.27	45.32	47.53	45.78	46.41	49.31
FeO	36.49	35.59	43.46	38.28	38.16	39.77	37.61	36.62
MnO	0.69	0.65	0.94	0.61	0.75	0.68	0.81	0.68
MgO	2.51	2.64	1.83	1.37	1.43	1.07	1.31	1.35
Total	99.99	98.22	99.45	98.07	100.07	100.04	98.00	98.76

Sample	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	4	5	6	1	2	3	4	5
TiO_2	7.22	6.98	6.82	10.06	9.01	8.17	7.05	6.24
Al_2O_3	2.88	2.95	3.77	2.19	2.38	2.62	3.22	2.66
Cr_2O_3	0.08	0.03	0.08	0.01	0.13	0.06	0.06	0.00
Fe_2O_3	50.66	51.31	49.31	43.28	46.99	50.38	50.71	50.85
FeO	36.28	36.05	35.65	38.10	37.88	37.64	35.96	34.44
MnO	0.68	0.70	0.55	0.53	0.44	0.58	0.72	0.62
MgO	1.24	1.39	1.31	0.68	1.09	1.43	1.58	1.28
Total	99.05	99.41	97.49	94.84	97.92	100.88	99.30	96.09

Sample	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	6	7	8	9	10	11	12	13
TiO_2	6.97	7.02	7.34	10.79	7.78	7.33	7.07	7.29
Al_2O_3	2.75	2.58	2.82	2.08	2.67	2.92	2.91	2.99
Cr_2O_3	0.03	0.06	0.06	0.02	0.01	0.05	0.00	0.00
Fe_2O_3	51.95	52.12	50.72	44.72	50.35	52.07	51.86	51.01
FeO	36.28	35.94	36.61	39.83	37.02	36.83	36.30	36.31
MnO	0.59	0.73	0.53	0.38	0.60	0.76	0.78	0.74
MgO	1.40	1.75	1.27	1.13	1.29	1.54	1.45	1.59
Total	99.96	100.20	99.37	98.95	99.72	101.50	100.37	99.93

Sample	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	1	2	3	4	5	6	7	1
TiO_2	12.67	13.65	12.44	13.39	9.74	8.86	12.91	9.24
Al_2O_3	2.24	2.31	2.12	2.35	2.26	2.33	2.21	2.71
Cr_2O_3	0.00	0.02	0.01	0.07	0.05	0.07	0.03	0.04
Fe_2O_3	39.35	35.76	39.36	38.10	47.78	48.72	41.38	48.27
FeO	41.40	41.68	41.06	42.07	39.29	38.42	42.60	38.78
MnO	0.37	0.35	0.32	0.51	0.60	0.51	0.46	0.55
MgO	0.43	0.35	0.31	0.47	1.05	0.84	0.49	1.32
Total	96.46	94.12	95.62	96.96	100.77	99.74	100.07	100.92

Sample	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	2	1	2	3	4	1	2	1
TiO_2	11.10	39.85	39.84	40.76	40.08	9.60	10.84	40.16
Al_2O_3	2.60	0.40	0.43	0.26	0.34	2.66	3.20	0.57
Cr_2O_3	0.11	0.08	0.02	0.03	0.00	0.05	0.05	0.00
Fe_2O_3	43.78	21.94	22.94	20.87	22.52	47.44	43.58	21.38
FeO	39.79	33.23	32.92	34.22	33.35	38.76	39.75	33.44
MnO	0.53	0.69	0.99	0.66	0.82	0.72	0.39	0.77
MgO	1.74	2.73	2.71	2.52	2.65	1.45	1.77	2.70
Total	99.65	98.91	99.86	99.32	99.76	100.69	99.57	99.02

Sample	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	2	3	4	5	6	1	2	1
TiO_2	40.48	40.45	40.97	39.10	40.90	12.02	11.46	9.75
Al_2O_3	0.33	0.34	0.63	0.48	0.35	2.52	2.81	3.34
Cr_2O_3	0.09	0.04	0.03	0.00	0.00	0.00	0.06	0.13
Fe_2O_3	22.57	22.08	17.67	26.28	23.03	42.93	43.01	45.68
FeO	33.82	33.71	33.84	32.07	33.68	40.97	41.25	38.36
MnO	0.85	0.87	0.88	1.07	1.30	0.76	0.36	0.78
MgO	2.46	2.54	3.00	2.86	2.55	1.40	0.52	1.92
Total	100.59	100.04	97.02	101.87	101.81	100.59	99.47	99.96

Sample	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	2	3	1	2	3	4	5	1
TiO_2	11.61	19.82	41.13	43.00	41.57	40.88	40.79	11.40
Al_2O_3	2.93	2.07	0.38	0.54	0.31	0.35	0.51	2.50
Cr_2O_3	0.05	0.07	0.00	0.01	0.00	0.00	0.00	0.01
Fe_2O_3	43.56	30.27	22.07	13.75	20.98	22.14	22.40	45.06
FeO	40.48	47.80	34.25	35.33	34.99	34.40	34.96	40.74
MnO	0.85	1.18	0.81	1.20	0.79	0.56	0.58	0.66
MgO	1.75	2.52	2.74	3.02	2.26	2.57	2.66	1.62
Total	101.23	103.73	101.37	96.84	100.91	100.89	101.89	101.98

Sample	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	2	1	2	3	4	5	6	7
TiO_2	9.44	44.00	41.60	40.40	40.82	42.32	41.08	40.59
Al_2O_3	2.84	0.33	0.41	0.30	0.30	0.60	0.35	0.32
Cr_2O_3	0.03	0.01	0.03	0.02	0.06	0.07	0.06	0.02
Fe_2O_3	46.53	17.54	20.56	22.68	22.73	17.11	21.88	23.13
FeO	38.30	36.68	34.93	33.75	33.82	34.98	34.43	33.79
MnO	0.65	0.80	0.71	0.80	1.02	0.99	0.86	0.98
MgO	1.38	2.96	2.51	2.53	2.65	2.94	2.34	2.45
Total	99.17	102.32	100.75	100.48	101.39	99.02	101.00	101.28

Sample	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	8	9	1	2	3	4	5	6
TiO_2	40.68	41.27	20.45	19.06	13.13	10.19	9.77	9.48
Al_2O_3	0.32	0.35	1.46	2.07	2.35	2.63	2.38	2.30
Cr_2O_3	0.00	0.03	0.01	0.00	0.00	0.03	0.00	0.09
Fe_2O_3	22.97	21.48	26.40	29.73	41.14	47.16	47.78	49.00
FeO	33.53	34.53	47.42	46.45	41.68	39.43	39.18	39.31
MnO	0.98	0.66	0.88	1.14	0.80	0.88	0.67	0.56
MgO	2.93	2.74	1.97	2.17	1.83	1.55	1.27	1.25
Total	101.41	101.06	98.59	100.62	100.93	101.87	101.05	101.99

Sample	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	1	2	3	1	2	3	4	5
TiO_2	12.23	13.84	11.71	9.79	9.69	9.21	9.33	9.35
Al_2O_3	2.74	2.23	2.80	2.56	2.57	2.74	2.84	2.69
Cr_2O_3	0.05	0.00	0.03	0.19	0.19	0.12	0.07	0.09
Fe_2O_3	41.64	38.78	41.85	47.12	47.69	48.29	47.05	47.18
FeO	41.93	43.04	41.02	39.15	38.78	38.36	37.90	38.16
MnO	0.47	0.50	0.39	0.72	0.95	0.79	0.88	0.75
MgO	0.40	0.52	0.66	1.18	1.50	1.60	1.71	1.50
Total	99.46	98.92	98.45	100.70	101.37	101.10	99.78	99.73

Sample	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	6	7	8	9	10	11	12	1
TiO_2	9.66	10.10	10.17	11.20	12.25	16.00	20.21	42.68
Al_2O_3	2.66	2.70	2.65	2.65	2.49	2.13	1.57	0.23
Cr_2O_3	0.09	0.17	0.15	0.09	0.09	0.09	0.05	0.00
Fe_2O_3	47.61	47.00	46.31	43.36	42.43	35.47	26.65	19.32
FeO	38.75	39.46	39.27	39.75	40.83	44.09	47.01	36.14
MnO	0.79	0.74	0.68	0.61	0.87	0.93	1.14	0.82
MgO	1.65	1.53	1.57	1.70	1.73	1.78	1.85	2.00
Total	101.21	101.70	100.81	99.37	100.69	100.50	98.47	101.20

Sample	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-7-A	DC-6-C
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	2	3	4	5	1	2	3	1
TiO_2	43.18	42.12	42.47	43.07	40.87	41.94	42.51	41.30
Al_2O_3	0.24	0.21	0.29	0.29	0.33	0.26	0.26	0.25
Cr_2O_3	0.01	0.09	0.11	0.11	0.06	0.00	0.06	0.07
Fe_2O_3	18.03	17.67	18.50	19.23	20.05	19.26	20.31	20.58
FeO	36.37	35.67	35.90	36.23	34.74	35.22	35.73	34.69
MnO	0.87	0.68	0.77	1.02	0.69	0.85	0.83	0.96
MgO	2.26	2.18	2.16	2.10	1.87	2.32	2.36	2.11
Total	100.97	98.61	100.20	101.96	98.61	99.86	102.05	99.97

Sample	DC-6-C	DC-6-C	DC-6-C	DC-6-C	DC-6-C	DC-6-C	DC-6-C	DC-6-C
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	2	3	4	5	6	7	1	2
TiO_2	42.33	42.63	40.70	42.43	42.30	42.67	42.29	41.56
Al_2O_3	0.32	0.30	0.32	0.23	0.34	0.32	0.28	0.33
Cr_2O_3	0.08	0.06	0.02	0.05	0.00	0.00	0.03	0.07
Fe_2O_3	20.06	18.35	18.52	19.79	19.99	18.00	19.10	22.05
FeO	35.39	35.75	34.33	35.54	35.89	35.98	35.89	35.04
MnO	0.89	0.94	0.73	1.14	0.61	0.74	0.72	0.71
MgO	2.52	2.35	2.18	2.09	2.19	2.33	2.02	2.31
Total	101.59	100.37	96.79	101.25	101.31	100.05	100.32	102.07

Sample	DC-6-C	DC-6-C	DC-6-C	DC-6-C	DC-6-C	DC-6-C	DC-6-C	DC-6-C
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	3	4	5	6	7	8	9	10
TiO_2	42.17	42.40	42.01	42.68	40.55	43.12	42.39	45.58
Al_2O_3	0.29	0.30	0.26	0.28	0.23	0.22	0.27	0.25
Cr_2O_3	0.00	0.05	0.00	0.12	0.00	0.00	0.09	0.06
Fe_2O_3	19.33	20.53	19.64	19.05	18.15	20.09	20.89	13.30
FeO	35.44	35.54	35.37	35.70	34.01	36.42	35.33	37.95
MnO	0.82	0.92	0.93	1.04	0.81	0.68	1.01	0.97
MgO	2.37	2.37	2.10	2.33	2.33	2.38	2.51	2.93
Total	100.41	102.10	100.30	101.19	96.08	102.91	102.49	101.04

Sample	DC-6-C	DC-6-C	DC-6-C	DC-6-C	DC-6-C	DC-6-C	DC-6-C	DC-6-C
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	1	2	3	4	5	6	7	8
TiO_2	10.05	9.84	9.83	9.87	11.31	13.19	16.42	19.70
Al_2O_3	2.41	2.71	2.68	2.71	2.81	2.36	1.98	1.71
Cr_2O_3	0.18	0.10	0.09	0.20	0.17	0.09	0.12	0.01
Fe_2O_3	47.80	47.15	47.83	47.84	44.48	41.02	35.22	29.34
FeO	39.54	38.90	39.33	39.29	40.19	41.61	44.62	47.31
MnO	0.75	0.88	0.82	0.69	0.97	1.00	0.94	1.02
MgO	1.51	1.54	1.39	1.85	1.78	1.81	1.79	2.14
Total	102.25	101.11	101.96	102.47	101.71	101.09	101.09	101.23

Sample	DC-6-C	DC-6-C	DC-6-C	DC-6-C	DC-6-C	DC-6-C	DC-6-C
Rock Type	dacite	dacite	dacite	dacite	dacite	dacite	dacite
Line Number	1	1	2	3	4	5	6
TiO_2	44.27	9.51	9.66	9.29	9.78	10.09	10.34
Al_2O_3	0.34	2.46	2.71	2.80	2.59	2.84	2.84
Cr_2O_3	0.00	0.11	0.11	0.10	0.16	0.18	0.12
Fe_2O_3	14.17	47.92	47.00	45.60	47.45	46.91	46.43
FeO	37.23	38.64	38.64	37.39	38.70	39.07	39.31
MnO	0.81	0.83	0.73	0.63	0.95	0.95	1.02
MgO	2.50	1.39	1.56	1.75	1.67	1.85	1.71
Total	99.32	100.87	100.41	97.56	101.30	101.89	101.79

APPENDIX G2

Fe-Ti oxide analyses: Volcán Ceboruco, Mexico

Fe-Ti oxide analyses were obtained using a Cameca SX-50 electron microprobe at the University of Alaska Fairbanks or a Cameca Camebax electron microprobe at Brown University, under the following analytical conditions: an accelerating voltage of 15 KeV, beam current of 10 nA, and a focused beam with a spot size of 1-3 μm. Magnetite-ilmenite pairs are located next to each other in the table. Major oxides are reported in weight percent (wt.%) with Fe_2O_3 and FeO calculated using the mineral formula calculation of Stormer (1983). "Line number" refers to the analysis number during a particular analytical transect. "Rock type" refers to the host rock, which contained the Fe-Ti oxide that was analyzed. Abbreviations as follows: **Rd** rhyodacite. Standards, counting times, and analytical errors are summarized in the table below:

Element	Counting Times (seconds)		Standard	Typical Analytical Error (wt.%, 1σ)
	Peak	Bkgd.		
Ti	10	5	Ilmenite (USNM 96189)	.131
Al	10	5	Chromite (USNM 117075)	.037
Cr	10	5	Chromite (USNM 117075)	.008
Fe	10	5	Ilmenite (USNM 96189)	.272
Mn	10	5	Ilmenite (USNM 96189)	.020
Mg	10	5	Chromite (USNM 117075)	.020
Si	10	5	Quartz (USNM R17701)	.007

Sample	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B
Rock Type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line Number	1	2	3	4	5	6	1	2
TiO_2	11.68	11.40	12.10	11.85	12.14	11.94	46.58	46.20
Al_2O_3	2.53	2.53	2.51	2.55	2.53	2.51	0.20	0.17
Cr_2O_3	0.05	0.00	0.04	0.01	0.04	0.00	0.00	0.08
Fe_2O_3	43.15	43.26	43.61	43.24	43.16	43.19	13.26	13.46
FeO	38.39	37.66	39.40	38.94	39.35	38.97	35.62	35.63
MnO	1.07	1.24	1.05	1.00	0.99	0.97	1.62	1.43
MgO	1.55	1.59	1.52	1.47	1.52	1.53	2.60	2.51
Total	98.42	97.68	100.23	99.06	99.72	99.11	99.88	99.48

Sample	18-P1T-B	18-P1T-B	18-P1B-A	18-P1B-A	18-P1B-A	18-P1B-A	18-P1B-A	18-P1B-A
Rock Type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line Number	3	4	1	2	3	4	5	6
TiO_2	47.01	46.35	11.60	11.43	12.09	11.84	12.02	12.04
Al_2O_3	0.21	0.16	2.52	2.51	1.54	2.58	2.52	2.53
Cr_2O_3	0.03	0.00	0.00	0.06	0.00	0.00	0.02	0.00
Fe_2O_3	12.08	12.81	43.50	44.11	44.32	43.37	42.66	43.41
FeO	36.22	35.69	38.45	38.35	39.16	38.92	38.78	39.39
MnO	1.43	1.66	0.90	1.13	1.07	0.92	1.11	0.90
MgO	2.59	2.42	1.60	1.52	1.42	1.56	1.51	1.50
Total	99.57	99.09	98.57	99.11	99.60	99.18	98.62	99.77

Sample	18-P1B-A	18-P1B-A	18-P1B-A	18-P1B-A	18-P1B-A	18-P1B-A	18-P1B-A	18-P1B-A
Rock Type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line Number	7	8	9	10	11	12	13	14
TiO_2	11.90	12.42	12.41	12.50	11.97	12.03	11.88	11.79
Al_2O_3	2.56	2.56	2.93	2.66	2.78	2.49	2.54	2.55
Cr_2O_3	0.01	0.03	0.00	0.01	0.03	0.00	0.00	0.02
Fe_2O_3	42.97	43.39	43.25	43.47	43.01	43.96	43.16	43.22
FeO	39.01	40.06	40.39	40.21	39.12	39.61	38.85	38.68
MnO	0.98	1.04	0.98	1.01	0.91	0.95	1.01	1.04
MgO	1.43	1.44	1.38	1.51	1.58	1.46	1.52	1.53
Total	98.85	100.95	101.34	101.37	99.40	100.50	98.96	98.83

Sample	18-P1B-A	18-P1B-A	18-P1B-A	18-P1B-A	18-P1B-A	18-P1B-A	18-P1B-A	18-P1B-A
Rock Type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line Number	15	16	17	18	19	20	21	22
TiO_2	12.01	12.03	12.05	11.97	11.64	11.81	12.05	11.97
Al_2O_3	2.61	2.49	2.54	2.53	2.56	2.41	2.58	2.65
Cr_2O_3	0.10	0.00	0.02	0.00	0.00	0.04	0.00	0.00
Fe_2O_3	43.41	43.04	42.62	42.87	43.19	43.34	42.64	43.71
FeO	39.28	39.11	38.97	38.92	38.37	38.90	39.05	39.28
MnO	1.11	1.05	0.93	0.98	0.99	0.97	1.09	1.19
MgO	1.47	1.45	1.54	1.51	1.57	1.45	1.42	1.45
Total	99.99	99.17	98.67	98.78	98.33	98.92	98.83	100.25

Sample	18-P1B-A	18-P1B-A	18-P1B-A	18-P1B-A	18-P1B-A	18-P1B-A	18-P1B-A	18-P1B-A
Rock Type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line Number	1	2	3	4	5	6	7	8
TiO_2	46.78	47.17	47.24	46.73	45.83	46.27	46.88	45.62
Al_2O_3	0.23	0.25	0.21	0.22	0.20	0.18	0.21	0.21
Cr_2O_3	0.00	0.03	0.00	0.01	0.05	0.01	0.03	0.04
Fe_2O_3	12.07	12.87	12.32	13.69	12.87	12.73	13.51	13.66
FeO	36.06	36.10	36.31	36.00	34.83	35.66	36.01	34.67
MnO	1.38	1.53	1.54	1.38	1.58	1.41	1.56	1.67
MgO	2.59	2.68	2.59	2.60	2.69	2.54	2.57	2.62
Total	99.11	100.63	100.21	100.63	98.05	98.81	100.76	98.49

Sample	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B
Rock Type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line Number	1	2	3	4	5	6	7	1
TiO_2	12.90	12.63	11.27	11.92	12.02	11.22	11.90	11.84
Al_2O_3	1.78	1.68	1.67	1.59	1.72	1.63	1.70	1.64
Cr_2O_3	0.00	0.11	0.00	0.05	0.02	0.00	0.03	0.00
Fe_2O_3	36.47	38.61	40.28	38.96	40.54	39.21	39.92	39.19
FeO	39.25	39.67	37.80	38.65	39.41	37.13	38.90	38.29
MnO	0.98	1.09	1.06	0.95	0.99	1.09	1.30	1.15
MgO	1.14	1.05	1.02	0.99	1.15	1.16	1.04	1.14
Total	92.52	94.84	93.09	93.12	95.84	91.45	94.78	93.25

Sample	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B
Rock Type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line Number	2	3	4	1	2	3	4	5
TiO_2	12.05	11.70	12.16	11.88	11.64	11.61	12.01	11.66
Al_2O_3	1.70	1.70	1.74	1.69	1.81	1.65	1.71	1.69
Cr_2O_3	0.02	0.00	0.00	0.00	0.00	0.02	0.03	0.00
Fe_2O_3	39.05	38.93	38.34	39.24	39.24	40.33	38.60	38.72
FeO	38.85	38.20	38.93	38.35	38.33	38.61	38.55	38.15
MnO	1.02	1.03	0.82	1.16	1.01	0.96	0.92	0.86
MgO	1.12	1.01	1.10	1.08	1.03	1.06	1.00	1.02
Total	93.81	92.58	93.09	93.40	93.06	94.24	92.82	92.11

Sample	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B
Rock Type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line Number	1	2	3	4	5	1	2	3
TiO_2	13.32	11.09	11.95	11.97	11.74	12.11	12.05	11.77
Al_2O_3	1.73	1.79	1.73	1.76	1.72	1.66	1.68	1.57
Cr_2O_3	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.04
Fe_2O_3	37.65	41.69	39.83	39.45	40.01	40.15	39.93	40.63
FeO	40.36	38.22	39.14	38.76	38.59	39.51	39.32	38.88
MnO	1.11	1.06	1.00	1.18	1.09	1.02	0.89	1.09
MgO	1.07	1.17	1.01	1.17	0.99	1.02	0.99	1.02
Total	95.24	95.08	94.66	94.29	94.14	95.45	94.86	95.00

Sample	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B
Rock Type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line Number	4	5	6	7	8	9	1	2
TiO_2	11.80	12.51	11.61	13.26	11.94	11.10	44.96	45.90
Al_2O_3	1.69	1.71	1.73	1.68	1.64	1.79	0.17	0.15
Cr_2O_3	0.00	0.02	0.00	0.09	0.00	0.00	0.02	0.01
Fe_2O_3	39.55	39.16	40.09	38.28	39.00	40.13	7.75	7.64
FeO	38.90	40.04	38.50	40.86	38.71	37.60	37.82	38.60
MnO	0.77	0.91	0.96	0.94	0.85	1.09	1.31	1.34
MgO	1.12	1.00	1.10	1.04	0.96	1.01	1.88	1.91
Total	93.84	95.35	93.99	96.14	93.12	92.71	93.93	95.55

Sample	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B
Rock Type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line Number	3	4	5	6	7	8	9	10
TiO_2	46.75	46.71	44.60	45.28	45.56	46.98	46.24	43.20
Al_2O_3	0.14	0.23	0.16	0.16	1.31	0.18	0.16	0.20
Cr_2O_3	0.00	0.01	0.00	0.00	0.02	0.07	0.12	0.11
Fe_2O_3	6.21	6.18	8.69	7.36	6.19	5.63	7.62	9.74
FeO	39.28	39.24	37.35	38.19	38.55	39.33	39.01	36.08
MnO	1.42	1.48	1.44	1.31	1.32	1.55	1.31	1.49
MgO	1.91	1.84	1.85	1.72	1.82	1.93	1.86	1.82
Total	95.70	95.68	94.10	94.01	94.77	95.67	96.32	92.65

Sample	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B
Rock Type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line Number	1	2	3	4	5	6	7	8
TiO_2	47.38	44.79	46.66	48.08	43.67	44.79	46.37	47.71
Al_2O_3	0.06	0.17	0.14	0.15	0.14	0.13	0.18	0.16
Cr_2O_3	0.04	0.01	0.00	0.00	0.04	0.00	0.16	0.00
Fe_2O_3	5.55	6.64	5.80	4.15	9.69	7.81	7.10	3.07
FeO	40.03	37.71	39.54	40.61	36.61	37.66	38.82	40.32
MnO	1.28	1.28	1.19	1.34	1.33	1.42	1.58	1.34
MgO	1.88	1.82	1.74	1.87	1.88	1.85	1.82	1.84
Total	96.21	92.42	95.07	96.20	93.34	93.65	96.03	95.33

Sample	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B
Rock Type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line Number	9	10	1	2	3	4	5	6
TiO_2	46.53	45.82	45.94	46.76	46.40	46.44	45.03	47.13
Al_2O_3	0.15	0.13	0.19	0.17	0.17	0.14	0.14	0.13
Cr_2O_3	0.02	0.00	0.00	0.00	0.10	0.02	0.10	0.05
Fe_2O_3	6.86	7.14	6.80	6.16	7.17	8.08	7.90	4.39
FeO	39.17	38.54	38.60	39.21	38.77	38.84	37.92	40.06
MnO	1.40	1.37	1.43	1.48	1.67	1.58	1.31	1.11
MgO	1.91	1.82	1.95	1.96	1.80	1.88	1.79	1.85
Total	96.04	94.81	94.90	95.73	96.08	96.99	94.18	94.72

Sample	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B
Rock Type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line Number	7	8	9	1	2	3	4	5
TiO_2	46.41	46.77	47.31	47.76	46.03	48.65	47.18	46.95
Al_2O_3	0.18	0.12	0.19	0.13	0.15	0.12	0.14	0.16
Cr_2O_3	0.00	0.04	0.00	0.00	0.05	0.00	0.00	0.01
Fe_2O_3	7.65	7.11	5.95	3.30	6.50	3.44	4.46	4.54
FeO	38.88	39.33	40.07	40.57	38.80	41.05	39.48	39.53
MnO	1.54	1.46	1.22	1.10	1.21	1.31	1.67	1.48
MgO	1.87	1.83	1.77	1.88	1.95	1.99	1.81	1.86
Total	96.53	96.65	96.52	94.74	94.70	96.56	94.72	94.54

Sample	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B
Rock Type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line Number	6	7	8	9	10	1	2	3
TiO_2	47.39	46.84	47.36	47.27	45.58	10.82	12.08	12.13
Al_2O_3	0.17	0.16	0.16	0.11	0.16	1.66	1.64	1.65
Cr_2O_3	0.00	0.01	0.06	0.04	0.06	0.11	0.00	0.14
Fe_2O_3	4.03	4.93	3.72	4.54	6.43	41.44	40.34	39.62
FeO	40.12	39.43	39.84	40.08	38.38	37.65	39.14	39.05
MnO	1.22	1.39	1.49	1.24	1.44	0.94	1.16	1.02
MgO	1.89	1.92	1.76	1.67	1.71	1.06	1.16	1.14
Total	94.82	94.68	94.40	94.95	93.70	93.68	95.52	94.76

Sample	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B
Rock Type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line Number	4	5	6	7	8	9	10	11
TiO_2	12.47	11.41	12.15	11.40	11.55	11.78	12.32	10.46
Al_2O_3	1.80	1.71	1.70	1.57	1.66	1.69	1.62	1.74
Cr_2O_3	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00
Fe_2O_3	38.80	39.70	40.09	40.82	40.04	39.21	39.25	41.19
FeO	39.69	37.90	39.26	38.39	38.33	38.16	39.24	36.91
MnO	0.94	0.95	1.09	1.10	1.02	1.12	1.26	1.07
MgO	0.98	1.02	1.13	0.98	1.06	1.04	0.97	1.02
Total	94.67	92.70	95.42	94.27	93.66	93.00	94.65	92.38

Sample	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B
Rock Type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line Number	12	13	14	15	16	17	1	2
TiO_2	11.78	11.41	11.51	11.42	11.45	11.43	11.62	12.26
Al_2O_3	1.72	1.73	1.72	1.71	1.59	1.68	1.68	1.56
Cr_2O_3	0.05	0.00	0.04	0.00	0.02	0.00	0.11	0.00
Fe_2O_3	39.73	40.00	39.99	40.74	41.03	40.42	39.21	38.19
FeO	38.78	38.16	38.11	38.29	38.71	38.33	38.49	39.06
MnO	0.89	1.06	1.20	1.14	0.84	1.01	0.70	0.78
MgO	1.09	1.00	1.07	1.00	1.13	0.98	1.00	1.05
Total	94.05	93.36	93.65	94.31	94.76	93.85	92.82	92.92

Sample	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B
Rock Type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line Number	3	4	5	6	7	8	9	10
TiO_2	12.50	12.26	11.35	11.70	11.95	11.50	12.24	12.20
Al_2O_3	1.60	1.59	1.65	1.58	1.71	1.66	1.61	1.52
Cr_2O_3	0.01	0.00	0.00	0.03	0.03	0.08	0.00	0.04
Fe_2O_3	39.55	38.86	40.96	40.30	39.56	39.70	39.14	39.11
FeO	39.73	39.04	38.43	38.54	38.71	38.33	39.32	39.25
MnO	1.05	1.10	1.02	1.16	1.00	0.89	0.92	0.81
MgO	0.97	0.97	1.05	1.03	1.14	1.03	1.04	1.03
Total	95.42	93.82	94.45	94.34	94.10	93.19	94.26	93.96

Sample	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B
Rock Type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line Number	11	12	13	14	15	16	17	18
TiO_2	11.64	11.08	11.48	11.98	11.39	12.08	11.73	12.04
Al_2O_3	1.58	1.55	1.62	1.66	1.52	1.60	1.66	1.70
Cr_2O_3	0.00	0.08	0.05	0.01	0.10	0.07	0.00	0.00
Fe_2O_3	39.17	40.32	39.03	37.97	40.35	39.03	39.87	39.83
FeO	37.86	37.89	37.88	38.51	38.22	38.97	38.59	39.24
MnO	1.07	0.89	0.90	0.75	0.93	0.92	1.03	0.84
MgO	1.06	1.04	0.99	1.03	0.97	1.08	1.01	1.11
Total	92.39	92.85	91.94	91.90	93.48	93.75	93.89	94.76

Sample	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B
Rock Type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line Number	19	1	2	3	4	5	6	7
TiO_2	11.71	10.80	12.06	10.97	11.56	11.38	11.79	12.44
Al_2O_3	1.73	1.55	1.57	1.55	1.74	1.74	1.63	1.65
Cr_2O_3	0.05	0.00	0.02	0.01	0.00	0.00	0.05	0.07
Fe_2O_3	40.10	40.03	39.10	40.62	40.06	38.56	39.82	37.66
FeO	38.71	37.05	38.81	37.45	38.19	37.42	38.48	38.84
MnO	0.95	0.78	1.00	0.97	1.10	0.94	1.13	1.03
MgO	1.10	1.08	1.01	0.98	1.04	1.12	1.06	1.09
Total	94.35	91.29	93.57	92.56	93.70	91.17	93.97	92.79

Sample	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B
Rock Type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line Number	8	9	10	1	2	3	4	5
TiO_2	11.88	11.37	11.32	12.02	11.83	12.02	11.77	12.67
Al_2O_3	1.64	1.63	1.64	1.70	1.61	1.70	1.58	1.64
Cr_2O_3	0.00	0.01	0.03	0.01	0.00	0.04	0.11	0.00
Fe_2O_3	38.21	40.07	39.27	39.29	40.48	40.39	40.26	38.55
FeO	38.07	37.93	37.71	38.79	38.79	39.43	39.04	39.49
MnO	1.22	1.11	0.86	1.05	1.21	0.95	0.78	1.13
MgO	1.05	0.99	1.01	1.05	1.08	1.12	1.06	1.14
Total	92.07	93.12	91.83	93.91	94.99	95.66	94.62	94.62

Sample	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B
Rock Type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line Number	6	7	8	9	10	11	12	13
TiO_2	12.27	10.59	12.08	11.75	11.50	12.06	11.77	11.74
Al_2O_3	1.49	1.63	1.72	1.58	1.53	1.63	1.54	1.62
Cr_2O_3	0.00	0.06	0.00	0.00	0.04	0.00	0.06	0.17
Fe_2O_3	38.61	35.02	39.91	39.86	41.09	39.87	40.23	38.96
FeO	38.54	35.62	38.87	38.77	38.86	39.20	38.62	38.28
MnO	1.18	0.76	1.37	0.94	0.80	1.08	1.10	0.97
MgO	1.08	1.02	1.02	1.02	1.12	1.00	1.02	1.01
Total	93.17	84.69	94.98	93.93	94.94	94.85	94.34	92.75

Sample	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B
Rock Type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line Number	14	15	16	17	18	19	20	1
TiO_2	11.94	11.63	12.62	12.13	12.21	11.30	11.15	10.55
Al_2O_3	1.58	1.70	1.62	1.66	1.62	1.57	1.72	1.76
Cr_2O_3	0.15	0.00	0.00	0.10	0.00	0.00	0.00	0.01
Fe_2O_3	38.34	39.17	37.89	38.73	38.72	39.46	40.09	40.39
FeO	38.30	38.32	39.32	38.92	39.23	37.62	38.02	36.67
MnO	1.05	0.95	1.00	0.94	0.77	0.98	0.93	1.12
MgO	1.02	0.98	1.15	1.10	0.97	1.06	0.99	1.14
Total	92.38	92.75	93.61	93.59	93.52	91.99	92.89	91.65

Sample	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B
Rock Type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line Number	2	3	4	5	6	7	8	9
TiO_2	12.10	12.46	11.56	10.94	12.11	12.13	11.80	11.92
Al_2O_3	1.73	1.71	1.65	1.68	1.65	1.61	1.67	1.62
Cr_2O_3	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00
Fe_2O_3	39.80	38.62	40.06	41.38	37.78	40.15	38.87	39.13
FeO	39.45	39.29	38.42	37.94	38.53	39.63	38.48	38.52
MnO	0.81	1.03	0.92	0.95	0.96	0.73	0.93	1.06
MgO	1.01	1.10	0.98	1.01	0.96	1.09	0.99	1.10
Total	94.91	94.21	93.62	93.90	92.00	95.34	92.74	93.35

Sample	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B
Rock Type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line Number	10	11	12	13	14	15	16	17
TiO_2	11.09	12.99	12.74	11.09	11.67	11.63	12.37	11.86
Al_2O_3	1.78	1.66	1.61	1.64	1.97	4.84	1.66	1.74
Cr_2O_3	0.01	0.00	0.00	0.00	0.00	0.03	0.00	0.00
Fe_2O_3	40.21	37.84	38.15	40.39	35.64	34.70	39.60	39.80
FeO	37.82	39.76	39.52	37.66	37.13	38.61	39.39	39.10
MnO	0.95	1.02	1.12	1.03	1.13	0.90	1.16	0.78
MgO	0.92	1.13	1.05	1.05	0.67	1.20	1.06	1.00
Total	92.78	94.39	94.20	92.86	88.22	91.90	95.24	94.27

Sample	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B
Rock Type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line Number	18	19	20	1	2	3	4	5
TiO_2	11.92	11.92	11.30	44.98	44.20	45.31	44.38	45.32
Al_2O_3	1.54	1.66	1.64	0.21	0.14	0.13	0.10	0.18
Cr_2O_3	0.00	0.02	0.06	0.05	0.00	0.00	0.06	0.05
Fe_2O_3	39.15	39.84	40.02	10.22	9.44	8.11	8.82	9.28
FeO	38.27	38.85	38.20	37.58	36.78	38.02	37.45	37.65
MnO	1.22	0.99	0.76	1.59	1.65	1.45	1.17	1.73
MgO	0.99	1.02	1.00	1.86	1.86	1.87	1.89	1.93
Total	93.09	94.30	92.98	96.49	94.06	94.89	93.81	96.14

Sample	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B
Rock Type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line Number	6	7	8	9	10	11	12	13
TiO_2	45.79	46.34	44.03	45.01	42.35	44.31	45.54	44.19
Al_2O_3	0.14	0.16	0.08	0.18	0.13	0.17	0.16	0.12
Cr_2O_3	0.06	0.07	0.02	0.00	0.00	0.10	0.00	0.00
Fe_2O_3	8.62	7.32	9.19	8.51	12.16	8.68	8.32	10.19
FeO	38.38	38.95	36.91	37.86	35.31	36.82	38.18	36.95
MnO	1.45	1.41	1.26	1.30	1.43	1.66	1.36	1.33
MgO	1.90	1.87	2.01	1.86	1.89	1.92	2.00	2.05
Total	96.34	96.11	93.52	94.71	93.27	93.65	95.55	94.83

Sample	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B
Rock Type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line Number	14	15	16	17	18	1	2	3
TiO_2	45.28	43.93	44.63	45.03	44.23	11.20	12.55	11.80
Al_2O_3	0.15	0.14	0.17	0.22	0.16	1.66	1.64	1.61
Cr_2O_3	0.00	0.16	0.00	0.00	0.00	0.00	0.05	0.00
Fe_2O_3	9.27	7.82	9.42	8.36	9.52	40.12	39.01	40.26
FeO	37.69	36.72	37.40	37.78	37.22	37.98	39.66	38.76
MnO	1.62	1.39	1.36	1.34	1.25	0.92	1.13	1.02
MgO	2.03	1.96	1.94	1.94	1.99	1.02	1.11	1.09
Total	96.03	92.11	94.92	94.66	94.36	92.89	95.15	94.53

Sample	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B
Rock Type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line Number	4	5	6	7	8	9	10	1
TiO_2	11.91	12.53	12.07	11.59	11.97	11.11	11.53	11.24
Al_2O_3	1.71	1.64	1.66	1.60	1.67	1.59	1.64	1.67
Cr_2O_3	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.01
Fe_2O_3	39.41	38.33	39.21	40.31	38.45	41.04	39.84	40.55
FeO	38.54	39.43	38.73	38.52	38.59	37.86	38.26	38.21
MnO	1.19	0.80	1.14	1.06	0.88	1.03	1.01	0.93
MgO	1.10	1.00	1.05	1.10	1.14	1.07	1.04	1.04
Total	93.86	93.74	93.86	94.18	92.70	93.70	93.31	93.63

Sample	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B
Rock Type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line Number	2	3	4	5	6	7	8	9
TiO_2	11.57	11.71	11.28	11.17	12.39	12.59	10.95	12.12
Al_2O_3	1.71	1.66	1.65	1.67	1.79	1.68	1.78	1.68
Cr_2O_3	0.00	0.00	0.00	0.03	0.03	0.00	0.05	0.00
Fe_2O_3	40.39	38.41	40.51	41.24	38.15	38.52	41.02	38.84
FeO	38.91	37.91	37.77	38.37	39.30	39.67	37.92	38.97
MnO	0.78	1.00	1.22	0.88	0.84	1.02	0.94	0.90
MgO	1.10	1.13	1.02	1.07	1.05	0.96	1.07	1.10
Total	94.46	91.80	93.46	94.43	93.55	94.45	93.73	93.62

Sample	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B
Rock Type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line Number	10	1	2	3	4	5	6	7
TiO_2	11.67	12.26	11.67	11.10	12.00	11.38	12.90	12.11
Al_2O_3	1.67	1.63	1.58	1.72	1.73	1.69	1.85	1.78
Cr_2O_3	0.02	0.09	0.02	0.00	0.00	0.00	0.08	0.04
Fe_2O_3	40.45	36.89	40.75	39.50	38.68	40.98	37.52	40.54
FeO	38.68	38.26	38.88	37.54	38.79	38.30	39.99	39.59
MnO	0.89	1.10	1.00	0.87	0.80	1.08	0.89	1.12
MgO	1.19	1.12	1.11	1.08	1.10	1.11	1.01	1.07
Total	94.58	91.35	95.00	91.82	93.11	94.54	94.25	96.25

Sample	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B
Rock Type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line Number	8	9	10	1	2	3	4	5
TiO_2	12.15	11.76	12.37	11.04	12.01	12.98	11.67	11.97
Al_2O_3	1.74	1.64	1.78	1.65	1.75	1.61	1.74	1.59
Cr_2O_3	0.14	0.00	0.04	0.03	0.00	0.00	0.00	0.01
Fe_2O_3	37.95	39.54	39.36	39.55	38.43	37.57	38.40	39.21
FeO	38.70	38.84	39.65	37.39	38.85	40.00	37.61	38.66
MnO	1.21	0.90	1.12	0.88	0.94	0.88	1.07	0.89
MgO	1.00	0.97	1.00	1.06	0.95	1.09	1.20	1.18
Total	92.89	93.66	95.31	91.61	92.93	94.13	91.69	93.52

Sample	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B
Rock Type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line Number	6	7	8	9	10	1	2	3
TiO_2	12.18	11.97	11.72	11.64	11.26	12.53	12.45	12.29
Al_2O_3	1.79	1.72	1.70	1.61	1.62	1.57	1.71	1.62
Cr_2O_3	0.11	0.00	0.00	0.00	0.00	0.01	0.08	0.03
Fe_2O_3	39.48	39.66	39.50	39.80	39.45	38.73	38.38	38.49
FeO	39.38	38.82	38.60	38.32	37.60	39.66	39.28	39.13
MnO	1.04	1.09	1.04	1.14	1.00	0.87	1.02	0.80
MgO	1.03	1.06	0.99	1.09	1.07	1.02	0.98	1.06
Total	95.03	94.32	93.54	93.59	92.01	94.40	93.89	93.44

Sample	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B
Rock Type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line Number	4	5	6	7	8	9	1	2
TiO_2	12.14	12.99	11.59	11.90	12.76	12.28	11.28	11.97
Al_2O_3	1.56	1.65	1.68	1.66	1.64	1.75	1.75	1.69
Cr_2O_3	0.00	0.05	0.00	0.06	0.00	0.00	0.07	0.00
Fe_2O_3	38.19	37.78	39.60	40.07	38.70	38.59	38.24	38.84
FeO	38.73	39.73	38.21	38.88	39.92	39.20	37.09	38.89
MnO	0.93	1.14	0.97	1.11	0.95	1.03	0.94	0.72
MgO	0.91	1.07	0.99	1.04	0.97	0.95	1.12	0.95
Total	92.47	94.41	93.06	94.71	94.93	93.80	90.48	93.06

Sample	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-B	77-P2B-C2
Rock Type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala dacite
Line Number	3	4	5	6	7	8	9	1
TiO_2	11.77	10.97	11.43	11.97	11.83	12.01	12.25	11.55
Al_2O_3	1.61	1.71	1.64	1.66	1.68	1.72	1.65	3.71
Cr_2O_3	0.00	0.00	0.05	0.05	0.01	0.10	0.00	0.24
Fe_2O_3	39.19	39.51	40.39	39.52	38.63	39.39	37.31	38.86
FeO	38.52	37.29	38.30	38.80	38.24	39.02	38.49	38.07
MnO	0.93	1.02	1.10	1.12	1.08	0.93	0.94	0.59
MgO	1.02	0.89	1.08	0.97	1.03	0.99	1.07	3.63
Total	93.04	91.39	93.98	94.08	92.50	94.16	91.71	96.64

Sample	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	2	3	4	5	6	7	8	9
TiO_2	11.34	10.74	12.53	13.05	11.71	12.05	11.17	11.10
Al_2O_3	4.48	4.54	4.48	4.52	4.15	4.09	4.41	4.45
Cr_2O_3	0.35	0.15	0.12	0.21	0.19	0.16	0.21	0.20
Fe_2O_3	35.16	37.75	35.92	35.39	36.11	36.25	35.99	36.34
FeO	36.56	36.91	38.98	39.70	37.49	38.17	37.34	36.99
MnO	0.40	0.26	0.40	0.60	0.44	0.62	0.53	0.46
MgO	3.92	3.85	4.02	3.76	3.60	3.43	3.53	3.53
SiO_2	0.08	0.13	0.13	0.11	0.07	0.12	0.37	0.17
Total	92.29	94.33	96.58	97.35	93.76	94.87	93.54	93.24

Sample	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	10	1	2	3	4	1	2	3
TiO_2	12.51	8.88	9.75	10.72	9.52	8.70	9.34	10.35
Al_2O_3	4.44	2.95	2.88	2.96	2.86	2.86	2.86	2.95
Cr_2O_3	0.20	0.00	0.00	0.00	0.04	0.04	0.00	0.00
Fe_2O_3	36.69	45.03	42.42	41.90	43.89	43.91	43.74	44.30
FeO	39.33	36.53	37.35	38.45	36.94	35.98	37.09	38.72
MnO	0.52	0.81	0.84	0.68	0.86	0.87	0.94	0.78
MgO	3.60	1.71	1.82	2.01	1.91	1.64	2.08	2.05
SiO_2	0.07	0.10	0.34	0.14	0.10	0.24	0.42	0.14
Total	97.35	96.01	95.39	96.85	96.14	94.24	96.48	99.28

Sample	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	4	5	6	7	8	9	1	2
TiO_2	9.66	9.66	11.19	10.33	10.18	9.68	12.62	10.51
Al_2O_3	2.94	2.91	3.02	2.94	3.10	2.96	3.53	3.13
Cr_2O_3	0.03	0.00	0.13	0.00	0.10	0.00	0.00	0.11
Fe_2O_3	42.30	43.42	41.77	41.95	43.89	40.94	37.77	40.95
FeO	36.56	36.76	40.62	40.62	38.66	36.87	39.78	36.87
MnO	0.71	0.86	0.70	0.29	0.76	0.80	0.30	0.44
MgO	1.93	1.91	1.90	0.85	1.90	1.68	3.53	3.31
SiO_2	0.06	0.01	0.65	0.83	0.20	0.39	0.16	0.03
Total	94.19	95.52	99.98	97.81	98.80	93.33	97.70	95.36

Sample	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	3	4	5	6	7	8	9	10
TiO_2	10.43	10.16	10.68	10.90	10.31	10.74	11.47	12.68
Al_2O_3	2.94	2.92	2.77	2.68	2.89	2.80	3.07	3.73
Cr_2O_3	0.19	0.05	0.09	0.06	0.00	0.00	0.15	0.09
Fe_2O_3	43.24	45.01	41.90	42.30	43.63	43.28	41.06	36.82
FeO	38.04	38.39	38.02	38.31	37.95	38.72	39.09	39.39
MnO	0.47	0.38	0.31	0.48	0.46	0.19	0.10	0.44
MgO	3.10	2.89	2.63	2.78	2.97	3.07	3.55	3.44
SiO_2	0.13	0.09	0.06	0.08	0.12	0.14	0.15	0.09
Total	98.54	99.89	96.46	97.59	98.34	98.93	98.64	96.68

Sample	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	1	2	3	4	5	6	7	8
TiO_2	11.34	12.91	11.23	12.09	12.13	12.14	11.19	12.20
Al_2O_3	4.41	4.82	4.59	4.51	4.55	4.12	4.14	4.39
Cr_2O_3	0.16	0.08	0.00	0.04	0.14	0.09	0.22	0.27
Fe_2O_3	40.14	36.92	38.23	37.30	38.43	37.99	40.05	37.57
FeO	38.94	40.32	37.94	38.72	39.44	39.05	38.49	39.35
MnO	0.42	0.44	0.23	0.43	0.41	0.56	0.45	0.46
MgO	3.60	4.02	4.02	3.94	3.79	3.62	3.60	3.69
SiO_2	0.11	0.14	0.16	0.09	0.06	0.12	0.13	0.15
Total	99.12	99.66	96.40	97.11	98.94	97.69	98.27	98.07

Sample	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	9	10	1	2	3	4	5	1
TiO_2	11.07	11.27	8.80	9.16	10.29	8.48	10.10	9.21
Al_2O_3	4.48	4.66	2.84	2.74	2.99	2.77	3.01	2.85
Cr_2O_3	0.09	0.28	0.04	0.07	0.00	0.03	0.00	0.00
Fe_2O_3	38.58	38.34	46.51	41.14	44.18	37.14	44.36	46.55
FeO	37.79	38.29	36.97	36.74	38.40	33.88	38.44	37.76
MnO	0.24	0.55	0.97	0.52	0.96	0.81	0.65	0.84
MgO	3.84	3.62	1.67	1.87	1.95	1.84	1.91	1.73
SiO_2	0.11	0.19	0.15	0.68	0.10	0.87	0.08	0.13
Total	96.20	97.19	97.95	92.93	98.87	85.82	98.56	99.07

Sample	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	2	3	4	5	6	7	1	2
TiO_2	8.91	10.22	10.98	10.18	10.01	9.70	11.48	10.69
Al_2O_3	2.96	2.93	3.04	3.02	2.94	3.09	3.22	2.85
Cr_2O_3	0.00	0.01	0.00	0.00	0.00	0.03	0.00	0.15
Fe_2O_3	44.39	45.34	44.77	43.43	43.53	45.99	42.56	43.19
FeO	37.19	38.82	39.71	38.16	38.06	38.51	39.60	38.42
MnO	0.78	0.83	1.05	0.70	0.98	0.89	0.39	0.42
MgO	1.80	2.01	2.12	1.99	1.93	1.84	3.44	3.09
SiO_2	0.48	0.09	0.09	0.12	0.31	0.16	0.14	0.12
Total	96.51	100.25	101.76	97.61	97.77	100.21	100.84	98.94

Sample	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	3	4	5	6	7	8	9	1
TiO_2	10.49	10.12	10.36	10.93	11.00	12.28	12.38	12.39
Al_2O_3	2.83	2.87	2.83	2.88	2.86	3.09	3.67	3.66
Cr_2O_3	0.02	0.01	0.08	0.00	0.05	0.01	0.17	0.02
Fe_2O_3	43.71	44.55	44.63	43.70	43.21	40.83	37.87	38.11
FeO	38.29	38.70	38.84	39.32	39.06	40.02	39.27	39.24
MnO	0.48	0.27	0.19	0.43	0.34	0.34	0.42	0.58
MgO	2.70	2.59	2.72	2.76	3.20	3.54	3.62	3.64
SiO_2	0.06	0.22	0.09	0.14	0.17	0.09	0.12	0.15
Total	98.57	99.34	99.74	100.17	99.89	100.20	97.52	97.78

Sample	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	2	3	4	5	6	7	8	9
TiO_2	12.03	10.35	10.24	10.81	10.75	9.59	10.12	11.97
Al_2O_3	3.21	2.96	2.96	2.78	2.80	2.89	3.02	3.19
Cr_2O_3	0.00	0.00	0.00	0.00	0.13	0.20	0.05	0.10
Fe_2O_3	40.20	44.61	43.23	44.12	43.43	43.20	42.83	36.03
FeO	39.32	38.63	37.74	39.36	39.02	36.69	37.33	39.26
MnO	0.45	0.36	0.42	0.34	0.38	0.30	0.34	0.42
MgO	3.54	3.13	2.71	2.67	2.60	2.81	3.31	3.48
SiO_2	0.12	0.17	0.05	0.14	0.14	0.07	0.16	0.88
Total	98.86	100.20	97.35	100.22	99.24	95.74	97.16	95.31

Sample	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	10	1	2	3	4	5	1	2
TiO_2	11.87	11.87	12.68	11.70	10.72	11.69	12.13	10.80
Al_2O_3	3.61	2.45	2.43	2.51	2.76	2.30	2.37	2.63
Cr_2O_3	0.06	0.00	0.02	0.09	0.11	0.02	0.08	0.01
Fe_2O_3	39.19	40.53	40.40	42.21	42.22	40.41	40.73	41.87
FeO	39.22	39.53	40.59	39.99	38.38	39.02	39.96	38.34
MnO	0.76	0.96	1.33	1.09	1.07	1.15	1.17	1.11
MgO	2.83	1.30	1.37	1.42	1.46	1.35	1.34	1.44
SiO_2	0.18	0.04	0.08	0.10	0.09	0.12	0.09	0.14
Total	97.74	96.69	98.90	99.11	96.81	96.06	97.87	96.33

Sample	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	3	4	5	1	2	3	4	5
TiO_2	12.90	11.74	12.05	12.48	11.80	12.02	11.35	11.56
Al_2O_3	2.36	2.41	2.34	2.53	2.34	2.39	2.33	2.42
Cr_2O_3	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00
Fe_2O_3	40.40	40.61	39.70	41.66	41.91	39.82	41.65	42.80
FeO	41.35	39.24	39.49	40.74	39.71	39.46	38.99	40.11
MnO	0.99	0.99	0.98	1.38	1.30	1.01	1.21	0.90
MgO	1.33	1.36	1.44	1.38	1.32	1.31	1.29	1.34
SiO_2	0.11	0.04	0.13	0.05	0.10	0.08	0.12	0.09
Total	99.43	96.38	96.13	100.21	98.46	96.10	97.06	99.22

Sample	77-P2B-C2	77-P2B-C2	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	1	1	1	2	3	4	5	1
TiO_2	11.77	11.64	10.98	12.43	10.97	11.83	12.06	11.96
Al_2O_3	2.35	2.26	3.71	4.27	4.49	4.43	3.69	4.04
Cr_2O_3	0.01	0.07	0.09	0.08	0.14	0.06	0.01	0.19
Fe_2O_3	39.85	40.36	36.29	37.76	33.51	37.71	39.79	39.05
FeO	39.85	38.85	36.31	39.69	41.32	38.74	40.21	39.37
MnO	1.13	0.94	0.70	0.25	0.49	0.39	0.67	0.63
MgO	1.59	1.67	3.10	3.84	4.14	3.63	2.94	3.27
SiO_2	0.56	0.11	0.20	0.11	2.80	0.12	0.32	0.12
Total	97.12	95.90	91.38	98.43	97.86	96.90	99.69	98.63

Sample	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	2	3	4	5	6	7	8	9
TiO_2	12.08	10.59	11.69	11.55	11.21	11.41	11.17	12.32
Al_2O_3	4.61	4.51	4.46	4.57	4.67	4.62	4.27	4.58
Cr_2O_3	0.11	0.00	0.10	0.11	0.00	0.17	0.03	0.03
Fe_2O_3	37.54	39.99	38.43	39.48	40.07	40.68	38.09	37.00
FeO	39.04	37.18	38.48	38.66	38.41	39.19	37.41	40.60
MnO	0.50	0.36	0.30	0.57	0.46	0.39	0.32	0.40
MgO	3.83	3.86	4.07	3.94	3.96	3.97	3.83	4.45
SiO_2	0.14	0.02	0.06	0.09	0.08	0.09	0.07	0.88
Total	97.85	96.51	97.60	98.97	98.85	100.53	95.20	100.25

Sample	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	1	2	3	4	5	6	7	8
TiO_2	11.18	10.94	11.16	11.12	10.80	10.83	11.21	11.02
Al_2O_3	4.38	4.47	4.45	4.40	4.36	4.20	4.41	4.41
Cr_2O_3	0.12	0.20	0.09	0.06	0.03	0.02	0.06	0.18
Fe_2O_3	40.15	41.58	41.59	40.20	40.36	39.19	39.02	41.33
FeO	38.31	38.50	39.15	38.64	37.88	37.41	38.27	38.84
MnO	0.61	0.68	0.48	0.33	0.35	0.39	0.44	0.57
MgO	3.74	3.51	3.78	3.66	3.75	3.67	3.55	3.62
SiO_2	0.10	0.02	0.13	0.14	0.08	0.13	0.15	0.15
Total	98.60	99.90	100.80	98.55	97.61	95.84	97.11	100.12

Sample	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	9	1	1	2	3	4	5	1
TiO_2	10.28	9.53	11.58	11.46	11.61	10.11	11.07	8.11
Al_2O_3	4.02	3.71	4.13	4.31	4.12	3.86	3.87	3.51
Cr_2O_3	0.16	0.00	0.16	0.00	0.00	0.08	0.11	0.03
Fe_2O_3	41.73	42.72	37.67	40.06	39.68	42.64	41.35	47.33
FeO	37.37	37.81	40.38	38.81	39.06	37.46	39.08	36.24
MnO	0.70	0.63	0.60	0.59	0.83	0.64	0.29	0.53
MgO	3.30	2.39	3.43	3.63	2.88	3.07	3.30	2.81
SiO_2	0.10	0.48	1.11	0.12	0.12	0.06	0.18	0.16
Total	97.66	97.27	99.06	98.97	98.30	97.93	99.26	98.71

Sample	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	2	3	4	5	1	2	3	1
TiO_2	9.07	9.52	9.11	9.61	10.32	8.50	9.09	44.95
Al_2O_3	3.89	3.83	3.65	3.70	3.67	3.53	3.42	0.20
Cr_2O_3	0.08	0.10	0.09	0.11	0.01	0.00	0.01	0.03
Fe_2O_3	46.67	45.64	45.10	46.42	46.07	46.76	45.99	9.85
FeO	37.63	38.27	36.82	38.53	38.57	36.00	36.89	37.32
MnO	0.61	0.46	0.52	0.54	0.75	0.65	0.62	1.38
MgO	2.83	2.95	2.82	2.83	2.89	2.87	2.86	2.66
SiO_2	0.07	0.06	0.12	0.11	0.12	0.03	0.00	0.00
Total	100.85	100.84	98.23	101.85	102.40	98.33	98.86	96.39

Sample	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	2	3	4	5	6	7	8	9
TiO_2	46.44	46.93	46.69	47.86	45.10	46.94	47.85	46.39
Al_2O_3	0.18	0.13	0.15	0.25	0.25	0.23	0.17	0.19
Cr_2O_3	0.00	0.00	0.05	0.00	0.14	0.00	0.02	0.01
Fe_2O_3	10.10	9.47	8.87	8.47	10.24	10.39	6.94	8.75
FeO	38.39	38.31	38.57	39.75	37.69	38.76	39.70	38.42
MnO	1.50	1.27	1.71	1.43	1.61	1.57	1.46	1.44
MgO	2.64	2.56	2.72	2.53	2.58	2.73	2.64	2.67
SiO_2	0.00	0.00	0.00	0.02	0.02	0.04	0.00	0.03
Total	99.25	97.77	98.76	100.31	97.63	100.66	98.78	97.89

Sample	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	1	2	3	4	5	6	7	8
TiO_2	12.49	12.12	12.10	11.72	12.60	11.72	12.25	12.02
Al_2O_3	2.35	2.44	2.29	2.31	2.49	2.33	2.42	2.32
Cr_2O_3	0.00	0.00	0.00	0.03	0.03	0.00	0.14	0.23
Fe_2O_3	41.32	42.31	41.90	41.29	40.88	41.79	41.29	41.62
FeO	40.50	40.83	40.21	39.47	40.89	39.45	40.58	40.44
MnO	1.18	1.00	1.16	1.20	1.02	1.13	0.91	0.88
MgO	1.49	1.65	1.52	1.62	1.62	1.64	1.63	1.56
SiO_2	0.02	0.19	0.09	0.22	0.10	0.09	0.11	0.14
Total	99.34	100.52	99.27	97.87	99.62	98.14	99.33	99.21

Sample	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	9	10	11	12	13	14	15	16
TiO_2	12.64	11.69	12.84	12.43	11.35	12.29	12.77	12.35
Al_2O_3	2.40	2.50	2.44	2.39	2.35	2.43	2.32	2.24
Cr_2O_3	0.00	0.00	0.13	0.02	0.08	0.00	0.00	0.00
Fe_2O_3	41.01	42.39	40.25	40.32	41.79	40.90	40.63	42.05
FeO	40.86	39.90	40.86	39.88	38.96	40.13	40.89	40.80
MnO	1.00	1.01	1.24	1.32	0.96	1.21	1.04	1.19
MgO	1.61	1.59	1.58	1.67	1.58	1.60	1.63	1.60
SiO_2	0.05	0.07	0.10	0.08	0.05	0.11	0.08	0.18
Total	99.56	99.15	99.43	98.10	97.13	98.68	99.35	100.41

Sample	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	17	18	19	20	1	2	3	4
TiO_2	11.32	11.99	11.30	11.03	12.41	11.47	11.52	12.66
Al_2O_3	2.38	2.32	2.37	2.20	2.39	2.38	2.30	2.37
Cr_2O_3	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.08
Fe_2O_3	42.71	41.46	42.22	42.86	42.08	42.61	41.71	41.38
FeO	39.19	39.63	38.72	38.70	40.86	39.40	39.05	40.92
MnO	1.08	1.21	1.08	1.02	0.95	1.25	1.10	1.29
MgO	1.66	1.67	1.87	1.72	1.74	1.42	1.59	1.58
SiO_2	0.08	0.07	0.04	0.11	0.05	0.08	0.08	0.10
Total	98.43	98.35	97.64	97.65	100.48	98.60	97.34	100.38

Sample	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	1	2	3	4	5	1	2	3
TiO_2	10.70	10.93	11.02	12.55	11.76	46.30	48.39	48.36
Al_2O_3	2.47	2.36	2.43	2.43	2.31	0.16	0.13	0.16
Cr_2O_3	0.17	0.00	0.00	0.10	0.01	0.12	0.00	0.00
Fe_2O_3	44.02	43.67	41.20	40.19	41.42	10.10	6.83	7.48
FeO	39.03	39.01	38.14	40.48	39.54	38.37	40.04	40.09
MnO	0.98	0.95	1.12	1.05	1.00	1.45	1.53	1.48
MgO	1.62	1.80	1.64	1.57	1.60	2.62	2.74	2.77
SiO_2	0.12	0.12	0.14	0.10	0.11	0.03	0.00	0.03
Total	99.11	98.84	95.69	98.47	97.74	99.15	99.66	100.37

Sample	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	4	5	6	7	8	9	1	1
TiO_2	46.48	47.97	44.94	47.09	47.11	48.58	46.67	11.34
Al_2O_3	0.16	0.17	0.18	0.18	0.14	0.20	0.14	2.40
Cr_2O_3	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
Fe_2O_3	8.99	8.74	10.32	7.27	9.47	7.19	9.09	42.92
FeO	38.45	39.89	37.19	39.07	38.91	40.29	38.76	39.43
MnO	1.46	1.52	1.51	1.54	1.64	1.48	1.37	1.04
MgO	2.71	2.48	2.47	2.54	2.58	2.71	2.72	1.65
SiO_2	0.03	0.02	0.04	0.05	0.01	0.00	0.07	0.11
Total	98.27	100.79	96.67	97.75	99.86	100.45	98.82	98.89

Sample	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	1	2	3	4	5	6	7	8
TiO_2	11.99	12.28	11.32	12.48	12.94	12.22	12.64	12.29
Al_2O_3	2.40	2.36	2.46	2.35	2.31	2.32	2.40	2.40
Cr_2O_3	0.05	0.00	0.09	0.00	0.09	0.11	0.03	0.00
Fe_2O_3	41.16	41.62	42.14	41.22	40.15	41.99	40.62	42.38
FeO	40.06	40.60	39.37	40.83	41.05	40.75	40.90	41.25
MnO	1.14	0.96	1.07	0.99	1.20	1.11	1.10	1.05
MgO	1.26	1.31	1.34	1.50	1.33	1.28	1.41	1.34
SiO_2	0.12	0.05	0.13	0.10	0.08	0.09	0.12	0.17
Total	98.17	99.27	97.92	99.47	99.14	99.87	99.21	100.87

Sample	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	1	2	3	4	5	6	7	8
TiO_2	11.93	12.23	13.07	11.76	12.09	12.59	12.20	11.78
Al_2O_3	2.26	2.38	2.46	2.46	2.37	2.32	2.33	2.43
Cr_2O_3	0.00	0.00	0.11	0.00	0.00	0.00	0.04	0.04
Fe_2O_3	42.35	42.89	40.90	42.15	41.65	39.33	41.99	42.26
FeO	40.27	41.19	41.78	40.23	40.69	40.73	40.57	39.91
MnO	1.09	0.94	1.16	0.87	1.10	1.00	1.05	1.14
MgO	1.30	1.37	1.32	1.27	1.26	1.34	1.42	1.47
SiO_2	0.07	0.06	0.08	0.07	0.22	0.30	0.06	0.07
Total	99.27	101.06	100.88	98.80	99.38	97.60	99.66	99.10

Sample	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	9	1	2	3	4	5	6	7
TiO_2	11.59	10.32	11.59	10.50	11.80	11.53	10.88	11.09
Al_2O_3	2.29	4.37	4.47	4.33	4.41	4.51	4.67	4.64
Cr_2O_3	0.01	0.09	0.02	0.10	0.00	0.00	0.00	0.04
Fe_2O_3	41.57	42.19	38.94	41.79	39.85	39.95	41.93	40.96
FeO	40.71	37.73	38.70	37.53	39.30	38.95	38.52	38.84
MnO	1.34	0.50	0.30	0.51	0.27	0.30	0.43	0.30
MgO	1.20	3.80	3.96	4.01	3.91	3.90	4.12	3.88
SiO_2	0.73	0.10	0.11	0.04	0.03	0.05	0.05	0.09
Total	99.44	99.10	98.10	98.81	99.57	99.19	100.59	99.83

Sample	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	8	9	10	11	12	13	14	15
TiO_2	11.15	11.30	10.02	11.45	10.70	11.77	11.01	12.19
Al_2O_3	4.75	4.42	4.66	4.64	4.70	4.54	4.42	4.56
Cr_2O_3	0.12	0.01	0.01	0.00	0.00	0.00	0.00	0.00
Fe_2O_3	41.13	40.39	41.32	40.59	39.53	40.82	39.80	38.48
FeO	38.96	38.79	36.86	38.96	37.40	39.84	37.77	39.33
MnO	0.40	0.42	0.35	0.41	0.29	0.27	0.43	0.36
MgO	3.85	3.87	4.05	4.03	4.06	3.98	4.02	4.00
SiO_2	0.05	0.13	0.07	0.03	0.09	0.07	0.09	0.02
Total	100.40	99.34	97.34	100.12	96.77	101.29	97.54	98.94

Sample	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	16	17	18	1	2	3	4	5
TiO_2	10.29	10.87	11.07	10.91	11.09	10.97	11.47	11.89
Al_2O_3	4.47	4.43	4.24	4.11	4.44	4.44	4.50	4.51
Cr_2O_3	0.00	0.12	0.11	0.09	0.07	0.12	0.14	0.09
Fe_2O_3	42.09	40.52	40.78	39.92	40.23	39.93	41.31	39.64
FeO	37.72	38.31	38.36	37.90	38.29	37.83	39.46	39.38
MnO	0.34	0.34	0.51	0.39	0.31	0.44	0.48	0.32
MgO	3.98	3.58	3.53	3.41	3.92	3.86	4.02	4.00
SiO_2	0.11	0.09	0.02	0.07	0.06	0.04	0.13	0.04
Total	99.02	98.25	98.63	96.81	98.41	97.63	101.51	99.86

Sample	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	6	7	8	9	10	11	12	13
TiO_2	11.27	11.59	11.33	10.68	11.34	10.72	11.14	11.18
Al_2O_3	4.43	4.37	4.58	4.50	4.31	4.38	4.69	4.37
Cr_2O_3	0.00	0.15	0.00	0.03	0.11	0.08	0.00	0.00
Fe_2O_3	40.35	39.89	41.21	41.48	41.42	41.07	40.65	40.37
FeO	38.48	39.16	39.39	38.27	39.35	38.07	38.74	38.40
MnO	0.50	0.38	0.28	0.45	0.38	0.33	0.34	0.42
MgO	3.87	3.71	4.04	3.90	3.72	3.77	3.86	3.80
SiO_2	0.07	0.09	0.16	0.15	0.10	0.07	0.07	0.06
Total	98.96	99.34	100.99	99.55	100.73	98.49	99.50	98.60

Sample	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	14	15	16	17	18	19	20	1
TiO_2	10.85	11.12	10.84	11.08	10.77	10.95	10.57	12.89
Al_2O_3	4.50	4.36	4.11	4.12	4.11	4.26	4.03	2.37
Cr_2O_3	0.04	0.06	0.00	0.07	0.00	0.01	0.07	0.00
Fe_2O_3	41.51	41.21	41.53	40.89	41.13	40.39	41.23	40.08
FeO	38.40	38.42	38.63	38.67	38.16	38.49	38.19	41.23
MnO	0.46	0.55	0.32	0.47	0.48	0.39	0.55	0.87
MgO	3.86	3.88	3.47	3.39	3.60	3.45	2.85	1.57
SiO_2	0.08	0.03	0.13	0.11	0.17	0.18	0.13	0.13
Total	99.70	99.63	99.03	98.80	98.41	98.13	97.61	99.14

Sample	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	2	3	4	5	6	7	8	9
TiO_2	11.32	11.93	12.87	11.82	12.18	11.83	12.78	12.16
Al_2O_3	2.48	2.42	2.35	2.39	2.31	2.33	2.37	2.29
Cr_2O_3	0.03	0.00	0.00	0.00	0.02	0.16	0.03	0.07
Fe_2O_3	42.98	41.83	41.46	40.86	40.60	40.77	40.52	41.28
FeO	39.34	40.09	41.87	39.74	40.02	39.42	41.18	40.41
MnO	1.15	1.01	0.90	1.11	1.00	1.16	1.05	0.79
MgO	1.44	1.34	1.25	1.35	1.32	1.33	1.36	1.40
SiO_2	0.02	0.03	0.08	0.20	0.06	0.08	0.12	0.04
Total	98.76	98.64	100.78	97.47	97.51	97.07	99.41	98.45

Sample	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	1	2	3	4	5	6	7	8
TiO_2	12.65	12.46	13.35	12.87	12.22	11.55	12.20	11.69
Al_2O_3	2.25	2.40	2.49	2.45	2.43	2.28	2.29	2.41
Cr_2O_3	0.02	0.00	0.00	0.00	0.04	0.18	0.15	0.09
Fe_2O_3	42.85	41.45	40.60	39.72	42.41	42.72	42.23	41.60
FeO	41.58	40.76	42.17	40.86	41.11	39.90	40.97	39.53
MnO	1.17	1.14	1.01	1.02	0.93	0.94	0.99	1.18
MgO	1.44	1.38	1.33	1.33	1.39	1.41	1.25	1.31
SiO_2	0.07	0.06	0.04	0.04	0.10	0.06	0.09	0.06
Total	102.03	99.65	101.00	98.29	100.64	99.03	100.17	97.87

Sample	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	9	10	1	2	3	4	5	6
TiO_2	13.15	12.25	11.82	13.04	11.62	12.01	11.99	13.08
Al_2O_3	2.44	2.45	2.37	2.43	2.37	2.32	2.31	2.43
Cr_2O_3	0.00	0.04	0.08	0.00	0.00	0.00	0.00	0.11
Fe_2O_3	40.39	40.93	41.92	41.31	43.55	43.02	41.94	41.00
FeO	41.67	40.34	39.76	41.96	40.15	40.77	40.12	[illegible]
MnO	1.12	1.04	1.13	1.10	1.21	1.01	1.19	0.89
MgO	1.28	1.39	1.54	1.28	1.19	1.39	1.31	1.29
SiO_2	0.06	0.07	0.07	0.09	0.02	0.07	0.08	0.10
Total	100.11	98.50	98.70	101.21	100.12	100.60	98.93	101.05

Sample	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	7	8	9	10	1	2	3	4
TiO_2	12.45	12.31	13.32	12.00	12.14	12.39	12.60	12.66
Al_2O_3	2.37	2.44	2.31	2.33	2.44	2.46	2.42	2.38
Cr_2O_3	0.00	0.00	0.00	0.00	0.09	0.09	0.00	0.16
Fe_2O_3	41.83	41.39	39.99	41.64	41.15	42.67	41.60	41.32
FeO	40.78	40.54	41.81	39.96	40.39	41.19	40.96	41.38
MnO	1.13	1.04	0.99	0.96	0.96	1.12	1.23	1.00
MgO	1.48	1.43	1.33	1.75	1.44	1.37	1.39	1.34
SiO_2	0.03	0.05	0.07	0.09	0.11	0.01	0.04	0.10
Total	100.08	99.19	99.81	98.73	98.72	101.30	100.23	100.34

Sample	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	71-P2T-D	71-P2T-D	71-P2T-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	5	6	7	8	9	1	2	3
TiO_2	11.93	11.61	12.10	11.72	12.55	45.69	45.87	46.45
Al_2O_3	2.12	2.38	2.28	2.37	2.40	0.23	0.19	0.25
Cr_2O_3	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Fe_2O_3	39.93	42.23	41.22	42.41	39.87	11.45	8.82	10.77
FeO	39.89	39.61	40.54	39.98	40.29	37.65	38.35	38.56
MnO	1.16	1.16	0.82	1.01	0.94	1.58	1.21	1.54
MgO	1.22	1.32	1.26	1.43	1.86	2.65	2.42	2.53
SiO_2	0.42	0.06	0.14	0.07	0.15	0.02	0.01	0.10
Total	96.68	98.38	98.36	99.00	98.06	99.26	96.87	100.19

Sample	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	4	5	6	7	8	9	1	2
TiO_2	47.55	48.01	47.32	48.51	47.34	46.10	45.96	48.21
Al_2O_3	[illegible]	0.24	0.18	0.18	0.20	0.19	0.20	0.20
Cr_2O_3	0.13	0.01	0.00	0.00	0.00	0.07	0.15	0.06
Fe_2O_3	7.48	7.02	10.06	7.42	7.29	9.08	8.21	7.39
FeO	39.63	40.01	39.45	40.39	39.61	38.45	38.28	40.27
MnO	1.45	1.47	1.33	1.40	1.33	1.37	1.29	1.33
MgO	2.62	2.39	2.57	2.59	2.48	2.39	2.62	2.52
SiO_2	0.15	0.00	0.04	0.00	0.10	0.05	0.08	0.03
Total	99.11	99.15	100.94	100.50	98.35	97.68	96.78	100.01

Sample	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	3	4	5	6	7	8	9	1
TiO_2	46.26	48.34	43.85	44.79	45.90	47.80	45.23	11.95
Al_2O_3	0.17	0.21	0.19	0.22	0.21	0.22	0.16	2.44
Cr_2O_3	0.05	0.00	0.00	0.05	0.00	0.00	0.02	0.04
Fe_2O_3	10.34	8.19	9.57	10.77	10.06	7.83	10.74	42.10
FeO	38.30	40.16	36.48	37.27	38.14	39.58	37.61	40.36
MnO	1.59	1.55	1.49	1.47	1.47	1.57	1.37	1.07
MgO	2.48	2.48	2.24	2.33	2.40	2.66	2.52	1.56
SiO_2	0.04	0.00	0.10	0.10	0.03	0.04	0.08	0.16
Total	99.22	100.93	93.91	97.01	98.20	99.70	97.75	99.68

Sample	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	2	3	4	5	6	7	8	9
TiO_2	12.13	11.64	11.85	13.37	12.48	12.13	11.73	11.75
Al_2O_3	2.32	2.46	2.31	2.41	2.37	2.29	2.42	2.37
Cr_2O_3	0.01	0.00	0.00	0.00	0.06	0.11	0.10	0.00
Fe_2O_3	40.77	42.59	42.47	39.93	41.84	41.15	41.24	42.62
FeO	40.19	40.09	40.06	41.93	40.91	40.11	39.67	39.69
MnO	0.86	1.13	1.30	0.95	1.13	1.15	1.04	1.29
MgO	1.38	1.39	1.38	1.44	1.40	1.39	1.42	1.74
SiO_2	0.10	0.16	0.13	0.08	0.03	0.11	0.13	0.10
Total	97.76	99.46	99.49	100.11	100.20	98.44	97.75	99.56

Sample	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	1	2	3	4	1	2	3	1
TiO_2	11.43	11.49	11.47	13.20	11.57	11.89	12.44	12.21
Al_2O_3	2.39	2.38	2.28	2.51	2.32	2.36	2.44	4.42
Cr_2O_3	0.06	0.00	0.06	0.09	0.00	0.00	0.09	0.00
Fe_2O_3	42.86	42.49	42.14	40.47	41.42	41.91	41.59	37.71
FeO	39.61	39.67	39.56	41.88	39.43	40.03	40.99	39.03
MnO	1.06	1.08	0.96	1.05	0.90	0.98	1.12	0.46
MgO	1.48	1.38	1.29	1.43	1.46	1.59	1.47	4.08
SiO_2	0.07	0.11	0.09	0.08	0.12	0.09	0.13	0.14
Total	98.97	98.60	97.85	100.72	97.21	98.86	100.26	98.04

Sample	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	2	3	4	5	6	7	8	9
TiO_2	13.41	11.26	11.56	12.98	12.04	11.40	11.85	11.46
Al_2O_3	4.61	4.58	4.67	4.69	4.78	4.69	4.58	4.38
Cr_2O_3	0.18	0.08	0.12	0.12	0.01	0.00	0.22	0.00
Fe_2O_3	34.95	38.48	38.09	35.27	37.66	38.19	37.62	37.47
FeO	40.23	38.37	38.56	40.19	39.46	38.53	39.04	37.92
MnO	0.31	0.17	0.49	0.22	0.36	0.45	0.30	0.44
MgO	3.99	4.05	4.00	4.09	4.06	4.01	3.91	4.03
SiO_2	0.07	0.24	0.25	0.30	0.29	0.33	0.22	0.26
Total	97.75	97.23	97.74	97.86	98.65	97.61	97.74	95.95

Sample	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	10	1	2	3	4	1	2	3
TiO_2	10.97	10.95	12.29	12.29	12.28	13.50	12.74	11.79
Al_2O_3	4.64	4.44	4.69	4.75	4.43	4.48	4.77	4.75
Cr_2O_3	0.17	0.12	0.17	0.01	0.12	0.15	0.25	0.01
Fe_2O_3	38.86	39.71	37.19	37.02	38.77	35.79	37.29	38.96
FeO	37.64	37.86	39.65	39.29	39.55	40.74	40.43	39.48
MnO	0.37	0.41	0.38	0.46	0.61	0.37	0.44	0.45
MgO	4.10	4.32	4.18	4.22	4.20	3.93	4.10	4.12
SiO_2	0.14	0.24	0.31	0.26	0.18	0.11	0.25	0.31
Total	96.89	98.04	98.85	98.30	100.13	99.08	100.27	99.87

Sample	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	4	5	1	2	3	4	5	6
TiO_2	10.95	13.31	11.79	11.75	11.23	11.91	11.75	11.50
Al_2O_3	4.62	4.63	4.41	4.63	4.54	4.77	4.51	4.63
Cr_2O_3	0.18	0.14	0.16	0.21	0.05	0.13	0.17	0.16
Fe_2O_3	38.27	35.93	37.74	38.73	38.73	38.53	38.29	37.96
FeO	37.75	41.11	38.51	39.00	38.69	39.69	39.14	38.41
MnO	0.55	0.38	0.66	0.38	0.42	0.45	0.39	0.33
MgO	4.04	4.22	3.99	4.18	3.97	4.01	3.97	4.07
SiO_2	0.37	0.43	0.26	0.17	0.44	0.33	0.30	0.21
Total	96.73	100.15	97.53	99.03	98.07	99.82	98.51	97.27

Sample	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	7	8	9	10	1	2	3	4
TiO_2	11.39	11.84	11.43	12.15	11.58	12.31	11.92	12.08
Al_2O_3	4.57	4.45	4.69	4.64	2.37	2.50	2.40	2.35
Cr_2O_3	0.05	0.15	0.00	0.14	0.08	0.00	0.10	0.00
Fe_2O_3	38.06	38.11	38.81	38.66	41.75	41.95	41.64	42.65
FeO	38.45	38.80	38.47	39.94	39.20	41.02	40.01	40.63
MnO	0.38	0.46	0.43	0.27	1.21	1.09	0.97	1.05
MgO	3.99	4.00	3.96	3.90	1.41	1.24	1.39	1.52
SiO_2	0.33	0.18	0.15	0.15	0.04	0.09	0.02	0.08
Total	97.23	97.98	97.93	99.86	97.64	100.20	98.45	100.36

Sample	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	1	2	3	4	5	1	2	3
TiO_2	12.46	12.17	11.93	12.00	11.78	10.86	11.74	9.32
Al_2O_3	2.39	2.36	2.43	2.43	2.28	2.36	2.35	2.52
Cr_2O_3	0.00	0.04	0.01	0.00	0.00	0.00	0.00	0.13
Fe_2O_3	41.87	42.15	43.24	41.04	42.67	44.35	42.30	45.27
FeO	41.03	40.71	41.01	39.66	40.28	39.49	39.77	37.35
MnO	1.04	1.00	0.87	1.11	1.11	0.94	1.00	0.91
MgO	1.45	1.36	1.30	1.39	1.49	1.56	1.63	1.60
SiO_2	0.07	0.06	0.07	0.00	0.18	0.16	0.05	0.19
Total	100.31	99.84	100.86	97.63	99.80	99.73	98.83	97.28

Sample	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	1	2	3	4	5	6	7	8
TiO_2	11.88	11.54	12.66	11.70	12.42	12.49	13.32	12.04
Al_2O_3	4.51	4.68	4.64	4.57	4.62	4.74	4.75	4.72
Cr_2O_3	0.12	0.19	0.18	0.10	0.27	0.05	0.10	0.14
Fe_2O_3	39.53	38.96	37.51	38.25	37.63	38.45	37.77	39.18
FeO	39.12	38.48	40.05	38.43	39.57	40.37	41.15	39.47
MnO	0.43	0.34	0.40	0.29	0.35	0.15	0.38	0.44
MgO	4.10	4.44	4.02	4.14	4.13	4.10	4.30	4.31
SiO_2	0.02	0.12	0.12	0.05	0.07	0.11	0.09	0.11
Total	99.69	98.74	99.59	97.51	99.07	100.46	101.85	100.41

Sample	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	9	1	2	3	4	5	6	7
TiO_2	11.78	9.32	9.53	9.64	9.54	9.73	9.58	9.30
Al_2O_3	4.34	3.81	3.62	3.71	3.80	3.86	3.71	3.76
Cr_2O_3	0.19	0.07	0.11	0.02	0.00	0.01	0.13	0.11
Fe_2O_3	38.84	44.54	45.04	44.89	44.33	44.19	43.88	44.71
FeO	38.73	37.33	37.51	37.92	37.57	37.72	37.41	36.97
MnO	0.39	0.46	0.48	0.45	0.40	0.57	0.49	0.72
MgO	4.19	2.87	3.07	2.91	2.94	2.79	2.90	2.87
SiO_2	0.11	0.12	0.06	0.11	0.11	0.06	0.13	0.07
Total	98.57	98.53	99.42	99.65	98.69	98.93	98.22	98.50

Sample	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	8	9	10	1	2	3	4	5
TiO_2	9.53	9.30	10.45	8.80	9.37	9.11	8.85	9.34
Al_2O_3	3.76	3.89	3.77	3.66	3.70	3.83	3.84	3.81
Cr_2O_3	0.00	0.00	0.00	0.00	0.07	0.02	0.09	0.06
Fe_2O_3	44.99	46.73	42.63	45.75	45.40	45.35	46.74	45.30
FeO	37.62	38.33	38.04	36.56	37.46	37.12	37.19	37.54
MnO	0.46	0.39	0.43	0.53	0.59	0.65	0.57	0.47
MgO	2.87	2.67	3.09	2.84	2.83	2.78	2.80	2.76
SiO_2	0.03	0.04	0.01	0.04	0.06	0.10	0.02	0.02
Total	99.26	101.36	98.42	98.17	99.47	98.96	100.09	99.31

Sample	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	6	7	8	9	10	1	2	3
TiO_2	9.99	10.11	9.45	9.05	9.61	9.45	9.41	10.75
Al_2O_3	3.78	3.99	3.71	3.79	3.59	3.70	3.74	3.65
Cr_2O_3	0.01	0.12	0.00	0.00	0.00	0.00	0.00	0.09
Fe_2O_3	43.27	44.23	44.06	45.97	45.25	45.06	44.66	43.14
FeO	37.79	38.70	37.05	37.20	37.90	37.81	37.26	39.21
MnO	0.53	0.36	0.54	0.65	0.44	0.44	0.55	0.46
MgO	2.73	2.88	2.81	2.80	2.76	2.85	2.72	2.78
SiO_2	0.06	0.06	0.06	0.08	0.05	0.15	0.03	0.12
Total	98.15	100.45	97.68	99.54	99.60	99.47	98.37	100.19

Sample	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	4	5	1	2	3	4	5	6
TiO_2	9.17	9.31	10.92	10.10	10.19	10.09	9.96	10.05
Al_2O_3	3.71	3.74	4.36	4.38	4.31	4.33	4.25	4.35
Cr_2O_3	0.00	0.00	0.00	0.00	0.14	0.00	0.00	0.00
Fe_2O_3	43.85	45.64	41.62	43.19	42.46	42.52	42.72	42.87
FeO	36.69	37.39	38.48	37.88	38.18	37.90	37.73	38.19
MnO	0.48	0.55	0.54	0.54	0.34	0.50	0.45	0.36
MgO	2.74	2.81	3.65	3.45	3.15	3.05	2.95	3.01
SiO_2	0.11	0.01	0.07	0.07	0.08	0.09	0.06	0.10
Total	96.75	99.45	99.63	99.60	98.85	98.48	98.11	98.94

Sample	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	7	8	9	10	11	12	13	14
TiO_2	9.43	9.47	10.05	9.01	9.51	10.15	10.46	9.37
Al_2O_3	4.35	4.40	4.32	4.24	4.38	4.40	4.18	4.32
Cr_2O_3	0.14	0.05	0.03	0.00	0.00	0.12	0.03	0.00
Fe_2O_3	44.02	43.86	43.14	43.32	43.70	42.67	42.60	43.52
FeO	37.30	37.49	38.00	36.21	37.80	38.35	38.52	37.13
MnO	0.43	0.51	0.47	0.46	0.25	0.29	0.43	0.41
MgO	3.05	2.97	3.14	3.13	2.97	3.13	3.08	2.84
SiO_2	0.00	0.09	0.05	0.08	0.12	0.10	0.07	0.03
Total	98.72	98.83	99.20	96.45	98.74	99.22	99.38	97.62

Sample	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	15	16	17	18	1	2	3	4
TiO_2	9.53	9.88	9.31	10.70	11.19	9.20	9.71	9.23
Al_2O_3	4.26	4.27	4.34	4.30	4.58	4.20	4.24	4.26
Cr_2O_3	0.00	0.23	0.06	0.11	0.00	0.12	0.00	0.01
Fe_2O_3	43.57	43.77	44.65	40.50	42.07	44.16	44.15	44.49
FeO	37.47	38.20	37.37	37.61	39.47	36.76	38.16	37.31
MnO	0.40	0.37	0.32	0.44	0.49	0.50	0.21	0.43
MgO	3.00	3.10	3.18	3.61	3.55	3.13	3.14	3.08
SiO_2	0.10	0.07	0.00	0.02	0.07	0.02	0.11	0.12
Total	98.35	99.88	99.23	97.29	101.42	98.09	99.71	98.92

Sample	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	5	6	7	8	9	1	2	3
TiO_2	9.43	9.55	9.81	9.57	10.99	8.84	9.64	9.26
Al_2O_3	4.28	4.38	4.30	4.36	4.34	3.04	3.14	3.20
Cr_2O_3	0.08	0.09	0.10	0.05	0.00	0.00	0.00	0.12
Fe_2O_3	43.35	43.33	43.25	43.31	41.01	46.07	44.93	46.24
FeO	37.19	37.52	37.79	37.54	38.44	36.66	37.66	37.84
MnO	0.42	0.32	0.50	0.37	0.48	0.48	0.70	0.92
MgO	3.09	2.97	3.03	2.99	3.63	2.46	2.18	2.22
SiO_2	0.11	0.06	0.10	0.10	0.08	0.05	0.06	0.24
Total	97.95	98.21	98.88	98.27	98.97	97.60	98.31	100.05

Sample	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	4	5	6	7	8	9	10	1
TiO_2	10.14	10.46	9.99	10.33	9.10	9.99	9.27	9.43
Al_2O_3	3.15	3.09	3.05	3.19	3.08	3.09	2.94	3.00
Cr_2O_3	0.00	0.00	0.00	0.00	0.04	0.00	0.05	0.00
Fe_2O_3	44.82	45.78	46.43	45.72	45.64	45.08	46.28	44.45
FeO	38.58	39.22	38.91	38.96	36.94	38.33	37.45	37.00
MnO	0.71	0.91	0.60	0.85	0.79	0.66	0.76	0.61
MgO	2.18	2.42	2.21	2.40	2.13	2.18	2.43	2.33
SiO_2	0.09	0.11	0.03	0.04	0.06	0.04	0.14	0.08
Total	99.67	101.98	101.22	101.50	97.78	99.38	99.32	96.90

Sample	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	2	3	4	5	6	7	8	9
TiO_2	9.08	9.57	10.99	10.13	9.86	10.89	10.10	9.15
Al_2O_3	3.04	3.15	3.11	2.98	3.13	3.17	2.93	3.07
Cr_2O_3	0.12	0.05	0.08	0.16	0.00	0.00	0.24	0.05
Fe_2O_3	44.36	45.30	44.32	44.94	45.93	44.04	44.35	44.94
FeO	36.29	37.59	39.72	38.39	38.48	39.20	38.05	36.60
MnO	0.79	0.79	0.74	0.87	0.68	0.92	0.78	0.80
MgO	2.44	2.39	2.17	2.15	2.11	2.14	2.29	2.39
SiO_2	0.13	0.10	0.02	0.08	0.03	0.00	0.06	0.10
Total	96.26	98.94	101.16	99.70	100.21	100.35	98.79	97.00

Sample	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E	71-P2T-E
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	1	2	3	4	5	6	7	8
TiO_2	9.03	8.86	9.02	9.65	10.06	9.01	8.74	10.65
Al_2O_3	3.84	3.78	3.77	3.89	3.73	3.80	3.61	3.73
Cr_2O_3	0.03	0.00	0.00	0.00	0.00	0.00	0.06	0.03
Fe_2O_3	44.02	46.65	44.87	45.24	45.08	45.33	45.59	42.58
FeO	36.89	37.15	36.55	38.22	38.41	36.97	36.17	38.55
MnO	0.64	0.45	0.62	0.52	0.55	0.46	0.54	0.59
MgO	2.92	3.03	3.03	2.68	3.02	2.89	3.05	2.87
SiO_2	0.18	0.06	0.10	0.07	0.04	0.08	0.02	0.09
Total	98.45	99.99	97.96	100.28	100.89	98.54	97.79	99.00

Sample	71-P2T-E	71-P2T-E	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	9	10	1	2	3	4	5	6
TiO_2	9.53	9.05	47.94	47.95	48.43	47.53	47.52	47.39
Al_2O_3	3.75	3.75	0.22	0.16	0.12	0.22	0.17	0.12
Cr_2O_3	0.00	0.01	0.06	0.00	0.15	0.00	0.11	0.07
Fe_2O_3	44.47	45.74	7.21	5.76	6.32	5.93	7.25	7.23
FeO	37.56	37.22	39.20	39.53	39.59	38.78	38.73	38.49
MnO	0.36	0.51	1.12	0.78	1.11	1.08	1.10	1.28
MgO	2.91	2.89	4.02	4.10	4.10	4.14	4.14	4.02
SiO_2	0.07	0.11	0.04	0.07	0.03	0.02	0.02	0.00
Total	98.65	99.28	99.80	98.34	99.85	97.69	99.05	98.60

Sample	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	7	8	9	1	2	3	4	5
TiO_2	46.11	47.19	46.14	13.06	12.11	12.26	12.21	13.00
Al_2O_3	0.17	0.21	0.21	2.43	2.41	2.35	2.33	2.29
Cr_2O_3	0.00	0.00	0.00	0.02	0.00	0.00	0.02	0.00
Fe_2O_3	8.20	6.62	7.59	40.06	42.09	40.36	41.22	39.89
FeO	37.58	38.70	37.53	41.07	40.30	39.59	39.74	40.75
MnO	0.93	0.98	1.20	1.05	0.92	1.04	1.01	0.79
MgO	4.18	3.97	3.92	1.97	2.13	2.01	2.05	2.17
SiO_2	0.00	0.04	0.00	0.12	0.13	0.08	0.01	0.05
Total	97.17	97.72	96.58	99.79	100.08	97.69	98.60	98.93

Sample	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	6	7	8	9	10	11	12	13
TiO_2	12.18	12.62	12.12	12.39	12.05	11.65	12.50	10.83
Al_2O_3	2.31	2.42	2.28	2.37	2.33	2.20	2.48	2.35
Cr_2O_3	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.15
Fe_2O_3	41.71	42.39	41.61	42.51	40.12	42.50	40.91	42.80
FeO	40.01	41.32	39.91	40.78	39.13	39.43	40.76	38.61
MnO	1.06	0.91	0.98	0.88	0.88	0.87	0.77	0.75
MgO	1.96	2.00	1.95	2.17	2.05	2.07	1.91	2.06
SiO_2	0.07	0.05	0.06	0.05	0.04	0.06	0.10	0.15
Total	99.29	101.80	98.90	101.16	96.61	98.79	99.43	97.70

Sample	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	14	15	16	17	1	2	3	4
TiO_2	11.31	10.82	11.24	10.43	48.79	46.66	47.55	45.83
Al_2O_3	2.43	2.44	2.54	2.54	0.22	0.18	0.16	0.20
Cr_2O_3	0.00	0.04	0.02	0.11	0.00	0.00	0.00	0.22
Fe_2O_3	42.50	42.33	43.01	43.60	4.89	7.70	6.41	9.51
FeO	39.07	37.91	39.07	38.78	40.02	37.85	38.93	37.55
MnO	0.93	1.00	0.99	0.94	0.95	1.25	1.13	0.81
MgO	2.26	2.22	2.15	2.26	4.13	4.08	3.86	4.12
SiO_2	0.18	0.10	0.09	0.46	0.00	0.02	0.02	0.04
Total	98.67	96.85	99.11	99.11	99.00	97.74	98.06	98.27

Sample	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	5	6	7	8	9	1	2	3
TiO_2	46.23	48.98	48.16	46.57	45.39	11.71	11.49	11.98
Al_2O_3	0.20	0.18	0.19	0.24	0.19	2.34	2.40	2.26
Cr_2O_3	0.00	0.00	0.00	0.08	0.06	0.08	0.00	0.03
Fe_2O_3	9.52	4.95	5.93	7.05	9.54	42.22	42.33	42.89
FeO	37.52	39.99	39.59	37.82	36.91	39.51	39.22	40.14
MnO	1.12	1.29	0.88	1.19	0.88	0.82	0.84	0.89
MgO	4.19	4.02	4.06	4.23	4.29	2.42	2.32	2.26
SiO_2	0.02	0.06	0.02	0.09	0.00	0.13	0.12	0.07
Total	98.81	99.48	98.82	97.26	97.25	99.23	98.73	100.52

Sample	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	4	5	6	7	8	9	1	2
TiO_2	11.95	12.19	11.14	10.74	10.98	10.23	11.29	11.14
Al_2O_3	2.46	2.63	2.44	2.62	2.66	2.96	2.62	2.39
Cr_2O_3	0.00	0.00	0.00	0.00	0.09	0.00	0.13	0.00
Fe_2O_3	41.67	41.85	43.88	43.60	42.44	45.93	42.60	43.97
FeO	39.78	40.15	38.90	38.30	38.44	38.87	39.40	39.58
MnO	0.83	0.88	0.84	0.96	0.70	0.75	0.51	0.70
MgO	2.27	2.29	2.49	2.51	2.46	2.40	2.38	2.23
SiO_2	0.10	0.02	0.00	0.11	0.05	0.07	0.09	0.15
Total	99.04	100.00	99.69	98.84	97.83	101.20	99.01	100.17

Sample	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	3	4	1	2	3	4	5	6
TiO_2	12.81	10.47	12.91	12.30	13.12	11.94	13.47	14.16
Al_2O_3	2.26	2.61	3.92	4.81	5.07	5.28	4.82	4.33
Cr_2O_3	0.01	0.11	0.21	0.00	0.03	0.00	0.07	0.11
Fe_2O_3	42.07	44.37	37.18	37.63	36.25	37.15	36.52	33.46
FeO	41.15	38.74	39.93	39.27	40.65	38.89	40.89	40.71
MnO	0.95	0.91	0.63	0.48	0.39	0.40	0.30	0.46
MgO	2.17	2.37	3.72	4.11	3.98	4.16	4.26	3.95
SiO_2	0.03	0.27	0.15	0.08	0.15	0.13	0.05	0.13
Total	101.46	99.85	98.66	98.68	99.64	97.95	100.38	97.32

Sample	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	1	2	3	4	5	6	7	8
TiO_2	12.36	13.11	12.87	12.45	11.78	12.65	12.83	13.15
Al_2O_3	3.60	4.53	5.13	5.40	5.15	5.09	4.73	4.66
Cr_2O_3	0.30	0.02	0.00	0.17	0.00	0.00	0.08	0.14
Fe_2O_3	38.25	37.21	35.49	36.96	37.13	37.30	36.50	36.21
FeO	39.91	40.43	39.92	39.91	38.48	40.00	39.78	40.18
MnO	0.74	0.53	0.32	0.38	0.37	0.52	0.47	0.42
MgO	3.14	4.09	3.96	3.94	3.98	3.84	4.09	4.07
SiO_2	0.31	0.14	0.13	0.07	0.06	0.05	0.11	0.07
Total	98.60	100.05	97.81	99.29	96.95	99.44	98.59	98.90

Sample	71-P2T-D	71-P2T-D	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	9	10	1	2	3	4	5	6
TiO_2	13.72	12.64	8.96	9.46	8.69	8.68	8.80	9.60
Al_2O_3	4.51	3.80	3.77	3.76	3.83	3.63	3.67	3.74
Cr_2O_3	0.10	0.08	0.00	0.00	0.00	0.00	0.01	0.00
Fe_2O_3	34.91	38.18	45.24	43.44	43.15	44.54	43.61	43.08
FeO	40.74	39.45	36.88	36.96	35.55	35.90	35.83	36.63
MnO	0.40	0.70	0.50	0.48	0.51	0.45	0.33	0.64
MgO	4.03	3.73	2.89	3.03	2.87	2.91	3.17	3.02
SiO_2	0.15	0.06	0.12	0.15	0.15	0.08	0.15	0.05
Total	98.57	98.65	98.36	97.30	94.75	96.21	95.56	96.76

Sample	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	7	1	2	3	4	5	6	7
TiO_2	9.03	13.03	11.43	11.28	10.84	9.86	9.87	9.63
Al_2O_3	3.74	3.79	3.24	2.88	2.77	2.78	2.74	2.83
Cr_2O_3	0.00	0.00	0.14	0.00	0.12	0.16	0.00	0.04
Fe_2O_3	43.84	36.32	38.39	41.91	42.04	44.13	43.47	43.46
FeO	36.29	40.00	37.52	38.81	38.26	37.78	37.52	36.82
MnO	0.49	0.65	0.46	0.24	0.33	0.33	0.16	0.36
MgO	2.98	3.18	3.51	3.30	2.72	2.78	2.58	2.76
SiO_2	0.12	0.18	0.12	0.09	0.03	0.19	0.11	0.10
Total	96.49	97.14	94.80	98.50	97.11	98.00	96.45	96.00

Sample	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	8	9	10	1	2	3	4	5
TiO_2	10.19	11.25	10.27	11.48	11.31	11.18	11.20	11.47
Al_2O_3	2.80	3.18	2.85	4.50	4.18	2.82	3.99	4.59
Cr_2O_3	0.04	0.01	0.06	0.15	0.18	0.29	0.02	0.08
Fe_2O_3	42.37	39.92	42.56	37.32	36.71	37.70	37.76	37.04
FeO	37.37	38.00	37.62	38.04	37.12	36.72	37.63	37.95
MnO	0.41	0.27	0.31	0.34	0.40	0.38	0.32	0.24
MgO	2.84	3.44	2.85	3.88	3.62	3.53	3.43	3.79
SiO_2	0.16	0.10	0.12	0.19	0.08	0.16	0.17	0.12
Total	96.19	96.16	96.65	95.89	93.60	92.79	94.52	95.29

Sample	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-C2	77-P2B-D	77-P2B-D	77-P2B-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	6	7	8	9	10	1	2	3
TiO_2	12.02	12.05	12.09	11.97	11.80	11.03	11.42	12.56
Al_2O_3	4.56	4.42	4.57	4.06	4.36	2.32	2.32	2.34
Cr_2O_3	0.19	0.28	0.24	0.30	0.18	0.00	0.00	0.04
Fe_2O_3	36.44	35.79	36.39	36.50	36.65	41.51	41.74	40.63
FeO	38.61	38.26	38.87	38.70	38.34	37.88	39.13	40.85
MnO	0.25	0.26	0.31	0.53	0.32	1.21	1.04	1.00
MgO	3.91	4.09	3.72	3.51	3.74	1.70	1.31	1.38
SiO_2	0.13	0.15	0.15	0.32	0.17	0.06	0.06	0.12
Total	96.09	95.30	96.33	95.88	95.57	95.71	97.01	98.91

Sample	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	4	5	6	7	8	9	10	11
TiO_2	13.02	12.22	11.52	12.45	11.70	12.87	10.60	11.90
Al_2O_3	2.22	2.30	2.30	2.23	2.38	2.28	2.30	2.30
Cr_2O_3	0.00	0.11	0.00	0.04	0.12	0.06	0.05	0.06
Fe_2O_3	40.11	39.35	41.33	37.54	40.05	39.52	42.75	40.09
FeO	41.13	39.65	39.23	39.23	38.93	40.88	38.01	39.32
MnO	1.18	0.93	0.97	1.02	1.13	0.88	1.03	0.99
MgO	1.30	1.37	1.36	1.45	1.40	1.53	1.54	1.44
SiO_2	0.09	0.08	0.09	0.16	0.11	0.12	0.07	0.11
Total	99.03	96.01	96.82	94.13	95.82	98.14	96.36	96.21

Sample	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	1	2	3	4	5	6	7	8
TiO_2	11.16	11.11	10.88	12.10	11.38	12.06	11.99	12.13
Al_2O_3	2.32	2.34	2.35	2.20	2.27	2.40	2.37	2.47
Cr_2O_3	0.00	0.00	0.00	0.00	0.03	0.10	0.05	0.00
Fe_2O_3	42.58	42.09	42.56	41.37	43.03	41.08	41.57	40.06
FeO	38.73	38.86	38.54	40.13	39.47	39.76	40.19	39.88
MnO	1.31	1.11	1.15	1.07	1.05	1.24	0.99	0.90
MgO	1.48	1.34	1.35	1.42	1.45	1.35	1.39	1.52
SiO_2	0.10	0.14	0.11	0.12	0.05	0.03	0.09	0.12
Total	97.68	97.00	96.93	98.41	98.72	98.02	98.64	97.00

Sample	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D	77-P2B-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	9	1	2	3	4	5	6	7
TiO_2	11.43	8.64	10.62	10.89	10.65	10.77	11.92	10.90
Al_2O_3	2.23	3.94	3.76	4.23	4.37	4.45	4.32	4.55
Cr_2O_3	0.04	0.13	0.12	0.00	0.00	0.05	0.02	0.01
Fe_2O_3	41.86	43.84	41.70	39.07	39.16	40.56	39.16	39.52
FeO	39.04	35.51	37.88	37.38	37.18	37.78	39.35	37.75
MnO	1.09	0.75	0.72	0.37	0.26	0.42	0.39	0.24
MgO	1.58	2.91	2.89	3.59	3.78	3.82	3.86	3.73
SiO_2	0.11	0.09	0.03	0.06	0.11	0.05	0.14	0.01
Total	97.38	95.80	97.73	95.59	95.52	97.89	99.16	96.71

Sample	77-P2B-D	77-P2B-D	77-P2B-H	77-P2B-H	77-P2B-H	77-P2B-H	77-P2B-H	77-P2B-H
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	8	9	1	2	3	4	5	6
TiO_2	10.69	11.34	8.85	9.85	9.19	8.71	9.53	9.48
Al_2O_3	4.52	4.28	3.65	3.64	3.69	3.54	3.65	3.67
Cr_2O_3	0.00	0.04	0.00	0.04	0.00	0.00	0.10	0.00
Fe_2O_3	40.03	40.29	45.30	42.24	43.04	43.07	42.67	42.95
FeO	37.76	38.84	36.42	36.95	36.23	35.39	36.91	36.67
MnO	0.28	0.30	0.56	0.52	0.60	0.54	0.33	0.50
MgO	3.68	3.68	2.95	2.83	2.77	2.65	2.81	2.88
SiO_2	0.09	0.07	0.08	0.07	0.12	0.11	0.11	0.10
Total	97.04	98.83	97.81	96.13	95.64	94.01	96.09	96.25

Sample	77-P2B-H	77-P2B-H	77-P2B-H	77-P2B-H	77-P2B-H	77-P2B-H	77-P2B-H	77-P2B-H
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	7	8	1	2	3	4	5	6
TiO_2	9.68	8.06	10.06	9.03	9.53	8.65	9.02	9.24
Al_2O_3	3.68	3.71	3.51	3.50	3.54	3.78	3.66	3.67
Cr_2O_3	0.00	0.04	0.00	0.00	0.03	0.07	0.00	0.00
Fe_2O_3	42.26	44.89	42.85	42.74	43.62	45.65	44.26	43.29
FeO	36.64	34.95	37.95	36.81	36.92	36.33	36.23	36.49
MnO	0.50	0.44	0.53	0.41	0.58	0.63	0.66	0.47
MgO	2.85	2.92	2.84	2.77	2.77	2.75	2.63	2.81
SiO_2	0.05	0.06	0.27	0.49	0.07	0.05	0.02	0.11
Total	95.66	95.06	98.02	95.83	97.06	97.90	96.47	96.07

Sample	77-P2B-H	77-P2B-H	77-P2B-H	77-P2B-H	77-P2B-H	77-P2B-H	77-P2B-H	77-P2B-H
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	7	8	9	10	11	12	13	14
TiO_2	9.10	9.59	8.61	8.80	9.18	9.13	8.40	8.60
Al_2O_3	3.66	3.82	3.67	3.73	3.84	3.80	3.68	3.64
Cr_2O_3	0.00	0.12	0.07	0.11	0.08	0.08	0.00	0.00
Fe_2O_3	42.88	44.01	44.85	45.27	43.67	44.12	44.61	44.03
FeO	35.83	37.67	36.08	36.44	36.64	37.01	35.82	35.80
MnO	0.55	0.47	0.43	0.68	0.27	0.46	0.42	0.28
MgO	2.91	2.73	2.91	2.83	2.90	2.66	2.57	2.76
SiO_2	0.08	0.12	0.12	0.10	0.03	0.16	0.11	0.08
Total	95.01	98.52	96.74	97.96	96.61	97.41	95.61	95.18

Sample	77-P2B-H	77-P2B-H	77-P2B-H	77-P2B-H	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	15	16	17	18	1	2	3	4
TiO_2	8.62	8.97	9.21	8.25	11.25	10.79	10.33	11.51
Al_2O_3	3.75	3.79	3.62	3.74	2.36	2.36	2.33	2.27
Cr_2O_3	0.00	0.00	0.09	0.00	0.00	0.15	0.00	0.00
Fe_2O_3	44.65	44.54	43.24	45.09	40.78	41.79	42.75	40.25
FeO	35.97	36.28	36.21	35.39	38.13	37.83	37.22	38.29
MnO	0.45	0.52	0.53	0.55	0.85	0.75	0.91	0.97
MgO	2.98	2.93	2.93	2.83	2.13	2.18	2.20	2.07
SiO_2	0.12	0.01	0.08	0.08	0.10	0.08	0.10	0.14
Total	96.54	97.05	95.91	95.91	95.61	95.93	95.84	95.49

Sample	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	5	6	7	8	9	10	11	12
TiO_2	11.52	12.22	12.10	12.82	11.76	11.09	12.29	12.08
Al_2O_3	2.23	2.21	2.33	2.07	2.22	2.21	2.31	2.24
Cr_2O_3	0.00	0.07	0.05	0.00	0.00	0.04	0.10	0.08
Fe_2O_3	39.80	40.34	39.36	38.79	39.53	40.83	39.97	40.11
FeO	38.10	39.56	39.03	39.50	38.22	37.78	39.67	39.43
MnO	0.74	0.86	0.95	1.06	1.15	0.80	1.01	0.91
MgO	2.20	2.09	1.92	2.20	1.89	1.98	1.82	1.92
SiO_2	0.08	0.08	0.08	0.07	0.09	0.04	0.09	0.13
Total	94.68	97.43	95.82	96.50	94.88	94.77	97.26	96.89

Sample	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	13	14	15	16	17	18	19	20
TiO_2	11.50	11.36	12.22	12.59	11.89	11.55	12.30	12.16
Al_2O_3	2.30	2.17	2.20	2.21	2.29	2.26	2.20	2.22
Cr_2O_3	0.00	0.06	0.00	0.00	0.00	0.00	0.04	0.06
Fe_2O_3	40.11	40.66	39.99	38.78	40.85	39.45	39.17	39.72
FeO	38.26	37.93	39.40	39.27	39.09	37.86	39.43	39.13
MnO	0.93	1.02	0.88	0.94	1.03	0.91	0.81	0.98
MgO	1.93	2.03	2.06	2.16	2.08	2.08	1.94	2.13
SiO_2	0.09	0.04	0.09	0.04	0.09	0.06	0.12	0.12
Total	95.13	95.27	96.84	95.99	97.33	94.16	96.01	96.51

Sample	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	1	2	3	4	5	6	7	8
TiO_2	46.00	45.06	44.66	46.07	44.82	45.44	47.25	45.60
Al_2O_3	0.17	0.11	0.14	0.18	0.19	0.15	0.16	0.13
Cr_2O_3	0.01	0.00	0.00	0.00	0.14	0.00	0.02	0.00
Fe_2O_3	6.81	8.85	8.45	7.48	8.24	7.65	5.58	6.86
FeO	37.36	36.71	36.10	37.61	36.42	36.86	38.74	36.91
MnO	1.29	1.02	1.24	0.98	1.17	1.03	1.08	1.19
MgO	3.85	3.95	3.98	4.04	3.99	4.21	3.79	4.13
SiO_2	0.00	0.00	0.00	0.01	0.08	0.00	0.00	0.01
Total	95.49	95.70	94.57	96.36	95.04	95.35	96.61	94.82

Sample	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	9	10	11	12	13	14	15	16
TiO_2	45.61	46.27	45.79	45.25	45.57	44.55	45.56	46.48
Al_2O_3	0.16	0.18	0.20	0.20	0.20	0.15	0.18	0.17
Cr_2O_3	0.10	0.07	0.00	0.06	0.00	0.05	0.01	0.06
Fe_2O_3	7.06	7.17	6.30	6.70	7.36	9.25	6.30	5.91
FeO	37.15	37.69	37.32	36.54	37.01	36.20	37.10	38.13
MnO	0.92	1.00	1.15	1.22	1.19	0.95	1.05	0.93
MgO	4.17	4.15	3.91	4.15	3.97	4.23	4.00	3.89
SiO_2	0.00	0.00	0.04	0.00	0.02	0.06	0.01	0.00
Total	95.16	96.52	94.72	94.12	95.31	95.42	94.22	95.57

Sample	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	1	2	3	4	5	6	7	8
TiO_2	10.51	11.09	10.91	12.37	11.70	11.88	11.38	11.41
Al_2O_3	2.58	2.48	2.35	2.44	2.45	2.40	2.30	2.33
Cr_2O_3	0.00	0.07	0.07	0.06	0.01	0.00	0.00	0.00
Fe_2O_3	42.21	41.52	42.32	39.42	40.25	39.38	40.71	41.72
FeO	37.37	38.16	37.97	39.72	38.33	38.52	38.13	38.52
MnO	0.81	0.79	0.85	0.75	0.89	0.80	0.75	0.85
MgO	2.44	2.36	2.38	2.19	2.38	2.21	2.47	2.33
SiO_2	0.08	0.09	0.06	0.12	0.01	0.05	0.09	0.03
Total	96.01	96.54	96.92	97.08	96.03	95.23	95.83	97.19

Sample	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	9	9	10	11	12	13	14	15
TiO_2	11.04	10.69	11.30	12.53	11.94	11.35	13.10	12.34
Al_2O_3	2.29	2.40	2.24	2.26	2.32	2.32	2.21	2.19
Cr_2O_3	0.11	0.11	0.03	0.15	0.06	0.01	0.06	0.13
Fe_2O_3	41.84	40.81	40.74	38.98	39.78	42.09	35.49	37.59
FeO	38.05	37.25	37.97	39.50	38.96	38.57	42.48	40.95
MnO	0.91	0.75	0.75	0.94	0.72	0.94	0.97	0.71
MgO	2.29	2.19	2.25	2.15	2.26	2.29	2.30	2.33
SiO_2	0.11	0.09	0.03	0.09	0.11	0.06	0.04	0.05
Total	96.63	94.29	95.31	96.60	96.14	97.63	96.65	96.28

Sample	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	16	17	1	2	3	4	5	6
TiO_2	11.09	12.74	43.46	46.42	45.14	47.42	44.50	45.31
Al_2O_3	2.26	2.31	0.19	0.11	0.27	0.16	0.19	0.22
Cr_2O_3	0.00	0.00	0.00	0.00	0.05	0.02	0.00	0.06
Fe_2O_3	38.81	37.14	6.25	3.13	4.56	1.94	5.58	4.85
FeO	40.35	42.58	38.39	40.80	39.35	41.83	38.90	39.56
MnO	0.86	0.90	1.24	1.05	0.96	1.18	0.96	0.99
MgO	2.29	2.27	4.19	4.14	4.22	4.13	4.13	4.08
SiO_2	0.07	0.00	0.00	0.04	0.08	0.00	0.02	0.04
Total	95.73	97.94	93.71	95.71	94.63	96.68	94.29	95.10

Sample	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	7	8	9	10	11	12	13	14
TiO_2	46.21	45.52	44.88	47.36	46.58	46.28	45.68	46.71
Al_2O_3	0.17	0.20	0.23	0.19	0.22	0.19	0.19	0.20
Cr_2O_3	0.00	0.09	0.00	0.00	0.00	0.02	0.03	0.00
Fe_2O_3	1.82	4.18	3.99	2.42	4.08	5.80	6.66	4.95
FeO	40.82	39.71	39.69	41.65	40.95	37.74	37.28	38.18
MnO	1.16	1.05	1.10	0.95	1.03	1.05	1.03	0.94
MgO	4.16	4.10	3.97	3.90	4.15	4.00	4.07	4.13
SiO_2	0.05	0.00	0.09	0.06	0.08	0.00	0.09	0.02
Total	94.38	94.86	93.95	96.53	97.09	95.09	95.04	95.13

Sample	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	15	16	17	18	19	1	2	3
TiO_2	46.63	45.47	45.92	45.01	44.44	10.98	10.92	10.69
Al_2O_3	0.21	0.21	0.19	0.17	0.24	2.34	2.28	2.33
Cr_2O_3	0.01	0.13	0.00	0.00	0.00	0.07	0.00	0.13
Fe_2O_3	6.68	8.26	7.36	8.82	7.85	42.45	41.05	41.63
FeO	37.94	36.97	37.26	36.73	36.28	38.39	37.85	37.59
MnO	1.04	1.04	1.14	0.97	1.08	0.86	0.72	0.79
MgO	4.22	4.18	4.12	4.03	3.84	2.02	2.14	2.08
SiO_2	0.02	0.06	0.01	0.05	0.09	0.06	0.15	0.09
Total	96.77	96.33	96.00	95.77	93.81	97.18	95.12	95.32

Sample	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	4	5	6	7	8	9	10	11
TiO_2	11.26	11.47	12.53	11.93	11.87	12.57	10.61	11.21
Al_2O_3	2.28	2.25	2.28	2.23	2.22	2.23	2.23	2.28
Cr_2O_3	0.02	0.03	0.00	0.00	0.13	0.01	0.00	0.13
Fe_2O_3	39.75	39.81	39.63	39.79	40.68	39.71	41.80	40.85
FeO	37.65	38.08	39.67	38.80	38.93	39.87	37.08	38.14
MnO	0.92	0.83	0.99	0.92	1.18	0.91	0.95	0.98
MgO	2.16	1.95	2.09	1.99	2.01	2.06	2.03	1.94
SiO_2	0.14	0.06	0.06	0.08	0.11	0.08	0.00	0.12
Total	94.18	94.49	97.25	95.74	97.13	97.43	94.69	95.64

Sample	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	12	13	14	15	16	17	18	19
TiO_2	12.13	11.00	11.31	12.38	11.78	11.69	11.55	10.79
Al_2O_3	2.18	2.29	2.35	2.22	2.29	2.21	2.40	2.26
Cr_2O_3	0.00	0.11	0.09	0.08	0.07	0.00	0.00	0.00
Fe_2O_3	40.07	41.42	39.32	39.00	39.86	40.89	40.56	42.61
FeO	39.31	38.22	37.27	39.20	38.45	38.78	38.51	37.88
MnO	0.91	0.79	1.03	0.89	1.05	0.92	0.85	0.90
MgO	2.06	2.06	2.14	2.15	2.10	2.00	2.15	2.23
SiO_2	0.12	0.16	0.03	0.08	0.09	0.07	0.07	0.08
Total	96.78	96.05	93.54	96.90	95.70	96.56	96.10	96.75

Sample	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	20	1	2	3	4	5	6	7
TiO_2	11.58	43.94	44.64	44.20	47.10	44.78	47.40	46.21
Al_2O_3	2.29	0.19	0.18	0.21	0.15	0.21	0.18	0.15
Cr_2O_3	0.06	0.10	0.00	0.01	0.14	0.00	0.07	0.00
Fe_2O_3	40.90	8.99	7.57	8.32	5.77	7.39	6.29	6.82
FeO	38.64	35.75	36.39	35.94	38.40	36.42	38.96	37.73
MnO	0.86	1.04	0.95	1.13	1.21	1.03	1.01	0.97
MgO	2.28	3.99	3.97	3.90	3.98	3.98	3.88	4.13
SiO_2	0.10	0.08	0.00	0.06	0.05	0.00	0.07	0.05
Total	96.71	94.09	93.71	93.78	96.80	93.81	97.85	96.06

Sample	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	8	9	10	11	12	13	14	15
TiO_2	46.03	44.47	44.58	45.31	47.67	47.56	46.09	47.37
Al_2O_3	0.14	0.22	0.18	0.14	0.15	0.18	0.15	0.20
Cr_2O_3	0.08	0.00	0.08	0.00	0.03	0.00	0.07	0.11
Fe_2O_3	7.29	8.23	7.36	7.10	4.69	4.12	6.53	5.42
FeO	37.20	36.01	36.05	36.78	38.69	39.06	37.71	38.88
MnO	1.34	1.03	1.09	1.02	1.25	0.95	0.86	0.93
MgO	4.03	4.18	4.17	4.26	4.21	4.02	4.13	4.08
SiO_2	0.00	0.00	0.00	0.05	0.03	0.07	0.04	0.08
Total	96.12	94.13	93.50	94.66	96.72	95.96	95.58	97.08

Sample	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	16	1	2	3	4	5	6	7
TiO_2	45.37	10.58	10.24	10.62	10.66	11.30	11.31	11.25
Al_2O_3	0.20	2.40	2.55	2.37	2.32	2.35	2.31	2.31
Cr_2O_3	0.01	0.00	0.00	0.00	0.00	0.00	0.03	0.02
Fe_2O_3	6.44	43.05	42.40	42.29	42.97	40.99	41.89	41.31
FeO	37.19	37.97	36.97	37.61	37.57	38.15	38.46	38.36
MnO	0.87	0.77	0.96	0.69	1.09	0.77	0.90	0.75
MgO	3.89	2.36	2.26	2.42	2.42	2.38	2.31	2.39
SiO_2	0.01	0.13	0.10	0.09	0.10	0.07	0.07	0.14
Total	93.99	97.26	95.48	96.10	97.14	96.01	97.27	96.52

Sample	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	8	9	10	11	12	13	14	15
TiO_2	11.09	12.07	11.47	11.66	11.47	11.89	12.59	12.26
Al_2O_3	2.35	2.35	2.31	2.29	2.26	2.36	2.24	2.27
Cr_2O_3	0.08	0.05	0.00	0.00	0.00	0.00	0.00	0.00
Fe_2O_3	41.27	40.93	40.95	40.51	40.80	40.34	39.52	40.56
FeO	38.09	39.72	38.41	38.63	38.05	38.88	39.74	39.66
MnO	0.97	0.81	0.96	0.82	0.97	0.92	0.91	0.98
MgO	2.16	2.20	2.24	2.23	2.26	2.13	2.24	2.17
SiO_2	0.17	0.12	0.11	0.09	0.02	0.05	0.10	0.12
Total	96.17	98.25	96.45	96.22	95.84	96.56	97.33	98.03

Sample	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	16	17	18	19	20	1	2	3
TiO_2	11.25	11.43	12.44	14.46	19.89	45.24	46.14	45.19
Al_2O_3	2.40	2.21	2.19	2.10	1.68	0.24	0.18	0.24
Cr_2O_3	0.03	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Fe_2O_3	42.52	41.34	40.23	35.91	24.63	8.18	7.56	8.38
FeO	38.77	38.39	39.74	41.26	45.21	36.77	37.64	36.79
MnO	0.88	0.84	0.69	0.95	0.98	0.84	0.93	1.02
MgO	2.18	2.20	2.41	2.34	2.85	4.36	4.17	4.08
SiO_2	0.05	0.03	0.05	0.10	0.07	0.00	0.01	0.04
Total	98.07	96.43	97.75	97.14	95.30	95.62	96.63	95.73

Sample	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	5	6	7	8	9	10	11	12
TiO_2	11.22	10.48	10.38	10.72	10.84	11.97	10.63	12.16
Al_2O_3	2.41	2.58	2.43	2.52	2.37	2.34	2.38	2.42
Cr_2O_3	0.00	0.00	0.07	0.03	0.00	0.09	0.00	0.00
Fe_2O_3	41.24	42.12	42.13	41.01	41.60	40.99	41.33	40.97
FeO	38.07	37.27	37.36	37.30	37.69	39.45	37.34	39.63
MnO	0.92	0.71	0.67	0.69	0.73	0.91	0.80	0.89
MgO	2.54	2.44	2.36	2.59	2.40	2.43	2.30	2.35
SiO_2	0.15	0.04	0.14	0.12	0.10	0.18	0.16	0.07
Total	96.54	95.64	95.53	94.97	95.73	98.35	94.95	98.49

Sample	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	13	14	15	16	17	18	19	20
TiO_2	11.46	11.57	12.09	11.22	11.19	10.75	11.90	11.58
Al_2O_3	2.31	2.32	2.28	2.04	2.26	2.18	2.21	2.30
Cr_2O_3	0.00	0.01	0.05	0.00	0.00	0.09	0.02	0.00
Fe_2O_3	41.17	40.62	40.12	41.77	42.07	41.99	40.85	40.56
FeO	38.33	38.70	39.13	38.24	38.28	37.46	39.22	38.55
MnO	0.93	0.79	0.99	0.86	0.96	0.78	0.80	0.71
MgO	2.35	2.31	2.11	2.19	2.29	2.24	2.36	2.28
SiO_2	0.07	0.17	0.08	0.10	0.09	0.01	0.14	0.08
Total	96.63	96.49	96.85	96.42	97.13	95.50	97.49	96.06

Sample	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	21	22	23	24	1	2	3	4
TiO_2	11.74	11.32	12.72	13.24	45.70	44.61	45.03	46.51
Al_2O_3	2.31	2.30	2.24	2.39	0.18	0.17	0.19	0.18
Cr_2O_3	0.02	0.04	0.00	0.00	0.00	0.00	0.00	0.06
Fe_2O_3	41.81	40.53	38.78	38.82	8.26	8.71	8.02	7.43
FeO	39.35	38.20	39.55	39.45	37.09	36.21	36.18	37.84
MnO	0.79	0.70	0.86	0.64	0.98	0.96	1.29	1.09
MgO	2.30	2.20	2.34	2.39	4.30	4.18	4.34	4.15
SiO_2	0.08	0.09	0.06	0.04	0.01	0.00	0.04	0.02
Total	98.41	95.38	96.56	96.98	96.52	94.84	95.09	97.27

Sample	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	5	6	7	8	9	10	11	12
TiO_2	45.91	44.19	48.23	47.29	46.14	44.69	45.16	46.59
Al_2O_3	0.16	0.17	0.22	0.16	0.24	0.17	0.20	0.15
Cr_2O_3	0.00	0.00	0.13	0.07	0.00	0.00	0.12	0.03
Fe_2O_3	7.07	9.15	6.08	4.50	6.83	8.89	8.39	5.31
FeO	37.30	35.68	39.62	38.86	37.66	35.97	36.64	38.07
MnO	1.10	1.12	1.05	1.00	1.06	1.32	1.02	1.01
MgO	4.17	4.21	3.94	3.83	4.04	4.10	4.19	4.04
SiO_2	0.04	0.02	0.06	0.02	0.07	0.00	0.00	0.03
Total	95.75	94.55	99.33	95.74	96.04	95.14	95.71	95.23

Sample	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	71-P2T-D	18-P2B-F
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	13	14	15	16	17	18	19	1
TiO_2	47.97	47.04	45.88	45.69	44.70	45.90	44.82	10.09
Al_2O_3	0.21	0.18	0.29	0.22	0.22	0.20	0.27	3.41
Cr_2O_3	0.10	0.08	0.08	0.00	0.08	0.00	0.05	0.18
Fe_2O_3	6.15	7.57	8.90	8.37	9.33	8.06	8.81	43.92
FeO	39.26	38.38	37.08	37.54	36.31	37.56	36.99	38.18
MnO	0.97	0.98	1.26	0.76	1.04	1.12	1.00	0.66
MgO	4.15	4.17	4.15	4.06	4.14	3.96	3.98	2.50
SiO_2	0.02	0.00	0.02	0.06	0.06	0.17	0.41	0.09
Total	98.84	98.39	97.65	96.69	95.87	96.97	96.33	99.03

Sample	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	2	3	4	5	6	1	2	3
TiO_2	9.07	12.19	12.77	12.56	10.31	10.48	8.32	9.47
Al_2O_3	3.59	4.33	4.42	4.33	3.83	2.24	4.81	3.85
Cr_2O_3	0.05	0.30	0.13	0.13	0.25	0.02	0.00	0.00
Fe_2O_3	43.10	39.40	37.50	38.40	41.23	45.44	41.91	43.76
FeO	36.52	39.98	40.15	40.03	37.40	38.40	38.73	37.14
MnO	0.53	0.53	0.27	0.58	0.68	1.38	0.48	0.42
MgO	2.71	3.44	3.95	3.74	2.74	1.80	2.81	2.88
SiO_2	0.30	0.04	0.08	0.11	0.04	0.08	1.67	0.07
Total	95.86	100.21	99.26	99.87	96.48	99.84	98.73	97.58

Sample	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	4	5	6	7	1	2	3	4
TiO_2	8.37	9.88	9.58	9.46	9.00	9.34	9.03	9.76
Al_2O_3	3.73	3.80	3.74	3.89	3.41	3.78	3.77	3.79
Cr_2O_3	0.04	0.06	0.00	0.00	0.00	0.00	0.00	0.00
Fe_2O_3	45.10	44.96	45.17	46.96	44.67	45.59	44.55	45.68
FeO	36.00	38.05	37.45	38.24	36.58	37.30	36.49	38.43
MnO	0.36	0.70	0.57	0.58	0.52	0.58	0.54	0.52
MgO	2.74	2.93	3.09	3.18	3.08	3.07	2.85	3.00
SiO_2	0.13	0.05	0.00	0.08	0.24	0.03	0.04	0.12
Total	96.48	100.44	99.59	102.38	97.49	99.69	97.27	101.30

Sample	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	5	6	7	8	1	2	3	4
TiO_2	9.51	9.16	8.01	9.04	8.79	8.60	9.14	9.79
Al_2O_3	3.74	3.85	3.82	3.93	3.54	3.85	3.76	3.67
Cr_2O_3	0.00	0.00	0.00	0.00	0.02	0.00	0.04	0.00
Fe_2O_3	45.77	45.85	45.52	46.72	46.09	48.39	44.48	43.93
FeO	37.74	37.25	35.41	37.59	36.81	37.55	37.05	37.48
MnO	0.61	0.57	0.41	0.53	0.49	0.43	0.40	0.64
MgO	3.16	3.13	2.69	3.01	2.91	3.12	2.92	2.96
SiO_2	0.10	0.09	0.05	0.08	0.12	0.10	0.16	0.10
Total	100.62	99.89	95.91	100.92	98.76	102.04	97.94	98.57

Sample	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	5	6	7	8	9	10	1	2
TiO_2	9.62	9.73	8.78	9.65	8.34	9.61	8.81	8.58
Al_2O_3	3.77	3.71	3.56	3.75	3.69	3.68	3.71	3.90
Cr_2O_3	0.00	0.00	0.07	0.01	0.07	0.05	0.08	0.02
Fe_2O_3	46.70	44.94	46.73	44.98	47.09	45.88	45.68	45.65
FeO	38.31	38.01	37.09	37.85	36.33	38.27	36.70	36.54
MnO	0.70	0.40	0.55	0.55	0.57	0.51	0.45	0.59
MgO	3.07	2.96	2.61	2.84	2.97	2.75	2.79	2.76
SiO_2	0.08	0.07	0.05	0.06	0.08	0.08	0.04	0.14
Total	102.26	99.83	99.45	99.69	99.13	100.83	98.26	98.19

Sample	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	3	4	5	6	7	8	1	2
TiO_2	9.27	9.62	9.30	9.57	12.43	12.67	12.01	11.53
Al_2O_3	3.91	3.73	3.65	3.64	2.25	2.32	2.43	2.50
Cr_2O_3	0.00	0.00	0.04	0.00	0.00	0.20	0.00	0.00
Fe_2O_3	45.51	44.59	46.34	44.85	41.05	40.72	40.98	42.36
FeO	37.59	37.47	37.88	37.63	40.08	41.05	39.89	39.87
MnO	0.51	0.55	0.46	0.61	1.22	0.96	1.10	0.96
MgO	2.85	2.89	2.76	2.90	1.60	1.41	1.31	1.34
SiO_2	0.08	0.03	0.05	0.14	0.01	0.08	0.07	0.09
Total	99.71	98.87	100.48	99.35	98.63	99.41	97.79	98.65

Sample	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	3	4	5	6	1	2	3	4
TiO_2	11.90	12.51	11.85	11.40	8.68	9.21	9.57	9.35
Al_2O_3	2.34	2.46	2.30	2.45	3.58	3.63	3.90	3.62
Cr_2O_3	0.01	0.17	0.03	0.00	0.02	0.11	0.15	0.05
Fe_2O_3	44.12	41.48	42.25	43.03	45.05	45.09	44.42	45.81
FeO	41.02	41.15	40.42	39.66	36.02	36.96	37.64	37.38
MnO	1.14	0.87	0.82	1.08	0.61	0.42	0.44	0.56
MgO	1.25	1.42	1.39	1.54	2.81	3.02	2.92	3.06
SiO_2	0.06	0.02	0.11	0.10	0.08	0.02	0.06	0.05
Total	101.83	100.08	99.17	99.27	96.86	98.46	99.09	99.88

Sample	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	5	1	2	3	4	5	6	7
TiO_2	9.19	46.09	45.68	47.47	45.82	45.97	48.06	43.39
Al_2O_3	3.66	0.18	0.25	0.18	0.16	0.18	0.18	0.20
Cr_2O_3	0.12	0.00	0.00	0.00	0.05	0.15	0.07	0.06
Fe_2O_3	46.18	10.05	10.15	8.75	10.73	9.60	7.94	11.50
FeO	37.80	37.94	37.67	39.13	37.90	38.14	39.98	36.00
MnO	0.53	1.69	1.57	1.78	1.58	1.37	1.49	1.26
MgO	2.79	2.58	2.59	2.51	2.44	2.63	2.48	2.53
SiO_2	0.15	0.00	0.00	0.00	0.01	0.03	0.00	0.02
Total	100.42	98.53	97.91	99.81	98.68	98.07	100.20	94.97

Sample	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	8	9	10	11	12	13	1	2
TiO_2	47.75	47.20	45.58	47.01	46.63	47.19	48.04	46.02
Al_2O_3	0.19	0.10	0.24	0.15	0.22	0.19	0.25	0.19
Cr_2O_3	0.02	0.09	0.01	0.00	0.05	0.00	0.00	0.05
Fe_2O_3	7.16	8.28	11.17	9.84	10.47	8.94	8.97	8.81
FeO	39.91	39.12	37.52	38.96	38.80	39.32	39.70	38.40
MnO	1.29	1.54	1.65	1.49	1.34	1.47	1.61	1.29
MgO	2.50	2.57	2.58	2.58	2.58	2.43	2.74	2.47
SiO_2	0.03	0.03	0.01	0.00	0.03	0.06	0.04	0.04
Total	98.85	98.93	98.76	100.04	100.11	99.62	101.35	97.25

Sample	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	3	4	5	6	7	8	9	1
TiO_2	44.48	45.71	46.95	47.05	44.58	46.60	45.94	46.66
Al_2O_3	0.17	0.19	0.22	0.12	0.60	0.13	0.20	0.17
Cr_2O_3	0.00	0.00	0.00	0.02	0.00	0.06	0.14	0.00
Fe_2O_3	12.16	10.21	9.88	8.82	7.84	9.37	10.50	8.89
FeO	36.39	37.97	38.76	39.11	39.18	38.83	38.24	38.64
MnO	1.85	1.40	1.57	1.45	1.46	1.34	1.28	1.58
MgO	2.48	2.46	2.67	2.49	2.41	2.45	2.53	2.49
SiO_2	0.00	0.00	0.00	0.01	1.88	0.00	0.00	0.02
Total	97.54	97.93	100.05	99.08	97.94	98.79	98.83	98.44

Sample	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	2	3	4	5	6	7	8	9
TiO_2	45.45	46.88	46.87	46.60	47.85	45.88	46.83	47.47
Al_2O_3	0.19	0.19	0.19	0.18	0.16	0.17	0.19	0.17
Cr_2O_3	0.16	0.13	0.02	0.04	0.08	0.05	0.13	0.00
Fe_2O_3	10.45	9.12	9.34	12.22	8.56	8.27	7.87	9.07
FeO	37.77	38.95	38.71	38.27	39.71	37.46	38.44	39.00
MnO	1.36	1.36	1.58	1.70	1.50	1.36	1.19	1.33
MgO	2.53	2.60	2.63	2.72	2.57	3.45	3.52	3.35
SiO_2	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Total	97.96	99.23	99.33	101.73	100.44	96.64	98.16	100.39

Sample	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	10	11	12	13	14	15	16	1
TiO_2	49.70	45.01	48.16	46.02	46.85	45.78	44.95	44.96
Al_2O_3	0.13	0.18	0.17	0.20	0.21	0.19	0.19	0.16
Cr_2O_3	0.05	0.01	0.02	0.00	0.00	0.07	0.00	0.01
Fe_2O_3	4.35	9.97	8.11	8.95	9.39	8.81	10.35	9.29
FeO	41.13	37.07	39.67	37.69	38.45	37.71	36.87	37.18
MnO	1.33	1.15	1.28	1.39	1.36	1.19	1.28	1.06
MgO	3.15	3.28	3.27	3.32	3.28	3.24	3.23	3.19
SiO_2	0.00	0.05	0.00	0.04	0.00	0.01	0.01	0.05
Total	99.84	96.72	100.63	97.61	99.55	97.00	96.89	95.91

Sample	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	2	3	4	5	6	1	2	3
TiO_2	48.53	46.85	45.91	46.78	47.10	8.55	9.67	9.25
Al_2O_3	0.21	0.19	0.17	0.20	0.16	3.73	3.80	3.76
Cr_2O_3	0.00	0.13	0.09	0.12	0.07	0.02	0.09	0.00
Fe_2O_3	5.29	9.22	9.27	9.61	9.78	45.92	45.64	45.43
FeO	40.08	38.53	37.68	38.38	38.57	36.31	38.40	37.54
MnO	1.26	1.26	1.40	1.38	1.44	0.51	0.54	0.50
MgO	3.30	3.31	3.26	3.32	3.32	3.07	2.98	2.89
SiO_2	0.03	0.00	0.08	0.04	0.00	0.13	0.17	0.14
Total	98.70	99.49	97.85	99.83	100.45	98.24	101.29	99.51

Sample	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	4	5	6	7	8	1	2	3
TiO_2	9.25	9.75	10.11	9.20	9.18	11.60	11.96	12.98
Al_2O_3	3.83	3.93	3.77	3.80	3.74	2.30	2.40	2.28
Cr_2O_3	0.00	0.00	0.00	0.10	0.01	0.00	0.05	0.00
Fe_2O_3	46.25	42.40	44.88	44.85	45.93	41.60	42.72	37.65
FeO	37.58	38.62	38.64	37.27	37.78	39.52	40.79	40.22
MnO	0.60	0.48	0.68	0.44	0.45	1.00	1.04	1.05
MgO	3.04	2.95	2.92	3.03	2.94	1.64	1.41	1.27
SiO_2	0.08	0.75	0.15	0.16	0.20	0.21	0.16	0.12
Total	100.63	98.87	101.15	98.85	100.24	97.86	100.52	95.58

Sample	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F	18-P2B-F
Rock Type	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite	Jala dacite
Line Number	4	5	6	7	8	9	10
TiO_2	11.33	12.49	8.81	8.85	8.66	9.39	8.33
Al_2O_3	2.34	2.43	3.61	3.74	3.92	3.73	3.75
Cr_2O_3	0.00	0.01	0.09	0.07	0.00	0.04	0.00
Fe_2O_3	42.30	42.12	45.81	44.58	47.58	45.58	47.12
FeO	39.17	41.33	37.00	36.35	37.45	37.78	36.64
MnO	1.19	1.03	0.27	0.50	0.48	0.47	0.43
MgO	1.44	1.69	2.86	2.91	2.96	2.94	2.96
SiO_2	0.14	0.18	0.14	0.10	0.11	0.12	0.14
Total	97.91	101.28	98.67	97.10	101.17	100.05	99.38

APPENDIX H1

Matrix glass analyses: Mt. Dutton volcano, Alaska

Matrix glass analyses were obtained using a Cameca SX-50 electron microprobe at the University of Alaska Fairbanks, under the following analytical conditions: an accelerating voltage of 15 KeV, beam current of 10 nA, and a defocused beam with a diameter of 10 μm. In addition, a self-calibrating volatile acquisition method was used to correct for the possible degradation of volatile element x-ray intensity (particularly Na) over time, following the methods of Devine et al. (1995). Major oxides are reported in weight percent (wt.%) with all analyses normalized to 100% anhydrous and total Fe reported as FeO. "Line number" refers to the analysis number during a particular analytical transect. "Rock type" refers to the host rock, which contained the matrix glass that was analyzed. Abbreviations as follows: **CC** - Coarse-crystalline; **Q** quenched; **Encl** - enclave. Standards, counting times, and analytical errors are summarized in the table below:

Element	Counting Times (seconds)		Standard	Typical Analytical Error (wt.%, 1σ)
	Peak	Bkgd.		
Si	30	15	Rhyolitic Glass (USNM 72854 VG-568)	.143
Ti	15	7.5	Ilmenite (USNM 96189)	.022
Al	10	5	Scapolite (USNM R6600-1)	.058
Fe	15	7.5	Ilmenite (USNM 96189)	.074
Mn	10	5	Ilmenite (USNM 96189)	.010
Mg	10	5	Basaltic Glass (USNM 113716)	.013
Ca	10	5	Apatite (USNM 104021)	.020
Na	10	5	Scapolite (USNM R6600-1)	.070
K	10	5	Orthoclase (CM Taylor)	.079
F	10	5	Fluorite (CM Taylor)	.030
P	10	5	Apatite (USNM 104021)	.023
Cl	10	5	Scapolite (USNM R6600-1)	.012

Sample	DC-3	DC-3	DC-3	DC-3	DC-3	DC-3	DC-3	DC-3
Rock type	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl
Line number	1	2	3	4	5	6	7	8
SiO2	77.67	78.30	78.40	78.27	78.12	77.96	77.18	77.11
Al2O3	10.72	10.84	10.99	10.99	11.01	11.06	10.98	11.12
TiO2	0.08	0.19	0.19	0.22	0.23	0.23	0.23	0.24
FeO	1.10	1.19	1.19	1.35	1.35	1.39	1.40	1.42
MnO	0.01	0.21	0.09	0.06	0.20	0.00	0.14	0.00
MgO	0.03	0.03	0.04	0.06	0.06	0.07	0.07	0.08
CaO	0.33	0.34	0.36	0.40	0.40	0.42	0.41	0.44
Na2O	3.46	3.54	3.59	3.60	3.66	3.62	3.63	3.64
K2O	5.16	5.19	4.97	4.86	4.84	4.80	4.76	4.66
P2O5	1.21	0.00	0.00	0.00	0.96	0.25	1.01	1.02
Cl	0.15	0.16	0.17	0.19	0.19	0.19	0.19	0.19
F	0.07	0.00	0.00	0.00	0.00	0.06	0.00	0.07
Orig. Total	99.70	98.71	98.48	98.54	98.64	98.63	99.50	99.42

Sample	DC-3	DC-3	DC-3	DC-3	DC-3	DC-3	DC-3	DC-3
Rock type	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl
Line number	1	2	3	4	5	6	7	8
SiO2	77.47	76.45	76.93	76.61	75.32	74.88	75.07	75.46
Al2O3	11.53	11.64	12.04	12.07	12.31	12.35	12.51	12.70
TiO2	0.25	0.25	0.25	0.26	0.51	0.53	0.28	0.30
FeO	1.48	1.47	1.52	1.59	2.05	2.18	1.61	1.64
MnO	0.00	0.09	0.04	0.17	0.09	0.09	0.01	0.00
MgO	0.08	0.08	0.08	0.09	0.20	0.26	0.10	0.11
CaO	0.44	0.45	0.48	0.51	0.76	0.81	0.52	0.54
Na2O	3.70	3.70	3.76	3.81	3.79	3.81	3.88	3.94
K2O	4.71	4.64	4.69	4.68	4.56	4.53	4.53	4.55
P2O5	0.00	1.04	0.00	0.00	0.00	0.19	1.05	0.53
Cl	0.20	0.21	0.21	0.22	0.34	0.36	0.23	0.24
F	0.15	0.00	0.00	0.00	0.05	0.00	0.22	0.09
Orig. Total	98.50	99.28	98.02	97.86	99.36	99.63	99.07	98.44

Sample	DC-3	DC-3	DC-3	DC-3	DC-3	DC-3	DC-3	DC-3
Rock type	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl
Line number	1	2	3	4	5	6	7	8
SiO2	75.01	74.97	74.69	75.48	74.36	75.29	74.00	75.13
Al2O3	12.68	12.78	12.88	13.04	12.85	12.91	12.73	12.99
TiO2	0.31	0.32	0.32	0.34	0.36	0.36	0.36	0.37
FeO	1.64	1.66	1.68	1.71	1.72	1.75	1.73	1.78
MnO	0.05	0.10	0.00	0.03	0.00	0.05	0.03	0.08
MgO	0.11	0.11	0.12	0.12	0.12	0.13	0.13	0.14
CaO	0.55	0.55	0.55	0.56	0.57	0.59	0.59	0.61
Na2O	3.93	3.94	3.94	3.99	3.95	4.04	3.99	4.05
K2O	4.50	4.50	4.46	4.49	4.38	4.43	4.26	4.31
P2O5	0.79	0.78	1.03	0.00	1.28	0.00	1.78	0.00
Cl	0.24	0.24	0.24	0.25	0.26	0.26	0.26	0.27
F	0.18	0.04	0.00	0.00	0.14	0.18	0.14	0.29
Orig. Total	98.88	99.00	99.26	98.31	99.70	98.34	100.21	98.78

Sample	DC-3	DC-3	DC-3	DC-3	DC-3	DC-3	DC-3	DC-3
Rock type	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl
Line number	1	2	3	4	5	6	7	8
SiO2	75.36	75.18	75.24	74.25	75.20	74.19	75.09	75.17
Al2O3	12.95	12.98	12.91	12.75	12.98	12.68	12.90	12.92
TiO2	0.41	0.43	0.43	0.44	0.44	0.61	0.44	0.44
FeO	1.84	1.86	1.87	1.85	1.89	2.20	1.89	1.90
MnO	0.06	0.12	0.09	0.10	0.00	0.08	0.00	0.00
MgO	0.15	0.16	0.16	0.16	0.17	0.26	0.17	0.17
CaO	0.63	0.63	0.64	0.64	0.66	0.82	0.66	0.67
Na2O	4.07	4.07	4.08	4.03	4.14	4.21	4.27	4.28
K2O	4.32	4.29	4.29	4.21	4.23	4.17	4.18	4.16
P2O5	0.00	0.00	0.00	0.96	0.00	0.39	0.00	0.00
Cl	0.28	0.28	0.28	0.28	0.29	0.39	0.29	0.29
F	0.00	0.00	0.00	0.31	0.00	0.00	0.11	0.00
Orig. Total	98.54	98.64	98.58	99.90	98.51	99.88	98.78	98.71

Sample	DC-3	DC-3	DC-3	DC-3	DC-3	DC-3	DC-3	DC-3
Rock type	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl
Line number	1	2	3	4	5	6	7	8
SiO2	75.12	74.65	74.69	73.51	74.93	74.74	74.60	74.27
Al2O3	12.90	12.79	12.87	12.74	12.88	12.91	12.84	12.73
TiO2	0.45	0.47	0.49	0.48	0.50	0.51	0.51	0.52
FeO	1.91	1.96	2.03	2.02	2.05	2.06	2.06	2.08
MnO	0.04	0.11	0.14	0.01	0.00	0.07	0.03	0.04
MgO	0.18	0.19	0.19	0.19	0.20	0.20	0.21	0.21
CaO	0.67	0.71	0.73	0.72	0.74	0.77	0.77	0.78
Na2O	4.30	4.28	4.29	4.22	4.30	4.30	4.63	4.72
K2O	4.14	4.12	4.09	4.01	4.06	4.05	4.01	3.99
P2O5	0.00	0.00	0.00	1.53	0.00	0.00	0.00	0.00
Cl	0.29	0.31	0.32	0.32	0.34	0.35	0.35	0.35
F	0.00	0.42	0.16	0.26	0.00	0.05	0.00	0.31
Orig. Total	98.75	99.19	99.12	100.81	99.01	99.23	99.35	99.67

Sample	DC-3C-1	DC-3C-1	DC-3C-1	DC-3C-1	DC-3C-1	DC-3C-1	DC-3C-1	DC-3C-1
Rock type	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl
Line number	1	2	3	4	5	6	7	8
SiO2	76.58	75.92	77.01	76.57	77.45	77.65	75.37	75.35
Al2O3	12.99	13.05	12.92	12.80	12.56	12.36	13.44	13.38
TiO2	0.34	0.30	0.18	0.32	0.18	0.29	0.17	0.34
FeO	2.15	2.08	1.89	2.23	1.99	1.73	2.01	2.03
MnO								
MgO	0.13	0.14	0.10	0.14	0.10	0.13	0.11	0.13
CaO	0.76	0.76	0.71	0.70	0.61	0.62	0.85	0.76
Na2O	2.67	3.40	3.14	2.99	2.81	2.95	3.78	3.71
K2O	4.09	3.97	3.82	3.97	4.13	4.02	4.05	4.02
P2O5								
Cl	0.29	0.29	0.23	0.27	0.20	0.27	0.21	0.28
F								
Orig. Total	99.84	99.23	98.48	99.91	98.05	97.92	98.30	99.63

Sample	DC-3C-1	DC-3C-1	DC-3C-1	DC-3C-1	DC-3C-1	DC-3C-1	DC-3C-1	DC-3C-1
Rock type	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl
Line number	9	10	11	12	13	14	15	AVG
SiO2	74.65	76.68	78.04	76.23	76.28	75.59	77.77	76.50
Al2O3	13.65	12.64	11.89	13.08	12.57	12.93	12.43	12.85
TiO2	0.20	0.26	0.32	0.41	0.21	0.30	0.20	0.27
FeO	2.22	2.14	1.65	1.94	2.53	2.52	1.94	2.07
MnO								
MgO	0.19	0.11	0.11	0.16	0.31	0.27	0.16	0.15
CaO	0.79	0.66	0.67	0.67	0.81	0.93	0.66	0.73
Na2O	3.86	3.44	3.14	3.25	3.07	3.39	2.77	3.19
K2O	4.16	3.69	3.89	4.01	3.84	3.74	3.81	3.95
P2O5								
Cl	0.27	0.39	0.28	0.26	0.40	0.34	0.26	0.28
F								
Orig. Total	98.97	97.61	98.95	99.03	98.16	99.45	98.52	98.76

Sample	DC-3M-1	DC-3M-1	DC-3M-1	DC-3M-1	DC-3M-1	DC-3M-1	DC-3M-1	DC-3M-1
Rock type	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl
Line number	1	2	3	4	5	6	7	8
SiO2	77.13	77.14	77.79	77.59	76.60	76.97	77.75	77.53
Al2O3	12.88	13.00	12.23	12.06	12.96	12.54	12.24	12.38
TiO2	0.24	0.05	0.31	0.22	0.21	0.21	0.31	0.33
FeO	1.87	1.83	1.89	2.13	1.75	2.01	1.89	1.87
MnO								
MgO	0.16	0.12	0.10	0.15	0.14	0.10	0.09	0.13
CaO	0.57	0.49	0.52	0.54	0.68	0.67	0.56	0.52
Na2O	2.66	3.02	2.86	3.01	3.36	3.36	2.87	2.99
K2O	4.21	4.07	4.05	4.08	4.08	3.96	4.03	4.01
P2O5								
Cl	0.28	0.27	0.25	0.21	0.22	0.24	0.27	0.24
F								
Orig. Total	98.40	99.11	99.13	98.46	98.14	98.52	98.95	98.19

Sample	DC-3M-1	DC-3M-1	DC-3M-1	DC-3M-1	DC-3M-1	DC-3M-1	DC-3M-1	DC-3M-1
Rock type	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl
Line number	9	10	11	12	13	14	15	AVG
SiO2	76.18	77.02	78.29	77.48	77.85	78.62	77.26	77.41
Al2O3	13.04	12.17	12.10	12.61	12.03	12.00	13.07	12.49
TiO2	0.19	0.48	0.26	0.21	0.07	0.24	0.31	0.24
FeO	2.38	2.04	1.61	1.87	2.19	1.93	2.09	1.96
MnO	-		-	-	-	-	-	-
MgO	0.17	0.21	0.11	0.09	0.08	0.12	0.14	0.13
CaO	0.69	0.70	0.51	0.45	0.44	0.44	0.66	0.56
Na2O	3.01	3.14	2.74	3.07	3.04	2.54	2.27	2.93
K2O	4.06	4.00	4.19	4.03	4.10	3.92	3.92	4.04
P2O5	-		-	-	-	-		
Cl	0.27	0.23	0.20	0.20	0.21	0.19	0.27	0.24
F	-		-	-	-	-	-	
Orig. Total	98.20	98.85	99.00	98.90	99.69	98.02	98.59	98.68

Sample	DC-3R-1	DC-3R-1	DC-3R-1	DC-3R-1	DC-3R-1	DC-3R-1	DC-3R-1	DC-3R-1
Rock type	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl
Line number	1	2	3	4	5	6	7	8
SiO2	77.80	77.97	77.99	78.10	76.97	77.06	76.77	77.10
Al2O3	12.31	11.65	11.75	11.86	12.09	12.35	12.53	12.45
TiO2	0.22	0.28	0.29	0.45	0.27	0.12	0.34	0.15
FeO	1.89	1.86	1.73	1.82	1.88	2.04	2.08	1.89
MnO				-	-	-		
MgO	0.11	0.11	0.11	0.08	0.15	0.13	0.13	0.10
CaO	0.68	0.56	0.50	0.55	0.60	0.54	0.49	0.58
Na2O	2.63	3.02	2.97	2.64	3.14	2.99	2.94	3.00
K2O	4.36	4.42	4.43	4.25	4.65	4.45	4.43	4.46
P2O5						-		-
Cl	0.29	0.15	0.22	0.25	0.25	0.30	0.28	0.26
F	-			-			-	
Orig. Total	98.88	99.52	99.18	98.48	98.99	99.38	98.36	98.13

Sample	DC-3R-1	DC-3R-1	DC-3R-1	DC-3R-1	DC-3R-1	DC-3R-1	DC-3R-1	DC-3R-1
Rock type	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl
Line number	9	10	11	12	13	14	15	AVG
SiO2	76.87	77.18	78.24	77.65	76.26	77.24	77.04	77.38
Al2O3	12.68	12.38	12.63	12.18	12.51	12.12	12.88	12.28
TiO2	0.43	0.27	0.30	0.33	0.17	0.27	0.22	0.28
FeO	2.30	1.77	1.55	1.78	2.41	1.95	1.96	1.93
MnO				-	-			
MgO	0.07	0.08	0.11	0.14	0.14	0.11	0.09	0.11
CaO	0.71	0.70	0.53	0.47	0.60	0.63	0.63	0.58
Na2O	2.80	2.91	2.91	3.00	3.27	3.00	2.44	2.86
K2O	4.28	4.53	4.38	4.19	4.42	4.49	4.54	4.41
P2O5				-	-		-	
Cl	0.19	0.18	0.25	0.26	0.23	0.19	0.22	0.24
F	-		-	-	-		-	
Orig. Total	98.70	98.83	97.28	98.28	98.88	99.64	98.75	98.75

Sample	DC-4A	DC-4A	DC-4A	DC-4A	DC-4A	DC-4A	DC-4A	DC-4A
Rock type	Q Encl	Q Encl	Q Encl	Q Encl	Q Encl	Q Encl	Q Encl	Q Encl
Line number	1	2	3	4	5	6	7	8
SiO2	74.84	74.40	76.23	74.79	75.92	73.55	74.77	74.18
Al2O3	12.24	12.11	11.26	12.15	11.55	14.03	12.82	13.68
TiO2	0.46	0.48	0.13	0.29	0.38	0.42	0.34	0.37
FeO	2.73	3.16	2.90	3.19	3.26	2.77	2.69	2.80
MnO	-	-	-	-	-	-	-	-
MgO	0.28	0.44	0.45	0.33	0.38	0.37	0.26	0.35
CaO	1.37	1.88	1.28	1.89	1.98	1.74	1.52	1.40
Na2O	3.21	4.96	4.90	5.28	5.12	4.76	4.98	5.01
K2O	4.54	2.20	2.40	1.71	1.09	2.10	2.25	1.89
P2O5	-	-	-	-	-	-	-	-
Cl	0.33	0.37	0.45	0.33	0.32	0.26	0.38	0.33
F	-	-	-	-	-	-	-	-
Orig. Total	98.28	97.87	97.20	97.48	98.16	100.64	99.51	100.48

Sample	DC-4A	DC-4A	DC-4A	DC-4A	DC-4A	DC-4B	DC-4B	DC-4B
Rock type	Q Encl	Q Encl	Q Encl	Q Encl	Q Encl	Q Encl	Q Encl	Q Encl
Line number	9	10	11	12	13	1	2	3
SiO2	74.44	73.90	73.43	73.50	72.96	77.54	74.33	74.56
Al2O3	13.20	13.22	14.23	13.57	14.60	11.73	13.91	12.85
TiO2	0.23	0.30	0.28	0.21	0.32	0.27	0.30	0.37
FeO	3.02	2.90	2.81	2.98	2.84	2.32	2.59	2.87
MnO	-	-	-	-	-	-	-	-
MgO	0.44	0.30	0.26	0.33	0.32	0.17	0.22	0.22
CaO	1.38	1.60	1.50	1.81	1.65	0.97	1.16	1.20
Na2O	5.13	5.04	4.90	5.04	4.96	3.12	3.62	3.72
K2O	1.68	2.27	2.15	2.12	2.01	3.78	3.61	3.90
P2O5		-	-	-	-	-	-	-
Cl	0.47	0.47	0.45	0.43	0.35	0.12	0.27	0.31
F	-	-	-		-	-	-	-
Orig. Total	100.71	99.58	100.72	99.02	99.62	98.87	100.16	99.62

Sample	DC-4B	DC-4B	DC-4B	DC-4B	DC-4B	DC-4B	DC-4B	DC-4B
Rock type	Q Encl	Q Encl	Q Encl	Q Encl	Q Encl	Q Encl	Q Encl	Q Encl
Line number	4	5	6	7	8	9	10	11
SiO2	75.34	75.29	75.52	75.78	75.30	76.43	74.78	73.77
Al2O3	12.70	12.27	12.44	11.98	12.23	12.06	13.53	13.29
TiO2	0.34	0.29	0.41	0.35	0.44	0.16	0.30	0.23
FeO	2.23	2.84	2.92	3.07	3.05	2.54	2.72	3.14
MnO	-	-		-	-	-		-
MgO	0.30	0.21	0.12	0.15	0.14	0.26	0.10	0.50
CaO	1.11	1.23	1.35	1.19	1.23	1.20	1.16	1.46
Na2O	3.83	3.62	3.46	3.53	3.59	3.50	3.44	3.58
K2O	3.77	3.96	3.63	3.77	3.81	3.63	3.79	3.67
P2O5	-		-	-	-	-	-	
Cl	0.39	0.29	0.16	0.18	0.20	0.23	0.18	0.35
F	-			-	-	-		
Orig. Total	99.30	98.34	98.69	99.19	99.15	98.87	99.73	99.43

Sample	DC-4B	DC-4B	DC-4B	DC-21	DC-21	DC-21	DC-21	DC-21
Rock type	Q Encl	Q Encl	Q Encl	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl
Line number	12	13	14	1	2	3	4	5
SiO2	74.47	75.48	74.28	79.67	78.83	77.30	77.46	77.72
Al2O3	13.68	12.14	12.24	9.95	10.19	11.33	11.33	11.20
TiO2	0.33	0.09	0.30	0.32	0.52	0.52	0.46	0.26
FeO	2.87	3.21	3.10	1.33	1.86	1.69	1.89	1.79
MnO		-		-	-			
MgO	0.34	0.49	0.52	0.10	0.11	0.08	0.12	0.06
CaO	0.89	1.86	2.12	0.46	0.53	0.52	0.56	0.52
Na2O	3.39	5.54	5.25	3.50	3.34	3.85	3.10	3.60
K2O	3.73	0.84	1.76	4.47	4.32	4.44	4.30	4.60
P2O5	-	-		-	-	-	-	
Cl	0.29	0.35	0.43	0.19	0.31	0.27	0.27	0.24
F	-	-	-	-	-	-	-	
Orig. Total	100.02	98.50	98.06	95.66	96.68	97.11	96.37	96.02

Sample	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21
Rock type	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl
Line number	6	7	8	9	10	11	12	13
SiO2	76.68	76.10	75.98	77.51	77.66	79.07	77.68	77.92
Al2O3	12.64	13.26	13.46	11.76	12.12	10.79	11.25	11.80
TiO2	0.43	0.35	0.31	0.41	0.50	0.61	0.30	0.16
FeO	1.96	1.79	1.60	1.74	1.72	1.57	1.83	1.62
MnO	-	-	-	-	-	-	-	-
MgO	0.12	0.10	0.12	0.13	0.06	0.06	0.14	0.04
CaO	0.54	0.38	0.42	0.41	0.28	0.36	0.48	0.39
Na2O	3.05	3.49	3.60	3.34	3.22	3.27	3.58	3.47
K2O	4.26	4.27	4.20	4.46	4.29	4.07	4.51	4.28
P2O5	-	-	-	-	-	-	-	-
Cl	0.32	0.27	0.30	0.25	0.23	0.20	0.23	0.31
F	-	-	-	-	-	-		-
Orig. Total	98.59	99.99	100.06	99.54	99.91	98.61	97.51	97.98

Sample	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21
Rock type	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl
Line number	14	15	16	17	18	19	20	21
SiO_2	78.77	78.33	77.73	77.07	78.24	79.34	77.42	75.91
Al_2O_3	10.70	11.39	12.00	12.77	11.50	10.23	12.39	13.75
TiO_2	0.45	0.25	0.20	0.40	0.47	0.55	0.33	0.36
FeO	1.80	1.71	1.75	1.68	1.55	1.41	1.57	1.68
MnO	-	-	-	-	-	-	-	-
MgO	0.09	0.12	0.08	0.08	0.13	0.09	0.17	0.16
CaO	0.47	0.35	0.42	0.44	0.39	0.47	0.41	0.45
Na_2O	3.35	3.29	3.55	3.23	3.23	3.56	3.24	3.44
K_2O	4.19	4.34	4.10	4.09	4.26	4.12	4.18	3.99
P_2O_5	-	-	-	-	-	-	-	-
Cl	0.19	0.20	0.18	0.25	0.23	0.24	0.30	0.26
F	-	-	-	-	-	-	-	-
Orig. Total	98.29	98.46	99.11	100.51	99.15	95.48	99.22	100.86

Sample	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21
Rock type	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl
Line number	22	23	24	25	26	27	28	29
SiO_2	77.16	78.33	75.85	77.61	77.36	76.95	76.96	77.42
Al_2O_3	12.39	11.42	14.01	11.84	12.43	12.55	12.47	11.84
TiO_2	0.33	0.23	0.42	0.31	0.19	0.27	0.39	0.26
FeO	1.83	1.61	1.25	1.35	1.44	1.67	1.66	1.66
MnO	-	-	-	-	-	-	-	-
MgO	0.17	0.16	0.11	0.12	0.10	0.13	0.16	0.15
CaO	0.46	0.38	0.47	0.45	0.43	0.48	0.47	0.50
Na_2O	3.46	3.34	3.46	3.74	3.38	3.45	3.52	3.62
K_2O	3.97	4.23	4.18	4.37	4.41	4.23	4.16	4.29
P_2O_5	-	-	-	-	-	-	-	-
Cl	0.22	0.29	0.28	0.22	0.25	0.27	0.20	0.26
F	-	-	-	-	-	-	-	-
Orig. Total	99.52	99.00	100.62	98.61	100.52	98.94	98.98	97.97

Sample	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21	DC-21
Rock type	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl
Line number	30	31	32	33	34	35	36	37
SiO_2	76.05	77.17	77.68	77.90	77.74	77.64	78.47	78.91
Al_2O_3	13.43	12.02	12.07	12.01	11.46	11.39	11.06	10.49
TiO_2	0.40	0.25	0.40	0.08	0.29	0.41	0.29	0.35
FeO	1.49	1.67	1.76	1.63	1.72	1.76	1.66	1.52
MnO	-	-	-	-	-	-	-	-
MgO	0.16	0.17	0.10	0.09	0.12	0.15	0.11	0.13
CaO	0.48	0.57	0.41	0.46	0.52	0.44	0.54	0.56
Na_2O	3.50	3.59	3.19	3.30	3.42	3.64	3.43	3.57
K_2O	4.29	4.33	4.15	4.29	4.45	4.34	4.22	4.16
P_2O_5	-	-	-	-	-	-	-	-
Cl	0.19	0.24	0.24	0.23	0.28	0.24	0.23	0.30
F	-	-	-	-	-	-	-	-
Orig. Total	100.87	99.17	100.96	100.13	99.94	99.33	98.78	98.83

Sample	DC-21	DC-21	DC-21	DC-21	DC-21
Rock type	CC Encl	CC Encl	CC Encl	CC Encl	CC Encl
Line number	38	39	40	41	42
SiO_2	77.37	77.60	78.18	77.59	77.15
Al_2O_3	11.36	11.96	11.09	11.45	12.42
TiO_2	0.33	0.43	0.31	0.46	0.19
FeO	1.94	1.60	1.61	1.62	1.66
MnO	-	-	-	-	-
MgO	0.14	0.03	0.17	0.18	0.11
CaO	0.51	0.40	0.46	0.47	0.46
Na_2O	3.65	3.35	3.49	3.60	3.50
K_2O	4.38	4.43	4.46	4.29	4.32
P_2O_5	-	-	-	-	-
Cl	0.31	0.21	0.22	0.35	0.19
F	-	-	-	-	-
Orig. Total	98.99	100.01	99.62	99.88	100.49

APPENDIX H2

Matrix glass analyses: Volcán Ceboruco, Mexico

Matrix glass analyses were obtained using a Cameca SX-50 electron microprobe at the University of Alaska Fairbanks or a Cameca Camebax electron microprobe at Brown University, under the following analytical conditions: an accelerating voltage of 15 KeV, beam current of 10 nA, and a defocused beam with a diameter of 10 μm. In addition, a self-calibrating volatile acquisition method was used to correct for the possible degradation of volatile element x-ray intensity (particularly Na) over time, following the methods of Devine et al. (1995). Major oxides are reported in weight percent (wt.%) with all analyses normalized to 100% anhydrous and total Fe reported as FeO. "Line number" refers to the analysis number during a particular analytical transect. "Rock type" refers to the host rock, which contained the matrix glass that was analyzed. Abbreviations as follows: **Rd** rhyodacite. Standards, counting times, and analytical errors are summarized in the table below:

Element	Counting Times (seconds)		Standard	Typical Analytical Error (wt.%, 1σ)
	Peak	Bkgd.		
Si	30	15	Rhyolitic Glass (USNM 72854 VG-568)	.205
Ti	15	7.5	Ilmenite (USNM 96189)	.041
Al	10	5	Rhyolitic Glass (USNM 72854 VG-568)	.093
Fe	15	7.5	Basaltic Glass (USNM 113498 1 VG-A99)	.077
Mn	10	5	Ilmenite (USNM 96189)	.024
Mg	10	5	Basaltic Glass (USNM 113716)	.011
Ca	10	5	Basaltic Glass (USNM 113716)	.020
Na	10	5	Rhyolitic Glass (USNM 72854 VG-568)	.038
K	10	5	Orthoclase (CM Taylor)	.050
F	10	5	Apatite (USNM 104021)	.035
P	10	5	Apatite (USNM 104021)	.054
Cl	10	5	Scapolite (USNM R6600-1)	.020

Sample	18-P1B-B	18-P1B-B	18-P1B-B	18-P1B-B	18-P1B-B	18-P1B-B	18-P1B-B	18-P1B-C
Rock type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line number	1	2	3	4	5	6	7	1
SiO_2	70.87	70.65	70.81	70.98	71.08	70.85	70.64	71.04
TiO_2	0.22	0.21	0.21	0.28	0.23	0.21	0.32	0.29
Al_2O_3	15.70	15.85	15.60	15.76	15.73	15.71	15.81	15.78
FeO	1.88	1.86	1.73	1.94	1.93	1.82	1.96	1.88
MnO	0.15	0.09	0.14	0.09	0.09	0.18	0.10	0.02
MgO	0.33	0.40	0.39	0.39	0.36	0.38	0.40	0.37
CaO	1.43	1.34	1.37	1.44	1.36	1.47	1.41	1.32
Na_2O	5.90	6.24	6.39	5.80	5.95	5.96	6.16	5.88
K_2O	3.51	3.36	3.35	3.30	3.26	3.41	3.20	3.43
Orig. Total	97.35	99.78	99.71	99.04	99.49	99.53	99.99	98.12

Sample	18-P1B-C	18-P1B-C	18-P1B-C	18-P1B-C	18-P1B-C	18-P1M-B	18-P1M-B	18-P1M-B
Rock type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line number	2	3	4	5	6	1	2	3
SiO_2	70.83	70.75	70.90	71.06	70.85	70.45	71.24	70.87
TiO_2	0.28	0.26	0.27	0.23	0.27	0.27	0.22	0.31
Al_2O_3	15.78	15.61	15.64	15.76	15.69	15.87	15.87	15.76
FeO	1.84	2.08	1.90	1.91	1.93	1.96	1.77	1.85
MnO	0.09	0.11	0.17	0.20	0.11	0.23	0.15	0.09
MgO	0.34	0.35	0.36	0.38	0.37	0.37	0.35	0.38
CaO	1.42	1.31	1.48	1.46	1.54	1.31	1.30	1.48
Na_2O	6.08	6.15	5.96	5.71	5.83	6.13	5.76	5.87
K_2O	3.32	3.37	3.33	3.29	3.40	3.41	3.34	3.39
Orig. Total	98.98	98.72	97.44	97.25	97.17	98.11	97.41	99.91

Sample	18-P1M-B	18-P1M-B	18-P1M-B	18-P1M-C	18-P1M-C	18-P1M-C	18-P1M-C	18-P1M-C
Rock type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line number	4	5	6	1	2	3	4	5
SiO_2	70.85	71.21	70.71	71.19	71.15	70.81	70.94	70.69
TiO_2	0.24	0.15	0.22	0.24	0.22	0.23	0.27	0.32
Al_2O_3	15.74	15.79	51.57	15.43	15.80	15.61	15.83	15.62
FeO	1.77	1.83	1.90	1.96	1.83	1.91	1.81	1.90
MnO	0.15	0.14	0.11	0.11	0.16	0.16	0.05	0.12
MgO	0.33	0.44	0.41	0.41	0.35	0.35	0.34	0.40
CaO	1.46	1.35	1.41	1.30	1.35	1.29	1.39	1.36
Na_2O	6.01	5.84	6.36	6.10	5.89	6.33	5.95	6.31
K_2O	3.45	3.23	3.31	3.25	3.25	3.31	3.42	3.26
Orig. Total	97.31	97.44	98.24	99.90	99.19	99.56	99.99	99.87

Sample	18-P1T-A	18-P1T-A	18-P1T-A	18-P1T-A	18-P1T-A	18-P1T-B	18-P1T-B	18-P1T-B
Rock type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line number	1	2	3	4	5	1	2	3
SiO_2	70.44	71.12	71.08	70.90	71.16	70.67	70.87	71.02
TiO_2	0.31	0.26	0.24	0.26	0.24	0.22	0.24	0.31
Al_2O_3	15.95	15.76	15.93	15.93	15.64	15.60	15.76	15.60
FeO	1.93	1.97	1.76	1.89	1.94	1.93	1.96	1.95
MnO	0.21	0.06	0.19	0.08	0.11	0.13	0.15	0.05
MgO	0.41	0.38	0.35	0.38	0.34	0.36	0.39	0.37
CaO	1.37	1.31	1.36	1.41	1.40	1.38	1.35	1.34
Na_2O	5.89	5.80	5.75	5.72	6.00	6.38	5.99	5.94
K_2O	3.49	3.35	3.33	3.42	3.16	3.32	3.30	3.41
Orig. Total	97.06	97.18	99.86	99.01	98.66	100.46	100.11	99.70

Sample	18-P1T-B	18-P1T-B	18-P1T-B	18-P1T-C	18-P1T-C	18-P1T-C	18-P1T-C	18-P1T-C
Rock type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line number	4	5	6	1	2	3	4	5
SiO_2	70.60	70.54	70.94	70.49	71.22	71.13	70.83	70.59
TiO_2	0.26	0.35	0.32	0.28	0.34	0.33	0.22	0.30
Al_2O_3	15.78	15.73	15.70	15.74	15.60	15.60	15.72	15.76
FeO	1.87	1.84	1.84	1.94	1.90	1.91	1.87	1.93
MnO	0.07	0.20	0.17	0.13	0.07	0.12	0.12	0.20
MgO	0.35	0.36	0.40	0.35	0.36	0.38	0.36	0.37
CaO	1.30	1.37	1.32	1.39	1.33	1.35	1.33	1.35
Na_2O	6.63	6.34	6.05	6.22	5.87	5.85	6.17	5.95
K_2O	3.13	3.26	3.25	3.45	3.31	3.33	3.37	3.54
Orig. Total	99.04	99.55	99.29	98.30	98.31	97.76	99.78	98.37

Sample	18-P1T-C	18-P1T-C	18-P1T-C	18-P1B-A	18-P1B-A	18-P1B-A	18-P1B-A	18-P1B-A
Rock type	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd	Jala Rd
Line number	6	7	8	3	4	6	7	8
SiO_2	70.99	71.04	70.94	70.87	70.66	70.38	69.93	70.77
TiO_2	0.27	0.17	0.20	0.25	0.26	0.34	0.25	0.27
Al_2O_3	15.62	15.65	15.77	15.70	15.51	15.56	16.03	15.85
FeO	1.84	1.90	1.95	1.88	1.90	2.16	2.36	2.06
MnO	0.14	0.12	0.12	0.12	0.13	0.15	0.07	0.12
MgO	0.39	0.34	0.38	0.34	0.30	0.36	0.38	0.37
CaO	1.40	1.32	1.38	1.45	1.41	1.41	1.40	1.39
Na_2O	5.89	6.13	6.01	3.16	6.43	6.27	6.22	5.81
K_2O	3.46	3.32	3.24	3.23	3.39	3.38	3.36	3.35
Orig. Total	97.84	97.94	99.86	98.24	98.48	100.76	98.49	98.45

APPENDIX I

Geochronological Data: Captain's Bay pluton and Unalaska Fm. volcanics

^{40}Ar-^{39}Ar dates for samples from the Captain's Bay pluton and Unalaska Formation volcanics were acquired using a VG-3600 mass spectrometer laser system in the Geochronology Laboratory at the University of Alaska Fairbanks. Prior to dating, all samples and standards were irradiated in a uranium-enriched reactor at McMaster University (Hamilton, Ontario, Canada). Standards and samples were heated using a 6-watt argon-ion laser, following the methods of York et al. (1981) and Layer et al. (1987). Ages for both whole-rock samples from the Unalaska Formation volcanics and amphibole separates from the Captain's Bay pluton were determined using a step-heating dating method. Each sample was heated in a series of steps from 150 mW to 8000 mW, with the number of steps (anywhere from nine to fourteen) chosen to reduce analytical error. Argon purification was accomplished using a liquid nitrogen trap and a SAES Zr-Al getter at 400°C. Following the procedures of McDougall and Harrison (1999), measured argon isotopes were corrected for system blank and mass discrimination, as well as Ca, K, and Cl interference reactions.

Appendix I

NOTES:

Weighted average J (irradiation parameter) calculated from standard MMhb-1 (513 9 Ma) or from Bern4B (17 25 Ma)

Runs are step heat analyses of ~10 single crystals of a mineral phase

Laser power (in milliwatts) is the heating step from a defocussed argon-ion laser 8700 mW represents the fusion step in most cases

Cumulative ^{39}Ar: the proportion of ^{39}Ar released in each step of a run

Plateau fractions denoted in **Bold**

Measured isotopic ratios (and 1-sigma error) are corrected for reactor induced interferences and decay of ^{37}Ar and ^{39}Ar

% Atm ^{40}Ar*: percent of atmospheric 40Ar in the sample assuming an initial ^{40}Ar/^{36}Ar ratio of 295 5

$^{40}Ar^{*}/^{39}Ar_{K}$ (40*/39K) and ages (and 1-sigma errors) calculated using the equations and constants quoted in McDougall and Harrison (1999)

UAF088-53 MH8G HO 09-29-01 UNALASKA2001 — Weighted average of J from MMhb-1 = 0 002369 +/- 0 000020

Laser Power (mW)	Cumulative 39Ar	40Ar/39Ar measured	+/-	37Ar/39Ar measured	+/-	36Ar/39Ar measured	+/-	% Atmos 40Ar	Ca/K	Cl/K	40*/39K	Age (Ma)	+/- (Ma)
150	0 001	367 89	54 32	2 109	0 358	1 4581	0 2518	117 1	3 88	0 299	-62 94	-291 24	199 90
300	0.003	126.24	4 14	1 727	0 065	0 4467	0 0324	104 5	3.17	0 131	-5 66	-24 35	37 17
500	0.014	47.06	0.75	1 465	0 030	0.1606	0 0075	100 7	2 69	0 073	-0 31	-1 32	9 27
750	0.030	41 94	0 29	2 620	0 016	0 1465	0 0039	102 8	4 82	0.059	-1 17	-5 02	4 91
1000	0.043	27.90	0 39	2 953	0 042	0 0891	0 0054	93 6	5 43	0 040	1 78	7 59	6 80
1250	0 062	27 02	0 34	2 569	0 035	0 0873	0 0050	94 8	4 72	0 042	1 40	5 98	6 22
1500	0.085	21 70	0 20	2 362	0 023	0 0663	0 0033	89 6	4 34	0 042	2 26	9 65	4 12
2000	0 118	15 23	0 13	2 171	0 019	0 0466	0 0030	89 6	3 99	0 043	1 59	6 78	3 80
2500	**0.185**	**11.98**	**0.07**	**1.817**	**0.012**	**0.0336**	**0.0013**	**82.0**	**3.34**	**0.052**	**2.16**	**9.19**	**1.62**
3000	**0.303**	**10.39**	**0.05**	**1.531**	**0.009**	**0.0272**	**0.0010**	**76.3**	**2.81**	**0.055**	**2.45**	**10.45**	**1.30**
8000	**1.000**	**4.69**	**0.01**	**5.237**	**0.015**	**0.0091**	**0.0001**	**49.2**	**9.64**	**0.081**	**2.38**	**10.13**	**0.19**
Integrated		8 89	0 02	4 232	0 010	0 0237	0 0003	75 5	7 79	0 073	2 18	9 28	0 37

Plateau age: 10.1 +/- 0.3 Ma — 3 fractions, 88% 39Ar release, MSWD = 0.2

UAF083-44 99UN37 WR#1 01-12-01 UNAMAK

Weighted average of J from Bern4B = 0.000063 +/- 0.000005

Laser Power (mW)	Cumulative 39Ar	40Ar/39Ar measured	+/-	37Ar/39Ar measured	+/-	36Ar/39Ar measured	+/-	% Atmos 40Ar	Ca/K	Cl/K	40*/39K	Age (Ma)	+/- (Ma)
200	0.011	1461.20	91.68	1.317	0.325	4.9273	0.2966	99.6	2.42	0.005	5.27	0.60	5.52
700	0.055	455.06	12.02	0.738	0.073	1.4466	0.0389	93.9	1.35	0.001	27.65	3.13	1.41
1200	0.155	204.71	2.45	0.679	0.034	0.5180	0.0068	74.8	1.25	0.004	51.70	5.84	0.16
1700	0.468	117.56	0.90	0.673	0.014	0.1484	0.0014	37.3	1.24	0.001	73.77	8.33	0.07
2200	0.722	116.57	0.80	0.689	0.014	0.1446	0.0018	36.6	1.26	0.002	73.91	8.35	0.08
2700	0.827	133.29	1.05	1.180	0.029	0.2005	0.0038	44.4	2.17	0.001	74.16	8.38	0.13
3200	0.891	148.73	1.74	1.413	0.047	0.2506	0.0066	49.7	2.60	0.002	74.83	8.45	0.22
3700	0.927	161.90	2.66	1.220	0.089	0.2995	0.0147	54.6	2.24	0.004	73.51	8.31	0.48
8000	1.000	174.79	1.62	1.474	0.043	0.3245	0.0094	54.8	2.71	0.002	79.06	8.93	0.31
Integrated		164.56	0.82	0.866	0.010	0.3226	0.0023	57.9	1.59	0.002	69.32	7.83	0.59

Plateau age: 8.4 +/- 0.6 Ma 6 fractions, 85% 39Ar release, MSWD = 0.9

UAF083-44 99UN37 WR#2 01-15-01 UNAMAK

Weighted average of J from Bern4B = 0.000063 +/- 0.000005

Laser Power (mW)	Cumulative 39Ar	40Ar/39Ar measured	+/-	37Ar/39Ar measured	+/-	36Ar/39Ar measured	+/-	% Atmos 40Ar	Ca/K	Cl/K	40*/39K	Age (Ma)	+/- (Ma)
200	0.010	1030.60	173.30	0.679	0.216	3.4284	0.5721	98.3	1.25	0.001	17.55	1.99	3.96
700	0.042	438.79	9.43	0.741	0.056	1.4025	0.0279	94.4	1.36	0.000	24.39	2.76	1.02
1200	0.145	195.06	2.91	0.651	0.027	0.4667	0.0071	70.7	1.20	0.001	57.21	6.46	0.26
1700	0.308	109.44	0.97	0.672	0.020	0.1208	0.0023	32.6	1.23	0.000	73.81	8.33	0.10
2200*	0.677	114.37	6.24	0.577	0.005	0.1283	0.0008	33.1	1.06	0.002	76.50	8.64	0.70
2700	0.844	123.00	0.61	0.786	0.018	0.1672	0.0024	40.1	1.44	0.004	73.66	8.32	0.09
3200	0.900	143.16	1.39	1.026	0.028	0.2270	0.0068	46.8	1.88	0.005	76.19	8.60	0.23
3700	0.939	147.62	1.80	0.969	0.059	0.2354	0.0053	47.1	1.78	0.007	78.15	8.82	0.18
8000	1.000	166.04	2.25	0.989	0.028	0.3030	0.0057	53.9	1.82	0.003	76.60	8.65	0.18
Integrated		148.82	2.38	0.707	0.007	0.2622	0.0015	52.0	1.30	0.002	71.41	8.06	0.66

Plateau age: 8.4 +/- 0.6 Ma 5 fractions, ~70% 39Ar release, MSWD = 2.3

* fraction measured on Faraday detector, poor gain correction with multiplier

UAF088-51 99CB9B HO#1 09-30-01 UNALASKA2001

Laser Power (mW)	Cumulative 39Ar	40Ar/39Ar measured	+/-	37Ar/39Ar measured
150	0.000	-7104.37	8958.34	-17.364
300	0.002	1969.56	293.96	8.074
500	0.008	482.81	29.31	7.585
750	0.017	194.82	7.86	6.150
1000	0.035	100.08	3.59	3.444
1250	0.051	117.16	4.28	5.547
1500	0.068	62.16	2.33	5.421
2000	0.102	110.68	2.45	4.101
2500	0.208	259.40	2.22	10.882
3000	0.328	109.56	0.45	21.750
3500	0.512	30.70	0.36	36.376
4000	0.781	21.59	0.06	24.128
4500	0.909	17.36	0.12	20.525
8000	1.000	15.83	0.13	24.192
Integrated		74.73	0.24	22.338

No plateau

UAF088-51 99CB9B HO#2 10-18-01 UNALASKA2001

Laser Power (mW)	Cumulative 39Ar	40Ar/39Ar measured	+/-	37Ar/39Ar measured
150	0.002	2247.77	306.40	7.901
500	0.022	322.53	7.26	2.791
1000	**0.087**	**182.81**	**0.85**	**3.699**
1500	**0.175**	**61.00**	**0.96**	**16.926**
2000	**0.314**	**98.16**	**0.43**	**15.570**
2500	**0.436**	**125.98**	**0.51**	**18.728**
3000	**0.546**	**72.53**	**1.93**	**23.724**
3500	**0.715**	**67.01**	**0.25**	**25.007**
4000	**0.792**	**23.46**	**0.98**	**16.111**
4500	**0.826**	**10.76**	**0.10**	**10.658**
8500	**1.000**	**10.31**	**0.06**	**8.389**
Integrated		80.65	0.32	16.176

Plateau age: 8.5 +/- 1.7 Ma

Weighted average of J from MMhb-1 = 0 002369 +/- 0 000020

+/-	36Ar/39Ar measured	+/-	% Atmos 40Ar	Ca/K	Cl/K	40*/39K	Age (Ma)	+/- (Ma)
22 087	-22 5086	28 4099	93 6	-31 51	-1 128	-449 34	-5176 07	44416 90
1 236	6 7300	1 0189	100 9	14 89	0 433	-18 68	-81 63	229 42
0 477	1 6306	0 1186	99 7	13 99	0 144	1 50	6 41	84 87
0 266	0 5810	0 0533	87 9	11 33	0 055	23 65	98 34	57 87
0 126	0 3429	0 0260	101 0	6 33	0 036	-1 02	-4 35	29 23
0 204	0 4172	0 0312	104 9	10 21	0 032	-5 75	-24 73	35 15
0 209	0 2253	0 0238	106 5	9 98	0 013	-4 06	-17 43	28 59
0 092	0 3857	0 0142	102 7	7 55	0 023	-3 03	-12 98	14 76
0 095	0 8604	0 0077	97 7	20 11	0 248	5 98	25 36	5 41
0 091	0 3656	0 0041	97 1	40 48	0 375	3 18	13 52	4 94
0 428	0 1049	0 0025	92 2	68 36	0 280	2 45	10 43	2 79
0 069	0 0714	0 0015	89 4	44 98	0 254	2 33	9 92	1 85
0 140	0 0604	0 0031	94 0	38 17	0 269	1 05	4 50	3 98
0 191	0 0596	0 0029	100 0	45 10	0 336	0 00	-0 02	3 68
0 072	0 2510	0 0016	97 1	41 59	0 261	2 23	9 52	1 89

Weighted average of J from MMhb-1 = 0 002369 +/- 0 000020

+/-	36Ar/39Ar measured	+/-	% Atmos 40Ar	Ca/K	Cl/K	40*/39K	Age (Ma)	+/- (Ma)
1 098	7 5861	1 0395	99 7	14 57	0 158	6 67	28 27	161 36
0 070	1 0714	0 0275	98 1	5 13	0 072	6 11	25 93	16 46
0.023	**0.6117**	**0.0065**	**98.7**	**6.80**	**0.079**	**2.29**	**9.77**	**7.38**
0.215	**0.2035**	**0.0045**	**96.5**	**31.40**	**0.351**	**2.13**	**9.09**	**5.41**
0.082	**0.3254**	**0.0036**	**96.8**	**28.86**	**0.231**	**3.18**	**13.55**	**4.26**
0.076	**0.4232**	**0.0044**	**98.2**	**34.79**	**0.298**	**2.33**	**9.93**	**5.22**
0.621	**0.2453**	**0.0067**	**97.5**	**44.21**	**0.329**	**1.81**	**7.72**	**8.60**
0.101	**0.2285**	**0.0023**	**98.0**	**46.64**	**0.352**	**1.35**	**5.78**	**2.79**
0.563	**0.0728**	**0.0039**	**86.7**	**29.87**	**0.321**	**3.15**	**13.43**	**5.49**
0.105	**0.0429**	**0.0072**	**110.5**	**19.69**	**0.185**	**-1.14**	**-4.88**	**9.19**
0.036	**0.0319**	**0.0018**	**85.5**	**15.48**	**0.137**	**1.50**	**6.41**	**2.32**
0 079	0 2699	0 0015	97 4	30 00	0 257	2 09	8 91	1 74

9 fractions, ~98% 39Ar release, MSWD = 0.8

UAF088-52 99UN9 WR 09-29-01 UNALASKA2001

Laser Power (mW)	Cumulative 39Ar	40Ar/39Ar measured	+/-	37Ar/39Ar measured
150	0.000	1231.10	119.06	5.931
500	0.010	481.32	76.27	1.916
750	0.027	115.89	0.46	1.216
1000	0.064	64.08	0.23	0.858
1250	0.184	12.92	0.03	0.645
1500	**0.372**	**3.67**	**0.08**	**0.712**
2000	**0.614**	**3.84**	**0.01**	**0.844**
2500	**0.819**	**4.50**	**0.01**	**0.865**
3000	**0.855**	**5.08**	**0.02**	**1.424**
3500	**0.877**	**6.03**	**0.04**	**2.356**
4000	**0.903**	**5.95**	**0.04**	**2.319**
4500	**0.935**	**5.90**	**0.04**	**1.732**
8000	**1.000**	**5.72**	**0.01**	**1.368**
Integrated		14.44	0.70	0.973
	Plateau age:		**8.6 +/- 0.3 Ma**	

Weighted average of J from MMhb-1 = 0.002369 +/- 0.000020

+/-	36Ar/39Ar measured	+/-	% Atmos 40Ar	Ca/K	Cl/K	40*/39K	Age (Ma)	+/- (Ma)
0.610	4.2274	0.4366	101.4	10.93	0.075	-17.73	-77.42	204.00
0.017	2.0367	0.0195	125.0	3.52	0.019	-120.56	-606.59	457.04
0.008	0.3861	0.0039	98.4	2.23	0.004	1.85	7.89	4.70
0.004	0.2121	0.0021	97.7	1.58	0.002	1.45	6.20	2.55
0.002	0.0381	0.0006	86.9	1.18	0.001	1.69	7.21	0.74
0.016	**0.0054**	**0.0003**	**42.5**	**1.31**	**0.001**	**2.10**	**8.93**	**0.41**
0.002	**0.0061**	**0.0002**	**45.7**	**1.55**	**0.001**	**2.07**	**8.82**	**0.26**
0.002	**0.0084**	**0.0003**	**54.2**	**1.59**	**0.001**	**2.05**	**8.75**	**0.31**
0.007	**0.0113**	**0.0017**	**63.9**	**2.62**	**0.002**	**1.82**	**7.78**	**2.15**
0.016	**0.0140**	**0.0028**	**66.2**	**4.33**	**0.004**	**2.03**	**8.65**	**3.58**
0.015	**0.0141**	**0.0020**	**67.6**	**4.26**	**0.006**	**1.92**	**8.19**	**2.52**
0.010	**0.0147**	**0.0016**	**71.6**	**3.18**	**0.005**	**1.67**	**7.11**	**1.97**
0.003	**0.0133**	**0.0008**	**67.1**	**2.51**	**0.003**	**1.87**	**7.98**	**0.98**
0.004	0.0463	0.0003	94.3	1.79	0.002	0.82	3.50	3.02

8 fractions, ~82% 39Ar release, MSWD = 0.8