A TRANSLATIONAL MODEL FOR THE GREAT VALLEY GROUP CALIFORNIA: A DETRITAL ZIRCON ANALYSIS

By

Gabriel M. Izsak

(Under the Direction of James E. Wright)

ABSTRACT

The Great Valley Group has long been considered to be the forearc basin of a traditional convergent margin assemblage along with the Franciscan Complex (subduction complex), and Sierra Nevada batholith (magmatic arc), with negligible translation between them. However, evidence has been provided in previous studies suggesting that the Great Valley Group was deposited in a basin that was translated north in the Cretaceous. The purpose of this project is to use new petrologic and detrital zircon data to test the translational model. New petrographic and detrital zircon data shows that the Klamath GVG and the Coast Range GVG are distinct from each other. Comparing the zircon data by depositional age shows the Coast Range GVG and Klamath GVG as dissimilar in the Neocomain, becoming more alike in the mid-Cretaceous, and being quite similar in the Cenomanian to Turonian. This data supports the idea that the Coast Range GVG and Klamath GVG were deposited apart from each other and the Coast Range GVG was translated northward along strike-slip faults until it was adjacent to the Klamath GVG in the Cenomanian to Turonian.

INDEX WORDS: Great Valley Group, Franciscan Complex, Sierra Nevada batholith, Coast Range GVG, Klamath GVG

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CHAPTER 1

INTRODUCTION

The Great Valley Group

The Great Valley Group is composed of deep marine sediments that accumulated in the elongate north-south Great Valley forearc basin from the Late Jurassic to Late Cretaceous (Cowan and Bruhn, 1992 and references therein). The Great Valley basin underlies the San Joaquin and Sacramento Valleys of Northern California extending from the Klamath Mountains in the north to the Transverse Ranges in the south, and spanning the area between the Sierra Nevada and the Coast Ranges (Figure 1). The majority of the Great Valley Group is buried beneath the Cenozoic strata of the central valley of California, but it does outcrop along the west side of the Sacramento Valley and at the north end of the valley on the southeast flank of the Klamath Mountains (Figures 1,2). The Great Valley Group can be divided into two separate packages; the Great Valley Group that was deposited upon the Klamaths to the north (Klamath GVG) and the Great Valley Group that was deposited upon the Coast Ranges to the south (Coast Range GVG). For the purposes of this study, the Cold Fork Fault (Figure 2), a northwest-striking, steeply northeast-dipping fault with a controversial displacement history (Constenius et al., 2000; Moxon, 1990; Jones and Irwin, 1971; Suchecki, 1984) defines the boundary between the Klamath GVG and the Coast Range GVG.

The deep marine turbidites of the Great Valley Group consist of even-bedded to massive mudstone, shale, siltstone, and up to 10% thick-bedded sandstones and conglomerates (Suchecki, 1984). In the Coast Ranges, the Great Valley Group depositionally overlies Upper Jurassic

(Oxfordian to Kimmeridgian) volcanic-pelagic rocks, which in turn depositionally overlie the ca. 165 Ma Coast Range Ophiolite (Hopson et al., 1996). Great Valley Group strata in this region span the Late Jurassic (Tithonian) to Late Cretaceous (Maastrichtian) and are interpreted to have formed in a submarine fan environment (Suchecki, 1984; Ingersoll, 1978). On the east side of the Central Valley the depositional basement for the Great Valley Group is Late Jurassic and older metamorphic rocks of the Sierra Nevada (Figure 1). In this area the oldest Great Valley Group strata are early Late Cretaceous (Cenomanian; Williams, 1997). These strata accumulated in a shelf environment. (Dickinson, 1976; Cowan and Bruhn, 1992 and references therein). In the southern Klamath Mountians, the Great Valley Group GVG ranges from Upper Neocomian (Hauterivian-Barremain) to Upper Cretaceous (Cenomanian) and rests unconformably upon Upper Jurassic and older metamorphic basement rocks of the Klamath Mountains province (Figures 1,2).

Classic Interpretation of the Great Valley Group

Deposition of the Great Valley Group in a forearc basin setting is widely accepted (Cowan and Bruhn, 1992). The classic interpretation is that the Great Valley Group accumulated in situ with respect to the presently adjacent convergent margin assemblages of California, including the Jura-Cretaceous magmatic arc assemblage of the Sierra Nevada and Klamath Mountains, and the Jura-Cretaceous Franciscan subduction complex. (Figure 1; Burchfiel et al., 1992 and references therein). This traditional model assumes orthogonal subduction which would result in no margin parallel movement of the Great Valley Group during deposition, and provided the tectonic framework for much of the early work on the Great Valley Group (Ingersoll, 1978, 1979, 1982, 1983; Dickinson 1972; Suchecki 1984).

In his study of the Great Valley Group Ingersoll (1979) focused mainly on sedimentary structures and processes as well as the structural evolution of the Great Valley forearc basin. He concluded that detritus for submarine fan and channel deposits was derived from the Sierra Nevada province to the east, and the Klamath Mountains province to the north. Dickinson and Rich (1972) used six distinct petrographic parameters (P/F, Lv/L, %M, %Q, %F, %L; Table 1) to distinguish five Great Valley Group petrofacies (Rumsey, Cortina, Boxer, Lodoga, and Stony Creek). Petrographic differences among these five petrofacies (Table 2) were attributed to different intrusive and volcanic episodes in the Sierra Nevada (Dickinson and Rich, 1972). Of particular interest is the Upper Jurassic to Lower Cretaceous (Tithonian to Barremian) Stony Creek petrofacies which shows greater abundance of volcanic lithics compared with the other petrofacies, and which Dickinson and Rich (1972) interpreted to reflect derivation from the Klamath Mountains and northern Sierra Nevada during the Yosemite (Tithonian to Valanginian) magmatic episode (Evernden and Kistler, 1970). Ingersoll (1983) used seven petrographic parameters (P/F, Lv/L, %M, Qp/Q, %Q, %F, %L; Table 1) to further differentiate the Great Valley Group into 8 distinct petrofacies (Rumsey, Cortina, Boxer, Lodoga, Stony Creek, Platina, Grabast, and Los Gatos; Table 2). Data from this study showed that Klamath GVG samples contain higher percentages of metamorphic detritus, while the Coast Range GVG samples contain more felsic volcanic detritus (Table 2). Ingersoll (1983) concluded that the majority of metamorphic detritus in the Great Valley Group was derived from the Klamath Mountains, whereas most of the volcanic detritus was derived from the Sierra Nevada. Suchecki (1984) used paleocurrent data to determine that Great Valley Group detritus was derived mainly from the north and east, but was also contributed to by a western source which he interpreted to have been an outer-arc ridge.

DeGraaff-Surpless and others (2002) used detrital zircon data to explain the evolution of the Great Valley forearc basin. They analyzed 17 samples and focused on the Upper Cretaceous strata of the Sacramento valley using the SHRIPM-RG at the Stanford-U.S. Geological Survey Microisotopic Analytical Center (SUMAC). One area of interest to DeGraaff-Surpless was the Cache Creek (Figure 1) petrofacies which was deposited along the west side of the Sacramento Valley (Figure 2). The Cache Creek detrital zircon signature broadens upsection from nearly unimodal peaking between 145 Ma and 155 Ma, to signatures with multiple age peaks between 90 Ma and 200 Ma (Figure 3). Degraaff-Surpless and other (2002) interpreted this change in detrital zircon distribution to reflect a response to many different geomorphologic changes in the Great Valley forearc basin throughout its formation, including changes in the expansion of drainage systems from localized to much broader areas, changing shelf and submarine canyon morphology due to relative change in sea level, increased dissection of the Klamath-Sierran arc, and change in direction of drainage systems within the arc. Zircons are also present within the range of 140-160 Ma which is scarce in plutons of the Sierra Nevada (Irwin, 2003). These zircons are explained as having been derived from undated plutons in the Sierran basement beneath the Great Valley. This is a curious explanation, since it is strange to have the Great Valley Group burying its source of detritus. An alternative interpretation is that the source of 140-160 Ma zircons is much farther away than the Sierra Nevada, and the Great Valley Group has been transported since its deposition.

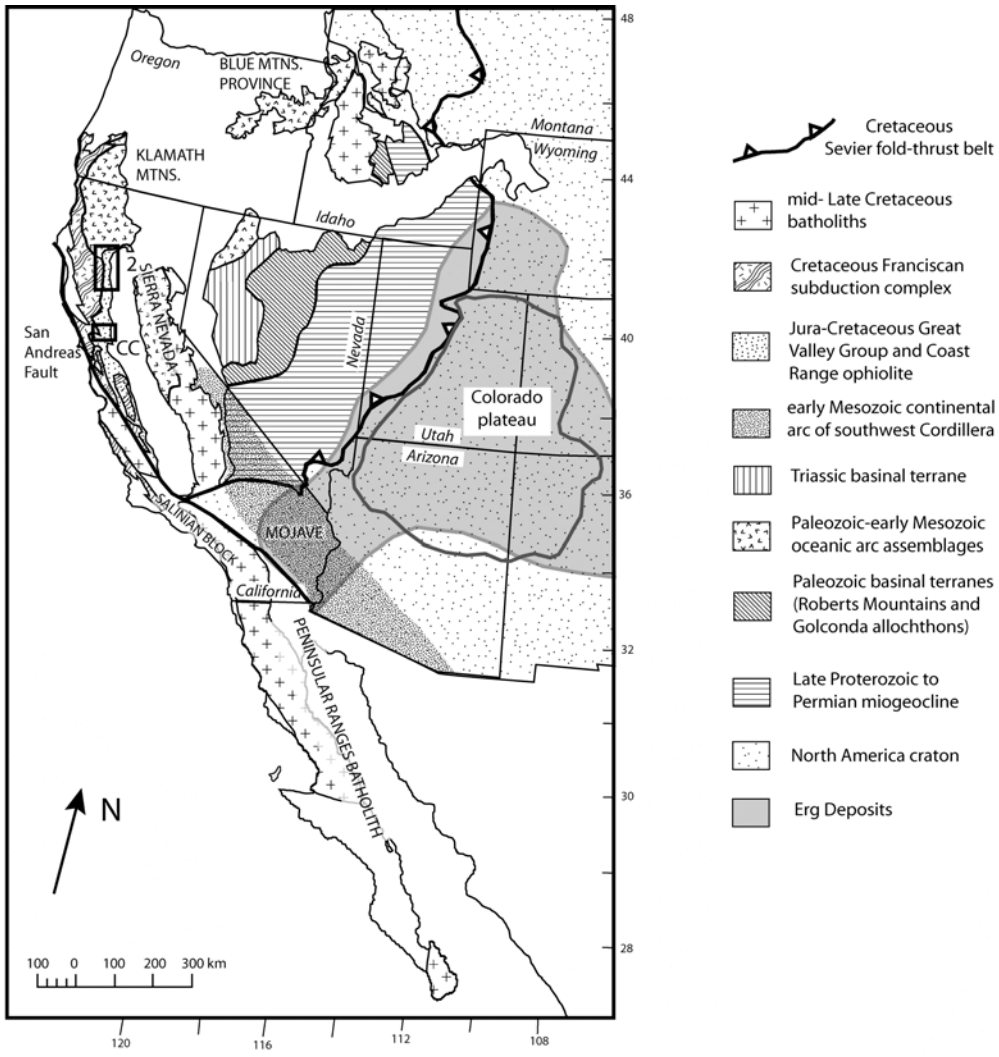


Figure 1: Geology of Western U.S. Cordillera

Map showing the geology of the western Cordillera. The box labeled 2 shows the approximate location of figure 2 and the box labled CC shows the Cache Creek section. Adapted from Wright and Wyld (2007).

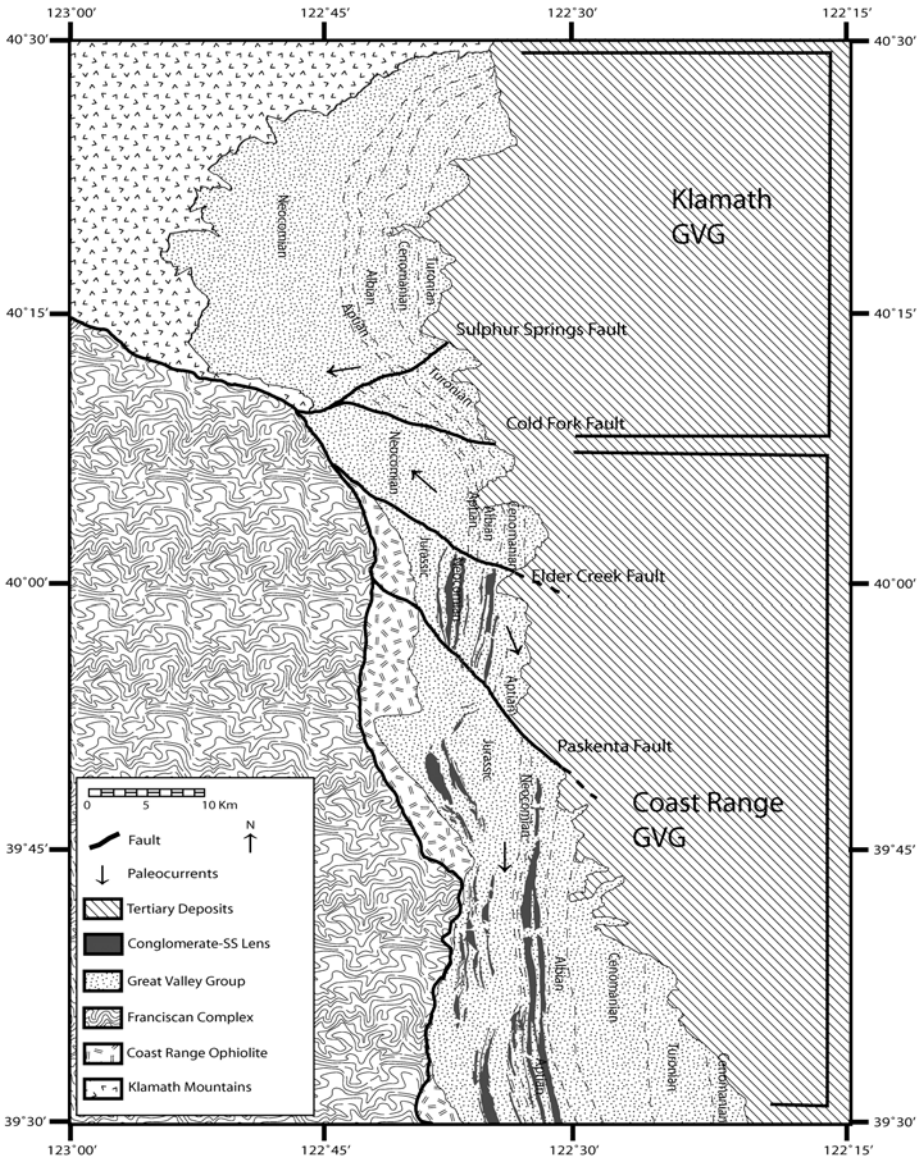


Figure 2: Contact of Klamath and Coast Range GVG

Map showing the area of contact between the Klamath GVG, north of the Cold Fork fault and the Coast Range GVG, south of the Cold Fork fault.

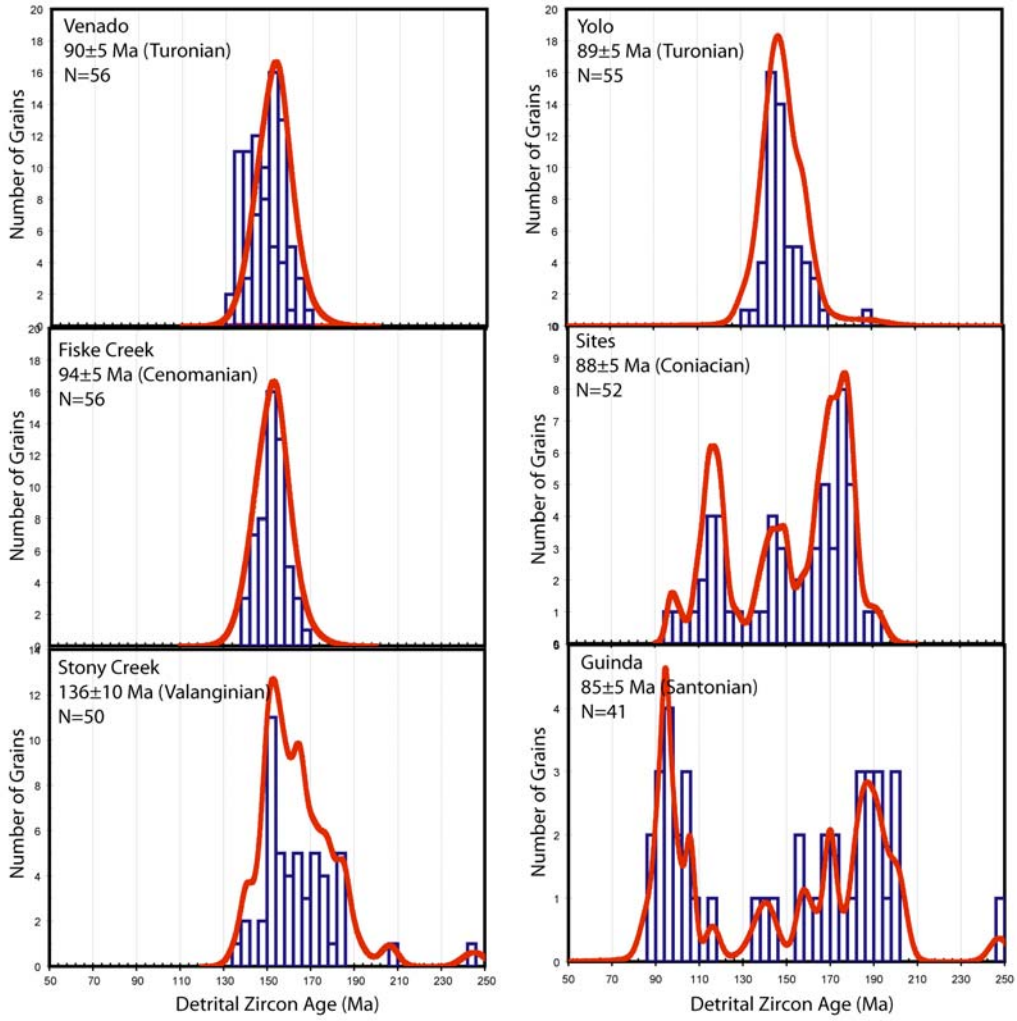


Figure 3: Cache Creek Zircon Signatures

Detrital zircon signatures for Cache Creek section samples. Depositional age estimates are from Linn et al. (1991). Data from Degraaff-Surpless et al. (2002).

Table 1: Petrographic Parameters

Explanation of petrographic parameters used in petrographic analysis of thin-secions. Parameters taken from Dickinson and Rich (1972) and Ingersoll (1983).

Petrographic Parameter	Explanation	Dickinson and Rich (1972) or Ingersoll (1983)
P/F	Plagioclaise/Total feldspar	Both
Lv/L	Volcanic lithics/Total Lithics	Both
M%	Percentage of phylosilicate grains	Both
Qp/Q	Polycrystalline quartz/Total quartz	Ingersoll (1983)
Q%	Percentage of quartz	Both
F%	Percentage of feldspar	Both
L%	Percentage of lithics	Both

Table 2: Petrofacies from Dickinson and Ingersoll

Description of petrofacies from Dickinson and Rich (1972) and Ingersoll (1983).

Petrofacies	Age Range	Location	Coast Range or Klamath	Dickinson and Rich (1972) or Ingersoll (1983)	Petrographic Characteristics
Stony Creek	Tithonian-Barremian	Sacramento Valley	Both	Both	Low Q, low F, high L, low M, high P/F, high Lv/L, high Qp/Q, and rich in volcanic detritus
Platina	Valanginian-Barremian	Sacramento Valley	Both	Ingersoll (1983)	High Q, low F, high L, low M, high P/F, very low Lv/L, high Qp/Q, rich in metamorphic lithics, and low in volcanic detritus
Lodoga	Aptian-Albian	Sacramento Valley	Both	Both	High Q, low F, variable L, low M, high P/F, low Lv/L, high Qp/Q, rich in metamorphic lithics
Boxer	Cenomanian-Turonian	Sacramento Valley	Both	Both	Moderate Q, moderate F, moderate L, low M, moderate P/F, high Lv/L, low Qp/Q, and rich in volcanic detritus
Grabast	Cenomanian-Turonian	San Joaquin Valley	Coast Range	Ingersoll (1983)	Moderate Q, moderate F, moderate L, moderate M, moderate P/F, moderate Lv/L, low Qp/Q, and rich in metamorphic lithics
Cortina	Turonian-Santonian	Sacramento Valley	Both	Both	Moderate Q, high F, moderate L, moderate M, low P/F, high Lv/L, low Qp/Q, and rich in volcanic detritus, and felsic plutonics
Los Gatos	Turonian-Santonian	San Joaquin Valley	Coast Range	Ingersoll (1983)	Moderate Q, high F, moderate L, high M, low P/F, moderate Lv/L, low Qp/Q, and rich in metamorphic lithics
Rumsey	Santonian-Maastrichtian	Both	Both	Both	High Q, high F, low L, high M, low P/F, moderate Lv/L, low Qp/Q, and rich in felsic plutonics

CHAPTER 2

TRANSLATIONAL MODEL FOR THE GREAT VALLEY GROUP

Contradictory to the classic interpretation of the Great Valley Group, a newer study by Wright and Wyld (2007) presents three lines of evidence suggesting that the older strata (Tithonian to Albian) of the Coast Range GVG was not deposited in its current location. According to evidence presented in their study, the Klamath GVG accumulated in place, but the Upper Jurassic to Lower Cretaceous (Tithonian to Albian) Coast Range GVG was likely deposited much farther to the south and was not in depositional continuity with the Klamath GVG until the early Late Cretaceous (Cenomanian to Turonian). To explain these relations, Wright and Wyld (2007) proposed that the older part of the Coast Range GVG was transported northward in the Early Cretaceous along dextral strike-slip faults that developed in the forearc in response to oblique subduction. In this chapter, I summarize the evidence presented in Wright and Wyld (2007) supporting the translational model.

Oblique Subduction at Modern Convergent Plate Boundaries

Citing data presented in Jarrard (1986), Wright and Wyld (2007) note that approximately 50% of all modern convergent margins have forearc slivers bounded by active strike-slip faults. Obliquity of subduction (deviation from orthogonal convergence) must be at least 15º to create margin parallel strike-slip faulting in the forearc (Jarrard, 1986; Figure 4). The long span of Great Valley Group deposition (~80 Ma) makes it unlikely that the angle of convergence during plate subduction was always less than the 15º of obliquity necessary for strike-slip faulting in the forearc (Wright and Wyld, 2007). Paleomagnetic data indicate significant periods of highly

oblique convergence along the western margin of North America during the Jurassic and Cretaceous (Engebretson et al., 1985). Wright and Wyld (2007) emphasize independent geologic relations demonstrating that approximately 400-450 km of dextral displacement occurred in the U.S. Cordillera in the Early Cretaceous along a fault system extending from southern California to western Idaho (MSNI fault; Figure 5; Schweickert and Lahren, 1990; Wyld and Wright, 2001, 2005).

Geologic Relations between the Klamath Mountains and Coast Ranges

A second line of evidence presented by Wright and Wyld (2007) favoring a translational model involves a comparison of geologic relations between the Klamath Mountains and Coast Ranges across the Cold Fork fault (Figures 6,7). Figures 6 and 7 show the main differences when comparing the Klamath GVG and the Coast Range GVG across the Cold Fork fault.

The Nevadan orogeny is a well documented and well dated event that resulted in widespread deformation and metamorphism in the Klamath Mountains and Sierra Nevada provinces between 150 Ma and 146 Ma (Tithonian; Saleeby et al, 1982; Harper and Wright, 1984; Sharp, 1988; Wyld and Wright, 1988). In the Klamath Mountains for example, the ca. 165 Ma Josephine ophiolite and the overlying Oxfordian to Kimmeridgian Galice Formation were deformed in the Nevadan orogeny and there was no deposition of strata during the Tithonian. In contrast, in the Coast Ranges the ca. 165 Ma Coast Range ophiolite is overlain by Oxfordian to Kimmeridgian volcanic-pelagic strata which are in turn conformably overlain by the Tithonian to Upper Cretaceous Great Valley Group with no record of any deformation, metamorphism, or stratigraphic break during the time of the Nevadan orogeny (Hopson et al., 1996). It seems unlikely that the Coast Ranges could be adjacent to the Klamath Mountains and inboard of the Sierra Nevada while not undergoing the same kind of deformation. The relationship of the

undeformed Coast Ranges with the deformed Klamath Mountains and Sierra Nevada (Figure 6) suggests a strike-slip boundary may have separated these provinces, and they only became juxtaposed after the Nevadan orogeny.

To the north of the Cold Fork Fault the oldest unit of the Klamath GVG is Hauterivian to Barremian, while to the south the oldest unit of the Coast Range GVG is Tithonian. To the north of the Cold Fork fault in the Klamath GVG the Hauterivian to Barremain section is much thicker than it is in the Coast Range GVG to the South (Figure 7; Wright and Wyld, 2007). The differences across the Cold Fork fault have been explained in multiple ways due to differing opinions on the nature of the Cold Fork fault. The Cold Fork fault has been described as a syndepositional normal fault (Constenius et al., 2000), a left-lateral strike-slip fault (Jones and Irwin, 1971), and a strike-slip fault that was later modified by normal faulting (Wright and Wyld, 2007). Normal faulting can explain the differences in thickness of units across the Cold Fork Fault but cannot explain the missing Upper Jurassic units in the Klamath GVG, while strike-slip faulting can explain all of the differences across the Cold Fork Fault.

Comparison of Detrital Zircon data with Potential Sources

Wright and Wyld (2007) used zircon data from Surpless and others (2006) along with two new samples to show that the Coast Range GVG has been translated since its deposition. They begin their detrital zircon analysis with a comparison of the >260 Ma Great Valley Group zircon signature with a variety of potential local sources and conclude that they are a poor match for the Great Valley Group (Figure 8). The potential local sources include Paleozoic and early Mesozoic rocks of the Klamath Mountains, Sierra Nevada, and northwest Nevada, as well as the Middle Paleozoic Roberts Mountain Allochthon and Late Paleozoic Golconda Allochthon (Figure 1; Gehrels et al., 2000; Riley et al., 2000). They noticed that the local sources are

dominated by a population of ca. 1.8-2.1 Ga zircons as well as a large Late Archean component, while both of these ages are almost non-existent in the Great Valley Group (Figure 8). Another important observation is that the Great Valley Group has a large component in the 1.4-1.6 Ga range that is absent in potential local sources (Figure 8). The Great Valley Group also has a higher abundance of Paleozoic to Neoproterozoic grains than local sources (Figure 8). This poor match between the Great Valley Group and its proposed source region led Wright and Wyld (2007) to investigate other possible sources in the southwest Cordillera including the Jurassic erg deposits of the Colorado Plateau (Figure 9), the Oaxaca terrane of Mexico (Figure 10) and the McCoy Mountains Formation in southeastern California and southwestern Arizona (Figure 9). The Jurassic ergs are large eolian dune deposits that formed on the Colorado Plateau in southwestern Laurentia and are composed mainly of quartzose sandstones (Dickinson and Gehrels, 2003). The Jurassic erg deposits have a detrital zircon signature that matches well with the Great Valley group (Figure 11), especially the 3 populations that are not accounted for by the local sources (Paleozoic to Neoproterozoic, Grenville-aged (1.0-1.3 Ga), and 1.4-1.8 Ga) (Dickinson and Gehrels, 2003). The main discrepancy between the Great Valley Group and the erg deposits is that the Grenville-aged component of the Great Valley Group is centered at ca. 980 Ma, while the Grenville-aged component of the erg deposits is centered at ca. 1.2 Ga. Wright and Wyld (2007) then compared the <260 Ma detrital zircon ages in the Great Valley Group to the McCoy Mountains Formation in southeast California and southwest Arizona (Figure 9). The McCoy Mountains Formation is a 7 km thick sequence of fluvial conglomerate, sandstone, and shale that accumulated during the Late Jurassic to Late Cretaceous (Barth eth al., 2004). The McCoy Mountains Formation formed in a retroarc foreland basin that developed between the continental arc to the west and a fold-and-thrust belt to the northeast (Figure 9;

Barth et al., 2004). Based on the similarity between the <260 Ma zircons in the Great Valley Group and the McCoy Mountains formation (Figure 11), they concluded that a southwest provenance is likely for the older part of the Coast Range GVG not because the McCoy Mountains Formation it is a possible source for the Great Valley Group, but because it formed in situ and thus received detritus from many possible southwestern sources. Wright and Wyld (2007) then compared the Grenville-aged component to the Oaxaca terrane which contains basement rocks that have yielded ca. 980-1200 Ma ages (Figure 10). The Oaxaca terrane is the largest exposure (10,000 km^2) of Precambrian to Paleozoic rocks in southern Mexico (Keppie et al., 2003). The Oaxaca terrane is interpreted to be a small exposed part of a much more extensive geologic province (Figure 10; Keppie et al., 2003). The Oaxaca terrane and the Great Valley Group show strong similarities as they both contain an abundance of Grenville aged grains younger than 1.0 Ga (Figure 12). Because multiple southwest sources show similarities with the older part of the Coast Range GVG, the Upper Jurassic to Lower Cretaceous (Tithonian to Albian) Coast Range GVG was interpreted as deposited in the Southwest Cordillera and later translated northward along a series of dextral strike-slip faults of Late Jurassic to Early Cretaceous age (Wright and Wyld, 2007).

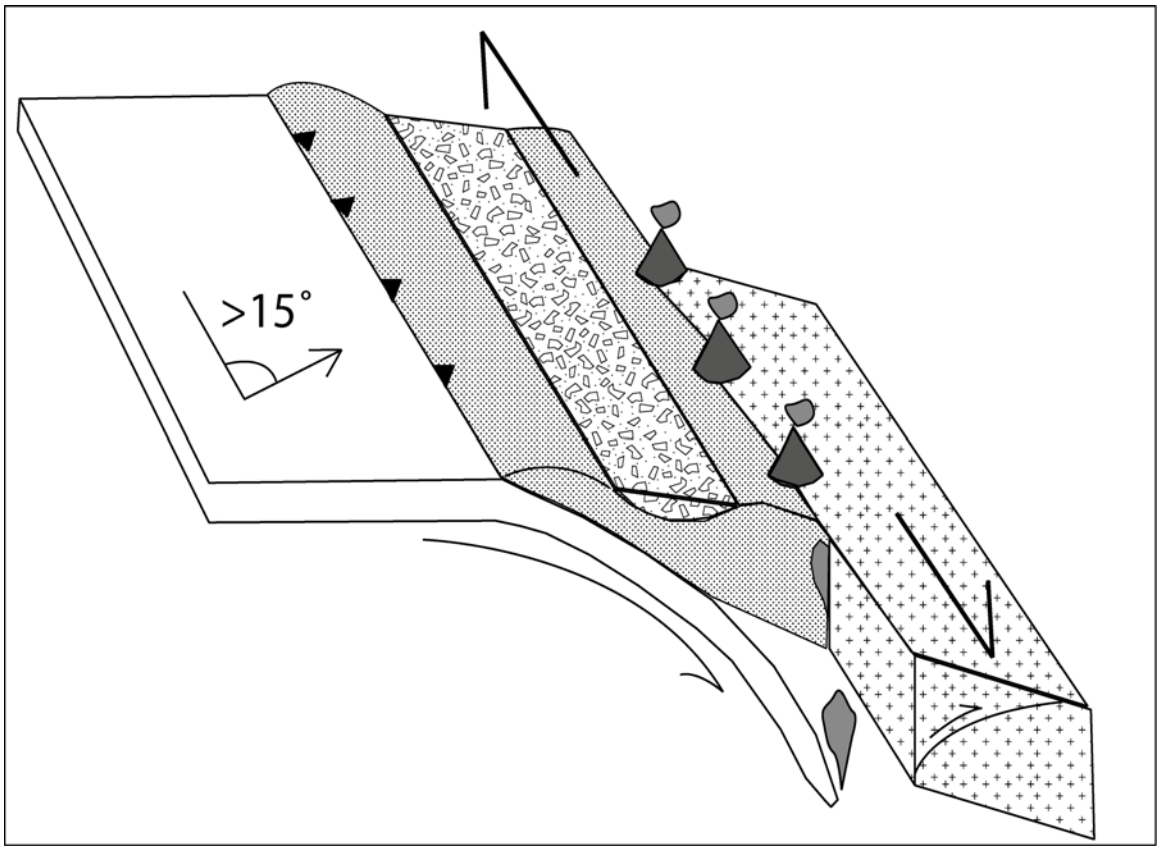


Figure 4: Oblique Subduction

This figure shows oblique subduction causing strike slip faulting due to strain partitioning. The forearc sliver is moving parallel to the continental margin. Adapted from Jarrard (1986).

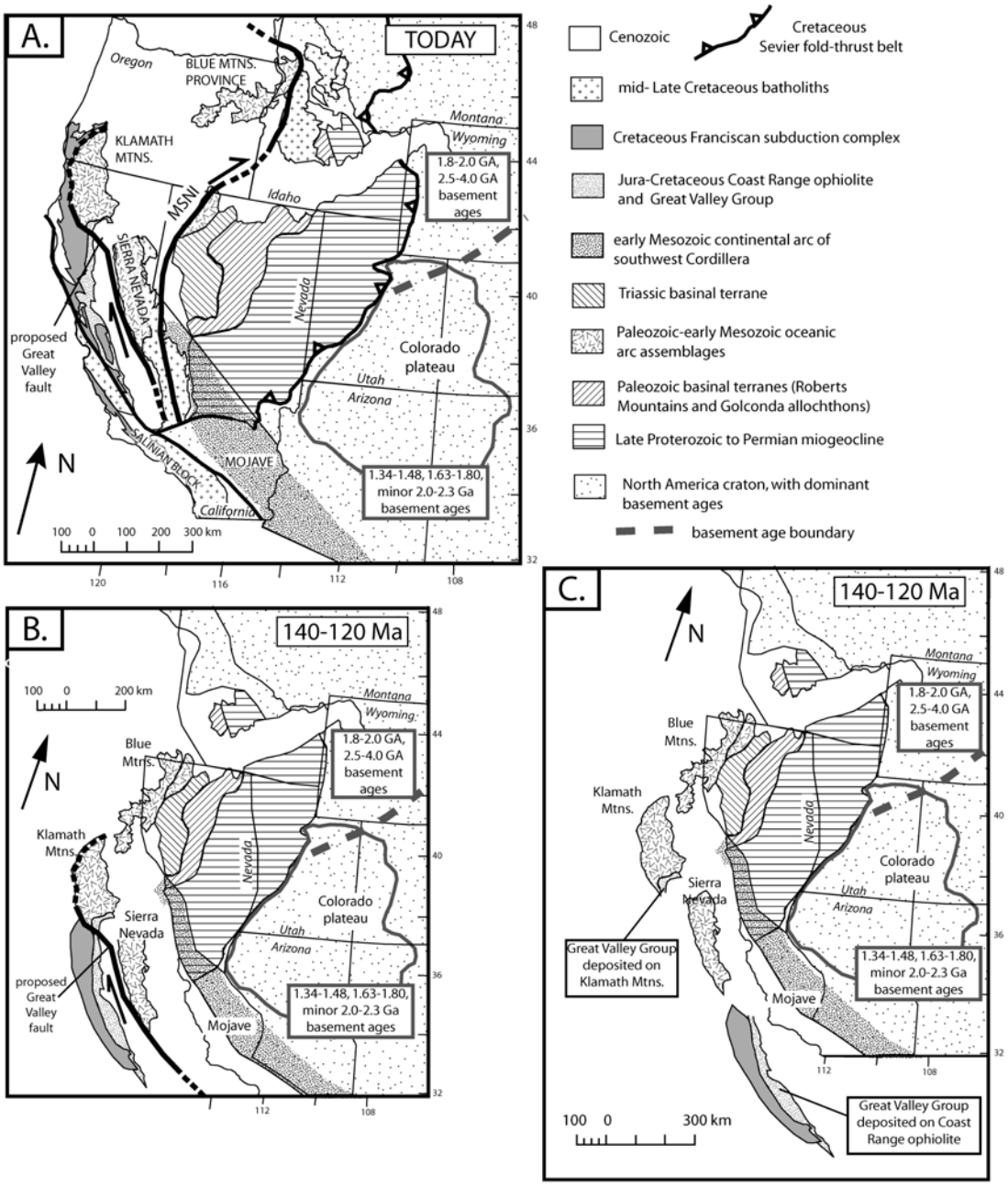


Figure 5: Neocomian Paleoreconstruction

(A) Geology of western U.S. Cordillera, showing approximate locations of Great Valley fault and Mojave-Snow-Nevada-Idaho (MSNI) fault. (B) Paleoreconstruction for the Early Cretaceous restoring 400 km of dextral displacement along the MSNI fault. (C) Same as B, but also restoring displacement along the Great Valley fault showing the proposed separation between the Klamath GVG and the Coast Range GVG basins. From Wright and Wyld (2007).

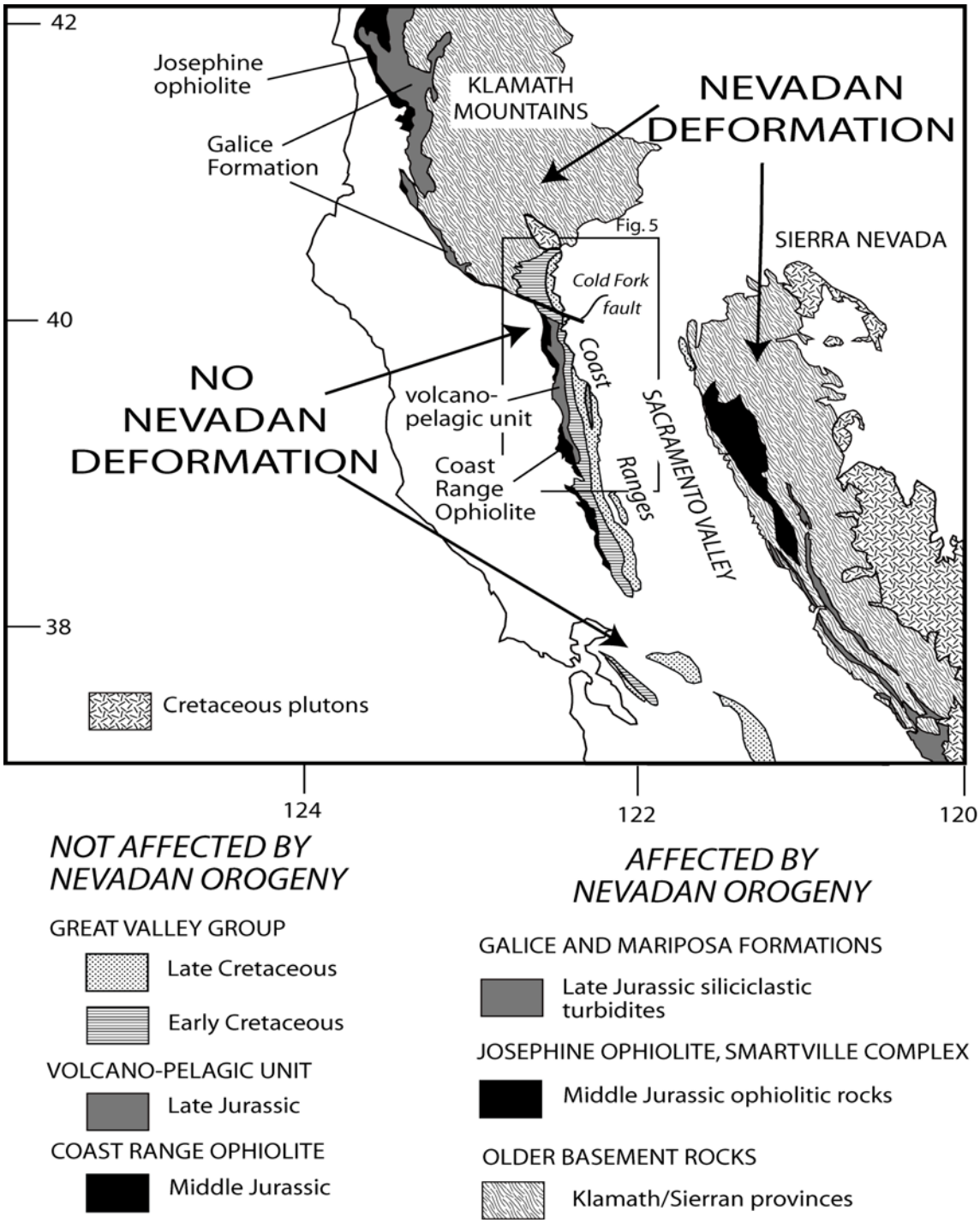


Figure 6: Nevadan Deformation

Map of northern California showing that the Great Valley Group was unaffected by the Nevadan orogeny while the surrounding Klamath Mountains and Sierra Nevada were affected. Adapted from Wright and Wyld (2007).

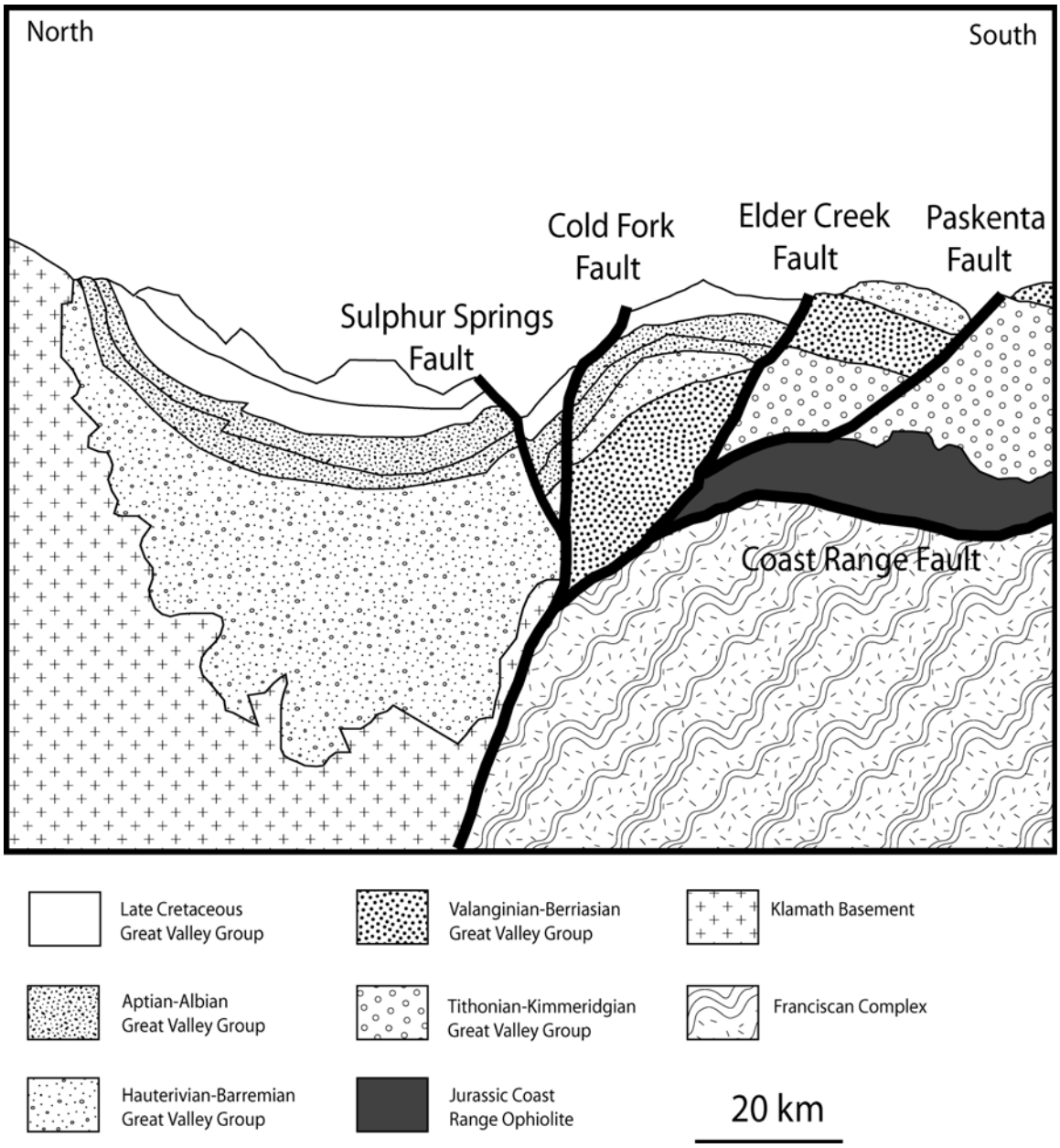


Figure 7: Cross-Section of Great Valley Group across Cold Fork Fault
North to South cross section of the Great Valley Group, showing stratigraphic relationships across multiple faults in the northern Coast Range and Southern Klamaths. Adapted from Constenius et al. (2000).

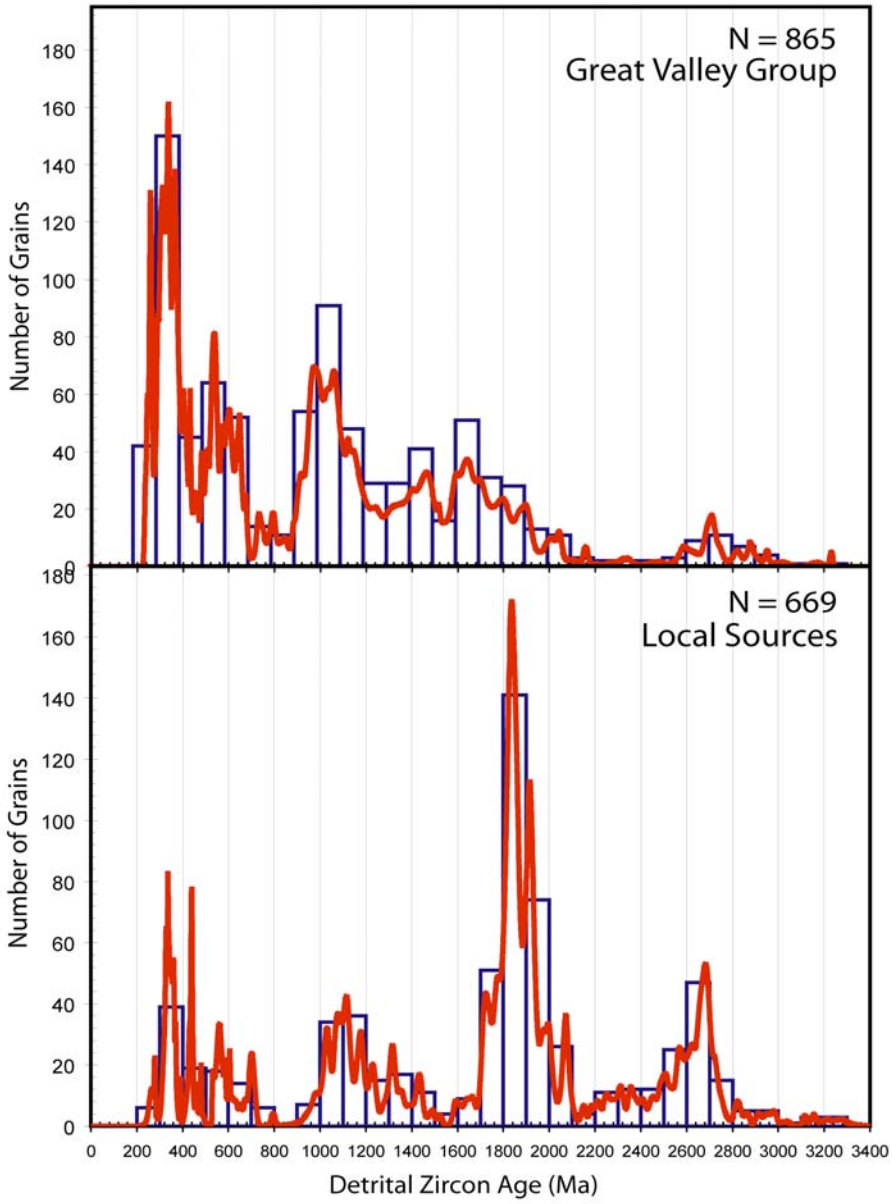


Figure 8: Great Valley Group vs. Local Sources

Comparison of the Great Valley Group detrital zircon signature (top) with that of likely local sources (bottom). Usually multiple sources are not combined in a single plot but in this case the local sources have been combined on one plot to more easily show zircon populations not present in the Great Valley Group. Great Valley Group data from Wright and Wyld (2007), Surpless et al. (2006), and this paper. Local sources data from Darby et al. (2000), Gehrels and Miller (2000), Gehrels et al. (2000), Harding et al. (2000), Riley et al. (2000), Spurlin et al. (2000), and Wallin et al. (2000).

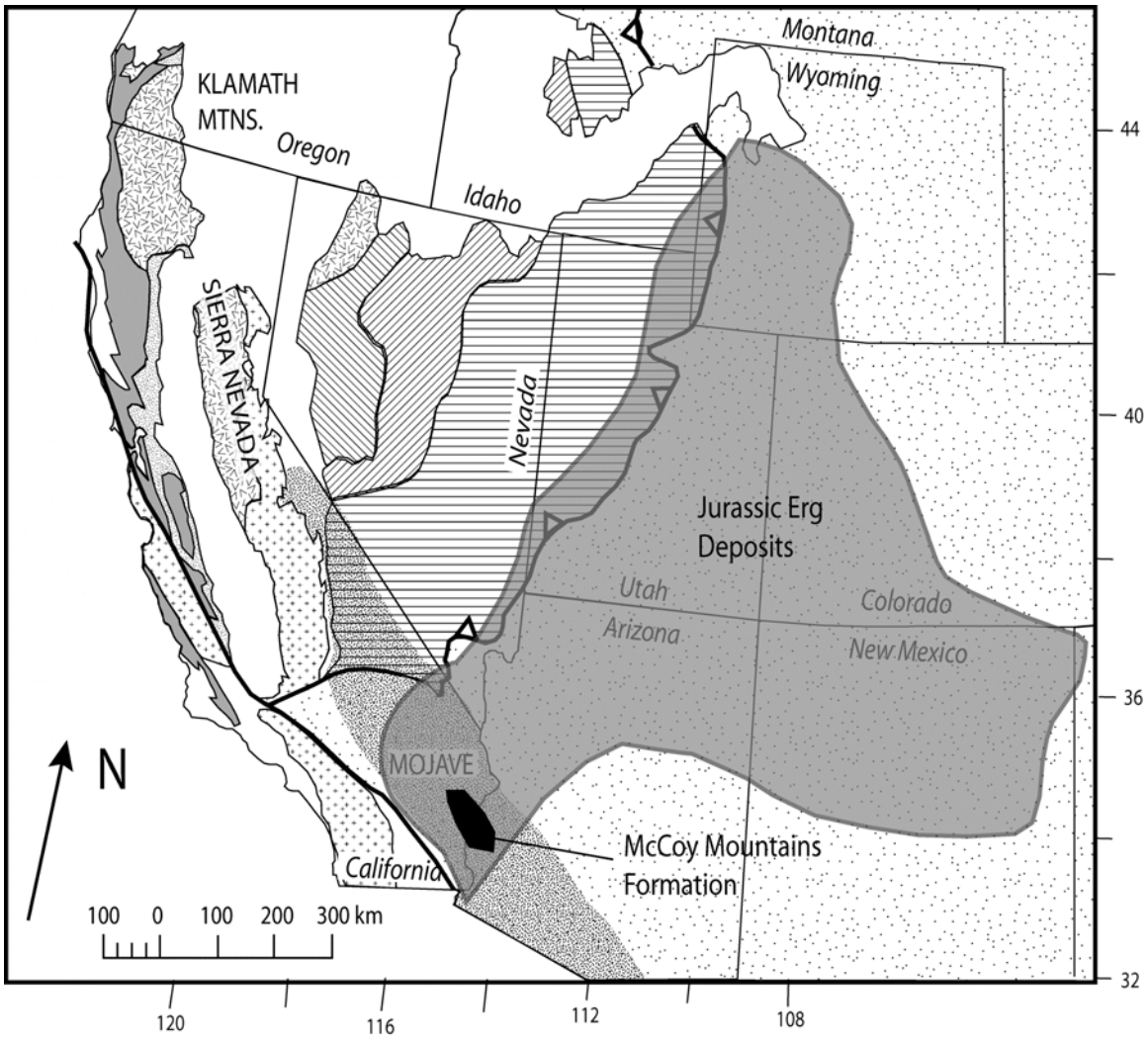


Figure 9: Jurassic Ergs and McCoy Mountains Formation

Map showing distribution of Jurassic erg deposits (Dickinson and Gehrels, 2003) and the location of the Jura-Cretaceous McCoy Mountains Formation (Barth et al., 2004). Adapted from Wright and Wyld (2007).

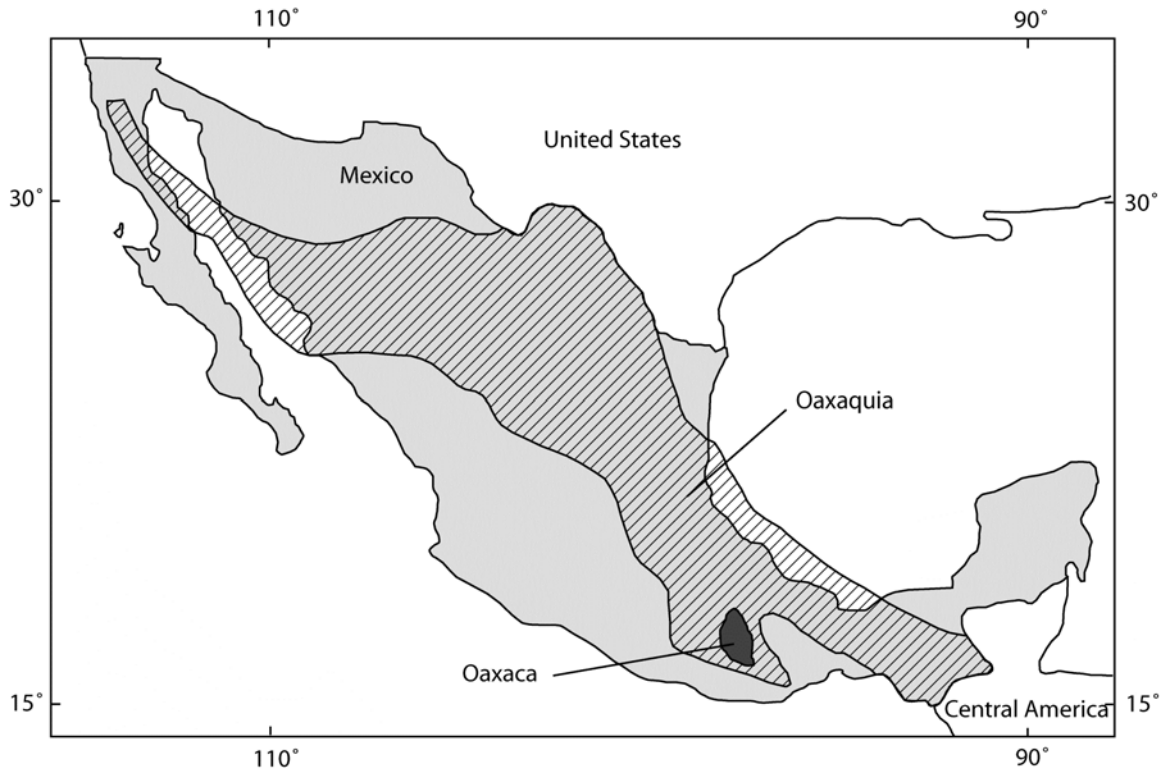


Figure 10: Oaxaca Terrane

Map showing location of Oaxaca terrane and Oaxaquita which is considered to be underlain by the Oaxaca terrane. Adapted from Keppie et al. (2003).

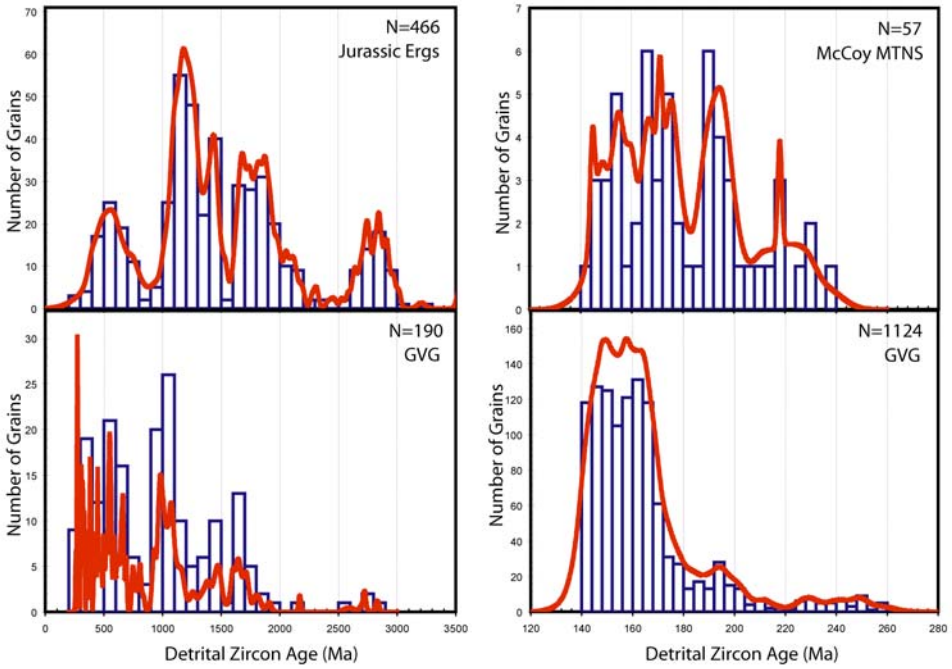


Figure 11: Great Valley Group vs. Jurassic Ergs and McCoy Mountains Formation (Left) Comparison of Jurassic erg deposits with pre-260 detrital zircon signature of Jurassic Great Valley Group strata. Great Valley Group data from Wright and Wyld (2007), Surpless et al. (2006), and this paper. Erg data from Dickinson and Gehrels (2003). (Right) Comparison of the 140-260 Ma zircons from the McCoy Mountains Formation with 140-260 Ma zircons from the Great Valley Group. Great Valley Group data from Wright and Wyld (2007), Surpless et al. (2006), and this paper. McCoy Mountins Formation data from Barth et al. (2004).

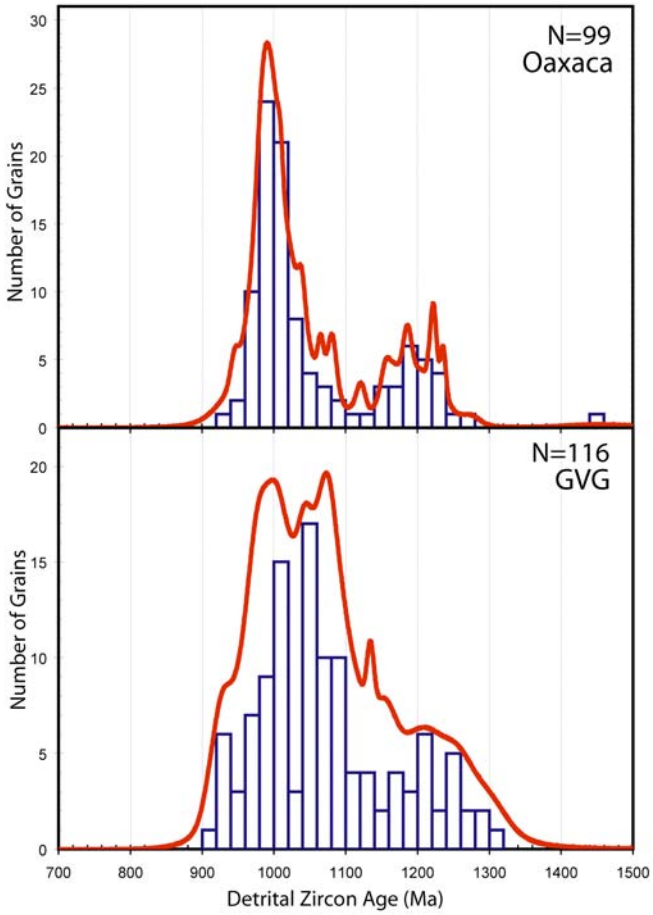


Figure 12: Great Valley Group vs. Oaxaca Terrane

Detrital zircon signature of grains between 900 Ma and 1300 Ma in the Oaxaca terrane compared to the same aged grains in the Great Valley Group. Great Valley Group data from Wright and Wyld (2007) and this paper. Oaxaca terrane data from Gillis et al. (2005).

CHAPTER 3

NEW DATA AND ANALYSES

The purpose of this research is test the hypothesis of Wright and Wyld (2007) that the Klamath GVG and Coast Range GVG accumulated in separate basins and were juxtaposed by strike-slip faulting. Twenty-two Great Valley Group samples were collected for detrital zircon analysis, of which 14 were analyzed. Nine samples from Wright and Wyld (2007) were also used (Table 3). The results from the Klamath GVG and Coast Range GVG were compared against each other to show similarities and differences in provenance. Petrographic analyses were also performed to see if there were significant differences between Klamath and Coast Range samples.

New Petrographic Data

Petrographic analysis of the Great Valley Group was performed on 14 thin sections from the Klamath (KGV-2, KGV-4, KGV-7, KGV-8, and KGV-10) and the Coast Range (SM-1, GR-1a, EC-3, EC-5, NV-1, CFP-2, PK-2, VGV-1, and VGV-4) portions of the Great Valley Group. This work was based on Ingersoll (1983) which attempted to tie provenance to petrography of Great Valley Group samples. The samples were analyzed in to investigate possible differences in provenance between the Klamath GVG and the Coast Range GVG. The samples that were used were 26 x 46 mm unstained thin sections and were counted using a Carl Zeiss point counting device to perform 300 counts on each slide.

The data (Table 4; Figures 13-16) shows that only one of Ingersoll's (1983) parameters showed a difference between the Klamath and Coast Range GVG. The only one of Ingersoll's

(1983) parameters that seemed to show any distinction between the Klamath GVG and Coast Range GVG is the Lv/L parameter. For the Klamath samples Lv/L is 21.2±3.8 % while the Lv/L for the Coast Range samples is 67.4±6.3 % (Figure 15). The lithic material in the Klamath samples is primarily metamorphic or sedimentary in nature, whereas the majority of lithics in the Coast Range samples are volcanic.

Because using Ingersoll's (1983) petrographic parameters as a basis for my analysis did not yield particularly useful results, I analyzed the petrographic data using two other methods. First I looked at the raw petrographic data (Appendix A) from my point counts to see if there were any observable differences between the Klamath GVG and Coast Range GVG Samples. The three petrologic components that I found to show differences between the Klamath GVG and Coast Range GVG were chert, sedimentary lithics, and limeclasts. With respect to chert, the Klamath GVG samples averaged 6.13 % with 80 % of the samples containing less than 7 % chert, while the Coast Range GVG samples averaged 18.2 % with 56 % of the samples containing more than 21 % chert. With respect to sedimentary lithics, the Klamath GVG samples averaged 7 % with 60 % of the samples containing more than 5.3 % sedimentary lithics, while the Coast Range GVG samples averaged 1.9 % with 56 % of the samples containing less than 2 % sedimentary lithics. With respect to limeclasts, the Klamath GVG samples averaged 12.7 % with 60% of the samples containing more than 17 % limeclasts, while the Coast Range GVG samples averaged 6.8 % with 56% of the samples containing less than 3 % limeclasts. The Klamath GVG has more sedimentary lithics and limeclasts, but less chert than the Coast Range GVG. These differences suggest that source regions for detritus differed significantly between the Coast Range GVG and Klamath GVG basins.

To further analyze the new petrographic data I performed a Principal Component Analysis in R (http://www.r-project.org), a statistics program. Principal Component Analysis is a mathematical procedure that transforms a number of correlated variables into the same number of uncorrelated variables called principal components (PCs). The first principal component is defined as showing the greatest variance in any projection of the data (Smith, 2002). The second principal component shows the second greatest variance and this continues to the nth principal component where n is the number of original variables. Each of the original variables influences the principal components to a different degree which can be shown in correlation biplots. In correlation biplots two principal components are plotted against each other with arrows (loadings) representing the original variables (Smith, 2002). The length of the arrows as well as their angle from each axis show how much they contribute to each principal component, with long arrows and small angles indicating a greater contribution. The results of the analyses were then plotted on correlation biplots to see if the Klamath GVG could be distinguished from the Coast Range GVG. When plotting PC 1 vs. PC 3, a distinction between Klamath GVG and Coast Range GVG samples can be easily seen (Figure 17). The Klamath GVG samples all plot in the upper left quadrant (negative PC 1, positive PC 3) with the exception of KGV-8 which has a slightly negative PC 3 value, while the Coast Range GVG samples all plot in the remaining 3 quadrants with the exception being VGV-1 which has a slightly negative PC 1 value to place it in the upper left corner. Plotting PC 1 vs. PC 4 also shows a strong distinction between the Klamath GVG and Coast Range GVG (Figure 18) The Klamath GVG samples all plot in the lower left quadrant (negative PC 1, negative PC 4) with the exception of KGV-2 which has a slightly positive PC 4 value. Both the principal component analysis and the raw data analysis

show that the Klamath GVG and Coast Range GVG are petrologically distinct and imply that the Klamath GVG and Coast Range GVG had different source regions.

Detrital Zircon Methods

The twenty-two samples (Table 3; Figure 19; Plate 1) were separated by using the following procedures: rock samples were crushed using a jaw crusher; rock fragments were powdered using a disk mill; powdered samples were run over a Gemeni table to concentrate heavy minerals; a hand magnet was passed over remaining sample to remove iron filings; nonmagnetic fraction was placed in methylene iodide with a density of 3.3 g/cm^3 for density separation; heavy fraction was magnetically separated using a Frantz magnetic separator; nonmagnetic fraction was bathed in hydrochloric and nitric acid; remaining sample was observed under a microscope to make sure that only zircon remained.

The twenty-two zircon separates (Appendix B) were analyzed at the Arizona Laserchron Center at the University of Arizona under the direction of Dr. George Gehrels. The Laserchron Center has a Multicollector Inductively Coupled Plasma Mass Spectrometer (GVI Isoprobe) coupled to a ArF 193 nm Excimer laser ablation system (LAMCICPMS), which can be used to acquire high precision U-Th-Pb ages. The diameter of the beam was set to 35 microns and pits were 15 microns deep. Each analysis consists of a 20 second background peak integration, 12 one second integrations with the laser firing, and a 30 second delay to prepare for the next sample by purging the previous sample. For measurements of $^{206}Pb/^{238}U$, $^{206}Pb/^{204}Pb$, and $^{206}Pb/^{207}Pb$ the error is approximately 1-2 %. For detrital samples approximately 100 analyses are necessary with a blank measured before every analysis and a standard measured after every 5 unknown analyses. The standards used to monitor fractionation were SL, large concordant zircon from Sri Lanka with a known ID-TIMS age of 564±5 Ma and 49127 with a known age of

136.6±4 Ma. For each sample a NIST 610 glass was also analyzed to monitor Uranium and Thorium concentrations (Gehrels et al., 2006). The LAMCICPMS was operated for a total of 72.5 hours over the course 5 days and 31 samples were analyzed with an efficiency of 89.8, which means that only approximately 10% of the analyses had to be discarded, usually due to the laser burning through the zircon and into the epoxy.

Additional zircon samples (Appendix C) used in this study were prepared using the separation methods above and analyzed by Wright and Wyld (2007) at the Stanford-USGS Microisotopic Analytical Center (SUMAC). The instrument used was a Sensitive High Resolution Ion Microprobe Reverse Geometry (SHRIMP-RG) unit with an O^{-}_{2} primary beam with intensity of 6-10 nA, mass resolution of 6500-7500 at 10% peak height, and sensitivity of 5-15 counts per second normalized to the beam current in nA and the Pb concentration in ppm in SL13 standard. The diameter of the beam was 20-40 microns and each analysis consisted of five scans through each isotopic mass for a total of 65 seconds, counting 2 s on Zr_2O, 7 s on ^{204}Pb, 7 s on background, 12 s on ^{206}Pb, 16 s on ^{207}Pb, 10 s on ^{208}Pb, 5 s on ^{238}U, 3 s on $^{248}(ThO)$, and 3 s on $^{254}(UO)$ (Degraaff-Surpless et al., 2002).

The data collected from the LAMCICPMS at the Arizona Laserchron Center and the SHRIMP-RG at the SUMAC were then collated and transformed into probability density plots using Isoplot (Ludwig, 2000) which operates within Microsoft Excel. The program uses the age and uncertainty of the analyses to plot a curve on a graph using the following equation (Sircombe 2000):

$$f(t) = \sum_{i=1}^{N} \frac{1}{e_i \sqrt{2\pi}} \exp(-(t - x_i)^2 / 2e_i^2)$$

where x_i is the age measurement, e_i is the analytical error, t is the age, and N is the sample size (Sircombe 2000). In probability density plots the area under the curve of each individual analysis is the equal to each other (100%). The position of a curve for an individual analysis is determined by the age of the analysis while the shape of the curve (tall and narrow, short and wide, etc.) is determined by the uncertainty. The curves are summed together to form an age distribution for the sample.The Great Valley Group zircon data is shown in probability density plots with histograms to indicate the number of analyses over a certain age range. The plots make it easy to compare Coast Range and Klamath GVG of different ages.

New Detrital Zircon Data

When comparing the zircon data from the Coast Range and Klamath GVG (Appendix B, C) it is easiest to separate the data by detrital zircon age so the plots do not become too cluttered and difficult to interpret. Thus, the data has been separated into plots of analyses from 0-300 Ma and 300-3500 Ma. The data have been separated by depositional age so that changes in the zircon signatures of the Coast Range and Klamath GVG can be seen with the passage of time.

Zircon signatures of the 0-300 Ma range differ in the Coast Range and Klamath GVG. The Coast Range GVG analyses from 0-300 Ma (Figure 20) show that approximately 75% of the analyses form a peak of Late Jurassic to Early Cretaceous age (Oxfordian to Berriasian; 140-165 Ma), with a smaller peak, composed of approximately 5% of analyses, from late Aptian to Albian (105-115 Ma). The Klamath GVG analyses from 0-300 Ma (Figure 20) display two peaks, one in the Neocomian (130-140 Ma) comprising approximately 55% of the analyses, and one in the Middle to Late Jurassic (Bathonian to Callovian; 160-170 Ma) comprising approximately 40% of the analyses. The Klamath GVG also has a significant dip in Late Jurassic zircons almost directly aligned with the peak in the Coast Range GVG. In summary, the

Klamath GVG samples are full of Early Cretaceous (Neocomian) zircons and Middle Jurassic (Bathonian to Callovian) zircons and lack Late Jurassic zircons while the Coast Range GVG samples are dominated by Late Jurassic and earliest Cretaceous (Oxfordian to Berriasian) zircons.

The Klamath GVG zircon signature from 0-300 Ma suggests that the detritus came from plutons in the nearby Klamath Mountains. Plutonic rocks are an important source of detrital zircons due to the fact that an abundance of detrital zircons of a certain age can easily be tied to a nearby pluton of the same age. The Neocomian peak (136 Ma) contains about 20 % of all Klamath analyses from 0-300 Ma, and several plutons in the southern Klamaths are of that age, including Shasta Bally (136 Ma), Craggy Fork (136 Ma), Sugar Pine (137 Ma), and Caribou Mountain (138 Ma) (Figure 21; Lanphere et al., 1968; Lanphere and Jones, 1978; Hacker and Ernst, 1993). The Middle to Late Jurassic peak is highest at 168 Ma and several plutons exist in the southern Klamaths of similar age including Ironside Mountain (170 Ma), Wildwood (169 Ma), Denny Complex (168 Ma), and Price Creek (170) (Figure 21; Wright and Fahan, 1988). Paleocurrent data indicates mostly north to south sediment transport in the Late Jurassic to Early Cretaceous (Suchecki, 1984) so the Klamath Mountains could be a viable source of detritus for the Klamath GVG since the two large peaks represent the two largest plutons (Shasta Balley and Ironside Mountain) in the southern Klamaths. The majority of the zircons from the Coast Range GVG are Middle to Late Jurassic (145-165 Ma) and although there are many plutons in that age range in the Klamath Mountains, the lack of strong peaks from the two largest plutons in the southern Klamaths suggests that most of the detritus from the Coast Range GVG came from a different source.

The differences in the zircon signatures of the Coast Range and Klamath GVG analyses between 300 and 3500 Ma (Figure 22) are less apparent. Three main features to note in the Coast Range GVG are: a series of peaks throughout the Paleozoic, with highs in the Late Mississippian (320-340 Ma) and Early to Middle Devonian (375-420 Ma) and a trough in the Early Mississippian (345-355 Ma); a series of peaks in the Early Paleozoic and Neoproterozoic, with highs in the Early Cambrian (510-530 Ma) and Late Proterozoic (600-640 Ma); and a dual peak of Middle Proterozoic age (1000-1200 Ma) and Early to Middle Proterozoic age (1400-1800 Ma) with a Middle Proterozoic trough (1250-1350 Ma). In the Klamath GVG the most important feature is a main peak in the Late Devonian and Early Mississippian (340-370 Ma) with smaller peaks for the Early to Middle Proterozoic (1000-2000 Ma) the Late Archean (2700-2800 Ma). The Klamath GVG also has a small peak of zircons (1.8-2.0 Ga) that is not apparent in the Coast Range GVG. One other important feature is that the Coast Range data slopes much more steeply from 1 Ga to 3 Ga than the flat Klamath signature. In summary there are several important differences between the Coast Range and Klamath GVG samples for the 200-3500 Ma grains. The Coast Range GVG has a much higher component of Early Paleozoic and Neoproterozoic grains, whereas the Klamath GVG has a much higher component of Late Devonian and Early Mississippian grains, and also there is a distinct difference in the shape of the Klamath and Coast Range GVG zircon distribution from 1 Ga to 3 Ga.

The Coast Range GVG zircon signature from 300-3500 Ma (Figure 22) suggests that local sources probably did not provide the majority of the detritus. Local sources are dominated by 1.8-2.1 Ma zircons while the Coast Range GVG has only a few analyses in this age range. Also, the Coast Range GVG contains zircons in the age ranges of 500-800 Ma and 1.4-1.6 Ga while the local sources have almost no zircons of those ages. The Coast Range GVG is

consistent with the zircon signature of the Jurassic erg deposits of the Colorado Plateau. The main difference between these two signatures is that the Jurassic ergs have a strong peak at 1.2 Ga (Dickinson, 2003) while the Coast Range GVG has a younger with a peak of approximately 1.0 Ga. The differences between the Coast Range GVG and local sources, combined with the similarity of the signature to the Jurassic erg deposits suggests that the Coast Range GVG was deposited farther to the south and later translated northward.

Another way of comparing the Coast Range GVG to the Klamath GVG is by separating the analyses by the age of the rock from which the zircon was extracted and comparing samples of similar age (Figures 23-25). Because most of the age data from all samples was between 0 and 300 Ma, few sample analyses lie in the 300-3500 Ma range. For example, in the Aptian to Albian strata only 38 zircons are outside of the 0-300 Ma age range, and thus would not make a useful plot. Because of this, I only discuss zircon age data from 0-300 Ma when comparing the Klamath and Coast Range GVG of different ages.

Comparing the Neocomian strata of the Coast Range GVG to the Klamath GVG shows two different zircon signatures (Figure 23). The Coast Range data shows two double peaks at approximately 145-150 Ma and 160-165 Ma with a trough between them at 155 Ma. The Klamath data shows a large peak at 136 Ma with two smaller peaks at 160 Ma and 168 Ma. The Klamath and Coast Range data are similar in that the double peak at 160-165 Ma in the Coast Range GVG matches the 160 Ma and 168 Ma peaks in the Klamth GVG. However, the 136 Ma peak that dominates the Klamath samples is not found in the Coast Range samples. The Klamath GVG lacks data (only 2 samples) between 180 Ma and 300 Ma, while many samples (76) in the Coast Range GVG lie in that age range.

Comparing the Aptian to Albian strata of the Coast Range GVG to the Klamath GVG shows distinct differences between the zircon signatures (Figure 24). The Coast Range data shows a narrow single peak at 112 Ma and a wider double peak at 145 Ma and 164 Ma, with a large trough between 115 Ma and 130 Ma. The Klamath data shows two large peaks at 135 Ma and 167 Ma with a trough between the two at approximately 145-155 Ma. The Klamath and Coast range data are different for the Aptian to Albian. The two peaks in the Coast Range data are located at low points in the Klamath data and the same is true of the peaks in the Klamath data. The Aptian to Albian data show similarities with the Neocomian data with the Klamath data showing a strong peak at 135-136 Ma in both ages and the Coast Range data showing a large double peak with most analyses falling between 140 Ma and 170 Ma.

Comparing the Cenomanian to Turonian strata of the Coast Range GVG to the Klamath GVG shows two similar zircon signatures (Figure 25). The Coast Range data shows a broad peak between 138 Ma and 144 Ma and a double peak from 156-164 Ma. The Klamath data shows a broad peak at approximately 137-141 Ma and a small triple peak from 156-170 Ma. This data shows strong similarities with the two most prominent peaks in both the Klamath and Coast Range data in the same age range. As in the older samples, the 136 Ma peak in the Cenomanian to Turonian Klamath GVG data is present in the Coast Range data as well. The double peak from 155-170 Ma is present in both the Klamath and Coast Range data as it was in the Neocomian samples. The fact that the Klamath GVG and Coast Range GVG zircon signatures are so similar in the Cenomanian to Turonian samples suggests that by approximately the Cenomanian the two basins were now part of one large basin. This is supported by the fact that Cenomanian strata are the oldest Great Valley Group deposits to span the entire Great Valley basin and also deposited on Sierran basement (Williams, 1997).

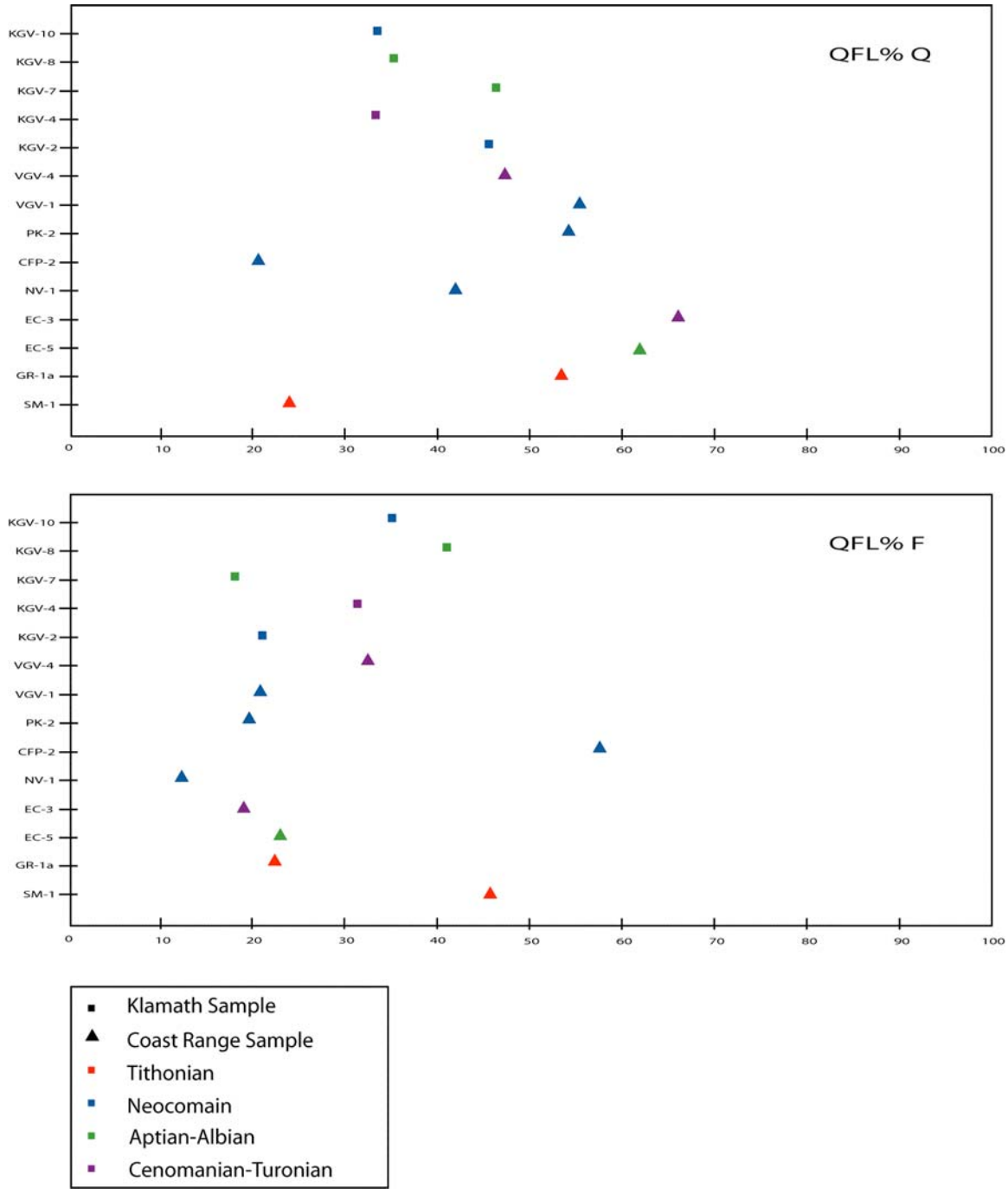


Figure 13: Q % and F %

Graphs of Quartz and Feldspar percentages for all 14 samples.

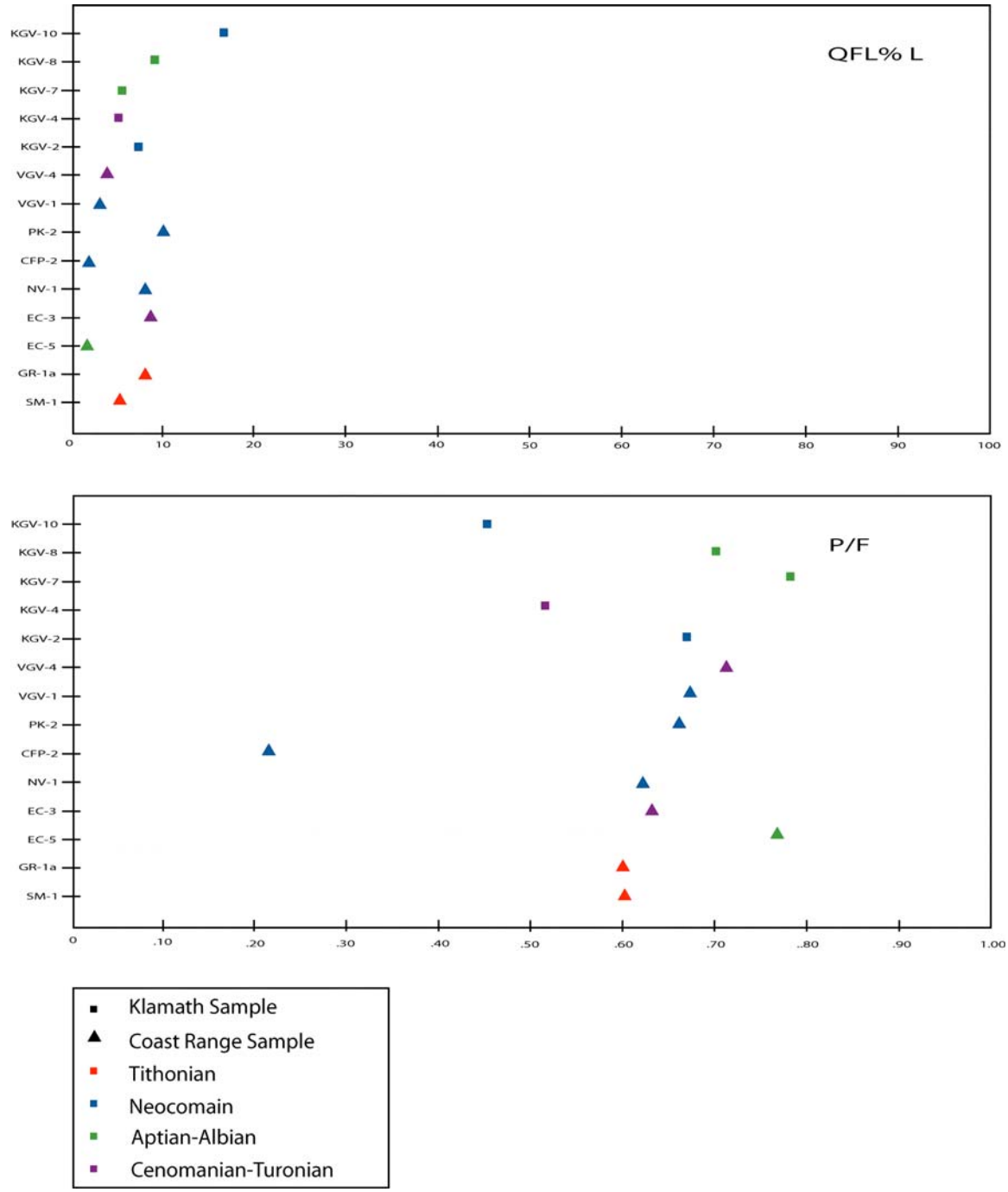


Figure 14: L % and P/F

Graphs showing Lithic percentage and P/F for all 14 samples.

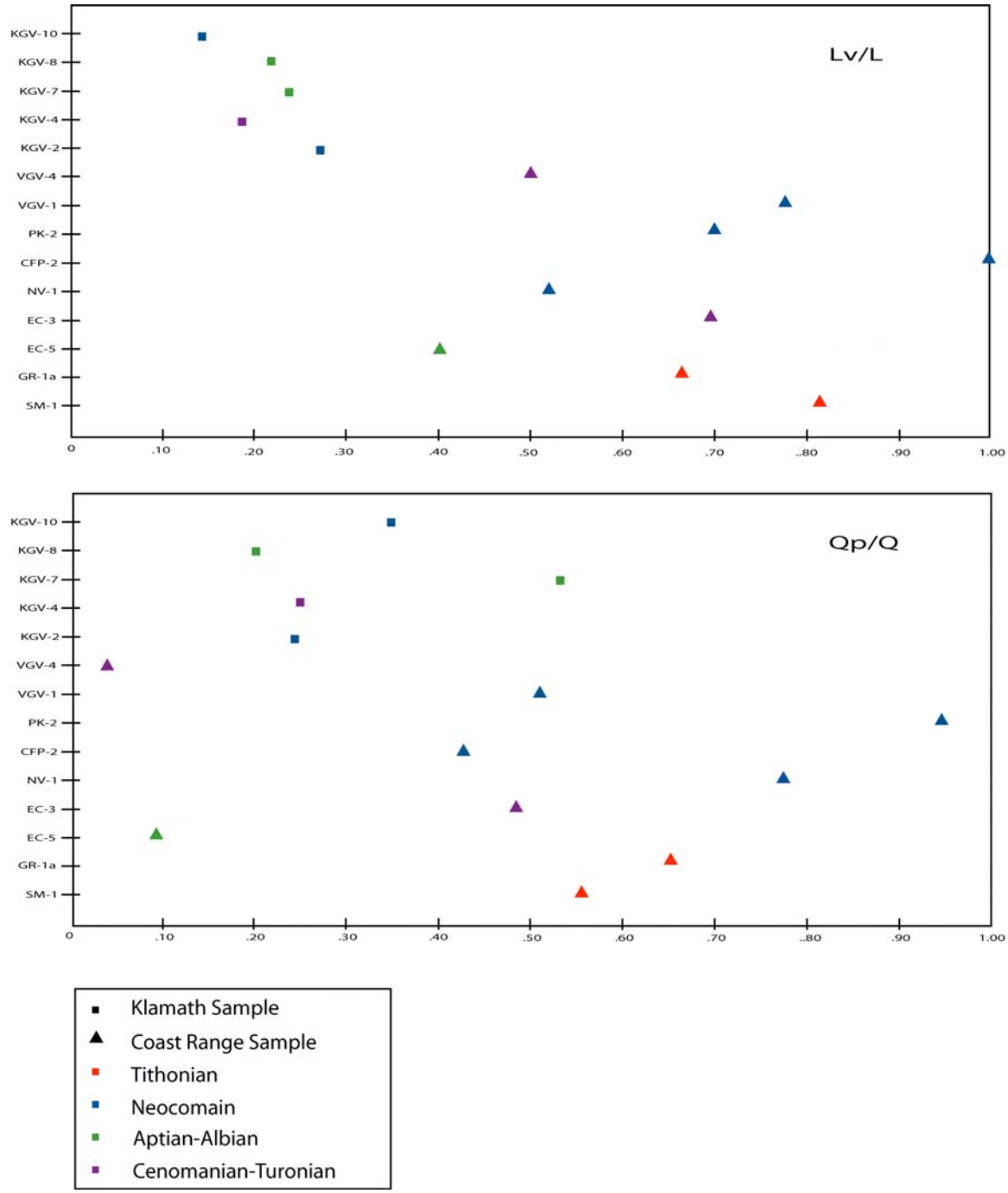


Figure 15: Lv/L and Qp/Q

Graphs showing Lv/L and Qp/Q for all 14 samples.

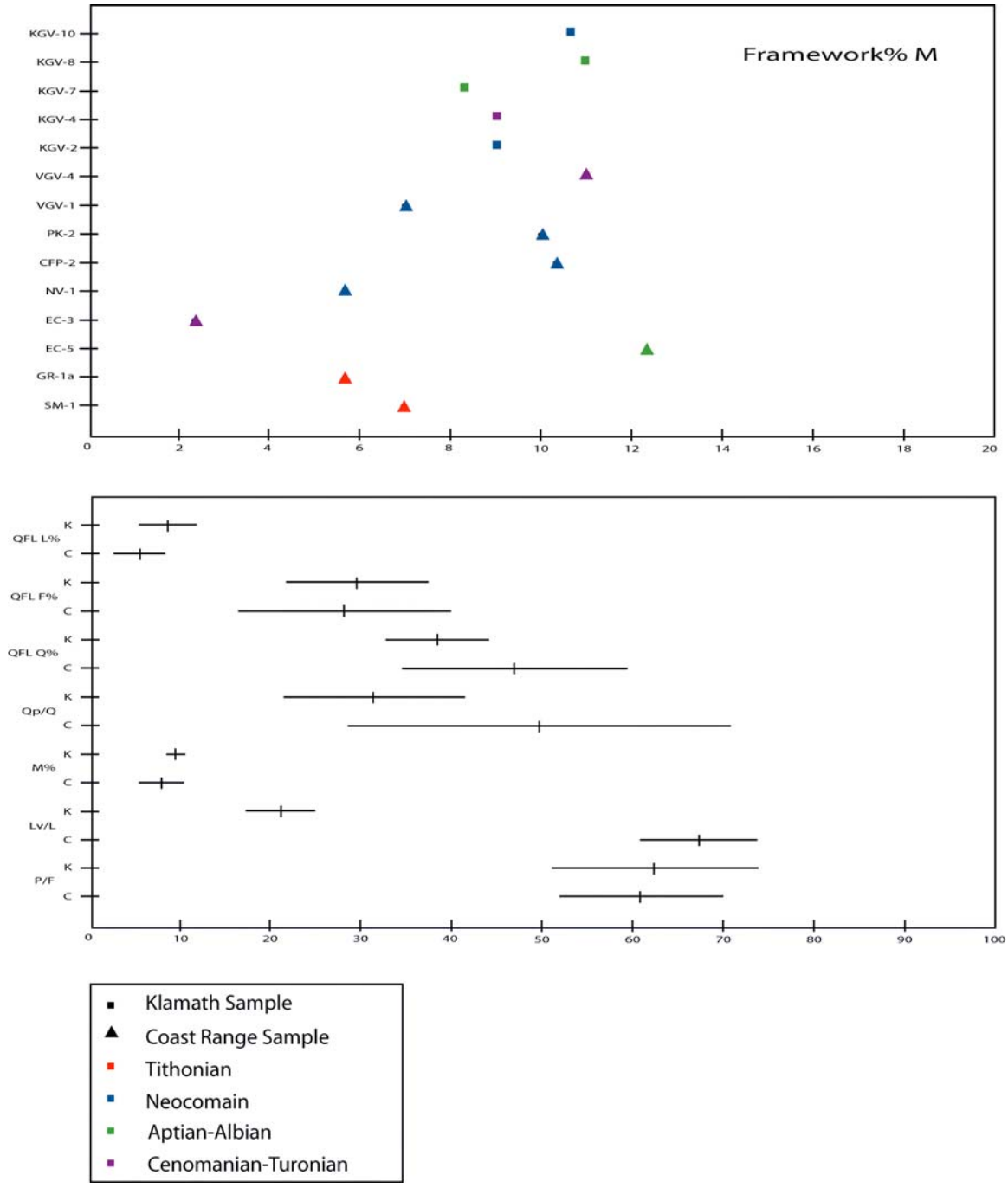


Figure 16: M % and Averages of all Petrographic Parameters

(Top) Graph showing the framework % of M for all 14 samples. (Bottom) Graph showing the averages and standard deviations for all 7 petrographic parameters in Klamath (K) and Coast Range (C) samples.

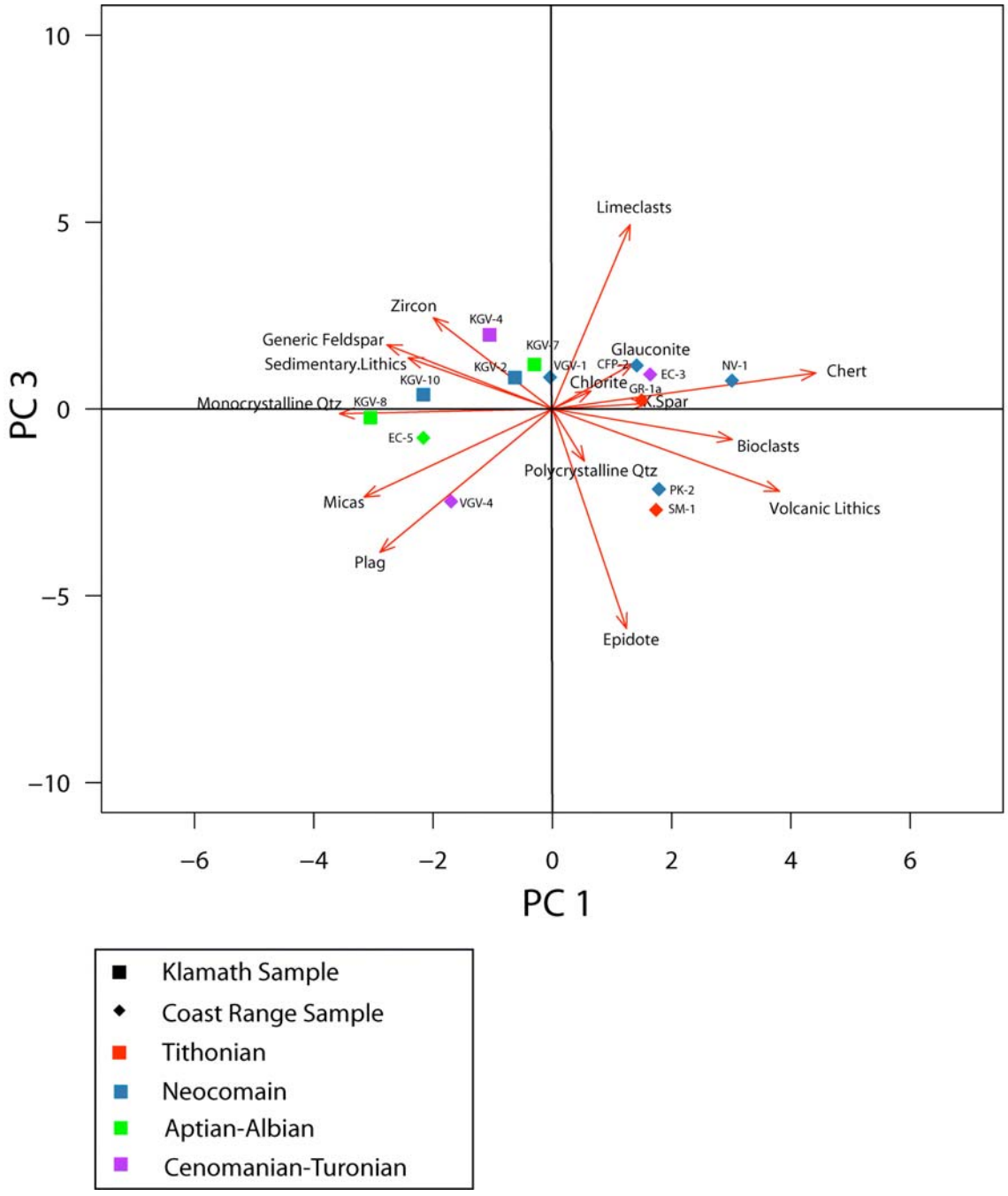


Figure 17: Correlation Biplot for PC 1 and PC 3

Correlation biplot showing the results of Principal Component Analysis plotted with respect to PC 1 and PC 3.

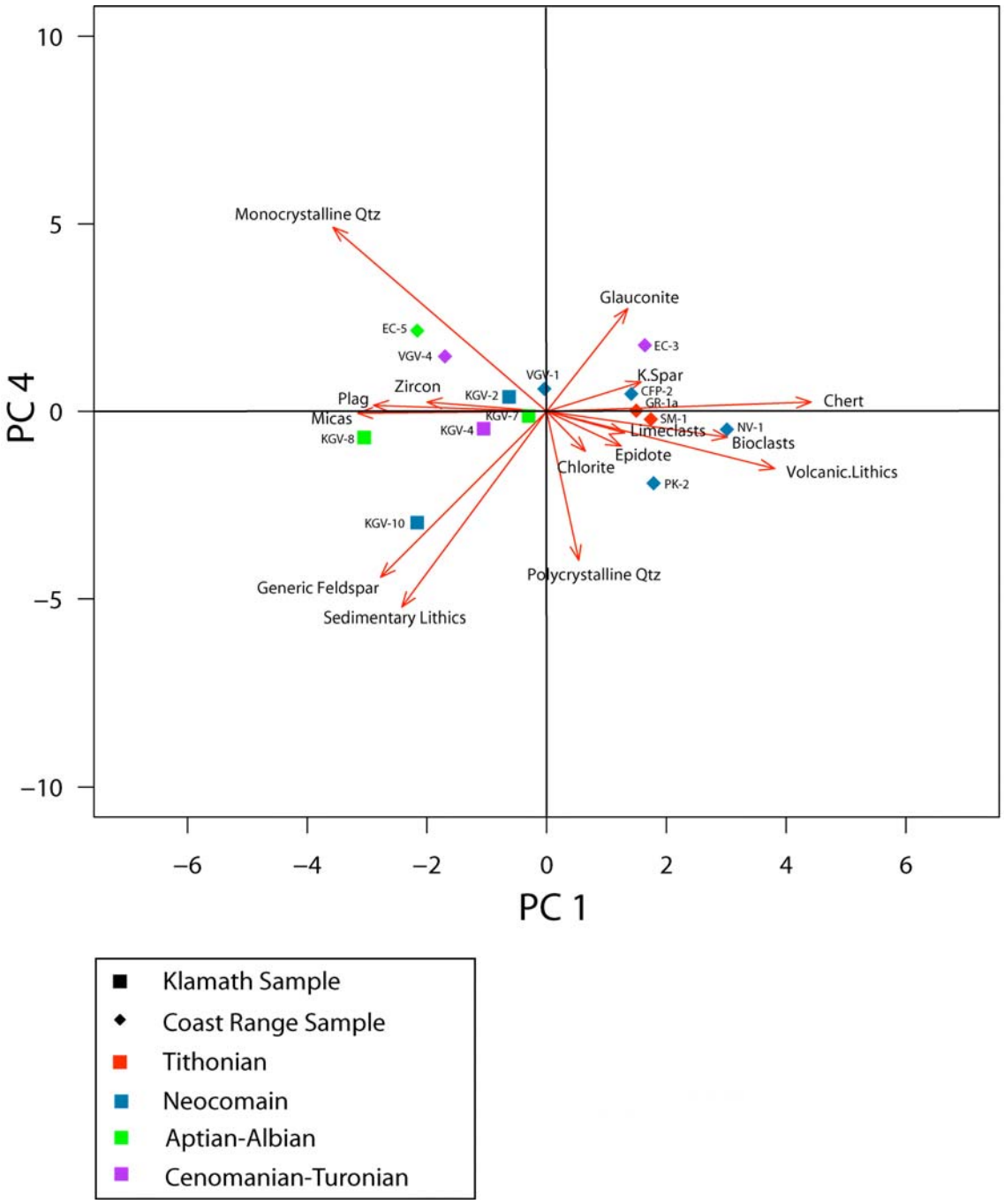


Figure 18: Correlation Biplot for PC 1 and PC 4

Correlation biplot showing the results of Principal Component Analysis plotted with respect to PC 1 and PC 4.

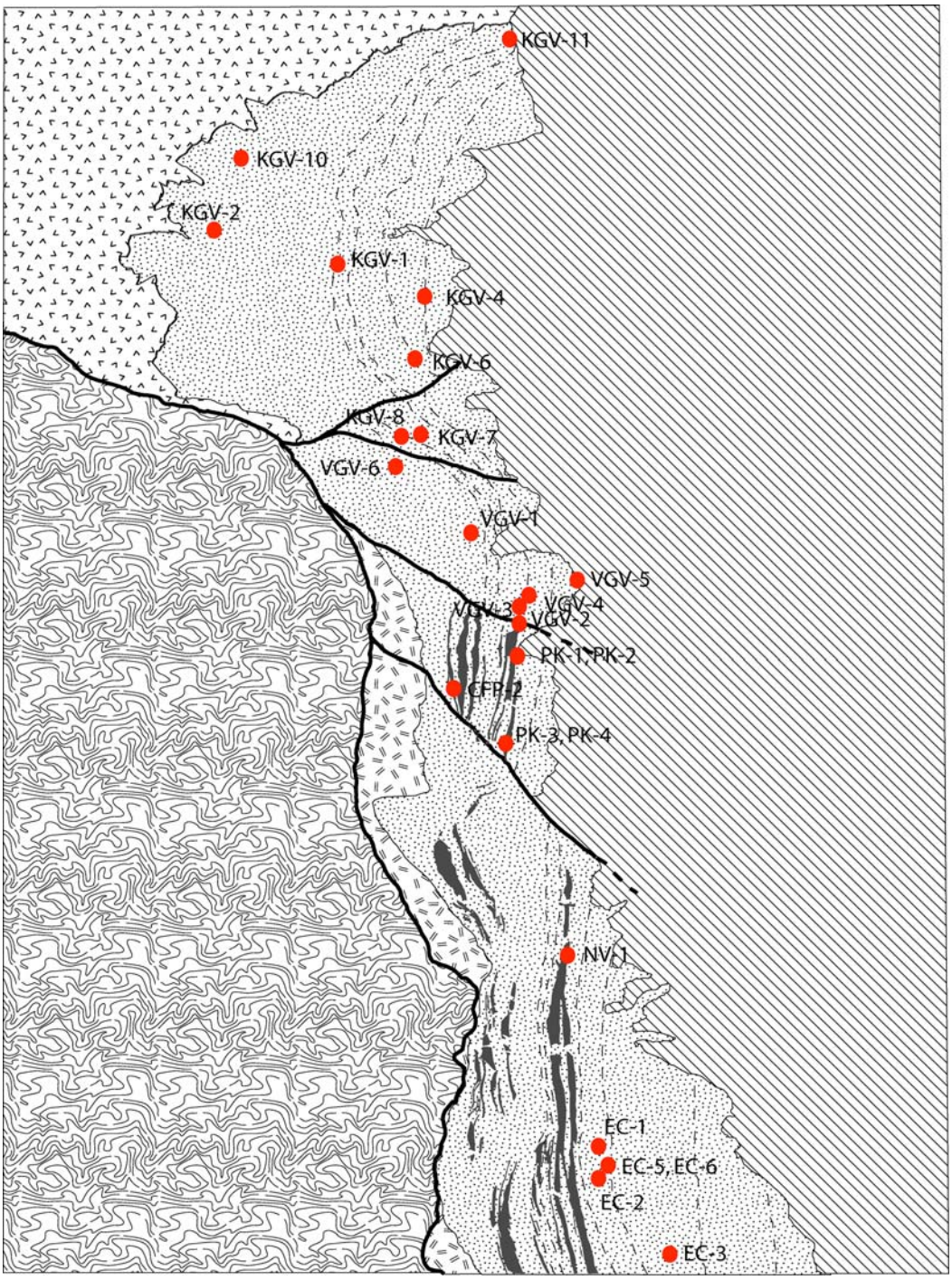


Figure 19: Sample Locations

Map showing locations of samples used for petrographic and detrital zircon analysis. PC-1, EC-4, GR-1a, and SM-1 are located off the map. Map base is the same as figure 2.

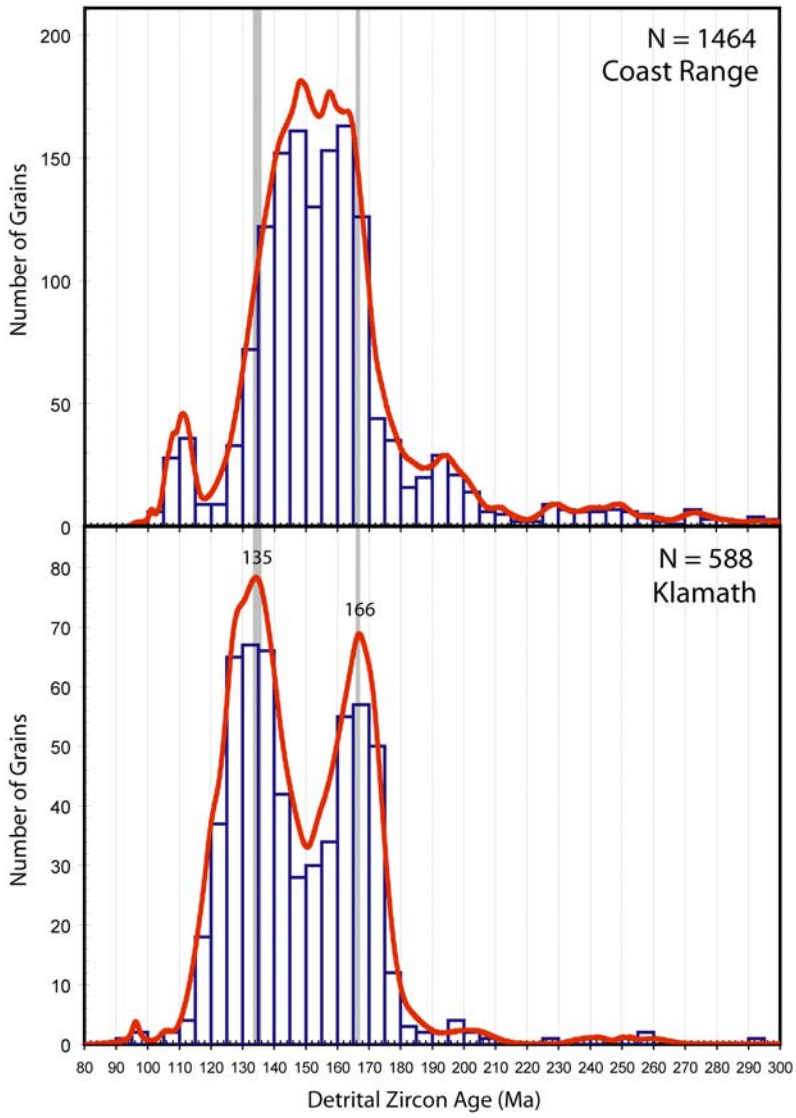


Figure 20: Coast Range GVG vs. Klamath GVG (0-300 Ma)
Comparison of 0-300 Ma analyses for the Coast Range GVG (top) and Klamath GVG (bottom). The shaded stripes are present to emphasize differences in the zircon signatures.

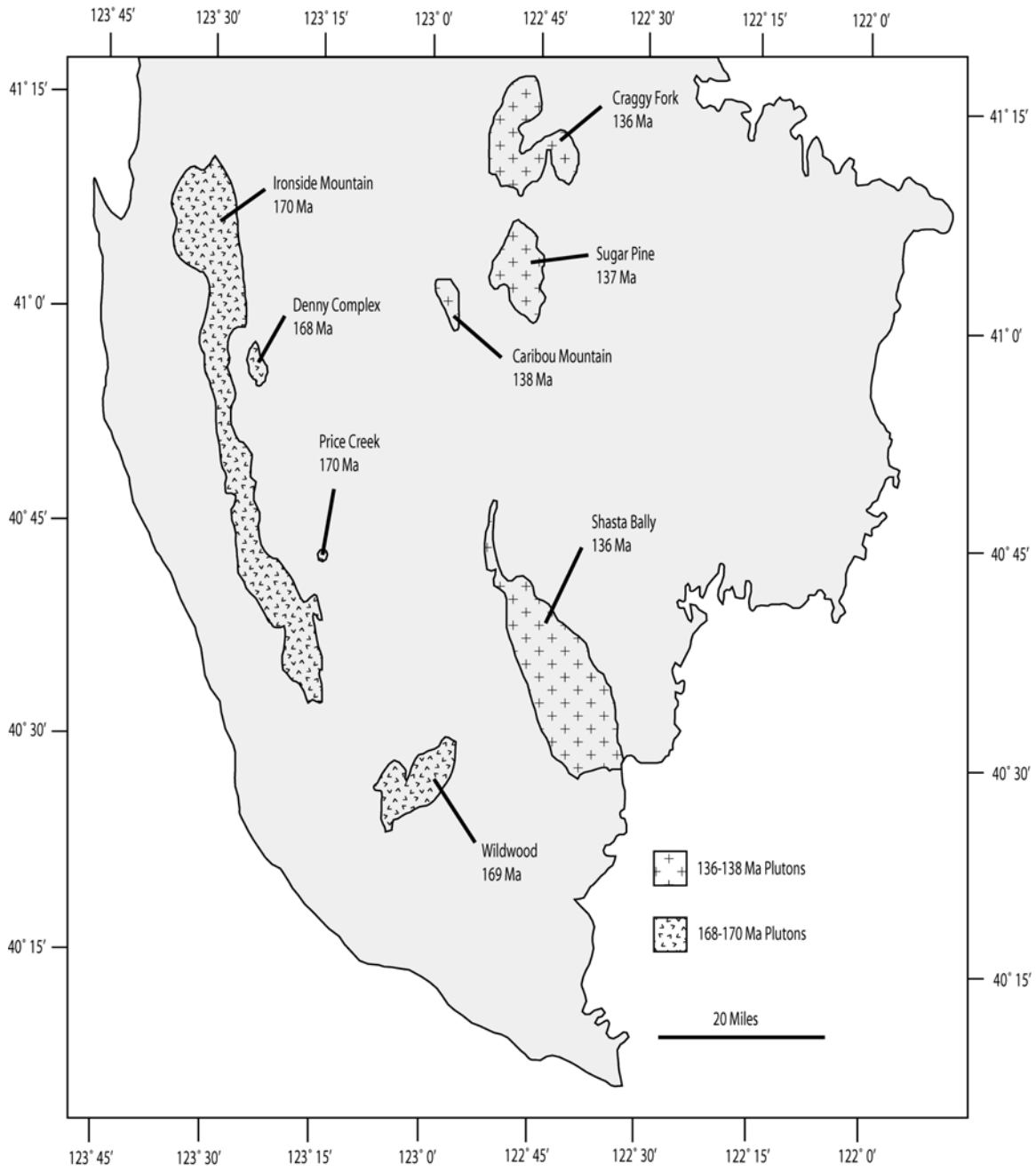


Figure 21: Plutons of Southern Klamath Mountains

Map of southern Klamath Mountains showing the locations of specific pluton ages that relate to detrital zircon analyses. Adapted from Irwin 2003. Age data from Wright and Fahan (1988) and Harper and Wright (1984).

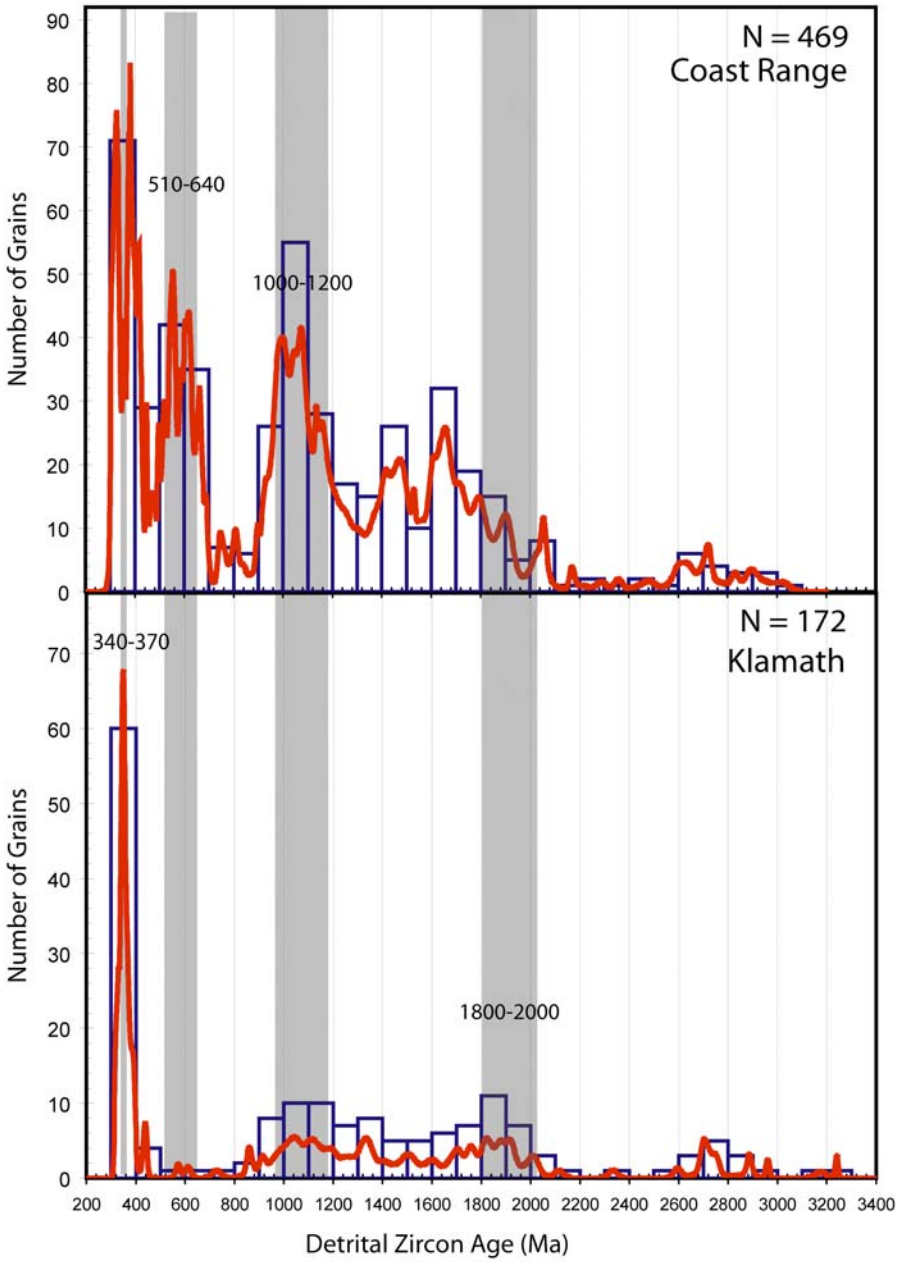


Figure 22: Coast Range GVG vs. Klamath GVG (300-3500 Ma)
Comparison of 300-3500 Ma analyses for the Coast Range GVG (top) and Klamath GVG (bottom). The shaded stripes are present to emphasize differences in the zircon signatures.

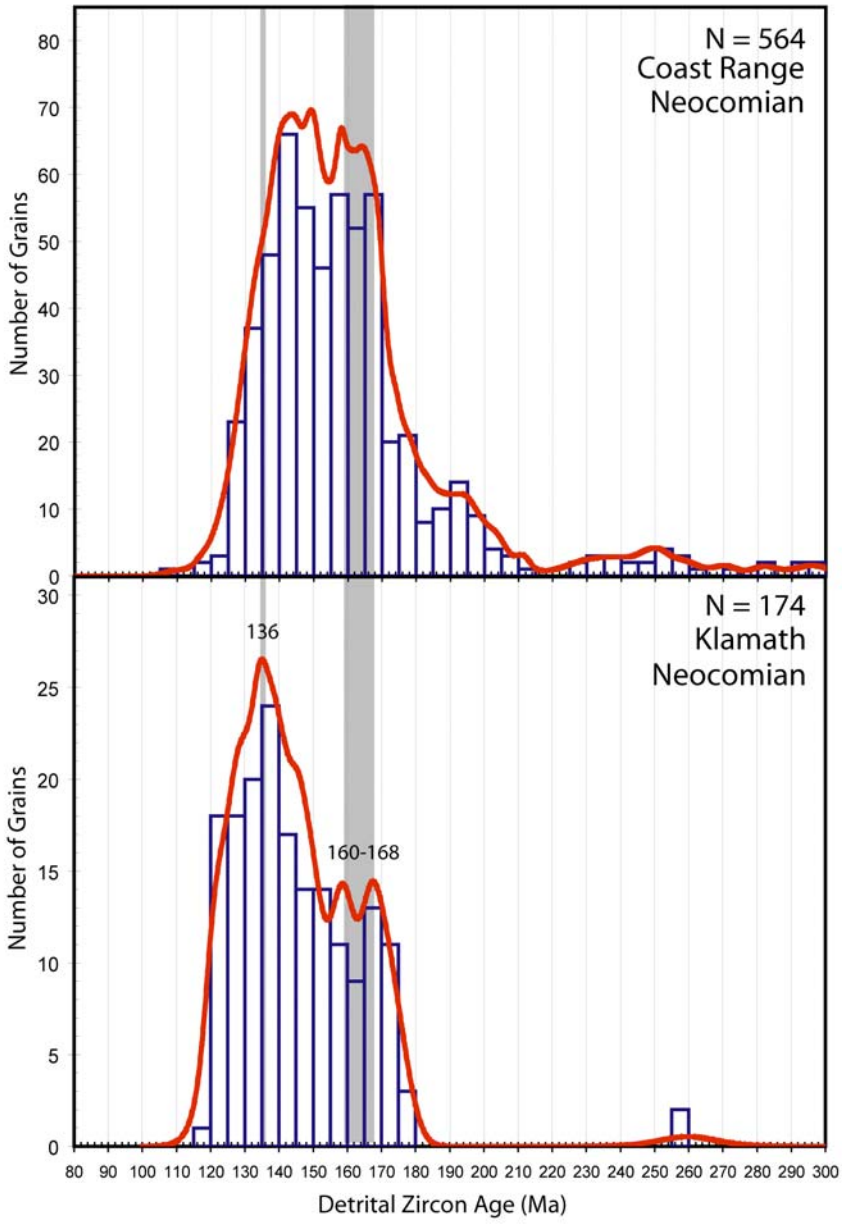


Figure 23: Neocomian Coast Range GVG vs. Klamath GVG

Comparison of 0-300 Ma analyses for the Neocomian strata in the Coast Range GVG (top) and the Neocomian strata in the Klamath GVG (bottom). The shaded stripes are present to emphasize differences in the zircon signature.

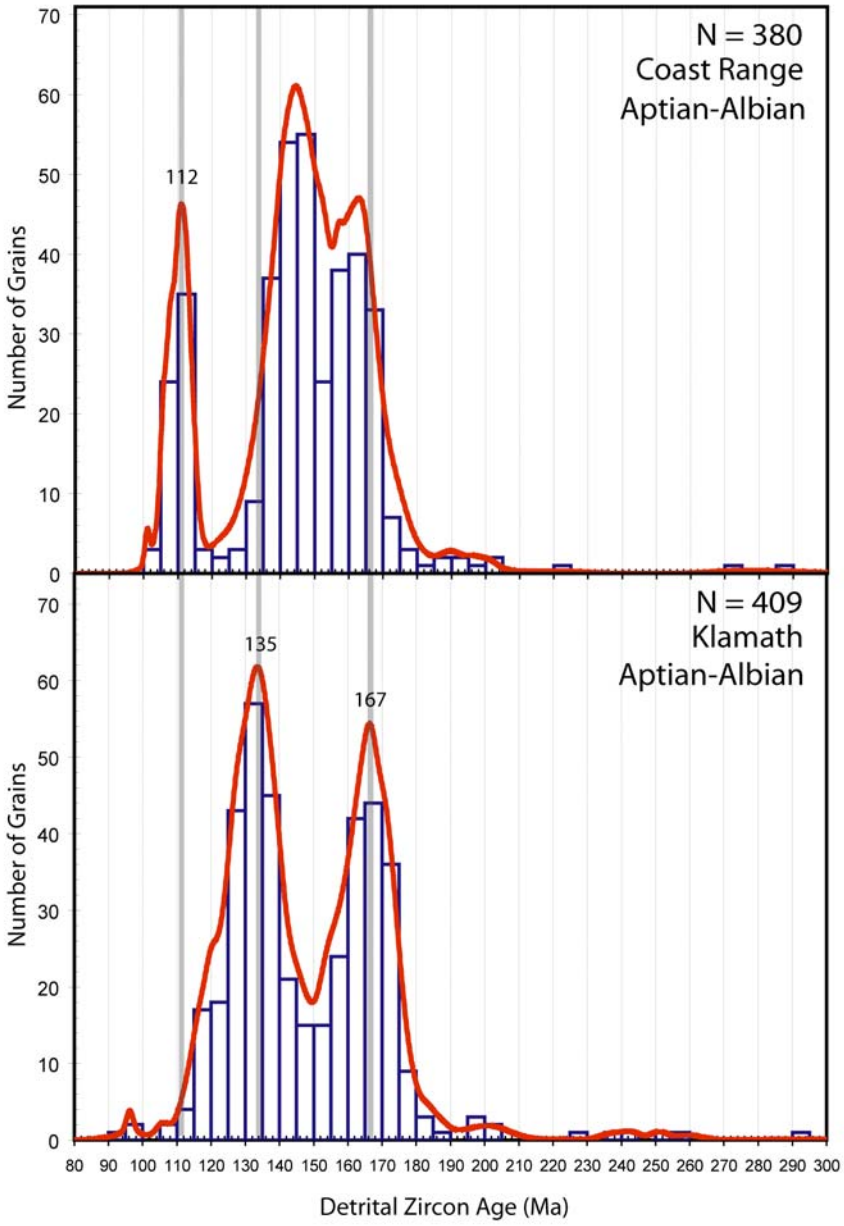


Figure 24: Aptian-Albian Coast Range GVG vs. Klamath GVG

Comparison of 0-300 Ma analyses for the Aptian to Albian strata in the Coast Range GVG (top) and the Aptian to Albian strata in the Klamath GVG (bottom). The shaded stripes are present to emphasize differences in zircon signatures.

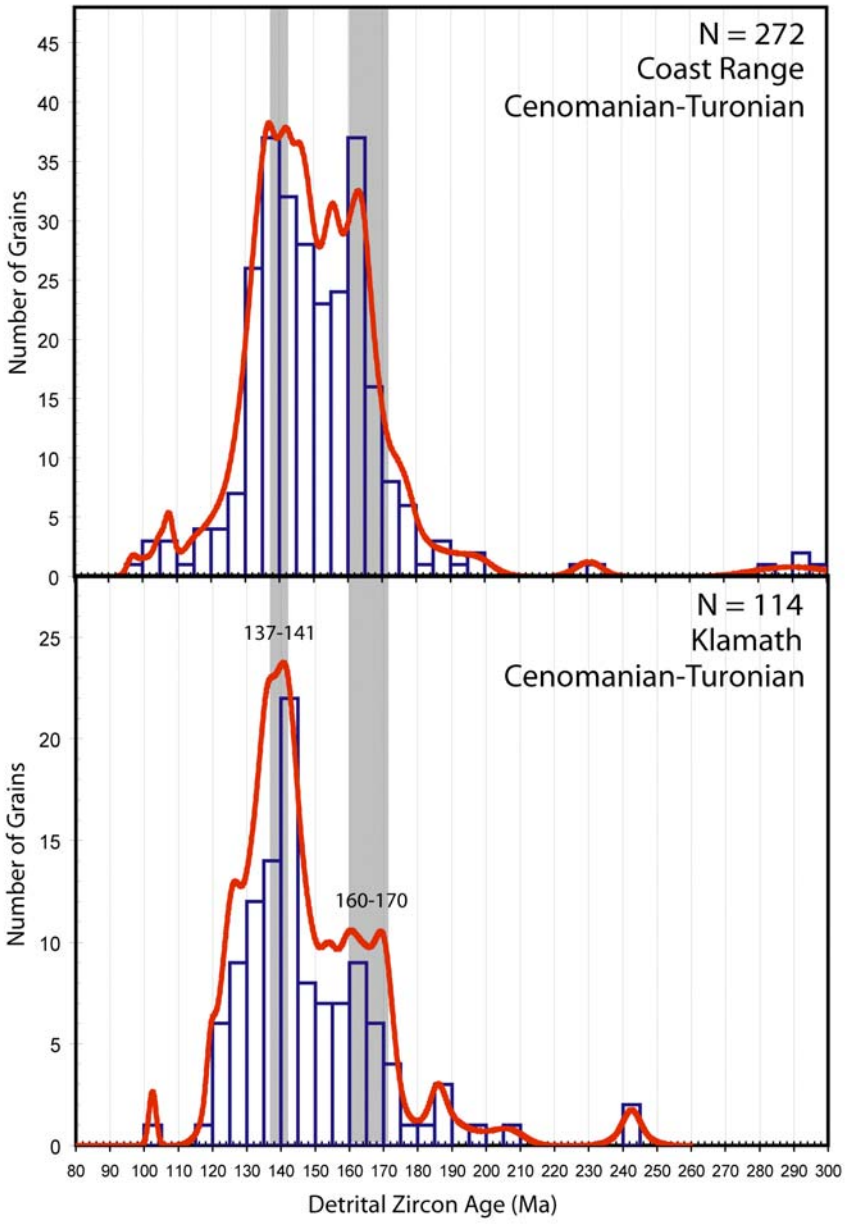


Figure 25: Cenomanian-Turonian Coast Range GVG vs. Klamath GVG
Comparison of 0-300 Ma analyses for the Cenomanian to Turonian strata in The Coast Range GVG (top) and the Cenomanian to Turonian strata in the Klamath GVG (bottom). The shaded stripes are present to emphasize differences in zircon signatures.

Table 3: Sample Information

Samples used for petrographic and detrital zircon analysis.

Sample	Age	Coast Range or Klamath	Petrographic or Zircon Analysis	Collected by	Location
PC-1	Aptian	Coast Range	Zircon Analysis	Jim Wright	N38º30.318, W122º06.905
PK-1	Valanginian-Berriasian	Coast Range	Zircon Analysis	Gabriel Izsak	N39º59.157, W122º34.435
PK-2	Valanginian-Berriasian	Coast Range	Both	Gabriel Izsak	N39º59.560, W122º33.618
PK-3	Valanginian-Berriasian	Coast Range	Zircon Analysis	Gabriel Izsak	N39º55.014, W122º31.459
PK-4	Valanginian-Berriasian	Coast Range	Zircon Analysis	Gabriel Izsak	N39º54.584, W122º33.930
EC-1	Aptian-Albian	Coast Range	Zircon Analysis	Jim Wright	N39º36.664, W122º31.686
EC-2	Barremian-Aptian	Coast Range	Zircon Analysis	Gabriel Izsak	N39º34.972, W122º31.296
EC-3	Cenomanian	Coast Range	Both	Gabriel Izsak	N39º31.755, W122º27.304
EC-4	Albian	Coast Range	Zircon Analysis	Gabriel Izsak	N39º27.220, W122º27.383
EC-5	Albian	Coast Range	Petrographic Analysis	Gabriel Izsak	N39º35.867, W122º30.223
EC-6	Aptian-Albian	Coast Range	Zircon Analysis	Gabriel Izsak	N39º35.868, W122º30.222
CFP-2	Hauterivian-Barremian	Coast Range	Petrographic Analysis	Gabriel Izsak	N39º53.396, W122º37.255
GR-1a	Tithonian	Coast Range	Petrographic Analysis	Gabriel Izsak	N39º25.656, W122º30.742
NV-1	Berriasian	Coast Range	Petrographic Analysis	Gabriel Izsak	N39º45.007, W122º31.750
SM-1	Tithonian	Coast Range	Petrographic Analysis	Gabriel Izsak	N35º05.141, W120º15.405
VGV-1	Hauterivian-Barremian	Coast Range	Both	Jim Wright	N40º05.478, W122º37.213
VGV-2	Aptian	Coast Range	Zircon Analysis	Jim Wright	N40º02.997, W122º34.242
VGV-3	Albian	Coast Range	Zircon Analysis	Jim Wright	N40º02.939, W122º33.422
VGV-4	Cenomanian	Coast Range	Both	Jim Wright	N40º03.260, W122º31.990
VGV-5	Turonian	Coast Range	Zircon Analysis	Jim	N40º03.357,

				Wright	W122º30.462
VGV-6	Valanginian	Coast Range	Zircon Analysis	Gabriel Izsak	N40º08.238, W122º41.881
KGV-1	Hauterivian-Barremian	Klamath	Zircon Analysis	Jim Wright	N40º18.204, W122º43.410
KGV-2	Hauterivian-Barremian	Klamath	Petrographic Analysis	Jim Wright	N40º19.884, W122º50.514
KGV-4	Cenomanian	Klamath	Both	Jim Wright	N40º17.961, W122º39.631
KGV-6	Albian	Klamath	Zircon Analysis	Jim Wright	N40º13.248, W122º39.881
KGV-7	Albian	Klamath	Both	Gabriel Izsak	N40º10.101, W122º38.954
KGV-8	Aptian	Klamath	Both	Gabriel Izsak	N40º10.088, W122º40.801
KGV-10	Hauterivian-Barremian	Klamath	Both	Gabriel Izsak	N40º23.417, W122º48.155
KGV-11	Aptian	Klamath	Zircon Analysis	Gabriel Izsak	N40º28.361, W122º35.706

Table 4: Petrographic Data

Values of the 7 petrographic parameters for the 14 petrographic samples.

Sample	P/F	Lv/L	M%	Qp/Q	Q%	F%	L%
KGV-10	0.45	0.14	10.67	0.35	33.33	35.33	16.33
KGV-8	0.70	0.22	11.00	0.20	35.33	41.33	9.00
KGV-7	0.78	0.24	8.33	0.53	46.33	18.33	5.67
KGV-4	0.52	0.19	9.00	0.25	33.00	31.67	5.33
KGV-2	0.67	0.27	9.00	0.24	45.33	21.33	7.33
VGV-4	0.71	0.50	11.00	0.04	47.00	32.67	4.00
VGV-1	0.67	0.78	7.00	0.51	55.33	21.33	3.00
PK-2	0.66	0.70	10.00	0.94	54.33	19.67	10.00
CFP-2	0.22	1.00	10.33	0.43	20.33	57.67	1.67
NV-1	0.62	0.52	5.67	0.78	41.67	12.33	8.33
EC-3	0.63	0.69	2.33	0.48	66.00	19.00	8.67
EC-5	0.77	0.40	12.33	0.09	61.67	23.00	1.67
GR-1a	0.60	0.67	5.67	0.66	53.33	22.67	8.00
SM-1	0.60	0.81	9.00	0.56	23.33	46.00	5.33

CHAPTER 4

CONCLUSIONS

The translational model for the Great Valley Group is strongly supported by the new petrographic and detrital zircon data presented here. My focus was to test the translational model by using this new data to show that the Klamath GVG and Coast Range GVG were distinct entities for most of their depositional history. The petrographic data was analyzed using three different methods. The first method was based on the work of Dickinson and Rich (1972) and Ingersoll (1983), and only showed distinction between the Klamath and Coast Range GVG in the Lv/L parameter. The lack of volcanic lithics is interpreted as being due to the lack of volcanism during the Late Jurassic and Early Cretaceous in the Klamath Mountians. The second method was analyzing the raw petrographic data to see if there were any obvious differences between the Klamath and Coast Range GVG. There were distinct differences in amounts of chert, sedimentary lithics, and limeclasts which can be attributed to the distance between the Klamath GVG and Coast Range GVG putting them in slightly different depositional environments. The third method was using a statistical analysis called Principal Component Analysis. This method also showed differences between the Klamath and Coast Range GVG as the Klamath samples clustered together in an area where the Coast Range samples were absent.

The new detrital zircon data also present a compelling case for the translational model of the Great Valley Group by showing distinction between the Klamath and Coast Range GVG. When all of the new data for the Klamath GVG and Coast Range GVG are compared major differences in the zircon signatures are apparent, especially two large peaks in the Klamath

signature at 136 Ma and 166 Ma that can be traced to prominent plutons in the Klamath Mountians, but are absent in the Coast Range signature. This new zircon data also shows an interesting pattern when the Klamath and Coast Range GVG samples are compared by depositional age. During the Neocomian, the zircon signatures of the Klamath GVG and Coast Range GVG were quite different but become more similar in the Aptian to Albian, and by the Cenomanian to Turonian they are quite comparable. The most important feature of the comparison between the Klamath GVG and Coast Range GVG for the Cenomanian to Turonian strata is that the Coast Range signature shows the 136 Ma peak that has been present in Klamath signature since the Neocomian. This new data, when combined with previous Great Valley Group zircon data (Wright and Wyld, 2007; Degraaff-Surpless et al., 2002), and geologic observations (Wright and Wyld, 2007) strongly suggests that the Klamath GVG and the Coast Range GVG were separated for their early depositional history, and during the Early Cretaceous the Coast Range GVG was being translated northward by dextral strike-slip faulting and arrived at its current configuration with the Klamath GVG during the Cenomanian.

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APPENDICES

Appendix A: Raw Petrographic Data

Sample	Monocrystalline quartz	Polycrystalline quartz	Chert	Plagioclaise feldspar	K-spar
EC-3	102	6	90	36	3
EC-5	168	4	13	53	0
VGV-1	81	22	63	43	0
VGV-4	136	0	5	70	12
CFP-2	35	0	26	38	112
SM-1	31	1	38	83	37
NV-1	28	5	92	23	0
PK-2	9	86	68	39	5
GR-1a	55	9	96	41	6
KGV-2	103	12	21	43	5
KGV-4	74	5	20	49	7
KGV-7	65	38	36	43	0
KGV-8	85	18	3	87	0
KGV-10	65	23	12	48	0

Sample	Generic feldspar	Volcanic lithics	Sedimentary lithics	Limeclasts	Micas
EC-3	18	18	8	9	7
EC-5	16	2	3	3	37
VGV-1	21	7	2	39	21
VGV-4	16	6	6	0	33
CFP-2	23	5	0	30	0
SM-1	18	13	3	8	4
NV-1	14	13	12	60	17
PK-2	15	21	9	6	30
GR-1a	21	16	8	29	17
KGV-2	16	6	16	51	21
KGV-4	39	3	13	62	12
KGV-7	12	4	13	60	23
KGV-8	37	6	21	7	28
KGV-10	58	7	42	10	23

Sample	Bioclasts	Epidote	Zircon	Glauconite	Chlorite
EC-3	1	0	1	1	0
EC-5	1	0	0	0	0
VGV-1	0	0	1	0	0
VGV-4	0	16	0	0	0
CFP-2	0	0	0	0	31
SM-1	18	23	0	0	23
NV-1	31	5	0	0	0

PK-2	0	12	0	0	0
GR-1a	1	1	0	0	0
KGV-2	0	0	0	0	6
KGV-4	0	0	1	0	15
KGV-7	3	0	1	0	2
KGV-8	0	1	2	0	5
KGV-10	0	3	0	0	9

APPENDIX B: Detrital Zircon Data Analyzed with LAMCICPMS

Sample Analysis			Isotopic Ratios					
PC 1	**U/ppm**	**U/Th**	**207Pb/235U**	**±%**	**206Pb/238U**	**±%**	**Best Age**	**±**
PC 1-1	34	1.7	0.16814	25.9	0.02660	6.8	169.3	11.4
PC 1-2	61	1.7	0.13788	22.0	0.02305	3.9	146.9	5.6
PC 1-4	102	1.9	0.14020	10.1	0.02276	2.9	145.1	4.1
PC 1-5	75	1.1	0.13365	14.8	0.02262	2.9	144.2	4.2
PC 1-6	1372	1.3	0.16083	1.8	0.02396	1.0	152.6	1.5
PC 1-7	156	1.5	0.14044	5.7	0.02150	2.3	137.1	3.2
PC 1-8	60	1.9	0.15744	15.5	0.02421	5.6	154.2	8.6
PC 1-9	225	1.4	0.15926	7.7	0.02312	3.3	147.3	4.8
PC 1-10	82	1.7	0.17066	12.9	0.02488	3.5	158.4	5.4
PC 1-11	99	2.5	0.17540	8.7	0.02415	3.2	153.8	4.8
PC 1-12	122	1.6	0.18171	7.0	0.02601	3.9	165.5	6.4
PC 1-13	76	1.5	0.19368	9.0	0.02302	6.1	146.7	8.9
PC 1-14	112	1.6	0.14108	13.1	0.02237	3.1	142.6	4.4
PC 1-15	140	1.5	0.17134	6.1	0.02250	2.2	143.4	3.1
PC 1-16	255	1.2	0.16735	3.4	0.02439	1.3	155.4	2.0
PC 1-17	152	1.6	0.17106	7.1	0.02202	2.1	140.4	2.9
PC 1-18	93	2.0	0.18365	9.3	0.02268	2.1	144.6	3.0
PC 1-19	145	2.3	0.17988	5.3	0.02364	1.9	150.6	2.8
PC 1-20	128	1.5	0.17066	6.6	0.02378	1.0	151.5	1.5
PC 1-21	2883	1.7	0.19257	2.4	0.02753	2.0	175.1	3.5
PC 1-22	108	1.4	0.15976	13.6	0.02252	4.2	143.6	5.9
PC 1-23	120	1.4	0.19500	7.6	0.02276	3.4	145.1	4.9
PC 1-24	182	1.5	0.17179	5.5	0.02237	2.2	142.6	3.2
PC 1-25	104	1.5	0.12205	33.5	0.02077	3.0	132.5	4.0
PC 1-26	114	1.3	0.20963	7.5	0.02248	2.8	143.3	3.9
PC 1-27	121	1.4	0.17201	6.5	0.02327	3.1	148.3	4.5
PC 1-28	190	1.3	0.16384	6.1	0.02252	2.6	143.5	3.7
PC 1-29	136	2.7	0.17517	10.7	0.02509	2.3	159.8	3.6
PC 1-30	107	2.0	0.21304	29.7	0.02365	4.1	150.7	6.0
PC 1-31	124	1.8	0.17594	5.5	0.02407	2.8	153.3	4.2
PC 1-32	99	2.1	0.17155	10.5	0.02303	2.9	146.8	4.2
PC 1-33	130	1.1	0.17747	14.4	0.02137	4.6	136.3	6.2
PC 1-34	159	1.2	0.15085	9.2	0.02224	2.7	141.8	3.8
PC 1-35	127	1.1	0.14182	8.7	0.02278	2.2	145.2	3.2
PC 1-36	163	1.6	0.15780	6.6	0.02172	4.7	138.5	6.4
PC 1-37	147	0.9	0.18310	9.6	0.02608	4.8	166.0	7.8
PC 1-39	110	1.9	0.18067	9.9	0.02196	3.4	140.0	4.7
PC 1-41	71	1.9	0.14540	20.8	0.02060	2.9	131.4	3.8
PC 1-42	128	3.8	0.16119	9.6	0.02442	3.0	155.5	4.5
PC 1-43	103	1.5	0.16874	10.5	0.02099	3.8	133.9	5.0
PC 1-44	169	1.6	0.16669	7.6	0.02336	4.9	148.8	7.1
PC 1-45	137	1.8	0.07573	56.3	0.02173	6.0	138.6	8.2
PC 1-46	61	1.7	0.16419	15.8	0.02302	3.8	146.7	5.5
PC 1-47	87	1.4	0.15376	18.9	0.02221	3.2	141.6	4.5
PC 1-48	117	1.7	0.17452	8.9	0.02549	4.3	162.3	6.9
PC 1-49	206	1.6	0.16095	7.2	0.02273	2.0	144.9	2.9

PC 1-50	353	0.5	0.45342	2.3	0.05977	1.6	374.2	5.7
PC 1-51	203	1.6	0.14700	8.8	0.02158	3.5	137.6	4.8
PC 1-52	180	1.4	0.17290	6.5	0.02600	1.3	165.4	2.2
PC 1-53	171	0.9	0.17062	7.6	0.02604	4.3	165.7	7.0
PC 1-54	179	1.0	0.16110	9.4	0.02358	4.6	150.2	6.8
PC 1-55	150	1.9	0.16457	7.2	0.02286	1.8	145.7	2.6
PC 1-56	65	2.5	0.16515	15.8	0.02155	4.3	137.4	5.9
PC 1-57	334	1.6	0.08464	39.9	0.01918	4.6	122.5	5.6
PC 1-58	57	2.0	0.17301	33.7	0.02249	5.2	143.4	7.4
PC 1-59	95	2.1	0.16604	14.2	0.02436	7.9	155.1	12.1
PC 1-60	261	1.6	0.13173	8.1	0.02076	5.1	132.5	6.6
PC 1-61	61	1.8	0.12797	17.7	0.02253	5.7	143.6	8.1
PC 1-62	70	2.0	0.17910	12.0	0.02169	4.4	138.3	6.0
PC 1-63	120	1.6	0.14723	10.2	0.02358	4.5	150.2	6.7
PC 1-64	71	2.2	0.17216	12.7	0.02314	4.3	147.5	6.3
PC 1-65	259	1.2	0.15000	5.7	0.02160	3.3	137.8	4.5
PC 1-66	61	2.3	0.16622	19.4	0.02308	4.7	147.1	6.8
PC 1-67	172	2.0	0.15873	6.8	0.02378	3.9	151.5	5.8
PC 1-68	161	1.9	0.08382	49.2	0.02078	6.1	132.6	8.0
PC 1-70	141	2.4	0.15384	8.2	0.02133	4.7	136.0	6.4
PC 1-71	115	1.1	0.16092	19.6	0.02824	6.2	179.5	11.1
PC 1-72	182	1.2	0.13605	12.7	0.02252	6.4	143.5	9.1
PC 1-73	124	1.7	0.14126	14.6	0.02343	4.5	149.3	6.7
PC 1-74	92	1.7	0.13043	13.4	0.02137	7.1	136.3	9.6
PC 1-75	66	1.6	0.10178	33.5	0.02106	7.8	134.4	10.4

PK 1	**U/ppm**	**U/Th**	**207Pb/235U**	**± %**	**206Pb/238U**	**± %**	**Best Age**	**±**
PK 1-1	95	0.8	1.13906	2.5	0.12103	2.2	876.4	24.6
PK 1-2	307	1.0	1.69503	3.0	0.16126	2.4	1101.2	36.2
PK 1-3	404	2.0	2.07228	2.6	0.18833	1.9	1192.2	34.7
PK 1-4	394	1.2	0.16633	6.5	0.02454	2.3	156.3	3.6
PK 1-6	107	1.6	0.16996	10.8	0.02264	5.4	144.3	7.7
PK 1-7	105	1.5	0.17608	6.7	0.02298	4.4	146.5	6.4
PK 1-8	161	2.4	1.90168	2.2	0.18136	1.0	1096.3	38.6
PK 1-9	87	1.6	0.64537	5.6	0.08007	2.3	496.6	10.9
PK 1-10	334	0.9	0.17148	5.1	0.02476	1.9	157.7	3.0
PK 1-11	237	0.7	0.26518	3.5	0.03734	2.5	236.4	5.9
PK 1-12	165	1.1	0.86532	2.5	0.10182	1.3	625.1	7.8
PK 1-13	145	0.9	1.84273	4.1	0.18046	2.7	1043.1	60.8
PK 1-14	252	2.5	0.19843	5.7	0.02825	4.7	179.6	8.4
PK 1-15	162	2.1	3.29655	4.4	0.26264	3.1	1447.3	59.3
PK 1-16	95	1.6	0.13535	9.1	0.02159	2.8	137.7	3.8
PK 1-17	386	1.9	0.17361	2.8	0.02572	1.9	163.7	3.2
PK 1-18	358	3.6	1.28571	3.1	0.13140	2.0	956.4	47.8
PK 1-19	169	1.1	4.85001	2.9	0.32060	2.7	1794.7	18.8
PK 1-20	284	2.0	3.13849	2.1	0.25124	1.8	1438.2	19.3
PK 1-21	79	1.8	0.16391	15.0	0.02429	1.8	154.7	2.7
PK 1-22	170	1.7	0.16483	6.9	0.02424	4.0	154.4	6.1
PK 1-23	82	0.8	2.96833	1.5	0.23914	1.0	1426.0	21.3
PK 1-24	462	2.2	0.36738	2.8	0.05041	2.2	317.0	6.8

PK 1-25	299	0.7	0.17366	3.8	0.02439	1.5	155.4	2.4
PK 1-26	842	3.9	0.14705	2.4	0.02189	1.8	139.6	2.4
PK 1-27	498	1.7	0.21605	2.3	0.03040	1.3	193.1	2.5
PK 1-28	175	1.2	0.78593	4.7	0.09536	1.2	587.2	6.6
PK 1-29	213	1.2	0.71521	6.9	0.08370	4.2	518.2	20.7
PK 1-30	785	1.1	0.19629	2.8	0.02883	1.0	183.2	1.8
PK 1-31	207	1.3	0.18881	7.8	0.02746	5.5	174.6	9.4
PK 1-32	402	0.7	0.18188	8.9	0.02819	2.3	179.2	4.0
PK 1-33	254	1.0	0.15222	5.6	0.02198	2.6	140.2	3.5
PK 1-34	66	0.5	0.94644	5.4	0.11004	3.0	673.0	19.3
PK 1-35	70	1.6	0.14177	25.6	0.02721	3.5	173.0	5.9
PK 1-36	63	0.6	0.47526	9.3	0.06607	2.1	412.4	8.3
PK 1-37	597	0.5	0.31842	2.3	0.04471	1.1	282.0	3.0
PK 1-38	848	5.4	0.19331	3.5	0.02830	2.7	179.9	4.8
PK 1-39	448	0.9	0.14703	14.7	0.02474	1.6	157.5	2.5
PK 1-40	298	3.0	0.82377	3.8	0.10167	1.4	624.2	8.5
PK 1-41	532	3.4	0.15970	4.7	0.02463	1.0	156.9	1.5
PK 1-42	221	1.7	0.16115	8.0	0.02558	2.5	162.8	4.0
PK 1-43	129	1.8	0.12569	23.6	0.02346	3.0	149.5	4.5
PK 1-44	341	1.4	0.18049	13.0	0.02769	1.7	176.1	3.0
PK 1-45	131	2.1	2.05966	4.3	0.19400	2.8	1121.1	64.8
PK 1-46	231	0.9	0.84314	1.9	0.10193	1.4	625.7	8.2
PK 1-47	148	1.5	0.93731	3.2	0.10907	2.7	667.4	17.4
PK 1-48	277	1.3	4.08693	1.8	0.29365	1.0	1641.5	28.4
PK 1-49	37	2.6	0.22219	16.4	0.03628	2.5	229.7	5.6
PK 1-50	615	1.1	0.17233	3.3	0.02574	1.2	163.8	1.9
PK 1-51	621	1.0	0.16677	3.5	0.02470	2.1	157.3	3.2
PK 1-52	134	2.1	0.12374	11.5	0.02036	2.2	129.9	2.9
PK 1-53	54	1.0	9.98187	1.8	0.44499	1.0	2483.8	25.5
PK 1-54	324	2.3	0.66630	2.0	0.08403	1.1	520.2	5.4
PK 1-55	206	1.2	0.47246	2.7	0.06130	1.3	383.6	5.0
PK 1-56	182	1.2	0.17199	7.7	0.02581	2.5	164.2	4.0
PK 1-57	495	2.0	0.84821	3.3	0.10001	1.5	614.5	8.5
PK 1-58	689	15.8	0.38010	2.5	0.05195	1.1	326.5	3.3
PK 1-59	58	1.6	0.11988	35.3	0.02175	8.1	138.7	11.2
PK 1-60	51	2.0	0.15042	16.5	0.02491	3.0	158.6	4.7
PK 1-61	139	0.8	4.02156	1.8	0.28424	1.4	1672.0	19.2
PK 1-62	424	5.8	1.98034	1.5	0.18607	1.1	1126.1	22.0
PK 1-63	705	1.3	0.27972	1.7	0.03953	1.1	249.9	2.7
PK 1-64	177	1.3	0.27771	6.5	0.04073	3.6	257.3	9.2
PK 1-65	97	2.1	0.40897	5.2	0.05073	1.8	319.0	5.6
PK 1-67	229	1.1	0.09153	45.2	0.02354	3.1	150.0	4.6
PK 1-68	661	1.7	0.21866	2.3	0.03067	1.2	194.7	2.4
PK 1-69	147	1.3	0.18821	8.6	0.02846	2.5	180.9	4.4
PK 1-70	116	1.2	0.84208	2.6	0.09980	1.1	613.2	6.5
PK 1-71	90	1.6	3.96303	5.5	0.29093	3.9	1601.5	72.0
PK 1-72	449	2.9	0.17403	7.3	0.02592	3.9	165.0	6.3
PK 1-73	121	0.9	0.40841	8.6	0.05050	5.2	317.6	16.0
PK 1-74	79	2.5	0.18575	24.9	0.02805	5.2	178.3	9.1
PK 1-75	114	0.9	15.27401	3.7	0.55624	2.0	2819.3	50.3

PK 1-76	366	2.2	2.14706	2.7	0.19302	1.0	1213.6	49.8
PK 1-77	130	1.7	0.37452	18.7	0.04705	1.4	296.4	3.9
PK 1-78	201	1.4	0.14294	6.9	0.02070	1.5	132.1	1.9
PK 1-79	463	1.0	0.17534	6.9	0.02617	2.1	166.5	3.5
PK 1-80	923	1.2	0.63027	1.5	0.08011	1.0	496.8	4.8
PK 1-81	462	5.8	2.95755	4.2	0.24318	3.9	1387.0	29.1
PK 1-82	209	1.9	0.21129	3.8	0.02951	1.5	187.5	2.8
PK 1-83	338	2.2	4.05952	1.8	0.28803	1.5	1664.8	19.6
PK 1-84	178	0.7	0.48368	6.4	0.06641	1.0	414.5	4.0
PK 1-85	134	1.3	3.18737	2.1	0.24768	1.7	1494.6	24.0
PK 1-86	25	1.3	1.96798	3.8	0.18359	1.4	1140.4	70.7
PK 1-87	133	0.6	0.93438	2.6	0.10990	1.4	672.1	8.9
PK 1-88	158	1.4	3.13021	2.1	0.24951	1.4	1446.3	29.3
PK 1-89	629	2.4	0.45182	3.2	0.06086	1.0	380.8	3.7
PK 1-90	127	0.9	0.68623	11.9	0.09085	2.8	560.6	14.8
PK 1-91	94	1.5	0.28649	7.1	0.04033	4.5	254.9	11.2
PK 1-93	62	0.4	3.22256	3.5	0.24479	2.5	1537.5	47.0
PK 1-94	134	0.6	0.50555	2.9	0.06301	1.6	393.9	6.0
PK 1-95	177	2.3	1.69637	1.8	0.16403	1.1	1068.6	28.8
PK 1-96	170	0.9	0.29678	4.0	0.03984	1.2	251.9	2.8
PK 1-97	146	2.3	1.48817	1.6	0.14922	1.0	995.2	25.0
PK 1-98	59	0.9	3.00620	2.4	0.24281	1.2	1421.2	39.5
PK 1-99	343	2.0	0.13865	15.6	0.02385	1.8	151.9	2.7
PK 1-100	134	0.8	0.39444	24.5	0.06490	2.2	405.4	8.5
PK 1-101	131	1.1	0.33900	9.8	0.04506	7.3	284.1	20.2
PK 1-102	107	1.2	0.16008	13.9	0.02310	2.9	147.2	4.3
PK 1-103	144	0.8	0.22851	5.4	0.02934	2.7	186.4	4.9
PK 1-104	272	0.5	4.37362	1.7	0.30290	1.0	1709.5	25.3
PK 1-105	342	2.0	2.14339	1.6	0.19857	1.2	1154.1	20.5
PK 1-106	573	1.0	0.17178	3.5	0.02514	2.5	160.1	3.9
PK 1-107	200	1.5	1.03185	4.6	0.11591	3.9	707.0	25.8
PK 1-108	749	1.2	0.16396	3.4	0.02388	1.6	152.1	2.3
PK 1-109	246	2.1	4.15454	7.4	0.29949	5.8	1635.4	84.1
PK 1-110	77	0.9	0.88223	3.8	0.10226	2.6	627.6	15.8

PK 2	**U/ppm**	**U/Th**	**207Pb/235U**	**± %**	**206Pb/238U**	**± %**	**Best Age**	**±**
PK 2-1	221	2.1	0.18930	5.8	0.02663	3.7	169.4	6.2
PK 2-2	173	2.8	0.21154	9.7	0.02778	7.2	176.6	12.5
PK 2-4	123	1.3	2.42189	4.1	0.21456	3.6	1242.3	41.5
PK 2-5	818	1.0	0.18945	3.5	0.02809	1.0	178.6	1.8
PK 2-6	189	0.6	0.18700	22.7	0.02606	4.5	165.9	7.3
PK 2-7	416	1.9	5.24606	6.4	0.27455	6.1	2209.6	34.2
PK 2-8	225	1.8	0.17937	7.5	0.02605	2.0	165.7	3.3
PK 2-9	537	1.3	0.28810	2.3	0.03967	1.2	250.8	2.8
PK 2-10	392	1.7	0.18950	4.9	0.02853	1.9	181.3	3.4
PK 2-11	100	0.9	9.78977	4.7	0.38584	2.2	2689.4	67.7
PK 2-12	1115	1.3	0.18425	3.5	0.02747	2.3	174.7	3.9
PK 2-13	155	1.1	3.28453	2.7	0.26058	1.8	1455.3	37.8
PK 2-14	368	2.5	0.21190	4.6	0.03088	1.5	196.1	2.8
PK 2-15	186	1.5	0.17507	6.7	0.02678	3.0	170.4	5.0

PK 2-16	78	1.5	0.12779	24.9	0.02386	5.3	152.0	8.0
PK 2-17	298	4.8	1.86995	1.5	0.18136	1.0	1062.6	21.2
PK 2-18	129	2.5	16.29938	2.4	0.56801	2.0	2891.0	21.2
PK 2-19	34	0.9	5.47982	3.1	0.33805	2.5	1919.5	32.1
PK 2-20	251	1.2	9.10810	1.4	0.43754	1.0	2357.0	17.1
PK 2-21	31	2.5	0.15328	43.0	0.03014	7.7	191.4	14.5
PK 2-22	240	1.2	0.28839	4.5	0.04177	2.3	263.8	5.9
PK 2-23	244	1.7	0.17208	5.6	0.02641	1.8	168.1	2.9
PK 2-24	157	1.7	1.74766	2.1	0.17401	1.2	1009.5	33.7
PK 2-25	282	4.2	0.43300	6.1	0.05958	4.0	373.1	14.7
PK 2-26	528	0.9	0.44733	2.6	0.05975	2.1	374.1	7.8
PK 2-27	1447	1.0	0.17335	3.5	0.02561	2.4	163.0	3.9
PK 2-28	1112	1.0	0.16253	2.3	0.02385	1.6	151.9	2.3
PK 2-29	91	3.2	14.12042	2.6	0.53417	1.6	2757.0	34.4
PK 2-30	499	2.1	0.20284	3.7	0.02995	2.1	190.2	4.0
PK 2-31	143	2.0	0.19030	13.4	0.03107	4.0	197.2	7.8
PK 2-32	198	4.6	2.57202	4.2	0.22438	3.7	1272.4	41.3
PK 2-33	344	9.0	6.90043	5.0	0.38940	3.8	2077.9	57.0
PK 2-34	151	2.4	0.23579	15.0	0.03849	2.9	243.5	6.9
PK 2-35	241	4.2	3.64069	6.0	0.27559	5.4	1544.0	50.8
PK 2-37	612	1.3	0.18387	2.7	0.02616	1.5	166.5	2.4
PK 2-38	38	2.2	5.51183	4.3	0.34918	1.7	1871.8	71.5
PK 2-39	178	1.3	0.17247	10.9	0.02795	3.1	177.7	5.4
PK 2-40	395	6.2	3.10884	6.1	0.24971	5.8	1431.7	36.4
PK 2-41	340	2.4	4.05617	3.5	0.29333	1.4	1629.5	59.2
PK 2-42	57	1.7	0.22082	17.2	0.03665	3.6	232.0	8.1
PK 2-43	226	4.2	0.48305	4.8	0.06644	1.9	414.7	7.5
PK 2-44	86	2.5	0.15925	16.8	0.02754	4.0	175.1	6.9
PK 2-46	276	1.6	0.33397	5.1	0.04636	3.8	292.1	10.8
PK 2-47	433	3.5	0.18091	4.5	0.02676	2.2	170.2	3.8
PK 2-48	403	1.3	0.18720	3.7	0.02766	1.6	175.9	2.8
PK 2-49	109	2.9	0.25200	11.1	0.03668	3.2	232.2	7.3
PK 2-50	107	1.2	0.77618	5.5	0.09016	2.2	556.5	11.7
PK 2-51	606	1.6	0.70130	1.6	0.08681	1.0	536.7	5.1
PK 2-54	1115	2.1	0.17728	2.5	0.02572	1.4	163.7	2.3
PK 2-55	92	1.1	3.85918	3.0	0.28323	1.9	1602.0	44.2
PK 2-56	48	2.1	0.23267	13.7	0.02598	5.1	165.4	8.3
PK 2-57	139	2.2	0.20594	7.1	0.03167	2.0	201.0	4.0
PK 2-58	96	2.7	0.20712	14.5	0.03009	3.8	191.1	7.2
PK 2-59	303	1.8	0.17890	5.7	0.02363	3.1	150.6	4.6
PK 2-60	139	2.9	0.17201	11.4	0.02615	3.2	166.4	5.2
PK 2-61	792	2.8	0.15329	4.2	0.02345	1.2	149.4	1.8
PK 2-62	211	0.9	0.82058	12.0	0.09579	1.9	589.7	10.7
PK 2-63	3558	1.7	0.18049	3.9	0.02556	2.3	162.7	3.7
PK 2-64	775	1.6	0.17513	3.1	0.02584	2.5	164.4	4.1
PK 2-65	1379	1.3	0.18966	2.8	0.02818	1.6	179.2	2.8
PK 2-66	63	1.5	0.15209	18.8	0.02434	6.7	155.0	10.2
PK 2-67	386	1.2	0.16261	13.0	0.02687	3.4	170.9	5.7
PK 2-68	180	2.6	1.98078	3.1	0.19000	1.4	1084.8	54.9
PK 2-69	626	4.0	1.56796	2.6	0.15628	1.2	936.0	10.3

PK 2-71	523	1.5	0.16231	3.2	0.02417	1.0	153.9	1.5
PK 2-72	195	1.8	0.19708	8.6	0.02593	2.2	165.0	3.7
PK 2-73	310	1.1	0.79745	2.3	0.09758	1.3	600.2	7.7
PK 2-74	177	2.4	4.57803	1.9	0.31065	1.6	1746.9	18.8
PK 2-75	79	1.6	0.15002	18.2	0.02333	3.0	148.7	4.4
PK 2-76	143	2.6	2.72222	4.1	0.22262	3.1	1397.4	52.7
PK 2-77	237	1.5	0.18398	8.2	0.02666	2.4	169.6	4.0
PK 2-78	360	7.7	1.83011	2.6	0.17827	2.3	1053.8	24.7
PK 2-79	315	0.4	0.37387	2.9	0.05226	1.7	328.4	5.4
PK 2-80	126	3.5	0.20184	11.5	0.03130	3.3	198.7	6.5
PK 2-81	107	1.3	0.15833	18.0	0.02722	4.2	173.1	7.1
PK 2-82	186	1.3	10.25313	5.6	0.46918	4.9	2439.7	44.7
PK 2-83	211	2.4	0.17950	5.1	0.02735	2.1	174.0	3.5
PK 2-84	446	2.1	0.20162	4.6	0.02992	1.9	190.1	3.5
PK 2-85	118	1.5	2.79337	2.7	0.23435	1.0	1348.2	49.2
PK 2-86	524	4.1	0.15910	4.1	0.02389	1.6	152.2	2.4
PK 2-87	1466	0.6	0.20523	5.7	0.03049	3.9	193.6	7.5
PK 2-88	117	1.8	0.17961	13.3	0.02606	4.1	165.8	6.8
PK 2-89	399	3.1	3.13160	5.5	0.23418	3.0	1566.9	85.9
PK 2-90	255	2.6	0.16755	7.0	0.02540	4.5	161.7	7.2
PK 2-91	191	1.9	0.17430	7.6	0.02634	3.3	167.6	5.4
PK 2-92	390	1.8	0.18631	3.8	0.02722	2.5	173.1	4.3
PK 2-93	329	1.6	0.18056	4.0	0.02650	1.7	168.6	2.8
PK 2-94	956	1.8	0.18074	3.0	0.02619	1.4	166.7	2.3
PK 2-95	2166	21.7	0.42526	3.2	0.05775	2.9	361.9	10.3
PK 2-96	1259	1.8	0.17986	2.6	0.02635	2.4	167.6	3.9
PK 2-97	602	1.3	0.18861	3.2	0.02766	2.5	175.9	4.3
PK 2-98	796	1.6	0.29148	2.1	0.04082	1.2	257.9	3.1
PK 2-99	121	1.3	5.44040	1.7	0.34102	1.0	1890.9	23.3
PK 2-100	643	0.8	0.17196	3.4	0.02589	1.8	164.7	2.9
PK 2-101	565	2.4	0.16240	3.9	0.02444	1.9	155.7	2.9
PK 2-102	1270	0.7	0.18768	3.9	0.02831	1.9	179.9	3.4
PK 2-103	306	2.4	0.30667	6.8	0.04425	3.7	279.1	10.2
PK 2-104	358	2.5	0.17941	4.1	0.02508	2.0	159.7	3.2
PK 2-105	337	1.8	0.18176	6.5	0.02692	2.1	171.3	3.6
PK 2-106	470	1.7	0.14978	24.3	0.02581	2.1	164.3	3.4
PK 2-107	57	3.1	0.18076	17.6	0.02401	4.7	152.9	7.1
PK 2-108	711	1.2	0.45641	3.4	0.06029	2.5	377.4	9.1
PK 2-109	588	1.5	0.17334	3.8	0.02542	2.3	161.8	3.7
PK 2-110	420	3.2	0.15868	6.9	0.02476	3.1	157.7	4.9

PK 3	**U/ppm**	**U/Th**	**207Pb/235U**	**± %**	**206Pb/238U**	**± %**	**Best Age**	**±**
PK 3-1	93	2.7	2.80889	5.5	0.23095	5.3	1387.0	28.6
PK 3-2	175	0.8	12.06142	3.4	0.49731	1.4	2614.6	51.8
PK 3-3	214	1.5	0.17238	7.4	0.02624	4.7	166.9	7.7
PK 3-4	207	0.9	0.66508	2.7	0.08441	1.5	522.4	7.7
PK 3-5	97	1.8	0.15681	11.4	0.02375	2.7	151.3	4.1
PK 3-6	318	1.4	5.21015	5.4	0.30512	4.8	2012.3	44.5
PK 3-7	98	2.1	0.17881	12.8	0.02342	4.9	149.2	7.2
PK 3-8	46	0.5	1.16226	15.8	0.14188	4.4	855.3	35.1

PK 3-9	110	1.4	1.85628	2.5	0.18142	1.0	1047.1	46.7
PK 3-10	170	1.8	2.34677	2.4	0.21059	2.0	1217.1	23.9
PK 3-11	268	1.0	1.67044	1.9	0.16462	1.5	1030.4	24.2
PK 3-12	104	1.1	2.13504	2.4	0.19529	1.3	1179.4	41.1
PK 3-13	36	2.1	0.42627	11.8	0.06326	2.6	395.4	10.1
PK 3-14	419	1.5	0.16603	3.2	0.02466	1.7	157.0	2.6
PK 3-15	421	1.1	0.15335	7.9	0.02232	3.1	142.3	4.3
PK 3-16	675	1.0	12.44557	2.2	0.49377	1.3	2678.5	28.8
PK 3-17	151	0.8	5.62662	1.4	0.34781	1.0	1915.9	18.3
PK 3-18	101	1.7	0.16937	11.5	0.02175	2.8	138.7	3.8
PK 3-19	153	3.9	1.54870	3.6	0.15872	1.3	949.6	11.8
PK 3-20	94	1.7	0.51530	7.7	0.06362	2.7	397.6	10.3
PK 3-21	293	0.9	3.78675	3.1	0.27647	2.7	1611.7	27.0
PK 3-22	1531	0.4	0.16724	2.7	0.02494	1.7	158.8	2.6
PK 3-23	304	1.3	0.18728	4.8	0.02664	1.8	169.5	2.9
PK 3-24	291	1.0	0.16159	5.9	0.02364	1.0	150.7	1.5
PK 3-25	173	1.4	0.14110	5.1	0.02114	2.5	134.9	3.4
PK 3-26	502	5.9	4.02853	6.4	0.27806	6.3	1715.6	18.7
PK 3-27	168	1.5	0.23328	5.7	0.03073	2.7	195.1	5.2
PK 3-28	199	2.7	5.27729	2.0	0.32961	1.0	1897.3	31.3
PK 3-29	946	5.9	2.40208	8.7	0.20098	8.1	1353.5	60.6
PK 3-30	59	0.7	3.91244	1.7	0.27933	1.1	1653.3	23.4
PK 3-31	300	1.5	0.81402	2.0	0.09752	1.3	599.8	7.6
PK 3-32	149	1.2	3.22481	2.1	0.25460	1.8	1464.6	19.7
PK 3-33	230	1.0	0.13702	7.5	0.02077	1.3	132.5	1.8
PK 3-34	313	1.8	0.17379	6.9	0.02536	1.1	161.5	1.7
PK 3-35	4331	0.6	0.18076	4.7	0.02748	2.4	174.8	4.2
PK 3-36	50	2.2	0.17603	20.4	0.03025	4.8	192.1	9.1
PK 3-37	250	0.6	4.33464	4.8	0.30306	4.4	1692.0	36.5
PK 3-38	25	2.8	0.23135	23.8	0.03291	6.2	208.8	12.7
PK 3-39	171	0.7	0.15721	10.8	0.02439	3.6	155.4	5.6
PK 3-40	282	1.3	0.17162	4.4	0.02597	1.8	165.3	2.9
PK 3-41	138	1.4	12.72987	1.4	0.49411	1.0	2714.6	16.6
PK 3-42	147	0.8	0.14960	11.5	0.02068	2.0	132.0	2.6
PK 3-43	56	2.4	0.19423	20.9	0.02222	4.3	141.7	6.1
PK 3-44	236	1.0	0.58398	4.7	0.07570	3.6	470.4	16.3
PK 3-45	77	1.3	0.18190	9.0	0.02203	2.3	140.4	3.2
PK 3-46	117	1.7	0.12947	12.1	0.02125	3.1	135.5	4.1
PK 3-47	390	1.0	0.18888	5.4	0.02659	3.0	169.2	4.9
PK 3-48	144	2.2	2.17648	2.2	0.19352	1.0	1235.2	39.2
PK 3-49	75	42.7	0.13392	24.7	0.02447	9.9	155.9	15.2
PK 3-51	137	1.5	0.53117	3.9	0.06794	1.2	423.8	4.9
PK 3-52	94	1.6	0.16959	9.3	0.02668	3.8	169.8	6.3
PK 3-53	153	1.1	0.65719	23.3	0.10055	2.2	617.7	13.0
PK 3-54	450	5.2	3.18337	1.9	0.24707	1.2	1497.0	28.2
PK 3-56	161	1.8	0.14324	6.1	0.02187	1.8	139.5	2.4
PK 3-57	285	1.9	0.50865	3.1	0.06575	2.1	410.5	8.2
PK 3-58	164	1.7	2.55687	2.6	0.21940	2.4	1304.6	21.2
PK 3-59	266	3.0	1.59734	2.0	0.15552	1.3	1054.8	30.6
PK 3-60	38	2.0	0.27692	17.4	0.03028	3.8	192.3	7.2

PK 3-61	220	1.1	0.15645	7.4	0.02113	2.6	134.8	3.4
PK 3-62	220	1.4	0.11687	6.9	0.01848	2.6	118.0	3.1
PK 3-63	135	1.6	1.89714	1.6	0.18133	1.0	1091.9	26.1
PK 3-64	308	1.3	0.47420	2.0	0.06309	1.0	394.4	3.8
PK 3-65	182	1.0	0.14964	11.4	0.02467	2.5	157.1	3.8
PK 3-66	31	2.5	0.26233	28.5	0.03217	5.4	204.1	10.9
PK 3-67	1183	1.1	0.18309	2.2	0.02667	1.8	169.7	3.1
PK 3-68	184	1.5	3.98439	1.5	0.28516	1.1	1648.7	18.8
PK 3-69	226	2.0	4.63562	1.4	0.31008	1.0	1773.1	18.4
PK 3-70	193	5.9	6.19936	1.7	0.35764	1.0	2038.9	23.8
PK 3-71	556	9.1	2.35141	2.1	0.20756	1.3	1249.4	31.0
PK 3-72	90	2.2	0.15820	11.4	0.02481	3.2	158.0	5.0
PK 3-73	90	1.7	0.22783	12.0	0.02954	2.3	187.7	4.3
PK 3-74	112	0.9	0.14893	8.5	0.02217	2.6	141.4	3.6
PK 3-75	235	1.5	4.70612	2.5	0.31676	2.1	1761.8	25.5
PK 3-76	144	1.7	0.14420	9.4	0.01961	4.4	125.2	5.5
PK 3-77	535	1.2	1.69402	2.8	0.16438	2.2	1061.6	35.6
PK 3-78	2063	1.7	0.33543	2.4	0.04704	2.1	296.3	6.1
PK 3-79	83	1.2	0.14164	18.3	0.02381	5.4	151.7	8.1
PK 3-80	197	1.3	0.13915	9.4	0.02039	3.3	130.1	4.3
PK 3-81	60	1.9	0.18777	24.2	0.02934	3.5	186.4	6.4
PK 3-82	592	2.2	2.01227	10.7	0.18051	10.2	1217.8	68.8
PK 3-83	76	1.3	0.13376	22.1	0.02456	5.6	156.4	8.6
PK 3-84	166	1.5	0.14474	6.7	0.02244	2.3	143.1	3.2
PK 3-85	100	1.6	0.11948	11.1	0.01716	3.1	109.7	3.4
PK 3-86	160	1.2	0.12977	12.0	0.02025	3.9	129.3	5.0
PK 3-87	304	1.1	0.67828	2.0	0.08264	1.0	511.9	4.9
PK 3-88	589	2.2	0.95685	2.1	0.10911	1.6	667.6	10.3
PK 3-89	281	0.3	0.50877	3.2	0.06671	1.6	416.3	6.6
PK 3-90	36	0.7	5.23643	2.3	0.33388	1.2	1860.1	34.0
PK 3-91	332	1.5	4.61957	1.8	0.31227	1.0	1753.9	28.3
PK 3-92	96	2.9	0.46305	5.7	0.06126	1.7	383.3	6.4
PK 3-93	100	1.4	0.48054	4.3	0.06438	1.1	402.2	4.3
PK 3-94	1018	1.3	0.17823	4.6	0.02677	1.0	170.3	1.7
PK 3-95	107	1.4	0.17727	12.8	0.02881	2.9	183.1	5.3
PK 3-96	177	2.6	0.43931	9.2	0.06000	2.7	375.7	10.0
PK 3-97	466	1.0	0.17267	5.9	0.02538	3.8	161.6	6.1
PK 3-98	545	0.9	0.19261	3.6	0.02839	2.1	180.5	3.7
PK 3-99	126	1.0	0.46034	5.5	0.06321	1.7	395.1	6.6
PK 3-100	122	1.3	1.64317	2.7	0.16515	2.2	985.3	20.2

PK 4	**U/ppm**	**U/Th**	**207Pb/235U**	**± %**	**206Pb/238U**	**± %**	**Best Age**	**±**
PK 4-1	350	1.5	0.14417	4.3	0.02191	1.8	139.7	2.5
PK 4-2	349	2.1	0.17418	5.4	0.02466	3.9	157.0	6.0
PK 4-3	175	3.8	0.12349	8.6	0.01954	3.3	124.8	4.0
PK 4-4	228	3.7	0.15691	3.6	0.02176	1.3	138.8	1.8
PK 4-5	160	2.1	0.14251	11.2	0.02256	2.1	143.8	3.0
PK 4-6	119	1.1	0.15661	7.8	0.02301	6.0	146.6	8.7
PK 4-7	251	1.3	0.15639	3.0	0.02265	1.6	144.4	2.3
PK 4-8	559	2.2	0.17311	2.0	0.02468	1.1	157.2	1.6

PK 4-9	219	1.3	0.17408	5.6	0.02563	2.0	163.2	3.3
PK 4-10	167	2.1	0.14554	6.7	0.02193	3.5	139.8	4.8
PK 4-11	445	1.1	0.16116	5.0	0.02432	3.9	154.9	6.0
PK 4-13	97	1.1	0.80052	3.4	0.09355	1.6	576.5	8.9
PK 4-14	106	1.9	0.13344	15.8	0.02259	5.1	144.0	7.3
PK 4-15	388	1.5	0.15438	5.2	0.02379	1.9	151.6	2.8
PK 4-16	401	1.6	0.15662	3.9	0.02366	2.2	150.7	3.3
PK 4-17	124	2.0	0.11582	16.4	0.02013	4.0	128.4	5.1
PK 4-18	109	2.0	0.12292	21.4	0.02128	3.9	135.7	5.2
PK 4-19	395	0.7	0.14384	17.6	0.02490	4.7	158.6	7.4
PK 4-20	221	1.1	0.14823	5.9	0.02299	1.9	146.5	2.7
PK 4-21	187	2.6	0.14584	8.6	0.02292	1.8	146.1	2.6
PK 4-22	36	2.0	0.11935	33.3	0.02481	6.8	158.0	10.5
PK 4-24	337	1.5	0.14533	9.3	0.02320	2.7	147.8	4.0
PK 4-25	84	1.4	0.57893	5.1	0.07655	2.1	475.5	9.6
PK 4-26	65	1.2	0.12449	23.5	0.02283	6.8	145.5	9.8
PK 4-27	103	2.1	0.13650	21.5	0.02490	3.3	158.6	5.1
PK 4-28	153	1.5	4.48013	1.5	0.30616	1.0	1733.9	19.4
PK 4-29	147	1.2	0.15358	8.5	0.02312	1.8	147.3	2.7
PK 4-30	82	1.6	0.20041	7.7	0.02497	3.6	159.0	5.7
PK 4-31	203	1.1	2.09499	9.5	0.14798	9.3	1673.1	41.8
PK 4-32	264	2.5	0.12919	8.6	0.02008	3.6	128.2	4.5
PK 4-33	157	2.1	0.10874	30.0	0.02195	5.8	139.9	8.0
PK 4-34	173	0.8	2.13905	2.3	0.19355	1.0	1200.8	41.1
PK 4-35	260	1.1	0.15657	6.5	0.02227	3.1	142.0	4.4
PK 4-36	184	2.6	0.12292	15.5	0.02119	1.8	135.2	2.4
PK 4-37	152	1.7	0.13968	9.7	0.02258	1.8	144.0	2.5
PK 4-38	250	3.3	0.12650	5.7	0.01976	2.5	126.1	3.1
PK 4-39	87	2.9	0.12379	17.4	0.02157	2.5	137.6	3.4
PK 4-40	243	1.5	0.14679	7.2	0.02277	2.3	145.1	3.3
PK 4-41	669	1.1	0.16657	2.5	0.02466	1.5	157.0	2.3
PK 4-42	261	1.6	0.23083	3.9	0.03214	1.0	203.9	2.0
PK 4-43	131	1.1	0.15814	9.6	0.02301	3.6	146.6	5.2
PK 4-44	132	1.0	0.14389	11.6	0.02320	3.9	147.8	5.7
PK 4-45	152	1.6	0.15562	9.9	0.02370	4.1	151.0	6.1
PK 4-46	175	3.8	0.11757	10.5	0.01950	2.0	124.5	2.4
PK 4-47	219	1.9	0.13777	8.1	0.02168	1.7	138.3	2.4
PK 4-48	338	3.1	0.12350	5.1	0.01921	1.9	122.7	2.3
PK 4-49	202	2.6	0.14000	9.3	0.02246	1.8	143.2	2.6
PK 4-50	258	2.3	0.15369	6.2	0.02358	1.6	150.2	2.4
PK 4-51	136	1.8	0.14266	12.3	0.02375	3.1	151.3	4.7
PK 4-52	158	2.8	0.16278	7.2	0.02136	3.2	136.2	4.3
PK 4-53	312	1.3	0.18421	8.3	0.02695	2.4	171.4	4.1
PK 4-54	300	0.9	0.14961	7.1	0.02353	1.8	150.0	2.7
PK 4-55	249	2.0	4.76870	2.2	0.30289	1.0	1867.1	35.3
PK 4-56	914	2.9	0.39607	1.6	0.05408	1.1	339.5	3.6
PK 4-57	197	2.7	0.15270	6.0	0.02125	2.3	135.5	3.1
PK 4-58	402	0.9	1.91873	5.3	0.17630	5.2	1170.4	23.4
PK 4-60	467	0.5	0.17089	8.2	0.02682	3.4	170.6	5.7
PK 4-61	145	3.9	0.10483	22.4	0.01969	3.3	125.7	4.1

PK 4-62	128	2.2	0.13094	17.5	0.02250	3.4	143.5	4.9
PK 4-63	179	3.7	1.90915	4.0	0.18318	3.3	1084.2	43.5
PK 4-66	262	3.4	0.68718	2.3	0.08447	1.7	522.7	8.3
PK 4-67	248	2.6	0.14551	5.0	0.02174	1.9	138.6	2.6
PK 4-68	150	1.5	0.06908	62.3	0.02172	5.4	138.5	7.4
PK 4-69	301	2.2	0.32748	5.7	0.04676	4.6	294.6	13.2
PK 4-70	79	1.9	0.14376	18.9	0.02255	3.9	143.8	5.5
PK 4-71	318	1.4	0.12850	7.0	0.02023	1.6	129.1	2.0
PK 4-72	200	1.1	0.20073	7.5	0.03081	2.3	195.6	4.5
PK 4-73	127	2.9	0.13678	13.0	0.02256	4.8	143.8	6.9
PK 4-74	226	1.1	0.16669	9.1	0.02673	1.5	170.0	2.5
PK 4-76	70	2.0	0.13971	19.9	0.02321	3.9	147.9	5.6
PK 4-77	130	3.0	0.13139	12.7	0.02128	2.8	135.7	3.7
PK 4-78	139	2.8	0.13147	23.6	0.02451	4.9	156.1	7.6
PK 4-79	164	1.9	0.14746	10.7	0.02353	4.3	149.9	6.4
PK 4-80	119	2.3	0.13009	15.3	0.02208	2.3	140.8	3.2
PK 4-81	119	2.0	0.12682	15.2	0.02178	3.2	138.9	4.4
PK 4-82	163	1.6	0.15025	9.0	0.02387	2.5	152.1	3.7
PK 4-83	167	1.7	0.16180	4.5	0.02351	2.0	149.8	2.9
PK 4-84	664	1.4	2.32560	4.3	0.20968	2.5	1207.8	68.6
PK 4-85	1028	2.3	1.39401	2.5	0.14463	2.3	925.6	21.2
PK 4-86	148	1.8	4.21327	6.7	0.28850	3.3	1730.3	107.3
PK 4-87	191	2.8	0.14936	6.7	0.02024	3.9	129.2	5.0
PK 4-88	98	2.1	0.19699	8.8	0.02369	2.9	150.9	4.4
PK 4-89	141	2.0	0.16964	9.6	0.02354	4.0	150.0	5.9
PK 4-90	749	0.8	0.15431	5.6	0.02361	2.1	150.4	3.1
PK 4-91	552	1.2	0.16006	2.9	0.02334	2.0	148.7	3.0
PK 4-92	467	1.0	0.28816	3.4	0.04065	1.8	256.9	4.4
PK 4-93	574	0.5	0.51934	3.1	0.06853	1.9	427.3	8.0
PK 4-94	155	2.4	0.15310	7.8	0.02090	2.9	133.3	3.9
PK 4-95	123	1.6	0.15740	10.7	0.02460	4.1	156.6	6.3
PK 4-96	293	1.7	0.14437	5.5	0.02238	1.9	142.7	2.7
PK 4-97	115	2.8	0.16183	10.2	0.02570	1.8	163.6	2.9
PK 4-98	511	0.9	3.91862	2.6	0.27985	2.3	1652.7	22.9
PK 4-99	137	2.8	0.17028	8.9	0.02302	3.7	146.7	5.4
PK 4-100	198	0.8	0.71787	4.8	0.09150	2.1	564.4	11.3
PK 4-101	236	1.2	0.16515	4.8	0.02485	3.2	158.3	4.9
PK 4-102	199	1.3	0.14437	20.3	0.02449	2.0	156.0	3.2
PK 4-103	218	1.6	0.13702	4.7	0.02055	2.1	131.1	2.7
PK 4-104	314	1.5	0.86985	2.1	0.10081	1.8	619.1	10.4
PK 4-105	73	2.0	0.17639	12.0	0.02508	2.8	159.7	4.4
PK 4-106	148	1.8	0.13196	16.6	0.02254	2.3	143.7	3.3
PK 4-107	90	2.5	0.16693	10.6	0.02431	3.3	154.8	5.0
PK 4-108	341	1.7	0.17251	3.9	0.02509	1.8	159.7	2.9
PK 4-109	131	1.3	0.17288	11.5	0.02656	1.9	169.0	3.2
PK 4-110	891	1.4	0.17308	3.6	0.02515	1.2	160.1	1.9

EC 1	**U/ppm**	**U/Th**	**207Pb/235U**	**± %**	**206Pb/238U**	**± %**	**Best Age**	**±**
EC 1-1	353	1.9	0.13704	3.7	0.02015	1.6	128.6	2.1
EC 1-2	97	2.8	0.15328	11.7	0.02120	3.6	135.2	4.8

EC 1-3	594	1.0	0.27125	2.8	0.03784	2.1	239.4	4.9
EC 1-4	75	1.7	0.18939	10.2	0.02321	4.5	147.9	6.6
EC 1-5	230	1.1	4.44371	2.3	0.29638	1.9	1778.4	23.6
EC 1-6	338	2.1	0.16310	6.9	0.02025	3.7	129.2	4.7
EC 1-7	387	2.4	0.14974	5.3	0.02036	3.8	129.9	4.8
EC 1-8	203	2.9	0.15333	8.2	0.02082	4.0	132.9	5.2
EC 1-9	692	1.1	0.17417	2.4	0.02498	1.1	159.0	1.8
EC 1-10	70	1.8	0.20959	13.1	0.02335	7.1	148.8	10.4
EC 1-11	1224	1.6	0.16658	3.4	0.02358	2.5	150.2	3.8
EC 1-12	217	1.2	4.31132	3.7	0.29517	3.3	1730.6	32.9
EC 1-14	343	2.3	0.13092	9.3	0.01974	3.9	126.0	4.9
EC 1-15	140	1.9	0.19108	7.8	0.02511	5.9	159.8	9.4
EC 1-16	89	1.1	17.47096	3.7	0.58762	2.2	2948.4	47.2
EC 1-17	70	19.8	2.12893	6.7	0.19634	3.4	1163.1	115.3
EC 1-18	174	3.1	0.76236	2.7	0.09381	2.1	578.0	11.7
EC 1-20	94	1.7	2.31217	3.2	0.20949	2.3	1198.2	42.9
EC 1-21	128	2.0	0.15122	9.9	0.02433	4.6	155.0	7.0
EC 1-22	476	2.2	0.18097	7.9	0.02536	2.5	161.4	4.0
EC 1-23	93	3.0	0.17496	13.2	0.02377	7.0	151.4	10.5
EC 1-24	106	1.6	3.39784	3.4	0.26567	1.9	1483.0	53.7
EC 1-25	94	2.8	0.18560	16.5	0.02379	3.0	151.5	4.4
EC 1-26	173	3.0	0.15287	6.0	0.02097	3.0	133.8	4.0
EC 1-27	162	0.5	2.95893	2.9	0.22763	2.4	1513.6	30.3
EC 1-28	950	1.9	0.16126	2.7	0.02336	2.1	148.8	3.1
EC 1-29	98	3.0	0.13226	15.3	0.02097	2.7	133.8	3.6
EC 1-30	311	2.8	0.15985	4.4	0.02386	2.8	152.0	4.3
EC 1-31	413	1.6	0.20343	6.7	0.02893	3.8	183.9	6.8
EC 1-32	227	2.0	0.14603	8.4	0.02209	2.0	140.8	2.8
EC 1-33	172	1.1	0.17186	8.9	0.02392	2.8	152.4	4.2
EC 1-34	293	1.4	0.16151	5.4	0.02303	3.9	146.8	5.6
EC 1-35	1546	2.6	0.17774	1.8	0.02594	1.1	165.1	1.8
EC 1-36	624	1.0	0.15002	3.3	0.02281	1.2	145.4	1.8
EC 1-37	267	0.9	4.42504	2.2	0.29363	2.0	1787.8	18.9
EC 1-38	427	2.0	0.16949	3.9	0.02538	2.1	161.6	3.4
EC 1-40	163	2.8	0.14902	14.5	0.02107	2.9	134.4	3.8
EC 1-41	358	1.4	0.15113	5.8	0.02335	2.2	148.8	3.2
EC 1-42	196	1.6	3.22544	2.5	0.25208	1.3	1483.8	40.7
EC 1-43	154	3.0	0.13044	11.7	0.02045	3.9	130.5	5.1
EC 1-44	437	0.8	0.16760	5.2	0.02527	3.0	160.9	4.8
EC 1-45	184	2.5	0.13279	9.6	0.02113	2.1	134.8	2.8
EC 1-46	86	1.4	0.83900	4.4	0.10191	3.5	625.6	20.6
EC 1-47	74	2.0	0.18130	21.0	0.02805	5.5	178.3	9.6
EC 1-48	155	2.7	0.14481	11.2	0.02234	4.2	142.4	5.9
EC 1-49	551	1.5	0.15484	3.9	0.02347	2.2	149.6	3.3
EC 1-50	328	2.3	0.13518	8.5	0.02133	2.8	136.0	3.8
EC 1-51	224	3.5	0.13434	7.8	0.02089	2.1	133.3	2.8
EC 1-52	62	2.7	0.19954	15.1	0.02193	4.7	139.9	6.5
EC 1-53	136	2.1	0.12516	14.8	0.02135	1.9	136.2	2.6
EC 1-54	211	1.2	0.14507	8.1	0.02315	1.7	147.5	2.5
EC 1-55	316	3.4	0.21629	8.2	0.03245	2.8	205.9	5.6

EC 1-56	187	3.0	0.14026	9.7	0.02097	2.1	133.8	2.7
EC 1-57	139	2.2	0.17055	8.1	0.02240	3.8	142.8	5.3
EC 1-58	113	3.3	2.38770	2.8	0.20818	2.0	1273.5	37.1
EC 1-59	206	2.3	0.15038	6.6	0.02027	2.1	129.3	2.7
EC 1-60	1258	0.8	0.17803	4.0	0.02531	1.3	161.1	2.1
EC 1-61	160	2.9	0.15640	7.2	0.02060	2.7	131.4	3.6
EC 1-62	355	2.1	0.14034	5.3	0.01961	3.2	125.2	4.0
EC 1-63	145	1.9	0.22384	25.2	0.03716	2.6	235.2	6.1
EC 1-64	253	2.8	0.16020	3.8	0.02084	1.7	133.0	2.3
EC 1-65	130	2.6	0.16618	10.1	0.02058	3.4	131.3	4.5
EC 1-66	131	2.2	0.16822	11.0	0.02637	2.0	167.8	3.2
EC 1-67	138	1.4	0.16255	11.3	0.02638	2.7	167.9	4.4
EC 1-69	88	1.0	0.73319	2.8	0.09124	1.2	562.9	6.2
EC 1-70	364	5.5	1.83492	2.9	0.17927	1.0	1047.8	55.2
EC 1-71	122	3.1	0.15301	8.4	0.02116	4.6	135.0	6.2
EC 1-72	225	2.8	0.13678	5.9	0.02036	2.3	129.9	3.0
EC 1-73	1106	0.8	0.16770	2.0	0.02477	1.0	157.7	1.6
EC 1-74	172	1.6	0.18362	5.1	0.02451	1.8	156.1	2.8
EC 1-75	414	2.6	0.21590	3.4	0.02982	1.7	189.4	3.2
EC 1-76	208	3.0	0.15387	9.7	0.02141	2.3	136.6	3.2
EC 1-77	115	2.4	0.15040	11.5	0.02113	5.6	134.8	7.4
EC 1-78	536	2.2	0.12100	14.9	0.02031	1.7	129.6	2.2
EC 1-79	175	2.8	0.16139	5.1	0.02109	2.3	134.5	3.1
EC 1-80	1648	3.9	1.71043	2.2	0.17099	2.0	1001.4	20.4
EC 1-81	223	2.3	0.17781	6.1	0.02369	2.4	150.9	3.5
EC 1-82	270	4.4	0.16539	5.4	0.02219	1.6	141.5	2.2
EC 1-83	166	2.9	0.17828	7.5	0.02204	4.4	140.5	6.1
EC 1-84	952	1.6	0.15448	3.1	0.02247	1.6	143.2	2.2
EC 1-86	69	1.0	0.14988	20.6	0.02620	8.3	166.7	13.7
EC 1-87	74	1.9	0.14758	23.4	0.02657	7.0	169.0	11.7
EC 1-88	81	3.1	0.22610	19.7	0.02707	5.0	172.2	8.5
EC 1-89	218	1.4	0.21958	8.9	0.03046	4.2	193.4	8.0
EC 1-90	723	1.8	0.21229	7.0	0.02980	6.3	189.3	11.8
EC 1-92	189	2.1	0.13123	10.7	0.02116	3.2	135.0	4.3
EC 1-93	131	1.6	0.17052	8.0	0.02493	3.2	158.7	5.0
EC 1-94	164	1.5	0.19326	5.6	0.02480	2.2	157.9	3.4
EC 1-95	132	2.6	0.17566	12.1	0.02084	2.3	132.9	3.1
EC 1-96	239	2.4	0.13574	6.5	0.02002	1.9	127.8	2.4
EC 1-97	463	1.9	0.15935	4.3	0.02368	3.3	150.9	4.9
EC 1-99	73	1.6	0.14593	26.3	0.02199	5.0	140.2	6.9
EC 1-100	630	2.1	1.72235	2.0	0.12887	1.2	1565.9	30.4

EC 2	**U/ppm**	**U/Th**	**207Pb/235U**	**± %**	**206Pb/238U**	**± %**	**Best Age**	**±**
EC 2-1	376	3.0	0.14477	4.1	0.02191	1.3	139.7	1.9
EC 2-2	179	3.4	0.17422	8.3	0.02299	3.4	146.5	5.0
EC 2-3	183	2.0	0.13715	7.9	0.02102	1.6	134.1	2.2
EC 2-4	139	5.7	0.13412	13.7	0.02247	3.0	143.3	4.2
EC 2-5	183	4.1	0.13661	7.7	0.02172	2.4	138.5	3.2
EC 2-6	116	2.9	0.15202	10.5	0.02174	2.7	138.7	3.8
EC 2-7	160	2.3	0.14157	9.0	0.02282	1.7	145.5	2.5

EC 2-8	141	1.9	0.14146	12.2	0.02147	3.0	136.9	4.0
EC 2-9	428	2.0	0.12867	6.6	0.02007	4.1	128.1	5.2
EC 2-10	111	2.3	0.17785	11.7	0.02103	3.3	134.2	4.4
EC 2-11	130	1.7	0.17871	20.6	0.02215	3.6	141.2	5.1
EC 2-12	123	1.5	0.13021	10.8	0.02138	2.9	136.4	4.0
EC 2-13	179	1.6	0.15218	7.2	0.02369	2.9	150.9	4.4
EC 2-14	106	2.3	0.14753	14.1	0.02214	3.1	141.2	4.3
EC 2-15	310	1.5	0.12354	7.3	0.01968	3.4	125.6	4.2
EC 2-16	171	2.1	0.15647	8.5	0.02214	1.8	141.1	2.6
EC 2-17	46	2.8	0.21993	18.3	0.02260	6.5	144.1	9.3
EC 2-18	92	1.6	0.16562	13.0	0.02274	4.9	145.0	7.1
EC 2-19	123	2.2	0.14348	8.7	0.02222	4.7	141.7	6.6
EC 2-20	80	1.9	0.08801	53.2	0.02103	6.6	134.2	8.7
EC 2-21	118	1.6	0.13821	15.9	0.02116	4.1	135.0	5.5
EC 2-22	75	1.8	0.12198	21.3	0.02233	2.7	142.3	3.9
EC 2-23	69	2.1	0.12438	17.1	0.02187	3.8	139.4	5.2
EC 2-24	181	1.0	0.15083	5.1	0.02338	1.0	149.0	1.5
EC 2-25	88	1.4	0.21931	10.0	0.02171	5.0	138.5	6.8
EC 2-26	72	2.0	0.18632	19.8	0.02205	5.0	140.6	7.0
EC 2-27	126	1.6	0.18042	11.7	0.02224	3.4	141.8	4.8
EC 2-28	61	2.3	0.14575	20.3	0.02129	5.2	135.8	6.9
EC 2-29	204	1.4	0.15821	6.6	0.02232	2.5	142.3	3.6
EC 2-30	82	2.2	0.19114	11.9	0.02257	3.4	143.9	4.9
EC 2-31	97	3.8	0.13290	16.9	0.02309	3.5	147.2	5.0
EC 2-32	137	1.9	0.13546	10.1	0.02197	2.1	140.1	2.9
EC 2-33	145	1.9	0.13098	13.0	0.02145	3.7	136.8	5.0
EC 2-34	409	2.6	0.13707	6.9	0.02179	1.6	139.0	2.2
EC 2-35	257	2.0	0.13486	8.8	0.02159	2.6	137.7	3.5
EC 2-36	166	2.1	0.12631	10.8	0.02071	3.5	132.1	4.6
EC 2-37	71	3.0	0.11705	18.4	0.02084	4.6	132.9	6.0
EC 2-38	85	2.8	0.15736	18.0	0.02331	4.7	148.5	6.9
EC 2-39	93	2.2	0.16242	9.2	0.02259	3.6	144.0	5.1
EC 2-40	87	3.4	0.15713	14.1	0.02292	2.8	146.1	4.0
EC 2-41	99	2.1	0.21114	8.5	0.02272	3.7	144.8	5.3
EC 2-42	74	1.9	0.16032	16.3	0.02218	4.3	141.4	6.0
EC 2-43	152	2.2	0.10404	32.4	0.02190	3.6	139.6	5.0
EC 2-44	89	2.7	0.19150	18.1	0.02163	5.4	137.9	7.3
EC 2-45	224	2.2	0.16908	5.7	0.02444	1.7	155.6	2.7
EC 2-46	134	2.6	0.16605	8.8	0.02272	2.4	144.8	3.4
EC 2-47	45	2.3	0.13355	28.6	0.02316	5.5	147.6	8.0
EC 2-48	190	2.3	0.17758	5.6	0.02424	1.9	154.4	3.0
EC 2-49	94	1.8	0.20273	14.2	0.02285	4.2	145.6	6.0
EC 2-50	98	1.8	0.19007	10.2	0.02222	3.6	141.7	5.0
EC 2-51	119	1.9	0.18216	9.6	0.02557	3.3	162.7	5.4
EC 2-52	148	2.7	0.17057	13.8	0.02239	3.1	142.7	4.3
EC 2-53	80	2.6	0.16324	10.9	0.02249	3.0	143.4	4.3
EC 2-54	68	2.0	0.19233	12.0	0.02087	7.5	133.2	9.9
EC 2-55	193	1.3	0.14817	5.2	0.02207	1.8	140.7	2.5
EC 2-56	176	1.6	0.15941	4.9	0.02185	2.6	139.4	3.6
EC 2-57	161	1.8	0.18032	7.7	0.02275	3.1	145.0	4.5

EC 2-58	73	2.2	0.14236	16.3	0.02083	6.9	132.9	9.1
EC 2-59	87	2.0	0.18051	13.4	0.02214	2.3	141.2	3.2
EC 2-60	87	3.5	0.16812	19.3	0.02178	4.1	138.9	5.6
EC 3	**U/ppm**	**U/Th**	**207Pb/235U**	**± %**	**206Pb/238U**	**± %**	**Best Age**	**±**
EC 3-1	684	3.8	0.12274	5.2	0.01886	2.9	120.5	3.4
EC 3-2	137	1.7	0.16066	12.0	0.02637	2.3	167.8	3.9
EC 3-3	92	1.6	0.17774	13.8	0.02829	6.1	179.8	10.8
EC 3-4	236	1.9	0.17293	4.5	0.02629	2.5	167.3	4.1
EC 3-5	210	1.8	0.13695	6.9	0.02161	2.8	137.8	3.9
EC 3-6	725	5.6	0.10666	5.9	0.01690	1.7	108.0	1.8
EC 3-7	139	1.5	0.15963	9.7	0.02568	2.7	163.4	4.4
EC 3-8	151	1.5	0.16937	7.9	0.02642	3.7	168.1	6.1
EC 3-9	379	1.3	0.17226	3.9	0.02616	1.4	166.5	2.3
EC 3-10	112	1.2	0.16044	12.0	0.02623	3.6	166.9	5.9
EC 3-11	234	2.0	0.13197	9.4	0.02103	1.6	134.1	2.2
EC 3-12	945	3.7	0.09855	3.3	0.01515	1.5	96.9	1.5
EC 3-13	1186	20.3	0.19099	3.7	0.02808	2.0	178.5	3.5
EC 3-14	157	1.4	0.13242	7.9	0.02074	2.5	132.3	3.3
EC 3-15	258	1.1	0.18010	8.0	0.02587	5.5	164.7	8.9
EC 3-16	218	2.0	0.15510	6.0	0.02402	1.8	153.0	2.7
EC 3-17	490	1.8	0.16505	4.3	0.02514	1.5	160.1	2.4
EC 3-18	122	1.7	0.12573	6.5	0.01973	3.5	125.9	4.4
EC 3-19	333	2.4	0.19854	5.3	0.02682	3.8	170.6	6.4
EC 3-20	135	1.5	0.16463	7.4	0.02538	2.3	161.6	3.6
EC 3-21	406	0.8	0.16365	3.4	0.02437	2.4	155.2	3.6
EC 3-22	566	1.6	0.19327	2.4	0.02797	1.7	177.8	3.0
EC 3-23	251	1.3	0.19544	4.0	0.02792	1.0	177.5	1.8
EC 3-24	297	1.6	0.16902	3.9	0.02560	2.1	163.0	3.5
EC 3-25	295	0.8	0.18355	4.4	0.02635	2.3	167.6	3.9
EC 3-26	170	1.4	0.17941	6.3	0.02753	2.9	175.0	5.0
EC 3-27	189	2.0	5.32778	2.1	0.33465	1.2	1887.2	30.8
EC 3-28	303	2.0	0.15866	4.8	0.02259	2.1	144.0	3.0
EC 3-29	170	2.3	0.16442	7.0	0.02545	3.3	162.0	5.3
EC 3-30	118	1.8	0.15517	8.1	0.02408	2.0	153.4	3.1
EC 3-31	443	1.6	0.16456	9.8	0.02571	2.0	163.6	3.2
EC 3-32	349	2.1	0.10017	6.1	0.01571	1.8	100.5	1.8
EC 3-33	169	1.9	0.13961	5.0	0.02108	3.0	134.5	4.0
EC 3-34	358	1.9	0.21121	6.1	0.02967	5.2	188.5	9.6
EC 3-35	271	1.5	0.11727	4.8	0.01801	2.2	115.1	2.6
EC 3-36	137	1.6	0.16454	6.5	0.02543	2.0	161.9	3.1
EC 3-37	179	1.4	0.12204	6.0	0.01684	2.8	107.7	3.0
EC 3-38	438	1.9	0.16473	3.0	0.02423	1.2	154.4	1.8
EC 3-39	143	2.0	0.16109	9.5	0.02471	3.2	157.3	4.9
EC 3-40	436	1.7	0.16677	3.5	0.02529	1.1	161.0	1.8
EC 3-41	340	2.3	0.18005	3.5	0.02692	2.7	171.3	4.5
EC 3-42	250	1.2	0.14761	6.1	0.02139	2.1	136.4	2.8
EC 3-43	128	1.9	0.16276	8.0	0.02580	2.9	164.2	4.7
EC 3-45	371	1.2	0.17638	4.9	0.02651	3.2	168.7	5.4
EC 3-46	132	2.4	0.14159	18.2	0.02493	3.8	158.8	6.0

EC 3-47	178	2.4	0.13428	10.8	0.02171	3.0	138.5	4.2
EC 3-48	121	1.3	0.16115	7.3	0.02491	3.6	158.6	5.7
EC 3-49	96	1.6	0.15713	19.3	0.02547	6.1	162.1	9.8
EC 3-50	442	1.3	0.16622	3.5	0.02515	2.2	160.1	3.5
EC 3-51	257	1.3	0.16990	5.4	0.02573	1.1	163.8	1.8
EC 3-52	493	1.0	0.15867	3.3	0.02388	1.8	152.1	2.7
EC 3-53	60	2.5	0.14271	19.6	0.02489	3.2	158.5	5.0
EC 3-54	188	1.8	0.18368	5.5	0.02580	1.8	164.2	2.9
EC 3-55	170	1.7	0.14729	32.2	0.02566	3.2	163.3	5.1
EC 3-56	166	1.9	0.19698	5.1	0.02591	2.3	164.9	3.8
EC 3-57	613	1.3	0.16135	2.6	0.02420	1.0	154.1	1.5
EC 3-58	265	1.7	0.11917	3.9	0.01639	1.7	104.8	1.8
EC 3-59	272	1.5	0.16054	4.4	0.02360	2.5	150.4	3.7
EC 3-60	132	1.3	0.19722	5.4	0.02617	2.3	166.5	3.8
EC 3-61	281	2.0	0.17850	4.9	0.02554	2.0	162.6	3.2
EC 3-62	114	1.9	0.18030	6.1	0.02556	2.5	162.7	4.0
EC 3-63	87	2.1	0.15131	9.0	0.02392	2.1	152.4	3.2
EC 3-64	188	2.0	0.13332	7.2	0.01944	3.3	124.1	4.1
EC 3-65	223	1.6	0.16401	6.4	0.02442	2.7	155.5	4.1
EC 3-66	258	1.6	0.18959	5.7	0.02418	3.8	154.0	5.8
EC 3-67	147	1.1	0.15698	5.4	0.02138	2.3	136.4	3.1
EC 3-68	230	2.0	0.11384	10.1	0.01873	2.9	119.7	3.5
EC 3-69	643	1.3	0.17636	4.1	0.02571	3.0	163.7	4.8
EC 3-70	291	1.4	0.19670	4.6	0.02622	3.3	166.8	5.4
EC 3-71	384	1.1	0.16811	4.6	0.02541	2.1	161.8	3.3
EC 3-72	223	2.1	0.18005	4.9	0.02568	1.5	163.4	2.4
EC 3-73	2177	1.0	0.18225	2.8	0.02657	2.0	169.0	3.3
EC 3-74	652	1.9	0.18653	3.5	0.02674	2.3	170.1	3.9
EC 3-75	506	1.5	0.19335	3.5	0.02744	1.0	174.5	1.7
EC 3-76	195	1.4	0.14084	6.5	0.02006	2.4	128.1	3.1
EC 3-77	161	1.7	0.17343	6.9	0.02555	3.5	162.6	5.7
EC 3-78	365	0.9	0.18515	4.2	0.02682	2.4	170.6	4.1
EC 3-79	1490	0.5	0.15075	5.2	0.02193	3.0	139.8	4.2
EC 3-80	315	1.5	0.12478	5.5	0.01806	3.6	115.4	4.1
EC 3-81	791	1.9	0.16051	3.5	0.02365	1.4	150.7	2.0
EC 3-82	206	2.2	0.19556	4.3	0.02745	1.8	174.5	3.0
EC 3-83	175	1.2	0.17705	5.3	0.02530	1.8	161.1	2.8
EC 3-84	142	2.6	1.69506	2.4	0.16839	1.0	1014.1	44.9
EC 3-85	351	1.3	0.18433	5.8	0.02567	1.9	163.4	3.0
EC 3-86	238	2.0	0.16831	5.0	0.02529	2.1	161.0	3.4
EC 3-87	224	1.6	0.19167	8.7	0.02615	1.9	166.4	3.2
EC 3-88	152	1.8	0.17982	6.9	0.02722	3.4	173.1	5.8
EC 3-89	218	1.7	0.16607	5.3	0.02475	1.9	157.6	3.0
EC 3-90	414	1.8	0.17025	4.1	0.02565	2.4	163.3	3.9
EC 3-91	141	1.5	0.17920	7.7	0.02492	3.7	158.7	5.8
EC 3-92	264	0.8	0.09848	59.7	0.02546	8.4	162.1	13.5
EC 3-93	177	1.1	0.16699	8.1	0.02550	1.9	162.3	3.1
EC 3-94	713	1.2	0.17999	2.8	0.02634	2.2	167.6	3.6
EC 3-95	497	0.8	0.16915	4.1	0.02517	2.4	160.2	3.8
EC 3-96	282	1.3	0.17205	6.5	0.02581	1.6	164.3	2.6

EC 3-97	327	2.2	0.17574	5.8	0.02576	1.8	164.0	2.9
EC 3-98	668	1.6	0.20608	4.2	0.02976	3.2	189.0	6.0
EC 3-99	154	1.2	0.15648	10.1	0.02496	2.8	159.0	4.4
EC 3-100	95	1.6	0.12143	22.2	0.02206	2.6	140.6	3.6
EC 4	**U/ppm**	**U/Th**	**207Pb/235U**	**± %**	**206Pb/238U**	**± %**	**Best Age**	**±**
EC 4-1	52	1.3	0.14829	12.3	0.02405	4.9	153.2	7.4
EC 4-2	121	1.5	0.15812	7.5	0.02413	2.7	153.7	4.2
EC 4-3	217	1.1	0.16838	5.1	0.02568	1.6	163.5	2.5
EC 4-4	120	1.3	0.15507	19.4	0.02628	3.1	167.2	5.1
EC 4-5	691	0.6	0.17467	2.7	0.02576	2.1	164.0	3.5
EC 4-6	172	1.4	0.16157	5.4	0.02440	2.8	155.4	4.3
EC 4-7	52	1.9	0.13128	23.6	0.02447	4.0	155.8	6.1
EC 4-8	433	0.7	0.10612	4.5	0.01626	3.2	104.0	3.3
EC 4-9	377	2.6	0.16087	3.4	0.02310	2.0	147.2	2.9
EC 4-10	113	1.4	0.15827	7.6	0.02449	2.1	156.0	3.2
EC 4-11	57	1.7	0.15772	14.5	0.02631	5.4	167.4	8.9
EC 4-12	93	1.2	0.16255	10.7	0.02565	4.0	163.3	6.4
EC 4-13	111	1.3	0.16650	9.2	0.02613	4.1	166.3	6.8
EC 4-14	72	1.0	0.14811	16.3	0.02569	3.6	163.5	5.9
EC 4-15	685	1.6	0.17130	5.1	0.02570	1.1	163.6	1.9
EC 4-16	95	0.8	0.15835	11.5	0.02514	3.3	160.1	5.2
EC 4-17	52	1.0	0.11255	25.8	0.02147	4.7	136.9	6.3
EC 4-18	197	0.7	0.16626	10.1	0.02649	4.8	168.6	7.9
EC 4-19	110	1.3	0.16747	9.9	0.02461	2.8	156.7	4.3
EC 4-20	99	1.4	0.20852	10.7	0.02580	4.3	164.2	6.9
EC 4-21	138	1.1	0.17710	13.1	0.02438	3.6	155.3	5.5
EC 4-22	80	1.7	0.14950	8.3	0.02351	3.9	149.8	5.8
EC 4-23	153	1.4	0.14305	7.7	0.02243	2.4	143.0	3.4
EC 4-24	65	1.5	0.15211	18.5	0.02661	4.2	169.3	6.9
EC 4-25	448	0.6	0.10279	6.4	0.01637	2.3	104.7	2.4
EC 4-26	95	1.4	0.16766	11.6	0.02556	1.7	162.7	2.8
EC 4-27	114	1.2	0.16739	11.1	0.02655	2.7	168.9	4.6
EC 4-28	62	1.2	0.16645	12.2	0.02540	2.8	161.7	4.5
EC 4-29	127	1.1	0.17366	7.9	0.02597	1.3	165.3	2.1
EC 4-30	29	2.1	0.13984	24.4	0.02510	9.4	159.8	14.8
EC 4-33	84	1.2	0.15946	12.2	0.02644	2.7	168.2	4.4
EC 4-34	442	0.7	0.17006	4.2	0.02593	2.0	165.0	3.2
EC 4-35	69	1.3	0.16222	9.9	0.02577	2.1	164.0	3.4
EC 4-36	212	1.0	0.16345	8.1	0.02587	1.3	164.7	2.2
EC 4-37	249	1.0	0.15111	15.9	0.02445	3.8	155.7	5.8
EC 4-38	54	2.5	0.11346	26.6	0.02158	4.4	137.6	6.0
EC 4-39	52	1.9	0.14024	18.4	0.02490	4.2	158.6	6.5
EC 4-40	363	0.6	0.15587	10.4	0.02533	3.5	161.3	5.6
EC 4-41	41	1.5	0.13741	22.5	0.02485	2.4	158.2	3.7
EC 4-42	85	2.1	0.14495	10.3	0.02316	3.4	147.6	4.9
EC 4-44	66	2.3	0.13061	17.9	0.02275	2.4	145.0	3.4
EC 4-45	71	1.2	0.16252	14.3	0.02464	2.6	156.9	4.1
EC 4-46	151	0.8	0.16557	8.5	0.02643	2.0	168.2	3.3
EC 4-47	84	1.8	0.08831	46.8	0.02326	5.0	148.2	7.3

EC 4-48	110	1.2	0.19832	7.9	0.03026	1.9	192.2	3.6
EC 4-49	111	1.4	0.17751	13.9	0.02695	3.0	171.5	5.0
EC 4-50	230	1.1	0.17019	4.3	0.02550	1.7	162.3	2.7
EC 4-51	145	1.2	0.16577	6.6	0.02584	3.1	164.4	5.0
EC 4-52	312	0.9	0.16641	4.8	0.02529	2.6	161.0	4.2
EC 4-53	81	2.5	0.19108	10.2	0.02315	3.8	147.5	5.6
EC 4-54	127	1.6	0.16310	5.4	0.02424	1.9	154.4	3.0
EC 4-55	80	2.1	0.17476	15.1	0.02453	3.5	156.2	5.5
EC 4-56	72	2.4	0.17603	14.2	0.02291	2.8	146.0	4.1
EC 4-57	120	1.0	0.17698	9.7	0.02513	2.5	160.0	3.9
EC 4-58	50	1.2	0.15724	18.3	0.02475	4.8	157.6	7.4
EC 4-59	129	1.3	0.16368	9.6	0.02339	2.7	149.0	4.0
EC 4-60	198	0.8	0.18670	5.1	0.02585	2.1	164.6	3.5
EC 4-61	77	1.9	0.19126	12.5	0.02489	4.1	158.5	6.4
EC 4-62	352	0.7	0.10620	5.8	0.01684	2.6	107.7	2.8
EC 4-63	147	1.1	0.14517	7.9	0.02133	2.3	136.0	3.1
EC 4-64	26	1.5	0.11719	30.3	0.02350	5.3	149.8	7.9
EC 4-65	436	1.0	0.16888	4.6	0.02549	2.0	162.2	3.2
EC 4-66	193	1.3	0.17746	5.3	0.02598	1.4	165.3	2.3
EC 4-67	256	0.8	0.16172	7.8	0.02557	2.3	162.7	3.7
EC 4-68	171	1.1	0.17025	7.4	0.02623	2.8	166.9	4.7
EC 4-69	140	1.6	0.16361	10.6	0.02328	3.6	148.4	5.3
EC 4-70	83	1.5	0.16921	13.6	0.02573	3.2	163.8	5.2
EC 4-71	302	2.3	0.15816	4.8	0.02315	1.1	147.6	1.7
EC 4-72	69	1.1	0.18094	12.8	0.02484	4.1	158.1	6.5
EC 4-73	198	1.6	0.20022	4.9	0.02988	1.4	189.8	2.6
EC 4-74	225	1.1	0.17592	6.9	0.02724	3.5	173.3	5.9
EC 4-75	120	1.1	0.18558	7.7	0.02687	3.0	170.9	5.1
EC 4-76	68	1.4	0.19461	9.8	0.02493	3.4	158.8	5.3
EC 4-77	125	0.9	0.17233	8.3	0.02488	1.8	158.4	2.8
EC 4-78	99	1.9	0.17971	12.4	0.02309	2.5	147.2	3.7
EC 4-79	308	0.7	0.18778	4.0	0.02565	2.3	163.3	3.6
EC 4-80	149	1.5	0.14509	6.3	0.02236	1.5	142.6	2.1
EC 4-81	56	1.7	0.15748	15.8	0.02195	5.6	139.9	7.8
EC 4-82	342	1.8	0.15154	4.7	0.02306	2.8	147.0	4.0
EC 4-83	406	2.2	0.15927	3.3	0.02287	2.0	145.8	2.8
EC 4-84	73	1.6	0.16371	10.6	0.02498	4.2	159.0	6.6
EC 4-85	131	2.0	0.15321	9.1	0.02442	1.9	155.5	2.9
EC 4-86	129	1.2	0.16293	7.1	0.02504	2.7	159.4	4.2
EC 4-87	148	1.4	0.16500	6.7	0.02560	3.0	162.9	4.9
EC 4-88	86	1.8	0.17964	11.1	0.02410	4.4	153.5	6.7
EC 4-89	53	1.5	0.19174	12.6	0.02540	3.5	161.7	5.6
EC 4-90	258	0.6	0.16489	4.5	0.02491	1.2	158.6	1.9
EC 4-91	63	1.2	0.19688	9.5	0.02493	4.7	158.7	7.4
EC 4-92	583	0.8	0.18279	3.1	0.02645	2.5	168.3	4.1
EC 4-93	74	2.5	0.20403	10.2	0.02319	3.9	147.8	5.7
EC 4-94	87	2.1	0.14627	12.9	0.02384	3.6	151.9	5.4
EC 4-95	444	1.1	0.18400	3.0	0.02629	2.1	167.3	3.5
EC 4-96	147	1.0	0.17874	7.4	0.02554	2.2	162.6	3.6
EC 4-97	85	1.1	0.15898	12.5	0.02514	2.3	160.1	3.6

EC 4-98	76	1.4	0.13897	16.8	0.02218	3.3	141.4	4.7
EC 4-99	87	0.8	0.16933	10.4	0.02550	2.9	162.3	4.7
EC 4-100	44	1.9	0.15378	18.0	0.02338	4.5	149.0	6.6
EC 6	**U/ppm**	**U/Th**	**207Pb/235U**	**± %**	**206Pb/238U**	**± %**	**Best Age**	**±**
EC 6-1	62	1.6	0.15837	14.3	0.02225	7.7	141.9	10.9
EC 6-2	42	2.0	0.15841	20.4	0.02293	3.0	146.2	4.4
EC 6-3	60	1.5	0.17224	11.1	0.02260	6.1	144.1	8.6
EC 6-4	62	1.6	0.20384	13.3	0.02170	5.8	138.4	8.0
EC 6-5	127	2.1	0.15486	15.6	0.02248	3.6	143.3	5.2
EC 6-6	231	1.6	0.15658	5.4	0.02220	3.0	141.6	4.2
EC 6-7	109	1.5	0.17656	12.0	0.02185	4.7	139.4	6.5
EC 6-8	73	1.7	0.14228	15.9	0.02230	4.2	142.2	5.9
EC 6-9	68	1.6	0.15423	19.3	0.02147	3.3	137.0	4.5
EC 6-10	89	1.5	0.15994	8.4	0.02180	3.2	139.0	4.4
EC 6-11	74	1.7	0.16242	12.0	0.02289	3.0	145.9	4.3
EC 6-12	62	1.6	0.17847	9.0	0.02203	4.1	140.5	5.7
EC 6-13	59	1.5	0.13003	20.7	0.02165	8.5	138.1	11.7
EC 6-14	172	3.2	0.16236	7.6	0.02263	3.3	144.2	4.7
EC 6-15	1217	2.9	0.16000	1.9	0.02377	1.5	151.5	2.2
EC 6-16	62	1.9	0.16099	13.9	0.02178	3.7	138.9	5.1
EC 6-17	74	1.6	0.21775	8.1	0.02232	3.1	142.3	4.3
EC 6-18	130	1.7	0.14167	8.0	0.02144	2.8	136.7	3.8
EC 6-19	201	1.6	0.13804	7.3	0.02142	3.4	136.6	4.6
EC 6-20	69	2.3	0.19724	10.3	0.02206	4.4	140.6	6.2
EC 6-21	41	2.7	0.18523	16.3	0.02316	3.3	147.6	4.8
EC 6-22	72	2.2	0.16098	13.0	0.02264	4.6	144.3	6.5
EC 6-23	88	2.0	0.17913	8.4	0.02201	4.0	140.3	5.6
EC 6-24	79	2.0	0.16587	9.8	0.02196	3.3	140.0	4.5
EC 6-25	48	2.6	0.13165	14.3	0.02105	3.4	134.3	4.6
EC 6-26	69	1.6	0.16311	13.0	0.02252	4.7	143.6	6.6
EC 6-27	62	1.7	0.15238	16.8	0.02123	4.1	135.4	5.5
EC 6-28	49	2.2	0.15239	18.1	0.02287	5.0	145.8	7.2
EC 6-29	154	1.7	0.15662	5.9	0.02190	1.5	139.6	2.0
EC 6-30	38	2.1	0.16067	19.3	0.02120	5.7	135.2	7.7
EC 6-31	63	2.0	0.14359	18.0	0.02249	6.1	143.4	8.7
EC 6-32	76	2.1	0.20201	11.1	0.02337	2.3	148.9	3.4
EC 6-33	52	2.1	0.14471	19.9	0.02252	4.6	143.6	6.6
EC 6-34	80	1.8	0.16854	11.7	0.02118	4.4	135.1	5.9
EC 6-35	100	2.5	0.14496	11.9	0.02351	2.8	149.8	4.2
EC 6-36	56	2.5	0.19454	10.0	0.02284	2.8	145.6	4.1
EC 6-38	83	1.4	0.14322	11.4	0.02208	2.8	140.8	3.9
EC 6-39	146	1.3	0.15240	6.0	0.02194	2.8	139.9	3.9
EC 6-40	77	1.6	0.14511	10.8	0.02254	3.7	143.7	5.2
EC 6-41	70	2.8	0.20188	11.8	0.02183	2.1	139.2	2.9
EC 6-42	77	2.4	0.14388	10.4	0.02314	3.6	147.5	5.3
EC 6-43	77	3.8	0.16517	11.2	0.02278	4.1	145.2	5.9
EC 6-44	55	2.5	0.13606	25.3	0.02309	5.9	147.1	8.6
EC 6-45	285	1.7	0.15408	4.0	0.02235	1.7	142.5	2.5
EC 6-46	69	2.5	0.15328	18.1	0.02265	5.1	144.4	7.3

EC 6-47	2263	2.7	0.15211	1.8	0.02272	1.0	144.9	1.4
EC 6-49	37	3.2	0.19759	18.7	0.02236	4.4	142.6	6.2
EC 6-50	52	3.0	0.20214	12.9	0.02272	4.0	144.9	5.8
EC 6-51	170	2.6	0.14291	5.1	0.02142	1.4	136.6	1.9
EC 6-52	91	2.8	0.12794	15.8	0.02186	4.0	139.4	5.5
EC 6-53	198	3.6	0.14380	5.2	0.02221	1.8	141.6	2.5
EC 6-54	104	1.8	0.13194	12.2	0.02206	2.7	140.7	3.7
EC 6-55	436	3.2	0.15650	3.7	0.02247	1.4	143.3	2.0
EC 6-56	99	1.7	0.17178	9.8	0.02276	2.4	145.1	3.5
EC 6-57	197	2.2	0.15696	9.6	0.02200	2.5	140.3	3.5
EC 6-58	72	3.6	0.14420	16.9	0.02264	2.6	144.3	3.7
EC 6-59	107	2.9	0.13638	24.9	0.02262	2.7	144.2	3.9
EC 6-60	103	1.8	0.14592	10.9	0.02203	1.1	140.5	1.5
EC 6-61	152	1.8	0.15918	7.2	0.02269	3.3	144.6	4.7
EC 6-63	144	1.4	0.17073	7.2	0.02464	2.3	156.9	3.5
EC 6-64	1071	2.9	0.06927	59.1	0.02170	4.5	138.4	6.2
EC 6-65	103	1.6	0.14720	8.6	0.02236	2.4	142.6	3.4
EC 6-66	170	4.0	0.15758	5.2	0.02356	1.5	150.1	2.2
EC 6-67	51	3.0	0.16164	18.8	0.02312	6.4	147.4	9.4
EC 6-68	54	1.9	0.14753	15.7	0.02218	5.1	141.4	7.1
EC 6-69	66	2.3	0.18830	13.1	0.02287	4.4	145.7	6.3
EC 6-70	60	2.2	0.17037	13.0	0.02144	3.7	136.7	4.9
EC 6-71	77	2.1	0.16998	10.0	0.02247	2.2	143.3	3.2
EC 6-72	125	3.1	0.13367	10.7	0.02178	3.4	138.9	4.6
EC 6-73	79	3.3	0.17480	11.1	0.02186	4.4	139.4	6.1
EC 6-74	75	3.3	0.12776	15.7	0.02185	3.0	139.3	4.2
EC 6-75	108	2.1	0.17777	9.0	0.02301	2.4	146.7	3.5

VGV 1	**U/ppm**	**U/Th**	**207Pb/235U**	**± %**	**206Pb/238U**	**± %**	**Best Age**	**±**
VGV 1-1	48	1.9	0.07340	59.3	0.02063	6.6	131.6	8.6
VGV 1-2	178	1.6	0.15872	10.7	0.02269	5.0	144.6	7.2
VGV 1-3	389	1.2	0.17067	4.8	0.02567	2.6	163.4	4.1
VGV 1-4	131	1.5	0.15145	12.2	0.02494	2.7	158.8	4.2
VGV 1-5	167	0.9	0.11430	10.6	0.01841	2.2	117.6	2.6
VGV 1-6	179	0.9	0.13818	16.4	0.02389	2.1	152.2	3.1
VGV 1-8	130	1.4	0.19127	7.1	0.02933	1.6	186.4	2.9
VGV 1-9	119	1.2	0.20722	6.1	0.03106	2.2	197.2	4.3
VGV 1-10	721	1.2	0.37531	2.4	0.05138	2.1	323.0	6.7
VGV 1-11	403	1.3	0.18068	3.9	0.02608	1.4	166.0	2.2
VGV 1-12	144	1.8	0.15439	7.0	0.02384	2.0	151.9	3.0
VGV 1-13	325	1.3	0.17492	5.5	0.02633	3.0	167.5	5.0
VGV 1-14	273	1.9	0.14519	6.3	0.02271	3.3	144.8	4.7
VGV 1-15	64	1.4	0.11775	20.6	0.02134	3.5	136.1	4.7
VGV 1-16	478	0.7	0.27625	3.6	0.03961	2.7	250.4	6.7
VGV 1-17	64	1.7	0.39455	11.4	0.05368	3.4	337.1	11.1
VGV 1-18	71	1.0	0.11360	25.8	0.02215	3.6	141.2	5.1
VGV 1-19	70	1.4	0.11148	30.8	0.02261	5.9	144.1	8.4
VGV 1-20	141	1.3	0.14790	8.6	0.02320	3.0	147.9	4.4
VGV 1-21	105	1.4	16.89638	3.1	0.56668	2.0	2953.0	38.6
VGV 1-25	102	1.0	0.73085	5.4	0.09195	2.4	567.1	12.9

VGV 1-26	272	15.3	0.15191	7.5	0.02254	3.6	143.7	5.1
VGV 1-28	120	1.3	0.16329	9.3	0.02295	4.1	146.3	5.9
VGV 1-30	213	0.9	0.12503	8.9	0.01990	5.5	127.0	6.9
VGV 1-31	148	1.1	0.15266	7.0	0.02161	2.7	137.8	3.7
VGV 1-32	738	3.9	2.19066	3.3	0.19267	2.9	1256.6	31.9
VGV 1-33	201	1.0	0.35043	28.7	0.05260	3.8	330.4	12.4
VGV 1-34	60	1.7	0.16169	10.0	0.02236	3.0	142.5	4.2
VGV 1-35	111	1.1	0.15312	8.2	0.02157	3.9	137.6	5.3
VGV 1-36	63	2.1	0.25008	7.8	0.03057	2.2	194.1	4.2
VGV 1-37	342	1.1	0.18689	4.5	0.02608	2.4	166.0	4.0
VGV 1-38	70	1.1	0.15226	13.7	0.02340	4.3	149.1	6.3
VGV 1-39	561	1.0	0.15389	3.6	0.02341	2.3	149.1	3.4
VGV 1-40	62	1.2	0.13272	30.0	0.02142	4.0	136.6	5.4
VGV 1-41	76	1.2	0.15582	12.5	0.02251	3.9	143.5	5.5
VGV 1-42	113	1.7	0.40380	5.7	0.05316	1.7	333.9	5.6
VGV 1-43	31	1.4	0.11881	61.3	0.02939	8.1	186.7	14.9
VGV 1-44	98	1.7	0.16824	13.3	0.02241	4.3	142.8	6.1
VGV 1-45	256	0.9	6.22056	3.9	0.35853	3.7	2040.6	23.5
VGV 1-46	282	0.9	0.14342	4.9	0.02206	2.6	140.7	3.6
VGV 1-47	95	1.3	0.13812	14.1	0.02216	1.7	141.3	2.4
VGV 1-48	363	0.8	0.14147	9.5	0.02264	4.2	144.3	6.0
VGV 1-49	160	1.3	0.12305	8.6	0.01965	3.8	125.5	4.7
VGV 1-50	281	1.7	0.15974	5.5	0.02439	1.4	155.3	2.2
VGV 1-51	143	1.2	0.16146	7.5	0.02500	1.5	159.2	2.4
VGV 1-52	122	1.5	0.14349	8.4	0.02260	1.5	144.1	2.1
VGV 1-53	283	1.1	0.17521	4.8	0.02623	3.2	166.9	5.3
VGV 1-54	89	1.3	0.11448	21.2	0.02087	3.1	133.1	4.1
VGV 1-55	516	1.7	0.17063	4.7	0.02330	3.0	148.5	4.4
VGV 1-56	77	1.8	0.14789	9.6	0.02168	3.1	138.3	4.3
VGV 1-57	34	1.5	0.12704	34.5	0.02064	9.2	131.7	12.0
VGV 1-58	188	1.9	4.99768	3.9	0.32713	3.7	1812.6	18.5
VGV 1-59	432	0.7	0.14243	5.9	0.02225	1.2	141.9	1.6
VGV 1-60	75	1.0	0.13422	21.6	0.02383	4.7	151.8	7.1
VGV 1-61	899	3.5	0.16276	2.8	0.02422	1.3	154.3	1.9
VGV 1-62	81	1.1	0.15435	15.9	0.02598	4.7	165.3	7.6
VGV 1-63	77	1.1	0.13969	18.6	0.02187	3.5	139.5	4.8
VGV 1-64	237	0.9	0.16165	10.4	0.02409	2.2	153.5	3.3
VGV 1-65	112	1.2	0.16911	14.1	0.02302	4.8	146.7	7.0
VGV 1-66	126	1.2	0.15138	7.4	0.02187	2.4	139.5	3.3
VGV 1-67	323	1.2	0.41834	2.1	0.05576	1.3	349.8	4.3
VGV 1-68	326	0.7	0.26713	2.6	0.03833	1.5	242.5	3.6
VGV 1-69	202	3.1	0.78894	3.9	0.09568	3.7	589.0	20.9
VGV 1-70	65	1.2	3.51876	2.8	0.26676	1.6	1541.3	43.0
VGV 1-71	120	1.2	0.23017	8.4	0.03050	4.5	193.7	8.6
VGV 1-72	109	1.5	0.16058	7.2	0.02499	3.3	159.1	5.2
VGV 1-73	120	0.9	0.50391	4.2	0.06367	2.5	397.9	9.5
VGV 1-74	25	1.9	0.18093	20.8	0.02942	6.4	186.9	11.8
VGV 1-75	133	1.1	0.13957	10.5	0.02122	2.6	135.4	3.5

VGV 2	**U/ppm**	**U/Th**	**207Pb/235U**	**± %**	**206Pb/238U**	**± %**	**Best Age**	**±**

VGV 2-1	229	1.0	0.19514	3.8	0.02740	1.8	174.3	3.1
VGV 2-2	105	0.9	0.21052	5.4	0.02728	3.9	173.5	6.6
VGV 2-3	76	0.8	0.17295	10.2	0.02383	5.7	151.8	8.5
VGV 2-4	465	0.4	0.18232	4.1	0.02621	2.4	166.8	4.0
VGV 2-5	181	0.9	0.11721	15.6	0.02016	4.0	128.6	5.1
VGV 2-6	154	0.5	0.17231	5.1	0.02625	1.9	167.0	3.1
VGV 2-7	300	1.5	2.02925	4.3	0.18615	4.0	1173.7	31.5
VGV 2-8	376	1.5	0.16861	3.8	0.02466	3.0	157.0	4.7
VGV 2-9	247	0.6	0.16868	4.7	0.02524	3.5	160.7	5.6
VGV 2-10	214	1.5	0.33372	4.4	0.04569	4.0	288.0	11.3
VGV 2-11	732	0.2	0.11024	13.6	0.01730	6.2	110.5	6.8
VGV 2-12	124	0.7	0.82824	3.6	0.09966	2.9	612.4	17.2
VGV 2-13	300	1.1	0.11181	6.7	0.01734	2.4	110.8	2.7
VGV 2-14	222	1.4	2.62234	2.6	0.22446	2.3	1309.4	20.7
VGV 2-15	224	1.4	0.16578	5.9	0.02541	2.2	161.8	3.5
VGV 2-16	672	5.3	1.73982	7.7	0.17057	7.2	1040.9	55.0
VGV 2-17	273	2.1	0.17048	6.7	0.02608	4.5	165.9	7.4
VGV 2-18	198	0.6	3.89397	3.0	0.28296	2.3	1620.5	34.9
VGV 2-19	234	0.9	0.44719	5.7	0.06100	5.0	381.7	18.5
VGV 2-20	224	1.1	0.10258	7.5	0.01646	3.3	105.3	3.4
VGV 2-21	135	1.0	1.71252	3.5	0.17052	3.0	1009.4	35.9
VGV 2-22	265	1.0	0.41625	4.2	0.05716	2.5	358.4	8.6
VGV 2-23	258	0.9	0.10343	14.7	0.01707	3.6	109.1	3.9
VGV 2-24	374	5.2	0.16942	5.6	0.02553	3.4	162.5	5.5
VGV 2-25	198	1.1	0.11727	8.7	0.01874	3.5	119.7	4.1
VGV 2-26	151	1.3	0.16270	8.4	0.02541	2.8	161.8	4.4
VGV 2-27	34	1.8	0.12292	31.3	0.02523	5.7	160.6	9.0
VGV 2-28	136	1.2	0.14423	10.7	0.02333	2.0	148.7	2.9
VGV 2-29	120	1.3	0.18957	16.7	0.02943	2.2	187.0	4.0
VGV 2-30	57	1.6	0.15714	26.5	0.02288	4.9	145.8	7.0
VGV 2-31	253	1.0	9.55620	5.1	0.39395	4.7	2614.9	33.1
VGV 2-32	832	0.9	0.15607	4.0	0.02354	3.3	150.0	4.9
VGV 2-33	226	0.7	3.52558	2.2	0.25537	1.9	1626.5	19.2
VGV 2-34	189	1.1	0.12726	7.6	0.01903	2.3	121.5	2.7
VGV 2-35	392	0.8	0.45801	3.9	0.06033	3.2	377.6	11.6
VGV 2-36	34	1.7	0.47109	9.9	0.06382	3.5	398.8	13.5
VGV 2-37	387	0.7	0.18870	4.0	0.02633	3.2	167.6	5.3
VGV 2-38	74	2.2	0.25252	11.9	0.03495	3.9	221.5	8.6
VGV 2-39	103	0.9	4.29906	3.0	0.27625	2.5	1846.1	30.4
VGV 2-40	216	0.5	0.13641	27.1	0.02406	2.6	153.3	4.0
VGV 2-41	53	1.6	0.21045	13.2	0.03151	4.6	200.0	9.0
VGV 2-42	62	1.4	0.17585	12.8	0.02399	4.0	152.8	6.0
VGV 2-43	562	1.4	0.82734	3.7	0.10027	3.3	616.0	19.4
VGV 2-44	172	0.7	0.14679	9.5	0.02339	4.0	149.0	5.9
VGV 2-45	136	0.8	0.14870	9.8	0.02131	4.0	135.9	5.4
VGV 2-46	255	0.9	0.17412	5.8	0.02632	4.6	167.5	7.6
VGV 2-47	69	1.4	0.14332	13.1	0.02085	5.8	133.0	7.6
VGV 2-48	290	1.1	0.16634	6.7	0.02535	4.1	161.4	6.5
VGV 2-49	357	0.9	0.16439	9.0	0.02618	1.7	166.6	2.8
VGV 2-50	329	1.6	18.48187	3.2	0.59171	2.8	3027.7	26.5

VGV 2-51	269	1.4	0.16634	4.6	0.02465	3.5	157.0	5.4
VGV 2-52	88	0.5	11.32213	3.7	0.46999	3.6	2603.3	17.4
VGV 2-53	227	0.9	0.14199	7.0	0.02169	2.4	138.3	3.3
VGV 2-54	342	1.0	0.13843	10.6	0.02250	4.2	143.4	5.9
VGV 2-55	772	0.7	0.17393	4.0	0.02533	2.8	161.3	4.4
VGV 2-56	326	1.2	0.17784	5.1	0.02537	4.2	161.5	6.7
VGV 2-57	380	0.8	0.10732	6.2	0.01683	3.2	107.6	3.4
VGV 2-58	171	1.8	0.34646	4.7	0.04914	2.5	309.3	7.5
VGV 2-59	289	0.8	0.17180	4.5	0.02576	3.0	164.0	4.8
VGV 2-60	40	1.2	12.40779	3.3	0.50362	3.1	2640.7	17.1
VGV 2-61	198	1.4	0.18431	6.3	0.02619	1.8	166.6	2.9
VGV 2-62	417	0.9	0.43129	4.1	0.05800	3.3	363.5	11.7
VGV 2-63	442	1.1	0.16348	7.0	0.02484	5.1	158.1	8.0
VGV 2-64	274	1.1	0.11184	5.5	0.01746	3.6	111.6	3.9
VGV 2-65	418	0.8	0.09967	16.9	0.01735	4.9	110.9	5.4
VGV 2-66	140	0.8	0.09681	34.9	0.01971	3.7	125.8	4.6
VGV 2-67	201	1.3	0.16371	7.4	0.02280	4.4	145.4	6.4
VGV 2-68	130	0.9	0.13224	9.3	0.01984	3.3	126.6	4.2
VGV 2-69	110	1.2	0.19467	9.4	0.03064	4.9	194.6	9.3
VGV 2-70	183	0.6	0.10054	29.4	0.02054	2.9	131.1	3.7
VGV 2-71	170	1.1	0.15508	10.8	0.02541	2.3	161.8	3.7
VGV 2-72	158	0.9	0.46093	4.3	0.06047	3.8	378.5	14.0
VGV 2-73	400	0.9	0.17259	14.3	0.02526	3.8	160.8	6.1
VGV 2-74	68	1.4	0.16335	17.2	0.02839	4.0	180.4	7.2
VGV 2-75	205	1.5	0.10386	7.8	0.01662	3.0	106.2	3.1

VGV 4	**U/ppm**	**U/Th**	**207Pb/235U**	**± %**	**206Pb/238U**	**± %**	**Best Age**	**±**
VGV 4-2	132	3.4	0.20155	12.7	0.02568	5.1	163.5	8.2
VGV 4-3	39	3.1	0.29441	13.7	0.02609	6.7	166.0	11.0
VGV 4-5	37	2.3	0.23328	27.8	0.02580	9.3	164.2	15.1
VGV 4-6	26	2.4	0.25637	15.4	0.02430	7.7	154.8	11.7
VGV 4-7	112	1.9	0.20754	6.3	0.02259	2.5	144.0	3.5
VGV 4-8	52	3.2	0.24246	12.4	0.02200	2.2	140.3	3.1
VGV 4-9	117	2.3	0.18445	11.5	0.02213	2.9	141.1	4.1
VGV 4-10	183	1.7	0.15489	6.4	0.02113	2.8	134.8	3.7
VGV 4-11	53	2.7	0.24928	10.4	0.02378	5.1	151.5	7.6
VGV 4-12	168	1.7	0.17150	8.4	0.02224	2.7	141.8	3.8
VGV 4-13	107	2.3	0.21924	10.5	0.02338	2.6	149.0	3.8
VGV 4-15	98	1.4	0.21748	7.7	0.02290	3.2	146.0	4.6
VGV 4-16	183	1.3	0.15774	5.9	0.02143	1.0	136.7	1.4
VGV 4-17	49	2.1	0.20754	17.4	0.02235	5.8	142.5	8.2
VGV 4-18	304	3.4	0.16383	4.0	0.02315	1.6	147.5	2.4
VGV 4-20	47	2.2	0.20655	26.0	0.02282	9.1	145.4	13.1
VGV 4-21	129	1.6	0.19310	9.5	0.02225	3.9	141.9	5.5
VGV 4-22	91	1.5	0.21401	9.2	0.02457	1.4	156.5	2.2
VGV 4-23	67	2.0	0.19021	13.2	0.02523	5.8	160.6	9.3
VGV 4-24	92	2.2	0.19900	9.9	0.02275	2.0	145.0	2.9
VGV 4-25	1053	1.4	0.14927	2.1	0.02347	1.5	149.5	2.3
VGV 4-26	153	1.6	0.17037	5.1	0.02242	1.8	142.9	2.6
VGV 4-27	314	1.9	0.18598	5.9	0.02690	3.2	171.1	5.3

VGV 4-28	96	2.1	0.12620	15.4	0.02337	4.7	148.9	6.9
VGV 4-29	78	1.8	0.15180	8.6	0.02443	5.4	155.6	8.3
VGV 4-30	89	2.0	0.15498	9.7	0.02392	2.7	152.4	4.1
VGV 4-31	35	2.3	0.18416	14.1	0.02520	5.8	160.4	9.3
VGV 4-32	48	2.1	0.16808	15.7	0.02213	3.5	141.1	4.9
VGV 4-33	47	1.7	0.10474	19.9	0.02202	3.7	140.4	5.1
VGV 4-34	62	2.2	0.12823	11.0	0.02294	3.1	146.2	4.5
VGV 4-36	123	1.1	0.30253	6.8	0.04761	5.3	299.8	15.6
VGV 4-37	1168	1.4	0.23031	2.7	0.03661	1.4	231.8	3.3
VGV 4-38	84	1.7	0.31947	7.1	0.04647	2.9	292.8	8.3
VGV 4-39	72	1.6	0.32479	7.4	0.05035	3.5	316.7	10.9
VGV 4-40	47	2.1	0.40867	9.1	0.05230	5.2	328.6	16.6
VGV 4-41	117	2.3	0.31523	6.6	0.05125	2.8	322.2	9.0
VGV 4-42	79	2.0	0.32058	9.9	0.05298	4.1	332.8	13.1
VGV 4-43	62	1.9	0.30778	7.6	0.04649	3.2	292.9	9.0
VGV 4-44	75	2.5	0.30827	5.0	0.04961	2.9	312.2	8.9
VGV 4-45	54	1.9	0.36907	11.7	0.05630	3.7	353.1	12.9

VGV 5	**U/ppm**	**U/Th**	**207Pb/235U**	**± %**	**206Pb/238U**	**± %**	**Best Age**	**±**
VGV 5-1	103	2.9	0.38309	3.9	0.05375	3.3	337.5	10.7
VGV 5-2	82	1.5	0.32997	7.8	0.04964	2.1	312.3	6.5
VGV 5-3	150	1.4	0.30377	4.6	0.04468	2.7	281.8	7.4
VGV 5-4	91	2.0	0.32854	6.4	0.04930	4.4	310.2	13.3
VGV 5-6	87	1.4	0.12291	11.1	0.02047	4.3	130.6	5.6
VGV 5-7	309	2.1	0.14743	6.2	0.02315	4.6	147.5	6.8
VGV 5-8	607	1.0	0.13778	3.3	0.02179	2.0	138.9	2.7
VGV 5-9	126	2.9	0.14661	5.2	0.02384	1.8	151.9	2.8
VGV 5-10	123	2.0	0.12358	8.9	0.02141	3.8	136.6	5.1
VGV 5-11	57	1.3	0.13200	11.5	0.02191	5.5	139.7	7.7
VGV 5-12	152	1.5	0.14868	7.1	0.02392	3.2	152.4	4.8
VGV 5-13	56	2.3	0.17212	10.9	0.02874	2.4	182.6	4.4
VGV 5-14	345	1.5	0.14653	3.7	0.02309	1.4	147.1	2.1
VGV 5-15	95	2.1	0.13192	11.0	0.02076	3.3	132.4	4.3
VGV 5-16	65	1.2	0.12851	12.7	0.02168	3.5	138.3	4.8
VGV 5-17	64	1.6	0.12923	10.2	0.02106	4.2	134.3	5.6
VGV 5-18	166	2.2	0.13692	4.8	0.02165	2.3	138.1	3.2
VGV 5-19	92	2.6	0.12606	9.7	0.01980	2.8	126.4	3.5
VGV 5-20	220	3.3	0.14591	3.9	0.02275	1.5	145.0	2.1
VGV 5-21	181	4.1	0.13826	8.1	0.02216	3.0	141.3	4.3
VGV 5-22	335	3.1	0.14893	3.8	0.02289	1.0	145.9	1.4
VGV 5-23	74	2.4	0.12898	17.2	0.02015	3.8	128.6	4.9
VGV 5-24	219	7.0	0.15198	4.8	0.02243	2.0	143.0	2.8
VGV 5-25	607	2.5	0.16015	3.9	0.02468	1.6	157.2	2.4
VGV 5-26	659	1.7	0.15395	3.5	0.02329	1.0	148.4	1.5
VGV 5-27	69	2.1	0.17349	12.2	0.02258	4.9	143.9	6.9
VGV 5-28	432	2.2	0.10792	6.5	0.01641	1.8	104.9	1.9
VGV 5-29	955	1.2	0.16192	2.5	0.02447	1.0	155.8	1.5
VGV 5-30	200	1.5	0.13270	5.8	0.02046	3.3	130.6	4.3
VGV 5-31	112	3.3	0.12753	14.9	0.02080	3.7	132.7	4.8
VGV 5-32	136	2.5	0.12471	12.0	0.01976	3.6	126.1	4.5

VGV 5-33	562	3.3	0.13852	4.1	0.02112	2.8	134.7	3.8
VGV 5-34	133	2.6	0.11184	10.3	0.01862	2.6	118.9	3.1
VGV 5-35	92	3.0	0.11654	12.7	0.01929	2.4	123.1	3.0
VGV 5-36	146	2.1	0.12674	10.6	0.01994	1.9	127.3	2.4
VGV 5-37	85	2.7	0.13107	14.0	0.02077	2.3	132.5	3.0
VGV 5-38	195	2.8	0.15874	5.4	0.02407	2.7	153.3	4.1
VGV 5-39	696	2.4	0.13034	11.0	0.02025	7.6	129.2	9.7
VGV 5-40	162	1.8	0.12314	10.3	0.01931	3.5	123.3	4.3
VGV 5-41	181	1.5	0.15586	6.8	0.02196	3.0	140.0	4.1
VGV 5-42	268	1.1	0.17000	4.1	0.02596	1.3	165.2	2.1
VGV 5-43	359	1.3	0.11623	5.1	0.01771	2.5	113.2	2.8
VGV 5-44	422	1.9	0.19044	4.4	0.02802	3.1	178.1	5.5
VGV 5-45	299	2.3	0.14698	5.9	0.02144	2.7	136.8	3.7
VGV 5-46	125	2.4	0.12624	13.2	0.02132	1.7	136.0	2.3
VGV 5-47	157	2.1	0.14868	6.3	0.02070	3.0	132.1	3.9
VGV 5-48	43	2.3	0.13846	22.6	0.02081	6.2	132.8	8.2
VGV 5-49	2210	0.7	0.13917	2.4	0.02076	1.8	132.4	2.4
VGV 5-50	686	2.7	0.17255	3.1	0.02452	1.3	156.2	2.0
VGV 5-51	182	1.7	0.12711	9.0	0.02039	2.6	130.1	3.3
VGV 5-52	430	2.4	0.15642	2.8	0.02323	1.4	148.1	2.0
VGV 5-53	157	2.4	1.56922	2.9	0.15602	2.1	1012.4	42.1
VGV 5-54	119	1.5	0.15640	8.4	0.02120	1.6	135.3	2.1
VGV 5-55	117	1.9	0.16204	9.4	0.02087	2.0	133.1	2.6
VGV 5-56	288	3.6	6.13059	3.3	0.36540	2.1	1981.0	44.6
VGV 5-57	53	1.7	0.23414	13.0	0.02436	9.4	155.1	14.5
VGV 5-58	202	1.8	0.20979	5.8	0.02945	2.6	187.1	4.9
VGV 5-59	121	4.3	0.20454	12.1	0.02436	5.6	155.1	8.6
VGV 5-60	132	1.2	1.58723	3.7	0.15874	2.0	1000.5	62.4

VGV 6	**U/ppm**	**U/Th**	**207Pb/235U**	**± %**	**206Pb/238U**	**± %**	**Best Age**	**±**
VGV 6-1	121	2.2	0.14702	12.5	0.02268	2.3	144.6	3.3
VGV 6-2	1061	1.6	0.15404	3.0	0.02232	1.8	142.3	2.6
VGV 6-3	329	5.3	1.34378	6.4	0.13834	5.8	941.5	56.8
VGV 6-4	196	1.2	2.47014	1.9	0.21267	1.5	1298.0	21.7
VGV 6-5	68	2.2	1.67410	3.8	0.16664	2.6	1010.1	55.0
VGV 6-6	264	1.4	3.84470	2.2	0.27659	1.0	1639.1	35.7
VGV 6-7	927	1.9	0.15252	6.2	0.02365	1.5	150.7	2.3
VGV 6-8	487	9.7	0.95111	5.5	0.10335	4.9	634.0	29.9
VGV 6-10	137	2.9	0.13193	14.2	0.02233	1.7	142.4	2.4
VGV 6-11	85	2.2	2.03645	2.8	0.19249	1.3	1114.1	50.6
VGV 6-12	102	2.6	0.14978	17.5	0.02162	5.0	137.9	6.8
VGV 6-13	178	1.5	1.78404	3.8	0.17493	2.6	1040.5	55.8
VGV 6-14	107	1.8	0.14576	10.7	0.02349	2.8	149.7	4.1
VGV 6-15	64	2.2	0.10724	25.3	0.02060	5.1	131.4	6.6
VGV 6-16	130	2.1	3.07249	2.5	0.24616	2.1	1436.6	26.7
VGV 6-17	452	2.7	1.95838	1.5	0.18612	1.0	1103.3	21.5
VGV 6-18	910	1.8	0.55119	2.4	0.07143	1.8	444.8	7.9
VGV 6-19	224	1.5	0.14316	9.6	0.02228	2.5	142.1	3.5
VGV 6-20	1415	1.8	2.26713	4.0	0.20708	3.6	1182.2	35.4
VGV 6-22	193	1.9	2.79061	2.3	0.23178	1.8	1367.6	28.0

VGV 6-23	433	1.5	3.42906	2.0	0.25765	1.4	1558.0	25.9
VGV 6-24	1526	3.9	0.19131	4.7	0.02855	2.9	181.5	5.2
VGV 6-25	126	0.8	3.78532	2.2	0.27164	1.5	1643.8	28.9
VGV 6-26	313	1.3	0.48258	2.7	0.06450	1.4	403.0	5.5
VGV 6-27	285	1.4	1.34743	2.5	0.14369	2.1	868.9	29.0
VGV 6-28	134	1.8	1.64983	3.6	0.16307	3.4	1024.4	24.8
VGV 6-29	236	2.6	0.19907	6.0	0.02691	3.9	171.2	6.5
VGV 6-30	266	5.4	0.67170	2.9	0.08276	1.6	512.6	7.9
VGV 6-31	345	1.7	0.18876	6.7	0.02656	2.3	169.0	3.9
VGV 6-32	766	2.2	0.76781	2.6	0.09215	1.7	568.3	9.5
VGV 6-33	338	2.2	0.18393	3.9	0.02760	1.6	175.5	2.7
VGV 6-34	665	21.8	2.28820	2.2	0.20833	1.5	1188.6	32.1
VGV 6-35	117	1.0	0.75170	4.2	0.09466	2.1	583.0	11.8
VGV 6-36	712	1.2	0.14085	14.1	0.02407	1.7	153.3	2.5
VGV 6-37	336	1.1	0.48876	6.1	0.06573	2.1	410.4	8.2
VGV 6-38	319	0.7	0.85048	2.8	0.10249	1.5	629.0	9.3
VGV 6-39	263	3.0	1.73648	3.9	0.16332	3.3	1124.0	40.2
VGV 6-40	242	1.8	3.17739	3.4	0.24936	3.0	1475.9	32.5
VGV 6-41	94	2.5	2.20368	2.9	0.20000	2.0	1194.9	42.2
VGV 6-42	55	1.3	5.91138	8.7	0.35589	3.3	1963.1	143.6
VGV 6-43	108	3.9	0.12359	14.0	0.02096	3.5	133.7	4.6
VGV 6-44	183	1.3	0.71597	3.6	0.08551	3.2	528.9	16.3
VGV 6-45	270	2.0	0.17003	8.4	0.02547	2.2	162.1	3.5
VGV 6-46	348	1.5	0.18321	5.5	0.02785	3.9	177.1	6.8
VGV 6-47	132	1.4	0.14711	10.1	0.02357	4.8	150.2	7.1
VGV 6-48	85	2.4	0.15869	14.3	0.02296	6.1	146.3	8.9
VGV 6-49	460	1.4	0.17730	4.0	0.02660	1.7	169.2	2.9
VGV 6-50	503	3.4	0.16434	4.3	0.02336	2.8	148.9	4.1
VGV 6-51	279	4.4	0.80257	4.0	0.09722	1.0	598.1	5.7
VGV 6-52	113	3.2	0.16484	15.8	0.02242	2.9	142.9	4.2
VGV 6-53	498	3.3	0.14867	3.2	0.02090	2.5	133.3	3.2
VGV 6-54	62	3.3	0.13538	18.9	0.02125	5.8	135.6	7.7
VGV 6-55	116	4.0	0.74936	3.6	0.09233	2.1	569.3	11.2
VGV 6-56	395	9.0	3.23268	1.4	0.25084	1.0	1497.4	19.4
VGV 6-57	61	3.5	2.04064	2.3	0.18667	1.0	1179.3	39.9
VGV 6-58	249	3.5	0.39306	4.1	0.05443	3.4	341.7	11.3
VGV 6-59	392	4.2	0.17125	4.1	0.02576	2.0	164.0	3.3
VGV 6-60	385	2.4	0.20043	4.4	0.02851	1.3	181.2	2.4
VGV 6-61	653	3.0	0.15905	7.8	0.02069	2.4	132.0	3.1
VGV 6-62	132	3.1	1.86610	2.2	0.17809	1.8	1095.0	25.8
VGV 6-63	609	2.3	0.15137	18.2	0.02589	2.4	164.8	3.9
VGV 6-64	203	2.2	0.66632	9.0	0.08620	8.0	533.0	40.8
VGV 6-65	237	1.3	2.05072	2.1	0.18729	1.7	1182.4	23.6
VGV 6-66	205	5.7	0.23677	5.9	0.03056	1.1	194.0	2.1
VGV 6-67	300	1.6	0.20172	36.0	0.04068	5.0	257.0	12.6
VGV 6-68	437	0.7	0.51075	3.5	0.06595	1.6	411.7	6.4
VGV 6-69	353	0.8	0.34808	2.9	0.04682	2.2	295.0	6.2
VGV 6-70	392	4.4	1.37702	3.0	0.14082	1.9	955.2	47.3
VGV 6-71	333	3.5	0.74822	9.4	0.09539	1.7	587.3	9.8
VGV 6-72	250	1.8	0.15236	7.6	0.02341	1.7	149.2	2.5

VGV 6-73	586	1.6	1.05247	4.6	0.11488	4.2	820.4	39.6
VGV 6-74	87	2.6	0.26394	10.1	0.04034	2.9	254.9	7.3
VGV 6-75	176	1.3	2.95494	2.4	0.24077	1.0	1404.4	42.2
VGV 6-76	449	1.8	0.16687	3.5	0.02495	2.1	158.9	3.3
VGV 6-77	298	1.4	5.21731	1.6	0.33186	1.0	1864.5	23.0
VGV 6-78	330	1.6	0.16593	6.5	0.02544	1.9	162.0	3.0
VGV 6-79	291	1.3	3.03461	2.5	0.24231	1.3	1443.0	41.8
VGV 6-80	40	3.4	0.21474	24.6	0.03820	5.1	241.7	12.1
VGV 6-81	124	2.3	0.50632	4.3	0.06540	2.7	408.4	10.6
VGV 6-82	282	1.0	0.58257	6.2	0.07661	4.9	475.8	22.6
VGV 6-83	592	11.3	0.81224	2.3	0.09829	1.4	604.4	8.2
VGV 6-84	158	4.0	0.18025	6.2	0.02209	2.1	140.9	3.0
VGV 6-85	42	0.9	11.80824	8.4	0.47411	7.9	2658.7	46.1
VGV 6-86	511	1.6	0.15895	5.1	0.02357	3.2	150.2	4.8
VGV 6-87	298	1.3	0.19220	5.0	0.02902	2.4	184.4	4.3
VGV 6-88	282	3.2	14.73348	4.2	0.52636	2.2	2850.5	58.2
VGV 6-89	435	4.0	6.15694	2.9	0.35650	2.5	2032.4	24.4
VGV 6-90	115	2.9	2.30684	3.2	0.20389	2.4	1246.9	40.5
VGV 6-92	153	1.8	1.22620	2.4	0.12945	1.8	889.7	33.5
VGV 6-93	1210	2.5	0.17897	5.9	0.02685	4.7	170.8	8.0
VGV 6-94	262	3.8	1.92414	3.2	0.18285	2.6	1103.4	37.9
VGV 6-95	51	4.3	0.27648	14.3	0.03184	3.5	202.0	6.9

KGV 1	**U/ppm**	**U/Th**	**207Pb/235U**	**± %**	**206Pb/238U**	**± %**	**Best Age**	**±**
KGV 1-3	770	0.7	0.16158	5.9	0.02495	1.6	158.9	2.5
KGV 1-4	513	1.1	0.13932	4.4	0.02136	2.3	136.2	3.1
KGV 1-5	156	1.9	0.13527	9.9	0.02201	3.4	140.4	4.8
KGV 1-6	125	0.8	0.12494	11.9	0.02071	1.9	132.2	2.5
KGV 1-8	385	1.1	0.14536	11.9	0.02376	2.5	151.4	3.8
KGV 1-9	175	0.6	0.13860	22.4	0.02464	3.2	156.9	4.9
KGV 1-10	378	5.1	1.50395	2.1	0.15220	1.7	913.3	14.1
KGV 1-11	230	1.2	0.13565	6.8	0.02109	3.3	134.5	4.4
KGV 1-12	269	1.1	0.13029	7.8	0.02073	3.5	132.3	4.6
KGV 1-13	1489	2.2	0.15455	3.0	0.02314	2.5	147.5	3.7
KGV 1-14	155	1.6	0.12421	9.2	0.01998	1.9	127.5	2.4
KGV 1-15	227	1.1	0.13872	4.6	0.02137	1.8	136.3	2.4
KGV 1-16	424	5.8	3.20744	4.8	0.25080	4.1	1482.8	48.4
KGV 1-17	194	1.1	0.13812	6.7	0.02151	3.3	137.2	4.5
KGV 1-18	292	1.1	0.13330	5.2	0.02060	2.8	131.4	3.6
KGV 1-19	126	1.3	0.14130	6.0	0.02154	2.9	137.4	3.9
KGV 1-20	315	1.6	0.15569	5.3	0.02348	3.2	149.6	4.7
KGV 1-21	256	0.9	0.14262	8.7	0.02255	2.5	143.8	3.5
KGV 1-22	156	1.4	0.13581	5.2	0.02076	1.8	132.4	2.3
KGV 1-23	55	2.3	2.66550	2.8	0.22579	1.1	1329.6	50.0
KGV 1-24	191	0.7	3.62510	3.3	0.27254	2.3	1556.9	45.6
KGV 1-25	100	1.4	4.82981	2.5	0.31929	2.1	1794.6	25.1
KGV 1-26	193	1.2	0.16326	12.6	0.02594	1.3	165.1	2.2
KGV 1-27	432	1.1	4.63005	3.6	0.29552	3.4	1858.3	23.0
KGV 1-28	138	0.8	11.85210	2.2	0.48764	1.4	2618.1	28.1
KGV 1-29	476	1.1	0.17275	4.2	0.02600	2.0	165.5	3.3

KGV 1-30	157	1.3	3.65977	2.0	0.26764	1.7	1608.7	18.9
KGV 1-31	1231	1.1	0.12804	3.5	0.01931	1.7	123.3	2.1
KGV 1-32	796	1.3	0.15952	2.8	0.02289	2.5	145.9	3.6
KGV 1-33	353	0.7	0.17921	2.3	0.02633	1.2	167.5	2.0
KGV 1-34	144	1.9	1.75413	1.8	0.17086	1.5	1053.9	21.1
KGV 1-35	268	0.5	3.97306	2.1	0.28131	1.8	1668.7	18.6
KGV 1-36	167	0.8	4.06430	3.2	0.29075	2.9	1649.6	22.5
KGV 1-37	92	1.0	0.16779	6.6	0.02234	2.0	142.5	2.8
KGV 1-38	223	1.0	0.13366	4.8	0.02068	1.6	131.9	2.1
KGV 1-39	50	1.7	2.31297	3.3	0.20784	2.8	1214.5	34.6
KGV 1-40	146	1.0	0.15178	5.5	0.02117	2.4	135.1	3.2
KGV 1-41	369	2.4	0.15102	3.5	0.02284	2.2	145.6	3.1
KGV 1-42	183	0.8	0.13657	4.2	0.02112	1.9	134.7	2.5
KGV 1-43	197	2.0	0.15124	7.4	0.02308	3.2	147.1	4.7
KGV 1-44	168	2.6	2.13869	2.5	0.19830	2.2	1152.4	22.1
KGV 1-45	150	0.9	0.14110	8.1	0.02035	1.7	129.9	2.2
KGV 1-46	435	2.2	0.17897	2.3	0.02635	1.5	167.7	2.4
KGV 1-47	109	0.9	0.31194	11.7	0.04114	4.9	259.9	12.5
KGV 1-48	477	1.9	2.37859	4.9	0.20709	4.8	1276.3	19.9
KGV 1-49	395	1.1	0.15172	3.3	0.02184	1.7	139.3	2.3
KGV 1-50	159	0.8	4.05207	3.1	0.29154	1.8	1639.0	46.3
KGV 1-51	151	1.6	3.39087	2.2	0.26265	1.7	1500.7	26.4
KGV 1-52	1196	0.7	0.17696	3.4	0.02602	2.4	165.6	3.9
KGV 1-53	171	0.7	0.13621	4.3	0.02105	1.8	134.3	2.4
KGV 1-54	105	0.8	0.16977	7.5	0.02642	4.3	168.1	7.2
KGV 1-55	132	1.1	0.11932	26.5	0.02274	5.0	145.0	7.1
KGV 1-56	72	1.1	0.13722	11.3	0.02196	2.9	140.0	4.1
KGV 1-57	214	1.4	0.14191	6.1	0.02165	2.2	138.1	3.0
KGV 1-58	153	1.1	0.15207	6.5	0.02158	2.9	137.6	4.0
KGV 1-59	239	2.0	4.78651	2.7	0.31951	2.5	1776.9	18.3
KGV 1-60	52	1.6	3.21499	2.4	0.25455	1.1	1459.1	40.0
KGV 1-61	369	1.8	3.65276	4.5	0.26176	4.4	1646.4	18.6
KGV 1-62	249	1.1	0.16953	3.5	0.02544	2.3	162.0	3.7
KGV 1-63	982	3.7	3.28020	1.5	0.25334	1.1	1506.2	19.1
KGV 1-64	170	1.1	0.14123	4.9	0.02173	2.8	138.6	3.9
KGV 1-65	207	1.1	0.40174	5.9	0.05638	4.3	353.6	14.7
KGV 1-66	108	0.7	1.86291	2.3	0.17709	1.1	1102.8	41.5
KGV 1-67	665	11.9	0.15895	2.6	0.02357	1.6	150.2	2.3
KGV 1-68	219	0.9	0.15681	7.0	0.02257	2.9	143.9	4.1
KGV 1-69	859	2.3	1.79648	2.1	0.17518	1.2	1051.7	33.1
KGV 1-70	51	0.7	5.11838	3.5	0.33150	1.6	1831.8	56.2
KGV 1-71	222	1.2	0.15316	4.5	0.02207	1.9	140.7	2.6
KGV 1-72	168	1.5	0.15946	4.1	0.02283	1.3	145.5	1.8
KGV 1-73	349	1.9	2.96264	4.5	0.23984	1.4	1416.7	81.7
KGV 1-74	125	1.3	0.13997	9.3	0.02103	1.2	134.2	1.6
KGV 1-75	170	1.1	0.13418	6.2	0.02094	2.5	133.6	3.3

KGV 4	**U/ppm**	**U/Th**	**207Pb/235U**	**± %**	**206Pb/238U**	**± %**	**Best Age**	**±**
KGV 4-1	67	1.1	0.13841	10.0	0.02057	2.3	131.3	3.0
KGV 4-2	144	2.4	0.13775	5.6	0.02138	1.6	136.4	2.1

KGV 4-3	91	1.4	0.14075	5.4	0.02142	2.1	136.6	2.8
KGV 4-4	1414	1.0	0.10658	2.4	0.01601	1.0	102.4	1.1
KGV 4-5	112	1.3	0.16507	7.1	0.02233	2.1	142.4	3.0
KGV 4-6	31	1.6	0.16935	19.3	0.02925	2.2	185.9	4.0
KGV 4-7	290	0.7	0.18159	3.7	0.02690	1.3	171.1	2.2
KGV 4-8	168	1.4	0.14079	6.4	0.02125	1.2	135.6	1.6
KGV 4-9	64	1.3	0.16947	8.8	0.02208	3.8	140.8	5.3
KGV 4-10	105	1.0	0.13318	5.9	0.02079	2.0	132.6	2.7
KGV 4-12	52	1.2	0.14991	12.0	0.02218	2.9	141.4	4.0
KGV 4-13	209	1.8	0.17111	4.3	0.02501	1.2	159.2	1.9
KGV 4-14	83	1.1	0.15436	6.9	0.02216	2.7	141.3	3.7
KGV 4-15	349	1.0	0.17554	3.9	0.02591	1.3	164.9	2.1
KGV 4-16	168	1.2	0.12725	6.0	0.01921	1.8	122.7	2.2
KGV 4-17	686	1.1	0.43552	1.9	0.05828	1.0	365.2	3.6
KGV 4-18	1066	2.1	0.26913	1.6	0.03834	1.0	242.5	2.4
KGV 4-19	44	1.8	0.19965	12.7	0.02231	4.5	142.2	6.4
KGV 4-20	195	1.8	1.99358	3.4	0.18164	1.0	1187.1	63.4
KGV 4-21	32	2.5	0.17041	21.1	0.02907	6.9	184.7	12.5
KGV 4-22	478	1.1	0.16645	3.5	0.02509	1.7	159.8	2.6
KGV 4-23	129	1.7	0.12028	8.8	0.01932	2.9	123.4	3.6
KGV 4-24	131	1.6	0.17820	6.7	0.02424	1.4	154.4	2.2
KGV 4-25	79	1.6	0.11936	15.9	0.01986	3.8	126.8	4.8
KGV 4-26	135	1.0	0.14252	5.0	0.01970	1.4	125.7	1.7
KGV 4-27	48	2.0	0.12455	19.6	0.02117	4.8	135.1	6.4
KGV 4-28	186	1.4	0.14814	5.6	0.02091	1.9	133.4	2.5
KGV 4-29	278	1.3	0.17551	3.5	0.02577	1.8	164.0	3.0
KGV 4-30	121	1.3	0.15418	7.3	0.02139	1.8	136.4	2.4
KGV 4-31	71	1.5	0.12577	15.6	0.02086	3.8	133.1	5.0
KGV 4-32	134	1.5	0.16309	7.5	0.02537	2.5	161.5	4.0
KGV 4-33	36	1.7	0.17786	15.8	0.02207	5.8	140.7	8.1
KGV 4-34	167	1.7	0.65016	4.9	0.08340	3.0	516.4	14.8
KGV 4-35	370	1.1	0.18627	3.3	0.02769	2.8	176.1	4.9
KGV 4-36	150	1.3	0.13459	9.3	0.02045	5.1	130.5	6.5
KGV 4-37	83	1.7	0.16836	8.2	0.02258	3.2	143.9	4.5
KGV 4-38	37	2.0	0.16603	18.1	0.02425	4.5	154.4	6.8
KGV 4-39	266	0.9	0.74705	7.0	0.09070	6.7	559.7	36.0
KGV 4-40	138	1.2	0.15566	8.9	0.02458	2.4	156.6	3.8
KGV 4-41	292	1.1	0.13245	6.4	0.01950	2.8	124.5	3.5
KGV 4-42	45	1.3	0.21151	15.0	0.02254	4.9	143.7	6.9
KGV 4-43	91	1.0	0.16581	8.0	0.02226	2.1	141.9	2.9
KGV 4-44	55	1.3	0.20889	10.3	0.02277	3.8	145.2	5.5
KGV 4-45	124	0.8	0.15084	7.4	0.02359	1.8	150.3	2.7
KGV 4-46	76	2.4	0.43264	6.7	0.05517	2.9	346.2	9.9
KGV 4-47	54	1.1	0.12414	19.2	0.02150	3.6	137.1	4.9
KGV 4-48	65	1.8	0.20294	10.1	0.02318	3.2	147.7	4.7
KGV 4-49	37	2.1	0.14401	19.8	0.02109	2.9	134.5	3.9
KGV 4-50	649	1.0	0.27409	3.0	0.03834	2.0	242.5	4.8
KGV 4-51	126	3.1	0.14058	13.6	0.02094	3.5	133.6	4.6
KGV 4-52	139	1.1	0.12769	16.2	0.02184	1.6	139.3	2.2
KGV 4-53	65	1.7	0.11844	16.1	0.02060	4.4	131.4	5.7

KGV 4-54	357	85.2	1.87422	2.3	0.17681	1.4	1118.0	34.9
KGV 4-55	172	1.4	0.11001	24.2	0.02107	4.9	134.4	6.6
KGV 4-56	242	1.2	0.13451	4.1	0.01870	1.0	119.4	1.2
KGV 4-57	240	1.0	4.04819	3.2	0.28553	1.7	1675.8	51.5
KGV 4-58	101	1.3	0.15139	9.6	0.02000	3.7	127.7	4.7
KGV 4-59	270	1.7	0.20837	3.1	0.02926	1.1	185.9	2.0
KGV 4-60	105	1.4	0.12631	12.4	0.02098	2.7	133.9	3.6
KGV 4-61	217	1.3	0.17416	4.0	0.02465	1.8	157.0	2.7
KGV 4-62	410	1.1	0.16367	3.3	0.02461	2.1	156.7	3.2
KGV 4-63	166	1.4	0.49460	5.1	0.06596	4.7	411.7	18.9
KGV 4-64	236	1.1	0.15624	10.4	0.02440	7.2	155.4	11.0
KGV 4-65	344	0.6	0.85319	6.9	0.09877	1.4	607.2	8.0
KGV 4-66	56	1.4	0.15802	13.5	0.02149	3.5	137.1	4.7
KGV 4-67	324	2.2	0.18855	6.0	0.02529	4.9	161.0	7.8
KGV 4-68	53	1.6	0.18377	10.3	0.02101	3.9	134.1	5.1
KGV 4-69	127	1.9	0.13260	7.8	0.01882	3.1	120.2	3.7
KGV 4-70	105	1.5	0.14727	4.2	0.02079	1.6	132.7	2.2
KGV 4-71	71	1.4	0.18358	7.7	0.02229	4.6	142.1	6.4
KGV 4-72	108	1.1	13.16952	4.3	0.51575	3.0	2699.9	50.7
KGV 4-73	73	1.6	0.16589	13.0	0.02247	3.7	143.3	5.2
KGV 4-74	47	1.3	0.23628	10.0	0.02284	5.3	145.6	7.7
KGV 4-75	34	2.3	0.27638	10.6	0.02355	5.1	150.0	7.5

KGV 6	**U/ppm**	**U/Th**	**207Pb/235U**	**± %**	**206Pb/238U**	**± %**	**Best Age**	**±**
KGV 6-1	778	1.3	0.10341	10.6	0.01664	3.8	106.4	4.0
KGV 6-2	439	1.3	0.11809	4.6	0.01818	1.7	116.1	1.9
KGV 6-3	478	2.2	0.15011	3.0	0.02239	1.6	142.8	2.3
KGV 6-4	161	1.5	0.14128	7.1	0.02017	3.6	128.7	4.5
KGV 6-5	140	1.1	0.17067	9.5	0.02421	3.1	154.2	4.7
KGV 6-6	227	2.6	0.13148	5.4	0.02052	1.8	131.0	2.3
KGV 6-7	173	2.4	0.08887	9.8	0.01456	5.8	93.2	5.4
KGV 6-8	122	1.9	0.15139	9.4	0.02421	1.6	154.2	2.5
KGV 6-9	442	1.4	0.16986	3.3	0.02529	1.9	161.0	3.0
KGV 6-10	104	2.0	0.11978	13.9	0.01948	3.8	124.4	4.7
KGV 6-11	650	4.1	0.16429	5.4	0.02415	2.6	153.8	3.9
KGV 6-12	176	2.8	0.12070	6.3	0.01906	3.0	121.7	3.6
KGV 6-13	203	3.5	0.11940	7.3	0.01866	2.5	119.2	3.0
KGV 6-14	344	2.4	0.16430	3.1	0.02483	1.1	158.1	1.7
KGV 6-15	433	2.8	0.09497	22.0	0.01508	2.7	96.5	2.6
KGV 6-16	276	1.7	0.11820	6.1	0.01875	2.2	119.7	2.6
KGV 6-17	742	1.2	0.16921	1.8	0.02505	1.4	159.5	2.1
KGV 6-18	202	1.8	0.18709	5.9	0.02782	2.8	176.9	5.0
KGV 6-19	118	1.8	0.17081	7.9	0.02576	3.3	164.0	5.3
KGV 6-20	586	1.2	0.17874	2.8	0.02627	1.0	167.2	1.7
KGV 6-21	666	2.7	0.16356	2.8	0.02450	1.3	156.0	2.1
KGV 6-22	701	0.7	0.18577	2.0	0.02716	1.1	172.7	1.8
KGV 6-23	58	1.6	0.14795	14.2	0.02229	6.5	142.1	9.2
KGV 6-24	190	1.8	0.13330	6.4	0.02086	3.4	133.1	4.5
KGV 6-25	279	2.4	0.15706	7.6	0.02337	4.7	148.9	6.9
KGV 6-26	168	2.7	0.12527	7.4	0.01978	1.9	126.3	2.3

KGV 6-27	166	1.9	0.11494	10.5	0.01852	4.4	118.3	5.2
KGV 6-28	459	2.7	0.17320	3.0	0.02569	2.3	163.5	3.8
KGV 6-29	101	1.9	0.13385	12.3	0.02129	4.7	135.8	6.4
KGV 6-30	128	2.7	0.16064	5.9	0.02460	2.7	156.7	4.2
KGV 6-31	1607	1.1	0.19796	3.3	0.02890	2.6	183.7	4.7
KGV 6-32	106	2.2	0.15272	8.5	0.02039	3.7	130.1	4.7
KGV 6-33	1058	3.2	0.27122	1.8	0.03840	1.1	242.9	2.7
KGV 6-34	203	2.3	0.20175	4.1	0.02706	1.7	172.1	2.9
KGV 6-35	78	2.7	0.22198	7.9	0.03107	2.7	197.3	5.3
KGV 6-36	113	1.8	0.17555	10.6	0.02195	3.5	140.0	4.9
KGV 6-37	242	1.8	0.18933	4.8	0.02659	2.2	169.2	3.7
KGV 6-38	442	1.3	0.55156	1.8	0.07110	1.4	442.8	5.8
KGV 6-39	644	3.7	0.28567	1.9	0.03969	1.0	250.9	2.5
KGV 6-40	333	1.3	0.18245	3.4	0.02658	1.7	169.1	2.8
KGV 6-41	134	1.6	0.15682	8.5	0.02139	1.8	136.4	2.4
KGV 6-42	186	1.2	0.15024	7.2	0.02139	2.3	136.4	3.1
KGV 6-43	328	1.6	0.17758	3.1	0.02605	2.3	165.8	3.8
KGV 6-44	787	1.3	0.17662	2.1	0.02608	1.0	166.0	1.6
KGV 6-45	515	2.0	0.20606	2.4	0.02886	1.0	183.4	1.9
KGV 6-46	108	0.9	21.75788	2.1	0.63494	1.5	3175.4	22.7
KGV 6-47	615	1.4	0.18595	3.1	0.02664	2.2	169.5	3.7
KGV 6-48	291	1.7	0.20303	3.6	0.02713	1.5	172.5	2.5
KGV 6-49	159	2.2	2.29078	3.3	0.20826	2.4	1191.5	45.5
KGV 6-50	606	2.8	0.19310	2.1	0.02758	1.3	175.4	2.2
KGV 6-51	178	1.3	0.14445	5.7	0.02014	1.6	128.6	2.0
KGV 6-52	200	1.7	0.16523	4.6	0.02113	2.1	134.8	2.8
KGV 6-53	132	1.8	0.44775	11.4	0.05507	3.2	345.6	10.8
KGV 6-54	143	1.3	0.20166	6.3	0.02628	2.3	167.2	3.8
KGV 6-55	193	1.0	0.13663	7.1	0.01976	3.7	126.2	4.7
KGV 6-56	130	1.1	0.17666	7.7	0.02595	2.4	165.2	3.9
KGV 6-57	233	1.5	0.17232	3.7	0.02605	2.2	165.8	3.6
KGV 6-58	919	1.1	0.18271	1.9	0.02685	1.0	170.8	1.7
KGV 6-59	294	1.1	0.18182	5.5	0.02618	2.1	166.6	3.4
KGV 6-60	225	1.8	0.21721	3.4	0.02941	1.2	186.9	2.3
KGV 6-61	187	2.0	0.19344	5.8	0.02744	2.4	174.5	4.2
KGV 6-62	205	1.2	0.17875	4.2	0.02640	1.4	168.0	2.3
KGV 6-63	1386	1.2	0.17798	1.4	0.02616	1.0	166.4	1.6
KGV 6-64	124	1.5	0.16986	6.7	0.02280	1.5	145.3	2.1
KGV 6-65	483	1.4	0.18930	2.3	0.02721	1.2	173.1	2.0
KGV 6-66	100	1.5	0.15598	8.6	0.02291	1.9	146.0	2.7
KGV 6-67	213	1.1	0.14411	5.1	0.02048	2.8	130.7	3.6
KGV 6-68	81	1.9	0.19326	8.4	0.02135	3.3	136.2	4.4
KGV 6-69	47	1.2	0.15738	15.9	0.02256	6.4	143.8	9.1
KGV 6-70	104	1.7	0.17012	9.1	0.02035	2.9	129.9	3.7
KGV 6-71	103	1.9	0.14922	9.2	0.02052	3.0	131.0	3.8
KGV 6-72	720	2.6	0.10167	5.8	0.01504	1.0	96.2	1.0
KGV 6-73	84	1.0	8.87024	1.5	0.43189	1.1	2334.0	17.3
KGV 6-74	158	1.8	0.14400	8.2	0.01877	2.1	119.9	2.5
KGV 6-75	240	2.4	0.13709	4.4	0.01876	1.2	119.8	1.4
KGV 6-76	532	2.4	0.17104	2.9	0.02542	1.7	161.8	2.7

KGV 6-77	635	2.2	0.18061	2.9	0.02569	2.4	163.5	3.8
KGV 6-78	132	2.0	0.19974	5.9	0.02545	2.9	162.0	4.7
KGV 6-79	50	2.9	0.17773	12.9	0.01962	5.9	125.3	7.3
KGV 6-80	753	1.4	0.13867	2.3	0.02074	1.1	132.3	1.5
KGV 6-81	300	1.1	0.20060	2.7	0.02802	2.1	178.1	3.7
KGV 6-82	201	1.6	0.20717	4.8	0.02679	2.9	170.5	4.9
KGV 6-83	290	1.3	0.17135	6.8	0.02451	4.7	156.1	7.2
KGV 6-84	98	1.9	0.17373	10.3	0.02085	3.7	133.0	4.9
KGV 6-85	433	1.1	0.17386	2.2	0.02565	1.7	163.3	2.7
KGV 6-86	132	1.7	0.14346	7.7	0.02105	3.3	134.3	4.3
KGV 6-87	134	1.6	0.18777	6.8	0.02504	2.1	159.4	3.3
KGV 6-88	298	17.6	0.16520	4.4	0.02356	1.4	150.1	2.0
KGV 6-89	162	1.5	3.90458	2.3	0.27915	1.6	1650.7	31.3
KGV 6-90	805	2.2	0.12169	2.7	0.01822	1.8	116.4	2.1
KGV 6-91	164	2.3	0.15782	5.2	0.02070	3.0	132.1	3.9
KGV 6-92	105	1.8	0.16729	7.5	0.02188	3.3	139.5	4.6
KGV 6-93	409	1.0	0.18534	3.7	0.02635	2.4	167.7	4.0
KGV 6-94	407	1.7	0.19081	3.2	0.02715	2.1	172.7	3.6
KGV 6-95	719	30.7	4.20440	1.9	0.29314	1.6	1697.1	18.7
KGV 6-96	108	2.5	0.14599	8.6	0.01945	4.2	124.2	5.2
KGV 6-97	434	1.5	0.11143	6.8	0.01653	1.7	105.7	1.8
KGV 6-98	186	2.7	0.17598	4.9	0.02456	2.4	156.4	3.6
KGV 6-99	399	1.0	0.17283	4.4	0.02480	3.0	157.9	4.8
KGV 6-100	251	2.4	0.13475	3.5	0.01884	1.2	120.3	1.5

KGV 7	**U/ppm**	**U/Th**	**207Pb/235U**	**± %**	**206Pb/238U**	**± %**	**Best Age**	**±**
KGV 7-1	137	1.6	0.15736	6.0	0.02178	1.6	138.9	2.2
KGV 7-2	80	2.5	0.15938	10.1	0.02034	6.9	129.8	8.9
KGV 7-3	108	2.7	0.15603	8.4	0.01945	3.1	124.2	3.8
KGV 7-4	552	1.7	0.39650	3.1	0.05369	1.7	337.2	5.5
KGV 7-5	192	2.7	0.13457	6.7	0.01975	3.0	126.0	3.7
KGV 7-6	138	1.8	0.14950	8.6	0.02053	4.0	131.0	5.2
KGV 7-7	96	1.8	0.17046	17.9	0.02213	5.5	141.1	7.7
KGV 7-8	166	2.4	0.13724	6.8	0.01996	2.6	127.4	3.3
KGV 7-9	181	2.2	0.14240	10.8	0.01958	2.4	125.0	3.0
KGV 7-10	80	2.5	0.16795	8.5	0.01953	4.6	124.7	5.7
KGV 7-11	76	1.0	0.14288	15.6	0.02096	3.7	133.7	4.9
KGV 7-12	89	2.0	0.18083	10.3	0.02868	3.9	182.3	6.9
KGV 7-13	211	1.7	0.13284	6.7	0.02052	2.9	130.9	3.8
KGV 7-14	137	1.1	0.34524	9.6	0.04642	5.6	292.5	16.1
KGV 7-15	167	1.6	0.42834	3.4	0.05760	2.1	361.0	7.4
KGV 7-16	226	1.6	0.12897	4.7	0.01945	2.6	124.2	3.1
KGV 7-17	109	2.8	0.13557	12.1	0.01959	4.6	125.1	5.7
KGV 7-18	42	1.5	0.25059	6.6	0.02395	2.9	152.6	4.3
KGV 7-19	198	2.5	0.14276	6.4	0.01908	2.6	121.9	3.1
KGV 7-20	211	1.3	14.50383	5.9	0.52912	5.2	2816.4	47.4
KGV 7-21	147	1.2	0.14727	5.6	0.02096	3.0	133.7	3.9
KGV 7-22	79	1.4	0.14891	8.9	0.02120	2.7	135.3	3.6
KGV 7-23	114	1.8	0.17888	10.0	0.02071	4.7	132.1	6.2
KGV 7-24	125	1.5	0.17473	7.4	0.01975	3.0	126.0	3.7

KGV 7-25	119	2.2	0.14607	9.8	0.02052	4.4	130.9	5.7
KGV 7-26	83	2.8	0.16092	9.9	0.01980	3.8	126.4	4.7
KGV 7-27	137	3.0	0.13517	5.5	0.01958	2.3	125.0	2.9
KGV 7-28	180	2.2	0.12807	7.5	0.01976	1.9	126.2	2.4
KGV 7-29	130	3.0	0.14290	9.5	0.02079	5.0	132.7	6.6
KGV 7-30	96	2.2	0.14869	11.3	0.01997	3.6	127.5	4.6
KGV 7-31	274	1.9	0.23007	4.1	0.03210	2.4	203.7	4.8
KGV 7-32	100	1.2	0.15946	11.7	0.02276	4.3	145.1	6.1
KGV 7-33	118	1.2	0.46027	3.4	0.06118	2.2	382.8	8.2
KGV 7-34	125	1.6	0.18513	11.8	0.02254	4.1	143.7	5.9
KGV 7-35	76	1.8	0.49834	6.6	0.05932	1.4	371.5	5.0
KGV 7-36	143	2.7	0.15110	5.9	0.01925	2.5	122.9	3.1
KGV 7-37	121	1.8	0.15649	7.4	0.01991	2.1	127.1	2.6
KGV 7-38	1981	0.7	0.14000	1.6	0.02103	1.2	134.1	1.6
KGV 7-39	116	1.0	4.16516	4.1	0.29785	1.9	1650.3	66.9
KGV 7-40	182	1.6	0.15900	4.9	0.02064	2.2	131.7	2.9
KGV 7-41	169	2.1	0.13399	7.8	0.01955	3.9	124.8	4.8
KGV 7-42	199	1.7	0.14563	7.5	0.02103	2.7	134.2	3.6
KGV 7-43	143	1.6	0.15942	10.6	0.02001	2.4	127.7	3.0
KGV 7-44	287	2.8	0.86795	15.2	0.09950	2.1	611.5	12.3
KGV 7-45	116	1.9	0.19158	8.0	0.02157	3.4	137.6	4.6
KGV 7-46	100	2.0	0.40929	2.9	0.05496	1.6	344.9	5.4
KGV 7-47	135	1.7	0.15449	6.1	0.02021	2.3	129.0	2.9
KGV 7-48	103	1.4	0.16880	5.8	0.02001	2.1	127.7	2.7
KGV 7-49	79	1.8	0.16370	13.4	0.02058	3.5	131.3	4.6
KGV 7-50	465	1.5	0.13731	3.1	0.01993	2.4	127.2	3.1
KGV 7-51	142	1.6	0.14559	6.8	0.02097	3.1	133.8	4.1
KGV 7-52	592	0.6	0.17473	7.6	0.02487	4.6	158.4	7.1
KGV 7-53	109	1.0	0.17093	15.0	0.02123	6.3	135.4	8.4
KGV 7-54	107	1.1	0.16351	11.9	0.02158	4.4	137.6	6.0
KGV 7-55	59	1.4	0.14049	19.2	0.02105	8.4	134.3	11.1
KGV 7-56	87	1.8	0.17173	9.4	0.02072	3.9	132.2	5.1
KGV 7-57	269	1.1	0.41374	3.5	0.05487	2.8	344.3	9.4
KGV 7-58	446	1.1	0.16510	2.9	0.02437	1.3	155.2	2.0
KGV 7-59	138	1.3	0.44348	3.6	0.06063	2.0	379.5	7.2
KGV 7-60	222	1.1	0.14686	5.3	0.02018	2.0	128.8	2.5
KGV 7-61	70	1.5	0.17264	12.8	0.02099	3.4	133.9	4.5
KGV 7-62	62	1.3	0.12550	14.3	0.02073	6.6	132.3	8.6
KGV 7-63	106	2.0	0.17814	9.0	0.02118	3.2	135.1	4.3
KGV 7-64	112	1.9	0.15114	13.8	0.02102	5.4	134.1	7.2
KGV 7-65	90	2.2	0.45080	6.3	0.06029	3.8	377.4	14.1
KGV 7-66	183	0.8	0.12037	10.9	0.01980	4.4	126.4	5.5
KGV 7-67	239	1.5	0.13537	5.3	0.02013	3.2	128.5	4.1
KGV 7-68	85	2.0	0.41611	4.8	0.05530	1.3	347.0	4.5
KGV 7-69	182	1.3	0.41674	2.6	0.05609	1.9	351.8	6.4
KGV 7-70	126	1.8	0.12863	9.0	0.02001	2.4	127.7	3.0
KGV 7-71	121	1.2	0.15990	7.8	0.02072	2.4	132.2	3.2
KGV 7-72	86	2.6	0.20462	8.1	0.03124	3.3	198.3	6.5
KGV 7-73	155	1.5	0.14528	6.4	0.01916	2.8	122.4	3.4
KGV 7-74	242	1.8	0.53859	2.1	0.07000	1.4	436.2	5.9

KGV 7-75	161	2.4	0.15805	8.3	0.02085	4.0	133.0	5.2
KGV 7-76	168	1.0	0.19224	9.9	0.02759	3.8	175.4	6.6
KGV 7-77	172	2.3	0.21295	13.4	0.02828	5.7	179.8	10.1
KGV 7-78	12	3.2	0.26352	42.2	0.03575	8.9	226.4	19.7
KGV 7-79	248	2.8	0.16634	8.9	0.02384	2.6	151.9	3.9
KGV 7-80	98	1.1	0.15456	13.0	0.02289	3.8	145.9	5.5
KGV 7-81	190	2.7	0.12533	11.6	0.01909	2.9	121.9	3.5
KGV 7-82	401	1.5	0.13798	6.1	0.02152	3.6	137.3	4.8
KGV 7-83	173	2.4	0.43500	3.6	0.05796	2.0	363.2	7.2
KGV 7-84	120	3.0	0.12331	13.6	0.01858	4.3	118.7	5.1
KGV 7-85	210	2.7	0.12861	8.7	0.01890	2.8	120.7	3.3
KGV 7-86	209	0.9	0.14064	7.7	0.02119	2.5	135.2	3.3
KGV 7-87	159	1.9	0.12403	13.6	0.01980	4.6	126.4	5.8
KGV 7-88	175	2.3	0.12152	13.7	0.01963	3.0	125.3	3.7
KGV 7-89	149	1.9	0.14726	6.1	0.02000	2.0	127.7	2.5
KGV 7-90	273	1.0	0.13750	5.2	0.02046	2.3	130.5	2.9
KGV 7-91	106	1.5	0.14396	13.5	0.02049	3.5	130.8	4.5
KGV 7-92	160	1.7	0.12996	6.3	0.01932	2.8	123.3	3.5
KGV 7-93	125	1.6	0.15427	8.2	0.02219	3.1	141.5	4.4
KGV 7-94	123	2.1	0.15256	8.8	0.01991	3.2	127.1	4.0
KGV 7-95	152	1.9	0.12488	11.2	0.02019	3.1	128.9	4.0
KGV 7-96	177	1.5	0.12598	7.6	0.01997	3.3	127.5	4.2
KGV 7-97	83	2.5	0.41096	6.2	0.05656	2.7	354.7	9.2
KGV 7-98	431	2.2	0.18054	8.7	0.02582	4.4	164.3	7.1
KGV 7-99	103	2.1	0.11624	12.2	0.01958	3.1	125.0	3.8
KGV 7-100	66	1.4	0.10535	25.5	0.02018	4.3	128.8	5.5

KGV 8	**U/ppm**	**U/Th**	**207Pb/235U**	**± %**	**206Pb/238U**	**± %**	**Best Age**	**±**
KGV 8-1	566	1.2	0.14577	7.8	0.01920	7.1	122.6	8.7
KGV 8-2	238	1.1	0.16078	3.7	0.02216	2.8	141.3	3.9
KGV 8-3	104	1.6	5.41770	3.8	0.33449	2.0	1918.1	58.0
KGV 8-4	343	2.1	1.91203	3.9	0.18318	3.6	1087.2	29.5
KGV 8-5	170	1.0	13.09269	4.2	0.50004	4.1	2741.3	17.3
KGV 8-6	444	8.8	0.18927	3.8	0.02638	2.8	167.8	4.7
KGV 8-7	608	3.1	0.15643	6.5	0.02142	6.0	136.6	8.1
KGV 8-8	266	1.2	0.19871	20.1	0.02232	3.2	142.3	4.5
KGV 8-9	201	0.8	0.17641	3.8	0.02256	2.8	143.8	3.9
KGV 8-10	172	1.2	0.16265	5.1	0.02104	3.3	134.2	4.4
KGV 8-11	396	1.1	0.47480	4.5	0.06086	4.3	380.9	15.7
KGV 8-12	263	0.9	1.70940	4.6	0.16954	4.1	1017.4	39.8
KGV 8-13	358	1.0	0.17498	3.7	0.02606	1.8	165.8	3.0
KGV 8-14	280	0.6	0.14995	5.7	0.02160	2.3	137.7	3.2
KGV 8-15	551	0.8	0.15325	14.6	0.02384	2.5	151.9	3.7
KGV 8-16	730	0.5	0.14556	6.2	0.02231	3.7	142.2	5.2
KGV 8-17	1097	0.9	0.16056	3.3	0.02237	2.9	142.6	4.1
KGV 8-18	158	1.2	1.62165	3.3	0.16267	3.1	971.6	28.1
KGV 8-19	292	1.1	4.32598	4.6	0.29861	4.3	1715.5	29.1
KGV 8-20	332	0.5	0.15214	6.3	0.02215	4.0	141.2	5.5
KGV 8-21	150	0.7	0.12842	10.7	0.02075	3.7	132.4	4.8
KGV 8-22	141	1.2	1.98043	6.0	0.18827	5.6	1102.7	43.2

KGV 8-23	210	1.0	0.49708	7.6	0.06497	7.2	405.8	28.4
KGV 8-24	201	0.9	0.15903	6.6	0.02286	2.1	145.7	3.0
KGV 8-25	161	1.1	0.14512	6.3	0.02125	2.3	135.6	3.1
KGV 8-26	242	0.9	0.44913	4.1	0.06025	2.9	377.2	10.6
KGV 8-27	431	1.9	4.41359	4.2	0.29884	4.1	1750.9	18.3
KGV 8-28	313	1.5	0.16016	7.2	0.02334	3.5	148.7	5.1
KGV 8-29	653	0.8	0.17692	3.7	0.02585	2.7	164.5	4.4
KGV 8-30	193	1.3	0.15227	6.8	0.02338	2.1	149.0	3.1
KGV 8-31	135	0.7	0.13776	10.2	0.02170	4.6	138.4	6.3
KGV 8-32	335	0.8	5.24961	2.9	0.33498	2.7	1858.7	18.1
KGV 8-33	139	1.0	0.14524	6.2	0.02144	4.1	136.7	5.5
KGV 8-34	761	0.9	0.15433	9.5	0.02422	1.9	154.2	3.0
KGV 8-35	74	0.9	2.36445	2.6	0.20815	2.1	1254.7	30.7
KGV 8-36	119	1.6	0.16551	8.8	0.02401	3.4	152.9	5.2
KGV 8-38	219	0.6	0.15075	5.3	0.02160	2.6	137.8	3.5
KGV 8-39	406	1.1	0.17785	3.8	0.02518	2.8	160.3	4.4
KGV 8-40	133	1.3	0.16487	13.3	0.02449	2.2	156.0	3.5
KGV 8-41	724	2.2	0.89058	2.6	0.09273	1.8	571.7	10.1
KGV 8-43	259	0.6	0.15693	6.2	0.02147	3.5	136.9	4.7
KGV 8-45	370	1.5	0.19898	3.7	0.02680	2.7	170.5	4.6
KGV 8-46	162	1.2	0.18738	6.9	0.02453	2.5	156.2	3.8
KGV 8-47	203	0.8	0.49610	3.8	0.06042	2.7	378.2	10.0
KGV 8-48	228	0.7	0.16669	4.3	0.02228	3.1	142.1	4.4
KGV 8-49	475	0.8	0.16150	3.3	0.02147	2.0	137.0	2.7
KGV 8-50	371	1.0	0.20902	5.3	0.02724	4.2	173.3	7.2
KGV 8-51	783	0.8	0.19827	4.7	0.02615	3.3	166.4	5.4
KGV 8-53	418	2.2	0.18454	3.3	0.02512	2.2	159.9	3.5
KGV 8-54	144	0.6	0.43665	5.0	0.05578	2.4	349.9	8.2
KGV 8-55	173	1.2	3.04060	4.8	0.23650	4.2	1492.9	43.5
KGV 8-56	60	0.6	2.17424	3.0	0.18912	2.2	1278.2	39.7
KGV 8-57	201	0.6	0.16667	5.4	0.02204	2.0	140.5	2.8
KGV 8-58	153	1.1	0.15433	7.8	0.02153	2.4	137.3	3.2
KGV 8-59	157	0.7	3.74124	5.1	0.27438	5.0	1603.3	21.8
KGV 8-60	654	1.0	0.18745	4.2	0.02673	3.8	170.0	6.4
KGV 8-61	364	1.5	0.17636	5.4	0.02574	3.3	163.9	5.3
KGV 8-62	254	0.6	0.14899	5.9	0.02177	3.4	138.9	4.7
KGV 8-63	441	0.9	1.92609	5.4	0.18307	5.3	1103.0	20.8
KGV 8-64	315	0.8	0.14073	4.9	0.02078	2.3	132.6	3.1
KGV 8-65	147	2.0	12.68048	4.7	0.49533	4.5	2704.2	24.7
KGV 8-66	93	0.8	0.12623	17.4	0.02141	3.2	136.6	4.3
KGV 8-67	225	0.5	0.14284	5.4	0.02090	2.7	133.3	3.6
KGV 8-68	459	0.8	0.17904	6.1	0.02696	2.5	171.5	4.2
KGV 8-69	262	1.0	0.13997	6.6	0.02179	2.4	138.9	3.3
KGV 8-70	451	0.9	0.18462	4.1	0.02735	3.3	174.0	5.7
KGV 8-71	117	0.8	0.12590	16.1	0.02145	2.9	136.8	3.9
KGV 8-72	273	0.9	1.74980	3.0	0.17172	2.8	1038.8	21.5
KGV 8-73	245	1.0	0.13242	9.0	0.02102	2.4	134.1	3.2
KGV 8-74	146	1.6	0.13262	12.4	0.02200	3.5	140.3	4.8
KGV 8-75	478	0.6	0.17247	4.9	0.02627	2.8	167.2	4.6
KGV 8-76	192	1.1	0.32549	27.6	0.05821	2.5	364.8	8.8

KGV 8-77	261	0.8	0.10491	33.5	0.02142	2.8	136.6	3.7
KGV 8-78	225	1.0	3.46726	3.9	0.26703	3.3	1511.5	38.0
KGV 8-79	164	1.3	0.15428	8.8	0.02443	2.9	155.6	4.5
KGV 8-80	204	0.9	11.97613	4.1	0.47740	2.5	2670.6	53.3
KGV 8-81	197	1.0	0.13929	7.9	0.02171	3.3	138.5	4.6
KGV 8-82	68	1.4	0.19547	13.6	0.03130	4.8	198.7	9.4
KGV 8-83	114	1.0	0.10453	34.7	0.02098	3.9	133.9	5.2
KGV 8-84	103	1.0	0.12082	13.9	0.02069	3.5	132.0	4.6
KGV 8-85	125	0.9	0.16013	10.7	0.02436	2.7	155.1	4.1
KGV 8-86	670	1.1	0.18070	5.0	0.02611	4.2	166.1	6.8
KGV 8-87	47	0.7	13.07255	1.9	0.50310	1.6	2728.7	17.2
KGV 8-88	306	1.8	1.81542	2.8	0.17254	2.5	1103.3	22.6
KGV 8-89	238	1.5	3.61466	3.9	0.26477	3.7	1605.6	24.7
KGV 8-90	135	26.2	0.17021	11.8	0.02659	4.7	169.1	7.8
KGV 8-91	50	0.8	0.19312	13.7	0.02212	8.3	141.0	11.6
KGV 8-92	60	1.2	3.48554	4.0	0.26912	3.1	1506.7	49.8
KGV 8-93	99	1.1	0.10282	32.8	0.02131	4.1	135.9	5.5
KGV 8-94	522	0.8	0.15017	5.9	0.02296	4.1	146.3	5.9
KGV 8-95	319	0.6	0.13463	5.3	0.02089	2.3	133.3	3.0
KGV 8-96	145	1.2	0.12103	33.9	0.02477	6.7	157.8	10.5
KGV 8-97	112	0.8	15.81963	3.4	0.55266	3.2	2886.9	18.6
KGV 8-98	132	1.3	0.14330	15.0	0.02437	2.8	155.2	4.3
KGV 8-99	686	0.7	0.18460	4.9	0.02662	4.3	169.4	7.2
KGV 8-100	224	1.9	1.70489	3.9	0.16905	3.5	1017.9	34.9

KGV 10	**U/ppm**	**U/Th**	**207Pb/235U**	**± %**	**206Pb/238U**	**± %**	**Best Age**	**±**
KGV 10-1	121	1.7	0.14342	15.8	0.02129	5.2	135.8	7.0
KGV 10-2	172	1.3	0.15354	10.4	0.02139	3.2	136.4	4.4
KGV 10-3	145	1.0	0.12755	14.6	0.02125	4.6	135.6	6.2
KGV 10-4	191	1.3	0.52473	3.3	0.06941	1.8	432.6	7.5
KGV 10-5	827	1.2	0.47041	1.9	0.06217	1.6	388.8	6.0
KGV 10-6	154	1.8	0.14278	11.7	0.02017	3.1	128.7	4.0
KGV 10-7	160	2.0	0.14485	12.0	0.01954	2.8	124.7	3.4
KGV 10-8	199	1.6	0.14005	4.7	0.02012	2.7	128.4	3.5
KGV 10-9	176	1.0	0.13220	9.1	0.02048	2.4	130.7	3.1
KGV 10-10	152	2.1	0.13248	13.5	0.01997	3.3	127.5	4.1
KGV 10-11	506	2.2	0.13102	4.8	0.01996	2.0	127.4	2.5
KGV 10-12	129	2.2	1.72795	4.2	0.16902	1.4	1045.5	79.6
KGV 10-13	132	2.5	3.13589	4.4	0.24672	1.1	1471.2	81.8
KGV 10-14	458	1.5	0.37376	4.9	0.05197	2.7	326.6	8.5
KGV 10-15	167	2.2	0.12374	9.5	0.01935	3.4	123.6	4.2
KGV 10-16	572	1.5	0.39146	2.7	0.05272	2.2	331.2	7.2
KGV 10-17	165	1.4	0.13366	11.1	0.01887	3.7	120.5	4.4
KGV 10-18	516	1.6	0.14556	5.9	0.02014	2.1	128.5	2.7
KGV 10-19	192	1.7	0.14131	8.0	0.02032	3.0	129.7	3.9
KGV 10-20	177	1.2	0.15320	7.6	0.01965	2.4	125.4	3.0
KGV 10-21	379	2.2	0.11781	7.5	0.01884	1.8	120.3	2.2
KGV 10-22	223	2.4	0.16225	6.2	0.02531	1.5	161.1	2.4
KGV 10-23	532	0.9	0.15560	4.2	0.02369	1.8	150.9	2.7
KGV 10-24	200	2.4	0.15089	7.1	0.01883	2.8	120.2	3.4

KGV 10-26	193	1.5	0.16635	8.7	0.02402	3.1	153.0	4.7
KGV 10-28	350	2.8	0.37547	3.1	0.05126	2.1	322.2	6.6
KGV 10-29	226	1.9	0.37766	3.4	0.05052	2.0	317.7	6.2
KGV 10-30	250	2.0	0.13301	7.6	0.01936	2.1	123.6	2.6
KGV 10-31	388	1.5	0.12351	5.4	0.01924	2.3	122.8	2.8
KGV 10-32	669	0.8	0.39046	2.2	0.05268	1.0	330.9	3.2
KGV 10-33	154	1.6	0.12715	12.9	0.02008	2.1	128.1	2.6
KGV 10-34	374	1.3	0.11748	7.7	0.01890	2.3	120.7	2.7
KGV 10-35	39	0.7	0.97561	7.6	0.11951	2.7	727.7	18.3
KGV 10-36	133	42.1	0.14511	14.3	0.02430	3.4	154.8	5.2
KGV 10-37	336	1.2	0.15632	8.8	0.02064	3.7	131.7	4.8
KGV 10-38	441	1.6	0.14185	6.1	0.02139	5.2	136.5	7.1
KGV 10-39	206	1.5	0.13118	10.1	0.02132	2.0	136.0	2.7
KGV 10-40	110	1.7	0.10718	21.7	0.01964	4.8	125.4	5.9
KGV 10-41	154	1.0	0.12608	16.2	0.02079	6.1	132.7	7.9
KGV 10-42	183	1.9	0.16203	9.0	0.02100	2.2	134.0	2.9
KGV 10-43	158	1.3	0.12378	12.2	0.02028	2.6	129.4	3.3
KGV 10-44	587	0.8	0.16847	3.6	0.02484	2.2	158.2	3.5
KGV 10-45	159	1.4	0.13222	12.5	0.02073	3.2	132.3	4.2
KGV 10-46	359	1.3	0.35908	3.1	0.05041	1.2	317.0	3.7
KGV 10-47	96	2.0	0.13626	17.6	0.01904	3.3	121.6	3.9
KGV 10-48	131	1.6	0.14794	11.3	0.01971	4.6	125.8	5.7
KGV 10-49	172	1.6	0.11474	10.6	0.01874	3.5	119.7	4.2
KGV 10-50	188	2.2	0.12064	9.9	0.01887	1.6	120.5	1.9
KGV 10-51	409	0.9	0.13163	4.5	0.02013	2.3	128.5	3.0
KGV 10-52	110	1.9	0.10326	25.3	0.01949	6.6	124.4	8.1
KGV 10-53	148	1.9	0.11388	16.3	0.01941	2.5	123.9	3.1
KGV 10-54	230	1.5	0.15404	7.6	0.02050	2.9	130.8	3.8
KGV 10-55	90	1.6	0.18017	14.2	0.02073	3.1	132.3	4.1
KGV 10-56	248	1.8	0.11487	30.2	0.01973	5.7	126.0	7.1
KGV 10-57	145	1.5	0.13373	10.9	0.01910	3.8	122.0	4.6
KGV 10-58	140	1.7	0.08802	36.3	0.01975	4.5	126.1	5.6
KGV 10-59	351	2.3	1.48370	2.1	0.15220	1.3	913.3	11.3
KGV 10-60	745	1.6	0.37258	3.8	0.05109	1.5	321.2	4.7
KGV 10-61	200	2.2	0.15652	9.0	0.01945	3.2	124.2	3.9
KGV 10-62	302	1.0	0.15424	4.1	0.02227	2.1	142.0	2.9
KGV 10-63	151	2.6	0.14145	10.4	0.01922	4.3	122.7	5.2
KGV 10-64	264	2.2	0.17637	5.7	0.02571	3.1	163.7	5.0
KGV 10-65	224	2.0	0.16994	10.6	0.02112	3.3	134.8	4.4
KGV 10-66	118	1.2	0.19921	13.2	0.02429	4.2	154.7	6.5
KGV 10-67	491	1.2	0.15975	3.0	0.02386	1.9	152.0	2.8
KGV 10-68	79	1.4	0.16276	14.9	0.02039	3.7	130.1	4.8
KGV 10-69	118	1.3	0.13085	23.8	0.01949	4.8	124.4	5.9
KGV 10-70	298	1.9	0.12127	19.7	0.01928	3.0	123.1	3.6
KGV 10-71	226	2.2	0.41166	2.7	0.05387	1.0	338.3	3.3
KGV 10-72	292	1.1	0.28507	6.4	0.04111	2.7	259.7	7.0
KGV 10-73	304	1.1	0.13284	8.1	0.01992	1.7	127.2	2.1
KGV 10-74	1012	1.0	0.41387	1.9	0.05519	1.5	346.3	5.0
KGV 10-75	122	1.4	0.17357	14.6	0.02078	3.7	132.6	4.8

KGV 11	U/ppm	U/Th	207Pb/235U	± %	206Pb/238U	± %	Best Age	±
KGV 11-1	208	2.3	0.25323	6.1	0.02705	4.3	172.0	7.2
KGV 11-2	447	2.4	0.21364	4.7	0.02564	2.6	163.2	4.1
KGV 11-3	419	2.4	0.19609	7.7	0.02428	1.5	154.7	2.4
KGV 11-4	764	3.3	0.20240	4.9	0.02640	2.9	168.0	4.9
KGV 11-5	861	3.0	0.17479	4.6	0.02655	2.2	168.9	3.7
KGV 11-6	2714	8.4	0.18329	3.2	0.02624	2.6	166.9	4.3
KGV 11-7	265	2.1	0.13779	15.4	0.02370	3.2	151.0	4.8
KGV 11-8	797	1.5	0.17028	4.2	0.02566	1.9	163.3	3.1
KGV 11-9	775	1.3	0.17537	3.7	0.02614	1.7	166.4	2.8
KGV 11-10	569	2.8	0.13071	6.5	0.02034	2.4	129.8	3.1
KGV 11-11	381	2.4	0.16773	7.9	0.02558	2.5	162.8	4.0
KGV 11-12	2018	2.6	0.17922	3.5	0.02640	3.1	168.0	5.2
KGV 11-13	3593	4.7	0.14709	4.7	0.02218	4.0	141.4	5.6
KGV 11-14	403	1.5	0.16096	5.2	0.02181	2.5	139.1	3.4
KGV 11-15	972	2.9	0.21679	3.4	0.03189	2.7	202.4	5.4
KGV 11-16	310	1.5	0.13835	9.6	0.02023	3.3	129.1	4.2
KGV 11-17	717	1.7	0.13499	27.4	0.02539	2.7	161.6	4.4
KGV 11-18	483	2.2	0.17417	4.9	0.02565	1.7	163.3	2.7
KGV 11-19	503	3.1	0.16668	8.2	0.02530	3.7	161.0	5.8
KGV 11-20	4009	2.3	0.18340	2.1	0.02693	1.7	171.3	2.9
KGV 11-21	971	1.8	0.18278	3.4	0.02716	1.4	172.7	2.5
KGV 11-22	531	1.6	0.13305	5.2	0.01964	1.7	125.3	2.1
KGV 11-23	910	1.7	0.16522	6.2	0.02365	2.2	150.7	3.2
KGV 11-24	214	1.9	2.18427	2.9	0.19866	2.5	1190.7	30.5
KGV 11-25	181	2.8	0.18095	10.0	0.02557	3.6	162.8	5.7
KGV 11-26	1557	1.7	0.11478	3.2	0.01757	1.9	112.3	2.1
KGV 11-27	387	1.9	0.15553	6.8	0.02437	1.8	155.2	2.7
KGV 11-28	998	2.4	0.17301	4.0	0.02591	2.9	164.9	4.7
KGV 11-29	1171	2.1	0.19447	3.9	0.02765	2.7	175.9	4.6
KGV 11-30	1739	1.5	0.11197	9.4	0.01803	1.6	115.2	1.8
KGV 11-31	626	1.4	0.17612	5.7	0.02506	3.4	159.6	5.3
KGV 11-32	834	1.6	0.19289	4.7	0.02774	1.9	176.4	3.2
KGV 11-33	497	4.4	0.11805	5.7	0.01833	1.8	117.1	2.1
KGV 11-34	1169	2.1	0.17991	4.5	0.02545	2.0	162.0	3.2
KGV 11-35	2090	2.3	0.19223	3.6	0.02752	3.0	175.0	5.2
KGV 11-36	1017	2.0	0.18619	2.8	0.02642	1.3	168.1	2.2
KGV 11-37	670	2.1	0.19473	3.6	0.02673	2.3	170.1	3.8
KGV 11-38	2266	1.3	0.12115	2.9	0.01840	2.5	117.6	2.9
KGV 11-39	193	2.6	0.14478	8.6	0.02293	2.8	146.1	4.1
KGV 11-40	333	1.4	0.16642	6.3	0.02428	2.0	154.7	3.1
KGV 11-41	540	5.0	0.13545	6.9	0.01822	3.4	116.4	3.9
KGV 11-42	1044	1.1	0.15351	3.4	0.02208	2.4	140.8	3.3
KGV 11-43	422	3.3	0.18003	5.3	0.02578	1.7	164.1	2.8
KGV 11-44	130	5.5	0.25874	9.7	0.02341	3.5	149.2	5.2
KGV 11-45	1132	2.1	0.17874	2.9	0.02654	2.1	168.9	3.4
KGV 11-46	200	1.6	0.18812	12.6	0.02289	2.5	145.9	3.6
KGV 11-47	297	2.5	0.18849	4.4	0.02546	1.6	162.1	2.5
KGV 11-48	448	3.0	0.14867	15.1	0.02288	2.5	145.8	3.5
KGV 11-49	1126	4.1	0.19088	3.8	0.02744	2.0	174.5	3.5

KGV 11-50	433	2.5	0.18524	3.6	0.02618	1.8	166.6	3.0
KGV 11-51	1811	1.5	0.11716	3.3	0.01764	1.9	112.7	2.1
KGV 11-52	590	3.4	0.14352	10.3	0.02082	3.0	132.8	3.9
KGV 11-53	968	1.8	0.16743	4.2	0.02524	2.3	160.7	3.6
KGV 11-54	1720	2.0	0.13937	3.5	0.02081	2.3	132.8	3.1
KGV 11-55	231	2.3	0.15029	13.9	0.02004	3.4	127.9	4.3
KGV 11-56	452	2.1	0.11978	11.3	0.02001	2.5	127.7	3.2
KGV 11-57	239	0.9	5.77928	3.0	0.34935	2.7	1955.9	22.0
KGV 11-58	1642	1.1	0.11604	5.4	0.01804	3.4	115.3	3.8
KGV 11-59	346	1.6	0.15405	9.9	0.02459	2.5	156.6	3.8
KGV 11-60	1492	2.2	0.17645	3.4	0.02629	1.1	167.3	1.8
KGV 11-61	128	3.3	0.09038	31.6	0.01892	3.7	120.8	4.4
KGV 11-62	1689	2.0	0.13115	3.8	0.01849	3.1	118.1	3.6
KGV 11-63	387	2.1	0.12940	9.1	0.01860	2.9	118.8	3.4
KGV 11-64	399	1.7	0.19204	7.4	0.02682	2.8	170.6	4.6
KGV 11-65	753	3.0	0.18541	3.9	0.02690	1.6	171.1	2.6
KGV 11-66	373	2.7	0.15245	21.8	0.02708	6.0	172.3	10.3
KGV 11-67	1631	1.3	0.12662	3.6	0.01920	2.7	122.6	3.2
KGV 11-68	523	2.5	0.19001	5.6	0.02700	2.4	171.7	4.0
KGV 11-69	313	2.0	0.13198	10.1	0.02120	1.9	135.3	2.6
KGV 11-70	239	2.2	0.13076	13.8	0.02172	4.4	138.5	6.1
KGV 11-71	394	3.6	0.19719	7.4	0.02576	2.8	163.9	4.5
KGV 11-72	77	0.8	4.98169	2.5	0.32384	1.9	1825.1	28.8
KGV 11-73	741	1.4	0.16875	6.6	0.02635	1.4	167.7	2.3
KGV 11-74	751	3.4	0.17003	4.7	0.02559	1.0	162.9	1.6
KGV 11-75	197	3.5	0.16907	12.0	0.02242	2.7	142.9	3.8
KGV 11-76	628	2.4	0.16682	3.8	0.02397	1.1	152.7	1.6
KGV 11-77	2905	1.6	0.11663	3.5	0.01758	3.0	112.4	3.4
KGV 11-78	1284	2.4	0.16923	3.4	0.02491	1.8	158.6	2.8
KGV 11-79	498	2.2	0.16448	10.2	0.02657	3.0	169.1	5.0
KGV 11-80	441	2.1	0.11493	8.6	0.01799	2.2	114.9	2.5
KGV 11-81	481	2.4	0.13835	4.8	0.01991	1.2	127.1	1.5
KGV 11-82	1244	1.5	0.17297	4.3	0.02536	1.7	161.4	2.6
KGV 11-83	282	1.9	0.12852	29.2	0.02516	5.3	160.2	8.4
KGV 11-84	599	2.2	0.17303	5.7	0.02589	1.4	164.8	2.3
KGV 11-85	707	2.9	0.18629	3.4	0.02636	1.9	167.8	3.1
KGV 11-86	201	2.3	0.12425	13.4	0.02113	2.5	134.8	3.3
KGV 11-87	1738	2.5	0.17935	4.7	0.02583	1.7	164.4	2.8
KGV 11-88	483	2.7	0.14304	5.0	0.02024	2.1	129.2	2.7
KGV 11-90	958	3.3	0.12467	15.2	0.02110	5.8	134.6	7.7
KGV 11-91	168	2.0	2.94719	5.5	0.23400	4.8	1453.9	49.8
KGV 11-92	517	2.5	0.17637	6.1	0.02585	2.2	164.5	3.6
KGV 11-93	1056	1.1	0.16436	6.9	0.02583	1.2	164.4	1.9
KGV 11-94	362	2.3	0.19567	5.5	0.02588	3.1	164.7	5.0
KGV 11-95	669	2.7	0.17631	2.8	0.02447	1.8	155.8	2.7
KGV 11-96	2257	2.0	0.18014	2.5	0.02642	1.8	168.1	3.0
KGV 11-98	2048	1.2	0.17981	3.2	0.02643	2.8	168.2	4.6
KGV 11-99	352	3.9	0.19314	6.6	0.02584	2.6	164.4	4.2
KGV 11-100	314	2.2	0.14507	8.7	0.02100	3.1	134.0	4.1

APPENDIX C: Detrital Zircon Data Analyzed with SHRIMP

Sample Analysis			Uncorrected Data				207-Corrected Data	
KGV 1	**U/ppm**	**Th/ppm**	**238U/206Pb**	**±%**	**207Pb/206Pb**	**±%**	**206U/238Pb Age**	**1σ err**
KGV 1-1	219	169	46.44	1.8	.0533	4.3	137.3	2.5
KGV 1-2	105	38	19.20	1.9	.0539	4.3	327.3	6.0
KGV 1-3	1108	1442	47.04	1.5	.0508	1.9	135.3	2.0
KGV 1-4	92	98	3.01	1.8	.1116	1.1	1851.8	28.6
KGV 1-5	329	207	41.07	1.8	.0512	3.1	155.1	2.7
KGV 1-6	51	19	45.34	3.3	.0666	7.7	140.6	4.6
KGV 1-7	174	95	42.23	2.2	.0513	5.4	150.9	3.2
KGV 1-8	153	114	41.42	2.2	.0519	5.0	153.8	3.4
KGV 1-9	271	180	45.21	1.9	.0498	3.7	140.6	2.6
KGV 1-10	204	104	36.99	2.0	.0537	3.8	170.3	3.4
KGV 1-11	487	319	40.33	1.7	.0521	2.6	157.6	2.6
KGV 1-12	127	45	45.82	2.4	.0516	5.4	139.2	3.2
KGV 1-13	194	80	45.66	2.1	.0542	4.3	138.3	2.9
KGV 1-14	66	26	2.97	2.0	.1160	1.4	1868.0	32.1
KGV 1-15	213	137	45.97	2.1	.0491	4.6	138.7	2.9
KGV 1-16	136	91	2.96	1.6	.1153	0.8	1874.7	26.5
KGV 1-17	510	385	38.56	1.7	.0501	2.6	165.0	2.7
KGV 1-18	526	249	38.45	1.7	.0499	2.5	165.5	2.7
KGV 1-19	395	201	42.66	1.8	.0521	3.1	148.2	2.6
KGV 1-20	62	68	5.19	2.1	.0776	2.3	1138.9	21.9
KGV 1-21	777	386	37.04	1.6	.1028	7.6	162.8	3.0
KGV 1-22	126	53	49.27	2.5	.0536	5.8	128.0	3.3
KGV 1-23	508	366	39.74	1.7	.0503	2.7	160.0	2.7
KGV 1-24	254	132	42.46	2.0	.0493	3.9	149.1	2.9
KGV 1-25	501	328	36.36	1.7	.0492	2.6	174.9	2.9
KGV 1-26	610	464	36.16	1.6	.0546	2.3	174.9	2.8
KGV 1-27	406	95	5.60	1.5	.0749	1.0	1057.9	15.0
KGV 1-28	144	148	2.85	1.7	.1174	0.9	1938.0	28.4
KGV 1-29	296	146	37.72	1.9	.0512	3.5	168.7	3.1
KGV 1-30	773	316	37.02	1.6	.0506	2.1	171.7	2.7
KGV 1-31	720	203	36.80	1.6	.0535	2.2	172.0	2.7
KGV 1-32	832	596	38.74	1.6	.0474	2.2	164.1	2.6
KGV 1-33	120	49	43.78	2.5	.0572	5.5	145.6	3.6
KGV 1-34	340	182	36.90	1.8	.0492	3.3	171.5	3.1
KGV 1-35	990	65	37.86	1.6	.0501	2.0	167.7	2.6
KGV 1-36	627	464	37.29	1.6	.0512	2.4	170.2	2.7
KGV 1-37	291	188	45.96	2.2	.0488	3.9	138.7	3.0
KGV 1-38	127	40	5.81	1.8	.0711	1.9	1022.0	17.4
KGV 1-39	385	195	39.23	1.8	.0576	3.1	160.3	3.0
KGV 1-40	1226	1778	43.22	1.6	.0492	1.9	146.3	2.3
KGV 1-41	521	288	40.18	1.8	.0602	2.9	156.0	2.9
KGV 1-42	366	230	44.01	1.9	.0599	3.4	140.3	3.0
KGV 1-43	110	53	43.35	2.7	.0557	6.3	147.0	3.9
KGV 1-44	297	238	46.40	2.0	.0529	5.6	136.1	2.8
KGV 1-45	181	61	1.92	1.8	.1857	0.7	2702.0	40.6
KGV 1-46	407	308	40.24	1.8	.0515	3.3	157.8	2.8

KGV 1-47	1416	1001	37.52	1.5	.0500	1.7	168.9	2.6
KGV 1-48	373	240	41.25	1.9	.0514	3.5	154.4	2.8
KGV 1-49	425	220	40.11	2.0	.0511	3.2	158.2	3.1
KGV 1-50	940	663	38.14	1.6	.0494	2.2	166.8	2.6
KGV 1-51	282	126	40.34	1.9	.0522	5.7	154.2	3.3
KGV 1-52	552	131	46.15	1.8	.0530	3.0	138.2	2.4
KGV 1-53	855	575	39.66	1.6	.0519	2.3	160.1	2.5
KGV 1-54	398	329	43.49	1.8	.0501	3.6	146.5	2.6
KGV 1-55	949	914	44.18	1.5	.0494	1.6	144.3	2.2
KGV 1-56	205	115	44.28	1.8	.0523	3.4	143.4	2.6
KGV 1-57	388	220	40.10	1.7	.0505	2.6	158.3	2.6
KGV 1-58	239	101	38.03	1.8	.0516	3.5	166.4	3.0
KGV 1-59	355	167	42.73	1.8	.0495	3.1	148.8	2.6
KGV 1-60	841	469	35.46	1.5	.0467	1.9	179.0	2.7
KGV 1-61	1623	996	36.05	1.5	.0493	1.3	176.4	2.6
KGV 1-62	938	787	43.30	1.6	.0493	1.9	147.2	2.3
KGV 1-63	363	310	42.39	1.8	.0503	3.2	149.8	2.7
KGV 1-64	142	82	37.27	2.1	.0516	4.9	170.7	3.6
KGV 1-65	312	125	42.93	1.8	.0535	3.2	148.1	2.7
KGV 1-66	488	278	36.55	1.7	.0510	2.5	174.0	2.8
KGV 1-67	96	88	42.22	2.5	.0513	5.9	146.8	4.1
KGV 1-68	411	131	40.44	1.8	.0493	3.1	157.0	2.8
KGV 1-69	851	435	37.48	1.6	.0483	2.2	169.5	2.7
KGV 1-70	272	221	45.50	1.9	.0505	3.7	140.1	2.6
KGV 1-71	225	172	45.30	2.0	.0526	4.0	139.7	2.7
KGV 1-72	247	120	43.97	2.0	.0487	4.1	143.4	2.8
KGV 1-73	290	177	44.09	1.9	.0491	3.6	144.6	2.7
KGV 1-74	281	178	44.22	1.9	.0494	4.0	144.1	2.7
KGV 1-75	549	578	45.37	1.7	.0481	3.4	140.5	2.3
KGV 1-76	991	895	39.05	1.6	.0492	1.9	163.0	2.5
KGV 1-77	194	118	37.09	2.1	.0561	4.1	170.5	3.5
KGV 1-78	1752	798	35.99	1.5	.0492	1.4	176.4	2.6
KGV 1-79	1931	1535	36.88	1.5	.0508	1.4	172.2	2.5
KGV 1-80	508	153	3.18	1.5	.1208	0.5	1754.1	23.1

KGV 4	**U/ppm**	**Th/ppm**	**238U/206Pb**	**±%**	**207Pb/206Pb**	**±%**	**206U/238Pb Age**	**1σ err**
KGV 4-1	841	868	44.78	1.4	.0491	3.7	142.3	1.9
KGV 4-2	128	73	45.99	2.4	.0402	19.6	140.1	3.1
KGV 4-3	485	343	41.52	1.4	.0471	6.1	153.8	2.2
KGV 4-4	188	93	37.91	1.8	.0420	7.0	169.4	3.1
KGV 4-5	346	193	37.49	1.6	.0419	4.9	171.2	2.6
KGV 4-6	144	30	40.93	2.6	.0295	35.1	159.3	3.8
KGV 4-7	696	429	37.55	1.4	.0498	2.3	169.4	2.3
KGV 4-8	38	15	45.11	3.8	.0722	9.0	137.3	5.3
KGV 4-9	92	42	3.17	1.6	.1045	1.4	1775.2	29.0
KGV 4-10	165	52	49.29	2.5	.0619	17.0	127.4	2.7
KGV 4-11	161	52	49.32	2.1	.0524	5.1	128.8	2.7
KGV 4-12	332	169	50.98	1.7	.0469	6.6	125.5	2.1
KGV 4-13	272	105	16.98	1.7	.0568	11.2	367.7	5.5
KGV 4-14	86	24	45.44	3.0	.0414	31.0	141.6	3.8

KGV 4-15	53	20	42.48	3.3	.0517	9.0	149.5	5.0
KGV 4-16	128	65	51.19	3.1	.0669	17.2	121.9	3.5
KGV 4-17	88	1	40.46	2.9	.0685	16.9	153.7	4.0
KGV 4-18	113	30	45.29	2.3	.0421	14.2	141.9	3.1
KGV 4-19	23	15	4.61	2.5	.0809	6.6	1267.8	30.4
KGV 4-20	786	597	39.47	1.3	.0485	2.5	161.4	2.1
KGV 4-21	113	55	44.55	2.2	.0502	8.1	142.9	3.1
KGV 4-22	295	177	18.48	1.4	.0516	4.5	340.4	4.7
KGV 4-23	102	48	48.20	2.4	.0275	30.0	135.8	3.1
KGV 4-24	42	12	33.41	2.9	.0202	31.5	197.0	5.8
KGV 4-25	391	278	37.38	1.5	.0529	5.6	169.5	2.5
KGV 4-26	140	80	41.63	8.3			162.8	6.1
KGV 4-27	110	39	37.75	2.3	.0270	36.1	173.1	3.8
KGV 4-28	74	39	33.97	2.5	.0458	18.1	187.9	4.5
KGV 4-29	270	126	38.97	1.7	.0484	10.4	163.5	2.7
KGV 4-30	90	31	50.18	3.1	.0433	36.8	128.0	3.2
KGV 4-31	400	151	37.53	1.5	.0566	5.0	168.0	2.5
KGV 4-32	44	17	45.32	3.3	.0598	8.6	138.8	4.7
KGV 4-33	154	62	19.30	1.7	.0451	6.8	328.7	5.5
KGV 4-34	86	46	49.67	3.0	.0735	16.6	124.6	3.3
KGV 4-35	23	6	39.51	7.1	.1287	32.4	145.5	6.8
KGV 4-36	63	20	45.06	3.3	.0363	39.6	143.7	4.2
KGV 4-37	340	182	37.52	1.6	.0528	3.1	168.9	2.6
KGV 4-38	68	24	43.42	3.5	.0706	22.8	142.9	4.1
KGV 4-39	117	64	38.21	2.6	.0591	5.1	164.6	4.3
KGV 4-40	54	15	41.68	3.7	.0803	20.4	147.0	4.6
KGV 4-41	177	115	46.64	2.0	.0471	7.6	137.0	2.8
KGV 4-42	325	237	18.19	1.4	.0533	2.8	345.0	4.9
KGV 4-43	162	110	46.11	2.3	.0368	23.5	140.3	2.9
KGV 4-44	130	45	49.26	2.3	.0509	5.9	129.2	3.0
KGV 4-45	86	31	54.25	4.2			126.0	3.5
KGV 4-46	45	22	44.29	3.6	.0466	17.5	144.3	5.0
KGV 4-47	441	232	37.36	1.5	.0467	4.4	170.9	2.6
KGV 4-48	108	40	46.92	2.5	.0527	10.7	135.3	3.4
KGV 4-49	117	52	45.69	2.4	.0591	5.8	137.8	3.4
KGV 4-50	68	26	43.72	3.1	.0477	8.4	146.0	4.5
KGV 4-51	189	127	43.49	2.1	.0474	10.1	146.8	3.0
KGV 4-52	63	26	42.46	3.3	.0471	19.6	150.4	4.8
KGV 4-53	216	137	38.86	2.0	.0543	10.7	162.8	3.1
KGV 4-54	151	65	30.96	2.1	.0425	8.8	206.9	4.2
KGV 4-55	84	35	46.61	3.1	.0206	61.0	141.5	4.0
KGV 4-56	359	306	38.50	1.6	.0508	3.5	165.0	2.7
KGV 4-57	218	208	3.12	1.4	.1111	1.0	1788.6	24.8
KGV 4-58	454	258	44.98	1.6	.0502	3.3	141.5	2.2
KGV 4-59	486	164	7.03	1.3	.0656	4.1	859.7	10.7

KGV 5	**U/ppm**	**Th/ppm**	**238U/206Pb**	**±%**	**207Pb/206Pb**	**±%**	**206U/238Pb Age**	**1σ err**
KGV 5-1	234	98	53.66	3.0	.0346	62.1	121.0	2.6
KGV 5-2	522	277	36.90	1.4	.0519	4.0	171.9	2.4
KGV 5-3	448	244	39.50	1.5	.0507	2.8	160.9	2.4

KGV 5-4	314	107	36.99	1.6	.0505	3.6	171.7	2.7
KGV 5-5	112	136	4.28	1.6	.0900	1.6	1348.3	20.8
KGV 5-6	265	211	43.76	1.8	.0454	8.9	146.3	2.6
KGV 5-7	221	110	36.93	2.1	.0515	5.2	171.8	3.5
KGV 5-8	314	117	54.05	1.7	.0484	4.7	118.2	2.1
KGV 5-9	219	136	38.21	2.0	.0280	27.7	170.9	3.0
KGV 5-10	304	106	39.48	1.6	.0485	3.5	161.4	2.6
KGV 5-11	158	136	38.31	2.0	.0381	15.5	168.4	3.2
KGV 5-12	192	146	37.71	1.8	.0591	8.3	166.7	2.9
KGV 5-13	63	13	10.96	2.3	.0710	3.3	554.8	12.6
KGV 5-14	321	267	37.18	1.5	.0522	3.3	170.5	2.6
KGV 5-15	380	210	38.00	1.6	.0469	3.4	167.9	2.7
KGV 5-16	1220	729	38.31	1.2	.0500	2.3	166.0	2.0
KGV 5-17	362	160	36.94	1.5	.0500	4.2	172.1	2.6
KGV 5-18	356	117	5.02	1.3	.0773	1.1	1173.6	15.0
KGV 5-19	281	112	45.72	1.7	.0545	8.1	138.5	2.3
KGV 5-20	470	199	26.76	1.4	.0481	2.6	237.3	3.2
KGV 5-21	262	151	46.82	1.7	.0450	5.6	136.9	2.3
KGV 5-22	377	257	36.56	1.5	.0483	4.7	174.2	2.6
KGV 5-23	2312	2300	45.41	1.2	.0505	4.0	140.1	1.7
KGV 5-24	504	221	36.33	1.5	.0514	2.6	174.6	2.6
KGV 5-25	315	242	38.55	1.6	.0476	4.8	165.4	2.6
KGV 5-26	188	162	38.18	2.0	.0540	17.0	165.7	2.8
KGV 5-27	800	704	41.16	1.3	.0511	2.8	154.4	2.0
KGV 5-28	171	81	38.66	1.8	.0502	8.9	164.5	2.9
KGV 5-29	943	1117	37.18	1.3	.0486	2.5	171.3	2.1
KGV 5-30	133	68	45.93	2.3	.0653	15.4	136.1	2.7
KGV 5-31	1283	768	38.34	1.2	.0507	1.8	165.7	2.0
KGV 5-32	205	62	55.24	2.0	.0349	22.9	117.6	2.2
KGV 5-33	74	17	44.85	2.5	.0580	6.3	140.6	3.6
KGV 5-34	2105	2097	37.29	1.2	.0500	1.2	170.5	2.0
KGV 5-35	141	75	38.79	2.0	.0487	8.9	164.2	3.2
KGV 5-36	167	58	38.81	1.8	.0549	5.0	162.9	3.0
KGV 5-37	222	83	38.35	1.7	.0524	3.5	165.3	2.7
KGV 5-38	1594	1597	37.22	1.3	.0494	1.6	170.9	2.1
KGV 5-39	795	361	39.96	1.3	.0486	2.4	159.5	2.1
KGV 5-40	127	76	46.01	2.0	.0470	7.7	138.9	2.8
KGV 5-41	485	247	37.95	1.4	.0507	2.3	167.4	2.3
KGV 5-42	181	64	40.78	1.7	.0460	6.7	156.8	2.7
KGV 5-43	494	307	39.46	1.4	.0527	3.6	160.7	2.2
KGV 5-44	159	73	37.25	1.9	.0573	8.8	169.2	3.0

KGV 6	**U/ppm**	**Th/ppm**	**238U/206Pb**	**±%**	**207Pb/206Pb**	**±%**	**206U/238Pb Age**	**1σ err**
KGV 6-1	79	25	16.35	2.7	.0593	4.1	379.3	9.9
KGV 6-2	238	78	48.05	2.0	.0505	4.4	130.5	2.7
KGV 6-3	362	149	47.21	1.8	.0546	3.3	133.3	2.5
KGV 6-4	1100	191	39.72	1.6	.0501	1.8	160.0	2.5
KGV 6-5	313	206	18.05	1.7	.0547	2.2	347.7	5.7
KGV 6-6	197	80	47.18	2.2	.0487	4.9	133.8	2.9
KGV 6-7	132	74	47.97	2.6	.0518	7.0	133.0	3.4

KGV 6-8	247	172	48.24	2.1	.0523	4.5	131.4	2.8
KGV 6-9	582	422	17.77	1.6	.0552	1.7	352.9	5.4
KGV 6-10	999	198	17.31	1.5	.0531	1.3	362.1	5.3
KGV 6-11	226	166	48.74	2.4	.0476	4.7	129.6	3.1
KGV 6-12	110	46	47.60	2.3	.0520	5.3	133.1	3.1
KGV 6-13	1024	839	18.24	1.5	.0528	1.1	343.8	4.9
KGV 6-14	122	65	46.58	2.3	.0575	5.0	136.0	3.1
KGV 6-15	289	141	36.98	1.8	.0508	3.7	172.0	3.0
KGV 6-16	101	35	46.96	2.5	.0515	6.0	135.9	3.3
KGV 6-17	299	192	17.83	1.7	.0533	2.2	351.7	5.7
KGV 6-18	109	41	48.44	2.5	.0507	6.1	131.7	3.2
KGV 6-19	308	253	46.63	1.9	.0465	3.8	136.2	2.5
KGV 6-20	233	70	4.16	1.6	.0863	1.0	1388.4	20.0
KGV 6-21	937	532	38.90	1.5	.0501	1.9	163.6	2.5
KGV 6-22	344	173	36.77	1.7	.0506	2.8	172.6	2.9
KGV 6-23	1315	133	17.96	1.5	.0539	1.0	349.1	5.0
KGV 6-24	202	94	49.25	2.3	.0551	4.3	127.8	3.0
KGV 6-25	164	92	46.21	2.2	.0494	5.0	138.0	3.1
KGV 6-26	93	55	46.65	2.7	.0511	6.8	136.7	3.7
KGV 6-27	150	80	17.71	1.9	.0539	3.4	354.1	6.7
KGV 6-28	203	93	48.12	2.1	.0466	4.7	133.5	2.8
KGV 6-29	225	83	48.66	2.0	.0476	4.4	127.9	3.0
KGV 6-30	183	92	47.22	2.1	.0439	4.9	132.1	3.2
KGV 6-31	129	70	47.75	2.2	.0499	5.1	130.5	2.9
KGV 6-32	112	43	48.98	2.3	.0506	5.3	130.3	3.0
KGV 6-33	490	301	43.43	1.6	.0490	2.5	146.5	2.4
KGV 6-34	137	53	48.72	2.2	.0488	5.0	129.5	2.8
KGV 6-35	330	113	35.82	1.7	.0501	2.8	177.2	3.0
KGV 6-36	487	256	24.35	1.6	.0512	1.9	259.4	4.0
KGV 6-37	191	60	47.36	2.0	.0486	4.5	134.7	2.7
KGV 6-38	341	198	17.69	1.6	.0551	1.9	353.8	5.5
KGV 6-39	205	82	47.22	2.0	.0503	4.1	134.2	2.7
KGV 6-40	102	52	49.09	2.8	.0507	5.8	128.9	3.6
KGV 6-41	242	190	39.63	1.9	.0500	3.5	160.7	2.9
KGV 6-42	652	414	36.05	1.6	.0494	2.1	176.0	2.7
KGV 6-43	164	95	46.03	2.5	.0514	5.0	138.5	3.5
KGV 6-44	144	60	17.44	1.9	.0552	3.0	360.7	6.7
KGV 6-45	504	32	15.86	1.6	.0543	1.6	393.7	5.9

VGV 1	**U/ppm**	**Th/ppm**	**238U/206Pb**	**±%**	**207Pb/206Pb**	**±%**	**206U/238Pb Age**	**1σ err**
VGV 1-1	184	104	39.23	1.2	.0522	3.5	161.7	2.0
VGV 1-2	223	88	25.65	0.9	.0509	2.5	246.6	2.3
VGV 1-3	65	31	16.52	1.5	.0538	3.7	379.0	5.7
VGV 1-4	178	108	5.69	0.8	.0740	1.2	1044.6	7.9
VGV 1-5	395	98	44.19	1.0	.0479	2.9	144.4	1.4
VGV 1-6	35	11	47.51	3.0	.0511	8.5	133.9	4.0
VGV 1-7	294	115	42.25	1.0	.0525	2.7	150.2	1.4
VGV 1-8	554	531	45.88	0.9	.0485	2.2	139.0	1.3
VGV 1-9	518	270	37.48	0.7	.0497	2.0	169.7	1.2
VGV 1-10	206	78	37.76	1.1	.0519	3.2	168.0	1.9

VGV 1-11	78	35	39.45	1.9	.0535	5.4	160.5	3.1
VGV 1-12	395	429	39.29	0.8	.0490	2.4	162.1	1.3
VGV 1-13	55	23	43.04	2.3	.0487	6.8	148.1	3.4
VGV 1-14	107	44	44.02	1.7	.0514	4.9	144.4	2.5
VGV 1-15	339	200	54.09	1.0	.0510	3.1	117.7	1.2
VGV 1-16	87	39	49.93	1.9	.0543	5.5	126.9	2.5
VGV 1-17	114	57	44.04	1.6	.0531	4.5	144.0	2.3
VGV 1-18	187	83	38.02	1.2	.0514	3.4	166.9	2.0
VGV 1-19	437	424	40.25	0.8	.0496	2.4	158.1	1.3
VGV 1-20	313	191	16.90	0.8	.0548	1.9	370.3	2.9
VGV 1-21	44	15	31.73	2.4	.0534	6.6	199.2	4.8
VGV 1-22	407	216	39.18	0.8	.0673	2.1	158.9	1.4
VGV 1-23	50	24	39.95	2.4	.1075	9.6	148.1	4.3
VGV 1-24	620	383	37.70	0.6	.0500	1.9	168.6	1.1
VGV 1-25	371	203	19.16	1.3	.0541	5.0	327.5	4.2
VGV 1-26	71	29	43.98	1.9	.0492	5.6	144.9	2.7
VGV 1-27	280	151	57.72	2.4	.0526	2.8	110.2	2.7
VGV 1-28	160	73	43.65	1.6	.0526	3.8	145.4	2.4
VGV 1-29	289	223	29.92	0.8	.0517	2.2	211.6	1.7
VGV 1-30	106	56	41.90	1.5	.0505	4.4	151.8	2.3
VGV 1-31	140	50	38.23	1.9	.0542	5.4	165.5	3.2
VGV 1-32	508	281	39.56	0.7	.0501	2.0	160.7	1.1
VGV 1-33	100	47	31.57	1.5	.0528	4.1	200.4	3.0
VGV 1-34	57	16	15.13	1.7	.0546	5.3	412.8	6.8
VGV 1-35	269	107	43.05	1.0	.0487	2.9	148.1	1.5
VGV 1-36	184	78	36.18	1.1	.0495	3.3	175.8	2.0
VGV 1-37	49	58	2.92	1.3	.1176	1.3	1892.5	24.9
VGV 1-38	101	54	4.07	0.9	.0922	1.2	1410.1	13.2
VGV 1-39	402	179	38.64	1.0	.0509	2.3	164.4	1.6
VGV 1-40	114	58	9.91	1.3	.0600	2.1	620.3	7.8
VGV 1-41	78	45	5.09	1.2	.0813	1.7	1151.1	13.2
VGV 1-42	463	241	37.59	0.9	.0488	2.5	169.4	1.5
VGV 1-43	427	515	40.02	0.9	.0490	2.7	159.2	1.5
VGV 1-44	409	225	38.01	0.8	.0503	2.4	167.2	1.4
VGV 1-45	216	154	38.73	1.5	.0497	4.4	164.3	2.5
VGV 1-46	1460	1011	40.32	0.6	.0490	1.9	158.0	1.0
VGV 1-47	162	78	17.47	1.2	.0553	2.9	358.2	4.3
VGV 1-48	259	208	40.64	1.4	.0491	4.1	156.7	2.2
VGV 1-49	23	18	39.11	4.0	.0502	11.8	162.6	6.5
VGV 1-50	134	64	42.93	1.6	.0517	4.7	147.9	2.4
VGV 1-51	86	68	42.51	1.9	.0500	5.4	149.7	2.8
VGV 1-52	136	117	3.35	0.9	.1001	1.0	1689.0	14.5
VGV 1-53	47	17	41.78	2.5	.0553	7.0	151.3	3.9
VGV 1-54	670	350	16.70	0.5	.0537	1.3	375.0	2.0
VGV 1-55	410	361	14.92	0.6	.0553	1.5	418.1	2.6
VGV 1-56	311	70	3.53	0.7	.1009	1.0	1602.7	10.7
VGV 1-57	128	54	38.93	1.6	.0462	4.7	164.1	2.6
VGV 1-58	217	85	39.08	1.2	.0493	3.6	162.9	2.0
VGV 1-59	357	212	6.66	0.6	.0746	1.9	895.3	5.7
VGV 1-60	162	76	42.91	1.5	.0482	4.5	148.6	2.3

VGV 1-61	126	55	42.99	1.6	.0518	4.7	147.7	2.4
VGV 1-62	342	195	37.77	1.1	.0497	3.1	168.4	1.8
VGV 1-63	641	386	36.50	0.7	.0504	1.9	174.1	1.2
VGV 1-64	274	40	42.47	1.1	.0488	3.3	150.1	1.7
VGV 1-65	220	118	5.47	0.8	.0772	1.2	1080.5	8.4

VGV 2	**U/ppm**	**Th/ppm**	**238U/206Pb**	**±%**	**207Pb/206Pb**	**±%**	**206U/238Pb Age**	**1σ err**
VGV 2-1	139	50	42.28	1.5	.0469	4.5	151.1	2.3
VGV 2-2	309	140	58.34	1.1	.0491	3.5	109.5	1.3
VGV 2-3	352	226	55.95	1.1	.0489	3.3	114.1	1.3
VGV 2-4	803	623	40.57	0.6	.0495	2.4	156.9	1.0
VGV 2-5	397	67	41.60	0.9	.0509	2.5	152.8	1.3
VGV 2-6	81	33	40.62	1.9	.0433	5.6	157.9	3.0
VGV 2-7	513	112	5.14	0.4	.1126	0.5	1098.0	8.0
VGV 2-8	413	166	2.66	0.4	.1232	0.4	2067.0	8.9
VGV 2-9	75	26	35.38	1.8	.0520	5.2	179.2	3.2
VGV 2-10	160	70	3.40	0.7	.1005	0.8	1667.4	12.1
VGV 2-11	88	59	1.76	1.0	.2106	0.6	2904.0	44.4
VGV 2-12	551	73	3.75	0.4	.1021	0.5	1509.6	6.5
VGV 2-13	57	25	40.16	2.4	.0541	6.7	157.6	3.8
VGV 2-14	267	146	57.87	1.1	.0510	3.3	110.1	1.2
VGV 2-15	69	30	5.07	1.2	.0808	1.6	1157.7	13.0
VGV 2-16	401	321	46.54	0.9	.0490	2.7	137.0	1.2
VGV 2-17	185	62	31.56	1.2	.0503	3.3	201.0	2.4
VGV 2-18	307	158	38.73	1.0	.0526	2.7	163.7	1.6
VGV 2-19	187	64	15.62	0.9	.0569	2.1	398.9	3.7
VGV 2-20	93	16	11.13	1.2	.0594	2.6	554.3	6.7
VGV 2-21	21	5	22.82	3.1	.0588	7.9	274.2	8.6
VGV 2-22	123	90	3.09	0.9	.1133	0.9	1799.2	16.0
VGV 2-23	230	124	56.37	1.4	.0630	3.8	111.3	1.6
VGV 2-24	34	18	42.68	3.5	.0642	9.5	146.6	5.3
VGV 2-25	53	25	37.22	2.6	.0600	6.8	168.7	4.5
VGV 2-26	99	21	5.92	1.1	.0759	1.7	1002.9	10.9
VGV 2-27	58	12	41.57	2.7	.0507	7.7	152.9	4.2
VGV 2-28	473	442	54.50	1.1	.0669	2.9	114.6	1.3
VGV 2-29	221	171	39.99	1.4	.0506	4.0	159.0	2.2
VGV 2-30	512	48	10.09	0.7	.0657	1.1	604.9	4.0
VGV 2-31	128	77	35.93	2.0	.0510	4.6	176.6	3.5
VGV 2-32	178	97	56.79	1.6	.0515	4.7	112.1	1.8
VGV 2-33	95	47	11.29	1.3	.0596	2.8	546.6	7.2
VGV 2-34	188	316	37.18	1.3	.0524	3.7	170.5	2.3
VGV 2-35	717	200	53.84	0.8	.0481	2.5	118.7	1.0
VGV 2-36	216	117	37.79	1.3	.0519	3.7	167.8	2.2
VGV 2-37	357	152	39.71	1.1	.0491	3.2	160.3	1.8
VGV 2-38	357	139	39.24	1.2	.0529	2.8	161.5	2.0
VGV 2-39	146	75	4.08	0.9	.0909	1.1	1410.3	12.7
VGV 2-40	90	41	3.66	1.2	.0972	1.4	1554.4	18.4
VGV 2-41	224	112	44.01	1.7	.0496	4.2	144.7	2.5
VGV 2-42	103	44	42.55	2.2	.0519	6.3	149.2	3.3
VGV 2-43	75	24	37.98	2.4	.0466	7.4	168.1	4.1

VGV 2-44	317	255	32.27	1.2	.0511	3.3	196.5	2.3
VGV 2-45	414	155	42.77	1.2	.0509	3.4	148.6	1.7
VGV 2-46	174	84	42.48	1.7	.0537	4.7	149.2	2.5
VGV 2-47	560	64	2.65	0.5	.1243	0.5	2069.9	11.0
VGV 2-48	35	18	36.92	3.5	.0652	8.9	169.0	6.1
VGV 2-49	150	119	3.50	1.0	.1006	1.1	1618.6	15.6
VGV 2-50	377	193	56.20	1.3	.0539	3.7	112.9	1.5

VGV 3	**U/ppm**	**Th/ppm**	**238U/206Pb**	**±%**	**207Pb/206Pb**	**±%**	**206U/238Pb Age**	**1σ err**
VGV 3-1	626	663	59.57	0.9	.0500	2.7	107.1	1.0
VGV 3-2	498	414	60.17	0.9	.0498	2.8	106.1	1.0
VGV 3-3	87	31	41.64	1.9	.0480	5.7	153.2	2.9
VGV 3-4	275	282	59.21	1.2	.0482	3.9	108.0	1.4
VGV 3-5	77	29	38.63	2.0	.0481	6.0	165.0	3.3
VGV 3-6	761	904	58.11	0.7	.0495	2.3	109.8	0.8
VGV 3-7	331	300	60.29	1.2	.0509	3.5	105.7	1.2
VGV 3-8	478	590	60.77	1.0	.0478	3.0	105.3	1.0
VGV 3-9	151	62	43.36	1.5	.0508	4.5	146.7	2.2
VGV 3-10	338	229	58.80	1.2	.0492	3.5	108.6	1.3
VGV 3-11	69	41	39.76	2.2	.0513	6.4	159.7	3.6
VGV 3-12	137	81	36.54	1.5	.0487	4.5	174.2	2.7
VGV 3-13	815	1156	56.43	0.8	.0499	2.4	113.0	0.9
VGV 3-14	340	232	57.74	1.2	.0480	3.8	110.7	1.3
VGV 3-15	283	278	59.22	1.3	.0488	4.1	107.9	1.4
VGV 3-16	592	620	58.25	0.9	.0469	2.7	109.9	1.0
VGV 3-17	331	298	57.97	1.2	.0468	3.9	110.5	1.4
VGV 3-18	554	621	57.73	0.9	.0497	2.9	110.5	1.1
VGV 3-19	255	184	58.66	1.4	.0493	4.1	108.8	1.5
VGV 3-20	896	1449	55.54	0.8	.0493	2.3	114.9	0.9
VGV 3-21	103	44	37.83	1.9	.0520	5.4	167.6	3.2
VGV 3-22	530	475	57.54	1.0	.0474	3.1	111.2	1.1
VGV 3-23	119	66	36.51	1.7	.0515	4.8	173.8	3.0
VGV 3-24	242	258	57.52	1.5	.0484	4.4	111.1	1.6
VGV 3-25	390	428	57.92	1.1	.0490	3.4	110.2	1.3
VGV 3-26	447	433	59.98	1.1	.0508	3.2	106.2	1.1
VGV 3-27	232	181	59.24	1.5	.0499	4.5	107.7	1.6
VGV 3-28	137	79	57.02	1.9	.0505	5.9	111.8	2.2
VGV 3-29	249	95	4.26	0.7	.0877	0.9	1358.5	9.2
VGV 3-30	65	22	38.31	2.4	.0500	6.9	166.0	4.0
VGV 3-31	249	264	42.61	1.3	.0530	3.7	148.8	1.9
VGV 3-32	116	114	56.44	2.0	.0520	6.0	112.7	2.3
VGV 3-33	299	296	56.45	1.3	.0488	4.1	113.1	1.5
VGV 3-34	459	445	57.60	1.1	.0494	3.3	110.8	1.2
VGV 3-35	241	164	57.29	1.5	.0466	4.7	111.8	1.7
VGV 3-36	115	37	40.03	2.0	.0492	5.8	159.1	3.2
VGV 3-37	546	400	56.94	1.0	.0493	3.1	112.1	1.1
VGV 3-38	339	377	56.74	1.3	.0480	4.0	112.7	1.5
VGV 3-39	1309	2198	63.26	0.7	.0495	2.0	100.9	0.7
VGV 3-40	598	528	56.50	1.0	.0490	3.0	113.0	1.1
VGV 3-41	131	56	4.98	1.0	.0954	1.4	1156.3	12.3

VGV 3-42	493	344	57.11	1.1	.0499	3.2	111.7	1.2
VGV 3-43	360	295	57.22	1.3	.0512	3.8	111.3	1.4
VGV 3-44	375	278	57.68	1.2	.0516	3.7	110.3	1.4
VGV 3-45	176	120	56.46	1.8	.0535	5.2	112.5	2.0
VGV 3-46	588	622	56.79	1.0	.0470	3.0	112.7	1.1
VGV 3-47	222	187	58.14	1.6	.0520	4.7	109.4	1.8
VGV 3-48	544	447	57.25	1.1	.0461	3.3	111.9	1.2
VGV 3-49	547	442	55.89	1.3	.0500	3.1	114.1	1.5
VGV 3-50	349	244	56.34	1.6	.0533	3.7	112.7	1.8
VGV 3-51	202	174	57.48	1.5	.0496	4.6	111.0	1.7
VGV 3-52	680	896	55.34	1.2	.0430	7.9	116.2	1.5
VGV 3-53	22	8	39.58	3.1	.0559	8.9	159.5	5.0
VGV 3-54	416	325	59.77	0.8	.0465	2.7	107.2	0.9
VGV 3-55	115	80	59.77	1.7	.0483	5.2	106.9	1.8
VGV 3-56	959	646	60.40	0.6	.0511	1.9	105.5	0.7
VGV 3-57	407	337	59.49	1.0	.0474	3.0	107.6	1.0
VGV 3-58	790	1045	59.18	0.7	.0486	2.1	108.0	0.7
VGV 3-59	532	449	59.01	0.9	.0483	2.7	108.3	1.0
VGV 3-60	523	582	56.97	1.0	.0505	2.9	111.9	1.1

VGV 4	**U/ppm**	**Th/ppm**	**238U/206Pb**	**±%**	**207Pb/206Pb**	**±%**	**206U/238Pb Age**	**1σ err**
VGV 4-1	47	16	46.54	2.7	.0585	7.6	135.4	3.7
VGV 4-2	54	21	42.37	2.6	.0554	7.1	149.2	3.9
VGV 4-3	258	78	45.08	1.2	.0501	3.5	141.2	1.7
VGV 4-4	64	21	41.63	2.4	.0508	7.4	152.7	3.6
VGV 4-5	65	23	45.36	2.4	.0532	7.4	139.8	3.3
VGV 4-6	360	179	38.88	0.9	.0477	2.7	164.0	1.5
VGV 4-7	254	121	10.25	0.7	.0603	1.5	599.9	4.4
VGV 4-8	49	18	44.76	2.7	.0528	9.6	141.7	4.0
VGV 4-9	543	161	59.36	1.0	.0479	3.0	107.7	1.0
VGV 4-10	152	51	43.66	1.6	.0489	4.7	146.0	2.4
VGV 4-11	125	70	39.91	1.7	.0484	5.0	159.7	2.7
VGV 4-12	96	41	42.74	1.9	.0550	5.3	148.0	2.9
VGV 4-13	93	37	42.74	2.0	.0529	5.7	148.4	3.0
VGV 4-14	411	312	40.80	1.0	.0483	2.8	156.3	1.5
VGV 4-15	139	95	39.84	1.7	.0541	4.7	158.9	2.7
VGV 4-16	155	98	43.85	1.6	.0548	4.5	144.3	2.3
VGV 4-17	136	67	42.09	1.7	.0551	4.8	150.2	2.6
VGV 4-18	99	59	43.05	2.0	.0521	5.6	147.5	2.9
VGV 4-19	160	44	41.68	1.5	.0506	4.4	152.6	2.3
VGV 4-20	547	165	44.60	0.9	.0521	2.5	142.4	1.2
VGV 4-21	141	111	4.89	0.8	.0805	1.2	1198.4	9.9
VGV 4-22	30	12	42.82	3.2	.0672	8.7	145.5	4.8
VGV 4-23	120	56	43.71	1.7	.0518	5.0	145.3	2.5
VGV 4-24	116	40	44.54	1.7	.0536	4.8	142.3	2.4
VGV 4-25	66	25	43.35	2.2	.0503	6.5	146.8	3.3
VGV 4-26	128	51	46.12	2.0	.0574	7.2	136.8	2.8
VGV 4-27	91	36	44.44	2.2	.0500	6.5	143.3	3.1
VGV 4-28	112	56	41.14	1.5	.0501	4.3	154.7	2.3
VGV 4-29	187	122	44.15	1.3	.0506	3.8	144.1	1.9

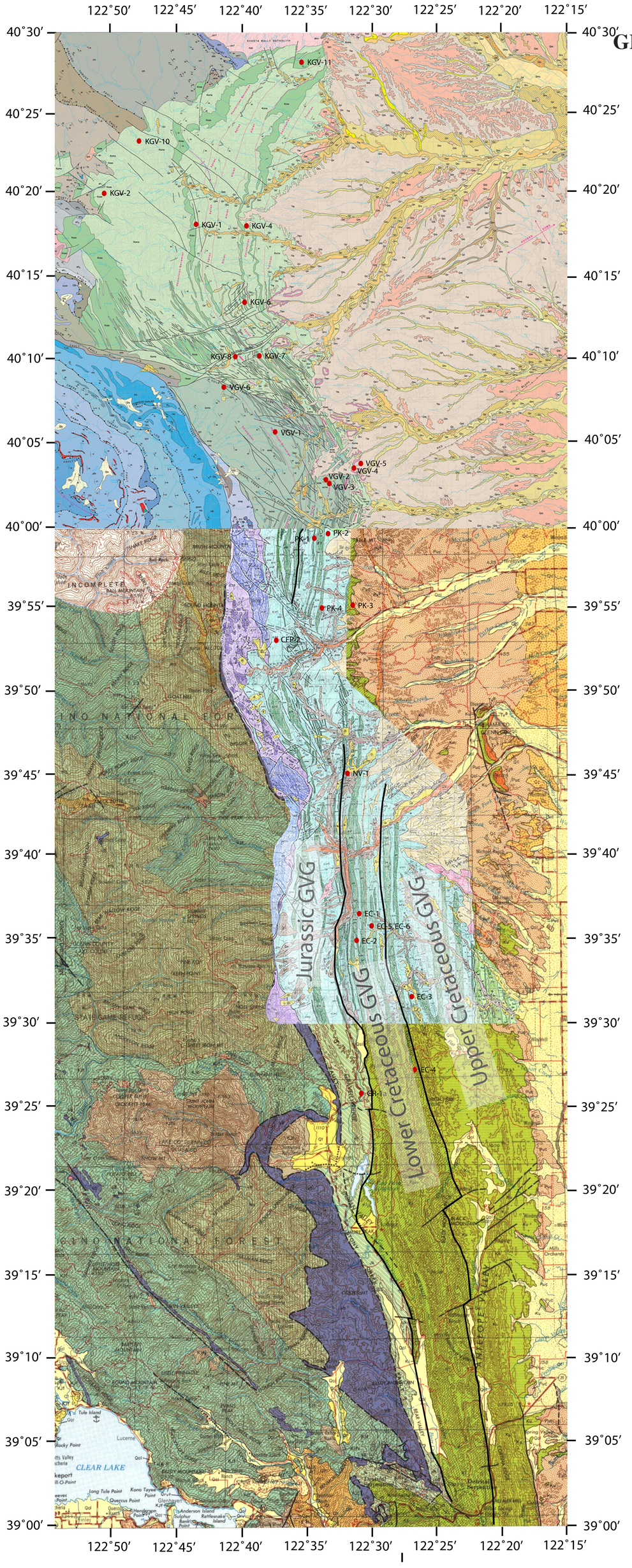
VGV 4-30	122	50	43.46	1.8	.0525	5.0	146.0	2.6
VGV 4-31	74	26	46.32	3.0	.0592	8.7	135.9	4.2
VGV 4-32	38	12	46.09	3.4	.0806	8.2	132.9	4.6
VGV 4-33	47	27	44.74	3.0	.0670	7.8	139.3	4.3
VGV 4-34	87	23	44.61	2.3	.0586	6.5	141.2	3.3
VGV 4-35	98	37	42.43	2.2	.0590	9.3	148.3	3.4
VGV 4-36	124	28	43.60	2.0	.0564	5.4	144.8	3.0
VGV 4-37	48	17	44.92	2.6	.0509	7.5	141.6	3.7
VGV 4-38	219	71	43.34	1.2	.0508	3.5	146.7	1.8
VGV 4-39	78	39	40.78	2.0	.0463	6.0	156.7	3.2
VGV 4-40	98	33	45.04	1.8	.0544	5.2	140.6	2.6

GEOLOGIC MAP OF THE RED BLUFF 30' × 60' QUADRANGLE, CALIFORNIA

By

M.C. Blake, Jr., D.S. Harwood, E.J. Helley, W.P. Irwin, A.S. Jayko, and D.L. Jones

1999



LIST OF MAP UNITS

[See Description of Map Units (in pamphlet) for complete unit descriptions]

SACRAMENTO VALLEY–CASCADE RANGE PROVINCE

Sedimentary rocks

- t — **Dredge tailings (Holocene)**
- Qsc — **Stream channel deposits (Holocene)**
- Qa — **Alluvium (Holocene)**
- Qo — **Overbank deposits (Holocene)**
- Qao — **Alluvial and overbank deposits, undivided (Holocene)**
- Qb — **Basin deposits (Holocene)**
- **Modesto Formation (Pleistocene)**—Divided into:
  - Qmu — **Upper member**
  - Qml — **Lower member**
- **Riverbank Formation (Pleistocene)**—Divided into:
  - Qru — **Upper member**
  - Qrl — **Lower member**
- Qrb — **Red Bluff Formation (Pleistocene)**
- Tog — **Older gravel deposits (Pleistocene and (or) Pliocene)**
- Tte — **Tehama Formation (Pliocene)**—Locally includes:
  - Tten — **Nomlaki Tuff Member**
- Tc — **Channel deposits (Pliocene and (or) Miocene)**
- Kc — **Chico Formation (Late Cretaceous)**

Volcanic rocks

- **Basaltic rocks of Inskip Hill volcanic center (Holocene)**—Divided into:
  - Qlp — **Basalt flow of Paynes Creek**
  - Qlu — **Basalt flows of Inskip Hill and Soap Butte, undivided**
- **Basaltic rocks of Black Butte volcanic center (Holocene)**—Divided into:
  - Qbc — **Cinder deposits**
  - Qbb — **Basalt flow of Black Butte**
- Qtbb — **Basalt near Tuscan Buttes (Holocene and (or) Pleistocene)**
- Qab — **Hypersthene andesite of Brokeoff Mountain (Pleistocene)**
- Cc — **Rockland ash bed of Sarna-Wojcicki and others (1982) (Pleistocene)**
- **Basalt flows of Shingletown Ridge (Pleistocene)**—Divided into:
  - QsfG — **Flow 3**
  - QsfF — **Flow 2**
  - QsfE — **Flow 1**
- Qeb — **Olivine basalt of Eagle Canyon (Pleistocene)**
- Qbd — **Olivine basalt of Devils Half Acre (Pleistocene)**
- Qcb — **Basalt of Coleman Forebay (Pleistocene)**
- QTa — **Andesite (Pleistocene and (or) Pliocene)**
- **Tuscan Formation (Pliocene)**—Divided into:
  - Ttu — **Undivided part**
  - Ttd — **Member D**
  - Tth — **Tuff member of Hogback Road**
  - Ttc — **Member C**
  - Tti — **Ishi Tuff Member**
  - Ttb — **Member B**
  - Tta — **Member A**
  - Ttn — **Nomlaki Tuff Member**
- Taa — **Basaltic andesite of Antelope Creek (Pliocene)**

SACRAMENTO VALLEY–WESTERN FOOTHILLS PROVINCE

- **Overlap assemblage (Late and Early Cretaceous)**—Divided into:
  - Koms — **Mudstone**
  - Koss — **Sandstone and conglomerate**
- **Elder Creek terrane**—Divided into:
  - ecms — **Mudstone (Early Cretaceous and Late Jurassic)**
  - ecss — **Sandstone and conglomerate (Early Cretaceous and Late Jurassic)**
- **Coast Range ophiolite (Late and Middle Jurassic)**—Divided into:
  - ecg — **Layered gabbro**
  - ecu — **Layered ultramafic rocks**
  - gb-ecsp — **Round Mountain serpentinite melange and blocks of gabbro**

COAST RANGES PROVINCE

- Qls — **Landslide deposits (Holocene and Pleistocene)**
- Qg — **Glacial deposits (Pleistocene)**
- **Pickett Peak terrane**—Divided into:
  - pzb-ppsm — **South Fork Mountain Schist and large bodies of metabasalt (Early Cretaceous, metamorphic age; protolith age unknown)**
  - mv-ppv — **Valentine Spring Formation of Worrall (1981, 1982) and minor amounts of meta-volcanic rock (Early Cretaceous, metamorphic age; protolith age unknown)**
- **Yolla Bolly terrane**—Divided into:
  - ybt — **Taliaferro Metamorphic Complex of Suppe (1972) (Early Cretaceous to Middle Jurassic?)**
  - ch-ybc, gs- — **Chicago Rock melange, blocks of greenstone, and lenses of chert (Early Cretaceous to Middle Jurassic)**
  - ch-ybh, sp- — **Metagraywacke of Hammerhorn Ridge, lenses of chert, and scarce serpentinite (Early Cretaceous to Middle Jurassic)**
  - ch-ybd — **Broken formation of Devils Hole Ridge and blocks and lenses of chert (Early Cretaceous to Middle Jurassic)**

KLAMATH MOUNTAINS PROVINCE

- Qls — **Landslide deposits (Holocene and Pleistocene)**
- Tog — **Older gravel deposits (Pleistocene and (or) Pliocene)**
- Ko — **Overlap assemblage (Early Cretaceous)**
- Ksb — **Shasta Bally batholith (Early Cretaceous)**
- **Western Klamath terrane**—Consists of:
  - **Smith River subterrane**—Divided into:
    - srs — **Metasedimentary rocks (Late Jurassic?)**
    - srv — **Metavolcanic rocks (Late Jurassic?)**
- **Hayfork terrane**—Consists of:
  - **Western Hayfork subterrane of Wright (1982) (Middle Jurassic)**—Divided into:
    - whE — **Unit 1**
    - whF — **Unit 2**
    - whG — **Unit 3**
    - whI — **Unit 4**
    - whu — **Undivided part**
  - **Plutonic rocks**—Divided into:
    - whpb — **Basin Gulch pluton (Middle Jurassic)**

Scale 1:250,000

5 0 5 10 15 20 Statute Miles

5 0 5 10 15 20 25 30 Kilometers

CONTOUR INTERVAL 200 FEET
WITH SUPPLEMENTARY CONTOURS AT 100 FOOT INTERVALS

Contact
(Dashed where approximately located; gradational or inferred)

Fault
(Dashed where approximately located)

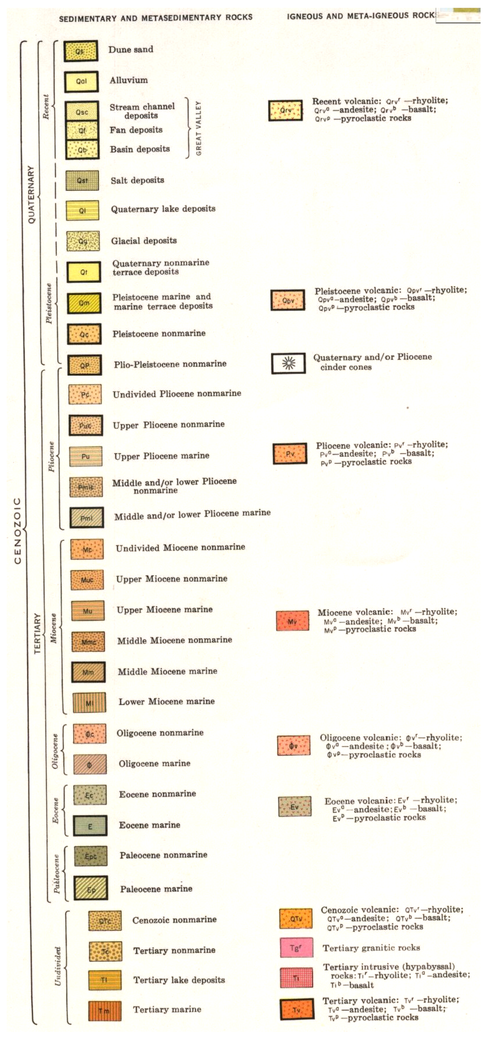
GEOLOGIC MAP OF CALIFORNIA

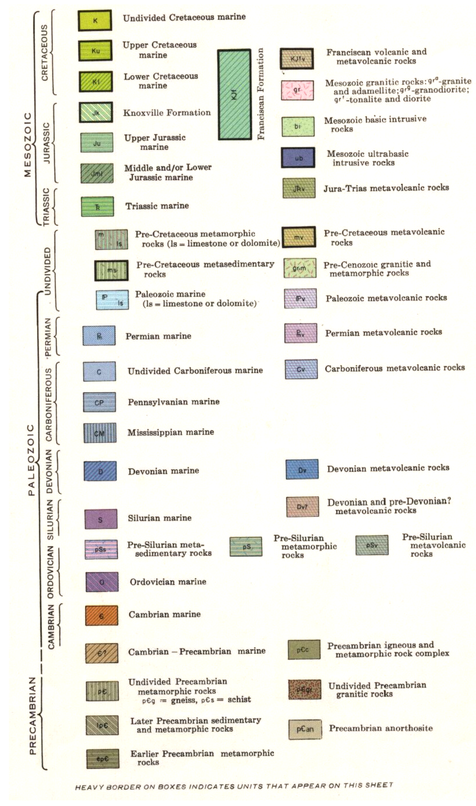
OLAF P. JENKINS EDITION

UKIAH SHEET

COMPILATION BY CHARLES W. JENNINGS AND RUDOLPH G. STRAND 1960

THIRD PRINTING, 1992





HEAVY BORDER ON BOXES INDICATES UNITS THAT APPEAR ON THIS SHEET

Plate 1: This plate is a compliation of maps 3 maps, Ukiah (Jennings and Strand, 1960), Red Bluff (Blake et al., 1999), and Willows (Blake et al., 2002). This map was put together to provide a much more detailed view of Great Valley Group geology. It also shows much more distinctly where samples were taken from. Detrital zircon and petrographic samples are denoted by red dots with the sample names. Two of my samples are out of the range of map, PC-1 and SM-1.