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QUARTZ NORMATIVE PLUTONIC ROCKS OF
INTERIOR ALASKA AND THEIR FAVORABILITY FOR
ASSOCIATION WITH GOLD

By
Laurel E. Burns, Rainer J. Newberry, and Diana N. Solie

STATE OF ALASKA
Department of Natural Resources
DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS

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QUARTZ NORMATIVE PLUTONIC ROCKS OF INTERIOR ALASKA AND THEIR FAVORABILITY FOR ASSOCIATION WITH GOLD

By

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INTRODUCTION

Several plutonic bodies in interior Alaska are known to host gold-bearing veins; several others are spatially associated with gold-bearing veins, hornfels, skarns, and gold placers. Moreover, recent new discoveries of gold-bearing and gold-associated plutons in interior Alaska have highlighted the possibility that unknown gold deposits exist.

To facilitate the exploration process, a tool to determine the likely gold potential for little-explored plutons in the area was needed. In this paper, the gold potential for interior Alaska plutonic rocks is investigated by applying discriminant functions developed by Newberry and Burns (1989) for major-element analyses. The discriminant functions statistically determine the extent to which the composition of an unaltered Alaskan plutonic rock resembles major-oxide compositions of unaltered plutonic rocks associated with gold deposits elsewhere in the world. Hence, a discriminant score generally predicts the favorability of a given pluton for associated lode- or placer-gold deposits. However, the discriminant equations are not applicable to the pervasively altered plutonic rocks characteristic of porphyry Cu-Mo deposits.

To accomplish this project, both new and published major-oxide and trace-element analyses of plutonic rocks in interior Alaska were compiled (apps. 1, 2). These data have been combined with plutonic outlines and contacts as published in geologic maps (sheet 1), and with published geochronological dates on the plutons to further understand the plutonic-related gold potential in interior Alaska (sheet 2). The gold discriminant scores are included on sheet 2.

DATA FROM PLUTONS IN INTERIOR ALASKA

Whole-rock chemical analyses for major oxides and selected trace elements were compiled from published and unpublished reports. New analytical data from both old and new samples were generated and added to the compilation (apps. 1, 2). Many of the new samples were obtained from the collections of the United States Geological Survey, collected by Florence Weber, Helen Foster, Terry Keith, and Rick Wilson. The cooperation of these individuals for the use of these samples is gratefully acknowledged. Additional new data are from samples collected by Thomas E. Smith (DGGs) and by Rainer Newberry (University of Alaska - Fairbanks). Sources of previously published data are listed in appendix 3. Pluton map outlines (sheets 1, 2) are adapted from published maps that are listed in the references.

Previously unanalyzed samples were tested by X-ray Assay Laboratories, Don Mills, Ontario, Canada, except for samples with 88RN prefixes, which were analyzed by Bondar-Clegg, Vancouver, British Columbia, Canada. Many of these new data were released as DGGs Public-data Files 90-13 and -16, on the Big Delta and Eagle Quadrangles, respectively.

Ages of the plutons, mainly based on K-Ar analyses, are compiled from published references (app. 4) with some previously unpublished dates contributed by Smith. Radiometric dates, compositional data, and plutonic outlines of the Mississippian gneiss domes (Dusel-Bacon and Aleinikoff, 1985) are not included in this study.

DISCRIMINANT ANALYSIS FOR "NONPORPHYRY" PLUTONIC GOLD POTENTIAL

The concept that plutonic rocks have distinctive major-oxide and trace-element signatures when associated with particular types of ore deposit is not new. Many geologists accept that plutonic tin deposits are associated

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with so-called tin granites (Taylor, 1979), characterized by highly fractionated chemistry and a low oxidation state (Swanson and others, 1988). On the basis of both major- and minor-element chemistry, Chatterjee and others (1983) used discriminant analysis to distinguish between Sn- and U-favorable granites in Nova Scotia. Similarly, AMAX geologists determined in the 1970s that many porphyry molybdenum deposits are associated with high-silica rhyolites exhibiting a characteristic major- and trace-element signature (White and others, 1981).

The current study originated by hypothesizing that if the gold in plutonic-related gold deposits (for example, Au-rich skarns) were truly pluton-derived, the plutonic rocks would probably have a diagnostic major-element and trace-element chemistry (Leveille and others, 1988). Performing discriminant analysis on hundreds of chemical analyses of unaltered plutonic rocks from around the world—both spatially associated and not spatially associated with gold deposits—indicated that discriminant equations could be created that effectively separated gold-associated plutons from nongold-associated plutons for a wide range of compositions, from diorite to granite (terminology used herein from Streckeisen, 1973).

To develop the discriminant functions, Newberry and Burns (1989) stored major-oxide compositions of 655 quartz normative plutonic rocks from about 150 geographic locations in a computer database. About 40 percent of the rocks in the database were known to be related to lode-gold or placer-gold deposits. By using a statistical discriminant program, the computer created equations (technique discussed further in app. 5), based on the chemical analyses in the database, that predicted to what extent an unaltered plutonic rock composition resembled compositions of plutonic rocks elsewhere associated with gold deposits. The subset of variables that yielded the best success rate included SiO_2 , Al_2O_3 , Fe_2O_3 , FeO , MgO , CaO , Na_2O , K_2O , $\text{Fe}_2\text{O}_3/\text{FeO}$, and an alkalinity term 'A', where $A = \text{Na}_2\text{O} + \text{K}_2\text{O} + 16 \cdot (0.372 \cdot \text{SiO}_2)$.

The statistical method that worked well in predicting the association or nonassociation of plutons with gold produced quadratic equations; hence, the detailed interaction of variables can not be easily described. However, the major discriminating factor for separating gold from nongold associated plutons was the oxidation ratio ($\text{Fe}_2\text{O}_3/\text{FeO}$), which has also been noticed by others (Leveille and others, 1988). In our collection of worldwide data, 94 percent of the nongold plutons had a $\text{Fe}_2\text{O}_3/\text{FeO} > 0.6$, whereas 87 percent of the gold-related quartz normative plutons had a $\text{Fe}_2\text{O}_3/\text{FeO} < 0.6$ (low oxidation state). The overlapping analyses are most easily classified as gold or nongold by quadratic discriminant analysis.

We thus use the discriminant functions to predict which plutons are likely to be associated with gold but can give the reader no easy way, other than the oxidation ratio, to determine what the discriminant functions are doing. This unalterable fact lends this report a "black-box" quality that we can currently do nothing about. We can only state that we are satisfied, on the basis of the low error rates (app. 5), that the set of discriminant equations Newberry and Burns (1989) developed can be used to predict the likelihood of gold association for unaltered rock samples from quartz-normative plutons, and that it predicts more accurately than by using the oxidation ratio only.

LIMITATIONS ON THIS PARTICULAR SET OF DISCRIMINANT FUNCTIONS

Several important limitations concerning the applicability of these particular discriminant equations to random plutonic rocks must be emphasized. First, the chemical effects of alteration on the original magmatic composition of a rock causes major complications; only analyses from relatively unaltered rocks can be used. Second, the pervasive alteration characteristics of "porphyry-type" deposits makes their chemical signatures somewhat different from those of other plutonic rocks (Leveille and others, 1988); hence, rocks from these deposit types are not applicable to this particular discriminant analysis. The term "nonporphyry" plutonic discriminant was adopted as a shorthand notation herein for the plutonic rock analyses applicable to this study. Third, although many alkalic (nepheline-normative) plutons are associated with gold deposits, they seem to follow somewhat different chemical patterns than quartz-normative gold-associated plutons; hence, only quartz-normative plutonic rocks were included in the discriminant analysis. Fourth, plutons showing evidence for strong chemical fractionation, as indicated by high levels of incompatible elements such as Rb, Li, and Y, are rarely associated with gold deposits (Leveille and others, 1988). Analyses with known high levels of these elements were not included in the database, but unfortunately, such trace-element data are not generally available. Inclusion of some of these high-Rb, nongold-associated granites in the database could be a source for minor errors concerning

granites associated with gold; however, because these rocks form a very minor part of the database, it should not be a cause for major concern. Fifth, aplites do not appear favorable in the discriminant analysis, even if from a gold-rich system.

Several compositional restrictions help to determine which rocks are either too altered to be used with the current set of discriminant equations or are too evolved to be associated with major gold deposits. These restrictions were used for the database and include the following:

1. Normative corundum must be less than 3; values higher than 3 generally indicate altered rocks.
2. $Y > 0$ and < 50 where $Y = (100 * \text{normative quartz}) / (\text{normative quartz} + \text{normative feldspars})$; values above 50 represent altered or nonigneous rocks.
3. Acmite, hematite, Na-metasilicate, or Ca-metasilicate, indicative of altered rocks, must not be present in the norm.
4. Rb content, if known, must be less than 400 ppm.

An analysis that does not conform to the first three criteria may still come from a plutonic system that produced gold, but it would be too altered to be analyzed with the existing set of discriminant equations. The fourth criteria, involving high Rb, indicates that the rocks have undergone a high degree of chemical evolution and hence are not likely to be associated with gold deposits (Leveille and others, 1988). Unfortunately, the Rb content is not generally available, and some discriminant scores for granites with high Rb contents are probably reported in appendix 3. However, our experience with the discriminant scores from rocks with Rb levels > 400 ppm shows these discriminant scores are always very low (generally less than 52; scoring discussed below) and reflect the low probability that they are associated with gold.

INTERPRETATION OF THE DISCRIMINANT-ANALYSIS RESULTS

The result of a discriminant function is a number between 0 and 100; a score of 100 indicates that the composition of the sample is indistinguishable from those of the nonporphyry gold-associated pluton composition data set; a score of 0 indicates the opposite. The score is not directly proportional to the amount of gold present, but is a good estimate of whether the sample belongs to a plutonic system that had the capability of depositing some gold.

The posterior probability shown herein (fig. 1; sheet 2; app. 3) is an average of discriminant scores from the set of five discriminant functions of Newberry and Burns (1989). We view these average posterior probabilities in the following light:

- values over 95 - excellent probability for association with nonporphyry gold,
- values over 80 - probably associated with gold,
- values above 60 - possibly an altered rock from a good gold system or an unaltered rock from a gold-poor system,
- values below 60 - probably not associated with nonporphyry gold.

In addition, our experience indicates that when two analyses are available from one pluton that have widely varying scores, such as 95 and 0, it is probable that one or both of the analyses is not representative of the pluton. For example, one sample might be from an aplite dike (which usually classifies as unfavorable) or a lamprophyre dike (usually classifies as favorable) with the other coming from the main plutonic body. Alternatively,

Figure 1. *Gold favorability as predicted by the discriminant functions of all available analyses from interior-Alaska plutons.*

mineralogical alteration might cause the chemical analysis to appear more favorable (for example, by lowering the $\text{Fe}_2\text{O}_3/\text{FeO}$ ratio) or less favorable (for example, by raising the ratio). It may be possible to determine, by examination of the major- and minor-element analysis, if alteration is a problem.

The areal extent of a pluton should be considered in assessing the meaning of a given Discriminant score because pluton-related gold deposits, as with other plutonic-related deposit types (such as Sn and Mo), appear to be concentrated in the country rock just above the pluton or in the uppermost part of a pluton; also, the areal extent of plutonic exposure generally increases with depth into a given pluton. In the case of tin deposits on the Seward Peninsula, for example, Swanson and others (1988) have shown that the ratio of lode- to placer-tin production is inversely related to the areal extent of the associated tin granite. A similar relationship might be expected for gold-related plutons. For example, in the Fairbanks area the 35-sq-km Gilmore Dome and the 10-sq-km Pedro Dome plutons are drained by major gold placers and surrounded by a small number of gold-bearing veins, but themselves contain few known gold-bearing veins. In contrast, the 2.5-sq-km Monte Cristo pluton near Fairbanks is drained by a few small gold placers, and contains the 4 to 6 million-oz (geologic resource) Fort Knox deposit. Similar logic applied to other areas in interior Alaska would indicate that the vicinity of a large "gold-favorable" pluton might be favorable for plutonic-related gold (most likely placer), even though the pluton itself might contain little gold. However, a given "favorable" pluton with a very large areal extent would probably be unfavorable for either lode or placer gold.

DISCUSSION

Compositional data, shown on a normative compositional diagram, show that quartz normative plutons in interior Alaska range from diorite to alkali-feldspar granite (fig. 2). Our sample data indicate(s) that the majority of plutonic rocks in the interior are granodiorite and granite.

Figure 2. Streckeisen-LeMaitre (1979) diagram showing normative mineral compositions of plutonic rocks in interior Alaska. Nepheline normative analyses excluded. Rock names are: 2 - alkali-feldspar granite; 3 - granite; 4 - granodiorite; 5 - tonalite; 6 - alkali-feldspar quartz syenite; 7 - quartz syenite; 8 - quartz monzonite; 9 - quartz monzodiorite; 10 - quartz diorite; 11 - alkali-feldspar syenite; 12 - syenite; 13 - monzonite; 14 - monzodiorite; 15 - diorite and gabbro.

Compositions of rocks in interior Alaska predicted to be strongly or moderately associated with gold are shown in figure 3. The plutons in interior Alaska that were predicted by the discriminant functions to be associated with gold deposits span the range in composition; however, two major compositions of plutons and dikes seem to be most gold-favorable in the interior. Most plutons with strong gold favorability (scores above 95) have compositions of or near granodiorite (fig. 3). Most other rocks with very favorable compositions for gold association contain less than 20 normative quartz*100/(normative quartz + feldspars) (fig. 3); almost all rocks of the interior with a low normative quartz/(normative quartz + feldspars) content are predicted to be very strongly gold-favorable and have scores greater than 99.9. Most of these analyses are from dikes.

Figure 4 shows compositions of interior Alaska rocks that are either not predicted to be associated with gold or are associated with a very weak gold system. Importantly, figure 4 shows that not all granodiorites or all low-normative quartz rocks appear favorable for gold. This is probably a function of the plutonic oxidation state—a lower oxidation state may favor gold enrichment (Leveille and others, 1988)—and may also be related to chemical variables not yet understood.

Since Triassic time, three major periods of plutonism have occurred in the interior: early Tertiary-Late Cretaceous, Early to mid-Cretaceous, and Early Jurassic (fig. 5; app. 4) and have been noted by other workers (Wilson and others, 1985). Gold favorability appears to vary with pluton age (figs. 6a-c). The Early to mid-Cretaceous plutons in the study area generally appear much more favorable for gold than the early Tertiary-Late Cretaceous plutons. Data are available for only two Jurassic plutons; one of these appears favorable for gold association.

Figure 3. Streckeisen-LeMaitre (1979) diagram showing fields of plutonic rocks predicted by the discriminant functions to have moderate to very good gold favorability. Field outlined by solid line with hatchures contains most samples predicted to have very good gold favorability (discriminant score more than 95); field outlined by dashed line contains most samples predicted to have moderate to good gold potential (discriminant score between 80 and 95). Numbers, shown where data points plot away from most analyses, are: 9 - discriminant score greater than 99.9; 4 - discriminant score between 95 and 99.9; and 3 - discriminant score between 80 and 95. Scoring discussed in text. Diagram nomenclature as in figure 2.

The average composition of each dated pluton shows that the early Tertiary-Late Cretaceous plutons are generally more evolved than the Early to mid-Cretaceous plutons (figs. 7a-c). Granites and alkali granites are more common in Tertiary time, whereas granodiorites are more common in mid-Cretaceous time. The diagram also shows that granodiorites of early Tertiary-Late Cretaceous age are favorable for gold association, despite their young age. This suggests that the most important factor for gold association in the interior is composition; a Tertiary date does not necessarily indicate poor gold potential. However, more Early to mid-Cretaceous plutons than early Tertiary-Late Cretaceous plutons have the right compositions to yield high gold favorability. Not enough data are available for Jurassic plutons to draw strong conclusions about their gold potential or even their composition. The Jurassic pluton with a low average normative quartz/(quartz + feldspars) does have a moderately favorable gold score.

The discriminant scores correlate well with the presence or absence of known lode or placer gold. Plutonic rocks in major gold districts (Fairbanks, Circle, Richardson, Fortymile areas) tend to have high scores, whereas plutonic rocks in areas lacking gold deposits (for example, the Tanacross - northern Nabesna Quadrangles and the southern Eagle Quadrangle) tend to have low ones. There are also large areas where plutonic rocks show high favorability scores, but where little gold is known to be associated (for example, much of Big Delta Quadrangle). Some of this we interpret as due to deep levels of erosion, especially in the area between the Shaw Creek fault and the Harper lineament, where plutonic bodies 30 to 60 km across are present, probably representing erosional levels at least 3 to 5 km below the plutonic cupolas. In other cases, insufficient exploration may account for the lack of known gold. For example, sampling by DGGs in the upper Chena area (Albanese, 1984) indicated the

Figure 4. Streckeisen-LeMaitre (1979) diagram showing fields of plutonic rocks predicted by the discriminant functions to have poor to absent gold favorability. Field outlined by solid line and hachures contains most of the samples which had a discriminant score less than 60; the two fields outlined by dashed lines contain most of the samples which had a discriminant score between 60 and 80. Numbers, shown where data points plot away from most analyses are: 0 - discriminant score less than 25; 1 - discriminant score between 25 and 60; 2 - discriminant score between 60 and 80. Scoring discussed in text. Diagram nomenclature as in figure 2.

Figure 5. Histogram showing available K-Ar dates and one Rb-Sr date on interior-Alaska plutons younger than Triassic. Sources for the data are given in appendix 4. Divisions for the age data used in this report are based on this diagram: early Tertiary-Late Cretaceous, 50-78 Ma; Early to mid-Cretaceous, 85-136 Ma; and Early to Middle Jurassic, 174-198 Ma.

Figures 6a-c. Histograms showing average gold favorability scores for (a) Early to Middle Jurassic, (b) Early to mid-Cretaceous, and (c) early Tertiary-Late Cretaceous plutons of the interior. Where more than one analysis or date was available from one pluton, the favorability score and the ages were each averaged, so that each pluton has only one symbol.

Figures 7a-c. Sireckeisen-LeMaitre (1979) compositional diagram showing average gold favorability scores for (a) Early to Middle Jurassic, (b) Early to mid-Cretaceous, and (c) early Tertiary-Late Cretaceous plutons for average composition of each dated pluton. Numbers are: 9 - discriminant score greater than 99.9; 4 - discriminant score between 95 and 99.9; 3 - discriminant score between 80 and 95; 2 - discriminant score between 60 and 80; 1 - discriminant score between 30 and 60; 0 - discriminant score between 0 and 30. Scoring discussed in text. Fields as in figure 2.

presence of gold-bearing skarn, vein, and hornfels in an area not previously recognized as gold favorable. These gold-bearing samples surround plutons for which our statistical analysis indicates have high gold favorability.

Although a detailed discussion of the various plutons and gold relations in the study area is beyond the scope of this report, a short synopsis of the major granodiorite-granite plutons and a discussion of the low quartz normative rocks is informative.

FAIRBANKS AREA

Many analyses for two moderately large plutons, Gilmore and Pedro Domes, in this major gold producing district were available. Both of these plutons intruded at about 90 Ma. Plots of favorability scores on a normative compositional diagram show that the less evolved rocks tend to be rated more favorably for gold (figs. 8a-c). Once the composition changes from granodiorite to granite, the calculated gold potential drops, indicating that the discriminant equations tend to favor the more mafic rock types. This might indicate a problem in the original data sets used to create the discriminants or it might indicate that granite *per se* is generally unfavorable for gold. If the latter hypothesis is correct, a major release of gold-bearing fluids might occur near the change from granodiorite to granite. Of further interest in the scores of Gilmore Dome pluton is that the high scores are in two concentrated areas (sheet 2). One of these high-favorability areas was mapped by Blum (1983) as being a distinct unit - granodiorite. The other cluster of high favorability scores occurs in the northwestern part of the Gilmore Dome pluton; the geochemical analyses of this area also suggest granodiorite composition. Thus, many large plutons of basically one age may contain several units of varying gold favorability.

Chemical analyses for the smaller Monte Cristo pluton, which hosts the Fort Knox gold deposit, yield high favorabilities for plutonic related gold, with posterior probabilities of 97.4 percent and 68.2 percent. Petrographic examination indicates that the latter sample is more abundantly chloritized, which may explain the low score. Interestingly, both samples were collected long before the gold deposit was known to exist and the two samples were collected in a manner identical to other samples from the Fairbanks area.

GARDINER PLUTON

The only known Cretaceous pluton that has uniformly poor gold favorability scores is the Gardiner pluton, southeast of Tok (fig. 9). All chemical samples and the two K-Ar dates are from the southwestern edge of the large area mapped as one pluton (sheet 1). Although the Gardiner rocks exhibit a moderately high $\text{Fe}_2\text{O}_3/\text{FeO}$ ratio (0.5 to 1.0, compared to values of 0.1 to 0.3 typical of Fairbanks area plutons), the values are not too high to generate a favorable gold potential score. This suggests that several (possibly independent) compositional variables are important in the gold discriminant functions. There are no known lode or placer gold deposits near the Gardiner pluton.

TOK-TETLIN PLUTON

This Cretaceous pluton contains quartz monzonites and quartz monzodiorites with compositions strongly predicted to be similar to gold-related plutons (fig. 10). The two granite analyses are less favorable, suggesting again that the gold potential decreases with chemical evolution. The Tok-Tetlin pluton is very large (100 sq km exposed), and any associated gold deposits may have been eroded away long ago. There are some small lode-gold (Berg and Cobb, 1968) and placer-gold (Cobb, 1973) occurrences on the north and northwest margins of the pluton. Cobb (1973) speculates that some of the Tertiary conglomerate-hosted gold of the Chistochina district has been derived from a source north of the Denali fault and east of the Chistochina district. The Tok-Tetlin pluton could be such a source.

HOPE SUITE

The Lime Peak, Quartz Creek, and Mount Prindle plutons, referred to by Burns and Newberry (1987) as the Hope Suite, crop out northeast of Fairbanks and have ages near 60 Ma. These granite plutons are known to be associated with small tin occurrences (Menzie and others, 1983; Burton and others, 1985; Newberry, 1987). Rb

Figure 9. Gold-favorability scores for the Gardiner pluton, southeast of Tok, shown on a Streckeisen-LeMaitre (1979) diagram. Fields as in figure 2; numbers as in figures 7a-c.

Figure 10. Gold-favorability scores for the Tok-Tetlin pluton, south of Tok, shown on a Streckeisen-LeMaitre (1979) diagram. Fields as in figure 2; numbers as in figures 7a-c.

values are commonly > 400 ppm, indicating a poor gold potential; the set of discriminant functions was only applied to samples with Rb < 400. The samples with Rb < 400 yielded low discriminant scores.

Diorite dikes (which are not numerous) yield the only favorable gold scores within the plutons (fig. 11). Gold is only about 10 ppb in veins, hornfels, and skarns surrounding these plutons. Thus, the placer gold present south of the Mount Prindle pluton probably is related to either nearby alkalic plutons or to a nonplutonic source instead of the Mount Prindle pluton.

CIRCLE HOT SPRINGS AND TWO-BIT PLUTONS

Geologic mapping and K-Ar dating by Wilkinson (1987) indicated two major plutonic units in the Circle district: a 77-Ma granodiorite-granite unit (Two-bit pluton) and a 59-Ma granite and alkali-feldspar granite unit (Circle Hot Springs pluton). The Two-bit pluton is less evolved than the Circle Hot Springs pluton, and although chemical analyses from both plutons yield both high and low gold favorabilities, the scores from the Two-bit pluton are generally higher (fig. 12). Many analyses from the younger pluton have high Rb; correspondingly, the discriminant functions predict very low favorability for gold. These scores are not shown on sheet 2 and appendix 2 in accordance with the Rb criteria for the discriminant functions, but are all less than about 50. Mafic dikes, similar to those in the Hope Suite, were favorable for gold. Gold-bearing, altered, granitic rock crops out near Miller House, at the northwest end of the district. The spatial association between placer gold and plutonic rock in the district suggests some genetic link, although some nonplutonic sources are also implicated (Yeend, 1987).

Figure 11. Gold-favorability scores for the Hope Suite plutons and mafic dikes, northeast of Fairbanks, shown on a Strecheisen-LaMaire (1979) diagram. Fields as in figure 2; numbers as in figures 7a-c.

Figure 12. Gold-favorability scores for the Circle Hot Springs and Two-bit plutons, northeast of Fairbanks, shown on a Srecksisen-LaMaitre (1979) diagram. Fields as in figure 2; numbers as in figures 7a-c.

LOW-SILICA ROCKS

Worldwide nepheline normative rocks and low-silica rocks [normative quartz/(normative quartz + feldspars) < 0.20] are commonly associated with gold. The discriminant functions we used do not deal with nepheline normative rocks. Most of the low-silica rocks in interior Alaska are predicted by the discriminant equations to be favorable for gold association. Many of these rocks are Cretaceous, are present as dikes, and could be related to larger plutons at depth.

CONCLUSION

On the basis of the discriminant analysis for gold mineralization favorability for "nonporphyry" granitic plutons, interior Alaska has some plutons that are very gold favorable. Mid-Cretaceous plutons in the interior are more likely to be associated with gold than are the early Tertiary ones. The younger group of plutons is generally more evolved—with proportionately more granite—than are the older groups.

The composition of a pluton is the most critical factor in predicted gold favorability. In the interior, granodiorite plutons are most likely to be associated with gold—probably near the granodiorite-granite border—with a low $\text{Fe}_2\text{O}_3/\text{FeO}$ ratio and rocks with low silica-alkali ratios. This generalization may be true because plutonic rocks of a given age in a given area have probably encountered similar crystallization and water-loss histories. In other regions, quartz diorite and tonalite (rather than granodiorite) may have the strongest predicted association with gold. However, plutons everywhere that have low silica contents should probably be investigated for their gold potential.

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NUMBER	1	2	3	4	5	8	7	8	9	10	11	12
SAMPLE	74AFr613	75ASj538	75AFr2175	75AFr2184	72AFr216	70AWr319	PVF1-1-63	PVF2-9-63	63AFr2c	64AFr2	64AFr70	68AFr66
QUAD	BigD	BigD	BigD	BigD	BigD	BigD	Tan	Tan	Eag	Eag	Eag	Eag
SiO2	71.10	68.80	66.08	69.95	69.80	75.40	42.87	42.84	58.90	66.51	68.30	64.40
AL2O3	15.10	15.64	16.59	14.64	14.20	13.20	11.17	10.45	15.17	15.97	15.70	17.10
FE2O3	0.50	0.77	0.96	0.77	0.71	0.59	7.98	4.64	1.75	1.08	0.50	2.00
FeO	2.00	3.39	2.78	2.27	2.00	0.10	4.78	8.14	5.37	3.19	2.40	2.20
FeO*	2.45	4.08	3.64	2.98	2.64	0.63	11.96	12.31	6.94	4.16	2.85	4.00
MGO	0.90	1.77	1.56	0.89	0.95	0.10	13.82	14.36	3.48	1.65	1.20	1.30
CAO	3.00	4.22	3.99	2.52	2.50	0.00	9.56	9.96	6.18	4.01	3.00	5.00
NA2O	3.00	2.94	3.15	3.18	2.62	3.65	3.71	3.78	2.08	2.92	2.90	3.60
K2O	3.50	3.28	3.39	4.22	4.94	4.54	1.88	1.83	4.32	3.21	3.30	2.30
TiO2	0.32	0.54	0.51	0.32	0.33	0.04	2.71	2.67	0.76	0.59	0.47	0.42
P2O5	0.15	0.09	0.22	0.17	0.09	0.02	0.96	1.03	0.51	0.10	0.15	0.21
MNO	0.03	0.09	0.08	0.07	0.07	0.02	0.16	0.17	0.16	0.09	0.07	0.10
H2O+	0.68	0.81	---	---	---	---	0.39	0.15	1.01	0.72	0.94	0.83
H2O-	0.32	0.06	---	---	---	---	0.45	0.27	---	---	---	---
CO2	0.08	0.22	---	---	---	---	---	---	0.00	0.00	0.06	0.01
LOI	---	---	---	---	0.85	1.08	---	---	---	---	---	---
SUM	100.68	100.62	99.31	99.00	99.06	98.74	100.44	100.29	99.69	100.04	99.99	99.47

NUMBER	167	168	169	170	171	172	173	174	175	176	177	178
SAMPLE	30547	KM147	CH81	PM281	PM280	CH60	CH59	KM142	CH57	1933	PM278	KM114
QUAD	Cir	Cir	Cir	Cir	Cir	Cir	Cir	Cir	Cir	Cir	Cir	Cir
SiO2	76.40	76.03	76.82	75.64	71.77	77.33	71.91	76.34	76.00	71.62	72.30	64.78
AL2O3	12.70	12.96	12.63	13.82	13.62	12.34	13.69	13.59	12.99	14.60	14.69	17.14
FE2O3	0.41	0.15	0.24	0.49	0.56	0.40	0.21	0.24	0.41	0.52	0.09	1.71
FeO	0.40	1.83	1.81	1.01	3.14	1.88	2.96	1.08	1.80	2.69	2.01	3.31
FeO*	0.77	1.96	2.03	1.45	3.64	2.04	3.15	1.30	2.17	3.16	2.09	4.85
MGO	0.00	0.09	0.11	0.11	0.39	0.06	0.34	0.09	0.04	0.81	0.42	1.00
CAO	0.64	0.74	0.74	0.58	1.54	0.51	1.45	0.48	0.76	3.44	1.35	4.05
NA2O	4.38	2.85	2.66	3.22	2.88	2.53	2.79	2.63	3.11	2.93	3.04	3.24
K2O	3.38	5.88	5.64	5.58	5.72	5.72	5.96	6.09	5.20	2.62	6.48	4.14
TiO2	0.04	0.17	0.19	0.12	0.52	0.17	0.47	0.10	0.14	0.35	0.32	0.73
P2O5	0.02	0.04	0.04	0.08	0.13	0.04	0.20	0.08	0.04	0.10	0.11	0.22
MNO	0.05	0.05	0.05	0.05	0.08	0.06	0.07	0.03	0.07	0.09	0.07	0.09
H2O+	---	---	---	---	---	---	---	---	---	---	---	---
H2O-	---	---	---	---	---	---	---	---	---	---	---	---
CO2	---	---	---	---	---	---	---	---	---	---	---	---
LOI	1.00	---	---	---	---	---	---	---	---	---	---	---
SUM	99.42	100.79	100.73	100.70	100.35	100.84	100.05	100.75	100.56	99.77	100.88	100.41

NUMBER	13	14	15	16	17	18	19	20	21	22	23	24
SAMPLE	68AFr2038	69AWr87	69AFr485	69AFr674	69AFr689	69AFr900	69AFr901	70AFr179	70AFr225	70AFr312	70AFr372	70AFr437a
QUAD	Eag	Eag	Eag	Eag	Eag	Eag	Eag	Eag	Eag	Eag	Eag	Eag
SIO2	65.70	73.70	59.20	71.20	66.00	65.87	61.78	58.80	66.00	65.10	74.80	65.10
AL2O3	15.90	14.20	13.60	15.30	16.60	16.72	13.24	15.60	17.10	14.60	14.20	16.80
FE2O3	1.10	0.40	2.10	0.30	0.60	1.45	1.75	1.90	1.60	1.80	0.28	0.76
FEO	3.20	1.20	4.70	1.60	3.10	2.60	5.37	4.70	1.70	2.50	0.84	3.40
FEO*	4.19	1.56	6.59	1.87	3.64	3.90	6.94	6.41	3.14	4.12	1.09	4.08
MGO	1.50	0.32	4.40	0.53	1.50	1.31	3.32	3.70	1.20	2.10	0.14	1.70
CAO	4.10	1.20	5.70	1.90	3.50	4.74	5.57	7.10	3.90	4.00	0.84	4.00
NA2O	2.70	3.00	2.30	3.00	2.90	3.20	2.57	2.80	4.80	3.00	3.10	2.40
K2O	2.60	4.10	4.10	3.60	2.90	2.72	4.31	2.60	2.50	4.40	4.80	3.70
TiO2	0.47	0.10	0.58	0.22	0.52	0.68	0.74	0.65	0.42	0.44	0.13	0.54
P2O5	0.15	0.05	0.41	0.09	0.17	0.60	0.51	0.36	0.19	0.25	0.13	0.13
MNO	0.10	0.05	0.14	0.08	0.08	0.14	0.15	0.14	0.07	0.08	0.00	0.03
H2O +	0.91	0.75	1.00	0.79	1.10	0.48	0.95	0.73	0.71	0.83	0.68	0.89
H2O-	---	---	---	---	---	---	---	---	---	---	---	---
CO2	0.01	0.01	0.04	0.07	0.08	0.00	0.00	0.01	0.05	0.36	<0.05	<0.05
LOI	---	---	---	---	---	---	---	---	---	---	---	---
SUM	98.44	99.08	98.27	98.68	99.05	100.49	100.26	99.09	100.24	99.46	99.94	99.45

NUMBER	179	180	181	182	183	184	185	186	187	188	189	190
SAMPLE	CH56A	CH33	CH54	LP10	LP19	LP54	LP21218	LP58	LP63	LP89	LP102	LP104
QUAD	Cir	Cir	Cir	Cir	Cir	Cir	Cir	Cir	Cir	Cir	Cir	Cir
SIO2	71.13	69.19	72.71	74.00	74.50	75.50	75.00	75.70	77.30	77.00	77.40	76.50
AL2O3	15.51	15.83	14.75	12.70	12.30	12.30	12.30	12.40	12.10	12.30	12.40	12.20
FE2O3	0.10	0.59	0.34	---	---	0.26	---	0.18	0.27	0.43	0.12	0.22
FEO	1.95	2.49	1.88	---	---	1.94	---	1.52	1.83	1.37	1.68	1.58
FEO*	2.04	3.02	2.17	2.25	2.25	2.17	1.93	1.68	2.07	1.76	1.79	1.78
MGO	0.65	0.77	0.52	0.15	0.10	0.19	0.05	0.04	0.09	0.05	0.03	0.03
CAO	2.50	2.69	2.14	0.85	0.80	0.76	0.85	0.67	0.88	0.45	0.68	0.80
NA2O	3.19	2.77	2.89	2.70	2.70	1.90	3.00	2.10	2.10	2.00	2.20	2.10
K2O	4.65	5.37	4.95	5.70	5.80	4.60	5.50	4.50	4.60	4.90	4.20	4.40
TiO2	0.27	0.32	0.22	0.15	0.10	0.18	0.05	0.05	0.05	0.09	0.03	0.04
P2O5	0.10	0.09	0.06	0.04	0.03	0.08	0.03	0.08	0.08	0.06	0.07	0.06
MNO	0.07	0.12	0.07	---	---	---	---	---	---	---	---	---
H2O +	---	---	---	---	---	---	---	---	---	---	---	---
H2O-	---	---	---	---	---	---	---	---	---	---	---	---
CO2	---	---	---	---	---	---	---	---	---	---	---	---
LOI	---	---	---	0.75	0.76	---	0.51	---	---	---	---	---
SUM	100.12	100.23	100.51	99.29	99.34	97.71	99.22	97.24	99.28	98.65	98.81	97.93

NUMBER	25	26	27	28	29	30	31	32	33	34	35	36
SAMPLE	70AFr45b	70AFr995	70AFr307b	70AFr3112	71AWr80	71AWr90	71AFr185	71AFr201	71AFr341	71AFr348	71AFr364	71AFr507
QUAD	Eag	Eag	Eag	Eag	Eag	Eag	Eag	Eag	Eag	Eag	Eag	Eag
SiO2	65.30	63.90	71.60	69.00	68.30	71.20	69.70	66.70	69.70	66.00	63.20	62.20
AL2O3	17.20	17.20	14.70	15.70	15.50	14.90	14.90	15.40	15.70	15.50	17.60	13.50
FE2O3	0.48	1.90	0.20	0.22	0.50	0.60	0.60	0.80	0.50	1.00	0.90	2.00
FEO	3.20	2.30	1.80	1.80	2.60	2.00	2.10	2.90	2.70	3.10	3.40	4.40
FEO*	3.63	4.01	1.78	2.00	3.05	2.54	2.64	3.62	3.15	4.00	4.21	6.20
MGO	1.30	1.40	0.70	1.10	1.20	0.50	1.10	1.50	1.20	1.50	0.88	3.30
CAO	3.00	5.70	1.30	2.20	2.90	2.10	2.90	3.50	3.10	3.80	5.10	4.60
NA2O	2.90	3.60	2.90	2.70	2.60	2.80	2.40	2.40	3.00	2.80	3.40	2.20
K2O	4.40	1.40	5.30	5.40	4.10	4.20	4.20	3.70	2.50	3.00	2.40	4.00
TiO2	0.66	0.44	0.27	0.39	0.39	0.21	0.32	0.49	0.35	0.53	0.42	0.87
P2O5	0.23	0.25	0.11	0.12	0.11	0.08	0.09	0.14	0.11	0.15	0.12	0.34
MNO	0.05	0.11	0.04	0.00	0.08	0.06	0.07	0.08	0.09	0.10	0.09	0.16
H2O+	1.00	0.76	0.62	0.84	1.10	0.76	1.00	0.90	1.60	1.80	1.20	1.30
H2O-	---	---	---	---	---	---	---	---	---	---	---	---
CO2	<0.05	0.07	0.04	<0.05	0.02	0.01	0.07	0.03	0.08	0.06	0.01	0.01
LOI	==	==	==	==	==	==	==	==	==	==	==	==
SUM	99.72	99.03	99.38	99.47	99.40	99.42	99.45	98.54	100.63	99.14	98.72	98.88

NUMBER	191	192	193	194	195	196	197	198	199	200	201	202
SAMPLE	LP20730	LP50	79AWs75	79AWs76	79AWs77	79AWs80	79AWs85	79AWs89	79AWs94A	9AWs101	JB135	JB137
QUAD	Cir	Cir	Cir	Cir	Cir	BigD	Cir	Cir	Cir	Liv	Fbx	Fbx
SiO2	74.00	71.50	64.30	76.30	72.40	72.40	75.20	66.30	71.00	42.00	74.95	77.67
AL2O3	13.60	14.80	15.90	12.20	13.70	14.20	14.40	16.20	14.30	8.99	11.85	12.13
FE2O3	---	---	1.86	0.39	0.41	0.41	0.85	0.66	0.42	5.90	0.47	0.20
FEO	---	---	2.16	1.19	1.66	1.74	0.85	3.22	2.03	9.45	2.84	1.13
FEO*	1.08	0.81	3.83	1.54	2.03	2.11	1.61	3.81	2.41	14.78	3.26	1.31
MGO	0.00	0.00	1.16	0.12	0.50	0.36	0.11	1.26	0.55	8.25	0.47	0.00
CAO	0.50	0.70	2.59	0.49	1.07	2.85	0.24	3.43	2.70	12.70	1.98	1.37
NA2O	4.40	5.80	3.68	2.84	2.86	2.69	5.50	2.96	1.83	1.23	2.76	3.37
K2O	4.80	4.40	5.78	5.15	5.28	3.85	3.25	3.35	4.86	4.25	3.40	3.68
TiO2	0.00	0.00	0.49	0.08	0.28	0.16	0.00	0.53	0.29	1.81	0.28	0.07
P2O5	0.04	0.02	0.30	0.00	0.12	0.06	0.09	0.28	0.08	2.86	0.10	0.04
MNO	---	---	0.06	0.02	0.05	0.04	0.20	0.05	0.03	0.32	0.10	0.04
H2O+	---	---	0.48	0.85	0.43	0.43	0.30	0.78	0.72	1.18	---	---
H2O-	---	---	0.18	0.09	0.12	0.07	0.01	0.08	0.10	0.27	---	---
CO2	---	---	0.13	0.14	0.12	0.27	0.00	0.00	0.41	0.14	---	---
LOI	<u>0.58</u>	<u>0.54</u>	---	---	---	---	---	---	---	---	---	---
SUM	99.00	98.57	99.07	99.86	99.00	99.53	101.00	99.10	99.32	97.35	99.20	99.70

NUMBER	37	38	39	40	41	42	43	44	45	46	47	48
SAMPLE	71AFr596b	71AFr635	71AFr662	71AFr664	71AFr701	71AFr793	71AFr800	71AFr2024	71AFr2025	71AFr2179	73AFr3191	66AWr78
QUAD	Eag	Eag	Eag	Eag	Eag	Eag	Eag	Eag	Eag	Eag	Eag	BigD
SiO2	60.20	67.50	66.00	63.30	70.40	74.20	68.70	75.20	67.50	65.40	53.30	67.00
AL2O3	15.70	15.80	16.20	16.80	15.20	14.10	15.90	13.30	15.20	15.90	16.60	15.10
FE2O3	1.00	1.10	1.30	1.20	0.40	0.30	0.30	0.20	0.60	1.00	3.70	0.98
FeO	4.90	2.30	2.50	3.40	1.80	1.00	1.60	1.00	3.10	3.40	4.70	2.30
FeO*	5.80	3.29	3.67	4.48	2.16	1.27	1.87	1.18	3.64	4.30	8.03	3.18
MGO	5.20	1.20	1.40	2.40	0.60	0.40	0.70	0.35	1.30	1.70	4.40	0.89
CAO	5.90	3.30	3.50	4.70	2.00	1.60	1.80	1.70	3.50	4.50	8.30	2.26
NA2O	2.10	3.00	3.00	2.40	2.90	2.90	3.30	2.20	2.50	2.80	3.20	3.38
K2O	2.20	2.80	2.80	2.60	4.30	4.20	4.80	4.40	3.20	2.10	2.60	5.07
TiO2	0.69	0.48	0.52	0.60	0.32	0.15	0.33	0.13	0.49	0.49	0.72	0.35
P2O5	0.00	0.17	0.18	0.16	0.14	0.04	0.12	0.03	0.12	0.14	0.29	0.13
MNO	0.14	0.08	0.10	0.10	0.05	0.04	0.04	0.02	0.08	0.12	0.17	0.08
H2O+	1.60	1.00	1.00	1.20	0.89	0.73	1.00	0.40	0.86	1.30	0.91	---
H2O-	---	---	---	---	---	---	---	---	---	---	---	---
CO2	0.01	0.01	0.03	0.02	0.03	0.01	0.02	0.02	0.01	0.07	0.02	---
LOI	---	---	---	---	---	---	---	---	---	---	---	0.77
SUM	99.64	98.74	98.53	98.88	99.03	99.67	98.61	98.95	98.46	98.92	98.91	98.31

NUMBER	203	204	205	206	207	208	209	210	211	212	213	214
SAMPLE	JB142	JB143	JB144	JB145	JB146	JB148	JB149	JB152	JB161	JB162	JB165	JB166b
QUAD	Fbx	Fbx	Fbx	Fbx	Fbx	Fbx	Fbx	Fbx	Fbx	Fbx	Fbx	Fbx
SiO2	71.15	70.00	69.65	74.72	71.76	71.43	74.85	74.30	72.95	76.68	72.88	74.69
AL2O3	14.50	14.23	13.58	14.38	12.75	13.90	13.05	12.52	14.40	12.89	13.79	13.14
FE2O3	0.45	0.27	0.46	0.29	0.41	0.42	0.11	0.18	0.64	0.35	0.41	0.15
FeO	2.93	2.57	3.33	1.53	2.79	2.61	1.32	1.55	1.49	0.54	0.19	0.63
FeO*	3.33	2.81	3.74	1.79	3.16	2.99	1.42	1.71	2.07	0.85	0.56	0.76
MGO	0.54	0.51	0.95	0.24	0.56	0.42	0.00	0.03	0.38	0.11	0.30	0.00
CAO	2.36	2.33	2.22	1.66	2.13	2.21	1.48	1.58	1.91	0.96	1.95	1.21
NA2O	3.28	3.24	2.79	3.14	2.90	3.21	3.39	3.25	3.03	3.69	3.28	3.71
K2O	3.66	3.59	4.01	4.46	3.47	3.41	3.90	3.95	4.46	4.56	4.13	4.65
TiO2	0.28	0.29	0.41	0.14	0.32	0.25	0.07	0.12	0.20	0.05	0.19	0.04
P2O5	0.08	0.09	0.14	0.09	0.09	0.07	0.07	0.06	0.07	0.12	0.08	0.04
MNO	0.08	0.08	0.10	0.08	0.10	0.17	0.04	0.06	0.07	0.10	0.07	0.03
H2O+	---	---	---	---	---	---	---	---	---	---	---	---
H2O-	---	---	---	---	---	---	---	---	---	---	---	---
CO2	---	---	---	---	---	---	---	---	---	---	---	---
LOI	---	---	---	---	---	---	---	---	---	---	---	---
SUM	99.31	97.20	97.64	100.71	97.28	98.10	98.28	97.60	99.60	100.05	97.27	98.29

NUMBER	49	50	51	52	53	54	55	56	57	58	59
SAMPLE	73AWr88h	73AWr88k	74AFr638a	74AFr646a	74AFr771a	74AFr777c	74AFr3001	74AWr177a	74AWr198	74AWr202a	74AWr233
QUAD	BigD	BigD	BigD	BigD	BigD	BigD	BigD	BigD	BigD	BigD	BigD
SIO2	73.20	74.40	70.00	73.80	65.80	71.40	64.10	68.60	69.40	75.60	74.90
AL2O3	13.20	13.70	14.70	13.00	16.10	14.40	15.30	15.70	14.90	12.70	13.20
FE2O3	0.43	0.62	0.39	0.52	1.28	0.10	1.07	0.52	0.64	0.58	0.43
FeO	1.30	0.40	2.20	0.60	2.60	1.90	3.20	2.80	2.50	0.50	0.90
FeO*	1.69	0.98	2.55	1.07	3.73	1.99	4.16	3.27	3.08	1.02	1.29
MGO	0.12	0.11	0.86	0.23	1.25	0.57	2.83	0.99	1.01	0.05	0.19
CAO	1.00	0.36	2.21	1.15	3.76	1.92	4.05	3.62	2.77	0.43	0.76
NA2O	3.68	3.72	3.16	3.33	4.00	3.35	3.22	3.43	3.51	4.29	4.12
K2O	4.89	5.12	3.65	5.09	2.75	3.53	3.51	2.42	3.39	4.56	4.51
TiO2	0.12	0.12	0.37	0.12	0.58	0.25	0.61	0.49	0.39	0.07	0.13
P2O5	0.05	0.05	0.12	0.04	0.17	0.11	0.16	0.16	0.13	0.02	0.04
MNO	0.04	0.02	0.07	0.03	0.12	0.07	0.09	0.07	0.10	0.06	0.08
H2O+	---	---	---	---	---	---	---	---	---	---	---
H2O-	---	---	---	---	---	---	---	---	---	---	---
CO2	---	---	---	---	---	---	---	---	---	---	---
LOI	<u>1.23</u>	<u>1.23</u>	<u>0.93</u>	<u>0.08</u>	<u>0.70</u>	<u>0.93</u>	<u>0.93</u>	<u>0.85</u>	<u>0.54</u>	<u>0.31</u>	<u>0.47</u>
SUM	99.26	99.85	98.66	97.99	99.09	98.53	99.07	99.65	99.28	99.17	99.73

NUMBER	215	216	217	218	219	220	221	222	223	224	225
SAMPLE	JB167	JB173	JB175	JB179	JB186	JB189	JB192	JB194	JB195	JB214	JB106
QUAD	Fbx	Fbx	Fbx	Fbx	Fbx	Fbx	Fbx	Fbx	Fbx	Liv	Fbx
SIO2	72.57	74.85	72.53	74.00	74.46	73.58	73.57	76.13	70.90	72.76	68.67
AL2O3	14.23	13.93	13.88	13.75	13.43	14.11	13.73	12.77	14.50	13.80	14.75
FE2O3	0.53	0.43	0.57	0.29	0.47	0.38	0.47	0.24	0.49	0.40	0.80
FeO	1.85	1.31	1.98	1.31	1.53	1.53	1.44	0.68	2.21	1.22	2.68
FeO*	2.33	1.70	2.49	1.57	1.95	1.87	1.88	0.90	2.65	1.58	3.40
MGO	0.57	0.31	0.53	0.23	0.36	0.35	0.33	0.09	0.65	0.50	0.88
CAO	1.99	2.38	2.26	1.50	1.73	1.70	1.70	1.58	2.52	1.75	2.25
NA2O	2.99	3.13	2.93	3.20	3.03	2.82	3.15	3.20	3.11	3.44	3.59
K2O	4.15	3.55	4.31	5.05	3.89	4.69	4.48	4.45	4.19	3.93	3.41
TiO2	0.24	0.16	0.26	0.13	0.20	0.18	0.16	0.08	0.32	0.19	0.40
P2O5	0.09	0.11	0.10	0.05	0.08	0.06	0.06	0.05	0.14	0.08	0.14
MNO	0.08	0.06	0.08	0.05	0.05	0.05	0.05	0.03	0.08	0.04	0.07
H2O+	---	---	---	---	---	---	---	---	---	---	---
H2O-	---	---	---	---	---	---	---	---	---	---	---
CO2	---	---	---	---	---	---	---	---	---	---	---
LOI	---	---	---	---	---	---	---	---	---	---	---
SUM	99.29	100.22	99.43	99.56	99.23	99.45	99.14	99.30	99.11	98.11	97.64

NUMBER	60	61	62	63	64	65	66	67	68	69	70	71
SAMPLE	74AWr254a	74AWr370	74AFr207a	72AFr215	75AFr238	75AFr630	75AFr636b	75AFr663a	75AFr675	75AFr733	75AFr754b	75AFr761a
QUAD	BigD	BigD	BigD	BigD	BigD	BigD	BigD	BigD	BigD	BigD	BigD	BigD
SiO2	73.00	55.80	73.30	69.50	68.60	75.00	75.60	67.90	62.50	65.60	75.00	69.80
AL2O3	14.40	16.40	14.00	14.60	15.20	12.30	12.40	15.60	15.80	15.90	13.40	14.50
FE2O3	0.21	1.03	0.30	0.57	0.25	0.48	0.29	0.65	0.95	0.37	0.19	0.76
FeO	0.90	6.00	0.60	2.20	2.60	1.10	1.00	2.80	4.20	3.70	0.20	1.60
FeO*	1.09	6.93	0.87	2.71	2.82	1.53	1.26	3.38	5.05	4.03	0.37	2.28
MGO	0.32	4.08	0.12	0.79	0.98	0.03	0.03	1.20	2.24	1.34	0.08	0.63
CAO	1.85	6.91	0.95	2.83	2.76	0.50	0.60	3.35	4.99	4.07	0.60	1.66
NA2O	3.79	2.92	3.94	3.16	3.21	3.85	3.81	3.20	2.71	3.43	4.18	3.42
K2O	3.98	2.31	5.24	4.08	3.72	5.12	4.87	3.30	3.32	2.32	5.06	4.92
TiO2	0.15	1.38	0.09	0.36	0.41	0.12	0.10	0.48	0.68	0.55	0.08	0.43
P2O5	0.05	0.41	0.04	0.10	0.13	0.02	0.01	0.13	0.16	0.16	0.05	0.15
MNO	0.05	0.12	0.04	0.06	0.07	0.03	0.02	0.04	0.10	0.10	0.02	0.07
H2O +	---	---	---	---	---	---	---	---	---	---	---	---
H2O-	---	---	---	---	---	---	---	---	---	---	---	---
CO2	---	---	---	---	---	---	---	---	---	---	---	---
LOI	<u>0.54</u>	<u>0.54</u>	<u>0.47</u>	<u>1.00</u>	<u>0.77</u>	<u>0.62</u>	<u>1.08</u>	<u>0.93</u>	<u>0.85</u>	<u>0.77</u>	<u>0.54</u>	<u>0.62</u>
SUM	99.24	97.90	99.09	99.25	98.88	99.17	99.81	99.58	98.50	98.31	99.38	98.56

NUMBER	226	227	228	229	230	231	232	233	234	235	236	237
SAMPLE	JB108	JB116a	JB127	JB128	JB132	JB134	JB213	JB215	JB201	JB203	JB205	JB207
QUAD	Fbx	Fbx	Fbx	Fbx	Fbx	Fbx	Liv	Liv	Liv	Liv	Liv	Liv
SiO2	70.16	72.52	69.76	70.30	71.61	74.08	70.61	67.03	59.36	59.65	61.95	62.47
AL2O3	14.77	13.98	14.80	14.83	14.76	13.02	14.80	15.05	16.52	16.05	16.34	15.78
FE2O3	0.29	0.47	0.58	0.68	0.40	0.57	0.65	0.95	1.09	1.00	1.08	1.11
FeO	1.31	1.49	2.61	2.12	1.94	2.52	2.16	3.15	5.67	6.03	5.07	5.36
FeO*	1.57	1.91	3.13	2.73	2.30	3.03	2.74	4.00	6.65	6.93	6.04	6.36
MGO	0.50	0.52	0.96	0.80	0.67	0.45	0.66	1.07	3.81	3.72	2.56	2.94
CAO	2.16	2.34	2.85	2.72	2.37	2.06	2.97	3.53	6.62	6.20	5.43	5.61
NA2O	3.93	3.24	3.17	3.04	3.39	2.87	3.53	3.54	2.50	2.56	2.45	2.14
K2O	4.15	4.05	3.13	3.66	3.71	3.37	3.09	3.00	2.52	2.43	2.75	2.69
TiO2	0.33	0.29	0.49	0.47	0.37	0.26	0.40	0.57	0.92	0.95	0.86	0.98
P2O5	0.11	0.08	0.12	0.15	0.13	0.10	0.15	0.19	0.22	0.23	0.19	0.18
MNO	0.05	0.04	0.06	0.05	0.04	0.09	0.05	0.09	0.12	0.14	0.12	0.12
H2O +	---	---	---	---	---	---	---	---	---	---	---	---
H2O-	---	---	---	---	---	---	---	---	---	---	---	---
CO2	---	---	---	---	---	---	---	---	---	---	---	---
LOI	---	---	---	---	---	---	---	---	---	---	---	---
SUM	97.76	99.02	98.53	98.82	99.39	99.39	99.07	98.17	99.35	98.96	98.80	99.38

NUMBER	72	73	74	75	76	77	78	79	80	81	82
SAMPLE	75AFr3308	75AFr2005/8	75AFr2025	75AFr2171	75AFr2175	75AFr2182	75AFr3087	75AFr3142	75AFr3151	5AFr3159	75AWr181a
QUAD	BigD	BigD	BigD	MtH	BigD	BigD	BigD	BigD	BigD	BigD	BigD
SIO2	61.90	74.10	70.00	68.40	64.80	54.30	59.40	69.90	66.80	63.80	72.20
AL2O3	16.10	13.90	14.50	15.20	16.40	16.00	15.20	14.60	15.40	16.90	14.10
FE2O3	0.47	0.32	0.56	1.11	0.98	0.96	1.03	0.95	0.46	0.46	0.37
FEO	4.80	0.70	2.60	1.90	2.90	6.80	5.80	1.80	2.60	3.70	1.10
FEO*	5.22	0.99	3.10	2.90	3.76	7.66	6.73	2.45	3.01	4.11	1.43
MGO	2.28	0.31	0.66	1.06	1.59	4.68	4.30	0.81	1.23	1.62	0.36
CAO	4.75	1.03	2.77	3.22	4.13	8.28	7.08	1.76	3.32	3.60	1.18
NA2O	3.01	4.38	2.85	3.33	3.51	2.34	2.17	3.66	3.14	3.16	3.14
K2O	3.29	4.38	3.79	3.64	3.14	3.39	1.99	4.18	3.76	3.27	4.58
TIO2	0.67	0.17	0.30	0.38	0.53	0.96	0.75	0.26	0.46	0.65	0.19
P2O5	0.17	0.08	0.08	0.13	0.15	0.28	0.13	0.07	0.14	0.25	0.11
MNO	0.12	0.04	0.08	0.08	0.09	0.15	0.14	0.08	0.07	0.09	0.05
H2O +	---	---	---	---	---	---	---	---	---	---	---
H2O-	---	---	---	---	---	---	---	---	---	---	---
CO2	---	---	---	---	---	---	---	---	---	---	---
LOI	<u>1.00</u>	<u>0.54</u>	<u>0.70</u>	<u>0.85</u>	<u>0.82</u>	<u>0.23</u>	<u>0.77</u>	<u>0.93</u>	<u>1.16</u>	<u>1.00</u>	<u>1.00</u>
SUM	98.56	99.93	98.89	99.30	98.82	98.37	98.74	98.80	98.54	98.50	98.38

NUMBER	238	239	240	241	242	243	244	245	251	252	253
SAMPLE	JB211	JB216	JB218	JB133	JB139	JB141	JB150	JB191	CI53	CI38	CI41
QUAD	Liv	Liv	Liv	Fbx	Fbx	Fbx	Fbx	Fbx	Cir	Cir	Cir
SIO2	65.36	65.34	63.49	75.08	76.27	75.26	73.16	74.42	75.00	74.00	74.50
AL2O3	15.99	14.95	15.78	13.83	12.59	12.94	13.68	13.59	12.30	12.70	12.30
FE2O3	1.29	0.83	0.59	0.76	0.10	0.18	1.13	0.96	0.00	0.00	0.00
FEO	3.96	4.41	4.37	1.22	1.04	0.95	1.45	0.59	0.00	0.00	0.00
FEO*	5.12	5.18	4.90	1.90	1.13	1.11	2.47	1.45	1.93	2.25	1.98
MGO	1.19	1.52	2.42	0.00	0.00	0.02	0.00	0.00	0.05	0.15	0.10
CAO	3.50	4.55	4.55	0.20	0.97	1.01	0.29	0.28	0.85	0.85	0.80
NA2O	2.36	2.64	3.55	3.94	3.70	3.51	3.89	3.80	3.00	2.70	2.70
K2O	3.50	3.19	2.24	4.61	4.27	4.48	4.60	4.53	5.50	5.70	5.80
TIO2	0.67	0.78	0.71	0.02	0.04	0.06	0.02	0.02	0.05	0.15	0.10
P2O5	0.21	0.22	0.20	0.05	0.06	0.04	0.05	0.09	0.03	0.04	0.03
MNO	0.08	0.09	0.11	0.03	0.10	0.04	0.01	0.02	0.04	0.03	0.04
H2O +	---	---	---	---	---	---	---	---	---	---	---
H2O-	---	---	---	---	---	---	---	---	---	---	---
CO2	---	---	---	---	---	---	---	---	---	---	---
LOI	---	---	---	---	---	---	---	---	<u>0.51</u>	<u>0.75</u>	<u>0.76</u>
SUM	98.11	98.52	98.01	99.72	99.14	98.49	98.27	98.30	99.26	99.32	99.11

NUMBER	83	84	85	86	87	88	89	90	91	92	93
SAMPLE	75AWr544	76AFr516	77AWr174	77AWr423	74AFr3133a	ECPD-46	ECC-1-228	ECP-4-16	ECC-2-124	ECPD-205	ECPD-35
QUAD	BigD	BigD	BigD	BigD	BigD	Liv	Liv	Liv	Liv	Liv	Liv
SiO2	70.20	57.30	73.90	64.10	67.80	73.62	69.85	70.96	74.19	61.63	65.09
AL2O3	15.70	16.90	14.30	16.70	15.20	14.35	15.63	16.27	13.64	15.53	18.02
FE2O3	0.30	1.15	0.22	1.26	0.68	0.65	0.55	1.19	0.05	1.92	0.06
FeO	1.60	6.80	0.80	2.80	2.60	0.82	3.84	1.22	1.11	4.95	4.15
FeO*	1.87	7.83	1.00	3.93	3.21	1.40	4.33	2.29	1.15	8.68	4.20
MGO	0.59	2.56	0.20	1.58	1.16	0.11	0.64	0.23	0.34	2.72	2.04
CAO	1.96	7.05	0.78	4.52	3.10	1.04	2.07	0.23	1.46	5.90	4.52
NA2O	3.07	1.89	2.93	3.74	3.29	2.84	2.48	2.98	3.69	2.02	2.53
K2O	5.25	1.66	4.78	2.32	3.44	5.36	3.56	5.46	3.80	2.67	3.50
TiO2	0.33	1.12	0.13	0.56	0.43	0.02	0.21	0.03	0.11	0.85	0.66
P2O5	0.09	0.24	0.15	0.16	0.14	0.01	0.10	0.02	0.03	0.21	0.21
MNO	0.04	0.15	0.03	0.10	0.09	0.03	0.06	0.01	0.05	0.13	0.11
H2O+	---	---	---	---	---	0.91	1.05	1.30	0.64	1.32	1.06
H2O-	---	---	---	---	---	0.67	0.50	0.50	0.54	0.63	0.26
CO2	---	---	---	---	---	---	---	---	---	---	---
LOI	<u>0.54</u>	<u>1.39</u>	<u>1.08</u>	<u>0.77</u>	<u>0.54</u>	---	---	---	---	---	---
SUM	99.67	98.21	99.30	98.61	98.47	100.43	100.54	100.40	99.65	100.48	100.21
NUMBER	254	255	275	278	279	280	281	282	283	284	285
SAMPLE	CI42	CI59	2294	84TS43	84TS44	84TS45	84TS46	84TS48	89RN105	89RN112	2880
QUAD	Cir	Cir	Fbx	BigD	BigD	BigD	BigD	Circ	Fbx	Fbx	Circ
SiO2	71.50	74.00	75.56	67.10	67.40	67.50	69.40	71.80	69.90	71.50	71.80
AL2O3	14.80	13.60	13.20	15.00	15.20	15.20	15.10	15.10	14.40	14.80	14.14
FE2O3	0.00	0.00	0.07	0.88	0.62	0.61	0.41	0.43	0.34	0.19	0.44
FeO	0.00	0.00	0.14	3.00	3.00	2.90	2.60	0.90	1.40	1.00	1.84
FeO*	0.81	1.08	0.20	3.79	3.56	3.45	2.97	1.29	1.71	1.17	2.04
MGO	0.00	0.00	0.07	1.46	1.23	1.19	0.79	0.42	0.76	0.84	0.50
CAO	0.70	0.50	0.61	3.45	3.31	3.24	2.71	1.10	1.51	1.51	2.22
NA2O	5.80	4.40	3.81	2.64	2.69	2.69	2.85	3.42	4.08	4.08	3.17
K2O	4.40	4.80	4.46	4.42	4.13	4.35	3.88	4.86	4.33	3.66	3.96
TiO2	0.00	0.00	0.03	0.53	0.49	0.45	0.41	0.22	0.23	0.24	0.28
P2O5	0.02	0.04	0.07	0.14	0.12	0.11	0.11	0.15	0.08	0.09	0.06
MNO	0.13	0.06	0.02	0.08	0.08	0.08	0.06	0.03	0.02	0.02	0.06
H2O+	---	---	---	---	---	---	---	---	---	---	---
H2O-	---	---	0.28	---	---	---	---	---	---	---	---
CO2	---	---	---	---	---	---	---	---	---	---	---
LOI	<u>0.54</u>	<u>0.58</u>	<u>0.27</u>	<u>0.47</u>	<u>0.62</u>	<u>0.62</u>	<u>0.93</u>	<u>0.70</u>	<u>1.70</u>	<u>1.16</u>	<u>2.30</u>
SUM	98.70	99.06	98.59	99.17	98.89	98.94	99.25	99.13	98.75	99.09	100.57

NUMBER	94	95	96	97	100	101	102	103	104	105	106
SAMPLE	ECC-4-28	AP-1	HL-1	MtFairplay	MCD82	MCD56	MCD59	MCD96	63Ba3001	62ACn544	62Ba2421
QUAD	Liv	Fbx	BigD	Tan	Liv	Liv	Liv	Liv	Tan	ChR	ChR
SIO2	59.67	78.47	54.35	55.38	48.84	47.00	46.63	43.30	70.50	67.50	74.10
AL2O3	17.17	10.94	17.09	18.98	18.18	15.68	15.42	14.04	14.50	15.50	12.40
FE2O3	1.17	0.63	0.97	2.65	1.63	6.60	1.79	3.34	1.10	1.00	0.92
FeO	5.76	0.48	7.61	4.16	9.11	8.22	9.80	9.51	1.80	3.00	1.80
FeO*	6.81	1.05	8.48	6.54	10.58	12.16	11.41	12.52	2.79	3.90	2.63
MGO	2.56	0.86	4.90	1.59	4.37	5.29	7.37	8.96	1.00	1.80	0.56
CAO	6.33	0.86	8.00	5.75	8.16	6.42	9.54	11.34	1.90	3.20	0.35
NA2O	2.13	3.67	2.13	4.60	4.83	3.21	2.69	2.66	3.00	2.20	2.40
K2O	3.16	4.79	3.23	5.40	0.00	3.19	1.50	1.58	4.10	3.80	4.90
TiO2	1.03	0.00	0.76	0.55	2.13	2.43	1.87	1.87	0.31	0.53	0.16
P2O5	0.31	0.00	0.26	0.32	0.06	0.06	0.03	0.07	0.26	0.16	0.20
MNO	0.13	0.03	0.14	0.10	0.13	0.11	0.19	0.17	0.08	0.07	0.10
H2O +	1.12	0.09	0.29	0.58	1.72	3.82	3.22	3.45	0.90	0.95	1.10
H2O-	0.13	0.01	0.13	0.01	0.17	0.23	0.21	0.23	0.30	0.15	0.10
CO2	---	---	---	---	---	---	---	---	0.05	0.11	0.10
LOI	---	---	---	---	---	---	---	---	---	---	---
SUM	100.67	100.83	99.86	100.07	99.33	100.26	100.26	100.52	99.80	99.97	99.19

NUMBER	286	287	318	319	320	321	322	323	324	325	326
SAMPLE	2890	2911	88RN300AP	88RN300BL	88RN301	88RN301M	88RN303AP	MOSQUITO-1	TAUR-1	AS-1	TOK-1
QUAD	BigD	BigD	BigD	BigD	BigD	BigD	BigD	Tan	Tan	Tan	Tan
SIO2	71.34	68.96	76.29	67.43	68.61	61.72	76.81	66.00	59.70	66.30	65.10
AL2O3	14.97	14.41	13.09	16.61	15.03	16.34	12.84	16.30	16.40	15.10	15.50
FE2O3	0.32	0.73	0.52	1.21	1.75	2.03	0.27	1.54	5.08	1.18	1.66
FeO	1.22	2.73	0.15	1.65	1.40	4.10	0.15	2.00	1.20	2.50	1.90
FeO*	1.51	3.39	0.15	1.65	1.40	4.10	0.15	3.39	5.77	3.54	3.39
MGO	0.43	1.03	0.11	0.71	0.70	1.83	0.01	1.59	2.33	1.52	1.51
CAO	1.82	2.87	0.58	2.93	2.58	4.01	0.20	3.71	4.40	3.60	2.71
NA2O	3.73	2.71	3.60	4.08	3.31	3.73	2.93	4.55	3.93	3.15	3.08
K2O	4.16	4.07	4.73	3.43	4.41	3.73	5.72	0.93	1.41	3.05	3.84
TiO2	0.21	0.44	0.04	0.31	0.29	0.52	0.04	0.67	0.63	0.41	0.44
P2O5	0.07	0.08	0.05	0.14	0.18	0.27	0.05	0.18	0.29	0.10	0.15
MNO	0.03	0.07	0.01	0.06	0.07	0.14	0.01	0.16	0.21	0.10	0.07
H2O +	---	---	---	---	---	---	---	---	---	---	---
H2O-	---	---	---	---	---	---	---	---	---	---	---
CO2	---	---	---	---	---	---	---	---	---	---	---
LOI	<u>0.51</u>	<u>0.14</u>	<u>0.83</u>	<u>0.95</u>	<u>0.97</u>	<u>0.91</u>	<u>0.58</u>	<u>2.54</u>	<u>4.39</u>	<u>2.00</u>	<u>2.39</u>
SUM	98.81	98.24	100.01	99.57	99.37	99.47	99.64	100.07	99.97	98.99	98.35

NUMBER	107	108	109	110	111	112	113	114	115	116	117	118
SAMPLE	62Ba2415	62Ba2424a	61Ba1634	63Ba3084	62Ba2490	80ABa297	TS222	MW111	RR151	TS52	TS60a	DNS93
QUAD	Chr	Chr	Chr	Eag	Chr	Eag	Cir	Cir	Cir	Cir	Cir	Cir
SIO2	73.90	75.90	73.90	41.90	43.00	48.30	73.00	85.10	74.80	74.80	76.80	77.20
AL2O3	15.10	13.40	14.50	14.70	12.80	11.30	12.50	7.19	12.50	12.50	11.70	11.70
FE2O3	0.22	0.10	0.07	1.80	2.80	5.50	0.78	0.59	0.26	0.47	0.36	0.58
FEO	0.48	0.80	0.36	7.80	9.40	6.60	0.30	0.00	1.40	1.40	1.20	1.20
FEO*	0.68	0.89	0.42	9.42	11.92	11.55	1.00	0.53	1.63	1.82	1.52	1.72
MGO	0.80	0.75	0.65	5.40	12.50	5.00	0.13	0.14	0.17	0.18	0.09	0.07
CAO	0.82	1.70	1.10	8.90	9.40	11.00	2.13	0.28	0.71	0.94	0.65	0.88
NA2O	2.90	1.70	3.70	3.20	1.90	2.30	0.30	2.17	3.32	3.41	3.40	2.97
K2O	4.40	4.30	4.00	2.10	0.65	0.85	5.70	2.84	5.05	5.14	4.84	4.49
TIO2	0.06	0.11	0.03	5.40	2.80	0.88	0.08	0.08	0.18	0.21	0.15	0.14
P2O5	0.27	0.24	0.25	0.96	0.43	0.29	0.02	0.02	0.05	0.05	0.03	0.03
MNO	0.04	0.14	0.03	0.17	0.23	0.18	0.14	0.02	0.03	0.03	0.03	0.03
H2O+	0.81	0.76	0.61	3.20	3.60	0.91	---	---	---	---	---	---
H2O-	0.12	0.07	0.04	0.39	0.23	0.19	---	---	---	---	---	---
CO2	<0.05	0.06	0.09	3.40	0.08	6.50	---	---	---	---	---	---
LOI	---	---	---	---	---	---	<u>4.00</u>	<u>1.20</u>	<u>0.70</u>	<u>0.50</u>	<u>0.50</u>	<u>0.60</u>
SUM	99.92	100.03	99.33	99.32	99.82	99.80	99.08	99.61	99.17	99.63	99.75	99.89

NUMBER	327	328	329	330	331	332	333	334	335	336	337	338
SAMPLE	TOK-2	TOK-3	63AFr223	64AFr31	64AFr79	64AFr138	64AFr142	64AFr172	64AFr227	68AFr107	68AFr227	69AFr664
QUAD	Tan	Tan	Eag	Eag	Eag	Eag	Eag	Eag	Eag	Eag	Eag	Eag
SIO2	63.70	65.00	68.10	62.20	70.80	66.80	64.70	71.60	66.20	55.70	57.50	67.60
AL2O3	16.10	15.60	15.10	16.40	15.10	15.60	15.40	14.20	16.00	14.10	14.20	15.50
FE2O3	1.63	1.93	1.14	1.52	0.69	1.37	0.95	0.51	1.65	3.46	4.69	0.65
FEO	2.70	1.80	1.30	4.20	1.00	2.50	4.30	1.70	2.50	5.80	4.40	2.70
FEO*	4.17	3.54	2.33	5.57	1.62	3.73	5.15	2.16	3.98	8.91	8.62	3.28
MGO	2.07	1.69	0.87	2.07	0.75	1.47	2.92	0.79	1.57	4.01	3.58	1.28
CAO	3.73	3.61	2.86	5.10	2.83	3.62	4.09	1.96	4.00	6.27	6.77	3.58
NA2O	2.90	3.10	3.76	3.61	4.23	3.23	1.73	3.40	3.32	2.46	3.04	3.11
K2O	3.64	3.95	4.10	1.89	3.15	3.28	2.77	3.86	2.93	2.98	3.39	3.26
TIO2	0.53	0.45	0.28	0.68	0.23	0.49	0.67	0.22	0.55	0.96	0.84	0.42
P2O5	0.19	0.15	0.14	0.14	0.09	0.14	0.10	0.08	0.18	0.53	0.49	0.10
MNO	0.10	0.14	0.08	0.18	0.05	0.10	0.08	0.08	0.11	0.19	0.20	0.09
H2O+	---	---	---	---	---	---	---	---	---	---	---	---
H2O-	---	---	---	---	---	---	---	---	---	---	---	---
CO2	---	---	---	---	---	---	---	---	---	---	---	---
LOI	<u>2.31</u>	<u>2.08</u>	<u>0.85</u>	<u>1.62</u>	<u>0.77</u>	<u>1.00</u>	<u>2.08</u>	<u>1.39</u>	<u>0.85</u>	<u>2.54</u>	<u>0.47</u>	<u>1.08</u>
SUM	99.60	99.50	98.58	99.61	99.69	99.60	99.79	99.77	99.84	99.00	99.57	99.37

NUMBER	119	120	121	122	123	124	125	126	127	128	129
SAMPLE	DNS110	TS60b	TS67	DNS113	MW15a	LB25	DA116	DA19c	RN130	TS58	RR149
QUAD	Cir	Cir	Cir	Cir	Cir	Cir	Cir	Cir	Cir	Cir	Cir
SIO2	76.00	76.60	76.00	75.60	75.50	74.90	76.30	75.40	74.30	74.50	76.10
AL2O3	12.00	12.50	12.30	12.50	13.30	12.70	13.60	13.80	12.80	13.10	12.40
FE2O3	0.41	0.34	0.41	0.32	0.29	0.40	0.19	0.13	0.45	0.31	0.29
FeO	1.10	1.00	1.10	1.30	0.80	0.50	0.20	0.40	1.00	1.30	1.10
FeO*	1.47	1.31	1.47	1.59	1.08	0.88	0.37	0.52	1.40	1.58	1.38
MGO	0.10	0.08	0.12	0.11	0.04	0.08	0.02	0.03	0.15	0.17	0.16
CAO	0.73	0.72	0.70	0.74	0.80	0.66	0.59	0.93	0.59	0.49	0.63
NA2O	3.49	3.42	3.58	3.61	3.58	3.77	3.53	3.48	3.53	3.48	3.61
K2O	5.01	4.78	5.08	4.88	5.14	5.35	5.31	5.53	5.01	4.89	4.72
TiO2	0.13	0.13	0.13	0.15	0.08	0.06	0.03	0.05	0.17	0.19	0.17
P2O5	0.03	0.05	0.03	0.04	0.02	0.02	0.02	0.03	0.08	0.08	0.07
MNO	0.03	0.03	0.03	0.04	0.02	0.03	0.01	0.02	0.06	0.06	0.06
H2O +	---	---	---	---	---	---	---	---	---	---	---
H2O-	---	---	---	---	---	---	---	---	---	---	---
CO2	---	---	---	---	---	---	---	---	---	---	---
LOI	<u>0.50</u>	<u>0.60</u>	<u>0.60</u>	<u>0.60</u>	<u>0.70</u>	<u>0.80</u>	<u>0.50</u>	<u>0.60</u>	<u>0.70</u>	<u>0.60</u>	<u>0.60</u>
SUM	99.53	100.21	100.08	99.89	100.27	99.25	100.30	100.38	98.84	99.15	99.91

NUMBER	339	340	341	342	343	344	345	346	347	348	349
SAMPLE	69AFr698	69AFr721	69AFr900A	70AFr310	70AFr430	70AFr468	70AFr2466B	70AFr2467	70AFr2471	70AFr2497A	70AFr2497B
QUAD	Eag	Eag	Eag	Eag	Eag	Eag	Eag	Eag	Eag	Eag	Eag
SIO2	67.20	57.20	65.80	72.40	69.60	68.90	66.70	71.20	73.20	70.90	76.00
AL2O3	15.80	15.40	16.30	14.60	15.20	15.70	16.10	15.10	14.40	14.70	13.40
FE2O3	0.83	0.85	1.63	0.23	0.73	0.48	0.65	0.56	0.21	0.40	0.40
FeO	2.70	2.70	2.30	1.20	1.40	2.20	2.40	1.20	1.30	1.60	0.20
FeO*	3.45	3.46	3.77	1.41	2.08	2.63	2.98	1.70	1.49	1.96	0.56
MGO	1.35	1.39	1.35	0.47	0.85	0.92	1.19	0.82	0.43	0.67	0.09
CAO	3.54	3.71	4.53	1.43	1.80	2.50	3.03	1.72	1.26	1.69	0.42
NA2O	3.05	2.94	3.45	3.20	3.49	3.36	3.27	3.19	3.18	3.67	3.98
K2O	3.11	2.83	2.60	4.65	5.02	3.94	4.33	4.92	4.31	4.27	4.74
TiO2	0.49	0.46	0.45	0.22	0.39	0.40	0.49	0.31	0.18	0.20	0.03
P2O5	0.14	0.11	0.19	0.10	0.15	0.16	0.16	0.10	0.12	0.08	0.03
MNO	0.09	0.09	0.14	0.05	0.06	0.07	0.09	0.05	0.05	0.08	0.04
H2O +	---	---	---	---	---	---	---	---	---	---	---
H2O-	---	---	---	---	---	---	---	---	---	---	---
CO2	---	---	---	---	---	---	---	---	---	---	---
LOI	<u>1.39</u>	<u>1.85</u>	<u>0.93</u>	<u>1.39</u>	<u>1.00</u>	<u>0.85</u>	<u>0.77</u>	<u>0.93</u>	<u>1.08</u>	<u>0.85</u>	<u>0.62</u>
SUM	99.69	89.53	99.67	99.94	99.69	99.48	99.18	100.10	99.72	99.09	99.95

NUMBER	130	131	132	133	134	135	136	137	138	139	140	141
SAMPLE	DNS124	MA89	DNS108	MA103	RN127	MW73	DA137	RN175e	DNS122	DNS121	DNS119	DA186
QUAD	Cir	Cir	Cir	Cir	Cir	Cir	Cir	Cir	Cir	Cir	Cir	Cir
SiO2	75.40	78.00	76.00	75.60	75.30	73.20	75.70	74.30	74.20	75.20	74.40	73.60
AL2O3	13.50	12.50	13.40	13.10	13.20	13.70	14.10	14.90	15.10	13.20	13.90	15.10
FE2O3	0.26	0.28	0.24	0.33	0.17	0.29	0.29	0.25	0.24	0.28	0.38	0.34
FEO	1.00	1.10	0.70	1.10	0.69	1.10	0.60	0.40	0.40	0.70	0.50	0.00
FEO*	1.23	1.35	0.92	1.40	0.84	1.36	0.86	0.62	0.62	0.95	0.84	0.31
MGO	0.17	0.16	0.07	0.19	0.07	0.28	0.05	0.00	0.01	0.09	0.08	0.00
CAO	0.80	0.50	0.60	0.91	0.39	0.73	0.41	0.37	0.49	0.39	0.31	0.41
NA2O	3.20	3.87	3.50	3.18	4.04	3.83	3.65	4.58	4.39	4.05	4.08	5.37
K2O	4.92	4.70	4.77	4.90	4.73	5.41	4.58	4.30	4.23	4.58	5.60	4.45
TiO2	0.16	0.16	0.11	0.18	0.08	0.19	0.04	0.04	0.04	0.09	0.06	0.03
P2O5	0.09	0.07	0.07	0.08	0.06	0.14	0.09	0.10	0.18	0.06	0.08	0.24
MNO	0.07	0.05	0.07	0.05	0.06	0.06	0.07	0.07	0.07	0.06	0.05	0.05
H2O+	---	---	---	---	---	---	---	---	---	---	---	---
H2O-	---	---	---	---	---	---	---	---	---	---	---	---
CO2	---	---	---	---	---	---	---	---	---	---	---	---
LOI	<u>0.70</u>	<u>0.70</u>	<u>0.50</u>	<u>0.60</u>	<u>0.70</u>	<u>0.80</u>	<u>0.70</u>	<u>0.50</u>	<u>0.50</u>	<u>0.70</u>	<u>0.60</u>	<u>0.00</u>
SUM	100.27	100.09	100.03	100.22	99.49	99.73	100.28	99.81	99.85	99.40	100.04	99.59

NUMBER	350	351	352	353	354	355	356	357	358	359	360	361
SAMPLE	70AWr67B	71AFr99	71AFr357	71AFr363	71AFr717	71AFr718	71AFr719	71AFr728	1AWr86A	74ARh70	90RN09	90RN10
QUAD	Eag	Eag	Eag	Eag	Eag	Eag	Eag	Eag	Eag	Nab	Tan	Tan
SiO2	74.00	65.00	65.80	69.00	71.30	71.90	67.10	72.50	71.70	73.00	74.30	70.00
AL2O3	13.60	15.80	16.00	15.40	14.60	13.90	15.50	14.70	14.60	13.80	13.20	14.50
FE2O3	0.41	1.03	1.22	1.03	0.82	0.50	0.71	0.19	0.56	0.58	1.10	0.87
FEO	1.10	3.30	2.70	1.60	1.20	1.10	2.60	1.20	1.40	1.40	0.40	1.50
FEO*	1.47	4.23	3.80	2.53	1.76	1.55	3.24	1.37	1.90	1.92	1.39	2.28
MGO	0.25	1.76	1.39	0.57	0.53	0.51	1.19	0.53	0.35	0.23	0.31	0.72
CAO	1.08	4.13	4.18	2.65	1.48	1.32	3.23	1.53	1.85	1.12	1.25	2.14
NA2O	3.21	2.86	3.31	3.98	3.91	3.10	2.93	4.05	3.11	3.91	3.50	3.75
K2O	4.98	3.71	2.73	3.52	4.27	5.21	3.99	3.63	4.89	4.86	4.64	4.17
TiO2	0.13	0.53	0.45	0.25	0.28	0.33	0.42	0.23	0.17	0.18	0.17	0.29
P2O5	0.04	0.13	0.12	0.06	0.09	0.10	0.12	0.07	0.05	0.04	0.05	0.08
MNO	0.06	0.10	0.12	0.06	0.04	0.05	0.09	0.04	0.06	0.05	0.06	0.72
H2O+	---	---	---	---	---	---	---	---	---	---	---	---
H2O-	---	---	---	---	---	---	---	---	---	---	---	---
CO2	---	---	---	---	---	---	---	---	---	---	---	---
LOI	<u>0.70</u>	<u>1.00</u>	<u>1.31</u>	<u>1.31</u>	<u>1.23</u>	<u>0.85</u>	<u>0.85</u>	<u>0.85</u>	<u>0.85</u>	<u>0.62</u>	<u>0.47</u>	<u>0.54</u>
SUM	99.56	99.35	99.33	99.43	99.55	98.87	98.73	99.52	99.59	99.94	99.63	101.44

NUMBER	142	143	144	145	146	147	148	149	150	151	152	153
SAMPLE	GP180	GP157	DNS178	DNS180	MA114	DNS179	RR129b	RR135	DA217c	RN198b	RN183-185	DNS111
QUAD	Cir	Cir	Cir	Cir	Cir	Cir	Cir	Cir	Cir	Cir	Cir	Cir
SiO2	73.60	71.40	74.00	73.70	71.50	76.30	75.70	76.60	75.00	69.20	76.40	49.10
AL2O3	14.30	14.40	14.20	13.90	14.00	13.80	13.80	13.10	13.00	13.80	13.10	15.70
FE2O3	0.43	0.41	0.32	0.50	0.57	0.40	0.15	0.19	0.22	1.02	0.17	1.72
FEO	0.80	1.70	0.80	1.00	0.70	0.00	0.00	0.00	0.60	3.00	0.10	8.70
FEO*	1.19	2.07	1.19	1.45	1.21	0.36	0.13	0.17	0.80	3.92	0.25	8.25
MGO	0.30	0.58	0.31	0.35	0.30	0.01	0.03	0.03	0.45	1.77	0.14	6.15
CAO	1.01	1.79	0.92	1.09	0.93	0.30	0.39	0.46	1.08	0.78	0.32	8.39
NA2O	3.61	4.51	3.52	3.54	3.76	4.51	5.11	5.19	4.02	3.37	4.23	2.31
K2O	5.17	3.75	5.08	4.91	5.35	4.54	3.85	3.89	3.85	4.45	5.15	0.55
TiO2	0.21	0.36	0.22	0.24	0.20	0.06	0.04	0.06	0.18	0.58	0.07	1.51
P2O5	0.09	0.14	0.09	0.11	0.11	0.05	0.02	0.04	0.06	0.18	0.03	0.26
MNO	0.06	0.08	0.06	0.06	0.09	0.02	0.01	0.01	0.03	0.10	0.01	0.23
H2O+	---	---	---	---	---	---	---	---	---	---	---	---
H2O-	---	---	---	---	---	---	---	---	---	---	---	---
CO2	---	---	---	---	---	---	---	---	---	---	---	---
LOI	<u>0.50</u>	<u>0.70</u>	<u>0.50</u>	<u>0.50</u>	<u>1.50</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>1.30</u>	<u>1.50</u>	<u>0.00</u>	<u>5.50</u>
SUM	100.08	99.82	100.12	99.90	99.01	99.99	100.10	99.57	99.79	99.75	99.72	98.12

NUMBER	362	363	364	365	366	367	368	369	370	371	372	373
SAMPLE	90RN20a	90RN20b	90RN21	90RN22	90RN25a	90RN25b	70AMn16	67ACx211	68ARh369	0AMn106	71ARh76	71ARh77
QUAD	Nab	Nab	Nab	Tan	Tan	Tan	Nab	Nab	Nab	Nab	Nab	Nab
SiO2	73.10	76.80	71.20	71.60	72.50	77.40	55.70	62.20	68.20	57.70	69.70	61.50
AL2O3	14.60	13.10	14.30	14.60	14.20	12.70	17.00	16.30	15.60	17.00	14.80	17.20
FE2O3	0.83	0.26	0.83	0.92	1.03	0.34	1.80	0.60	0.55	1.40	0.70	0.62
FEO	0.30	0.00	1.10	1.10	1.20	0.00	5.80	5.00	2.50	4.60	2.00	4.80
FEO*	1.05	0.23	1.85	1.93	2.13	0.31	7.42	5.54	2.99	5.86	2.63	5.36
MGO	0.35	0.06	0.63	0.66	0.61	0.06	3.90	2.50	1.00	3.00	1.10	2.70
CAO	1.45	0.59	2.07	1.91	2.20	0.39	6.20	4.30	2.60	5.80	2.70	5.40
NA2O	3.83	3.38	3.78	3.79	3.80	3.35	2.70	2.80	3.90	2.70	2.40	3.00
K2O	4.55	5.16	4.36	4.33	3.49	5.05	3.60	3.80	3.90	5.10	4.80	2.60
TiO2	0.20	0.06	0.24	0.25	0.28	0.06	0.90	0.65	0.46	0.73	0.30	0.54
P2O5	0.06	0.02	0.08	0.09	0.07	0.02	0.35	0.28	0.14	0.30	0.13	0.16
MNO	0.08	0.01	0.09	0.08	0.07	<0.01	0.15	0.12	0.08	0.14	0.08	0.16
H2O+	---	---	---	---	---	---	1.70	1.40	0.61	1.20	1.10	1.10
H2O-	---	---	---	---	---	---	0.14	0.08	0.09	0.24	0.15	0.09
CO2	---	---	---	---	---	---	0.05	0.05	0.05	0.05	0.05	0.05
LOI	<u>0.62</u>	<u>0.70</u>	<u>0.54</u>	<u>0.23</u>	<u>0.77</u>	<u>0.85</u>	---	---	---	---	---	---
SUM	100.13	100.17	99.49	99.80	100.43	100.22	99.99	100.08	99.68	99.96	99.99	99.92

NUMBER	154	155	156	157	158	159	160	161	162	163	164	165
SAMPLE	DNS52	MA224	GP283b	RS283b	RS87	GP82	LB43a	RN178a	LB44	LB94	JB39	30545
QUAD	Cir	Cir	Cir	Cir	Cir	Cir	Cir	Cir	Cir	Cir	Cir	Cir
SiO2	50.80	57.50	55.10	55.20	62.50	65.20	74.00	71.70	73.10	74.90	47.90	77.70
AL2O3	16.20	13.80	14.50	14.00	14.50	15.20	12.80	15.50	14.40	13.50	10.00	11.60
FE2O3	1.34	2.09	1.48	1.41	0.59	0.04	0.45	0.51	0.00	0.19	2.67	0.39
FeO	8.80	5.00	8.00	8.00	3.00	3.00	1.00	1.00	1.00	0.60	4.00	0.20
FeO*	8.01	6.88	7.33	7.27	3.53	3.04	1.40	1.46	1.00	0.77	6.40	0.55
MGO	6.28	4.67	4.23	5.30	2.31	1.28	0.04	0.04	0.01	0.01	7.88	0.00
CAO	7.14	3.60	5.30	5.18	3.57	3.10	0.34	0.14	0.16	0.27	8.53	0.41
NA2O	3.16	1.08	1.69	1.52	3.54	2.69	3.51	3.87	4.73	4.45	1.21	3.82
K2O	1.26	4.40	5.34	4.66	4.45	5.26	4.87	4.36	4.39	3.90	6.10	4.24
TiO2	1.51	0.87	0.96	0.97	0.62	0.44	0.05	0.05	0.03	0.04	0.70	0.04
P2O5	0.27	0.47	0.57	0.54	0.30	0.17	0.02	0.02	0.02	0.11	0.53	0.02
MNO	0.14	0.17	0.16	0.14	0.06	0.07	0.04	0.08	0.08	0.04	0.13	0.02
H2O+	---	---	---	---	---	---	---	---	---	---	---	---
H2O-	---	---	---	---	---	---	---	---	---	---	---	---
CO2	---	---	---	---	---	---	---	---	---	---	---	---
LOI	<u>3.80</u>	<u>3.62</u>	<u>2.08</u>	<u>2.08</u>	<u>2.08</u>	<u>1.62</u>	<u>0.85</u>	<u>1.16</u>	<u>0.69</u>	<u>0.62</u>	<u>7.77</u>	<u>0.77</u>
SUM	98.70	97.27	97.41	97.00	97.52	98.07	97.97	98.43	98.81	98.83	97.42	99.21

NUMBER	374	375	376	377	378	379	380	381	382	383	384	385
SAMPLE	71ARh117	4514	4515	4516	4517	4518	4519	4520	4521	4522	4523	4524
QUAD	Nab	Cir	Cir	Cir	Cir	Cir	Cir	Cir	Cir	Cir	Cir	Cir
SiO2	72.00	72.01	73.36	48.38	70.19	64.11	76.23	71.22	70.87	50.27	75.48	75.29
AL2O3	15.30	13.69	13.79	16.07	14.63	16.28	12.91	14.36	14.59	14.94	12.16	12.03
FE2O3	0.50	0.95	0.55	2.10	0.70	1.30	0.20	0.60	0.70	1.85	1.00	0.75
FeO	0.64	1.65	1.05	8.00	1.85	3.15	0.45	1.50	1.55	9.25	0.90	1.15
FeO*	1.09	2.50	1.54	9.89	2.48	4.32	0.63	2.04	2.18	10.91	1.80	1.82
MGO	0.26	0.40	0.23	7.43	0.50	1.11	0.10	0.40	0.64	4.96	0.10	0.10
CAO	1.50	1.62	0.90	9.57	2.68	4.21	1.04	2.33	2.43	8.09	0.52	0.51
NA2O	3.40	3.08	2.96	2.95	3.21	3.19	3.35	3.03	3.41	3.17	2.95	2.82
K2O	4.90	5.03	5.55	1.07	4.23	3.51	5.03	4.08	4.11	1.08	5.32	5.40
TiO2	0.03	0.43	0.18	1.93	0.30	0.87	0.07	0.31	0.33	2.76	0.20	0.20
P2O5	0.07	0.14	0.12	0.36	0.10	0.26	0.02	0.09	0.10	0.77	0.05	0.05
MNO	0.13	0.05	0.04	0.26	0.07	0.09	0.03	0.06	0.05	0.18	0.03	0.04
H2O+	1.00	---	---	---	---	---	---	---	---	---	---	---
H2O-	0.18	---	---	---	---	---	---	---	---	---	---	---
CO2	0.05	---	---	---	---	---	---	---	---	---	---	---
LOI	---	<u>0.49</u>	<u>0.88</u>	<u>0.97</u>	<u>0.78</u>	<u>1.21</u>	<u>0.49</u>	<u>0.93</u>	<u>0.61</u>	<u>1.73</u>	<u>0.91</u>	<u>0.88</u>
SUM	99.96	99.54	99.61	99.09	99.24	99.29	99.92	98.91	99.39	99.05	99.62	99.22

NUMBER	188
SAMPLE	30548
QUAD	Cir
SiO2	75.90
AL2O3	12.80
FE2O3	0.56
FeO	0.50
FeO*	1.00
MgO	0.00
CaO	0.04
Na2O	2.51
K2O	6.39
TiO2	0.06
P2O5	0.02
MNO	0.03
H2O +	---
H2O-	---
CO2	---
LOI	<u>0.89</u>
SUM	99.30

APPENDIX 1b

CIPW norms, based on analyses in Appendix 1a.

NUMBER	1	2	3	4	5	6	7	8	9	10	11	12
SAMPLE	74AFr613	75ASj538	75AFr2175	75AFr2184	72AFr216	70AWr319	PVF1-1-63	PVF2-9-63	63AFr2c	64AFr2	64AFr70	68AFr66
QTZ	31.77	23.74	23.04	27.91	28.43	37.53	0.00	0.00	11.77	24.75	30.09	22.05
COR	1.29	0.00	1.02	0.67	0.22	2.34	0.00	0.00	0.00	0.65	2.31	0.10
OR	20.77	19.47	20.17	25.19	29.72	27.47	11.15	10.83	25.87	19.10	19.90	13.78
AB	25.49	24.99	26.84	27.18	22.57	31.62	8.67	3.75	17.84	24.88	25.04	30.88
AN	13.98	19.88	18.49	11.51	12.03	0.00	8.31	6.15	19.56	19.37	14.19	23.76
NE	0.00	0.00	0.00	0.00	0.00	0.00	12.38	15.32	0.00	0.00	0.00	0.00
AC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIOP	0.00	0.46	0.00	0.00	0.00	0.00	25.70	29.02	6.70	0.00	0.00	0.00
HYP	5.05	9.09	7.56	5.40	5.13	0.26	0.00	0.00	13.04	8.32	6.47	5.19
OL	0.00	0.00	0.00	0.00	0.00	0.00	15.87	20.73	0.00	0.00	0.00	0.00
MT	0.73	1.12	1.40	1.13	1.05	0.28	8.11	6.74	2.57	1.58	0.74	2.94
HEM	0.00	0.00	0.00	0.00	0.00	0.41	2.42	0.00	0.00	0.00	0.00	0.00
ILM	0.61	1.03	0.98	0.61	0.64	0.08	5.17	5.08	1.46	1.13	0.91	0.81
SPH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RUT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AP	<u>0.35</u>	<u>0.21</u>	<u>0.51</u>	<u>0.40</u>	<u>0.21</u>	<u>0.00</u>	<u>2.23</u>	<u>2.39</u>	<u>1.20</u>	<u>0.23</u>	<u>0.35</u>	<u>0.49</u>
SUM	100.02	99.99	100.01	100.00	100.00	99.99	100.01	100.01	100.01	100.01	100.00	100.00

NUMBER	167	168	169	170	171	172	173	174	175	176	177	178
SAMPLE	30547	KM147	CH61	PM281	PM280	CH60	CH59	KM142	CH57	1933	PM278	KM114
QTZ	37.07	33.69	36.34	33.53	27.43	38.16	27.71	35.77	34.94	34.47	24.93	18.82
COR	0.73	0.65	0.89	1.61	0.20	1.15	0.49	1.98	0.95	0.93	0.48	0.49
OR	20.29	34.47	33.09	32.74	33.68	33.52	35.20	35.72	30.58	15.52	37.96	24.36
AB	37.66	23.93	22.34	27.06	24.28	21.23	23.60	22.09	26.17	24.85	25.50	27.30
AN	3.09	3.38	3.39	2.34	6.77	2.25	5.89	1.85	3.49	16.45	5.93	18.58
NE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIOP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HYP	0.43	3.25	3.16	1.61	5.55	2.71	5.46	1.89	2.95	6.13	4.23	6.09
OL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MT	0.60	0.22	0.35	0.71	0.81	0.58	0.30	0.35	0.59	0.76	0.13	2.47
HEM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ILM	0.08	0.32	0.36	0.23	0.98	0.32	0.89	0.19	0.26	0.67	0.60	1.38
SPH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RUT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AP	<u>0.05</u>	<u>0.09</u>	<u>0.09</u>	<u>0.18</u>	<u>0.30</u>	<u>0.09</u>	<u>0.46</u>	<u>0.18</u>	<u>0.09</u>	<u>0.23</u>	<u>0.25</u>	<u>0.51</u>
SUM	100.00	100.00	100.01	100.01	100.00	100.01	100.00	100.02	100.00	100.01	100.01	100.00

NUMBER	13	14	15	16	17	18	19	20	21	22	23	24
SAMPLE	68AFr2038	69AWr87	69AFr485	69AFr674	69AFr889	69AFr900	69AFr901	70AFr179	70AFr225	70AFr312	70AFr372	70AFr437a
QTZ	28.15	37.46	12.40	35.00	27.32	25.18	14.28	12.49	18.52	20.08	36.53	24.42
COR	1.59	2.81	0.00	3.30	2.79	1.33	0.00	0.00	0.00	0.00	2.71	1.91
OR	15.75	24.64	24.92	21.75	17.51	16.07	25.65	15.62	14.85	26.46	28.58	22.18
AB	23.43	25.82	20.02	25.95	25.07	27.07	21.90	24.09	40.83	25.83	26.43	20.60
AN	19.85	5.72	15.09	9.04	16.61	19.60	11.94	22.69	17.82	13.61	3.34	19.27
NE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIOP	0.00	0.00	9.13	0.00	0.00	0.00	10.33	8.77	0.31	3.98	0.00	0.00
HYP	8.32	2.64	13.21	3.88	8.40	6.01	10.75	11.44	4.10	5.97	1.46	9.15
OL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MT	1.64	0.59	3.13	0.45	0.89	2.10	2.56	2.80	2.33	2.66	0.41	1.12
HEM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ILM	0.92	0.19	1.13	0.43	1.01	1.25	1.42	1.26	0.80	0.85	0.25	1.04
SPH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RUT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AP	<u>0.36</u>	<u>0.12</u>	<u>0.98</u>	<u>0.21</u>	<u>0.40</u>	<u>1.39</u>	<u>1.19</u>	<u>0.85</u>	<u>0.44</u>	<u>0.59</u>	<u>0.30</u>	<u>0.31</u>
SUM	100.01	99.99	100.01	100.01	100.00	100.00	100.02	100.01	100.00	100.01	100.01	100.00

NUMBER	179	180	181	182	183	184	185	186	187	188	189	190
SAMPLE	CH58A	CH33	CH54	LP10	LP19	LP54	LP21218	LP58	LP63	LP89	LP102	LP104
QTZ	27.26	24.10	30.29	34.24	34.46	44.93	34.28	45.21	44.79	45.58	46.58	45.73
COR	0.92	0.78	0.89	0.65	0.20	3.08	0.24	3.14	2.31	3.08	3.21	2.73
OR	27.45	31.66	29.10	34.15	34.74	27.85	32.80	27.37	27.41	29.38	25.14	26.58
AB	26.96	23.38	24.33	23.16	23.15	16.47	25.62	18.29	17.92	17.17	18.86	18.16
AN	11.74	12.73	10.17	4.01	3.82	3.33	4.06	2.88	3.78	1.87	2.96	3.66
NE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIOP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HYP	4.80	5.68	4.18	2.12	2.07	3.42	1.74	2.55	3.12	1.98	2.86	2.60
OL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MT	0.15	0.85	0.49	1.29	1.29	0.39	1.10	0.27	0.40	0.63	0.18	0.33
HEM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ILM	0.51	0.61	0.42	0.29	0.19	0.35	0.10	0.10	0.10	0.17	0.08	0.08
SPH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RUT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AP	<u>0.23</u>	<u>0.21</u>	<u>0.14</u>	<u>0.09</u>	<u>0.07</u>	<u>0.19</u>	<u>0.07</u>	<u>0.19</u>	<u>0.19</u>	<u>0.14</u>	<u>0.16</u>	<u>0.14</u>
SUM	100.02	100.00	100.01	100.00	99.99	100.01	100.01	100.00	100.02	100.00	100.01	100.01

NUMBER	25	28	27	28	29	30	31	32	33	34	35
SAMPLE	70AFr45b	70AFr995	70AFr307b	70AFr3112	71AWr80	71AWr90	71AFr185	71AFr201	71AFr341	71AFr348	71AFr364
QTZ	22.12	23.48	30.23	25.84	28.53	32.93	31.23	28.09	33.03	27.58	20.59
COR	2.80	0.00	2.12	1.72	1.81	2.15	1.37	1.45	2.71	1.50	0.44
OR	26.34	8.42	31.72	32.35	24.85	25.18	25.23	22.40	14.93	18.22	14.54
AB	24.88	31.02	24.88	23.16	22.38	24.02	20.64	20.80	25.85	24.35	29.50
AN	13.58	27.13	5.81	10.27	13.91	10.03	14.03	16.85	14.82	17.35	25.14
NE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIOP	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HYP	7.82	5.72	4.20	5.29	6.97	4.24	5.80	7.93	7.20	8.13	7.35
OL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MT	0.71	2.81	0.29	0.32	0.74	0.88	0.88	1.19	0.73	1.49	1.34
HEM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ILM	1.27	0.85	0.52	0.75	0.75	0.40	0.62	0.95	0.67	1.04	0.82
SPH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RUT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AP	<u>0.54</u>	<u>0.59</u>	<u>0.28</u>	<u>0.28</u>	<u>0.28</u>	<u>0.19</u>	<u>0.21</u>	<u>0.33</u>	<u>0.28</u>	<u>0.38</u>	<u>0.29</u>
SUM	100.02	100.01	100.01	99.98	100.00	100.00	100.01	99.99	100.00	100.00	100.01

NUMBER	191	192	193	194	195	196	197	198	199	200	201
SAMPLE	LP20730	LP50	79AWs75	79AWs76	79AWs77	79AWs80	79AWs85	79AWs89	79AWs94A	79AWs101	J8135
QTZ	29.10	19.98	14.04	38.51	32.34	34.77	29.59	26.20	34.70	0.00	39.47
COR	0.36	0.00	0.00	1.08	1.65	0.58	1.60	2.18	1.34	0.00	0.27
OR	28.81	26.51	34.75	30.81	31.73	23.04	19.07	20.15	29.28	26.23	20.25
AB	37.81	50.04	31.68	24.33	24.61	23.05	46.22	25.49	15.79	1.00	23.54
AN	2.25	1.38	9.97	2.48	4.60	13.92	0.60	15.46	13.12	1.04	9.24
NE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.35	0.00
AC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WO	0.00	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIOP	0.00	1.35	0.91	0.00	0.00	0.00	0.00	0.00	0.00	38.62	0.00
HYP	0.98	0.00	4.26	2.09	3.65	3.61	1.49	7.86	4.41	0.00	5.77
OL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.33	0.00
MT	0.62	0.47	2.74	0.57	0.61	0.60	1.22	0.97	0.62	8.93	0.69
HEM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ILM	0.00	0.00	0.95	0.16	0.54	0.31	0.00	1.03	0.56	3.59	0.54
SPH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RUT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AP	<u>0.09</u>	<u>0.05</u>	<u>0.71</u>	<u>0.00</u>	<u>0.28</u>	<u>0.14</u>	<u>0.21</u>	<u>0.66</u>	<u>0.19</u>	<u>6.92</u>	<u>0.23</u>
SUM	100.00	99.99	100.01	100.00	100.01	100.02	100.00	100.00	100.01	100.01	100.00

NUMBER	36	37	38	39	40	41	42	43	44	45	46
SAMPLE	71AFr507	71AFr596b	71AFr635	71AFr662	71AFr664	71AFr701	71AFr793	71AFr800	71AFr2024	71AFr2025	71AFr2179
QTZ	19.53	18.69	30.43	28.17	24.75	31.74	37.10	26.20	41.42	30.28	27.78
COR	0.00	0.00	2.29	2.36	1.92	2.52	1.99	2.35	1.93	1.59	1.20
OR	24.23	13.28	18.93	16.97	15.73	25.90	25.09	29.08	26.39	19.38	12.72
AB	19.08	18.13	25.97	26.03	20.79	25.01	24.80	28.61	18.89	21.68	24.29
AN	15.52	27.48	15.62	16.60	22.81	9.18	7.76	8.35	8.36	16.99	21.95
NE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIOP	4.56	1.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HYP	11.62	19.70	5.79	6.49	10.67	4.11	2.44	4.06	2.40	7.97	9.29
OL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MT	2.97	1.48	1.83	1.93	1.78	0.59	0.44	0.45	0.29	0.89	1.49
HEM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ILM	1.69	1.34	0.93	1.01	1.17	0.82	0.29	0.64	0.25	0.95	0.95
SPH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RUT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AP	<u>0.81</u>	<u>0.00</u>	<u>0.40</u>	<u>0.43</u>	<u>0.38</u>	<u>0.33</u>	<u>0.09</u>	<u>0.29</u>	<u>0.07</u>	<u>0.29</u>	<u>0.33</u>
SUM	100.01	100.01	99.99	99.99	100.00	100.00	100.00	100.01	100.00	100.02	100.00

NUMBER	202	203	204	205	206	207	208	209	210	211	212
SAMPLE	JB137	JB142	JB143	JB144	JB145	JB146	JB148	JB149	JB152	JB161	JB162
QTZ	40.44	30.50	30.89	30.64	34.37	35.41	33.20	36.83	36.71	33.02	35.50
COR	0.21	1.05	1.02	0.97	1.57	0.58	1.10	0.74	0.17	1.29	0.43
OR	21.81	21.78	21.83	24.27	26.17	21.08	20.54	23.45	23.92	26.46	26.93
AB	28.60	27.95	28.20	24.18	28.38	25.22	27.69	29.19	28.18	25.74	31.21
AN	6.56	11.26	11.29	10.34	7.59	10.26	10.71	7.01	7.63	9.05	3.98
NE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIOP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HYP	1.87	6.08	5.59	7.79	3.03	6.00	5.50	2.33	2.75	2.97	1.08
OL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MT	0.29	0.66	0.40	0.68	0.42	0.61	0.82	0.18	0.27	0.93	0.51
HEM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ILM	0.13	0.54	0.57	0.80	0.26	0.63	0.48	0.14	0.23	0.38	0.10
SPH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RUT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AP	<u>0.09</u>	<u>0.19</u>	<u>0.21</u>	<u>0.33</u>	<u>0.21</u>	<u>0.21</u>	<u>0.17</u>	<u>0.17</u>	<u>0.14</u>	<u>0.16</u>	<u>0.28</u>
SUM	100.00	100.01	100.00	100.00	100.00	100.00	100.01	100.02	100.00	100.00	100.02

NUMBER	47	48	49	50	51	52	53	54	55	56	57
SAMPLE	73AFr3191	66AWr78	73AWr88h	73AWr88k	74AFr638a	74AFr646a	74AFr771a	74AFr777c	74AFr3001	74AWr177a	74AWr198
QTZ	2.59	21.30	30.64	32.80	31.21	32.70	21.55	33.13	18.41	29.12	27.65
COR	0.00	0.26	0.16	1.53	1.86	0.02	0.12	1.89	0.00	1.25	0.74
OR	15.88	30.72	29.48	30.68	22.07	30.72	16.52	21.37	21.13	14.47	20.29
AB	27.63	29.32	31.76	31.92	27.36	28.78	34.40	29.04	27.78	29.37	30.08
AN	23.73	10.82	4.73	1.48	10.42	5.56	17.83	9.02	17.25	17.12	13.06
NE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIOP	13.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.78	0.00	0.00
HYP	9.62	5.33	2.25	0.34	5.50	1.13	6.21	4.66	10.56	6.58	6.20
OL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MT	5.48	1.46	0.64	0.91	0.58	0.77	1.86	0.15	1.58	0.76	0.94
HEM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ILM	1.40	0.68	0.23	0.23	0.72	0.23	1.12	0.49	1.18	0.94	0.75
SPH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RUT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AP	<u>0.69</u>	<u>0.31</u>	<u>0.12</u>	<u>0.12</u>	<u>0.28</u>	<u>0.10</u>	<u>0.40</u>	<u>0.28</u>	<u>0.38</u>	<u>0.38</u>	<u>0.31</u>
SUM	100.01	100.00	100.01	100.01	100.00	100.01	100.01	100.01	100.01	99.99	100.02

NUMBER	213	214	215	216	217	218	219	220	221	222	223
SAMPLE	JB165	JB166b	JB167	JB173	JB175	JB179	JB186	JB189	JB192	JB194	JB195
QTZ	34.54	33.00	33.44	36.86	32.52	31.86	37.23	34.38	33.48	36.96	29.58
COR	0.59	0.00	1.43	0.87	0.53	0.41	1.29	1.46	0.78	0.00	0.61
OR	25.09	27.96	24.70	20.93	25.61	29.97	23.17	27.87	26.70	26.48	24.98
AB	28.53	31.94	25.48	26.43	24.93	27.20	25.84	23.99	26.88	27.27	26.55
AN	9.41	5.56	9.35	11.06	10.62	7.15	8.12	8.09	8.11	7.39	11.69
NE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIOP	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.00
HYP	0.77	0.91	4.16	2.66	4.23	2.63	3.10	3.18	2.93	1.13	4.94
OL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MT	0.30	0.22	0.77	0.62	0.83	0.42	0.69	0.55	0.69	0.35	0.72
HEM	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ILM	0.37	0.08	0.46	0.30	0.50	0.25	0.38	0.34	0.31	0.15	0.61
SPH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RUT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AP	<u>0.19</u>	<u>0.09</u>	<u>0.21</u>	<u>0.25</u>	<u>0.23</u>	<u>0.12</u>	<u>0.19</u>	<u>0.14</u>	<u>0.14</u>	<u>0.12</u>	<u>0.33</u>
SUM	100.01	100.01	100.00	99.98	100.00	100.01	100.01	100.00	100.00	100.00	100.01

NUMBER	58	59	60	61	62	63	64	65	66	67	68
SAMPLE	74AWr202a	74AWr233	74AWr254a	74AWr370	74AFr207a	72AFr215	75AFr238	75AFr630	75AFr636b	75AFr663a	75AFr675
QTZ	32.45	31.55	31.23	8.24	28.27	27.63	27.46	32.00	33.38	26.65	18.72
COR	0.00	0.26	0.62	0.00	0.22	0.08	1.21	0.00	0.00	1.00	0.00
OR	27.26	26.85	23.83	14.02	31.40	24.54	22.45	30.70	29.15	19.77	20.09
AB	36.72	35.12	32.49	25.38	33.80	27.21	27.74	33.08	32.65	27.45	23.48
AN	1.95	3.54	8.97	25.49	4.51	13.63	13.12	1.18	2.38	15.99	21.65
NE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIOP	0.06	0.00	0.00	5.72	0.00	0.00	0.00	1.07	0.50	0.00	2.18
HYP	0.53	1.72	2.15	15.95	1.09	5.14	6.55	1.01	1.30	6.97	10.76
OL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MT	0.85	0.63	0.31	1.53	0.44	0.84	0.37	0.71	0.43	0.96	1.41
HEM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ILM	0.13	0.25	0.29	2.69	0.17	0.70	0.80	0.23	0.19	0.92	1.32
SPH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RUT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AP	<u>0.05</u>	<u>0.09</u>	<u>0.12</u>	<u>0.98</u>	<u>0.09</u>	<u>0.24</u>	<u>0.31</u>	<u>0.05</u>	<u>0.02</u>	<u>0.31</u>	<u>0.38</u>
SUM	100.00	100.01	100.01	100.00	99.99	100.01	100.01	100.01	100.00	100.02	99.99

NUMBER	224	225	226	227	228	229	230	231	232	233	234
SAMPLE	JB214	JB106	JB108	JB116a	JB127	JB128	JB132	JB134	JB213	JB215	JB201
QTZ	33.31	27.97	26.16	32.04	30.96	31.18	30.95	38.15	30.31	24.87	13.36
COR	0.91	1.43	0.15	0.21	1.32	1.30	1.18	1.15	0.61	0.02	0.00
OR	23.67	20.64	25.09	24.17	18.77	21.89	22.06	20.04	18.43	18.06	14.99
AB	29.67	31.11	34.01	27.69	27.22	26.03	28.86	24.43	30.15	30.51	21.29
AN	8.32	10.50	10.23	11.20	13.55	12.88	10.98	9.63	13.88	16.58	26.58
NE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIOP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.14
HYP	2.97	6.06	3.03	3.27	6.10	4.70	4.39	5.05	4.55	7.02	15.78
OL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MT	0.59	1.19	0.43	0.69	0.85	1.00	0.58	0.83	0.95	1.40	1.59
HEM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ILM	0.37	0.78	0.64	0.58	0.95	0.90	0.71	0.50	0.77	1.10	1.76
SPH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RUT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AP	<u>0.19</u>	<u>0.33</u>	<u>0.26</u>	<u>0.19</u>	<u>0.28</u>	<u>0.35</u>	<u>0.30</u>	<u>0.23</u>	<u>0.35</u>	<u>0.45</u>	<u>0.51</u>
SUM	100.00	100.01	100.00	100.02	100.00	100.01	100.01	100.01	100.00	100.01	100.00

NUMBER	69	70	71	72	73	74	75	76	77	78	79
SAMPLE	75AFr733	75AFr754b	75AFr781a	75AFr3308	75AFr2005/8	75AFr2025	75AFr2171	75AFr2175	75AFr2182	75AFr3087	75AFr3142
QTZ	24.48	30.35	26.77	16.04	29.17	30.98	26.45	20.20	2.59	16.10	27.57
COR	0.75	0.08	0.91	0.00	0.23	0.88	0.24	0.08	0.00	0.00	1.05
OR	14.06	30.25	29.68	19.93	26.04	22.81	21.85	18.90	20.41	12.00	25.24
AB	29.75	35.78	29.55	26.11	37.29	24.56	28.62	30.24	20.17	18.74	31.64
AN	19.63	2.68	7.41	21.22	4.75	13.46	15.36	19.87	23.58	26.39	8.45
NE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIOP	0.00	0.00	0.00	1.50	0.00	0.00	0.00	0.00	13.53	6.98	0.00
HYP	9.33	0.35	3.37	12.80	1.60	5.71	4.81	7.93	15.79	16.50	3.97
OL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MT	0.55	0.28	1.13	0.70	0.47	0.83	1.64	1.42	1.42	1.52	1.41
HEM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ILM	1.07	0.12	0.83	1.30	0.33	0.58	0.73	1.03	1.86	1.45	0.51
SPH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RUT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AP	<u>0.38</u>	<u>0.12</u>	<u>0.38</u>	<u>0.40</u>	<u>0.14</u>	<u>0.19</u>	<u>0.31</u>	<u>0.35</u>	<u>0.66</u>	<u>0.31</u>	<u>0.17</u>
SUM	100.00	100.01	100.01	100.00	100.02	100.00	100.01	100.02	100.01	99.99	100.01

NUMBER	235	236	237	238	239	240	241	242	243	244	245
SAMPLE	JB203	JB205	JB207	JB211	JB216	JB218	JB133	JB139	JB141	JB150	JB191
QTZ	14.25	19.26	20.78	27.69	24.23	19.03	33.57	35.92	35.44	32.22	35.10
COR	0.00	0.00	0.00	2.51	0.00	0.00	2.12	0.26	0.59	1.93	2.18
OR	14.51	16.45	18.00	21.08	19.13	13.51	27.32	25.45	26.88	27.66	27.23
AB	21.89	20.98	18.22	20.35	22.67	30.65	33.43	31.58	30.15	33.49	32.71
AN	25.39	25.78	25.67	16.30	19.81	20.92	0.87	4.46	4.82	1.13	0.82
NE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIOP	3.45	0.20	0.96	0.00	1.38	0.64	0.00	0.00	0.00	0.00	0.00
HYP	16.69	13.66	14.47	8.37	9.53	12.53	1.64	1.96	1.65	1.75	0.30
OL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MT	1.47	1.59	1.62	1.91	1.22	0.87	1.11	0.15	0.27	1.67	1.42
HEM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ILM	1.82	1.65	1.87	1.30	1.50	1.38	0.04	0.08	0.12	0.04	0.04
SPH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RUT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AP	<u>0.54</u>	<u>0.45</u>	<u>0.42</u>	<u>0.50</u>	<u>0.52</u>	<u>0.47</u>	<u>0.12</u>	<u>0.14</u>	<u>0.09</u>	<u>0.12</u>	<u>0.21</u>
SUM	100.01	100.02	100.01	100.01	99.99	100.00	100.02	100.00	100.01	100.01	100.01

NUMBER	80	81	82	83	84	85	86	87	88	89	90
SAMPLE	75AFr3151	75AFr3159	75AWr181a	75AWr544	76AFr516	77AWr174	77AWr423	74AFr3133a	ECPD-46	ECC-1-228	ECP-4-16
QTZ	24.53	21.51	33.86	26.65	17.89	37.17	20.80	26.40	34.17	34.14	31.84
COR	0.48	2.27	2.15	1.63	0.00	3.31	0.21	0.78	2.03	4.22	5.16
OR	22.82	19.82	27.79	31.30	10.13	28.76	14.01	20.76	32.04	21.25	32.72
AB	27.28	27.42	27.28	26.20	16.52	25.24	32.34	28.43	24.31	21.20	25.57
AN	15.98	16.64	5.27	9.22	33.80	2.94	21.85	14.77	5.15	9.71	1.03
NE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIOP	0.00	0.00	0.00	0.00	0.59	0.00	0.00	0.00	0.00	0.00	0.00
HYP	7.01	9.79	2.45	3.72	16.58	1.66	7.46	8.70	1.28	8.04	1.82
OL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MT	0.69	0.68	0.55	0.44	1.72	0.33	1.87	1.01	0.95	0.81	1.75
HEM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ILM	0.90	1.27	0.37	0.63	2.20	0.25	1.09	0.83	0.04	0.40	0.06
SPH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RUT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AP	<u>0.33</u>	<u>0.59</u>	<u>0.26</u>	<u>0.21</u>	<u>0.57</u>	<u>0.35</u>	<u>0.38</u>	<u>0.33</u>	<u>0.02</u>	<u>0.23</u>	<u>0.05</u>
SUM	100.02	99.99	99.98	100.00	100.00	100.01	100.01	100.01	99.99	100.00	100.00

NUMBER	251	252	253	254	255	276	278	279	280	281	282
SAMPLE	Ci53	Ci38	Ci41	Ci42	Ci59	2294	84TS43	84TS44	84TS45	84TS46	84TS48
QTZ	34.38	34.21	34.83	19.84	29.03	35.74	24.16	25.84	25.30	30.05	30.78
COR	0.00	0.65	0.20	0.00	0.36	1.19	0.00	0.58	0.45	1.57	2.61
OR	32.89	34.14	34.82	26.48	28.79	26.88	26.46	24.83	26.14	23.32	29.18
AB	25.69	23.16	23.21	49.98	37.79	32.88	22.63	23.16	23.15	24.53	29.40
AN	3.90	4.01	3.83	1.38	2.25	2.82	16.24	15.91	15.62	12.94	4.55
NE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIOP	0.15	0.00	0.00	1.81	0.00	0.00	0.15	0.00	0.00	0.00	0.00
HYP	1.73	2.17	1.91	0.00	1.07	0.37	7.72	7.53	7.31	5.94	2.07
OL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MT	1.10	1.29	1.14	0.47	0.82	0.10	1.29	0.92	0.90	0.61	0.63
HEM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ILM	0.10	0.29	0.19	0.00	0.00	0.06	1.02	0.95	0.87	0.79	0.42
SPH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RUT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AP	<u>0.07</u>	<u>0.09</u>	<u>0.07</u>	<u>0.05</u>	<u>0.09</u>	<u>0.17</u>	<u>0.33</u>	<u>0.28</u>	<u>0.26</u>	<u>0.26</u>	<u>0.35</u>
SUM	100.00	100.00	100.00	100.00	100.00	100.01	100.00	100.00	100.00	100.01	99.99

NUMBER	91	92	93	94	95	96	97	100	101	102	103
SAMPLE	ECC-2-124	ECPD-205	ECPD-35	ECC-4-26	AP-1	HL-1	MtFairplay	MCD82	MCD56	MCD59	MCD96
QTZ	34.29	21.52	22.05	15.37	36.30	2.62	0.00	0.00	0.00	0.00	0.00
COR	0.89	0.00	0.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OR	22.80	16.01	20.91	18.78	28.10	19.19	32.08	0.00	19.59	9.15	9.64
AB	31.71	17.35	21.65	18.13	29.39	18.12	29.25	39.11	26.99	20.32	5.15
AN	7.16	25.80	21.29	28.12	0.00	27.69	15.27	28.66	19.70	26.41	22.41
NE	0.00	0.00	0.00	0.00	0.00	0.00	5.35	1.54	0.67	1.73	9.80
AC	0.00	0.00	0.00	0.00	1.27	0.00	0.00	0.00	0.00	0.00	0.00
NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIOP	0.00	2.08	0.00	1.19	3.40	8.70	9.41	10.37	10.28	18.25	28.56
HYP	2.80	12.29	11.90	14.02	1.27	20.21	0.00	0.00	0.00	0.00	0.00
OL	0.00	0.00	0.00	0.00	0.00	0.00	2.99	13.62	7.88	17.73	15.61
MT	0.07	2.83	0.09	1.71	0.27	1.41	3.86	2.43	9.95	2.68	5.00
HEM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ILM	0.21	1.64	1.27	1.97	0.00	1.45	1.05	4.15	4.80	3.67	3.67
SPH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RUT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AP	<u>0.07</u>	<u>0.49</u>	<u>0.49</u>	<u>0.72</u>	<u>0.00</u>	<u>0.61</u>	<u>0.75</u>	<u>0.14</u>	<u>0.14</u>	<u>0.07</u>	<u>0.17</u>
SUM	100.00	100.01	100.01	100.01	100.00	100.00	100.01	100.02	100.00	100.01	100.01

NUMBER	283	284	285	286	287	318	319	320	321	322	323
SAMPLE	89RN105	89RB112	2880	2890	2911	88RN300AP	88RN300BL	88RN301	88RN301M	88RN303AP	MOSQUITO-1
QTZ	25.32	29.54	32.39	29.11	28.98	36.29	23.23	26.51	13.29	37.94	26.01
COR	0.46	1.63	0.76	1.21	0.53	1.12	1.21	0.56	0.00	1.60	1.53
OR	26.36	22.09	23.81	25.01	24.52	28.18	20.56	26.50	22.40	34.13	5.64
AB	35.57	35.25	27.29	32.11	23.37	30.72	35.03	28.48	32.07	25.03	39.47
AN	7.18	7.05	10.81	8.72	13.98	2.57	13.82	11.82	17.10	0.67	17.67
NE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIOP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.10	0.00	0.00
HYP	3.96	3.48	3.61	2.80	6.50	0.28	3.45	2.58	9.42	0.03	5.86
OL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MT	0.51	0.28	0.65	0.47	1.08	0.40	1.78	2.58	2.99	0.40	2.29
HEM	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.00
ILM	0.45	0.47	0.54	0.41	0.85	0.08	0.60	0.56	1.00	0.08	1.11
SPH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RUT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AP	<u>0.19</u>	<u>0.21</u>	<u>0.14</u>	<u>0.17</u>	<u>0.19</u>	<u>0.12</u>	<u>0.33</u>	<u>0.42</u>	<u>0.64</u>	<u>0.12</u>	<u>0.43</u>
SUM	100.00	100.00	100.00	100.01	100.00	100.01	100.01	99.99	100.01	100.00	100.01

NUMBER	104	105	106	107	108	109	110	111	112	113	114
SAMPLE	63Ba3001	62ACn544	62Ba2421	62Ba2415	62Ba2424a	61Ba1634	63Ba3084	62Ba2490	60ABa297	TS222	MW111
QTZ	32.07	29.65	40.09	38.09	45.20	34.68	0.00	0.00	6.52	47.04	61.84
COR	2.33	2.38	3.08	4.77	3.48	2.72	0.00	0.00	0.00	2.12	0.09
OR	24.58	22.74	29.58	26.27	25.63	23.98	13.44	4.01	5.45	35.43	17.05
AB	25.76	18.85	20.74	24.79	14.51	31.75	19.59	16.76	21.11	2.67	18.66
AN	7.84	15.02	0.44	2.33	6.93	3.88	21.17	25.52	19.52	10.98	1.28
NE	0.00	0.00	0.00	0.00	0.00	0.00	5.27	0.00	0.00	0.00	0.00
AC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIOP	0.00	0.00	0.00	0.00	0.00	0.00	15.90	16.18	30.48	0.00	0.00
HYP	4.59	8.53	3.95	2.70	3.36	2.26	0.00	3.19	5.73	0.38	0.35
OL	0.00	0.00	0.00	0.00	0.00	0.00	8.29	23.53	0.00	0.00	0.00
MT	1.62	1.47	1.36	0.32	0.15	0.10	2.83	4.23	8.65	1.19	0.00
HEM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.60
ILM	0.60	1.02	0.31	0.12	0.21	0.06	11.11	5.55	1.81	0.16	0.04
SPH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RUT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
AP	<u>0.61</u>	<u>0.38</u>	<u>0.47</u>	<u>0.63</u>	<u>0.58</u>	<u>0.59</u>	<u>2.41</u>	<u>1.04</u>	<u>0.73</u>	<u>0.05</u>	<u>0.05</u>
SUM	100.00	100.02	100.00	100.02	100.01	100.00	100.01	100.01	100.00	100.02	100.00

NUMBER	324	325	326	327	328	329	330	331	332	333	334
SAMPLE	TAUR-1	AS-1	TOK-1	TOK-2	TOK-3	63AFr223	64AFr31	64AFr79	64AFr138	64AFr142	64AFr172
QTZ	20.26	25.96	25.18	21.62	22.03	23.77	18.45	27.18	24.97	29.07	31.22
COR	1.15	0.32	1.78	1.09	0.02	0.00	0.00	0.00	0.50	2.41	1.03
OR	8.72	18.58	23.65	22.11	23.96	24.79	11.40	18.82	19.66	16.75	23.19
AB	34.79	27.48	27.16	25.22	26.92	32.55	31.17	36.18	27.72	14.98	29.24
AN	20.88	17.74	12.99	17.74	17.38	12.50	23.43	13.05	17.29	20.10	9.49
NE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIOP	0.00	0.00	0.00	0.00	0.00	0.88	1.21	0.44	0.00	0.00	0.00
HYP	6.07	7.14	5.50	8.30	5.58	2.95	10.45	2.66	6.59	13.74	4.53
OL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MT	2.85	1.73	2.51	2.43	2.87	1.69	2.25	1.01	2.02	1.41	0.75
HEM	3.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ILM	1.25	0.80	0.87	1.04	0.88	0.54	1.32	0.44	0.94	1.30	0.43
SPH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RUT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AP	<u>0.70</u>	<u>0.24</u>	<u>0.36</u>	<u>0.45</u>	<u>0.36</u>	<u>0.33</u>	<u>0.33</u>	<u>0.21</u>	<u>0.33</u>	<u>0.24</u>	<u>0.14</u>
SUM	100.00	99.99	100.00	100.00	100.00	100.00	100.01	99.99	100.02	100.00	100.02

NUMBER	115	116	117	118	119	120	121	122	123	124	125
SAMPLE	RR151	TS52	TS60a	DNS93	DNS110	TS60b	TS67	DNS113	MW15a	LB25	DA116
QTZ	34.09	32.73	36.70	40.42	34.79	36.51	33.80	33.64	32.92	31.56	34.20
COR	0.41	0.00	0.00	0.43	0.00	0.53	0.00	0.03	0.44	0.00	1.02
OR	30.31	30.64	28.82	28.72	29.90	28.24	30.18	29.04	30.50	32.11	31.44
AB	28.53	29.11	28.99	25.31	29.82	29.05	30.45	30.76	30.42	32.40	29.93
AN	3.25	3.65	2.39	4.20	2.30	3.26	2.50	3.43	3.86	1.98	2.80
NE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIOP	0.00	0.63	0.58	0.00	1.01	0.00	0.69	0.00	0.00	1.08	0.00
HYP	2.58	2.04	1.65	1.74	1.26	1.55	1.47	2.24	1.24	0.18	0.23
OL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MT	0.38	0.69	0.53	0.85	0.60	0.50	0.60	0.47	0.42	0.59	0.28
HEM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ILM	0.35	0.40	0.29	0.27	0.25	0.25	0.25	0.29	0.15	0.12	0.06
SPH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RUT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AP	<u>0.12</u>	<u>0.12</u>	<u>0.07</u>	<u>0.07</u>	<u>0.07</u>	<u>0.12</u>	<u>0.07</u>	<u>0.09</u>	<u>0.05</u>	<u>0.05</u>	<u>0.05</u>
SUM	100.02	100.01	100.02	100.01	100.00	100.01	100.01	99.99	100.00	100.01	100.01

NUMBER	335	336	337	338	339	340	341	342	343	344	345
SAMPLE	64AFr227	68AFr107	68AFr227	69AFr664	69AFr696	69AFr721	69AFr800A	70AFr310	70AFr430	70AFr466	70AFr2466B
QTZ	24.32	11.44	10.33	26.42	27.17	20.41	23.81	32.18	25.07	26.96	22.18
COR	0.48	0.00	0.00	0.60	1.34	1.16	0.03	1.97	1.13	1.77	0.92
OR	17.49	18.26	20.21	19.60	18.70	19.07	15.56	27.88	30.06	23.61	26.00
AB	28.38	21.58	25.96	26.77	26.25	28.37	29.56	27.47	29.92	28.82	28.12
AN	18.99	19.31	15.23	17.41	16.94	20.17	21.50	6.54	8.06	11.52	14.21
NE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIOP	0.00	7.83	12.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HYP	6.50	13.43	6.27	7.21	7.11	8.13	5.83	2.96	3.60	5.48	6.29
OL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MT	2.42	5.20	8.88	0.96	1.22	1.41	2.39	0.34	1.07	0.71	0.96
HEM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ILM	1.06	1.89	1.61	0.81	0.95	1.00	0.87	0.42	0.75	0.77	0.95
SPH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RUT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AP	<u>0.37</u>	<u>1.27</u>	<u>1.15</u>	<u>0.24</u>	<u>0.33</u>	<u>0.29</u>	<u>0.45</u>	<u>0.24</u>	<u>0.35</u>	<u>0.38</u>	<u>0.38</u>
SUM	100.01	100.01	100.01	100.02	100.01	100.01	100.00	100.00	100.01	100.02	100.01

NUMBER	126	127	128	129	130	131	132	133	134	135	136
SAMPLE	DA19c	RN130	TS58	RR149	DNS124	MA89	DNS106	MA103	RN127	MW73	DA137
QTZ	31.97	33.37	34.20	35.16	35.72	33.86	35.90	35.78	32.83	28.22	35.98
COR	0.51	0.70	1.44	0.38	1.68	0.31	1.58	1.11	0.88	0.56	2.62
OR	32.75	30.17	29.32	28.09	29.20	27.94	28.32	29.07	28.29	32.31	27.18
AB	29.34	30.43	29.71	30.76	27.19	32.95	29.75	27.01	34.60	32.78	31.01
AN	4.43	2.45	1.94	2.69	3.40	2.04	2.53	4.01	1.58	2.74	1.45
NE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIOP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HYP	0.66	1.70	2.39	2.02	1.92	2.03	1.22	2.02	1.30	2.30	1.06
OL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MT	0.19	0.67	0.46	0.42	0.38	0.41	0.35	0.48	0.25	0.43	0.42
HEM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ILM	0.10	0.33	0.37	0.33	0.31	0.31	0.21	0.34	0.15	0.37	0.08
SPH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RUT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AP	0.07	0.19	0.19	0.18	0.21	0.16	0.16	0.19	0.14	0.33	0.21
SUM	100.02	100.01	100.02	100.01	100.01	100.01	100.00	100.01	100.00	100.02	100.01

NUMBER	346	347	348	349	350	351	352	353	354	355	356
SAMPLE	70AFr2467	70AFr2471	70AFr2497A	70AFr2497B	70AWr67B	71AFr99	71AFr357	71AFr363	71AFr717	71AFr718	71AFr719
QTZ	28.83	34.77	28.16	33.96	33.36	21.43	24.33	25.69	28.40	30.71	25.30
COR	1.65	2.53	1.13	1.04	1.07	0.00	0.29	0.38	1.09	1.02	0.79
OR	29.32	25.82	25.68	28.20	29.77	22.29	16.46	21.20	25.66	31.41	24.09
AB	27.22	27.28	31.61	33.90	27.47	24.61	28.57	34.32	33.85	26.76	25.33
AN	7.95	5.54	8.14	1.90	5.16	19.64	20.36	13.00	6.87	6.02	15.57
NE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIOP	0.00	0.00	0.00	0.00	0.00	0.27	0.00	0.00	0.00	0.00	0.00
HYP	3.39	3.12	4.17	0.29	2.23	8.92	7.03	3.27	2.67	2.47	6.77
OL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MT	0.82	0.31	0.59	0.58	0.60	1.52	1.81	1.52	0.91	0.74	1.05
HEM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ILM	0.59	0.35	0.39	0.06	0.25	1.02	0.87	0.48	0.54	0.64	0.82
SPH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RUT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AP	0.23	0.28	0.14	0.07	0.09	0.31	0.28	0.14	0.21	0.24	0.28
SUM	100.00	100.00	100.01	100.00	100.00	100.01	100.00	100.00	100.00	100.01	100.00

NUMBER	137	138	139	140	141	142	143	144	145	146	147	148
SAMPLE	RN175a	DNS122	DNS121	DNS119	DA186	GP180	GP157	DNS178	DNS180	MA114	DNS179	RR129b
QTZ	30.64	31.86	33.29	28.57	25.24	30.19	25.68	31.51	31.45	27.42	32.18	26.03
COR	2.29	2.86	1.03	0.76	1.28	1.15	0.00	1.46	1.05	0.61	1.04	0.00
OR	25.59	25.16	27.42	33.28	26.40	30.68	22.36	30.13	29.19	32.42	26.83	22.73
AB	39.02	37.39	34.72	34.72	45.62	30.87	38.50	29.90	30.13	32.63	38.18	49.50
AN	1.19	1.26	1.56	1.02	0.47	4.44	8.04	3.99	4.72	4.00	1.16	0.00
NE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.43
NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.39
WO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.62
DIOP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16
HYP	0.60	0.63	1.26	0.80	0.00	1.63	3.82	1.92	2.02	1.43	0.03	0.00
OL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MT	0.37	0.35	0.41	0.55	0.08	0.63	0.60	0.47	0.73	0.85	0.00	0.00
HEM	0.00	0.00	0.00	0.00	0.29	0.00	0.00	0.00	0.00	0.00	0.40	0.00
ILM	0.08	0.08	0.17	0.12	0.06	0.40	0.69	0.42	0.46	0.39	0.04	0.02
SPH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07
RUT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00
AP	<u>0.23</u>	<u>0.42</u>	<u>0.14</u>	<u>0.19</u>	<u>0.56</u>	<u>0.21</u>	<u>0.33</u>	<u>0.21</u>	<u>0.26</u>	<u>0.26</u>	<u>0.12</u>	<u>0.05</u>
SUM	100.01	100.01	100.00	100.01	100.00	100.00	100.02	100.01	100.01	100.01	100.00	100.00

NUMBER	357	358	359	360	361	362	363	364	365	366	367	368
SAMPLE	71AFr728	71AWr86A	74ARh70	90RN09	90RN10	90RN20a	90RN20b	90RN21	90RN22	90RN25a	90RN25b	70AMn16
QTZ	30.80	30.05	28.41	33.53	25.81	30.16	36.30	27.36	27.90	31.33	37.96	5.64
COR	1.51	0.96	0.17	0.27	0.12	0.89	0.94	0.00	0.42	0.34	1.07	0.00
OR	21.74	29.26	28.96	27.70	24.96	27.07	30.66	26.11	25.76	20.74	30.03	21.69
AB	34.73	26.65	33.36	29.92	32.13	32.63	28.76	32.41	32.28	32.33	28.52	23.29
AN	7.23	8.96	5.34	5.94	10.22	6.85	2.81	9.30	8.95	10.52	1.82	24.09
NE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIOP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.47	0.00	0.00	0.00	4.05
HYP	3.10	2.85	2.48	0.78	4.75	0.88	0.15	2.48	2.66	2.55	0.15	16.02
OL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MT	0.28	0.82	0.85	1.00	1.28	0.59	0.00	1.22	1.34	1.50	0.00	2.66
HEM	0.00	0.00	0.00	0.42	0.00	0.43	0.26	0.00	0.00	0.00	0.34	0.00
ILM	0.44	0.33	0.35	0.33	0.56	0.38	0.02	0.46	0.48	0.54	0.00	1.74
SPH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RUT	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.06	0.00
AP	<u>0.16</u>	<u>0.12</u>	<u>0.09</u>	<u>0.12</u>	<u>0.19</u>	<u>0.14</u>	<u>0.05</u>	<u>0.19</u>	<u>0.21</u>	<u>0.16</u>	<u>0.05</u>	<u>0.83</u>
SUM	99.99	100.00	100.01	100.01	100.02	100.02	100.00	100.00	100.00	100.01	100.00	100.00

NUMBER	149	150	151	152	153	154	155	156	157	158	159
SAMPLE	RR135	DA217a	RN196b	RN183-185	DNS111	DNS52	MA224	GP283b	RS283b	RS87	GP282
QTZ	30.97	34.28	27.48	31.37	5.50	1.19	19.38	6.73	8.46	14.38	19.79
COR	0.00	0.41	2.50	0.06	0.00	0.00	1.97	0.00	0.00	0.00	0.00
OR	23.09	23.10	26.76	30.52	3.51	7.85	27.76	32.87	29.25	27.85	32.46
AB	44.10	34.54	29.02	35.89	21.10	28.17	9.76	15.01	13.54	31.37	23.59
AN	0.96	5.04	2.74	1.40	33.30	27.71	15.79	17.13	18.43	10.88	14.25
NE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WO	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIOP	0.16	0.00	0.00	0.00	7.97	6.31	0.00	5.39	4.02	4.60	0.45
HYP	0.00	1.83	8.45	0.35	22.18	23.05	19.18	17.33	20.90	8.08	8.13
OL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MT	0.00	0.32	1.51	0.15	2.89	2.05	3.24	2.25	2.15	0.90	0.06
HEM	0.19	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ILM	0.02	0.35	1.12	0.13	3.10	3.02	1.76	1.91	1.94	1.23	0.87
SPH	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RUT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AP	<u>0.09</u>	<u>0.14</u>	<u>0.42</u>	<u>0.07</u>	<u>0.65</u>	<u>0.66</u>	<u>1.16</u>	<u>1.39</u>	<u>1.32</u>	<u>0.73</u>	<u>0.41</u>
SUM	99.99	100.01	100.00	100.01	100.00	100.01	100.00	100.01	100.01	100.02	100.01

NUMBER	369	370	371	372	373	374	375	376	377	378	379
SAMPLE	67ACx211	68ARh369	70AMn106	71ARh76	71ARh77	71ARh117	4514	4515	4516	4517	4518
QTZ	15.89	22.56	5.26	29.47	15.74	30.02	30.73	32.82	0.00	28.45	21.02
COR	0.44	0.58	0.00	1.07	0.02	1.87	0.57	1.58	0.00	0.14	0.21
OR	22.79	23.30	30.81	28.74	15.55	29.33	30.01	33.22	6.44	25.39	21.15
AB	24.04	33.36	23.20	20.58	25.70	29.14	26.31	25.37	25.44	27.59	27.52
AN	19.79	12.11	19.50	12.71	26.06	7.07	7.19	3.73	27.97	12.84	19.56
NE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIOP	0.00	0.00	8.36	0.00	0.00	0.00	0.00	0.00	14.83	0.00	0.00
HYP	14.27	6.08	10.90	5.52	14.61	1.62	2.65	1.85	6.24	3.76	6.33
OL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.59	0.00	0.00
MT	0.88	0.81	2.06	1.03	0.91	0.73	1.39	0.81	3.10	1.03	1.92
HEM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ILM	1.25	0.88	1.41	0.58	1.04	0.06	0.83	0.35	3.74	0.58	1.69
SPH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RUT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AP	<u>0.66</u>	<u>0.33</u>	<u>0.71</u>	<u>0.31</u>	<u>0.38</u>	<u>0.16</u>	<u>0.33</u>	<u>0.28</u>	<u>0.85</u>	<u>0.24</u>	<u>0.61</u>
SUM	100.00	100.00	100.00	100.00	100.00	100.00	100.01	100.01	100.00	100.02	100.01

NUMBER	160	161	162	163	164	165	166
SAMPLE	LB43a	RN178a	LB44	LB94	JB39	30545	30546
QTZ	34.55	32.41	28.19	34.05	0.00	39.04	37.15
COR	1.22	4.33	1.66	1.77	0.00	0.03	1.55
OR	29.63	26.49	26.49	23.51	40.21	25.45	38.29
AB	30.58	33.66	40.87	38.42	5.78	32.83	21.54
AN	1.60	0.58	0.68	0.63	4.28	1.93	0.07
NE	0.00	0.00	0.00	0.00	3.06	0.00	0.00
AC	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NA	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WO	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIOP	0.00	0.00	0.00	0.00	31.03	0.00	0.00
HYP	1.60	1.63	2.00	1.00	0.00	0.02	0.42
OL	0.00	0.00	0.00	0.00	8.48	0.00	0.00
MT	0.67	0.76	0.00	0.28	4.32	0.57	0.82
HEM	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ILM	0.10	0.10	0.06	0.08	1.48	0.08	0.12
SPH	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RUT	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AP	<u>0.05</u>	<u>0.05</u>	<u>0.05</u>	<u>0.26</u>	<u>1.37</u>	<u>0.05</u>	<u>0.05</u>
SUM	100.00	100.01	100.00	100.00	100.01	100.00	100.01

NUMBER	380	381	382	383	384	385
SAMPLE	4519	4520	4521	4522	4523	4524
QTZ	35.10	32.48	28.96	2.64	37.07	37.18
COR	0.11	0.96	0.36	0.00	0.73	0.75
OR	29.89	24.61	24.59	6.56	31.85	32.45
AB	28.51	26.17	29.21	27.56	25.29	24.26
AN	5.06	11.20	11.54	23.99	2.28	2.24
NE	0.00	0.00	0.00	0.00	0.00	0.00
AC	0.00	0.00	0.00	0.00	0.00	0.00
NA	0.00	0.00	0.00	0.00	0.00	0.00
WO	0.00	0.00	0.00	0.00	0.00	0.00
DIOP	0.00	0.00	0.00	9.97	0.00	0.00
HYP	0.86	2.91	3.45	19.32	0.81	1.51
OL	0.00	0.00	0.00	0.00	0.00	0.00
MT	0.29	0.89	1.03	2.78	1.47	1.11
HEM	0.00	0.00	0.00	0.00	0.00	0.00
ILM	0.13	0.60	0.63	5.39	0.39	0.39
SPH	0.00	0.00	0.00	0.00	0.00	0.00
RUT	0.00	0.00	0.00	0.00	0.00	0.00
AP	<u>0.05</u>	<u>0.21</u>	<u>0.23</u>	<u>1.83</u>	<u>0.12</u>	<u>0.12</u>
SUM	100.00	100.01	100.00	100.02	100.01	100.01

APPENDIX 2

DGGS trace element data, previously unpublished.

* analyzed by Bondar-Clegg. (All others analyzed by XRAL.)
- not analyzed.

NUMBER	SAMPLE	Rb(ppm)	Sr(ppm)	Y(ppm)	Nb(ppm)	Zr(ppm)	Ba(ppm)	Cr2O3(wt%)
5	72AFr216	166.0	289.0	18.0	<10	120.0	921.0	<0.01
6	70AWr319	622.0	<10	60.0	29.0	63.0	139.0	<0.01
48	66AWr78	197.0	393.0	30.0	30.0	194.0	1360.0	<0.01
49	73AWr88h	258.0	21.0	31.0	11.0	117.0	212.0	<0.01
50	73AWr88k	276.0	52.0	41.0	21.0	115.0	280.0	0.01
51	74AFr638A	139.0	262.0	30.0	10.0	148.0	1050.0	<0.01
52	74AFr646a	125.0	145.0	28.0	12.0	89.0	1090.0	<0.01
53	74AFr771a	118.0	345.0	42.0	14.0	211.0	767.0	<0.01
54	74AFr777c	133.0	316.0	17.0	16.0	134.0	1300.0	<0.01
55	74AFr3001	159.0	465.0	<10	28.0	146.0	1450.0	0.01
56	74AWr177a	105.0	392.0	57.0	12.0	189.0	614.0	<0.01
57	74AWr196	186.0	236.0	60.0	15.0	131.0	744.0	<0.01
58	74AWr202a	197.0	<10	52.0	30.0	82.0	303.0	<0.01
59	74AWr233	207.0	69.0	75.0	28.0	95.0	622.0	<0.01
60	74AWr254a	124.0	419.0	<10	22.0	52.0	1230.0	<0.01
61	74AWr370	88.0	713.0	29.0	28.0	142.0	1690.0	<0.01
62	75AFr207a	310.0	65.0	46.0	32.0	72.0	479.0	<0.01
63	72AFr215	163.0	367.0	14.0	22.0	139.0	1080.0	<0.01
64	75AFr238	168.0	305.0	29.0	<10	154.0	991.0	<0.01
65	75AFr630	506.0	<10	132.0	63.0	240.0	43.0	0.01
66	75AFr636b	558.0	<10	198.0	56.0	191.0	73.0	<0.01
67	75AFr663a	133.0	359.0	35.0	22.0	150.0	1250.0	<0.01
68	75AFr675	128.0	469.0	34.0	<10	142.0	1430.0	<0.01
69	75AFr733	117.0	334.0	39.0	21.0	194.0	668.0	<0.01
70	75AFr754b	217.0	62.0	<10	13.0	24.0	149.0	<0.01
71	75AFr761a	234.0	918.0	30.0	33.0	227.0	1840.0	<0.01
72	75AFr3308	159.0	405.0	23.0	18.0	151.0	1080.0	<0.01
73	75AFr2005/6	305.0	121.0	24.0	34.0	65.0	277.0	<0.01
73	75AFr2025	146.0	388.0	18.0	<10	148.0	1530.0	<0.01
75	75AFr2171	127.0	317.0	25.0	<10	130.0	778.0	<0.01
76	75AFr2175	151.0	430.0	21.0	11.0	158.0	845.0	<0.01
77	75AFr2182	122.0	655.0	37.0	11.0	157.0	1630.0	<0.01
78	75AFr3067	79.0	275.0	11.0	17.0	97.0	915.0	0.02
79	75AFr3142	185.0	145.0	29.0	21.0	86.0	639.0	0.01
80	75AFr3151	170.0	233.0	20.0	17.0	132.0	760.0	<0.01
81	75AFr3159	166.0	371.0	23.0	19.0	197.0	889.0	<0.01
82	75AWr181a	181.0	137.0	<10	18.0	72.0	583.0	<0.01
83	75AWr544	159.0	323.0	14.0	<10	170.0	1320.0	<0.01
84	76AFr516	58.0	545.0	30.0	18.0	181.0	933.0	<0.01
85	77AWr174	242.0	122.0	<10	<10	42.0	228.0	0.02
86	77AWr423	142.0	407.0	12.0	20.0	185.0	536.0	<0.01
87	74AFr3133a	147.0	289.0	16.0	16.0	159.0	852.0	<0.01
278	84TS43	206.0	330.0	33.0	16.0	200.0	1080.0	<0.01
279	84TS44	176.0	391.0	30.0	19.0	180.0	1580.0	<0.01
280	84TS45	172.0	381.0	28.0	26.0	194.0	1480.0	<0.01
281	84TS46	177.0	351.0	21.0	18.0	162.0	1250.0	<0.01
282	84TS48	270.0	227.0	<10	13.0	84.0	621.0	<0.01

NUMBER	SAMPLE	Rb(ppm)	Sr(ppm)	Y(ppm)	Nb(ppm)	Zr(ppm)	Ba(ppm)	Cr2O3(wt%)
283	89RN105	244.0	683.0	20.0	17.0	92.0	1440.0	<0.01
284	89RN112	255.0	895.0	<10	<10	94.0	1930.0	<0.01
318	88RN300AP*	210.0	20.0	30.0	25.0	135.0	<100	<0.01
319	88RN300BL*	140.0	295.0	13.0	22.0	185.0	390.0	<0.01
320	88RN301*	150.0	290.0	27.0	22.0	220.0	1200.0	<0.01
321	88RN301M*	180.0	255.0	54.0	19.0	200.0	650.0	<0.01
322	88RN303*	160.0	60.0	35.0	23.0	78.0	220.0	<0.01
323	MOSQUITO-1	69.0	624.0	11.0	11.0	202.0	439.0	<0.01
324	TAUR-1	<10	707.0	14.0	17.0	128.0	832.0	<0.01
325	AS-1	100.0	330.0	30.0	10.0	117.0	1430.0	<0.01
326	TOK-1	137.0	668.0	<10	21.0	123.0	1790.0	<0.01
327	TOK-2	147.0	747.0	11.0	22.0	120.0	1760.0	0.01
328	TOK-3	133.0	749.0	14.0	<10	114.0	1940.0	<0.01
329	63AFr223	138.0	784.0	<10	16.0	110.0	1570.0	0.02
330	64AFr31	101.0	314.0	38.0	19.0	108.0	970.0	<0.01
331	64AFr79	72.0	1040.0	<10	16.0	98.0	2020.0	0.02
332	64AFr138	107.0	320.0	<10	26.0	141.0	1330.0	<0.01
333	64AFr142	131.0	242.0	<10	11.0	204.0	884.0	0.01
334	64AFr172	149.0	183.0	45.0	39.0	97.0	1220.0	0.01
335	64AFr227	129.0	392.0	26.0	17.0	156.0	1160.0	<0.01
336	68AFr107	69.0	967.0	45.0	11.0	217.0	1400.0	<0.01
337	68AFr227	74.0	996.0	33.0	10.0	204.0	1090.0	<0.01
338	69AFr664	124.0	296.0	28.0	16.0	138.0	1470.0	<0.01
339	69AFr696	125.0	327.0	31.0	14.0	164.0	1090.0	<0.01
340	69AFr721	117.0	323.0	15.0	18.0	137.0	1600.0	0.01
341	69AFr900A	113.0	606.0	30.0	28.0	146.0	1880.0	<0.01
342	70AFr310	202.0	221.0	31.0	<10	97.0	890.0	0.01
343	70AFr430	220.0	868.0	25.0	27.0	182.0	1670.0	0.01
344	70AFr466	171.0	302.0	24.0	25.0	123.0	894.0	0.01
345	70AFr2466B	206.0	361.0	17.0	10.0	225.0	1180.0	<0.01
346	70AFr2467	232.0	321.0	24.0	13.0	113.0	813.0	0.01
347	70AFr2471	145.0	205.0	19.0	20.0	90.0	1220.0	<0.01
348	70AFr2497A	171.0	176.0	40.0	10.0	86.0	1360.0	0.01
349	70AFr2497B	265.0	<10	50.0	14.0	45.0	138.0	0.02
350	70AWr67B	188.0	237.0	34.0	18.0	110.0	1120.0	0.02
351	71AFr99	126.0	422.0	34.0	<10	151.0	1330.0	<0.01
352	71AFr357	124.0	392.0	17.0	14.0	123.0	1260.0	<0.01
353	71AFr363	150.0	342.0	45.0	<10	235.0	1430.0	0.01
354	71AFr717	228.0	237.0	13.0	18.0	182.0	784.0	0.01
355	71AFr718	248.0	381.0	<10	19.0	204.0	1650.0	0.01
356	71AFr719	155.0	327.0	26.0	22.0	168.0	1230.0	0.01
357	71AFr728	162.0	313.0	<10	<10	100.0	1380.0	0.01
358	71AWr86A	184.0	408.0	17.0	23.0	178.0	2480.0	0.02
359	74ARh70	180.0	89.0	53.0	19.0	175.0	635.0	0.03
360	90RN09	142.0	206.0	11.0	21.0	121.0	1320.0	24(ppm)
361	90RN10	159.0	327.0	26.0	19.0	154.0	1600.0	26(ppm)
362	90RN20a	177.0	283.0	<10	<10	133.0	1640.0	26(ppm)

NUMBER	SAMPLE	Rb(ppm)	Sr(ppm)	Y(ppm)	Hf(ppm)	Zr(ppm)	Ba(ppm)	Cr2O3(wt%)
363	90RN20b	219.0	29.0	26.0	24.0	40.0	133.0	23(ppm)
364	90RN21	187.0	331.0	25.0	32.0	151.0	1470.0	24(ppm)
365	90RN22	176.0	364.0	17.0	<10	143.0	1580.0	26(ppm)
366	90RN25a	149.0	258.0	33.0	<10	178.0	1590.0	23(ppm)
367	90RN25b	206.0	31.0	29.0	13.0	67.0	392.0	26(ppm)
375	4514*	-	-	-	-	-	0.08(wt%)	0.04
376	4515*	-	-	-	-	-	0.04(wt%)	0.03
377	4516*	-	-	-	-	-	0.04(wt%)	0.03
378	4517*	-	-	-	-	-	0.07(wt%)	0.03
379	4518*	-	-	-	-	-	0.18(wt%)	0.01
380	4519*	-	-	-	-	-	0.02(wt%)	0.02
381	4520*	-	-	-	-	-	0.12(wt%)	0.03
382	4521*	-	-	-	-	-	0.11(wt%)	0.03
383	4522*	-	-	-	-	-	0.12(wt%)	0.02
384	4523*	-	-	-	-	-	0.03(wt%)	0.03
385	4524*	-	-	-	-	-	0.03(wt%)	0.03

APPENDIX 3

Gold-favorability scores (posterior probability) for plutonic rocks from interior Alaska and sources of the original analytical data.

<u>NUMBER</u>	<u>SAMPLE</u>	<u>QUAD</u>	<u>PROB.</u>	<u>REFERENCE</u>
1	74AFr613	BigD	85.6	Luthy and others, 1981
2	75ASJ538	BigD	99.0	Luthy and others, 1981
3	75AFr2175	BigD	96.0	Luthy and others, 1981
4	75AFr2184	BigD	78.5	Luthy and others, 1981
5	72AFr216	BigD	65.8	Solie and others, 1990
6	70AWr319	BigD		Solie and others, 1990
7	PVF1-1-63	Tan		Foster and others, 1966
8	PVF2-9-63	Tan		Foster and others, 1966
9	63AFr2c	Eag	100.0	Foster and others, 1978
10	64AFr2	Eag	97.9	Foster and others, 1978
11	64AFr7D	Eag	97.3	Foster and others, 1978
12	68AFr66	Eag	9.7	Foster and others, 1978
13	68AFr2038	Eag	99.0	Foster and others, 1978
14	69AWr87	Eag	71.3	Foster and others, 1978
15	69AFr485	Eag	99.9	Foster and others, 1978
16	69AFr674	Eag		Foster and others, 1978
17	69AFr689	Eag	99.9	Foster and others, 1978
18	69AFr900	Eag	88.7	Foster and others, 1978
19	69AFr901	Eag	100.0	Foster and others, 1978
20	70AFr179	Eag	99.7	Foster and others, 1978
21	70AFr225	Eag	4.5	Foster and others, 1978
22	70AFr312	Eag	30.8	Foster and others, 1978
23	70AFr372	Eag	50.5	Foster and others, 1978
24	70AFr437a	Eag	99.9	Foster and others, 1978
25	70AFr458	Eag	100.0	Foster and others, 1978
26	70AFr995	Eag	37.4	Foster and others, 1978
27	70AAFr3078	Eag	67.8	Foster and others, 1978
28	70AFr3112	Eag	84.9	Foster and others, 1978
29	71AWr80	Eag	97.1	Foster and others, 1978
30	71AWr90	Eag	86.6	Foster and others, 1978
31	71AFr185	Eag	78.2	Foster and others, 1978
32	71AFr201	Eag	97.0	Foster and others, 1978
33	71AFr341	Eag	99.6	Foster and others, 1978
34	71AFr348	Eag	98.6	Foster and others, 1978
35	71AFr364	Eag	99.9	Foster and others, 1978
36	71AFr507	Eag	96.2	Foster and others, 1978
37	71AFr596b	Eag	100.0	Foster and others, 1978
38	71AFr635	Eag	89.8	Foster and others, 1978
39	71AFr662	Eag	91.7	Foster and others, 1978
40	71AFr664	Eag	99.5	Foster and others, 1978
41	71AFr701	Eag	87.6	Foster and others, 1978
42	71AFr793	Eag	53.9	Foster and others, 1978
43	71AFr800	Eag	88.7	Foster and others, 1978
44	71AFr2024	Eag	41.4	Foster and others, 1978
45	71AFr2025	Eag	99.3	Foster and others, 1978
46	71AFr2179	Eag	99.5	Foster and others, 1978
47	73AFr3191	Eag	64.9	Foster and others, 1978
48	66AWr78	BigD	84.2	Solie and others, 1990
49	73AWr88H	BigD	56.4	Solie and others, 1990
50	73AWr88K	BigD	0.0	Solie and others, 1990
51	74AFr638A	BigD	94.2	Solie and others, 1990
52	74AFr646A	BigD	0.0	Solie and others, 1990
53	74AFr771A	BigD	85.6	Solie and others, 1990
54	74AFr777C	BigD	88.3	Solie and others, 1990
55	74AFr3001	BigD	98.1	Solie and others, 1990
56	74AWr177A	BigD	98.8	Solie and others, 1990
57	74AWr196	BigD	92.0	Solie and others, 1990
58	74AWr202A	BigD	0.0	Solie and others, 1990
59	74AWr233	BigD	45.7	Solie and others, 1990
60	74AWr254A	BigD	57.5	Solie and others, 1990
61	74AWr370	BigD	100.0	Solie and others, 1990
62	75AFr207A	BigD	39.6	Solie and others, 1990
63	72AFr215	BigD	84.1	Solie and others, 1990
64	75AFr238	BigD	97.6	Solie and others, 1990

NUMBER	SAMPLE	QUAD	PROB.	REFERENCE
65	75AFr630	BigD		Solie and others, 1990
66	75AFr6368	BigD		Solie and others, 1990
67	75AFr663A	BigD	97.4	Solie and others, 1990
68	75AFr675	BigD	99.9	Solie and others, 1990
69	75AFr733	BigD	100.0	Solie and others, 1990
70	75AFr7548	BigD	0.0	Solie and others, 1990
71	75AFr761A	BigD	56.7	Solie and others, 1990
72	75AFr3308	BigD	100.0	Solie and others, 1990
73	75AFr2005/6	BigD	53.3	Solie and others, 1990
74	75AFr2025	BigD	94.5	Solie and others, 1990
75	75AFr2171	MtH	41.9	ADGGS unpub.data, 1989 (XRAL)
76	75AFr2175	BigD	95.7	Solie and others, 1990
77	75AFr2182	BigD	100.0	Solie and others, 1990
78	75AFr3067	BigD	100.0	Solie and others, 1990
79	75AFr3142	BigD	37.7	Solie and others, 1990
80	75AFr3151	BigD	96.5	Solie and others, 1990
81	75AFr3159	BigD	100.0	Solie and others, 1990
82	75AWr181A	BigD	66.6	Solie and others, 1990
83	75AWr544	BigD	76.6	Solie and others, 1990
84	76AFr516	BigD	100.0	Solie and others, 1990
85	77AWr174	BigD		Solie and others, 1990
86	77AWr423	BigD	92.0	Solie and others, 1990
87	74AFr3133A	BigD	94.3	Solie and others, 1990
88	ECPD-46	Liv	0.2	Britton, 1970; Forbes, 1982
89	ECC-1-228	Liv		Britton, 1970; Forbes, 1982
90	ECP-4-16	Liv		Britton, 1970; Forbes, 1982
91	ECC-2-124	Liv	30.0	Britton, 1970; Forbes, 1982
92	ECPD-205	Liv	99.7	Britton, 1970; Forbes, 1982
93	ECPD-35	Liv	100.0	Britton, 1970; Forbes, 1982
94	ECC-4-26	Liv	100.0	Britton, 1970; Forbes, 1982
95	AP-1	Fbx		Forbes, 1982
96	HL-1	BigD	100.0	Forbes, 1982
97	MtFairplaySy	Tan		Kerin, 1976
100	MCD82	Liv		Wheeler and others, 1987
101	MCD56	Liv		Wheeler and others, 1987
102	MCD59	Liv		Wheeler and others, 1987
103	MCD96	Liv		Wheeler and others, 1987
104	63ABa3001	Tan	33.6	Brabb & Hamachi, 1977
105	62ACr544	Chr	97.9	Brabb & Hamachi, 1977
106	62ABa2421	Chr		Brabb & Hamachi, 1977
107	62ABa2415	Chr		Brabb & Hamachi, 1977
108	62ABa2424a	Chr		Brabb & Hamachi, 1977
109	61ABa1634	Chr	47.9	Brabb & Hamachi, 1977
110	63ABa3084	Eag		Brabb & Hamachi, 1977
111	62ABa2490	Chr	100.0	Brabb & Hamachi, 1977
112	60ABa297	Eag	73.2	Brabb & Hamachi, 1977
113	TS222	Cir		Smith and others, 1987
114	MW111	Cir		Smith and others, 1987
115	RR151	Cir		Smith and others, 1987
116	TS52	Cir		Smith and others, 1987
117	TS60a	Cir		Smith and others, 1987
118	DNS93	Cir		Smith and others, 1987
119	DNS110	Cir		Smith and others, 1987
120	TS60b	Cir		Smith and others, 1987
121	TS67	Cir		Smith and others, 1987
122	DNS113	Cir		Smith and others, 1987
123	MW15a	Cir		Smith and others, 1987
124	LB25	Cir		Smith and others, 1987
125	DA116	Cir		Smith and others, 1987
126	DA19c	Cir		Smith and others, 1987
127	RN130	Cir		Smith and others, 1987
128	TS58	Cir		Smith and others, 1987
129	RR149	Cir		Smith and others, 1987
130	DNS124	Cir		Smith and others, 1987

<u>NUMBER</u>	<u>SAMPLE</u>	<u>QUAD</u>	<u>PROB.</u>	<u>REFERENCE</u>
131	MA89	Cir		Smith and others, 1987
132	DNS106	Cir		Smith and others, 1987
133	MA103	Cir		Smith and others, 1987
134	RN127	Cir		Smith and others, 1987
135	MW73	Cir		Smith and others, 1987
136	DA137	Cir		Smith and others, 1987
137	RN175e	Cir		Smith and others, 1987
138	DNS122	Cir		Smith and others, 1987
139	DNS121	Cir		Smith and others, 1987
140	DNS119	Cir		Smith and others, 1987
141	DA186	Cir		Smith and others, 1987
142	GP180	Cir		Smith and others, 1987
143	GP157	Cir		Smith and others, 1987
144	DNS178	Cir		Smith and others, 1987
145	DNS180	Cir		Smith and others, 1987
146	MA114	Cir		Smith and others, 1987
147	DNS179	Cir		Smith and others, 1987
148	RR129b	Cir		Smith and others, 1987
149	RR135	Cir		Smith and others, 1987
150	DA217c	Cir	68.9	Smith and others, 1987
151	RN196b	Cir	99.9	Smith and others, 1987
152	RN183-185	Cir		Smith and others, 1987
153	DNS111	Cir	100.0	Smith and others, 1987
154	DNS52	Cir	100.0	Smith and others, 1987
155	MA224	Cir	100.0	Smith and others, 1987
156	GP283b	Cir	100.0	Smith and others, 1987
157	RS283b	Cir	100.0	Smith and others, 1987
158	RS87	Cir	99.9	Smith and others, 1987
159	GP282	Cir	99.8	Smith and others, 1987
160	LB43e	Cir	52.0	Smith and others, 1987
161	RN178a	Cir		Smith and others, 1987
162	LB44	Cir	12.9	Smith and others, 1987
163	LB94	Cir	72.4	Smith and others, 1987
164	J839	Cir		Smith and others, 1987
165	30545	Cir	0.0	Smith and others, 1987
166	30546	Cir	0.0	Smith and others, 1987
167	30547	Cir	0.0	Smith and others, 1987
168	KM147	Cir		Wilkinson, 1987
169	CH61	Cir		Wilkinson, 1987
170	PM281	Cir		Wilkinson, 1987
171	PM280	Cir	94.7	Wilkinson, 1987
172	CH60	Cir		Wilkinson, 1987
173	CH59	Cir	99.8	Wilkinson, 1987
174	KM142	Cir		Wilkinson, 1987
175	CH57	Cir		Wilkinson, 1987
176	1933	Cir	99.9	Wilkinson, 1987
177	PM278	Cir	72.1	Wilkinson, 1987
178	KM114	Cir	99.8	Wilkinson, 1987
179	CH56A	Cir	94.5	Wilkinson, 1987
180	CH33	Cir	99.4	Wilkinson, 1987
181	CH54	Cir	86.7	Wilkinson, 1987
182	LP10	Cir		Warner and others, 1988
183	LP19	Cir		Warner and others, 1988
184	LP54	Cir		Warner and others, 1988
185	LP21218	Cir		Warner and others, 1988
186	LP58	Cir		Warner and others, 1988
187	LP63	Cir		Warner and others, 1988
188	LP89	Cir		Warner and others, 1988
189	LP102	Cir		Warner and others, 1988
190	LP104	Cir		Warner and others, 1988
191	LP20730	Cir		Warner and others, 1988
192	LP50	Cir		Warner and others, 1988
193	79AWs75	Cir	16.5	DuBois and others, 1986
194	79AWs76	Cir	30.9	DuBois and others, 1986

NUMBER	SAMPLE	QUAD	PROB.	REFERENCE
195	79AWs77	Cir	63.6	DuBois and others, 1986
196	79AWs80	BigD	81.5	DuBois and others, 1986
197	79AWs85	Cir	1.1	DuBois and others, 1986
198	79AWs89	Cir	99.8	DuBois and others, 1986
199	79AWs94A	Cir	78.8	DuBois and others, 1986
200	79AWs101	Liv		DuBois and others, 1986
201	J8135	Fbx	90.5	Blum, 1983
202	J8137	Fbx	71.0	Blum, 1983
203	J8142	Fbx	98.2	Blum, 1983
204	J8143	Fbx	97.7	Blum, 1983
205	J8144	Fbx	99.3	Blum, 1983
206	J8145	Fbx	69.9	Blum, 1983
207	J8146	Fbx	96.2	Blum, 1983
208	J8148	Fbx	96.6	Blum, 1983
209	J8149	Fbx	54.8	Blum, 1983; Allegro, 1987
210	J8152	Fbx	71.9	Blum, 1983
211	J8161	Fbx	55.5	Blum, 1983
212	J8162	Fbx	10.6	Blum, 1983
213	J8165	Fbx	0.0	Blum, 1983
214	J8166b	Fbx	59.2	Blum, 1983
215	J8167	Fbx	73.0	Blum, 1983
216	J8173	Fbx	81.4	Blum, 1983
217	J8175	Fbx	70.9	Blum, 1983
218	J8179	Fbx	49.8	Blum, 1983
219	J8186	Fbx	65.6	Blum, 1983
220	J8189	Fbx	59.3	Blum, 1983
221	J8192	Fbx	56.3	Blum, 1983
222	J8194	Fbx	66.7	Blum, 1983
223	J8195	Fbx	83.7	Blum, 1983
224	J8214	Liv	62.4	Blum, 1983
225	J8106	Fbx	97.4	Blum, 1983
226	J8108	Fbx	68.2	Blum, 1983
227	J8116a	Fbx	66.8	Blum, 1983
228	J8127	Fbx	96.3	Blum, 1983
229	J8128	Fbx	83.2	Blum, 1983
230	J8132	Fbx	81.8	Blum, 1983
231	J8134	Fbx	91.4	Blum, 1983
232	J8213	Liv	89.0	Blum, 1983
233	J8215	Liv	97.0	Blum, 1983
234	J8201	Liv	100.0	Blum, 1983
235	J8203	Liv	100.0	Blum, 1983
236	J8205	Liv	100.0	Blum, 1983
237	J8207	Liv	100.0	Blum, 1983
238	J8211	Liv	100.0	Blum, 1983
239	J8216	Liv	99.9	Blum, 1983
240	J8218	Liv	100.0	Blum, 1983
241	J8133	Fbx		Blum, 1983
242	J8139	Fbx		Blum, 1983
243	J8141	Fbx		Blum, 1983
244	J8150	Fbx		Blum, 1983
245	J8191	Fbx		Blum, 1983
251	C153	Cir		Burton and others, 1985
252	C138	Cir		Burton and others, 1985
253	C141	Cir		Burton and others, 1985
254	C142	Cir		Burton and others, 1985
255	C159	Cir		Burton and others, 1985
275	2294	Fbx	38.0	Allegro, 1987
278	84TS43	BigD	94.2	Solie and others, 1990
279	84TS44	BigD	97.9	Solie and others, 1990
280	84TS45	BigD	97.2	Solie and others, 1990
281	84TS46	BigD	97.3	Solie and others, 1990
282	84TS48	Circ	50.6	ADGGS unpub.data, 1989, (XRAL)
283	89RW105	Fbx	75.6	ADGGS unpub.data, 1989, (XRAL)
284	89RW112	Fbx	62.4	ADGGS unpub.data, 1989, (XRAL)

<u>NUMBER</u>	<u>SAMPLE</u>	<u>QUAD</u>	<u>PROB.</u>	<u>REFERENCE</u>
285	2880	Circ	71.2	ADGGS unpub.data, 1984
286	2890	BigD	64.3	Solie and others, 1990
287	2911	BigD	91.5	Solie and others, 1990
288	80AAF002A	MtH	99.5	Nokleberg, unpub.USGS data, 1989
289	80AF001B	MtH	99.4	Nokleberg, unpub.USGS data, 1989
290	80NK003A	MtH	97.3	Nokleberg, unpub.USGS data, 1989
291	80AF018A	MtH	85.2	Nokleberg, unpub.USGS data, 1989
293	80AL047A	MtH	89.1	Nokleberg, unpub.USGS data, 1989
294	80AF038A	MtH	44.8	Nokleberg, unpub.USGS data, 1989
295	80SB001A	MtH	0.0	Nokleberg, unpub.USGS data, 1989
296	81 ARM030A	MtH	72.3	Nokleberg, unpub.USGS data, 1989
297	81AIL043A	MtH	96.4	Nokleberg, unpub.USGS data, 1989
298	81AIL073A	MtH	64.3	Nokleberg, unpub.USGS data, 1989
299	81ANK009A	MtH	79.7	Nokleberg, unpub.USGS data, 1989
300	81ARM012A	MtH	50.4	Nokleberg, unpub.USGS data, 1989
301	81ASB001A	MtH	11.9	Nokleberg, unpub.USGS data, 1989
302	81ASB027A	MtH	80.1	Nokleberg, unpub.USGS data, 1989
303	81ASB051A	MtH		Nokleberg, unpub.USGS data, 1989
304	81ANK064A	MtH	92.5	Nokleberg, unpub.USGS data, 1989
305	78ANK149A	MtH	95.1	Nokleberg, unpub.USGS data, 1989
306	80NK139A	MtH	88.3	Nokleberg, unpub.USGS data, 1989
307	81AIL045A	MtH	39.8	Nokleberg, unpub.USGS data, 1989
308	81AIL060A	MtH	100.0	Nokleberg, unpub.USGS data, 1989
309	81AIL070A	MtH	0.0	Nokleberg, unpub.USGS data, 1989
310	81AIL084A	MtH	90.2	Nokleberg, unpub.USGS data, 1989
311	81ANK036A	MtH	94.7	Nokleberg, unpub.USGS data, 1989
312	81ANK039A	MtH	0.0	Nokleberg, unpub.USGS data, 1989
313	81ANK136R	MtH	55.3	Nokleberg, unpub.USGS data, 1989
314	81ASB021A	MtH	55.2	Nokleberg, unpub.USGS data, 1989
315	81AZN007C	MtH	100.0	Nokleberg, unpub.USGS data, 1989
316	85ANK159A	MtH	0.0	Nokleberg, unpub.USGS data, 1989
317	81AZN018A	MtH	0.1	Nokleberg, unpub.USGS data, 1989
318	88RN300AP	BigD		ADGGS data, 1989, (Bondar-Clegg)
319	88RN300BL	BigD	28.4	ADGGS data, 1989, (Bondar-Clegg)
320	88RN301	BigD	0.0	ADGGS data, 1989, (Bondar-Clegg)
321	88RN301M	BigD	97.6	ADGGS data, 1989, (Bondar-Clegg)
322	88RN303AP	BigD		ADGGS data, 1989, (Bondar-Clegg)
323	MOSQUITO-1		65.3	ADGGS unpub.data, 1990, (XRAL)
324	TAUR-1	Tan		ADGGS unpub.data, 1990, (XRAL)
325	AS-1	Tan	78.9	ADGGS unpub.data, 1990, (XRAL)
326	TOK-1	Tan	3.8	ADGGS unpub.data, 1990, (XRAL)
327	TOK-2	Tan	70.1	ADGGS unpub.data, 1990, (XRAL)
328	TOK-3	Tan	0.0	ADGGS unpub.data, 1990, (XRAL)
329	63AFr223	Eag	0.6	Newberry and others, 1990
330	64AFr31	Eag	99.7	Newberry and others, 1990
331	64AFr79	Eag	19.3	Newberry and others, 1990
332	64AFr138	Eag	67.2	Newberry and others, 1990
333	64AFr142	Eag	100.0	Newberry and others, 1990
334	64AFr172	Eag	71.6	Newberry and others, 1990
335	64AFr227	Eag	53.3	Newberry and others, 1990
336	68AFr107	Eag	69.1	Newberry and others, 1990
337	68AFr227	Eag	1.1	Newberry and others, 1990
338	69AFr664	Eag	95.6	Newberry and others, 1990
339	69AFr696	Eag	96.2	Newberry and others, 1990
340	69AFr721	Eag	100.0	Newberry and others, 1990
341	69AFr900A	Eag	44.0	Newberry and others, 1990
342	70AFr310	Eag	55.8	Newberry and others, 1990
343	70AFr430	Eag	49.2	Newberry and others, 1990
344	70AFr466	Eag	92.8	Newberry and others, 1990
345	70AFr2466B	Eag	93.6	Newberry and others, 1990
346	70AFr2467	Eag	48.4	Newberry and others, 1990
347	70AFr2471	Eag	63.5	Newberry and others, 1990
348	70AFr2497A	Eag	71.7	Newberry and others, 1990
349	70AFr2497B	Eag	0.0	Newberry and others, 1990

<u>NUMBER</u>	<u>SAMPLE</u>	<u>QUAD</u>	<u>PROB.</u>	<u>REFERENCE</u>
350	70AWr67B	Eag	43.2	Newberry and others, 1990
351	71AFr99	Eag	97.7	Newberry and others, 1990
352	71AFr357	Eag	88.7	Newberry and others, 1990
353	71AFr363	Eag	36.2	Newberry and others, 1990
354	71AFr717	Eag	46.0	Newberry and others, 1990
355	71AFr718	Eag	42.8	Newberry and others, 1990
356	71AFr719	Eag	94.3	Newberry and others, 1990
357	71AFr728	Eag	57.3	Newberry and others, 1990
358	71AWr86A	Eag	56.0	Newberry and others, 1990
359	74ARh70	Nab	51.4	Newberry data, 1990, (XRAL)
360	90RN09	Tan		ADGGS unpub.data, 1990, (XRAL)
361	90RN10	Tan	34.8	ADGGS unpub.data, 1990, (XRAL)
362	90RN20a	Nab		ADGGS unpub.data, 1990, (XRAL)
363	90RN20b	Nab		ADGGS unpub.data, 1990, (XRAL)
364	90RN21	Nab	3.9	ADGGS unpub.data, 1990, (XRAL)
365	90RN22	Tan	0.9	ADGGS unpub.data, 1990, (XRAL)
366	90RN25a	Tan	1.0	ADGGS unpub.data, 1990, (XRAL)
367	90RN25b	Tan		ADGGS unpub.data, 1990, (XRAL)
368	70AMn16	Nab	100.0	Richter and others, 1975
369	67ACx211	Nab	100.0	Richter and others, 1975
370	68ARh369	Nab	92.8	Richter and others, 1975
371	70AMn106	Nab	100.0	Richter and others, 1975
372	71ARh76	Nab	67.3	Richter and others, 1975
373	71ARh77	Nab	100.0	Richter and others, 1975
374	71ARh117	Nab	0.5	Richter and others, 1975
375	4514	Cir	5.9	ADGGS unpub.data, 1988, (Bondar-Clegg)
376	4515	Cir	11.8	ADGGS unpub.data, 1988, (Bondar-Clegg)
377	4516	Cir	100.0	ADGGS unpub.data, 1988, (Bondar-Clegg)
378	4517	Cir	90.2	ADGGS unpub.data, 1988, (Bondar-Clegg)
379	4518	Cir	99.9	ADGGS unpub.data, 1988, (Bondar-Clegg)
380	4519	Cir	91.2	ADGGS unpub.data, 1988, (Bondar-Clegg)
381	4520	Cir	87.1	ADGGS unpub.data, 1988, (Bondar-Clegg)
382	4521	Cir	67.9	ADGGS unpub.data, 1988, (Bondar-Clegg)
383	4522	Cir	100.0	ADGGS unpub.data, 1988, (Bondar-Clegg)
384	4523	Cir	0.0	ADGGS unpub.data, 1988, (Bondar-Clegg)
385	4524	Cir	0.1	ADGGS unpub.data, 1988, (Bondar-Clegg)

APPENDIX 4

K-Ar age dates on plutonic rocks from interior Alaska.

APPENDIX 4

K-Ar age dates on plutonic rocks from interior Alaska.

Ages listed in this appendix are the recalculated ages of Wilson and others (1985) when possible. The superscript 'e' indicates the date has not been recalculated with newer constants. References for the data, given by numbers, are listed at the end of the appendix; a reference number in parenthesis indicates original reference, with recalculated age given in reference published later. Rock names in capital letters are based on Streckeisen-LeMaitre (1979) normative classification of that sample. Other rock names used in this table are cited in original reference, and unfortunately use a mixture of rock terminology.

Mineral abbreviations used: Bi - biotite; Hb - hornblende; Am - amphibole; WMica - white mica; Mu - muscovite; Sa - sanadine; WR - whole rock; K-f - potassium feldspar; Tour - tourmaline; cpx - clinopyroxene; unk - unknown.

Rock name abbreviations used: Qtz syen - quartz syenite; syen - syenite; AF granite - alkali feldspar granite; qtz monz - quartz monzonite; qtzmonzodio - quartz monzodiorite; granodio - granodiorite; qtz dio - quartz diorite; dio - diorite; gab - gabbro; hblite - hornblende; andes - andesite; porph - porphyry; peg - pegmatite; lamp - lamprophyre; adam - adamellite.

APPENDIX 4

TERTIARY

LABEL SHEET 2	QUAD	LOCATION OR PLUTON NAME	SAMPLE	AGE	MIN	ROCK	REF
TK-A	Circle	Victoria Mtn pair	79AWS75	65.3 ± 0.7 65.5 ± 1.0	Bi Hb	QTZ SYEN ¹	8 ²
TK-B	Livengood	Cache Ck	71AWr513	59.8 ± 1.8	Bi	Bi granite	8(18)
TK-C	Circle	Lime Peak	79AWS76	56.7 ± 1.0	Bi	GRANITE ¹	5
TK-D	Circle	Quartz Ck	79AWS77	65.9 ± 1.4	Bi	GRANITE ¹	5
TK-E	Circle	Mt. Prindle	MP246	58.0 ± 1.8	Mu	Pegmatite	8(18)
TK-F	Circle	Mt. Prindle	MP406	59.5 ± 1.8	Bi	Bi granite	8(18)
TK-G	Circle	Chena Hot Spr	79AWs89	58.7 ± 0.9	Bi	GRANODIO ¹	8
TK-H	Circle	Chena Hot Spr	CHS72X	59.7 ± 1.8	Bi	Bi granite	8
TK-I	Big Delta	Granite Tors pair	75AFr2001	62.7 ± 2 67.7 ± 2.1	Mu Bi	Qtz monz	8(16)
TK-J	Big Delta	Granite Tors	75AFr2000b	59.2 ± 1.5	Bi	Qtz monz	8
TK-K	Big Delta	W-central quad	BigD1	67.8 ± 2 ^c	Bi	Granite	8(13)
TK-L	Circle	Circle Hot Sp	KM147	56.35 ± 1.7	Bi	GRANITE ¹	7
TK-M	Circle	Circle Hot Sp	CH61	57.75 ± 1.7	Bi	GRANITE ¹	7
TK-N	Circle	Circle Hot Sp	CH59	57.14 ± 1.7	Bi	GRANITE ¹	7
TK-O	Circle	Circle Hot Sp	KM133	54.17 ± 1.6	Bi	Minlzd aplite dike	7
TK-P	Circle	Circle Hot Sp	1933	57.28 ± 1.7	Bi	GRANITE ¹	7
TK-Q	Circle	Circle Hot Sp	61AE190	60.5 ± 1.8	Bi	Granite	8
TK-R	Circle	Two-Bit	PM250	70.92 ± 2.1	WMica	Peg dike	7
TK-S	Circle	Two-Bit	KM114	69.71 ± 2.1	Bi	GRANODIO ¹	7
TK-T	Circle	Yukon Fork	79AWs94a	62.4 ± 1.34	Bi	GRANITE- GRANODIO BORDER ¹	8
TK-U	Circle	E Big Windy C pair	78AWr287	60.6 ± 0.6 60.5 ± 0.6	Bi Mu	2 mica granite	8
TK-V	Circle	W Big Windy C	78AWr288	64.4 ± 0.48	Bi	Hb bi granite	8
TK-W	Circle	VABM Dex	79AFR583	72.8 ± 1.6	Bi	2 mica granite	5
TK-X	Circle	W upper Salcha pair	84TS48	77.6 ± 2.3 68.7 ± 2.1	Mu Bi	GRANITE ¹	6
TK-Y	Circle	U. Salcha R. pair	78AWr286	77.6 ± 2 73.5 ± 2.5	Mu Bi	2 mica granite	8
TK-Z	Circle	Caribou Ck	79AWs85	77.5 ± 2.3	Mu	AF GRANITE ¹ (Tour. granite)	8
TK-AA	Big Delta	NE quad	75ASj537	64.1 ± 1.9	Bi	Qtz monz	8(16)
TK-AB	Big Delta	E-central quad	75ASj530	55.2 ± 1.7	Bi	Granite	8(16)
TK-AC	Big Delta	E-central quad	75ASj528	61.6 ± 2	Sa	Rhyolite	8(16)
TK-AD	Mt. Hayes	W Robertson	BT48	69.2 ± 1.9	Bi	Dio	8(11)
TK-AE	Tanacross	E Robertson	74ASj140	66.6 ± 2	Bi	Gab	8(19)
TK-AF	Tanacross	Mt. Fairplay pair	74ASj144	67.2 ± 2 59.5 ± 3	Bi Am	Qtz monz	8(15)
TK-AG	Tanacross	Mt. Fairplay	61AE186	66 ^c	unk	Syen	8
TK-AH	Tanacross	NE quad pair	74ASj105	66.1 ± 3.1 69.1 ± 3.1	Bi Ho	Andes plug	8
TK-AI	Tanacross	East Taurus	74AFr926	65.7 ± 2	Bi	Intru	8
TK-AJ	Tanacross	East of Taurus	74ASj109a	67.9 ± 2.0	WR	Intru	8
TK-AJ	Tanacross	East of Taurus	74ASj109e	68.2 ± 2.0	Bi	Intru	8
TK-AJ	Tanacross	East of Taurus	74ASj109g	69.2 ± 2.0	WR	Intru	8
TK-AK	Nabesna	Snag	74ARh70	51.9 ± 1.5	Bi	GRANITE ¹	8(21)

¹Capital letters in the rock column denote name based on chemical analyses as plotted on a Streckeisen - LeMaitre (1979) diagram.
Small letters denote rock name listed in previous publication.

²References listed by number at end of appendix 4.

CRETACEOUS

LABEL SHEET 2	QUAD	LOCATION OR PLUTON NAME	SAMPLE	AGE	MIN	ROCK	REF
KJ-A	Livengood	O'Brien Crk	79AWs101	90.0 ± 2	Bi	Lamp	8
	Livengood	O'Brien Crk	unknown	86.7 ± 3.6	Bi	Cpx Syenite	4
	Livengood	O'Brien Crk	unknown	85.4 ± 6.4	Bi	Cpx Syenite	4
KJ-B	Circle	INSET A	RS87	89.3 ± 3.9	Bi	Hb qtz monz	3
KJ-C	Livengood	INSET B	ECPD-1	90.7 ± 5.1			8(9)
KJ-D	Livengood	INSET B	BB14	93.0 ± 5 ^c	Bi	Qtz monz	8(12)
KJ-E	Fairbanks	INSET B	81JB149	85.8 ± 2.6	Bi	GRANITE ¹	1
KJ-F	Fairbanks	INSET B	3 rocks; Rb/Sr	90.9 ± 0.9			2
KJ-G	Fairbanks	INSET B	81JB131	88.9 ± 2.7	Bi	Granite	1
KJ-H	Fairbanks	South of B	Fairbanks2	115 ± 6 ^c	Bi	Granite	8(20)
KJ-I	Big Delta	Chena R.	79AWS80	89.5 ± 1.4	Bi	GRANODIO ¹	5
KJ-J	Big Delta	Tanana R.	75AFr2182	91.2 ± 2.7	Bi	MONZODIO ¹	8
KJ-K	Big Delta	Tanana R.	75AFr2184	87.3 ± 2.7	Ho	GRANITE ¹	8
		pair		89.3 ± 2.7	Bi		
KJ-L	Big Delta	Tanana R.	76BT-Rich	89.1 ± 2.7	K-f	Porph	8(10)
KJ-M	Big Delta	N-central quad	75AFr2178	93.2 ± 2.8	Bi	Dio	8
KJ-N	Big Delta	N-central quad	75AFr2179	91.9 ± 2.7	Bi	Dio	8
KJ-O	Big Delta	N-central quad	84TS43	94.9 ± 2.8	Bi	GRANODIO ¹	6
		pair		96.3 ± 2.9	Am		
KJ-P	Big Delta	N-central quad	84TS44	93.4 ± 2.8	Bi	GRANODIO ¹	6
		pair		96.3 ± 3.9	Am		
KJ-Q	Big Delta	N-central quad	84TS45	92.4 ± 2.8	Bi	GRANODIO ¹	6
		pair		91.7 ± 2.7	Hb		
KJ-R	Big Delta	N-central quad	84TS46	85.0 ± 2.6	Bi	GRANODIO ¹	6
KJ-S	Big Delta	Lit Green frog	75ASj539	90.4 ± 3	Bi	Granodio	8(16)
KJ-T	Big Delta	W Shaw Ck Fl	75AFr2175	98.9 ± 3	Bi	GRANODIO ¹	8(16)
		pair		101.4 ± 4	Hb		
KJ-U	Big Delta	NE Shaw Ck Fl	75ASj538	90.0 ± 2	Bi	GRANODIO ¹	5
		pair		92.9 ± 2	Hb		
KJ-V	Eagle	E Charley R	71AFr2025	91.2	Ho	GRANODIO ¹	8(14)
		pair		95.1 ± 2.9	Bi		8(17)
KJ-W	Big Delta	SE Shaw Ck Fl	DT75-13	96.0 ± 2.9	Ho	Qtz monz	8(16)
KJ-X	Big Delta	SE Shaw Ck Fl	75AFr2174	92.0 ± 2.8	Bi	Qtz dio	8(16)
KJ-Y	Big Delta	SE Shaw Ck Fl	75AFr2181	89.9 ± 2.7	Bi	Dio	8
KJ-Z	Big Delta	SE Shaw Ck Fl	74AFr613	107.6 ± 3.2	Bi	GRANODIO ¹	8(16)
KJ-AA	Mt. Hayes	Tanana R.	75AFr2172	88.8 ± 2.7	Bi	Qtz monz	8
		pair		92.9 ± 2.8	Ho	Qtz monz	
KJ-AB	Mt. Hayes	W Robertson R.	72067	103.6 ± 3.1	Ho	Granodi	8(19)
KJ-AC	Mt. Hayes	Robertson R.	72068	123.1 ± 3.7	Bi	Pyrx	8(19)
		2 dates, 1 loc	72069	125.9 ± 3.8	Ho	Pyrx	8(19)
KJ-AD	Tanacross	Tanana R.	74ASj139	89.6 ± 3.1	Bi	Qtz monz	8(15)
KJ-AE	Tanacross	Tanana R.	H Foster3	135.5 ± 4.1	Hb	Gab	8(15)
KJ-AF	Eagle	Walker Fork	776-65	99.3 ± 3	Bi	Bi gneiss?	8(15)
KJ-AG	Tanacross	Border	74ASj110	108 ± 3.1	Bi	Qtz monz	8(15)
KJ-AH	Tanacross	Tanana R.	74ASj114	97.3 ± 3.1	Bi	Qtz monz	8(15)
KJ-AI	Nabesna	Gardiner pl.	71ARh-117	91.0 ± 2.5	Bi	GRANITE ¹	8(21)
KJ-AJ	Nabesna	Chestina pl.	71ARh-77	95.6 ± 2.7	Bi	QTZ MONZODIO ¹	8(21)
TOK-TETLIN PLUTON							
KJ-AK	Nabesna	Tellin phase	70AMn-106	94.1 ± 2.5	Ho	QTZ MONZO ¹	8(21)
KJ-AL	Nabesna	Tok phase	68ARh-369	94.6 ± 2.8	Bi	GRANITE ¹	8(21)
		pair		96.0 ± 3.5	Ho		
KJ-AM	Nabesna	Min Cairn phase	67ACx-212	93.5 ± 2.8	Bi	PROB. QTZ MONZODIO ¹	8(21)
		pair		95.1 ± 3.1	Ho		

JURASSIC

LABEL SHEET 2	QUAD	LOCATION OR PLUTON NAME	SAMPLE	AGE	MIN	ROCK	REF
J-A	Eagle	Joseph Crk	71AFr3008	185.1	Bi	QTZ MONZODIO ¹	8(14)
-		pair		174.7	Ho	(Hrnbldite)	
J-B	Eagle	Mt. Veta syen	63AFr2C	181.0	Ho	Qtz monz	8
J-C	Eagle	Taylor Mtn. syen	61AE184	180.0 ⁶	Bi	Adam	8(15)
J-D	Tanacross	Taylor Mtn. syen	74ASj113	198 ± 5	Bi	Granodio	8(15)
-		pair		195 ± 5	Hb		

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APPENDIX 5

Method used for forming discriminant functions.

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Method Used for Forming Discriminant Functions

Major-oxide compositions of 665 plutonic rocks were collected into a database of about 150 geographic locations. The rocks include all quartz normative compositions (fig. 13). About 40 percent of the rocks in the database are known to be related to lode-gold or placer-gold deposits.

The discriminant functions were computed by using an SAS program, DISCRIM. Both linear and quadratic equations were tried. Because the quadratic equations yielded a much lower error rate, only the results for the quadratic discriminant functions will be discussed here.

Discriminant functions were computed many times with varying subsets of variables and compositional restrictions. A set of five discriminant functions was formed on each subset of variables and compositions to get a more accurate estimate of the results. The subset of variables used with the best success consisted of SiO_2 , Al_2O_3 , Fe_2O_3 , FeO , MgO , CaO , Na_2O , K_2O , $\text{Fe}_2\text{O}_3/\text{FeO}$, and an alkalinity term 'A', where $A = \text{Na}_2\text{O} + \text{K}_2\text{O} - 16 + 0.372 \cdot \text{SiO}_2$. The discriminant functions were found to work as well when formed on small compositional subsets of the data (such as granites and granodiorites) as when the discriminant functions were formed from the database as a whole. Therefore, discriminant functions that were computed on the whole database were considered appropriate.

The data were randomly divided into a classifying group, composed of 60 percent of the data, and a test group, composed of the remaining 40 percent, every time a discriminant function was computed. The ratio of gold to non gold in both the classifying and test groups were kept the same as in the total database. The discriminant function was computed from the analyses in the classifying group and then used to try to classify the analyses in the test group. The validity of the discriminant function can thus be determined by seeing how well the discriminant function classified each analysis in the test group.

Several different estimates of errors are used. An estimate of the overall effectiveness of the discriminant functions is the apparent error rate (APER), which is defined as

$$\text{APER} = \frac{n_{1m} + n_{2m} + \dots + n_{im}}{n_1 + n_2 + \dots + n_i}$$

where

$$\begin{aligned} n_i &= \text{total observations in each group } i, \\ n_{im} &= \text{misclassified observations in each group.} \end{aligned}$$

However, the APER may not be the best number to minimize. Instead, the Type-II error, which is the number of gold-plutons misclassified as non gold plutons, should be kept low so that gold deposits are not overlooked (tables 1, 2). A discriminant function that yields a relatively low overall rate with a particularly low Type-II error rate—particularly for the test group—would seem the most desirable. Newberry and Burns (1989) achieved that type of discriminant function; thus we feel justified in classifying data from interior Alaska.

The final set of five discriminant functions averaged a 10 percent APER rate (a measure of the total accuracy of the discriminant function, see table 1) with a standard deviation of about 1.5. The discriminant functions also had a 5 percent average Type-II error rate with a standard deviation of about 1.1. Major variables in the discriminant are Fe_2O_3 , FeO , the ratio $\text{Fe}_2\text{O}_3/\text{FeO}$, and SiO_2 but other variables such as K_2O , have importance at certain oxidation states, which indicates that more variables than iron are important in predicting gold association. The gold-related rocks have very low $\text{Fe}_2\text{O}_3/\text{FeO}$, or low oxidation state.

Figures 13a-b. Streckeisen-LeMaitre (1979) diagram showing normative mineral compositions of plutonic rocks from around the world used in formation of the set of discriminant functions. A) - shows compositions (1) of rocks associated with gold systems, and b) - shows compositions (0) of rocks not associated with gold systems. Nepheline normative analyses excluded. Rock names are as in figure 2 in text.

Table 1. *Summary results of quadratic discriminant function for prediction gold-related plutons vs. nongold plutons.*

	Classification group APER ^a (%)	Test group Type-II error (%)	APER (%)	Type-II error (%)
Run 1	7.4	3.8	9.5	4.6
Run 2	8.4	4.4	9.9	3.7
Run 3	9.5	1.9	12.5	5.6
Run 4	9.7	6.3	7.6	7.4
Run 5	<u>8.7</u>	<u>1.9</u>	<u>9.9</u>	<u>4.6</u>
Average:	8.7	3.7	9.9	5.2

^a Apparent error rate.

Table 2. *Typical confusion matrix showing results for the classification group for run 1. The Type-I error, chance of classifying a nongold analysis as a gold-related analyses is 10.0 percent. The Type-II error is 3.8 percent. For example, out of 231 nongold-related samples, the discriminant function predicts that 208 of these would be not be related to gold. Twenty-three of the nongold samples had a discriminant score greater than 50, and thus classified as gold-related.*

		PREDICTED			
		<u>Nongold</u>	<u>Gold</u>	<u>Total</u>	<u>Error Percentages</u>
Actual	Nongold	208	23	231	10.0
	Gold	6	154	160	3.8