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Mineralogy of the Wooley Creek batholith, Slinkard pluton, and related dikes, Klamath Mountains, northern California

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APPENDIX. Petrographic descriptions of analyzed samples of the Wooley Creek batholith, Slinkard pluton, and roof-zone dikes. In Tables 2 through 8, mineral compositions are given in weight percent followed by structural formulae. Cations are normalized to six oxygens for pyroxene, 23 for amphibole, 22 for biotite, four for spinel (magnetite), and eight for feldspars. Temperature estimates in Tables 2 and 3 are from Lindsley's (1983) two-pyroxene geothermometer. Step-wise spot analyses from amphiboles and feldspars are shown by the labels "step in" and "step out" in the tables.

## Petrographic Description of Analyzed Samples

Samples are organized according to mode of occurrence and listed by sample number. Sample numbers without a letter prefix have the prefix MMB. Samples with the prefix SL were provided by C.M. Allen (Allen, 1981 and Barnes et al., 1986a).

## Wooley Creek Batholith

15 is a pyroxene biotite hornblende quartz diorite with hypidiomorphic granular texture and average grain size about 2mm. Sparse clinopyroxene forms the cores of olive to green hornblende. Ragged biotite books show replacement by chlorite and epidote. Plagioclase shows normal zoning and minor saussuritization. Quartz forms poikilitic patches and microcline is a sparse interstitial phase. Apatite and zircon are accessories.

30 is a biotite pyroxene quartz diorite with hypidiomorphic granular texture. Orthopyroxene is faintly pleochroic (pink to green), shows exsolution of clinopyroxene, and is locally jacketed by clinopyroxene. Orthopyroxene crystals include plagioclase and opaque minerals and show reaction to biotite and rarely to light green amphibole. Clinopyroxene has the same habit, inclusions, and alteration as orthopyroxene and shows exsolution of orthopyroxene. Biotite occurs as ragged, reddish-tan to reddish-brown crystals adjacent to pyroxene crystals. Plagioclase crystals have complexly twinned cores that show patchy and normal zoning, and rims that have few twins and show normal zoning. Pyroxene and apatite occur as inclusions in plagioclase cores and rounded quartz grains are included in plagioclase rims. Quartz occurs as an interstitial phase, zircon is the other accessory phase.

103 is a pyroxene biotite hornblende quartz diorite with hypidiomorphic granular texture and average grain size of 2mm. Rare clinopyroxene forms cores of subhedral hornblende clusters. Hornblende shows tan to olive to green pleochroism, patchy colors, and optically discontinuous cores. Actinolitic amphibole is secondary after hornblende. Locally, clusters of actinolitic amphibole are rimmed by hornblende, an indication of relic pyroxene. Biotite forms clusters of tan to slightly reddish-brown crystals and shows alteration to chlorite. Plagioclase crystals are complexly twinned, have euhedral to subhedral form, show patchy to normal zoning, and occasionally have bent twin lamellae. Quartz and sparse potassium feldspar fill interstices. Apatite and opaque minerals are accessories, epidote, chlorite, sphene, white mica, and hematite are secondary.

111 is similar to 30, but contains interstitial potassium feldspar and interstitial quartz with apatite and rutile (?) needles.

137 is an hypidiomorphic granular biotite hornblende quartz

diorite with average grain size approximately 2.5mm. Olive to tan, euhedral to subhedral hornblende shows seriate distribution to 4mm and has inclusions of opaque minerals, apatite, and plagioclase. Locally, hornblende occurs in crystal clusters. Hornblende and biotite show ambiguous crystallization relationships. Biotite forms ragged tan to brown books as much as 3.5mm in diameter with inclusions of plagioclase, apatite, and zircon. Subhedral plagioclase crystals range from 1mm to 3mm in length and show normal, sector, and oscillatory zoning. Quartz is an interstitial phase.

191 is similar to 137.

194 is similar to 137. Hornblende forms single crystals and crystal clusters. Hornblende crystals > 2mm long in clusters typically show patchy color zoning. This sample contains minor interstitial to poikilitic microcline.

208 is an hypidiomorphic granular biotite hornblende quartz monzodiorite. Average grain size is about 3mm, hornblende crystals reach at least 5mm in length. The mafic minerals are similar to those in 137. Plagioclase forms stubby prisms with oscillatory-normal zoning. Quartz and microcline are poikilitic.

236A is an olivine biotite pyroxene gabbro with hypidiomorphic granular texture and seriate grain size from 0.02mm to 2mm. Olivine forms anhedral grains surrounded by clinopyroxene and sparse orthopyroxene and commonly is altered to intergrown iddingsite and chlorite. Clinopyroxene occurs as euhedral to subhedral prisms and as rims around olivine. A few clinopyroxene-olivine crystal clusters were also observed. Clinopyroxene is optically zoned from core to rim; rims are inclusion-poor whereas cores are rich in plagioclase and opaque inclusions. Plagioclase crystals show oscillatory-normal and patchy zoning and contain inclusions of pyroxene. Potassium feldspar and quartz are interstitial phases. Reddish-brown biotite occurs as a reaction product of clinopyroxene and surrounding accessory ilmenite grains. Apatite is the other accessory.

257 is a glomeroporphyritic pyroxene gabbro with average grain size approximately 3mm. Clinopyroxene and orthopyroxene form glomerocrysts up to 1cm in diameter, with single crystals up to 7mm long. The pyroxenes show mutual exsolution, contain inclusions of opaque minerals, and show minor reaction to light green to light brown amphibole. Plagioclase forms lath-shaped crystals with minor recrystallization to form polygonal aggregates. Chlorite and quartz are accessory phases.

293 is a biotite hornblende quartz diorite with foliated hypidiomorphic granular texture. Average grain size is about 1mm. Foliation is formed by alignment of hornblende, biotite, and

plagioclase. Trace amounts of clinopyroxene form cores of light olive to light green subhedral hornblende crystals as much as 2mm in length. Hornblende also forms aggregates of 0.5mm crystals that reach at least 5mm in diameter. Vermicular quartz is typically included in hornblende crystals and some hornblende shows reaction to biotite. Biotite is slightly reddish-brown to light brown with a slight greenish tint. It occurs as aggregates of 0.5mm to 1mm long flakes that lie in the plane of foliation and are associated with granular titanite. Apatite and zircon are inclusions in biotite. Plagioclase forms stubby prisms as much as 2mm in length. Some plagioclase crystals are bent and a few are broken. Normal zoning is predominant but plagioclase cores show patchy zoning and variable amounts of sericitic alteration. Quartz is interstitial and slightly strained. Locally, quartz shows granulation. Potassium feldspar (interstitial) and opaque minerals are accessories; epidote, chlorite, hematite and tourmaline are secondary.

317 is biotite hornblende quartz monzodiorite with hypidiomorphic granular texture and average grain size of 2.5mm. Olive to tan hornblende occurs as elongate, euhedral prisms up to 5mm long and as clusters of subhedral (1mm diameter) crystals as much as 4mm in maximum dimension. Plagioclase, quartz, apatite, and opaque minerals are inclusions in hornblende. Brown to tan biotite occurs as books up to 3mm in diameter and contains inclusions of quartz, zircon, and hematite (after magnetite?). Plagioclase prisms show oscillatory-normal zoning and are as much as 4mm in length. Quartz commonly forms poikilitic grains, but hexagonal euhedra of quartz enclosed by poikilitic microcline were also observed. Minor chlorite and epidote are the secondary minerals.

351 is an hypidiomorphic granular hornblende pyroxene gabbro. Plagioclase in shows preferred orientation (foliation), is locally slightly bent, and contains clinopyroxene, hornblende, apatite, and opaque inclusions. The sample contains orthopyroxene clusters.

372 is a biotite hornblende granite with average grain size 3mm and hypidiomorphic granular texture. Light to medium olive hornblende occurs as subhedral prisms with inclusions of plagioclase and apatite. Dark to medium brown biotite forms subhedral to ragged books with plagioclase, apatite, and zircon inclusions. Plagioclase prisms are euhedral to subhedral and show oscillatory-normal zoning with slight patchy zoning. Hornblende is included in plagioclase cores. Perthitic potassium feldspar is interstitial to poikilitic, and includes all other phases in the rock. Quartz is interstitial, but locally shows crystal faces against potassium feldspar. Allanite is an accessory phase and chlorite occurs as a secondary mineral.

377 is a medium-grained hypidiomorphic granular hornblende biotite granite. Hornblende forms dark green euhedra and biotite occurs

as dark brown books. Plagioclase occurs as equant crystals to stubby laths with rounded cores and oscillatory-normal zoned rims. Quartz is typically interstitial but shows euhedral outlines against microcline. Microcline is poikilitic and perthitic. Mafic and accessory minerals are concentrated as inclusions in microcline; accessory minerals include apatite, relict magnetite, zircon, and euhedral titanite.

379 is a biotite hornblende quartz diorite similar to 397 except for the absence of clinopyroxene. Hornblende forms small (<1mm long) euhedra enclosed by quartz and clusters of subhedra that enclose plagioclase and quartz.

397 is a pyroxene biotite hornblende quartz diorite with hypidiomorphic granular texture and average grain size of about 2.5mm. Clinopyroxene occurs as cores of hornblende crystals, shows exsolution of orthopyroxene, and contains opaque mineral inclusions. Medium to light olive hornblende occurs as euhedral prisms up to 7mm in length and as clusters of 2mm-long euhedral to subhedral grains. Plagioclase, opaque minerals, zircon, and apatite are inclusions in hornblende. Biotite forms ragged reddish-brown to dark brown books up to 2mm in diameter. Biotite is typically associated with hornblende as a reaction product. Plagioclase occurs as stubby prisms with oscillatory-normal and patchy zoning. Quartz poikilitically encloses plagioclase and hornblende; microcline occurs interstitially and as small oikocrysts. Apatite, opaque minerals, and zircon are accessory phases; titanite, chlorite, sericite, and epidote are secondary.

471 is an hypidiomorphic granular biotite hornblende granodiorite with average grain size 2mm. Hornblende occurs as equant, euhedral prisms with light to medium brownish-olive pleochroism. Plagioclase, quartz, apatite, and zircon are included in hornblende, which shows minor alteration to chlorite. Biotite forms light to dark brown subhedral to ragged books with inclusions of plagioclase, apatite, zircon, and rare opaque minerals. Plagioclase prisms are euhedral with pronounced oscillatory-normal zoning and inclusions of hornblende and apatite. Perthitic microcline is interstitial to poikilitic and quartz (slightly strained) is interstitial. Epidote and chlorite are secondary minerals.

681Ah is an hypidiomorphic-granular biotite hornblende tonalite (average grain size 2mm) with euhedral, olive-green hornblende, reddish-brown biotite, weakly oscillatory-normal zoned plagioclase, interstitial to poikilitic quartz, and finely perthitic interstitial to poikilitic microcline. Accessory minerals are opaque minerals, stubby apatite (in biotite and hornblende), and acicular apatite (in plagioclase).

687 is an hypidiomorphic-granular (3-4mm) biotite hornblende granodiorite with mineralogy similar to 681Ah, quartz crystals to

5mm with sutured subgrains, and plagioclase with patchy-zoned cores, and oscillatory-normal rims. Accessory minerals are apatite, zircon, and ilmenite.

777B is a medium-grained hypidiomorphic granular biotite hornblende quartz diorite with average grain size of 1mm. Olive to blue-green hornblende contains sparse cores of relict clinopyroxene as well as inclusions of plagioclase, ilmenite, and relict magnetite. Biotite forms reddish-brown books that are typically intergrown with or rim hornblende. Subhedral plagioclase has weakly mottled, cracked cores and rims with weak normally-zoned rims. Rare inclusions in plagioclase are hornblende and equant apatite. Alteration minerals are sparse titanite, potassium feldspar, and chlorite.

#### Cumulate blocks

100 is an allotriomorphic granular olivine pyroxenite with average grain size of approximately 5mm. Olivine forms subhedral to anhedral crystals slightly altered to serpentine and hematite. Olivine shows reaction to clinopyroxene and orthopyroxene. Clinopyroxene and orthopyroxene form euhedral to subhedral crystals with inclusions of opaque minerals and show reaction to brown amphibole and tremolitic amphibole, respectively. Brown amphibole typically shows rims of green amphibole. Other secondary minerals are green spinel, carbonate, chlorite, epidote, and rare tourmaline.

171 is an amphibole pyroxenite that consists of a framework of clinopyroxene, orthopyroxene, and amphibole with hypidiomorphic granular texture. Clinopyroxene forms equant euhedra that show exsolution of orthopyroxene. Orthopyroxene forms weakly pleochroic, elongate prisms that show exsolution of clinopyroxene parallel to (100) and locally have clinopyroxene rims. Light tan to brown hornblende forms subhedral to poikilitic crystals that enclose all the other phases and show patchy zoning. Tan to reddish-brown pleochroic biotite is commonly associated with brown amphibole. Sparse plagioclase and rare quartz are interstitial phases.

184A is a pyroxene gabbro with hypidiomorphic granular texture. Clinopyroxene forms euhedral to subhedral prisms rimmed by light tan to light green actinolitic hornblende and locally partially replaced by granular amphibole plus biotite. Orthopyroxene has two habits--as prisms similar to clinopyroxene and as clusters of subhedral crystals (after olivine?). Biotite forms tan to reddish-brown anhedral flakes that enclose pyroxene, amphibole, and apatite. Plagioclase forms anhedral, normal to sector zoned crystals that commonly have euhedral cores and include clinopyroxene euhedra. Accessory phases are quartz, chromian spinel, and apatite.

## Synplutonic dikes

638 is a coarse- to medium-grained porphyritic pyroxene hornblende diorite with hypidiomorphic granular texture and equant hornblende phenocrysts as much as 2cm in diameter. Average grain size is variable in the outcrop from ~2mm near the dike margins to ~5mm near the core. Salitic clinopyroxene occurs as anhedral, partially replaced crystals enclosed by hornblende and as euhedral to subhedral grains enclosed by interstitial plagioclase. Clinopyroxene enclosed by plagioclase rarely shows appreciable replacement by hornblende. Hornblende is euhedral, poikilitic, and typically shows strong color zonation from medium-brown to olive-brown cores to pale olive outer cores, to pale green rims. All zones enclose clinopyroxene, plagioclase, and sparse iddingsite (after olivine?). Plagioclase and quartz are interstitial and plagioclase poikilitically encloses hornblende and clinopyroxene. Rare relict magnetite is the accessory mineral; chlorite, tremolitic amphibole, and epidote are secondary.

639 is a porphyritic to glomeroporphyritic hornblende microgabbro that is intrusive into 638. Phenocrysts of tan to olive hornblende average 1.5mm long and enclose rare clinopyroxene cores, plagioclase, and biotite. Plagioclase phenocrysts have a sharp core/rim boundary with mottled, cracked calcic cores surrounded by weakly oscillatory-normal zoned rims (with hornblende inclusions). The groundmass is an hypidiomorphic granular arrangement of hornblende, reddish-brown biotite, plagioclase, ilmenite, hematite (after magnetite) and apatite.

771 is a medium-grained hypidiomorphic granular (1mm average grain size) biotite hornblende gabbro with weakly aligned plagioclase and hornblende crystals. Sparse augitic pyroxene forms cores in olive to pale brown, patchy-zoned subhedral hornblende. Hornblende glomerocrysts are rare. Reddish-brown biotite ranges in habit from poikilitic books to thin flakes. Plagioclase is subhedral to interstitial. Large plagioclase crystals have patchy, relatively inclusion-rich cores and oscillatory-normal zoned rims. Accessory minerals include interstitial quartz, ilmenite, and prismatic and acicular apatite. Apatite is included in all other phases but is most common as inclusions in quartz and between interstitial plagioclase grains.

775A is a biotite hornblende gabbro similar to sample 639 (see above) except that 775A contains slightly more clinopyroxene (cores in hornblende that are partly altered to tremolitic amphibole), hornblende phenocrysts are absent, core areas in plagioclase are less resorbed, and apatite (acicular) is more abundant.

776 is a porphyritic hornblende gabbro with euhedral olive hornblende phenocrysts to 7mm long and anhedral, patchy-zoned,



inclusion-rich plagioclase phenocrysts to 7mm long. Groundmass texture ranges from hypidiomorphic to xenomorphic granular and consists of hornblende, plagioclase, and partly chloritized reddish-brown biotite with accessory opaque minerals, titanite, and acicular apatite.

#### Mafic Microgranitoid Enclaves

681Ae and 681A is a porphyritic biotite hornblende diorite with tan to olive hornblende phenocrysts (1mm) with inclusions of opaque minerals, zircon, plagioclase, and stubby apatite and medium brown biotite oikocrysts with plagioclase, hornblende, and acicular apatite inclusions. Plagioclase phenocrysts have distinct patchy-zoned cores, normally-zoned rims, and hornblende inclusions. Hornblende, biotite flakes, plagioclase, and trace potassium feldspar and quartz make up the fine-grained (0.2mm) idiomorphic groundmass. At the contact (681Ae) with the host, "phenocrysts" and "glomerocrysts" of hornblende, biotite, and quartz to ~3mm diameter are common and are similar in morphology to corresponding host minerals. Groundmass quartz is absent near the contact.

686B is a porphyritic (hornblende and plagioclase to 5mm) biotite hornblende quartz diorite with sparse granular hornblende-biotite glomerocrysts. Brownish-green to olive euhedral to subhedral hornblende shows seriate distribution. Plagioclase phenocrysts show complex twins, oscillatory-normal zoning, inclusion-poor cores surrounded by a hornblende and biotite inclusion-rich zone and an inclusion-poor rim. Groundmass minerals (average 0.5mm diameter) consist of hornblende, anhedral biotite books, equant oscillatory-zoned plagioclase, and slightly strained poikilitic quartz with accessory zircon and hollow, acicular apatite. Minor chlorite, epidote, and titanite are secondary.

686E is a porphyritic (plagioclase and hornblende to 4mm) biotite hornblende quartz diorite. Olive green to olive brown subhedral hornblende phenocrysts have distinct slightly darker cores surrounded by a dusting of ilmenite. Plagioclase phenocrysts commonly show normally-zoned synneusis twins in the core surrounded by a slightly altered dendritic(?) zone with a oscillatory-normal zoned rim. Plagioclase cores contain inclusions of hornblende, biotite, and rare stubby apatite; plagioclase rims have acicular apatite inclusions. The hypidiomorphic granular groundmass (0.5mm) consists of elongate to stubby hornblende, yellow to reddish-brown biotite books, subhedral to euhedral plagioclase, poikilitic quartz (surrounding plagioclase, hornblende, and acicular apatite), and sparse interstitial potassium feldspar.

766 is a medium-grained biotite hornblende gabbro from the Cuddihy Lake basin. Olive to medium-green hornblende and plagioclase form

phenocrysts and glomerocrysts (average 1mm) up to 3.5mm in maximum dimension. Plagioclase phenocrysts show distinct cores with patchy zoning. The groundmass is a panidiomorphic to hypidiomorphic granular arrangement of hornblende, plagioclase (some poikilitic), and biotite flakes, with accessory opaque minerals, acicular and prismatic apatite, and secondary hematite.

#### Metasedimentary and metagabbro enclaves

7B is a coarse-grained metagabbro (see text for discussion of possible origin). The primary texture was probably hypidiomorphic granular and consisted of hornblende, plagioclase, and quartz. The primary texture is overprinted by a porphyroblastic texture in which garnet and hornblende porphyroblasts as much as 6 cm in greatest dimension are present in an hypautomorphic granular base. Amphibole occurs as pale yellow-brown to olive ferrotschermakitic hornblende that is rimmed and partly replaced by cummingtonite. Brown biotite is sparse and occurs as interstitial flakes or as a reaction product of hornblende. Garnet is almandine-rich (ave.  $\sim$ py<sub>16</sub>alm<sub>62</sub> and <sub>10</sub>sp<sub>3</sub>), occurs as porphyroblastic dodecahedrons with ragged boundaries and contains inclusions of calcic plagioclase, cummingtonite, hornblende, quartz, biotite, apatite, and ilmenite. Plagioclase in the "groundmass" (1mm in length) shows sharp internal zonation from calcic cores to intermediate reverse-zoned rims, whereas small crystals lack calcic cores. Quartz is interstitial and ilmenite and apatite are accessory phases. Chlorite is a common secondary phase after amphibole and garnet.

119B is a metasedimentary(?) enclave with weak lepidoloblastic to granular texture (average grain size 0.15mm). Sparse 1mm-diameter clinopyroxene crystals are rimmed by hornblende or partly replaced by lamellar hornblende. Olive hornblende is commonly poikiloblastic with inclusions of vermicular quartz; reddish-brown biotite occurs as small flakes. Plagioclase is weakly normally zoned, bent crystals are sparse and pericline twins are common. Interstitial quartz is sparse and ilmenite is the accessory oxide phase.

133 is similar to 179 (see below) except that clinopyroxene also occurs as poikiloblastic grains and pyrrhotite and pyrite are additional accessory phases.

179 is a granoblastic metasedimentary enclave that consists of clinopyroxene, orthopyroxene, hornblende, biotite, plagioclase and sparse interstitial quartz. Average grain size is 0.3mm. Pyroxenes are pale green and contain micron-size opaque inclusions. Interstitial olive hornblende is sparse and reddish-brown biotite is typically poikiloblastic. Both hornblende and biotite also occur along fractures. Plagioclase has patchy-zoned cores and oscillatory-reverse rims. Some plagioclase crystals are bent. Accessory minerals include zircon, and granular apatite.

214B is a metasedimentary enclave with granoblastic texture and shows weak compositional and grain-size layering. Grain size ranges from <0.05 to 4mm and averages 0.2mm. Compositional layers are defined by relative abundance of clinopyroxene and plagioclase (with interstitial quartz). Clinopyroxene is green-brown and weakly pleochroic. Olive to blue-green hornblende is poikiloblastic and rims clinopyroxene and epidote occurs as poikiloblastic grains. Granular plagioclase shows weak reversed zoning. Accessory minerals are apatite, relict magnetite, and rare subhedral zircon.

219A is a strongly layered metasedimentary enclave with biotite-rich lepidoblastic layers and hornblende (+/- cummingtonite)-rich granoblastic layers. Biotite-rich layers consist of brown biotite, intermediate plagioclase with weak normal zoning, and quartz. Hornblende-rich layers consist of olive-brown to blue-green poikiloblastic ferrohornblende, sharply normally-zoned plagioclase with resorbed calcic ( $An_{85}$ ) cores and intermediate ( $\sim An_{50}$ ) rims, and quartz. Cummingtonite forms large (2-5mm long) crystals that are rimmed and locally replaced by ferrohornblende. Hematite, pyrite, equant subrounded apatite, and rare zircon are accessory minerals.

219B is a compositionally- and grain-sized-layered metasedimentary enclave with granoblastic to poikiloblastic textures and average grain sizes from 0.2 to 1mm. The typical assemblage within compositional layers is clinopyroxene-orthopyroxene-hornblende-plagioclase-biotite-quartz. Variations include the habit of hornblende (poikiloblastic to vermicular), the presence of cummingtonite, and plagioclase composition (from  $\sim An_{70}$  to  $\sim An_{50}$ ). Sparse layers of coarse-grained hornblende + clinopyroxene + cummingtonite + epidote (after plagioclase) + quartz are present. Accessory minerals are abundant and include apatite, pyrite, pyrrhotite, ilmenite, relict magnetite, tourmaline, and rare rutile.

219D is a metapelitic enclave with lepidoblastic to granoblastic texture and average grain size 0.2mm. The apparent prograde equilibrium assemblage in this sample is biotite-cordierite-plagioclase-kyanite-quartz-potassium feldspar. Cordierite  $Fe/(Fe + Mg) = 0.29$ . Sparse retrograde minerals are muscovite, epidote, chlorite, and hematite. Accessory minerals include zircon (inclusions in quartz), apatite, tourmaline, and pyrrhotite.

#### Slinkard Pluton

SL-IV is a strongly foliated biotite hornblende quartz diorite. The original texture was protoclastic, hypidiomorphic granular and has been modified by mylonitic deformation (Barnes et al., 1986a). Average grain size is 1.5mm except in thin (<0.5mm) mylonitic zones, in which average grain size is  $\sim 0.2$ mm. Hornblende shows color zoning from olive to tan cores to pale green rims, is

subhedral, is locally broken, and contains inclusions of plagioclase, quartz, zircon, and biotite. Reddish-brown biotite forms bent books that are partly chloritized, especially in mylonitic zones. Plagioclase has sericitized cores and anhedral normally zoned rims. Some crystals are bent. Quartz forms polygonal aggregates that locally show strain. Accessory minerals are apatite and zircon. Secondary minerals include chlorite, epidote, actinolitic amphibole, and rare chalcopyrite: these phases are most abundant in mylonitic zones.

SL86 is a medium-grained weakly foliated biotite hornblende quartz gabbro with hypidiomorphic granular texture that grades into patches of recrystallized(?) xenomorphic granular material (average grain size 2mm). Hornblende has brownish-olive cores and pale olive rims, contains sparse relict clinopyroxene cores, and is typically intergrown with books of reddish-brown biotite. Plagioclase has mottled, resorbed cores and normally-zoned rims and is typically anhedral. Quartz forms interstitial grains and large aggregates of polygonal crystals. Ilmenite, apatite, and zircon are accessory phases.

SL117A is a biotite hornblende tonalite with strong protoclastic foliation imposed on an hypidiomorphic granular texture with average grain size of 1mm. Anhedral hornblende is olive to pale olive: reddish-brown biotite occurs as flakes parallel to the foliation. Plagioclase crystals are subhedral to euhedral, are commonly slightly bent, contain mottled euhedral cores inside oscillatory-normal zoned rims, and contain hornblende and biotite inclusions. Quartz is interstitial and apatite is an accessory mineral.

SL134A is a porphyritic two-pyroxene andesite (microdiorite) dike in the western Slinkard pluton. Phenocrysts average ~0.5mm in diameter and sparse pyroxene glomerocrysts reach 3mm in diameter. The hypidiomorphic granular to xenomorphic granular groundmass is fine-grained (~0.05mm). Pyroxene phenocrysts are euhedra rimmed by dark green hornblende, but pyroxene in glomerocrysts is subhedral. Granule exsolution is sparse. Plagioclase phenocrysts have unzoned cores, oscillatory-normal rims (typically), and contain abundant very fine-grained inclusions of pyroxene and rare relict magnetite. Groundmass phases are brown biotite, hornblende, plagioclase, poikilitic potassium feldspar, and quartz. Apatite and relict magnetite are accessory phases.

264 is similar to 645A (see below).

642A is a two-mica granite with average grain size 0.5mm. Textures range from hypidiomorphic granular to aplitic. Biotite occurs as reddish-brown, ragged flakes that average 0.1mm in diameter and as books that reach 2mm in diameter. Muscovite occurs as ragged books as much as 1mm in diameter and as small (0.1mm) flakes replacing feldspars. Subhedral plagioclase has

ehedral, slightly altered cores and fresh, locally granophyric rims. Quartz is interstitial except where adjacent to interstitial microcline, where quartz shows euhedral crystal faces. Accessory minerals include garnet ( $\sim \text{py}_4 \text{sp}_{29} \text{alm}_{64} \text{gr}_3$ ), zircon, apatite, and epidote. Epidote crystals are  $< 0.2 \text{mm}^3$  in diameter and occur as euhedral to subhedral grains with straight boundaries against mica, vermicular contacts with plagioclase and as rare, fine-grained replacement of feldspar.

645A is a protoclastic to hypidiomorphic granular hornblende pyroxene gabbro. Clinopyroxene and orthopyroxene are subhedral, show mutual lamellar (and rare granular) exsolution, and rims of hornblende. Olive to olive-brown hornblende forms rims on pyroxene and is interstitial. Plagioclase is commonly bent, shows weak oscillatory zoning, and albite and pericline twins with wedge terminations. Accessory minerals are biotite, quartz, apatite, and ilmenite.

#### Roof Zone Dikes

164 is similar to 704 (see below).

548 is a porphyritic microgranodiorite that is mineralogically similar to 697 (see below) and contains phenocrysts of broken to euhedral quartz. Allanite is a rare accessory mineral.

551 is a porphyritic biotite hornblende microgranodiorite with phenocrysts to 6mm long set in a granophyric groundmass. Stubby olive hornblende phenocrysts show weak core to rim zonation from darker to lighter olive and contain inclusions of plagioclase, quartz, opaque minerals and apatite. Relict biotite phenocrysts are 2-3mm in diameter and are altered to a mixture of chlorite, titanite, actinolite, and muscovite. Euhedral to subhedral plagioclase phenocrysts generally show oscillatory-normal zoning, and contain inclusions of apatite, hornblende, and rare zircon. Plagioclase glomerocrysts are common. Quartz phenocrysts are euhedral, commonly broken, and have inclusions of hornblende, biotite, and rare apatite. The groundmass consists of hornblende, plagioclase, potassium feldspar, and quartz.

553 and 554 are similar to 704 (see below) and contain sparse oval clots of quartz +/- actinolitic amphibole +/- biotite in the groundmass.

555 is a porphyritic basalt with sparse olivine phenocrysts and clinopyroxene phenocrysts and glomerocrysts as much as 5mm in diameter. Clinopyroxene phenocrysts contain abundant inclusions of ilmenite, relict magnetite, and plagioclase. The groundmass of the rock is a seriate diabasic to subophitic arrangement of clinopyroxene, orthopyroxene, and plagioclase with interstitial biotite, quartz, K-feldspar, and Fe-Ti oxides.

557 is similar to 704 (see below).

579 is a medium-grained (average 1.5mm) biotite hornblende granodiorite with hypidiomorphic-granular texture. Subhedral pale tan to olive hornblende includes zircon and apatite. Reddish-brown biotite occurs as thin flakes and books. Plagioclase shows seriate distribution, inclusions of apatite and hematite (after magnetite), and both oscillatory-normal and oscillatory-reverse zoning (Figure 18a). Potassium feldspar is poikilitic to interstitial with both stringer and granule exsolution; quartz is interstitial or subhedral adjacent to potassium feldspar. Apatite, zircon, and allanite (with zircon inclusions) are the accessory minerals.

584 is similar to 704, but contains phenocrysts to 4mm long, groundmass with average grain size 0.1mm, and rare secondary calcite.

590 is a sparsely porphyritic (clinopyroxene) basalt with subophitic groundmass (average grain size 0.2mm). The groundmass consists of clinopyroxene and orthopyroxene partly replaced by pale brown poikilitic hornblende and reddish-brown biotite, plagioclase, sparse interstitial quartz, and ilmenite.

693 is a porphyritic pyroxene hornblende andesite with sparse clinopyroxene phenocrysts to ~1mm in diameter and elongate olive to tan, patchy zoned euhedral hornblende phenocrysts that average 1.5mm long. Biotite inclusions are common in hornblende; other phases included in hornblende are opaque minerals, plagioclase, and quartz. Hornblende also occurs as rims around biotite microphenocrysts. Plagioclase phenocrysts are euhedral to subhedral, equant to slightly elongate, and are oscillatory zoned. The groundmass is an intergranular arrangement of hornblende, biotite, plagioclase, quartz, potassium feldspar, and accessory ilmenite and apatite. Biotite typically shows alteration to chlorite.

697 is a biotite hornblende microgranodiorite with seriate hypidiomorphic granular texture and average grain size of 2mm. Prismatic euhedral to subhedral hornblende reaches 5mm in length and is pale olive to tan with darker browish-green cores. Hornblende also occurs in 0.4mm diameter clusters of anhedral (+biotite). Reddish-brown to -yellow biotite forms ragged books that average about 1mm in diameter. Plagioclase phenocrysts show complex twinning, oscillatory zoning, and mild saussuritization, especially in cores. Quartz is typically interstitial to poikilitic, but has subhedral outlines against perthitic, poikilitic microcline. Accessory apatite and zircon occur as inclusions in hornblende and biotite and in the groundmass along with opaque minerals.

699 is similar to 704 (see below) except that glomerocrysts are

elongate (flow-aligned?) and the intergranular groundmass contains minor potassium feldspar.

704 is a porphyritic (seriate) two-pyroxene andesite. Pyroxene phenocrysts (to 5mm diameter) are euhedral to slightly subhedral, glomerocrysts of clinopyroxene +/- plagioclase +/- opaque minerals +/- prismatic apatite are common and rarely contain orthopyroxene. Some orthopyroxene phenocrysts are rimmed by clinopyroxene. Pyroxene contains inclusions of opaque minerals. Fine-grained plagioclase (less than 0.01mm), biotite, amphibole, quartz, ilmenite, and lamellar magnetite make up the groundmass. Euhedral oscillatory-normal zoned plagioclase contains inclusions of clinopyroxene, opaque minerals, and apatite needles.

TABLE 1. Modal analyses in volume percent.

| Sample        | 687   | 777B  | 638   | 639   | 771   | 775A  | 776   | 681A  | 686B  | 686E  | 766  |
|---------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|
| Plagioclase   | 42.7  | 47.7  | 8.5   | 43.7  | 44.1  | 30.4  | 30.2  | 50.2  | 45.8  | 53.0  | 32.9 |
| K-feldspar    | 4.1   | ----  | ----  | ----  | tr    | ----  | tr    | tr    | 1.9   | 0.5   | 0.7  |
| Quartz        | 18.4  | 5.9   | 1.5   | 0.1   | 1.5   | 0.6   | ----  | 0.2   | 8.7   | 10.3  | 0.5  |
| Clinopyroxene | ----  | tr    | 11.0  | ----  | tr    | 0.1   | ----  | ----  | ----  | ----  | ---- |
| Orthopyroxene | ----  | ----  | ----  | ----  | ----  | ----  | ----  | ----  | ----  | ----  | ---- |
| Hornblende    | 25.1  | 37.5  | 73.7  | 52.6  | 44.2  | 64.2  | 61.0  | 38.6  | 37.3  | 29.2  | 61.5 |
| Biotite       | 8.7   | 8.1   | ----  | 3.1   | 8.4   | 2.5   | 8.3   | 10.5  | 6.2   | 6.5   | 3.7  |
| Cummingtonite | ----  | ----  | ----  | ----  | ----  | 1.5   | ----  | ----  | ----  | ----  | ---- |
| Groundmass    | ----  | ----  | ----  | ----  | ----  | ----  | ----  | ----  | ----  | ----  | ---- |
| Opaque min.   | 0.1   | tr    | 0.1   | 0.1   | 0.7   | 0.2   | 0.1   | 0.1   | tr    | 0.2   | 0.1  |
| Apatite       | 0.2   | 0.5   | tr    | 0.4   | 0.1   | 0.5   | 0.4   | 0.3   | 0.1   | 0.3   | 0.4  |
| Zircon        | tr    | tr    | ----  | ----  | ----  | ----  | ----  | ----  | ----  | ----  | ---- |
| Allanite      | ----  | ----  | ----  | ----  | ----  | ----  | ----  | ----  | ----  | ----  | ---- |
| Titanite      | ----  | ----  | ----  | ----  | ----  | ----  | ----  | ----  | ----  | 0.1   | ---- |
| Epidote       | ----  | ----  | 0.9   | ----  | 0.2   | ----  | ----  | 0.1   | ----  | ----  | ---- |
| Chlorite      | 0.7   | 0.2   | 1.0   | ----  | 0.8   | ----  | ----  | 0.1   | ----  | ----  | 0.1  |
| Ms/sericite   | ----  | 0.1   | 3.3   | ----  | ----  | ----  | ----  | ----  | ----  | ----  | ---- |
| TOTAL         | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.1 | 100.0 | 100.1 | 99.9 |
| n             | 1000  | 1000  | 1000  | 1000  | 1000  | 1000  | 1000  | 1000  | 1000  | 1000  | 1000 |



TABLE 1. Modal analyses in volume percent, *continued.*

| Sample        | 119B  | 133   | 179   | 214B  | 219A  | 219B  | SL-IV | SL86  | SL117 | SL134 | 264  |
|---------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|
| Plagioclase   | 57.9  | 66.6  | 52.0  | 29.1  | 42.2  | 31.1  | 41.9  | 47.2  | 54.6  | 9.4   | 56.2 |
| K-feldspar    | ----  | ----  | ----  | ----  | ----  | 4.6   | ----  | 0.1   | 0.2   | ----  | ---- |
| Quartz        | 2.7   | 0.9   | 1.9   | 22.1  | 7.1   | 15.0  | 18.2  | 14.3  | 25.4  | ----  | 0.7  |
| Clinopyroxene | 3.7   | 15.9  | 35.6  | 36.2  | ----  | 15.0  | ----  | ----  | ----  | 10.9  | 20.0 |
| Orthopyroxene | ----  | 10.6  | 7.3   | ----  | ----  | 3.6   | ----  | ----  | ----  | 2.0   | 16.8 |
| Hornblende    | 29.8  | 0.6   | 0.3   | 1.9   | 12.9  | 19.2  | 24.3  | 27.2  | 7.2   | ----  | 5.2  |
| Biotite       | 3.6   | 2.9   | 2.5   | ----  | 34.3  | 0.7   | 11.4  | 10.9  | 12.5  | 0.1   | 0.1  |
| Cummingtonite | ----  | ----  | ----  | ----  | 3.1   | 2.2   | ----  | ----  | ----  | ----  | ---- |
| Groundmass    | ----  | ----  | ----  | ----  | ----  | ----  | ----  | ----  | ----  | 77.6  | ---- |
| Opaque min.   | 2.3   | 2.6   | 0.4   | 10.6  | 0.4   | 8.5   | tr    | 0.1   | ----  | ----  | 0.8  |
| Apatite       | ----  | tr    | ----  | tr    | ----  | 0.1   | tr    | 0.1   | ----  | ----  | ---- |
| Zircon        | ----  | ----  | ----  | ----  | ----  | ----  | tr    | ----  | ----  | ----  | ---- |
| Allanite      | ----  | ----  | ----  | ----  | ----  | ----  | ----  | ----  | ----  | ----  | ---- |
| Titanite      | ----  | ----  | ----  | ----  | ----  | ----  | ----  | ----  | 0.1   | ----  | ---- |
| Epidote       | tr    | ----  | ----  | 0.1   | ----  | ----  | 1.2   | ----  | ----  | ----  | ---- |
| Chlorite      | ----  | ----  | ----  | ----  | ----  | ----  | 2.8   | 0.1   | ----  | ----  | ---- |
| Ms/sericite   | ----  | ----  | ----  | ----  | ----  | ----  | 0.2   | ----  | ----  | ----  | ---- |
| TOTAL         | 100.0 | 100.1 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 99.8 |
| n             | 1098  | 1009  | 1000  | 1000  | 1000  | 1000  | 1000  | 1000  | 1000  | 1000  | 1000 |

TABLE 1. Modal analyses in volume percent, *continued.*

| Sample        | 642A  | 645A  | 164B  | 548  | 551  | 553   | 554  | 555* | 557   | 579   | 584   |
|---------------|-------|-------|-------|------|------|-------|------|------|-------|-------|-------|
| Plagioclase   | 42.8  | 56.2  | 18.4  | 33.6 | 31.3 | 24.6  | 29.2 | 14.7 | 20.3  | 34.0  | 40.4  |
| K-feldspar    | 37.0  | ----  | ----  | ---- | ---- | ----  | ---- | ---- | ----  | 24.5  | ----  |
| Quartz        | 12.6  | 5.4   | ----  | 1.1  | 8.4  | ----  | ---- | ---- | ----  | 32.0  | ----  |
| Clinopyroxene | ----  | 23.1  | 8.5   | ---- | ---- | 6.9   | 9.3  | 13.7 | 13.0  | ----  | 5.4   |
| Orthopyroxene | ----  | 9.5   | 7.1   | tr   | ---- | 6.7   | 5.4  | ---- | 7.5   | ----  | 7.0   |
| Hornblende    | ----  | 3.1   | ----  | 15.1 | 8.9  | ----  | ---- | ---- | ----  | 3.5   | ----  |
| Biotite       | 5.2   | 1.7   | ----  | 4.7  | 2.6  | ----  | ---- | ---- | ----  | 6.0   | ----  |
| Cummingtonite | ----  | ----  | ----  | ---- | ---- | ----  | ---- | ---- | ----  | ----  | ----  |
| Groundmass    | ----  | ----  | 65.9  | 45.3 | 48.6 | 61.8  | 56.0 | 71.0 | 59.2  | ----  | 46.9  |
| Opaque min.   | ----  | 0.9   | 0.1   | ---- | ---- | tr    | ---- | 0.5  | tr    | ----  | 0.3   |
| Apatite       | ----  | 0.1   | ----  | tr   | tr   | ----  | ---- | ---- | ----  | tr    | ----  |
| Zircon        | ----  | ----  | ----  | ---- | tr   | ----  | ---- | ---- | ----  | tr    | ----  |
| Allanite      | ----  | ----  | ----  | ---- | ---- | ----  | ---- | ---- | ----  | ----  | ----  |
| Titanite      | ----  | ----  | ----  | ---- | ---- | ----  | ---- | ---- | ----  | ----  | ----  |
| Epidote       | ----  | ----  | ----  | ---- | ---- | ----  | ---- | ---- | ----  | ----  | ----  |
| Chlorite      | ----  | ----  | ----  | ---- | ---- | ----  | ---- | ---- | ----  | ----  | ----  |
| Ms/sericite   | 2.4   | ----  | ----  | ---- | ---- | ----  | ---- | ---- | ----  | ----  | ----  |
| TOTAL         | 100.0 | 100.0 | 100.0 | 99.8 | 99.8 | 100.0 | 99.9 | 99.9 | 100.0 | 100.0 | 100.0 |
| n             | 1000  | 1000  | 1000  | 1000 | 1000 | 1000  | 1000 | 1000 | 1000  | 1000  | 1000  |

TABLE 1. Modal analyses in volume percent, *continued.*

| Sample        | 590   | 693   | 697   | 699  | 704   |
|---------------|-------|-------|-------|------|-------|
| Plagioclase   | 47.2  | 9.2   | 45.5  | 21.1 | 27.9  |
| K-feldspar    | ----  | ----  | 12.7  | ---- | ----  |
| Quartz        | 2.5   | ----  | 18.7  | ---- | ----  |
| Clinopyroxene | 6.5   | 2.8   | ----  | 9.7  | 6.4   |
| Orthopyroxene | 13.5  | ----  | ----  | 0.4  | 7.0   |
| Hornblende    | 23.5  | 9.7   | 15.4  | ---- | ----  |
| Biotite       | 6.5   | 1.4   | 7.6   | ---- | ----  |
| Cumingtonite  | ----  | ----  | ----  | ---- | ----  |
| Groundmass    | ----  | 76.9  | ----  | 66.9 | 58.2  |
| Opaque min.   | 0.3   | tr    | ----  | 1.8  | 0.5   |
| Apatite       | tr    | ----  | tr    | ---- | ----  |
| Zircon        | ----  | ----  | ----  | ---- | ----  |
| Allanite      | ----  | ----  | 0.1   | ---- | ----  |
| Titanite      | ----  | ----  | ----  | ---- | ----  |
| Epidote       | ----  | ----  | ----  | ---- | ----  |
| Chlorite      | ----  | ----  | ----  | ---- | ----  |
| Ms/sericite   | ----  | ----  | ----  | ---- | ----  |
| TOTAL         | 100.0 | 100.0 | 100.0 | 99.9 | 100.0 |
| n             | 1000  | 1000  | 1000  | 1000 | 1324  |

TABLE 2.  
WCB/SP OPX ave

| SPL  | XTAL    | SiO2  | TiO2 | Al2O3 | MnO  | FeO(t) | MgO   | CaO   | Na2O | Cr2O3 | TOTAL  |
|------|---------|-------|------|-------|------|--------|-------|-------|------|-------|--------|
| 557  | opx, av | 52.79 | 0.33 | 1.14  | 0.28 | 21.11  | 22.61 | 1.90  | 0.03 | 0.05  | 100.23 |
| 164  | opx, av | 52.74 | 0.29 | 1.42  | 0.39 | 20.66  | 23.18 | 1.82  | 0.05 | 0.05  | 100.60 |
| 704  | opx, av | 53.64 | 0.22 | 0.88  | 0.54 | 20.12  | 23.52 | 1.44  | 0.02 | 0.04  | 100.35 |
| 553  | opx, av | 53.07 | 0.31 | 1.10  | 0.47 | 21.37  | 22.78 | 1.75  | 0.04 | 0.13  | 101.01 |
| 584  | opx, av | 53.97 | 0.23 | 0.94  | 0.48 | 18.87  | 24.94 | 1.49  | 0.04 | 0.10  | 101.05 |
| 548  | opx, av | 51.36 | 0.09 | 0.64  | 1.32 | 29.92  | 16.36 | 0.81  | 0.01 | 0.15  | 100.64 |
| 351  | opx, av | 52.32 | 0.10 | 1.00  | 0.86 | 26.61  | 18.55 | 1.42  | 0.02 | 0.06  | 100.92 |
| 264  | opx, av | 52.45 | 0.12 | 1.40  | 0.50 | 22.49  | 21.67 | 0.74  | 0.01 | 0.06  | 99.43  |
| 111  | opx, av | 50.97 | 0.25 | 1.15  | 0.58 | 25.01  | 20.43 | 1.50  | 0.06 | 0.05  | 99.98  |
| 171  | opx, av | 53.49 | 0.10 | 1.38  | 0.49 | 19.63  | 23.32 | 1.07  | 0.01 | 0.02  | 99.51  |
| 100  | opx, av | 54.54 | 0.17 | 2.12  | 0.22 | 13.75  | 27.29 | 1.70  | 0.09 | 0.09  | 99.96  |
| 30   | opx, av | 51.82 | 0.29 | 1.30  | 0.56 | 23.53  | 19.76 | 1.75  | 0.07 | 0.07  | 99.14  |
| 184  | opx, av | 53.16 | 0.15 | 1.43  | 0.46 | 18.17  | 23.95 | 1.15  | 0.07 | 0.09  | 98.62  |
| 257  | opx1    | 53.46 | 0.23 | 1.23  | 0.72 | 20.08  | 23.78 | 0.83  | 0.03 | 0.02  | 100.34 |
| 219B | opx, av | 50.46 | 0.05 | 0.68  | 0.63 | 33.49  | 14.53 | 0.822 | 0.01 | 0.01  | 100.71 |
| 645A | opx, av | 51.49 | 0.07 | 1.21  | 0.58 | 26.40  | 18.84 | 1.439 | 0.03 | 0.02  | 100.11 |
| s134 | opx, av | 53.13 | 0.20 | 1.41  | 0.41 | 19.86  | 23.19 | 1.628 | 0.02 | 0.09  | 99.86  |
| 133  | opx, av | 52.75 | 0.11 | 0.88  | 0.75 | 24.01  | 20.99 | 0.852 | 0.02 | 0.02  | 100.01 |

| SPL  | XTAL    | Si    | Ti    | Al    | Mn    | Fe(t) | Mg    | Ca    | Na    | Cr    | TOTAL | T(C) |
|------|---------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|
| 557  | opx, av | 1.957 | 0.008 | 0.049 | 0.008 | 0.654 | 1.249 | 0.075 | 0.002 | 0.001 | 4.002 | 1073 |
| 164  | opx, av | 1.945 | 0.007 | 0.061 | 0.011 | 0.637 | 1.273 | 0.071 | 0.003 | 0.001 | 4.010 | 1043 |
| 704  | opx, av | 1.973 | 0.005 | 0.037 | 0.016 | 0.616 | 1.290 | 0.056 | 0.001 | .000  | 3.995 | 912  |
| 553  | opx, av | 1.955 | 0.008 | 0.047 | 0.014 | 0.657 | 1.251 | 0.068 | 0.002 | 0.003 | 4.005 | 1037 |
| 584  | opx, av | 1.962 | 0.006 | 0.040 | 0.014 | 0.574 | 1.351 | 0.057 | 0.002 | 0.002 | 4.007 | 967  |
| 548  | opx, av | 1.983 | 0.003 | 0.028 | 0.043 | 0.967 | 0.941 | 0.033 | .000  | 0.003 | 4.003 | 613  |
| 351  | opx, av | 1.977 | 0.002 | 0.044 | 0.027 | 0.841 | 1.044 | 0.056 | 0.001 | 0.001 | 3.992 | 860  |
| 264  | opx, av | 1.967 | 0.003 | 0.061 | 0.015 | 0.705 | 1.211 | 0.029 | .000  | 0.001 | 3.992 | 689  |
| 111  | opx, av | 1.937 | 0.007 | 0.052 | 0.019 | 0.795 | 1.158 | 0.061 | 0.004 | 0.002 | 4.032 | 950  |
| 171  | opx, av | 1.977 | 0.003 | 0.060 | 0.015 | 0.607 | 1.285 | 0.042 | 0.001 | 0.001 | 3.990 | 808  |
| 100  | opx, av | 1.955 | 0.005 | 0.089 | 0.007 | 0.413 | 1.457 | 0.065 | 0.006 | 0.003 | 3.998 | 1100 |
| 30   | opx, av | 1.968 | 0.008 | 0.058 | 0.018 | 0.747 | 1.118 | 0.071 | 0.005 | 0.002 | 3.995 | 1027 |
| 184  | opx, av | 1.973 | 0.004 | 0.062 | 0.014 | 0.564 | 1.324 | 0.046 | 0.005 | 0.003 | 3.993 | 825  |
| 257  | opx1    | 1.966 | 0.005 | 0.053 | 0.021 | 0.615 | 1.303 | 0.032 | 0.001 | 0.000 | 3.997 | 700  |
| 219B | opx, av | 1.974 | 0.000 | 0.030 | 0.020 | 1.095 | 0.846 | 0.033 | 0.000 | 0.000 | 4.001 | 630  |
| 645A | opx, av | 1.960 | 0.001 | 0.053 | 0.018 | 0.840 | 1.068 | 0.057 | 0.001 | 0.000 | 4.002 | 515  |
| s134 | opx, av | 1.960 | 0.004 | 0.060 | 0.019 | 0.613 | 1.274 | 0.056 | 0.000 | 0.002 | 3.994 | 880  |
| 133  | opx, av | 1.970 | 0.002 | 0.038 | 0.023 | 0.755 | 1.177 | 0.033 | 0.001 | 0.000 | 4.001 | 700  |

TABLE 3. Clinopyroxene

| SPL  | XTAL    | SiO2  | TiO2 | Al2O3 | MnO  | FeO(t) | MgO   | CaO   | Na2O | Cr2O3 | TOTAL  |
|------|---------|-------|------|-------|------|--------|-------|-------|------|-------|--------|
| 557  | cpx, av | 51.34 | 0.56 | 2.09  | 0.26 | 11.65  | 14.17 | 19.32 | 0.30 | 0.06  | 99.74  |
| 164  | cpx, av | 51.58 | 0.59 | 2.02  | 0.26 | 11.47  | 14.62 | 19.06 | 0.29 | 0.06  | 99.94  |
| 704  | cpx, av | 52.04 | 0.47 | 1.70  | 0.31 | 9.97   | 14.94 | 20.23 | 0.34 | 0.08  | 100.07 |
| 555  | cpx, av | 51.78 | 0.53 | 2.71  | 0.30 | 9.95   | 15.30 | 19.37 | 0.29 | 0.09  | 100.33 |
| 553  | cpx, av | 51.48 | 0.57 | 1.98  | 0.30 | 12.45  | 14.32 | 18.11 | 0.31 | 0.06  | 99.59  |
| 590  | cpx3r   | 52.59 | 0.42 | 1.89  | 0.24 | 9.10   | 15.20 | 18.66 | 0.22 | 0.25  | 98.56  |
| 584  | cpx, av | 52.30 | 0.48 | 1.95  | 0.30 | 9.61   | 15.08 | 18.94 | 0.31 | 0.16  | 99.12  |
| 699  | cpx, av | 51.48 | 0.58 | 1.60  | 0.37 | 13.33  | 13.66 | 19.47 | 0.23 | 0.11  | 100.82 |
| 693  | cpx, av | 53.50 | 0.39 | 1.93  | 0.23 | 6.28   | 16.38 | 21.55 | 0.20 | 0.26  | 100.74 |
| 264  | cpx, av | 51.97 | 0.25 | 2.15  | 0.23 | 8.74   | 13.71 | 21.71 | 0.40 | 0.07  | 99.21  |
| 397  | cpx, av | 52.53 | 0.10 | 0.83  | 0.59 | 9.90   | 12.78 | 22.50 | 0.38 | 0.06  | 99.63  |
| 111  | cpx, av | 51.83 | 0.58 | 1.98  | 0.30 | 10.97  | 14.25 | 20.05 | 0.36 | 0.09  | 100.43 |
| 171  | cpx, av | 53.65 | 0.17 | 1.50  | 0.23 | 7.01   | 15.26 | 22.35 | 0.25 | 0.42  | 100.83 |
| 100  | cpx, av | 52.41 | 0.29 | 2.42  | 0.15 | 6.71   | 15.66 | 20.75 | 0.32 | 0.25  | 98.96  |
| 236  | cpx, av | 50.99 | 0.72 | 2.84  | 0.31 | 12.14  | 13.85 | 18.57 | 0.37 | 0.07  | 99.75  |
| 30   | cpx, av | 51.42 | 0.55 | 2.10  | 0.26 | 10.39  | 13.67 | 19.76 | 0.37 | 0.11  | 98.65  |
| 184  | cpx, av | 53.04 | 0.19 | 1.68  | 0.13 | 6.45   | 15.74 | 21.68 | 0.41 | 0.43  | 99.73  |
| 103  | cpx, av | 51.82 | 0.22 | 1.05  | 0.38 | 9.13   | 13.67 | 23.10 | 0.23 | 0.00  | 99.63  |
| 257  | cpx, av | 53.98 | 0.08 | 0.56  | 0.40 | 7.50   | 14.47 | 22.29 | 0.08 | 0.05  | 99.40  |
| 219B | cpx, av | 51.54 | 0.07 | 1.13  | 0.29 | 14.91  | 11.06 | 21.49 | 0.25 | .00   | 100.75 |
| 645A | cpx, av | 51.09 | 0.25 | 2.26  | 0.30 | 12.02  | 12.81 | 20.84 | 0.38 | 0.07  | 100.11 |
| s134 | cpx, av | 52.09 | 0.41 | 2.19  | 0.26 | 9.59   | 15.27 | 20.40 | 0.28 | 0.28  | 100.77 |
| 214B | cpx, av | 49.58 | 0.04 | 1.40  | 0.74 | 18.85  | 6.76  | 22.64 | 0.33 | 0.04  | 100.40 |
| 179  | cpx, av | 52.61 | 0.38 | 1.31  | 0.28 | 9.08   | 14.65 | 21.70 | 0.29 | 0.08  | 100.38 |
| 133  | cpx, av | 51.70 | 0.34 | 1.72  | 0.40 | 10.23  | 13.84 | 21.32 | 0.33 | 0.04  | 99.91  |
| SL86 | cpx, av | 52.84 | 0.18 | 1.76  | 0.32 | 8.75   | 14.47 | 20.30 | 0.22 | 0.00  | 98.89  |
| 777B | cpx1av  | 53.09 | 0.09 | 1.11  | 0.38 | 8.92   | 13.34 | 21.56 | 0.31 | 0.00  | 98.81  |
| 638  | cpx, av | 53.44 | 0.00 | 0.57  | 0.23 | 5.69   | 15.39 | 23.41 | 0.17 | 0.00  | 98.93  |

TABLE 3. Clinopyroxene, *continued*.

| SPL  | XTAL   | Si    | Ti    | Al    | Mn    | Fe(t) | Mg    | Ca    | Na    | Cr    | TOTAL | T(C) |
|------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|
| 557  | cpx,av | 1.932 | 0.015 | 0.092 | 0.007 | 0.366 | 0.794 | 0.778 | 0.022 | 0.001 | 4.008 | 1008 |
| 164  | cpx,av | 1.934 | 0.016 | 0.089 | 0.007 | 0.359 | 0.817 | 0.765 | 0.021 | 0.001 | 4.008 | 1045 |
| 704  | cpx,av | 1.942 | 0.013 | 0.074 | 0.009 | 0.311 | 0.830 | 0.808 | 0.023 | 0.002 | 4.010 | 985  |
| 555  | cpx,av | 1.921 | 0.014 | 0.118 | 0.008 | 0.308 | 0.845 | 0.769 | 0.020 | 0.002 | 4.007 | 1086 |
| 553  | cpx,av | 1.941 | 0.015 | 0.087 | 0.009 | 0.392 | 0.804 | 0.731 | 0.022 | 0.001 | 4.003 | 1074 |
| 590  | cpx3r  | 1.971 | 0.011 | 0.082 | 0.006 | 0.285 | 0.849 | 0.749 | 0.015 | 0.006 | 3.975 | 1120 |
| 584  | cpx,av | 1.957 | 0.013 | 0.085 | 0.009 | 0.300 | 0.840 | 0.759 | 0.022 | 0.004 | 3.989 | 1073 |
| 699  | cpx,av | 1.936 | 0.017 | 0.071 | 0.012 | 0.419 | 0.765 | 0.785 | 0.017 | 0.003 | 4.022 | 994  |
| 693  | cpx,av | 1.951 | 0.010 | 0.082 | 0.006 | 0.191 | 0.889 | 0.842 | 0.014 | 0.007 | 3.992 | 963  |
| 264  | cpx,av | 1.951 | 0.006 | 0.094 | 0.006 | 0.274 | 0.767 | 0.873 | 0.028 | 0.001 | 4.001 | 838  |
| 397  | cpx,av | 1.982 | 0.002 | 0.037 | 0.018 | 0.311 | 0.718 | 0.909 | 0.027 | 0.001 | 4.003 | 605  |
| 111  | cpx,av | 1.936 | 0.016 | 0.087 | 0.009 | 0.343 | 0.794 | 0.802 | 0.026 | 0.002 | 4.015 | 966  |
| 171  | cpx,av | 1.967 | 0.005 | 0.064 | 0.007 | 0.215 | 0.834 | 0.878 | 0.018 | 0.012 | 3.999 | 853  |
| 100  | cpx,av | 1.948 | 0.008 | 0.105 | 0.005 | 0.208 | 0.868 | 0.826 | 0.023 | 0.007 | 3.999 | 1023 |
| 236  | cpx,av | 1.918 | 0.020 | 0.126 | 0.010 | 0.383 | 0.778 | 0.749 | 0.027 | 0.002 | 4.012 | 1054 |
| 30   | cpx,av | 1.949 | 0.016 | 0.094 | 0.008 | 0.329 | 0.772 | 0.802 | 0.027 | 0.004 | 4.001 | 957  |
| 184  | cpx,av | 1.960 | 0.005 | 0.073 | 0.004 | 0.202 | 0.867 | 0.858 | 0.029 | 0.013 | 4.008 | 895  |
| 103  | cpx,av | 1.953 | 0.006 | 0.046 | 0.012 | 0.288 | 0.769 | 0.933 | 0.017 | 0.000 | 4.025 | ---  |
| 257  | cpx,av | 2.007 | 0.002 | 0.024 | 0.012 | 0.233 | 0.802 | 0.888 | 0.005 | 0.001 | 3.972 | 785  |
| 219B | cpx,av | 1.960 | 0.001 | 0.050 | 0.009 | 0.474 | 0.627 | 0.875 | 0.018 | 0.000 | 4.025 | 709  |
| 645A | cpx,av | 1.929 | 0.006 | 0.100 | 0.009 | 0.379 | 0.726 | 0.842 | 0.027 | 0.001 | 4.018 | 796  |
| s134 | cpx,av | 1.927 | 0.011 | 0.095 | 0.007 | 0.296 | 0.841 | 0.808 | 0.020 | 0.007 | 4.012 | 1031 |
| 214B | cpx,av | 1.946 | 0.001 | 0.064 | 0.097 | 0.618 | 0.395 | 0.952 | 0.025 | 0.001 | 4.024 | ---  |
| 179  | cpx,av | 1.955 | 0.010 | 0.056 | 0.007 | 0.282 | 0.811 | 0.864 | 0.020 | 0.002 | 4.007 | 784  |
| 133  | cpx,av | 1.942 | 0.009 | 0.075 | 0.012 | 0.321 | 0.774 | 0.858 | 0.024 | 0.001 | 4.015 | 859  |
| SL86 | cpx,av | 1.979 | 0.005 | 0.078 | 0.010 | 0.273 | 0.808 | 0.815 | 0.015 | 0.000 | 3.980 | 960  |
| 777B | cpx1av | 1.999 | 0.002 | 0.049 | 0.011 | 0.280 | 0.748 | 0.870 | 0.022 | 0.000 | 3.981 | 820  |
| 638  | cpx,av | 1.991 | 0.000 | 0.024 | 0.007 | 0.177 | 0.854 | 0.934 | 0.012 | 0.000 | 3.998 | ---  |

Table 4. WCB/SP amphibole.

| sample            | SiO <sub>2</sub> | Al <sub>2</sub> O <sub>3</sub> | Fe <sub>2</sub> O <sub>3</sub> | FeO   | MgO   | TiO <sub>2</sub> | Cr <sub>2</sub> O <sub>3</sub> | MnO  | BaO  | CaO   | Na <sub>2</sub> O |
|-------------------|------------------|--------------------------------|--------------------------------|-------|-------|------------------|--------------------------------|------|------|-------|-------------------|
| 548-2, outer core | 45.66            | 8.01                           | 0.00                           | 17.07 | 11.45 | 1.65             | 0.00                           | 0.39 | 0.00 | 10.49 | 1.58              |
| 548-2, rim A      | 49.28            | 5.09                           | 0.00                           | 17.35 | 12.22 | 1.04             | 0.00                           | 0.41 | 0.00 | 10.82 | 0.84              |
| 548-2, rim B      | 46.65            | 7.66                           | 0.00                           | 17.90 | 11.50 | 1.25             | 0.00                           | 0.46 | 0.00 | 10.37 | 1.41              |
| 548-2, inner rim  | 45.38            | 8.42                           | 0.00                           | 17.70 | 11.39 | 1.66             | 0.00                           | 0.41 | 0.00 | 10.56 | 1.73              |
| 548, gm hnbl      | 46.40            | 7.73                           | 0.00                           | 17.36 | 11.76 | 1.02             | 0.00                           | 0.43 | 0.00 | 10.37 | 1.45              |
| 551-1, rim        | 47.74            | 6.03                           | 0.00                           | 16.24 | 12.64 | 0.66             | 0.00                           | 0.44 | 0.00 | 10.66 | 1.04              |
| 551-1, step in    | 47.30            | 6.90                           | 0.00                           | 16.61 | 12.30 | 0.78             | 0.00                           | 0.45 | 0.00 | 10.80 | 1.20              |
| 551-1, outer cor  | 48.64            | 6.10                           | 0.00                           | 16.03 | 12.76 | 0.66             | 0.00                           | 0.48 | 0.00 | 10.53 | 1.12              |
| 551, gm hnbl      | 47.52            | 6.68                           | 0.00                           | 16.43 | 12.48 | 0.73             | 0.00                           | 0.44 | 0.00 | 10.34 | 1.17              |
| 693-2, rim        | 46.42            | 7.74                           | 0.00                           | 16.58 | 11.83 | 1.10             | 0.00                           | 0.42 | 0.00 | 9.96  | 1.34              |
| 693-2, core       | 44.98            | 8.60                           | 0.00                           | 16.56 | 11.58 | 1.71             | 0.00                           | 0.30 | 0.00 | 10.10 | 1.54              |
| 693-3, core       | 45.67            | 8.25                           | 0.00                           | 16.27 | 12.16 | 1.39             | 0.00                           | 0.39 | 0.00 | 9.85  | 1.47              |
| 693-3, rim        | 46.06            | 8.19                           | 0.00                           | 17.01 | 11.64 | 1.28             | 0.00                           | 0.41 | 0.00 | 9.53  | 1.41              |
| 579-2, core       | 49.97            | 4.35                           | 0.00                           | 18.14 | 12.30 | 0.44             | 0.00                           | 0.52 | 0.00 | 10.91 | 0.71              |
| 579-2, rim        | 50.14            | 3.97                           | 0.00                           | 17.45 | 12.70 | 0.50             | 0.00                           | 0.52 | 0.00 | 11.09 | 0.75              |
| 579-3, core       | 48.65            | 5.02                           | 0.00                           | 18.18 | 11.91 | 0.61             | 0.00                           | 0.57 | 0.00 | 10.97 | 0.88              |
| 579-3, rim        | 49.52            | 4.87                           | 0.00                           | 18.12 | 11.89 | 0.51             | 0.00                           | 0.50 | 0.00 | 10.98 | 0.80              |
| 697, gm hnbl      | 49.21            | 5.62                           | 0.00                           | 17.64 | 11.58 | 0.80             | 0.00                           | 0.46 | 0.00 | 11.56 | 0.81              |
| 697-2, core       | 47.03            | 7.48                           | 0.00                           | 16.78 | 11.88 | 1.34             | 0.00                           | 0.45 | 0.00 | 11.18 | 1.22              |
| 697-2, rim        | 49.54            | 5.09                           | 0.00                           | 17.41 | 12.39 | 0.71             | 0.00                           | 0.49 | 0.00 | 11.15 | 0.92              |
| 697-2, step in    | 46.29            | 8.47                           | 0.00                           | 17.04 | 11.50 | 1.64             | 0.00                           | 0.41 | 0.00 | 11.19 | 1.49              |
| 397-2, rim        | 45.78            | 7.88                           | 0.00                           | 16.34 | 12.04 | 1.29             | 0.00                           | 0.38 | 0.00 | 11.25 | 1.32              |
| 397-2, core       | 46.17            | 7.77                           | 0.00                           | 15.27 | 12.41 | 1.57             | 0.00                           | 0.30 | 0.00 | 11.60 | 1.20              |
| 397-2, mid-point  | 45.86            | 7.61                           | 0.00                           | 15.84 | 12.05 | 1.50             | 0.00                           | 0.35 | 0.00 | 11.49 | 1.20              |
| 351-1, rim        | 49.11            | 7.23                           | 0.00                           | 14.79 | 14.06 | 0.42             | 0.00                           | 0.26 | 0.00 | 11.24 | 0.84              |
| 351-2, core       | 48.75            | 7.45                           | 0.00                           | 14.86 | 13.87 | 0.25             | 0.00                           | 0.25 | 0.00 | 11.38 | 0.79              |
| 171-1, core       | 43.65            | 10.42                          | 0.00                           | 11.52 | 13.04 | 2.31             | 0.23                           | 0.17 | 0.00 | 11.59 | 1.52              |
| 171-1, rim        | 46.83            | 8.45                           | 0.00                           | 10.55 | 14.15 | 1.65             | 0.22                           | 0.15 | 0.00 | 11.57 | 1.17              |
| 171-2, core       | 45.09            | 10.10                          | 0.00                           | 11.51 | 13.44 | 1.99             | 0.14                           | 0.16 | 0.00 | 11.43 | 1.30              |
| 184A-1, core      | 49.22            | 5.96                           | 0.00                           | 9.10  | 16.46 | 0.74             | 0.31                           | 0.18 | 0.00 | 11.34 | 0.92              |
| 184A-1, rim       | 50.41            | 5.91                           | 0.00                           | 9.19  | 16.69 | 0.56             | 0.24                           | 0.17 | 0.00 | 11.43 | 0.83              |
| 208-2, core       | 45.98            | 7.35                           | 0.00                           | 16.37 | 11.72 | 1.91             | 0.05                           | 0.33 | 0.00 | 10.53 | 1.43              |
| 208-2, step out   | 45.34            | 7.03                           | 0.00                           | 16.12 | 11.30 | 1.81             | 0.07                           | 0.36 | 0.00 | 10.70 | 1.22              |
| 208-2, rim        | 44.48            | 7.87                           | 0.00                           | 17.06 | 10.59 | 1.22             | 0.04                           | 0.44 | 0.00 | 10.87 | 1.26              |
| 372A-1, core      | 44.77            | 7.12                           | 0.00                           | 16.38 | 11.20 | 1.62             | 0.02                           | 0.37 | 0.00 | 10.65 | 1.62              |
| 372A-1, rim       | 46.27            | 6.15                           | 0.00                           | 17.30 | 11.00 | 0.86             | 0.06                           | 0.70 | 0.00 | 10.84 | 1.24              |
| 194-2, core       | 43.62            | 8.87                           | 0.00                           | 16.43 | 9.47  | 1.91             | 0.06                           | 0.49 | 0.00 | 10.61 | 1.47              |
| 194-2, rim        | 45.76            | 7.08                           | 0.00                           | 17.66 | 10.40 | 1.07             | 0.03                           | 0.50 | 0.00 | 11.01 | 1.22              |
| 103-1, rim, plag  | 46.97            | 8.26                           | 0.00                           | 15.42 | 12.71 | 0.56             | 0.00                           | 0.39 | 0.00 | 11.60 | 0.90              |
| 103-1, core       | 46.72            | 7.81                           | 0.00                           | 15.16 | 13.06 | 0.64             | 0.00                           | 0.38 | 0.00 | 11.39 | 0.92              |
| 103-1, rim, qtz   | 47.30            | 7.72                           | 0.00                           | 15.39 | 12.76 | 0.57             | 0.00                           | 0.39 | 0.00 | 11.16 | 0.96              |
| 379-1, rim, qtz   | 45.62            | 7.90                           | 0.00                           | 15.14 | 13.10 | 1.09             | 0.00                           | 0.38 | 0.00 | 11.94 | 1.10              |
| 379-1, core       | 45.56            | 7.95                           | 0.00                           | 15.04 | 12.95 | 1.27             | 0.00                           | 0.38 | 0.00 | 11.27 | 1.32              |
| 379-1, rim, plag  | 46.10            | 7.58                           | 0.00                           | 15.08 | 13.12 | 0.90             | 0.00                           | 0.41 | 0.00 | 11.52 | 1.14              |
| 317-1, rim, plag  | 45.42            | 8.58                           | 0.00                           | 16.90 | 11.19 | 1.01             | 0.00                           | 0.42 | 0.01 | 11.44 | 1.21              |
| 317-1, core       | 45.31            | 8.84                           | 0.00                           | 17.11 | 11.54 | 1.50             | 0.00                           | 0.38 | 0.04 | 10.91 | 1.58              |
| 317-1, step out   | 45.15            | 8.49                           | 0.00                           | 16.57 | 11.81 | 1.67             | 0.00                           | 0.37 | 0.01 | 10.81 | 1.63              |
| 317-1, step out   | 44.63            | 8.71                           | 0.00                           | 16.32 | 11.68 | 1.64             | 0.00                           | 0.37 | 0.02 | 11.04 | 1.58              |
| 317-1, rim, Ksp   | 45.94            | 7.54                           | 0.00                           | 16.80 | 11.96 | 0.73             | 0.00                           | 0.40 | 0.15 | 11.37 | 1.09              |
| 471-1, rim        | 47.30            | 6.33                           | 0.00                           | 16.39 | 12.70 | 0.69             | 0.00                           | 0.45 | 0.00 | 11.27 | 0.89              |
| 471-1, mid-point  | 44.94            | 8.40                           | 0.00                           | 16.62 | 11.70 | 1.53             | 0.00                           | 0.40 | 0.02 | 11.29 | 1.45              |
| 471-1, core       | 46.39            | 8.18                           | 0.00                           | 15.91 | 12.39 | 2.06             | 0.00                           | 0.31 | 0.03 | 10.90 | 1.68              |
| 471-3, rim        | 44.45            | 7.99                           | 0.00                           | 17.37 | 11.24 | 1.04             | 0.00                           | 0.46 | 0.00 | 11.60 | 1.23              |

Table 4. HEDV (K) (continued)

| sample           | FeO  | SiO <sub>2</sub> | Total | Al    | Al    | Fe <sub>2</sub> O <sub>3</sub> | FeO <sub>T</sub> | H <sub>2</sub> O | Ti    |       |
|------------------|------|------------------|-------|-------|-------|--------------------------------|------------------|------------------|-------|-------|
| 548-2, outer cor | 0.73 | 0.00             | 0.00  | 97.25 | 6.868 | 1.417                          | 0.000            | 2.145            | 2.564 | 0.195 |
| 548-2, rim B     | 0.45 | 0.00             | 0.00  | 97.53 | 7.216 | 2.039                          | 0.000            | 2.153            | 2.702 | 0.112 |
| 548-2, rim B     | 0.52 | 0.00             | 0.00  | 97.71 | 6.965 | 1.345                          | 0.000            | 2.234            | 2.558 | 0.136 |
| 548-2, inner rim | 0.64 | 0.00             | 0.00  | 97.90 | 6.793 | 1.425                          | 0.000            | 2.214            | 2.340 | 0.134 |
| 548, gm htbl     | 0.50 | 0.00             | 0.00  | 97.00 | 6.957 | 1.305                          | 0.000            | 2.176            | 2.620 | 0.114 |
| 551-1, rim       | 0.45 | 0.00             | 0.00  | 95.96 | 7.195 | 1.070                          | 0.000            | 2.043            | 2.239 | 0.070 |
| 551-1, step in   | 0.49 | 0.00             | 0.00  | 96.83 | 7.021 | 1.216                          | 0.000            | 2.078            | 2.741 | 0.083 |
| 551-1, outer cor | 0.40 | 0.00             | 0.00  | 96.71 | 7.243 | 1.070                          | 0.000            | 1.992            | 2.331 | 0.070 |
| 551, gm htbl     | 0.42 | 0.00             | 0.00  | 96.21 | 7.136 | 1.181                          | 0.000            | 2.053            | 2.794 | 0.079 |
| 693-2, rim       | 0.46 | 0.00             | 0.00  | 95.85 | 7.011 | 1.378                          | 0.000            | 2.091            | 2.559 | 0.124 |
| 693-2, core      | 0.74 | 0.00             | 0.00  | 96.12 | 6.809 | 1.532                          | 0.000            | 2.092            | 2.612 | 0.191 |
| 693-3, core      | 0.54 | 0.00             | 0.00  | 95.98 | 6.886 | 1.465                          | 0.000            | 2.049            | 2.738 | 0.155 |
| 693-3, rim       | 0.53 | 0.00             | 0.00  | 96.06 | 6.958 | 1.453                          | 0.000            | 2.145            | 2.619 | 0.142 |
| 579-2, core      | 0.30 | 0.00             | 0.00  | 97.65 | 7.418 | 0.758                          | 0.000            | 2.248            | 2.722 | 0.048 |
| 579-2, rim       | 0.28 | 0.00             | 0.00  | 97.39 | 7.446 | 0.692                          | 0.000            | 2.165            | 2.810 | 0.052 |
| 579-3, core      | 0.41 | 0.00             | 0.00  | 97.22 | 7.292 | 0.884                          | 0.000            | 2.278            | 2.661 | 0.266 |
| 579-3, rim       | 0.38 | 0.00             | 0.00  | 97.56 | 7.370 | 0.851                          | 0.000            | 2.252            | 2.637 | 0.057 |
| 697, gm htbl     | 0.50 | 0.00             | 0.00  | 98.18 | 7.279 | 0.977                          | 0.000            | 2.179            | 2.552 | 0.086 |
| 697-2, core      | 0.51 | 0.00             | 0.00  | 97.87 | 6.985 | 1.308                          | 0.000            | 2.084            | 2.629 | 0.148 |
| 697-2, rim       | 0.35 | 0.00             | 0.00  | 98.04 | 7.319 | 0.884                          | 0.000            | 2.150            | 2.728 | 0.078 |
| 697-2, step in   | 0.63 | 0.00             | 0.00  | 98.66 | 6.839 | 1.475                          | 0.000            | 2.104            | 2.533 | 0.182 |
| 397-2, rim       | 0.84 | 0.00             | 0.00  | 97.11 | 6.876 | 1.393                          | 0.000            | 2.049            | 2.693 | 0.141 |
| 397-2, core      | 0.73 | 0.00             | 0.00  | 97.11 | 6.888 | 1.366                          | 0.000            | 1.905            | 2.759 | 0.175 |
| 397-2, mid-point | 0.78 | 0.00             | 0.00  | 96.68 | 6.895 | 1.345                          | 0.000            | 1.989            | 2.699 | 0.167 |
| 351-1, rim       | 0.30 | 0.00             | 0.00  | 98.25 | 7.136 | 1.237                          | 0.000            | 1.795            | 3.045 | 0.042 |
| 351-2, core      | 0.36 | 0.00             | 0.00  | 97.95 | 7.111 | 1.280                          | 0.000            | 1.811            | 3.014 | 0.025 |
| 171-1, core      | 1.01 | 0.00             | 0.00  | 95.46 | 6.552 | 1.844                          | 0.000            | 1.448            | 2.919 | 0.261 |
| 171-1, rim       | 0.70 | 0.00             | 0.00  | 95.44 | 6.933 | 1.474                          | 0.000            | 1.305            | 3.123 | 0.184 |
| 171-2, core      | 1.02 | 0.00             | 0.00  | 96.17 | 6.685 | 1.764                          | 0.000            | 1.426            | 2.970 | 0.222 |
| 184A-1, core     | 0.57 | 0.00             | 0.00  | 94.79 | 7.249 | 1.035                          | 0.000            | 1.120            | 3.614 | 0.082 |
| 184A-1, rim      | 0.47 | 0.00             | 0.00  | 95.90 | 7.317 | 1.011                          | 0.000            | 1.116            | 3.612 | 0.051 |
| 208-2, core      | 0.64 | 0.00             | 0.00  | 96.30 | 6.939 | 1.307                          | 0.000            | 2.066            | 2.637 | 0.217 |
| 208-2, step out  | 0.62 | 0.00             | 0.00  | 94.57 | 6.971 | 1.274                          | 0.000            | 2.073            | 2.592 | 0.210 |
| 208-2, rim       | 0.56 | 0.00             | 0.00  | 94.40 | 6.893 | 1.437                          | 0.000            | 2.211            | 2.447 | 0.143 |
| 372A-1, core     | 0.53 | 0.00             | 0.00  | 94.27 | 6.929 | 1.298                          | 0.000            | 2.120            | 2.585 | 0.188 |
| 372A-1, rim      | 0.45 | 0.00             | 0.00  | 94.87 | 7.126 | 1.116                          | 0.000            | 2.228            | 2.526 | 0.099 |
| 194-2, core      | 0.77 | 0.00             | 0.00  | 95.70 | 6.729 | 1.613                          | 0.000            | 2.377            | 2.178 | 0.221 |
| 194-2, rim       | 0.45 | 0.00             | 0.00  | 95.17 | 7.033 | 1.282                          | 0.000            | 2.270            | 2.383 | 0.124 |
| 103-1, rim, plag | 0.52 | 0.05             | 0.12  | 97.60 | 6.956 | 1.442                          | 0.000            | 1.909            | 2.805 | 0.262 |
| 103-1, core      | 0.55 | 0.05             | 0.08  | 96.72 | 6.972 | 1.374                          | 0.000            | 1.892            | 2.905 | 0.072 |
| 103-1, rim, Qtz  | 0.55 | 0.03             | 0.00  | 96.82 | 7.038 | 1.355                          | 0.000            | 1.915            | 2.830 | 0.064 |
| 379-1, rim, Qtz  | 0.62 | 0.05             | 0.17  | 97.11 | 6.829 | 1.394                          | 0.000            | 1.895            | 2.923 | 0.123 |
| 379-1, core      | 0.59 | 0.05             | 0.12  | 96.47 | 6.848 | 1.409                          | 0.000            | 1.891            | 2.901 | 0.144 |
| 379-1, rim, plag | 0.60 | 0.03             | 0.13  | 96.55 | 6.916 | 1.341                          | 0.000            | 1.892            | 2.934 | 0.102 |
| 317-1, rim, plag | 0.80 | 0.05             | 0.11  | 97.08 | 6.844 | 1.524                          | 0.000            | 2.130            | 2.513 | 0.114 |
| 317-1, core      | 0.73 | 0.11             | 0.15  | 98.11 | 6.765 | 1.556                          | 0.000            | 2.136            | 2.568 | 0.168 |
| 317-1, step out  | 0.71 | 0.00             | 0.15  | 97.31 | 6.778 | 2.502                          | 0.000            | 2.080            | 2.642 | 0.109 |
| 317-1, step out  | 0.70 | 0.08             | 0.09  | 96.80 | 6.720 | 1.551                          | 0.000            | 2.061            | 2.629 | 0.105 |
| 317-1, rim, Ksp  | 0.78 | 0.00             | 0.00  | 96.76 | 6.937 | 1.342                          | 0.000            | 2.122            | 2.691 | 0.083 |
| 471-1, rim       | 0.62 | 0.11             | 0.17  | 96.82 | 7.182 | 1.121                          | 0.000            | 2.055            | 2.842 | 0.078 |
| 471-1, mid-point | 0.71 | 0.00             | 0.12  | 97.12 | 6.770 | 1.492                          | 0.000            | 2.094            | 2.627 | 0.173 |
| 471-1, core      | 0.76 | 0.03             | 0.30  | 97.81 | 6.771 | 1.435                          | 0.000            | 1.585            | 2.755 | 0.201 |
| 471-2, rim       | 0.77 | 0.02             | 0.12  | 96.24 | 6.792 | 1.440                          | 0.000            | 2.222            | 2.562 | 0.120 |



Table 4. WDS/SP amphibole.

| sample            | Cr    | Mn    | Ca    | Na    | X     | TOTAL  | Cl    | F     |
|-------------------|-------|-------|-------|-------|-------|--------|-------|-------|
| 548-2, outer core | 0.000 | 0.048 | 1.590 | 0.459 | 0.137 | 15.513 |       |       |
| 548-2, rim A      | 0.000 | 0.048 | 1.721 | 0.239 | 0.083 | 15.263 |       |       |
| 548-2, rim B      | 0.000 | 0.057 | 1.555 | 0.407 | 0.056 | 15.454 |       |       |
| 548-2, inner rim  | 0.000 | 0.049 | 1.591 | 0.500 | 0.123 | 15.579 |       |       |
| 548, gm hmbi      | 0.000 | 0.053 | 1.665 | 0.418 | 0.092 | 15.476 |       |       |
| 551-1, rim        | 0.000 | 0.052 | 1.720 | 0.300 | 0.084 | 15.374 |       |       |
| 551-1, step in    | 0.000 | 0.052 | 1.730 | 0.347 | 0.092 | 15.419 |       |       |
| 551-1, outer cor  | 0.000 | 0.057 | 1.677 | 0.319 | 0.074 | 15.332 |       |       |
| 551, gm hmbi      | 0.000 | 0.053 | 1.662 | 0.339 | 0.079 | 15.386 |       |       |
| 693-2, rim        | 0.000 | 0.053 | 1.520 | 0.390 | 0.088 | 15.402 |       |       |
| 693-2, core       | 0.000 | 0.035 | 1.634 | 0.448 | 0.142 | 15.496 |       |       |
| 693-3, core       | 0.000 | 0.048 | 1.588 | 0.429 | 0.102 | 15.452 |       |       |
| 693-3, rim        | 0.000 | 0.048 | 1.538 | 0.407 | 0.102 | 15.410 |       |       |
| 579-2, core       | 0.000 | 0.065 | 1.733 | 0.205 | 0.056 | 15.252 |       |       |
| 579-2, rim        | 0.000 | 0.065 | 1.760 | 0.213 | 0.052 | 15.256 |       |       |
| 579-3, core       | 0.000 | 0.070 | 1.759 | 0.255 | 0.079 | 15.245 |       |       |
| 579-3, rim        | 0.000 | 0.061 | 1.750 | 0.227 | 0.070 | 15.274 |       |       |
| 697, gm hmbi      | 0.000 | 0.055 | 1.822 | 0.230 | 0.091 | 15.281 |       |       |
| 697-2, core       | 0.000 | 0.052 | 1.779 | 0.349 | 0.096 | 15.429 |       |       |
| 697-2, rim        | 0.000 | 0.061 | 1.765 | 0.260 | 0.065 | 15.309 |       |       |
| 697-2, step in    | 0.000 | 0.047 | 1.770 | 0.425 | 0.117 | 15.491 |       |       |
| 397-2, rim        | 0.000 | 0.044 | 1.807 | 0.383 | 0.158 | 15.544 |       |       |
| 397-2, core       | 0.000 | 0.035 | 1.865 | 0.346 | 0.135 | 15.474 |       |       |
| 397-2, mid-point  | 0.000 | 0.044 | 1.848 | 0.348 | 0.146 | 15.481 |       |       |
| 351-1, rim        | 0.000 | 0.030 | 1.749 | 0.234 | 0.055 | 15.324 |       |       |
| 351-2, core       | 0.000 | 0.030 | 1.776 | 0.222 | 0.064 | 15.333 |       |       |
| 171-1, core       | 0.027 | 0.022 | 1.864 | 0.442 | 0.193 | 15.569 |       |       |
| 171-1, rim        | 0.026 | 0.018 | 1.835 | 0.337 | 0.133 | 15.368 |       |       |
| 171-2, core       | 0.017 | 0.020 | 1.815 | 0.374 | 0.192 | 15.483 |       |       |
| 184A-1, core      | 0.036 | 0.023 | 1.789 | 0.262 | 0.106 | 15.317 |       |       |
| 184A-1, rim       | 0.027 | 0.021 | 1.777 | 0.233 | 0.087 | 15.263 |       |       |
| 208-2, core       | 0.006 | 0.043 | 1.703 | 0.418 | 0.122 | 15.458 |       |       |
| 208-2, step out   | 0.008 | 0.046 | 2.590 | 0.365 | 0.122 | 15.422 |       |       |
| 208-2, rim        | 0.005 | 0.057 | 1.804 | 0.380 | 0.112 | 15.489 |       |       |
| 372A-1, core      | 0.003 | 0.048 | 1.767 | 0.486 | 0.104 | 15.527 |       |       |
| 372A-1, rim       | 0.007 | 0.091 | 1.789 | 0.370 | 0.099 | 15.442 |       |       |
| 194-2, core       | 0.007 | 0.064 | 2.178 | 0.440 | 0.151 | 15.535 |       |       |
| 194-2, rim        | 0.004 | 0.065 | 1.813 | 0.363 | 0.080 | 15.425 |       |       |
| 103-1, rim, plag  | 0.000 | 0.049 | 1.854 | 0.258 | 0.098 | 15.433 | 0.013 | 0.056 |
| 103-1, core       | 0.000 | 0.048 | 1.822 | 0.266 | 0.105 | 15.456 | 0.013 | 0.038 |
| 103-1, rim, qtz   | 0.000 | 0.049 | 1.779 | 0.277 | 0.104 | 15.411 | 0.008 | 0.000 |
| 379-1, rim, qtz   | 0.000 | 0.048 | 1.915 | 0.319 | 0.118 | 15.564 | 0.013 | 0.080 |
| 379-1, core       | 0.000 | 0.048 | 1.815 | 0.385 | 0.113 | 15.554 | 0.023 | 0.057 |
| 379-1, rim, plag  | 0.000 | 0.052 | 1.851 | 0.332 | 0.115 | 15.535 | 0.008 | 0.062 |
| 317-1, rim, plag  | 0.000 | 0.054 | 1.847 | 0.354 | 0.154 | 15.534 | 0.013 | 0.052 |
| 317-1, core       | 0.000 | 0.048 | 1.745 | 0.457 | 0.139 | 15.582 | 0.028 | 0.071 |
| 317-1, step out   | 0.000 | 0.047 | 1.739 | 0.474 | 0.136 | 15.587 | 0.000 | 0.071 |
| 317-1, step out   | 0.000 | 0.047 | 1.786 | 0.463 | 0.135 | 15.597 | 0.020 | 0.043 |
| 317-1, rim, Ksp   | 0.000 | 0.051 | 1.840 | 0.319 | 0.150 | 15.535 | 0.000 | 0.000 |
| 471-1, rim        | 0.000 | 0.057 | 1.813 | 0.259 | 0.119 | 15.449 | 0.028 | 0.081 |
| 471-1, mid-point  | 0.000 | 0.051 | 1.822 | 0.424 | 0.136 | 15.589 | 0.000 | 0.048 |
| 471-1, core       | 0.000 | 0.039 | 1.742 | 0.485 | 0.145 | 15.592 | 0.008 | 0.142 |
| 471-3, rim        | 0.000 | 0.060 | 1.901 | 0.365 | 0.150 | 15.619 | 0.005 | 0.000 |

Table 4. WDR/SP amphibole.

| sample            | SiO2  | Al2O3 | Fe2O3 | FeO   | MgO   | TiO2 | Cr2O3 | MnO  | BaO  | CaO   | Na2O |
|-------------------|-------|-------|-------|-------|-------|------|-------|------|------|-------|------|
| 471-3, core       | 44.05 | 8.56  | 0.00  | 17.03 | 31.50 | 1.62 | 0.00  | 0.44 | 0.04 | 10.61 | 1.67 |
| 471-3, rim, plag  | 46.22 | 7.62  | 0.00  | 17.23 | 12.25 | 0.81 | 0.00  | 0.46 | 0.00 | 11.04 | 1.29 |
| SL117-1, core     | 51.88 | 5.10  | 0.00  | 13.12 | 14.90 | 0.81 | 0.00  | 0.32 | 0.00 | 12.32 | 0.53 |
| SL117-1, rim      | 51.93 | 4.31  | 0.00  | 12.70 | 15.31 | 0.21 | 0.00  | 0.32 | 0.00 | 12.31 | 0.46 |
| SL117-2, core     | 51.63 | 4.87  | 0.00  | 12.66 | 15.13 | 0.32 | 0.00  | 0.33 | 0.00 | 12.50 | 0.45 |
| SL117-2, rim      | 51.63 | 4.90  | 0.00  | 12.48 | 15.15 | 0.10 | 0.00  | 0.30 | 0.00 | 12.32 | 0.43 |
| SL86-2, core      | 47.55 | 8.89  | 0.00  | 13.80 | 13.09 | 1.48 | 0.00  | 0.33 | 0.00 | 11.41 | 0.90 |
| SL86-2, mid-point | 47.78 | 8.97  | 0.00  | 13.85 | 12.95 | 1.50 | 0.00  | 0.32 | 0.00 | 11.27 | 0.87 |
| SL86-2, rim       | 46.83 | 9.04  | 0.00  | 13.94 | 13.08 | 1.63 | 0.00  | 0.29 | 0.00 | 11.46 | 0.97 |
| 775-1, rim, qtz   | 47.25 | 8.34  | 0.00  | 13.95 | 13.38 | 1.52 | 0.00  | 0.27 | 0.00 | 10.84 | 1.21 |
| 775-1, core       | 46.21 | 9.18  | 0.00  | 14.25 | 13.07 | 1.53 | 0.00  | 0.20 | 0.00 | 10.88 | 1.40 |
| 775-1, near rim   | 46.45 | 9.00  | 0.00  | 14.04 | 13.21 | 1.38 | 0.00  | 0.17 | 0.00 | 10.66 | 1.26 |
| 775-1, outer por  | 46.00 | 9.40  | 0.00  | 13.93 | 13.31 | 1.37 | 0.00  | 0.24 | 0.00 | 11.16 | 1.33 |
| 776-2, rim        | 46.16 | 9.27  | 0.00  | 14.83 | 12.84 | 1.25 | 0.00  | 0.29 | 0.00 | 11.00 | 1.28 |
| 776-2, mid-point  | 47.77 | 8.01  | 0.00  | 14.43 | 13.71 | 1.12 | 0.00  | 0.31 | 0.00 | 10.47 | 1.13 |
| 776-2, core       | 46.75 | 8.55  | 0.00  | 14.84 | 13.25 | 1.16 | 0.00  | 0.32 | 0.00 | 10.41 | 1.17 |
| 776-2, core B     | 47.14 | 8.79  | 0.00  | 14.80 | 13.14 | 1.06 | 0.00  | 0.03 | 0.00 | 10.37 | 1.14 |
| 777B-1, rim       | 46.37 | 8.68  | 0.00  | 16.39 | 12.36 | 0.70 | 0.00  | 0.39 | 0.00 | 10.95 | 1.11 |
| 777B-1, step in   | 45.37 | 8.77  | 0.00  | 16.54 | 12.05 | 1.60 | 0.00  | 0.30 | 0.00 | 10.61 | 1.24 |
| 777B-1, step in   | 44.63 | 8.83  | 0.00  | 16.14 | 12.05 | 1.95 | 0.00  | 0.34 | 0.00 | 10.86 | 1.30 |
| 777B-1, core      | 45.72 | 8.96  | 0.00  | 15.77 | 12.02 | 1.75 | 0.00  | 0.23 | 0.00 | 11.10 | 1.13 |
| 293-1, rim        | 49.82 | 6.09  | 0.00  | 13.57 | 13.77 | 0.24 | 0.00  | 0.33 | 0.00 | 12.38 | 0.60 |
| 293-1, core       | 45.77 | 8.95  | 0.00  | 14.82 | 11.77 | 1.48 | 0.00  | 0.34 | 0.00 | 12.12 | 1.02 |
| 293-1, step out   | 46.08 | 9.02  | 0.00  | 14.89 | 11.79 | 1.59 | 0.00  | 0.39 | 0.00 | 12.21 | 1.01 |
| 293-3, rim        | 51.11 | 4.93  | 0.00  | 13.69 | 14.23 | 0.11 | 0.00  | 0.35 | 0.00 | 12.48 | 0.48 |
| 293-3, core       | 46.91 | 7.92  | 0.00  | 14.82 | 12.31 | 1.13 | 0.00  | 0.36 | 0.00 | 11.95 | 0.80 |
| 638-1, rim        | 50.95 | 5.14  | 0.00  | 9.21  | 17.29 | 0.55 | 0.00  | 0.20 | 0.00 | 12.04 | 0.77 |
| 638-1, step in    | 50.95 | 5.88  | 0.00  | 9.45  | 17.14 | 0.24 | 0.00  | 0.25 | 0.00 | 11.86 | 0.69 |
| 638-1, step in    | 51.78 | 5.77  | 0.00  | 9.22  | 17.23 | 0.08 | 0.00  | 0.18 | 0.00 | 11.71 | 0.65 |
| 638-1, step in    | 46.93 | 10.59 | 0.00  | 10.32 | 14.91 | 0.44 | 0.00  | 0.20 | 0.00 | 11.59 | 1.44 |
| 638-1, step in    | 46.05 | 10.71 | 0.00  | 10.08 | 14.74 | 0.95 | 0.00  | 0.15 | 0.00 | 11.56 | 1.41 |
| 638-1, step in    | 45.66 | 10.81 | 0.00  | 10.05 | 14.98 | 1.19 | 0.00  | 0.18 | 0.00 | 11.70 | 1.54 |
| 638-1, core       | 47.46 | 9.51  | 0.00  | 9.41  | 15.90 | 1.16 | 0.00  | 0.20 | 0.00 | 11.79 | 1.48 |
| 638-2, core       | 43.22 | 11.91 | 0.00  | 8.95  | 15.17 | 2.09 | 0.00  | 0.08 | 0.00 | 12.10 | 2.00 |
| 638-2, rim        | 52.55 | 3.80  | 0.00  | 9.20  | 17.73 | 0.26 | 0.00  | 0.21 | 0.00 | 11.94 | 0.52 |
| 639 gm, rim       | 46.00 | 9.00  | 0.00  | 14.21 | 12.36 | 1.60 | 0.00  | 0.26 | 0.00 | 12.06 | 1.27 |
| 639-1, rim        | 45.76 | 8.49  | 0.00  | 14.21 | 12.72 | 1.62 | 0.00  | 0.23 | 0.00 | 12.29 | 1.14 |
| 639-1, step in    | 45.81 | 8.79  | 0.00  | 14.79 | 12.25 | 1.30 | 0.00  | 0.28 | 0.00 | 12.21 | 1.20 |
| 639-1, step in    | 45.60 | 9.14  | 0.00  | 14.86 | 12.23 | 1.83 | 0.00  | 0.25 | 0.00 | 11.90 | 1.35 |
| 639-1, core       | 47.07 | 7.65  | 0.00  | 14.64 | 12.00 | 1.36 | 0.00  | 0.29 | 0.00 | 11.99 | 1.15 |
| 681A-1, rim       | 45.81 | 8.87  | 0.00  | 17.35 | 11.42 | 0.77 | 0.00  | 0.38 | 0.00 | 11.48 | 1.29 |
| 681A-1, step in   | 45.95 | 8.37  | 0.00  | 17.09 | 11.66 | 1.24 | 0.00  | 0.37 | 0.00 | 11.10 | 1.38 |
| 681A-1, core      | 46.16 | 8.27  | 0.00  | 17.06 | 11.27 | 1.38 | 0.00  | 0.41 | 0.00 | 11.16 | 1.23 |
| 681A-B, core      | 44.88 | 9.16  | 0.00  | 17.25 | 11.06 | 1.61 | 0.00  | 0.35 | 0.00 | 10.17 | 1.56 |
| 681A-B, step out  | 45.40 | 8.45  | 0.00  | 17.46 | 11.19 | 1.31 | 0.00  | 0.45 | 0.00 | 10.27 | 1.52 |
| 681A-B, rim       | 45.81 | 8.27  | 0.00  | 17.58 | 11.59 | 0.74 | 0.00  | 0.33 | 0.00 | 11.30 | 1.30 |
| 681A gm1, core    | 45.21 | 9.11  | 0.00  | 17.48 | 10.88 | 1.02 | 0.00  | 0.42 | 0.00 | 11.39 | 1.09 |
| 681A gm2, core    | 45.59 | 8.38  | 0.00  | 17.43 | 11.27 | 1.07 | 0.00  | 0.43 | 0.00 | 11.16 | 1.27 |
| 681B-4, rim       | 45.40 | 8.61  | 0.00  | 17.07 | 11.16 | 1.04 | 0.00  | 0.38 | 0.00 | 11.08 | 1.21 |
| 681B-4, step in   | 45.86 | 8.28  | 0.00  | 17.09 | 11.52 | 1.16 | 0.00  | 0.41 | 0.00 | 10.57 | 1.39 |
| 681B-4, core      | 45.66 | 8.33  | 0.00  | 17.24 | 11.45 | 1.64 | 0.00  | 0.47 | 0.00 | 10.14 | 1.45 |
| 686B-1, core      | 45.49 | 8.35  | 0.00  | 17.27 | 11.18 | 1.70 | 0.00  | 0.44 | 0.00 | 11.55 | 1.48 |
| 686B-1, step out  | 45.92 | 8.13  | 0.00  | 17.01 | 11.64 | 1.61 | 0.00  | 0.40 | 0.00 | 11.60 | 1.51 |

Table 4. WCB/SF analysis.

| sample            | FeO  | Ca   | S    | Total | Al    | Si    | Fe3+  | FeO   | Ti    | Mn    |
|-------------------|------|------|------|-------|-------|-------|-------|-------|-------|-------|
| 471-2, core       | 6.71 | 0.00 | 2.14 | 96.37 | 6.705 | 1.538 | 0.000 | 2.171 | 2.512 | 0.166 |
| 471-3, rim, plagi | 6.33 | 0.00 | 2.00 | 97.60 | 6.518 | 1.544 | 0.000 | 2.157 | 2.732 | 0.201 |
| 5.117-1, core     | 6.34 | 0.00 | 2.00 | 98.70 | 7.434 | 0.857 | 0.000 | 1.568 | 3.163 | 3.001 |
| 5.117-1, rim      | 6.23 | 0.00 | 2.00 | 97.60 | 7.433 | 0.732 | 0.000 | 1.532 | 1.280 | 0.061 |
| 5.117-2, core     | 6.30 | 0.00 | 2.00 | 98.10 | 7.430 | 0.823 | 0.000 | 1.521 | 3.244 | 0.034 |
| 5.117-2, rim      | 6.43 | 0.00 | 2.00 | 97.75 | 7.457 | 0.831 | 0.000 | 1.575 | 3.250 | 0.000 |
| 5.26-2, core      | 6.43 | 0.00 | 2.00 | 97.69 | 6.932 | 1.523 | 0.000 | 1.582 | 2.845 | 0.158 |
| 5.26-2, mid-point | 6.53 | 0.00 | 2.00 | 97.85 | 6.937 | 1.538 | 0.000 | 1.562 | 2.800 | 0.150 |
| 5.26-2, rim       | 6.53 | 0.00 | 2.00 | 97.74 | 6.857 | 1.542 | 0.000 | 1.726 | 2.853 | 0.176 |
| 775-1, rim, gnt   | 6.51 | 0.00 | 2.00 | 97.33 | 6.942 | 1.444 | 0.000 | 1.711 | 2.922 | 0.164 |
| 775-1, core       | 6.61 | 0.00 | 2.00 | 97.33 | 6.813 | 1.592 | 0.000 | 1.756 | 2.872 | 0.168 |
| 775-1, near rim   | 6.54 | 0.00 | 2.00 | 96.73 | 6.866 | 1.565 | 0.000 | 1.735 | 2.910 | 0.151 |
| 775-1, outer core | 6.55 | 0.00 | 2.00 | 97.30 | 6.776 | 1.632 | 0.000 | 1.716 | 2.922 | 0.151 |
| 775-2, rim        | 6.53 | 0.00 | 2.00 | 97.46 | 6.815 | 1.612 | 0.000 | 1.828 | 2.825 | 0.138 |
| 775-2, mid-point  | 6.40 | 0.00 | 2.00 | 97.36 | 7.013 | 1.383 | 0.000 | 1.771 | 2.998 | 0.121 |
| 775-2, core       | 6.44 | 0.00 | 2.00 | 96.92 | 6.914 | 1.489 | 0.000 | 1.832 | 2.921 | 0.125 |
| 776-2, core 2     | 6.43 | 0.00 | 2.00 | 97.23 | 6.942 | 1.521 | 0.000 | 1.819 | 2.883 | 0.117 |
| 777-1, rim        | 6.45 | 0.00 | 2.00 | 97.39 | 6.892 | 1.512 | 0.000 | 2.037 | 2.735 | 0.074 |
| 777B-1, step in   | 6.70 | 0.00 | 2.00 | 97.18 | 6.791 | 1.546 | 0.000 | 2.069 | 2.688 | 0.175 |
| 777B-1, step in   | 6.73 | 0.00 | 2.00 | 96.82 | 6.712 | 1.562 | 0.000 | 2.025 | 2.701 | 0.220 |
| 777B-1, core      | 6.73 | 0.00 | 2.00 | 97.50 | 6.768 | 1.571 | 0.000 | 1.959 | 2.662 | 0.192 |
| 293-1, rim        | 6.46 | 0.00 | 2.00 | 97.27 | 7.297 | 1.048 | 0.000 | 1.659 | 3.024 | 0.025 |
| 293-1, core       | 6.75 | 0.00 | 2.00 | 97.02 | 6.824 | 1.670 | 0.000 | 1.846 | 2.616 | 0.152 |
| 293-1, step out   | 6.72 | 0.00 | 2.00 | 97.69 | 6.823 | 1.573 | 0.000 | 1.843 | 2.599 | 0.174 |
| 293-3, rim        | 6.23 | 0.00 | 2.00 | 97.61 | 7.438 | 0.841 | 0.000 | 1.665 | 2.067 | 0.008 |
| 293-3, core       | 6.55 | 0.00 | 2.00 | 96.77 | 6.979 | 1.388 | 0.000 | 1.842 | 2.722 | 0.126 |
| 538-1, rim        | 6.37 | 0.00 | 2.00 | 96.52 | 7.355 | 0.873 | 0.000 | 1.110 | 3.722 | 0.059 |
| 538-1, step in    | 6.30 | 0.00 | 2.00 | 96.96 | 7.319 | 0.995 | 0.000 | 1.134 | 3.658 | 0.025 |
| 538-1, step in    | 6.22 | 0.00 | 2.00 | 97.04 | 7.396 | 0.968 | 0.000 | 1.098 | 3.666 | 0.008 |
| 538-1, step in    | 6.70 | 0.00 | 2.00 | 97.12 | 6.801 | 1.808 | 0.000 | 1.252 | 3.222 | 0.046 |
| 538-1, step in    | 6.79 | 0.00 | 2.00 | 96.44 | 6.734 | 1.845 | 0.000 | 1.231 | 3.210 | 0.103 |
| 538-1, step in    | 6.52 | 0.00 | 2.00 | 96.51 | 6.658 | 1.960 | 0.000 | 1.226 | 3.261 | 0.122 |
| 538-1, core       | 6.46 | 0.00 | 2.00 | 97.36 | 6.836 | 1.611 | 0.000 | 1.133 | 3.412 | 0.123 |
| 538-2, core       | 6.57 | 0.00 | 2.00 | 96.08 | 6.369 | 2.067 | 0.000 | 1.098 | 3.329 | 0.229 |
| 538-2, rim        | 6.20 | 0.00 | 2.00 | 96.42 | 7.562 | 0.641 | 0.000 | 1.105 | 2.799 | 0.025 |
| 639 gm, rim       | 6.73 | 0.00 | 2.00 | 97.49 | 6.823 | 1.566 | 0.000 | 1.752 | 2.722 | 0.172 |
| 639-1, rim        | 6.64 | 0.00 | 2.00 | 97.11 | 6.820 | 1.487 | 0.000 | 1.752 | 2.817 | 0.179 |
| 639-1, step in    | 6.57 | 0.00 | 2.00 | 97.39 | 6.801 | 1.538 | 0.000 | 1.834 | 2.712 | 0.144 |
| 639-1, step in    | 6.80 | 0.00 | 2.00 | 97.96 | 6.741 | 1.592 | 0.000 | 1.835 | 2.694 | 0.199 |
| 639-1, core       | 6.61 | 0.00 | 2.00 | 97.77 | 6.943 | 1.329 | 0.000 | 1.805 | 2.857 | 0.147 |
| 681A-1, rim       | 6.73 | 0.00 | 2.00 | 97.92 | 6.833 | 1.558 | 0.000 | 2.162 | 2.539 | 0.083 |
| 681A-1, step in   | 6.55 | 0.00 | 2.00 | 97.71 | 6.856 | 1.471 | 0.000 | 2.132 | 2.592 | 0.135 |
| 681A-1, core      | 6.63 | 0.00 | 2.00 | 97.55 | 6.892 | 1.454 | 0.000 | 2.128 | 2.525 | 0.153 |
| 681A-2, core      | 6.58 | 0.00 | 2.00 | 96.64 | 6.767 | 1.622 | 0.000 | 2.173 | 2.482 | 0.191 |
| 681A-2, step out  | 6.62 | 0.00 | 2.00 | 96.68 | 6.856 | 1.501 | 0.000 | 2.201 | 2.516 | 0.146 |
| 681A-2, rim       | 6.55 | 0.00 | 2.00 | 97.58 | 6.861 | 1.459 | 0.000 | 2.222 | 2.538 | 0.083 |
| 681A gm1, core    | 6.86 | 0.00 | 2.00 | 97.45 | 6.793 | 1.612 | 0.000 | 2.196 | 2.435 | 0.114 |
| 681A gm2, core    | 6.56 | 0.00 | 2.00 | 97.15 | 6.835 | 1.483 | 0.000 | 2.199 | 2.525 | 0.119 |
| 681B-4, rim       | 6.66 | 0.00 | 2.00 | 96.63 | 6.857 | 1.533 | 0.000 | 2.154 | 2.513 | 0.115 |
| 681B-4, step in   | 6.53 | 0.00 | 2.00 | 96.82 | 6.892 | 1.464 | 0.000 | 2.147 | 2.579 | 0.132 |
| 681B-4, core      | 6.67 | 0.00 | 2.00 | 97.04 | 6.858 | 1.472 | 0.000 | 2.164 | 2.561 | 0.181 |
| 686B-1, core      | 6.29 | 0.00 | 2.00 | 97.87 | 6.797 | 1.469 | 0.000 | 2.157 | 2.486 | 0.182 |
| 686B-1, step out  | 6.54 | 0.00 | 2.00 | 98.36 | 6.618 | 1.422 | 0.000 | 2.108 | 2.575 | 0.172 |

Table A: WCB/SP amphibole.

| sample            | Cr    | Mn    | Ca    | Na    | K     | TOTAL  | Cl    | F     |
|-------------------|-------|-------|-------|-------|-------|--------|-------|-------|
| 471-3, core       | 0.000 | 0.057 | 1.733 | 0.494 | 0.138 | 15.645 | 0.021 | 0.067 |
| 471-3, rim, plag  | 0.000 | 0.058 | 1.770 | 0.374 | 0.120 | 15.564 | 0.015 | 0.058 |
| SL117-1, core     | 0.000 | 0.038 | 1.888 | 0.143 | 0.059 | 15.189 |       |       |
| SL117-1, rim      | 0.000 | 0.038 | 1.900 | 0.127 | 0.042 | 15.174 |       |       |
| SL117-2, core     | 0.000 | 0.038 | 1.925 | 0.122 | 0.050 | 15.187 |       |       |
| SL117-2, rim      | 0.000 | 0.034 | 1.908 | 0.119 | 0.076 | 15.197 |       |       |
| SL86-2, core      | 0.000 | 0.038 | 1.780 | 0.252 | 0.077 | 15.287 |       |       |
| S_86-2, mid-point | 0.000 | 0.038 | 1.756 | 0.243 | 0.094 | 15.258 |       |       |
| SL86-2, rim       | 0.000 | 0.034 | 1.796 | 0.275 | 0.094 | 15.350 |       |       |
| 775-1, rim, ota   | 0.000 | 0.030 | 1.703 | 0.340 | 0.099 | 15.361 |       |       |
| 775-1, core       | 0.000 | 0.021 | 1.717 | 0.398 | 0.112 | 15.450 |       |       |
| 775-1, near rim   | 0.000 | 0.017 | 1.687 | 0.360 | 0.100 | 15.391 |       |       |
| 775-1, outer cor  | 0.000 | 0.026 | 1.760 | 0.380 | 0.099 | 15.461 |       |       |
| 776-2, rim        | 0.000 | 0.034 | 1.737 | 0.364 | 0.100 | 15.454 |       |       |
| 776-2, mid-point  | 0.000 | 0.034 | 1.646 | 0.318 | 0.073 | 15.356 |       |       |
| 776-2, core       | 0.000 | 0.039 | 1.649 | 0.334 | 0.082 | 15.385 |       |       |
| 776-2, core B     | 0.000 | 0.039 | 1.634 | 0.324 | 0.078 | 15.356 |       |       |
| 777B-1, rim       | 0.000 | 0.048 | 1.745 | 0.318 | 0.083 | 15.448 |       |       |
| 777B-1, step in   | 0.000 | 0.035 | 1.700 | 0.355 | 0.131 | 15.490 |       |       |
| 777B-1, step in   | 0.000 | 0.040 | 1.747 | 0.375 | 0.137 | 15.519 |       |       |
| 777B-1, core      | 0.000 | 0.026 | 1.780 | 0.323 | 0.135 | 15.445 |       |       |
| 293-1, rim        | 0.000 | 0.039 | 1.942 | 0.157 | 0.082 | 15.263 |       |       |
| 293-1, core       | 0.000 | 0.039 | 1.933 | 0.293 | 0.140 | 15.422 |       |       |
| 293-1, step out   | 0.000 | 0.047 | 1.934 | 0.287 | 0.134 | 15.414 |       |       |
| 293-3, rim        | 0.000 | 0.042 | 1.943 | 0.132 | 0.038 | 15.196 |       |       |
| 293-3, core       | 0.000 | 0.043 | 1.903 | 0.227 | 0.100 | 15.336 |       |       |
| 638-1, rim        | 0.000 | 0.021 | 1.860 | 0.211 | 0.063 | 15.273 |       |       |
| 638-1, step in    | 0.000 | 0.029 | 1.821 | 0.249 | 0.055 | 15.294 |       |       |
| 638-1, step in    | 0.000 | 0.021 | 1.789 | 0.234 | 0.038 | 15.217 |       |       |
| 638-1, step in    | 0.000 | 0.021 | 1.799 | 0.399 | 0.127 | 15.473 |       |       |
| 638-1, step in    | 0.000 | 0.017 | 1.811 | 0.399 | 0.146 | 15.496 |       |       |
| 638-1, step in    | 0.000 | 0.021 | 1.830 | 0.433 | 0.094 | 15.520 |       |       |
| 638-1, core       | 0.000 | 0.021 | 1.818 | 0.410 | 0.084 | 15.447 |       |       |
| 638-2, core       | 0.000 | 0.008 | 1.907 | 0.566 | 0.104 | 15.677 |       |       |
| 638-2, rim        | 0.000 | 0.021 | 1.840 | 0.143 | 0.034 | 15.168 |       |       |
| 639 gm, rim       | 0.000 | 0.030 | 1.909 | 0.360 | 0.134 | 15.453 |       |       |
| 639-1, rim        | 0.000 | 0.026 | 1.954 | 0.327 | 0.118 | 15.469 |       |       |
| 639-1, step in    | 0.000 | 0.035 | 1.943 | 0.370 | 0.125 | 15.500 |       |       |
| 639-1, step in    | 0.000 | 0.030 | 1.882 | 0.386 | 0.147 | 15.527 |       |       |
| 639-1, core       | 0.000 | 0.034 | 1.892 | 0.324 | 0.112 | 15.443 |       |       |
| 681A-1, rim       | 0.000 | 0.043 | 1.834 | 0.315 | 0.135 | 15.502 |       |       |
| 681A-1, step in   | 0.000 | 0.043 | 1.773 | 0.394 | 0.105 | 15.501 |       |       |
| 681A-1, core      | 0.000 | 0.048 | 1.782 | 0.254 | 0.118 | 15.433 |       |       |
| 681A-8, core      | 0.000 | 0.044 | 1.642 | 0.456 | 0.110 | 15.483 |       |       |
| 681A-8, step out  | 0.000 | 0.057 | 1.661 | 0.443 | 0.115 | 15.495 |       |       |
| 681A-8, rim       | 0.000 | 0.040 | 1.811 | 0.374 | 0.123 | 15.540 |       |       |
| 681A gm1, core    | 0.000 | 0.053 | 1.831 | 0.317 | 0.163 | 15.512 |       |       |
| 681A gm2, core    | 0.000 | 0.053 | 1.796 | 0.366 | 0.105 | 15.493 |       |       |
| 681B-4, rim       | 0.000 | 0.044 | 1.791 | 0.354 | 0.124 | 15.485 |       |       |
| 681B-4, step in   | 0.000 | 0.048 | 1.702 | 0.401 | 0.101 | 15.465 |       |       |
| 681B-4, core      | 0.000 | 0.057 | 1.631 | 0.418 | 0.127 | 15.470 |       |       |
| 686B-1, core      | 0.000 | 0.052 | 1.863 | 0.425 | 0.052 | 15.491 |       |       |
| 686B-1, step out  | 0.000 | 0.048 | 1.843 | 0.431 | 0.100 | 15.521 |       |       |

Table 4. WCB/SP amphibole.

| sample             | SiO2  | Al2O3 | Fe2O3 | FeO   | MgO   | TiO2 | Cr2O3 | MnO  | BaO  | CaO   | Na2O |
|--------------------|-------|-------|-------|-------|-------|------|-------|------|------|-------|------|
| 686B-1, rim        | 46.31 | 7.69  | 0.00  | 16.51 | 12.00 | 1.26 | 0.00  | 0.48 | 0.00 | 12.07 | 1.30 |
| 686B-1, inner pi   | 45.87 | 8.39  | 0.00  | 15.90 | 11.48 | 1.76 | 0.00  | 0.41 | 0.00 | 11.59 | 1.52 |
| 686E-3, rim        | 43.91 | 9.82  | 0.00  | 17.43 | 10.95 | 1.77 | 0.00  | 0.34 | 0.00 | 12.26 | 1.38 |
| 686E-3, step in    | 45.97 | 8.36  | 0.00  | 16.28 | 12.48 | 1.57 | 0.00  | 0.33 | 0.00 | 11.18 | 1.53 |
| 686E-3, core A     | 45.87 | 8.25  | 0.00  | 16.04 | 12.40 | 1.86 | 0.00  | 0.30 | 0.00 | 11.43 | 1.54 |
| 686E-3, core B     | 45.93 | 7.80  | 0.00  | 16.50 | 12.47 | 1.72 | 0.00  | 0.37 | 0.00 | 11.38 | 1.43 |
| 686E-3, step out   | 45.91 | 8.18  | 0.00  | 16.30 | 12.27 | 1.68 | 0.00  | 0.38 | 0.00 | 11.63 | 1.48 |
| 686E-3, rim        | 46.30 | 7.77  | 0.00  | 16.31 | 12.43 | 1.40 | 0.00  | 0.43 | 0.00 | 12.14 | 1.25 |
| 687-3, core        | 45.05 | 8.33  | 0.00  | 17.08 | 11.53 | 1.51 | 0.00  | 0.45 | 0.00 | 11.22 | 1.59 |
| 687-3, step out    | 45.56 | 8.02  | 0.00  | 17.16 | 11.24 | 1.48 | 0.00  | 0.39 | 0.00 | 11.22 | 1.50 |
| 687-3, rim         | 46.08 | 7.77  | 0.00  | 16.86 | 11.44 | 0.94 | 0.00  | 0.41 | 0.00 | 11.95 | 1.16 |
| 687 gm 1, ave.     | 45.72 | 7.98  | 0.00  | 17.09 | 11.21 | 0.70 | 0.00  | 0.41 | 0.00 | 11.93 | 1.22 |
| 687 gm 2, ave.     | 45.53 | 8.00  | 0.00  | 17.00 | 11.30 | 1.13 | 0.00  | 0.41 | 0.00 | 11.94 | 1.20 |
| 771 gm 1, ave.     | 44.82 | 10.11 | 0.00  | 16.39 | 11.21 | 1.34 | 0.00  | 0.30 | 0.00 | 11.67 | 1.25 |
| 771 gm 2, ave.     | 44.86 | 9.81  | 0.00  | 16.68 | 11.50 | 1.38 | 0.00  | 0.38 | 0.00 | 11.13 | 1.25 |
| 771-3, core        | 45.78 | 9.25  | 0.00  | 16.66 | 11.68 | 1.48 | 0.00  | 0.34 | 0.00 | 11.15 | 1.12 |
| 771-3, step out    | 44.17 | 10.19 | 0.00  | 16.80 | 11.09 | 2.05 | 0.00  | 0.33 | 0.00 | 11.39 | 1.27 |
| 771-3, step out    | 45.48 | 9.42  | 0.00  | 16.58 | 11.73 | 1.44 | 0.00  | 0.36 | 0.00 | 11.04 | 1.18 |
| 771-3, step out    | 46.38 | 8.45  | 0.00  | 16.54 | 12.22 | 1.58 | 0.00  | 0.38 | 0.00 | 10.89 | 1.11 |
| 771-3, rim         | 46.94 | 8.57  | 0.00  | 16.01 | 12.23 | 1.15 | 0.00  | 0.43 | 0.00 | 11.12 | 1.05 |
| 9L-IV-2, rim       | 48.30 | 7.39  | 0.00  | 12.55 | 13.93 | 0.33 | 0.00  | 0.33 | 0.00 | 12.42 | 0.76 |
| 9L-IV-2, mid-point | 45.81 | 8.75  | 0.00  | 13.34 | 13.03 | 0.78 | 0.00  | 0.38 | 0.00 | 12.13 | 0.93 |
| 9L-IV-2, core      | 46.53 | 9.81  | 0.00  | 13.87 | 12.84 | 0.74 | 0.00  | 0.36 | 0.00 | 11.82 | 1.05 |
| 545-1, ave.        | 42.88 | 12.01 | 0.00  | 15.64 | 10.73 | 2.14 | 0.00  | 0.15 | 0.00 | 11.89 | 1.26 |
| 545-4, ave.        | 43.54 | 11.35 | 0.00  | 15.57 | 10.98 | 1.83 | 0.00  | 0.16 | 0.00 | 11.86 | 1.07 |
| 377-3, rim         | 47.57 | 8.27  | 0.00  | 14.79 | 13.19 | 0.78 | 0.00  | 1.01 | 0.00 | 11.70 | 1.41 |
| 377-3, core        | 46.58 | 7.13  | 0.00  | 14.70 | 12.95 | 0.99 | 0.00  | 0.96 | 0.00 | 11.79 | 1.61 |
| 377-3, rim         | 46.03 | 6.93  | 0.00  | 15.32 | 12.83 | 0.93 | 0.00  | 1.07 | 0.00 | 11.89 | 1.39 |
| 377-3, core        | 47.75 | 8.50  | 0.00  | 14.51 | 13.37 | 0.82 | 0.00  | 1.00 | 0.00 | 12.70 | 1.43 |
| 377-4, rim         | 50.78 | 4.33  | 0.00  | 13.45 | 15.02 | 0.52 | 0.00  | 1.09 | 0.00 | 11.63 | 1.05 |
| 377-4, core        | 49.48 | 4.88  | 0.00  | 14.25 | 14.45 | 0.50 | 0.00  | 1.11 | 0.00 | 11.72 | 1.13 |

Table 4. WCB/SP amphibole.

| sample             | Al <sub>2</sub> O <sub>3</sub> | Si   | F    | Total | Si    | Al    | Fe <sup>3+</sup> | Fe <sup>2+</sup> | Mg    | Ti    |
|--------------------|--------------------------------|------|------|-------|-------|-------|------------------|------------------|-------|-------|
| 586B-1, rim        | 0.50                           | 0.00 | 0.00 | 98.13 | 6.287 | 1.344 | 0.000            | 2.051            | 2.658 | 0.140 |
| 586B-1, inner rim  | 0.60                           | 0.00 | 0.00 | 98.52 | 6.797 | 1.461 | 0.000            | 2.091            | 2.539 | 0.195 |
| 686E-3, rim        | 0.86                           | 0.00 | 0.00 | 98.71 | 6.554 | 1.728 | 0.000            | 2.173            | 2.436 | 0.197 |
| 686E-3, step in    | 0.64                           | 0.00 | 0.00 | 98.34 | 6.799 | 1.455 | 0.000            | 2.015            | 2.752 | 0.173 |
| 686E-3, core A     | 0.57                           | 0.00 | 0.00 | 98.24 | 6.784 | 1.437 | 0.000            | 1.983            | 2.730 | 0.204 |
| 686E-3, core B     | 0.61                           | 0.00 | 0.00 | 98.20 | 6.815 | 1.353 | 0.000            | 2.047            | 2.757 | 0.191 |
| 686E-3, step out   | 0.52                           | 0.00 | 0.00 | 98.36 | 6.797 | 1.425 | 0.000            | 2.017            | 2.708 | 0.187 |
| 686E-3, rim        | 0.57                           | 0.00 | 0.00 | 98.61 | 6.846 | 1.349 | 0.000            | 2.013            | 2.737 | 0.152 |
| 687-3, core        | 0.59                           | 0.00 | 0.00 | 97.35 | 6.776 | 1.474 | 0.000            | 2.145            | 2.583 | 0.167 |
| 687-3, step out    | 0.55                           | 0.00 | 0.00 | 97.13 | 6.852 | 1.420 | 0.000            | 2.157            | 2.519 | 0.163 |
| 687-3, rim         | 0.66                           | 0.00 | 0.00 | 97.26 | 6.920 | 1.375 | 0.000            | 2.116            | 2.561 | 0.105 |
| 687 gm 1, ave.     | 0.57                           | 0.00 | 0.00 | 96.82 | 6.904 | 1.418 | 0.000            | 2.158            | 0.003 | 0.075 |
| 687 gm 2, ave.     | 0.60                           | 0.00 | 0.00 | 97.12 | 6.857 | 1.419 | 0.000            | 2.140            | 2.538 | 0.124 |
| 771 gm 1, ave.     | 0.44                           | 0.00 | 0.00 | 97.93 | 6.682 | 1.776 | 0.000            | 2.043            | 2.490 | 0.148 |
| 771 gm 2, ave.     | 0.45                           | 0.00 | 0.00 | 97.44 | 6.698 | 1.725 | 0.000            | 2.081            | 2.558 | 0.153 |
| 771-3, core        | 0.40                           | 0.00 | 0.00 | 97.86 | 6.788 | 1.614 | 0.000            | 2.052            | 2.580 | 0.165 |
| 771-3, step out    | 0.54                           | 0.00 | 0.00 | 97.83 | 6.589 | 1.791 | 0.000            | 2.093            | 2.465 | 0.228 |
| 771-3, step out    | 0.49                           | 0.00 | 0.00 | 97.71 | 6.763 | 1.649 | 0.000            | 2.059            | 2.596 | 0.157 |
| 771-3, step out    | 0.50                           | 0.00 | 0.00 | 98.05 | 6.856 | 1.471 | 0.000            | 2.044            | 2.690 | 0.173 |
| 771-2, rim         | 0.36                           | 0.00 | 0.00 | 97.95 | 6.923 | 1.488 | 0.000            | 1.973            | 2.687 | 0.125 |
| SL-IV-2, rim       | 0.27                           | 0.00 | 0.00 | 96.29 | 7.121 | 1.285 | 0.000            | 1.544            | 3.059 | 0.034 |
| SL-IV-2, mid-point | 0.54                           | 0.00 | 0.00 | 96.68 | 6.925 | 1.524 | 0.000            | 1.650            | 2.874 | 0.086 |
| SL-IV-2, core      | 0.51                           | 0.00 | 0.00 | 96.63 | 6.903 | 1.555 | 0.000            | 1.720            | 2.839 | 0.078 |
| 645-1, ave.        | 1.36                           | 0.00 | 0.00 | 98.05 | 6.392 | 2.108 | 0.000            | 1.947            | 2.384 | 0.236 |
| 645-4, ave.        | 1.16                           | 0.00 | 0.00 | 97.52 | 6.511 | 2.000 | 0.000            | 1.943            | 2.448 | 0.202 |
| 377-2, rim         | 0.46                           | 0.00 | 0.00 | 97.19 | 7.076 | 1.095 | 0.000            | 1.837            | 2.920 | 0.087 |
| 377-2, core        | 0.56                           | 0.00 | 0.00 | 97.56 | 6.961 | 1.247 | 0.000            | 1.822            | 2.868 | 0.109 |
| 377-3, rim         | 0.59                           | 0.00 | 0.00 | 96.87 | 6.924 | 1.228 | 0.000            | 1.925            | 2.875 | 0.092 |
| 377-3, core        | 0.49                           | 0.00 | 0.00 | 97.57 | 7.059 | 1.132 | 0.000            | 1.792            | 2.946 | 0.091 |
| 377-4, rim         | 0.42                           | 0.00 | 0.00 | 98.15 | 7.385 | 0.717 | 0.000            | 1.635            | 3.257 | 0.055 |
| 377-4, core        | 0.43                           | 0.00 | 0.00 | 97.95 | 7.267 | 0.840 | 0.000            | 1.750            | 3.164 | 0.051 |

Table 4. WCB/EP amphibole.

| sample             | Cr    | Mg    | Ca    | Na    | K     | TOTAL  | Cl | F |
|--------------------|-------|-------|-------|-------|-------|--------|----|---|
| 686B-1, rim        | 0.000 | 0.057 | 1.920 | 0.371 | 0.091 | 15.517 |    |   |
| 686B-1, inner rim  | 0.000 | 0.047 | 1.839 | 0.435 | 0.109 | 15.509 |    |   |
| 686E-3, rim        | 0.000 | 0.039 | 1.958 | 0.398 | 0.162 | 15.542 |    |   |
| 686E-3, step in    | 0.000 | 0.039 | 1.771 | 0.438 | 0.121 | 15.564 |    |   |
| 686E-3, core A     | 0.000 | 0.035 | 1.810 | 0.438 | 0.104 | 15.523 |    |   |
| 686E-3, core B     | 0.000 | 0.042 | 1.807 | 0.409 | 0.113 | 15.546 |    |   |
| 686E-3, step out   | 0.000 | 0.047 | 1.843 | 0.421 | 0.095 | 15.540 |    |   |
| 686E-3, rim        | 0.000 | 0.052 | 1.922 | 0.355 | 0.104 | 15.531 |    |   |
| 687-3, core        | 0.000 | 0.057 | 1.805 | 0.459 | 0.110 | 15.577 |    |   |
| 687-3, step out    | 0.000 | 0.048 | 1.804 | 0.437 | 0.101 | 15.501 |    |   |
| 687-3, rim         | 0.000 | 0.048 | 1.921 | 0.335 | 0.123 | 15.504 |    |   |
| 687 gm 1, ave.     | 0.000 | 0.048 | 1.928 | 0.354 | 0.106 | 15.513 |    |   |
| 687 gm 2, ave.     | 0.000 | 0.048 | 1.927 | 0.349 | 0.115 | 15.517 |    |   |
| 771 gm 1, ave.     | 0.000 | 0.035 | 1.864 | 0.358 | 0.083 | 15.479 |    |   |
| 771 gm 2, ave.     | 0.000 | 0.043 | 1.778 | 0.359 | 0.083 | 15.460 |    |   |
| 771-3, core        | 0.000 | 0.039 | 1.771 | 0.317 | 0.074 | 15.410 |    |   |
| 771-3, step out    | 0.000 | 0.039 | 1.821 | 0.368 | 0.101 | 15.494 |    |   |
| 771-3, step out    | 0.000 | 0.043 | 1.758 | 0.336 | 0.091 | 15.453 |    |   |
| 771-3, step out    | 0.000 | 0.047 | 1.723 | 0.316 | 0.091 | 15.412 |    |   |
| 771-3, rim         | 0.000 | 0.052 | 1.752 | 0.298 | 0.064 | 15.364 |    |   |
| 9L-IV-2, rim       | 0.000 | 0.039 | 1.959 | 0.216 | 0.047 | 15.305 |    |   |
| 9L-IV-2, mid-point | 0.000 | 0.043 | 1.919 | 0.255 | 0.100 | 15.386 |    |   |
| 9L-IV-2, core      | 0.000 | 0.043 | 1.877 | 0.300 | 0.096 | 15.412 |    |   |
| 645-1, ave.        | 0.000 | 0.017 | 1.898 | 0.363 | 0.258 | 15.603 |    |   |
| 645-4, ave.        | 0.000 | 0.017 | 1.895 | 0.307 | 0.219 | 15.543 |    |   |
| 377-2, rim         | 0.000 | 0.126 | 1.864 | 0.426 | 0.087 | 15.498 |    |   |
| 377-2, core        | 0.000 | 0.118 | 1.875 | 0.462 | 0.104 | 15.565 |    |   |
| 377-3, rim         | 0.000 | 0.132 | 1.917 | 0.402 | 0.110 | 15.650 |    |   |
| 377-3, core        | 0.000 | 0.121 | 1.853 | 0.408 | 0.091 | 15.492 |    |   |
| 377-4, rim         | 0.000 | 0.132 | 1.810 | 0.294 | 0.077 | 15.361 |    |   |
| 377-4, core        | 0.000 | 0.138 | 1.840 | 0.319 | 0.077 | 15.446 |    |   |

Table 4. Xenolith amphibole.

| Sample           | SiO <sub>2</sub> | Al <sub>2</sub> O <sub>3</sub> | FeO   | Fe <sub>2</sub> O <sub>3</sub> | MgO   | TiO <sub>2</sub> | Cr <sub>2</sub> O <sub>3</sub> | MnO  | BaO  | CaO   | Na <sub>2</sub> O |
|------------------|------------------|--------------------------------|-------|--------------------------------|-------|------------------|--------------------------------|------|------|-------|-------------------|
| 219A-1, ave.     | 43.24            | 10.41                          | 20.73 | 0.00                           | 8.82  | 0.92             | 0.00                           | 0.29 | 0.00 | 11.14 | 1.40              |
| 219A-2, ave.     | 43.85            | 9.84                           | 20.53 | 0.00                           | 9.26  | 0.64             | 0.00                           | 0.29 | 0.00 | 11.00 | 1.38              |
| 219A-4, ave.     | 44.39            | 9.18                           | 19.89 | 0.00                           | 10.04 | 0.61             | 0.00                           | 0.22 | 0.00 | 11.13 | 1.23              |
| 219A-3, ave.     | 52.31            | 1.01                           | 26.05 | 0.00                           | 15.39 | 0.92             | 0.00                           | 0.66 | 0.00 | 11.69 | 0.14              |
| 219A-5, ave.     | 52.57            | 1.07                           | 26.90 | 0.00                           | 15.14 | 0.82             | 0.00                           | 0.65 | 0.00 | 11.49 | 0.14              |
| 7B-1, rim        | 41.82            | 14.34                          | 21.25 | 0.00                           | 6.57  | 0.62             | 0.00                           | 0.25 | 0.00 | 10.70 | 1.41              |
| 7B-1, core       | 42.18            | 13.87                          | 21.86 | 0.00                           | 7.08  | 0.62             | 0.00                           | 0.24 | 0.00 | 10.60 | 1.38              |
| 7B-2, rim        | 41.57            | 14.21                          | 21.74 | 0.00                           | 6.83  | 0.73             | 0.00                           | 0.23 | 0.00 | 10.77 | 1.38              |
| 7B-2, core       | 41.61            | 13.78                          | 22.48 | 0.00                           | 6.70  | 1.20             | 0.00                           | 0.28 | 0.00 | 10.63 | 1.30              |
| 7B-3, incl, gt   | 52.30            | 1.68                           | 27.26 | 0.00                           | 14.61 | 0.84             | 0.00                           | 0.34 | 0.00 | 11.21 | 0.19              |
| 7B-4, incl, gt   | 51.80            | 2.04                           | 27.57 | 0.00                           | 14.36 | 0.84             | 0.00                           | 0.31 | 0.00 | 11.39 | 0.20              |
| 7B-5, incl, gt   | 51.61            | 2.13                           | 27.49 | 0.00                           | 14.26 | 0.85             | 0.00                           | 0.31 | 0.00 | 11.39 | 0.24              |
| 7BB-1, incl, gt  | 51.05            | 2.63                           | 27.48 | 0.00                           | 11.11 | 0.89             | 0.00                           | 0.46 | 0.00 | 9.62  | 0.31              |
| 7BB-2, incl, gt  | 31.71            | 1.57                           | 29.49 | 0.00                           | 13.06 | 0.87             | 0.00                           | 0.49 | 0.00 | 10.97 | 0.16              |
| 7BB-3, incl, gt  | 52.43            | 0.95                           | 30.10 | 0.00                           | 13.20 | 0.84             | 0.00                           | 0.37 | 0.00 | 10.56 | 0.11              |
| 7BB-4, rim, plag | 42.47            | 14.36                          | 22.11 | 0.00                           | 6.78  | 0.63             | 0.00                           | 0.27 | 0.00 | 10.66 | 1.34              |
| 119-1            | 45.89            | 8.89                           | 14.56 | 0.00                           | 12.33 | 1.11             | 0.00                           | 0.34 | 0.00 | 11.39 | 1.03              |
| 119-2            | 50.19            | 5.95                           | 13.57 | 0.00                           | 14.61 | 0.50             | 0.00                           | 0.34 | 0.00 | 11.49 | 0.63              |
| 119-3            | 51.33            | 4.18                           | 12.49 | 0.00                           | 15.89 | 0.26             | 0.00                           | 0.30 | 0.00 | 11.56 | 0.47              |
| 119-4            | 48.22            | 7.69                           | 13.57 | 0.00                           | 13.35 | 0.86             | 0.00                           | 0.34 | 0.00 | 11.82 | 0.83              |
| 119-5            | 47.59            | 7.79                           | 14.18 | 0.00                           | 13.23 | 1.18             | 0.00                           | 0.30 | 0.00 | 11.47 | 0.89              |
| 219B-1A          | 42.07            | 10.56                          | 22.18 | 0.00                           | 7.86  | 0.71             | 0.00                           | 0.21 | 0.00 | 11.18 | 1.20              |
| 219B-1B          | 41.82            | 11.19                          | 22.54 | 0.00                           | 7.48  | 0.71             | 0.00                           | 0.13 | 0.00 | 11.15 | 1.27              |
| 219B-2A          | 40.54            | 11.77                          | 22.95 | 0.00                           | 7.09  | 0.50             | 0.00                           | 0.17 | 0.00 | 11.25 | 1.24              |
| 219B-2B          | 40.34            | 11.63                          | 23.21 | 0.00                           | 6.88  | 0.79             | 0.00                           | 0.20 | 0.00 | 11.14 | 1.26              |
| 219B-3A          | 40.79            | 11.28                          | 23.34 | 0.00                           | 7.13  | 0.62             | 0.00                           | 0.17 | 0.00 | 11.52 | 1.22              |
| 219B-3B          | 41.24            | 11.23                          | 23.07 | 0.00                           | 7.01  | 0.79             | 0.00                           | 0.20 | 0.00 | 11.29 | 1.28              |
| 219B-4           | 41.34            | 10.93                          | 22.46 | 0.00                           | 7.43  | 1.04             | 0.00                           | 0.17 | 0.00 | 11.34 | 1.13              |



Table 4. Xenolith amphibole.

| sp1              | K2O  | Cl   | F    | Sum   | Si    | Al    | Fe2+  | Mg    | Ti    | Cr    |
|------------------|------|------|------|-------|-------|-------|-------|-------|-------|-------|
| 219A-1, ave.     | 0.76 | 0.00 | 0.00 | 97.62 | 6.601 | 1.868 | 2.637 | 1.998 | 0.103 | 0.000 |
| 219A-2, ave.     | 0.68 | 0.00 | 0.00 | 97.55 | 6.582 | 1.767 | 2.625 | 2.102 | 0.271 | 0.000 |
| 219A-4, ave.     | 0.69 | 0.00 | 0.00 | 97.38 | 6.747 | 1.641 | 2.529 | 2.274 | 0.066 | 0.000 |
| 219A-5, ave.     | 0.02 | 0.00 | 0.00 | 97.30 | 7.828 | 0.175 | 3.259 | 3.431 | 0.000 | 0.000 |
| 219A-5, ave.     | 0.02 | 0.00 | 0.00 | 98.01 | 7.831 | 0.168 | 3.347 | 2.360 | 0.000 | 0.000 |
| 7B-1, rim        | 0.44 | 0.00 | 0.00 | 97.39 | 6.373 | 2.571 | 2.706 | 1.489 | 0.067 | 0.000 |
| 7B-1, core       | 0.39 | 0.00 | 0.00 | 98.34 | 6.373 | 2.470 | 2.763 | 1.592 | 0.093 | 0.000 |
| 7B-2, rim        | 0.38 | 0.00 | 0.00 | 97.94 | 6.334 | 2.547 | 2.761 | 1.548 | 0.080 | 0.000 |
| 7B-2, core       | 0.50 | 0.00 | 0.00 | 98.48 | 6.324 | 2.466 | 2.854 | 1.516 | 0.134 | 0.000 |
| 7B-3, incl, gt   | 0.02 | 0.00 | 0.00 | 97.84 | 7.792 | 0.328 | 3.393 | 3.244 | 0.204 | 0.000 |
| 7B-4, incl, gt   | 0.03 | 0.00 | 0.00 | 97.75 | 7.744 | 0.359 | 3.444 | 3.198 | 0.204 | 0.000 |
| 7B-5, incl, gt   | 0.03 | 0.00 | 0.00 | 97.50 | 7.735 | 0.374 | 3.443 | 3.184 | 0.204 | 0.000 |
| 7BB-1, incl, gt  | 0.04 | 0.00 | 0.00 | 98.78 | 7.664 | 0.462 | 3.448 | 2.484 | 0.009 | 0.000 |
| 7BB-2, incl, gt  | 0.03 | 0.00 | 0.00 | 97.56 | 7.817 | 0.279 | 3.727 | 2.941 | 0.004 | 0.000 |
| 7BB-3, incl, gt  | 0.00 | 0.00 | 0.00 | 97.77 | 7.905 | 0.168 | 3.791 | 2.964 | 0.004 | 0.000 |
| 7BB-4, rim, plag | 0.43 | 0.00 | 0.00 | 99.05 | 6.379 | 2.539 | 2.777 | 1.516 | 0.070 | 0.000 |
| 119-1            | 0.80 | 0.00 | 0.00 | 96.33 | 6.871 | 1.564 | 1.819 | 2.750 | 0.123 | 0.000 |
| 119-2            | 0.31 | 0.00 | 0.00 | 97.59 | 7.296 | 1.020 | 1.647 | 3.166 | 0.251 | 0.000 |
| 119-3            | 0.21 | 0.00 | 0.00 | 96.70 | 7.479 | 0.718 | 1.522 | 3.451 | 0.025 | 0.000 |
| 119-4            | 0.52 | 0.00 | 0.00 | 97.17 | 7.020 | 1.328 | 1.664 | 2.923 | 0.090 | 0.000 |
| 119-5            | 0.61 | 0.00 | 0.00 | 97.22 | 7.016 | 1.350 | 1.748 | 2.902 | 0.129 | 0.000 |
| 219B-1A          | 1.21 | 0.00 | 0.00 | 97.20 | 6.528 | 1.930 | 2.877 | 1.816 | 0.082 | 0.000 |
| 219B-1B          | 1.25 | 0.00 | 0.00 | 96.73 | 6.417 | 2.061 | 2.947 | 1.744 | 0.083 | 0.000 |
| 219B-2A          | 1.39 | 0.00 | 0.00 | 96.88 | 6.359 | 2.173 | 3.011 | 1.653 | 0.055 | 0.000 |
| 219B-2B          | 1.63 | 0.00 | 0.00 | 97.07 | 6.331 | 2.150 | 3.043 | 1.507 | 0.092 | 0.000 |
| 219B-3A          | 1.53 | 0.00 | 0.00 | 97.79 | 6.355 | 2.071 | 3.041 | 1.650 | 0.096 | 0.000 |
| 219B-3B          | 1.41 | 0.00 | 0.00 | 97.50 | 6.418 | 2.060 | 3.021 | 1.626 | 0.091 | 0.000 |
| 219B-4           | 1.39 | 0.00 | 0.00 | 97.21 | 6.436 | 2.005 | 2.923 | 1.722 | 0.119 | 0.000 |

Table 4. Xenolith amphibole.

| sol              | Mg    | Ca    | Na    | K     | TOTAL  | D1 | D2 |
|------------------|-------|-------|-------|-------|--------|----|----|
| 219A-1, ave.     | 0.036 | 1.814 | 0.411 | 0.147 | 15.615 |    |    |
| 219A-2, ave.     | 0.036 | 1.793 | 0.402 | 0.129 | 15.608 |    |    |
| 219A-4, ave.     | 0.026 | 1.810 | 0.361 | 0.133 | 15.586 |    |    |
| 219A-3, ave.     | 0.083 | 0.268 | 0.039 | 0.004 | 15.086 |    |    |
| 219A-5, ave.     | 0.079 | 0.236 | 0.039 | 0.000 | 15.080 |    |    |
| 7B-1, rim        | 0.031 | 1.744 | 0.416 | 0.085 | 15.480 |    |    |
| 7B-1, core       | 0.026 | 1.716 | 0.377 | 0.071 | 15.481 |    |    |
| 7B-2, rim        | 0.026 | 1.753 | 0.406 | 0.071 | 15.506 |    |    |
| 7B-2, core       | 0.036 | 1.730 | 0.379 | 0.093 | 15.532 |    |    |
| 7B-3, incl, gt   | 0.039 | 0.192 | 0.052 | 0.000 | 15.044 |    |    |
| 7B-4, incl, gt   | 0.039 | 0.219 | 0.052 | 0.004 | 15.064 |    |    |
| 7B-5, incl, gt   | 0.040 | 0.220 | 0.006 | 0.004 | 15.070 |    |    |
| 7B8-1, incl, gt  | 0.057 | 0.923 | 0.288 | 0.004 | 15.119 |    |    |
| 7B8-2, incl, gt  | 0.062 | 0.155 | 0.044 | 0.004 | 15.035 |    |    |
| 7B8-3, incl, gt  | 0.044 | 0.088 | 0.031 | 0.000 | 14.996 |    |    |
| 7B8-4, rim, plag | 0.031 | 1.715 | 0.388 | 0.079 | 15.494 |    |    |
| 119-1            | 0.039 | 1.823 | 0.294 | 0.149 | 15.432 |    |    |
| 119-2            | 0.038 | 1.788 | 0.175 | 0.055 | 15.235 |    |    |
| 119-3            | 0.034 | 1.805 | 0.126 | 0.038 | 15.202 |    |    |
| 119-4            | 0.039 | 1.858 | 0.232 | 0.095 | 15.310 |    |    |
| 119-5            | 0.034 | 1.808 | 0.255 | 0.112 | 15.354 |    |    |
| 219B-1A          | 0.022 | 1.857 | 0.359 | 0.236 | 15.709 |    |    |
| 219B-1B          | 0.014 | 1.868 | 0.381 | 0.248 | 15.763 |    |    |
| 219B-2A          | 0.018 | 1.888 | 0.373 | 0.276 | 15.806 |    |    |
| 219B-2B          | 0.023 | 1.869 | 0.382 | 0.322 | 15.819 |    |    |
| 219B-3A          | 0.018 | 1.920 | 0.355 | 0.302 | 15.819 |    |    |
| 219B-3B          | 0.022 | 1.882 | 0.383 | 0.278 | 15.762 |    |    |
| 219B-4           | 0.018 | 1.891 | 0.338 | 0.274 | 15.726 |    |    |

TABLE 5. Representative biotite analyses.

| sp1  | grain   | SiO2  | TiO2 | Al2O3 | FeO   | MnO  | MgO   | CaO  | Na2O | K2O   | Total |
|------|---------|-------|------|-------|-------|------|-------|------|------|-------|-------|
| 30   | bi1r    | 37.15 | 4.05 | 14.92 | 16.46 | 0.05 | 13.37 | 0.15 | 0.10 | 9.83  | 96.06 |
| 236A | bi2gm   | 37.46 | 4.44 | 12.96 | 21.13 | 0.07 | 10.53 | 0.15 | 0.17 | 9.72  | 96.62 |
| 236A | bi3gm   | 36.82 | 4.66 | 13.03 | 20.85 | 0.06 | 10.85 | 0.11 | 0.16 | 9.54  | 96.08 |
| 184  | bi1c    | 38.77 | 2.82 | 13.88 | 12.03 | 0.04 | 18.53 | 0.12 | 0.15 | 9.40  | 95.74 |
| 184  | bi3r    | 38.76 | 3.13 | 13.73 | 10.41 | 0.03 | 18.92 | 0.04 | 0.24 | 9.55  | 94.82 |
| 171  | bi1     | 38.04 | 4.76 | 13.71 | 12.65 | 0.09 | 16.35 | 0.11 | 0.37 | 9.45  | 95.52 |
| 111  | bi1c    | 40.67 | 3.38 | 14.18 | 17.23 | 0.10 | 11.54 | 0.15 | 1.31 | 9.17  | 97.72 |
| 194  | bi1c    | 36.94 | 3.33 | 14.89 | 21.11 | 0.29 | 11.02 | 0.01 | 0.11 | 10.10 | 97.79 |
| 208  | bi2r    | 36.72 | 3.19 | 14.36 | 20.27 | 0.29 | 10.80 | 0.00 | 0.14 | 9.99  | 95.76 |
| 317  | bi1c    | 36.71 | 3.79 | 13.88 | 20.70 | 0.29 | 10.71 | 0.00 | 0.10 | 9.97  | 96.16 |
| 317  | bi2av   | 35.77 | 3.53 | 14.76 | 19.64 | 0.26 | 10.81 | 0.02 | 0.12 | 9.82  | 94.73 |
| 317  | bi4,5av | 35.56 | 3.07 | 15.12 | 19.54 | 0.26 | 10.74 | 0.05 | 0.11 | 9.77  | 94.22 |
| 471  | bi1av   | 35.78 | 3.52 | 13.91 | 20.76 | 0.27 | 11.16 | 0.02 | 0.11 | 9.28  | 94.81 |
| 471  | bi2av   | 35.70 | 3.77 | 14.14 | 20.08 | 0.29 | 10.93 | 0.02 | 0.20 | 9.27  | 94.39 |
| 372A | bi1     | 36.56 | 3.25 | 13.04 | 21.63 | 0.38 | 11.29 | 0.00 | 0.11 | 9.94  | 96.20 |
| 372A | bi2     | 36.50 | 3.28 | 12.90 | 21.99 | 0.52 | 10.41 | 0.00 | 0.09 | 9.67  | 95.35 |
| 372A | bi4av   | 35.79 | 3.33 | 13.73 | 21.39 | 0.38 | 10.20 | 0.02 | 0.07 | 9.57  | 95.58 |
| 377A | bi1av   | 36.71 | 2.93 | 13.84 | 16.99 | 0.63 | 13.25 | 0.02 | 0.04 | 9.66  | 94.06 |
| 377A | bi2av   | 36.82 | 2.69 | 13.67 | 16.76 | 0.77 | 13.48 | 0.05 | 0.05 | 9.79  | 94.08 |
| 687  | bi2r    | 36.02 | 3.58 | 14.31 | 19.87 | 0.24 | 11.14 | 0.02 | 0.13 | 8.82  | 94.12 |
| 687  | bi2av   | 35.55 | 3.69 | 14.16 | 20.20 | 0.24 | 11.06 | 0.01 | 0.11 | 9.70  | 95.71 |
| 642A | bi2av   | 33.47 | 1.95 | 18.37 | 25.14 | 0.64 | 4.71  | 0.03 | 0.05 | 9.63  | 94.00 |
| 642A | bi3av   | 33.83 | 1.93 | 18.97 | 24.28 | 0.57 | 4.61  | 0.05 | 0.05 | 9.75  | 94.05 |
| 548  | bi3av   | 35.22 | 4.02 | 13.81 | 19.98 | 0.17 | 11.13 | 0.02 | 0.08 | 9.01  | 93.45 |
| 548  | bi4av   | 35.27 | 3.79 | 13.94 | 19.84 | 0.16 | 11.18 | 0.02 | 0.08 | 9.15  | 93.44 |
| 579  | bi1av   | 35.55 | 3.56 | 14.21 | 20.77 | 0.21 | 10.62 | 0.02 | 0.09 | 9.30  | 94.34 |
| 579  | bi2av   | 35.18 | 3.09 | 14.03 | 21.34 | 0.24 | 10.48 | 0.02 | 0.07 | 9.15  | 93.68 |
| 219D | bi1av   | 34.82 | 2.52 | 17.23 | 18.33 | 0.08 | 11.35 | 0.00 | 0.34 | 8.78  | 93.45 |
| 219D | bi2-4av | 34.60 | 3.02 | 17.63 | 17.95 | 0.03 | 10.64 | 0.00 | 0.26 | 8.93  | 93.05 |
| 133  | bi2,3av | 35.62 | 3.79 | 14.32 | 16.39 | 0.09 | 13.30 | 0.04 | 0.02 | 8.91  | 92.47 |
| 133  | bi4av   | 35.12 | 4.19 | 13.31 | 16.34 | 0.09 | 13.31 | 0.02 | 0.02 | 9.07  | 92.13 |

TABLE 5. Representative biotite analyses, *continued.*

| spl  | grain   | Si    | Ti    | Al    | Fe2+  | Mn    | Mg    | Ca    | Na    | K     | TOTAL  |
|------|---------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| 30   | bi1r    | 5.559 | 0.455 | 2.632 | 2.059 | 0.006 | 2.983 | 0.024 | 0.028 | 1.875 | 15.621 |
| 236A | bi2gm   | 5.705 | 0.508 | 2.326 | 2.692 | 0.010 | 2.390 | 0.024 | 0.049 | 1.889 | 15.593 |
| 236A | bi3gm   | 5.637 | 0.536 | 2.351 | 2.669 | 0.008 | 2.476 | 0.019 | 0.047 | 1.864 | 15.607 |
| 184  | bi1c    | 5.675 | 0.311 | 2.394 | 1.473 | 0.004 | 4.043 | 0.018 | 0.043 | 1.755 | 15.716 |
| 184  | bi3r    | 5.692 | 0.346 | 2.376 | 1.278 | 0.004 | 4.143 | 0.007 | 0.070 | 1.789 | 15.704 |
| 171  | bi1     | 5.616 | 0.529 | 2.386 | 1.562 | 0.011 | 3.599 | 0.018 | 0.106 | 1.779 | 15.605 |
| 111  | bi1c    | 5.627 | 0.352 | 2.312 | 1.994 | 0.012 | 2.380 | 0.022 | 0.350 | 1.619 | 14.668 |
| 194  | bi1c    | 5.563 | 0.377 | 2.643 | 2.658 | 0.037 | 2.473 | 0.001 | 0.031 | 1.941 | 15.724 |
| 208  | bi2r    | 5.632 | 0.368 | 2.596 | 2.600 | 0.038 | 2.469 | 0.000 | 0.042 | 1.954 | 15.699 |
| 317  | bi1c    | 5.622 | 0.437 | 2.506 | 2.652 | 0.038 | 2.446 | 0.000 | 0.029 | 1.948 | 15.676 |
| 317  | bi2av   | 5.538 | 0.411 | 2.694 | 2.543 | 0.034 | 2.494 | 0.003 | 0.036 | 1.940 | 15.693 |
| 317  | bi4,5av | 5.531 | 0.359 | 2.773 | 2.542 | 0.034 | 2.490 | 0.008 | 0.033 | 1.939 | 15.710 |
| 471  | bi1av   | 5.554 | 0.411 | 2.546 | 2.695 | 0.036 | 2.582 | 0.003 | 0.033 | 1.838 | 15.698 |
| 471  | bi2av   | 5.549 | 0.441 | 2.591 | 2.610 | 0.038 | 2.532 | 0.003 | 0.060 | 1.838 | 15.662 |
| 372A | bi1     | 5.635 | 0.377 | 2.368 | 2.788 | 0.049 | 2.595 | 0.000 | 0.032 | 1.954 | 15.798 |
| 372A | bi2     | 5.681 | 0.384 | 2.367 | 2.862 | 0.069 | 2.415 | 0.000 | 0.026 | 1.921 | 15.725 |
| 372A | bi4av   | 5.605 | 0.392 | 2.535 | 2.802 | 0.050 | 2.381 | 0.003 | 0.021 | 1.912 | 15.701 |
| 377A | bi1av   | 5.647 | 0.339 | 2.510 | 2.186 | 0.082 | 3.038 | 0.003 | 0.012 | 1.896 | 15.713 |
| 377A | bi2av   | 5.666 | 0.311 | 2.480 | 2.157 | 0.100 | 3.091 | 0.008 | 0.015 | 1.922 | 15.750 |
| 687  | bi2r    | 5.583 | 0.414 | 2.611 | 2.575 | 0.027 | 2.575 | 0.000 | 0.036 | 1.743 | 15.564 |
| 687  | bi2av   | 5.524 | 0.431 | 2.594 | 2.625 | 0.032 | 2.561 | 0.002 | 0.033 | 1.923 | 15.725 |
| 642A | bi2av   | 5.368 | 0.235 | 3.474 | 3.372 | 0.087 | 1.126 | 0.005 | 0.016 | 1.971 | 15.654 |
| 642A | bi3av   | 5.390 | 0.231 | 3.563 | 3.235 | 0.077 | 1.095 | 0.009 | 0.015 | 1.982 | 15.597 |
| 548  | bi3av   | 5.527 | 0.474 | 2.555 | 2.622 | 0.023 | 2.603 | 0.003 | 0.024 | 1.804 | 15.635 |
| 548  | bi4av   | 5.534 | 0.447 | 2.579 | 2.603 | 0.021 | 2.614 | 0.003 | 0.024 | 1.832 | 15.657 |
| 579  | bi1av   | 5.547 | 0.418 | 2.615 | 2.710 | 0.028 | 2.470 | 0.003 | 0.027 | 1.851 | 15.668 |
| 579  | bi2av   | 5.552 | 0.367 | 2.610 | 2.816 | 0.032 | 2.465 | 0.003 | 0.021 | 1.842 | 15.708 |
| 219D | bi1av   | 5.389 | 0.293 | 3.144 | 2.373 | 0.011 | 2.618 | 0.000 | 0.102 | 1.734 | 15.664 |
| 219D | bi2-4av | 5.370 | 0.353 | 3.226 | 2.330 | 0.004 | 2.461 | 0.000 | 0.078 | 1.768 | 15.590 |
| 133  | bi2,3av | 5.528 | 0.441 | 2.618 | 2.126 | 0.009 | 3.074 | 0.004 | 0.004 | 1.762 | 15.568 |
| 133  | bi4av   | 5.489 | 0.491 | 2.573 | 2.132 | 0.009 | 3.100 | 0.000 | 0.004 | 1.807 | 15.605 |

TABLE 6.

## SPINEL PHASE

| SPL | xtal   | SiO2 | TiO2  | Al2O3 | Cr2O3 | FeO(t) | MnO  | MgO  | CaO  | TOTAL |
|-----|--------|------|-------|-------|-------|--------|------|------|------|-------|
| 555 | mt1    | 0.07 | 5.61  | 2.40  | 0.71  | 84.18  | 0.11 | 0.29 | 0.00 | 93.37 |
| 555 | mt2    | 0.03 | 10.50 | 2.76  | 0.82  | 79.07  | 0.32 | 1.92 | 0.00 | 95.41 |
| 555 | mt3    | 0.16 | 11.39 | 3.90  | 0.52  | 78.00  | 0.69 | 0.45 | 0.00 | 95.11 |
| 555 | nmt1av | 0.41 | 11.59 | 1.89  | 0.80  | 78.07  | 0.96 | 0.09 | 0.43 | 94.24 |
| 699 | mt1a   | 0.11 | 18.98 | 0.13  | 0.13  | 76.51  | 0.98 | 0.07 | 0.00 | 96.90 |
| 699 | mt2    | 0.07 | 12.82 | 0.17  | 0.08  | 81.38  | 0.86 | 0.04 | 0.00 | 95.42 |
| 699 | nmt1av | 0.22 | 13.63 | 0.00  | 0.00  | 81.09  | 0.94 | 0.04 | 0.19 | 96.11 |
| 699 | nmt3a  | 0.20 | 22.94 | 0.00  | 0.00  | 73.32  | 1.38 | 0.04 | 0.02 | 97.89 |
| 699 | nmt5av | 0.09 | 18.32 | 0.07  | 0.14  | 76.56  | 1.21 | 0.03 | 0.02 | 96.34 |
| 704 | mt1av  | 0.13 | 12.84 | 0.00  | 0.00  | 77.74  | 0.43 | 2.02 | 0.18 | 93.34 |
| 704 | mt3av  | 0.10 | 12.61 | 0.00  | 0.00  | 79.54  | 0.40 | 1.12 | 0.02 | 93.79 |
| 553 | mt1av  | 0.08 | 13.11 | 0.06  | 1.70  | 79.29  | 1.02 | 0.04 | 0.05 | 95.34 |
| 584 | mt3av  | 0.08 | 18.34 | 0.19  | 0.38  | 75.54  | 0.93 | 0.07 | 0.08 | 95.61 |
| 584 | mt4av  | 0.08 | 14.64 | 0.05  | 0.39  | 78.76  | 0.97 | 0.04 | 0.06 | 94.98 |
| 584 | mt5av  | 0.22 | 15.14 | 2.14  | 0.28  | 75.65  | 0.78 | 0.23 | 0.04 | 94.48 |
| 584 | mt6av  | 0.07 | 17.38 | 0.31  | 0.36  | 76.07  | 1.31 | 0.03 | 0.07 | 95.60 |

## SPINEL PHASE

| SPL | xtal   | Si    | Ti    | Al    | Cr    | Fe(t) | Mn    | Mg    | TOTAL |
|-----|--------|-------|-------|-------|-------|-------|-------|-------|-------|
| 555 | mt1    | 0.002 | 0.160 | 0.108 | 0.021 | 2.690 | 0.003 | 0.016 | 3.000 |
| 555 | mt2    | 0.000 | 0.292 | 0.120 | 0.024 | 2.449 | 0.010 | 0.105 | 3.000 |
| 555 | mt3    | 0.005 | 0.320 | 0.171 | 0.014 | 2.443 | 0.021 | 0.025 | 3.000 |
| 555 | nmt1av | 0.016 | 0.332 | 0.085 | 0.024 | 2.489 | 0.031 | 0.005 | 3.000 |
| 699 | mt1a   | 0.003 | 0.538 | 0.006 | 0.003 | 2.416 | 0.031 | 0.003 | 3.000 |
| 699 | mt2    | 0.002 | 0.367 | 0.006 | 0.002 | 2.594 | 0.027 | 0.001 | 3.000 |
| 699 | nmt1av | 0.008 | 0.388 | 0.000 | 0.000 | 2.564 | 0.030 | 0.002 | 3.000 |
| 699 | nmt3a  | 0.006 | 0.648 | 0.000 | 0.000 | 2.302 | 0.043 | 0.001 | 3.000 |
| 699 | nmt5av | 0.004 | 0.522 | 0.003 | 0.004 | 2.426 | 0.039 | 0.002 | 3.000 |
| 704 | mt1av  | 0.005 | 0.370 | 0.000 | 0.000 | 2.491 | 0.014 | 0.115 | 3.000 |
| 704 | mt3av  | 0.003 | 0.364 | 0.000 | 0.000 | 2.557 | 0.012 | 0.063 | 3.000 |
| 553 | mt1av  | 0.002 | 0.377 | 0.002 | 0.050 | 2.534 | 0.032 | 0.001 | 3.000 |
| 584 | mt3av  | 0.002 | 0.527 | 0.008 | 0.011 | 2.417 | 0.029 | 0.003 | 3.000 |
| 584 | mt4av  | 0.002 | 0.422 | 0.001 | 0.011 | 2.529 | 0.030 | 0.001 | 3.000 |
| 584 | mt5av  | 0.008 | 0.434 | 0.095 | 0.008 | 2.417 | 0.025 | 0.012 | 3.000 |
| 584 | mt6av  | 0.002 | 0.499 | 0.013 | 0.010 | 2.431 | 0.041 | 0.001 | 2.999 |

TABLE 6.  
SPINEL PHASE; *continued.*

| SPL | xtal   | Fe <sup>3+</sup> | Fe <sup>2+</sup> | XFe <sup>2+</sup> | XFe <sup>3+</sup> | X'usp |
|-----|--------|------------------|------------------|-------------------|-------------------|-------|
| 555 | mt1    | 1.546            | 1.144            | 0.984             | 0.923             | 0.181 |
| 555 | mt2    | 1.272            | 1.177            | 0.911             | 0.899             | 0.318 |
| 555 | mt3    | 1.164            | 1.279            | 0.965             | 0.862             | 0.381 |
| 555 | nmt1av | 1.195            | 1.294            | 0.960             | 0.916             | 0.368 |
| 699 | mt1a   | 0.907            | 1.508            | 0.978             | 0.990             | 0.540 |
| 699 | mt2    | 1.253            | 1.341            | 0.980             | 0.993             | 0.366 |
| 699 | nmt1av | 1.208            | 1.356            | 0.971             | 1.000             | 0.384 |
| 699 | nmt3a  | 0.692            | 1.609            | 0.973             | 1.000             | 0.646 |
| 699 | nmt5av | 0.942            | 1.484            | 0.973             | 0.992             | 0.521 |
| 704 | mt1av  | 1.251            | 1.240            | 0.902             | 1.000             | 0.348 |
| 704 | mt3av  | 1.265            | 1.292            | 0.945             | 1.000             | 0.352 |
| 553 | mt1av  | 1.190            | 1.344            | 0.975             | 0.958             | 0.392 |
| 584 | mt3av  | 0.922            | 1.495            | 0.977             | 0.980             | 0.533 |
| 584 | mt4av  | 1.138            | 1.392            | 0.976             | 0.989             | 0.423 |
| 584 | mt5av  | 1.013            | 1.404            | 0.974             | 0.908             | 0.479 |
| 584 | mt6av  | 0.976            | 1.455            | 0.970             | 0.977             | 0.504 |

TABLE 7. PLAGIOCLASE

| Sample            | SiO <sub>2</sub> | Al <sub>2</sub> O <sub>3</sub> | FeO  | CaO   | Na <sub>2</sub> O | K <sub>2</sub> O | TiO <sub>2</sub> | Sum  | TOTAL  |
|-------------------|------------------|--------------------------------|------|-------|-------------------|------------------|------------------|------|--------|
| 704-1, core       | 54.80            | 28.25                          | 0.48 | 11.02 | 4.55              | 0.38             | 0.05             | 0.17 | 100.09 |
| 704-1, mid-point  | 55.22            | 27.79                          | 0.57 | 10.59 | 5.18              | 0.41             | 0.02             | 0.05 | 99.83  |
| 704-1, rim B      | 55.39            | 27.77                          | 0.48 | 10.63 | 5.29              | 0.39             | 0.03             | 0.02 | 100.00 |
| 704-1, rim A      | 53.61            | 29.39                          | 0.63 | 11.84 | 4.59              | 0.38             | 0.04             | 0.03 | 100.43 |
| 704-1, rim C      | 53.26            | 29.52                          | 0.55 | 12.38 | 4.29              | 0.30             | 0.08             | 0.00 | 100.39 |
| 704 gm            | 55.24            | 28.14                          | 0.60 | 10.71 | 5.29              | 0.27             | 0.08             | 0.13 | 100.45 |
| 704-2, rim        | 55.25            | 27.60                          | 0.54 | 10.14 | 5.33              | 0.45             | 0.09             | 0.07 | 99.48  |
| 704-2, step in    | 54.94            | 28.67                          | 0.49 | 10.90 | 4.94              | 0.38             | 0.07             | 0.08 | 100.47 |
| 704-2, step in    | 55.20            | 28.20                          | 0.49 | 10.84 | 4.93              | 0.39             | 0.08             | 0.00 | 100.13 |
| 704-2, core A     | 54.43            | 29.10                          | 0.44 | 11.61 | 4.71              | 0.31             | 0.07             | 0.15 | 100.53 |
| 704-2, core B     | 54.34            | 28.66                          | 0.50 | 11.46 | 4.73              | 0.35             | 0.00             | 0.02 | 100.06 |
| 704-3, rim        | 54.77            | 28.48                          | 0.59 | 11.15 | 4.95              | 0.34             | 0.05             | 0.10 | 100.43 |
| 704-3, step in    | 55.56            | 28.11                          | 0.59 | 10.77 | 5.22              | 0.36             | 0.00             | 0.14 | 100.75 |
| 704-3, step in    | 55.38            | 28.36                          | 0.45 | 10.76 | 5.18              | 0.38             | 0.04             | 0.31 | 100.85 |
| 704-3, step in    | 55.01            | 28.73                          | 0.45 | 11.02 | 4.82              | 0.38             | 0.00             | 0.00 | 100.40 |
| 704-3, step in    | 53.22            | 29.46                          | 0.58 | 12.02 | 4.43              | 0.30             | 0.07             | 0.02 | 100.09 |
| 704-3, core       | 54.51            | 28.86                          | 0.48 | 11.20 | 4.73              | 0.35             | 0.01             | 0.19 | 100.33 |
| 704-4, core       | 55.62            | 28.11                          | 0.56 | 10.60 | 5.19              | 0.34             | 0.00             | 0.02 | 100.44 |
| 704-4, rim        | 53.83            | 29.16                          | 0.56 | 11.75 | 4.60              | 0.28             | 0.02             | 0.00 | 100.20 |
| 704-4, mid-point  | 55.00            | 28.28                          | 0.50 | 10.71 | 5.04              | 0.36             | 0.07             | 0.17 | 100.13 |
| 553-3, core A     | 52.05            | 29.94                          | 0.60 | 13.68 | 3.90              | 0.31             | 0.00             | 0.02 | 100.49 |
| 553-3, core B     | 54.17            | 28.61                          | 0.54 | 12.12 | 4.57              | 0.39             | 0.07             | 0.08 | 100.55 |
| 553-3, rim        | 53.62            | 28.79                          | 0.59 | 12.57 | 4.50              | 0.35             | 0.00             | 0.07 | 100.68 |
| 557 gm 1, rim     | 54.65            | 28.31                          | 0.59 | 11.39 | 4.81              | 0.37             | 0.07             | 0.17 | 100.33 |
| 557 gm 2, core    | 54.11            | 28.45                          | 0.56 | 11.38 | 4.81              | 0.44             | 0.02             | 0.14 | 99.91  |
| 557 gm 3, core    | 54.32            | 28.22                          | 0.48 | 11.07 | 4.98              | 0.46             | 0.04             | 0.08 | 99.65  |
| 557-2, core       | 52.93            | 29.53                          | 0.53 | 12.60 | 4.09              | 0.33             | 0.09             | 0.00 | 100.10 |
| 557-2, rim        | 53.22            | 29.29                          | 0.59 | 12.38 | 4.35              | 0.32             | 0.14             | 0.08 | 100.38 |
| 557-2, step in    | 54.82            | 28.31                          | 0.58 | 11.14 | 4.71              | 0.41             | 0.04             | 0.05 | 100.08 |
| 557-2, step in    | 52.75            | 29.79                          | 0.59 | 12.58 | 4.09              | 0.33             | 0.16             | 0.00 | 100.25 |
| 557-2, rim B      | 52.67            | 29.07                          | 0.58 | 12.64 | 3.93              | 0.30             | 0.07             | 0.04 | 100.10 |
| 164-3, rim        | 54.95            | 28.82                          | 0.56 | 10.95 | 4.92              | 0.35             | 0.09             | 0.11 | 100.81 |
| 164-3, core       | 52.80            | 29.64                          | 0.53 | 12.24 | 4.46              | 0.32             | 0.04             | 0.23 | 100.26 |
| 164-3, mid-point  | 49.98            | 31.84                          | 0.56 | 14.50 | 3.05              | 0.08             | 0.05             | 0.00 | 100.06 |
| 555-1, core       | 45.88            | 34.70                          | 0.25 | 17.43 | 1.33              | 0.04             | 0.10             | 0.16 | 99.89  |
| 555-1, rim        | 49.96            | 32.50                          | 0.23 | 14.95 | 2.94              | 0.07             | 0.03             | 0.00 | 100.68 |
| 555-2, core       | 47.71            | 33.84                          | 0.26 | 16.39 | 2.07              | 0.07             | 0.00             | 0.00 | 100.35 |
| 590 gm 1          | 50.00            | 31.91                          | 0.12 | 14.45 | 3.25              | 0.08             | 0.00             | 0.17 | 99.98  |
| 590 gm 2          | 48.94            | 32.64                          | 0.14 | 15.77 | 2.65              | 0.04             | 0.07             | 0.00 | 100.26 |
| 590 gm 3          | 48.51            | 32.72                          | 0.23 | 15.54 | 2.52              | 0.04             | 0.02             | 0.02 | 99.60  |
| 590 gm 4          | 48.97            | 32.16                          | 0.10 | 14.91 | 2.87              | 0.03             | 0.07             | 0.00 | 99.11  |
| 103-1, core A     | 55.01            | 29.21                          | 0.10 | 10.80 | 5.08              | 0.09             | 0.04             | 0.14 | 100.47 |
| 103-1, core B     | 53.87            | 29.54                          | 0.15 | 12.00 | 4.28              | 0.11             | 0.00             | 0.05 | 100.00 |
| 103-1, outer core | 55.80            | 29.04                          | 0.11 | 10.49 | 4.59              | 0.12             | 0.02             | 0.05 | 100.34 |
| 103-2, rim        | 55.95            | 28.74                          | 0.14 | 10.32 | 5.12              | 0.12             | 0.08             | 0.15 | 100.62 |
| 103-2, core       | 55.16            | 29.23                          | 0.07 | 11.15 | 4.65              | 0.08             | 0.00             | 0.04 | 100.39 |
| 103-3, rim        | 56.56            | 28.52                          | 0.10 | 9.95  | 5.07              | 0.07             | 0.03             | 0.20 | 100.49 |
| 699-2, core       | 52.20            | 29.57                          | 0.56 | 12.09 | 3.90              | 0.30             | 0.00             | 0.30 | 99.99  |
| 699-2, mid-point  | 50.47            | 30.92                          | 0.53 | 14.31 | 3.17              | 0.22             | 0.00             | 0.20 | 99.90  |
| 699-2, rim        | 49.32            | 31.61                          | 0.55 | 15.39 | 2.75              | 0.21             | 0.00             | 0.32 | 100.22 |
| 699-2, step in    | 50.04            | 31.16                          | 0.53 | 14.72 | 3.11              | 0.24             | 0.00             | 0.30 | 100.11 |
| 699-2, step in    | 48.53            | 31.59                          | 0.51 | 15.40 | 2.61              | 0.14             | 0.00             | 0.25 | 99.27  |
| 699-1, core       | 54.20            | 28.07                          | 0.41 | 11.11 | 4.81              | 0.48             | 0.00             | 0.31 | 99.43  |

TABLE 7. PLAGIOCLASE

| Sample            | Si    | Al    | Fe    | Ca    | Na    | K     | Ti    | Sum   | TOTAL |
|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 704-1, core       | 2.474 | 1.524 | 0.017 | 0.533 | 0.433 | 0.021 | 0.001 | 0.004 | 4.987 |
| 704-1, mid-point  | 2.500 | 1.482 | 0.021 | 0.513 | 0.454 | 0.022 | 0.000 | 0.001 | 4.994 |
| 704-1, rim B      | 2.501 | 1.478 | 0.017 | 0.514 | 0.452 | 0.021 | 0.000 | 0.000 | 4.994 |
| 704-1, rim A      | 2.428 | 1.563 | 0.022 | 0.572 | 0.421 | 0.017 | 0.001 | 0.000 | 4.997 |
| 704-1, rim C      | 2.407 | 1.573 | 0.020 | 0.599 | 0.375 | 0.017 | 0.002 | 0.000 | 4.993 |
| 704 gm            | 2.486 | 1.493 | 0.022 | 0.516 | 0.461 | 0.014 | 0.002 | 0.000 | 4.997 |
| 704-2, rim        | 2.507 | 1.475 | 0.020 | 0.492 | 0.468 | 0.025 | 0.002 | 0.001 | 4.990 |
| 704-2, step in    | 2.471 | 1.519 | 0.017 | 0.525 | 0.430 | 0.021 | 0.001 | 0.001 | 4.985 |
| 704-2, step in    | 2.488 | 1.498 | 0.017 | 0.523 | 0.431 | 0.021 | 0.002 | 0.000 | 4.981 |
| 704-2, core A     | 2.444 | 1.539 | 0.016 | 0.557 | 0.410 | 0.017 | 0.001 | 0.004 | 4.988 |
| 704-2, core B     | 2.458 | 1.527 | 0.019 | 0.555 | 0.414 | 0.020 | 0.000 | 0.000 | 4.992 |
| 704-3, rim        | 2.468 | 1.511 | 0.021 | 0.538 | 0.432 | 0.018 | 0.001 | 0.001 | 4.990 |
| 704-3, step in    | 2.493 | 1.486 | 0.021 | 0.517 | 0.453 | 0.020 | 0.000 | 0.002 | 4.992 |
| 704-3, step in    | 2.493 | 1.498 | 0.016 | 0.517 | 0.450 | 0.021 | 0.001 | 0.000 | 4.993 |
| 704-3, step in    | 2.474 | 1.522 | 0.016 | 0.530 | 0.419 | 0.021 | 0.000 | 0.000 | 4.983 |
| 704-3, step in    | 2.413 | 1.573 | 0.021 | 0.583 | 0.388 | 0.017 | 0.001 | 0.000 | 4.996 |
| 704-3, core       | 2.458 | 1.533 | 0.017 | 0.540 | 0.413 | 0.020 | 0.000 | 0.004 | 4.984 |
| 704-4, core       | 2.498 | 1.488 | 0.021 | 0.510 | 0.451 | 0.018 | 0.000 | 0.000 | 4.985 |
| 704-4, rim        | 2.433 | 1.553 | 0.021 | 0.569 | 0.403 | 0.016 | 0.000 | 0.000 | 4.995 |
| 704-4, mid-point  | 2.481 | 1.504 | 0.018 | 0.518 | 0.441 | 0.020 | 0.001 | 0.004 | 4.986 |
| 553-3, core A     | 2.363 | 1.603 | 0.023 | 0.665 | 0.343 | 0.018 | 0.000 | 0.001 | 5.016 |
| 553-3, core B     | 2.446 | 1.523 | 0.020 | 0.586 | 0.400 | 0.023 | 0.000 | 0.002 | 5.002 |
| 553-3, rim        | 2.431 | 1.533 | 0.022 | 0.608 | 0.394 | 0.020 | 0.000 | 0.002 | 5.010 |
| 557 gm 1, rim     | 2.466 | 1.505 | 0.020 | 0.549 | 0.419 | 0.021 | 0.001 | 0.004 | 4.986 |
| 557 gm 2, core    | 2.456 | 1.522 | 0.020 | 0.552 | 0.423 | 0.025 | 0.000 | 0.002 | 5.000 |
| 557 gm 3, core    | 2.466 | 1.509 | 0.017 | 0.538 | 0.438 | 0.026 | 0.001 | 0.001 | 4.997 |
| 557-2, core       | 2.401 | 1.579 | 0.020 | 0.612 | 0.359 | 0.019 | 0.002 | 0.000 | 4.992 |
| 557-2, rim        | 2.410 | 1.563 | 0.021 | 0.600 | 0.381 | 0.017 | 0.004 | 0.001 | 4.997 |
| 557-2, step in    | 2.476 | 1.507 | 0.021 | 0.538 | 0.412 | 0.022 | 0.001 | 0.001 | 4.978 |
| 557-2, step in    | 2.398 | 1.590 | 0.021 | 0.510 | 0.385 | 0.019 | 0.005 | 0.000 | 4.990 |
| 557-2, rim B      | 2.389 | 1.596 | 0.021 | 0.513 | 0.344 | 0.017 | 0.001 | 0.000 | 4.981 |
| 164-3, rim        | 2.465 | 1.522 | 0.021 | 0.535 | 0.432 | 0.020 | 0.002 | 0.000 | 4.989 |
| 164-3, core       | 2.394 | 1.583 | 0.020 | 0.595 | 0.391 | 0.017 | 0.001 | 0.005 | 5.006 |
| 164-3, mid-point  | 2.279 | 1.710 | 0.020 | 0.708 | 0.270 | 0.004 | 0.001 | 0.000 | 4.991 |
| 555-1, core       | 2.113 | 1.883 | 0.009 | 0.860 | 0.119 | 0.001 | 0.002 | 0.004 | 4.992 |
| 555-1, rim        | 2.264 | 1.738 | 0.008 | 0.725 | 0.258 | 0.004 | 0.000 | 0.000 | 4.994 |
| 555-2, core       | 2.179 | 1.821 | 0.005 | 0.801 | 0.184 | 0.004 | 0.000 | 0.000 | 4.999 |
| 590 gm 1          | 2.280 | 1.714 | 0.004 | 0.705 | 0.288 | 0.004 | 0.000 | 0.004 | 4.999 |
| 590 gm 2          | 2.232 | 1.754 | 0.004 | 0.771 | 0.234 | 0.001 | 0.001 | 0.000 | 4.997 |
| 590 gm 3          | 2.227 | 1.771 | 0.000 | 0.764 | 0.224 | 0.001 | 0.000 | 0.000 | 4.994 |
| 590 gm 4          | 2.253 | 1.745 | 0.002 | 0.734 | 0.255 | 0.001 | 0.001 | 0.000 | 4.992 |
| 103-1, core A     | 2.465 | 1.542 | 0.002 | 0.518 | 0.440 | 0.004 | 0.001 | 0.002 | 4.974 |
| 103-1, core B     | 2.432 | 1.571 | 0.005 | 0.580 | 0.374 | 0.005 | 0.000 | 0.001 | 4.968 |
| 103-1, outer core | 2.494 | 1.529 | 0.004 | 0.502 | 0.406 | 0.006 | 0.000 | 0.001 | 4.942 |
| 103-2, rim        | 2.498 | 1.512 | 0.004 | 0.493 | 0.443 | 0.006 | 0.002 | 0.004 | 4.962 |
| 103-2, core       | 2.471 | 1.542 | 0.002 | 0.535 | 0.423 | 0.004 | 0.000 | 0.000 | 4.958 |
| 103-3, rim        | 2.521 | 1.498 | 0.002 | 0.475 | 0.437 | 0.002 | 0.000 | 0.004 | 4.940 |
| 699-2, core       | 2.380 | 1.589 | 0.020 | 0.638 | 0.344 | 0.017 | 0.000 | 0.005 | 4.995 |
| 699-2, mid-point  | 2.310 | 1.667 | 0.020 | 0.701 | 0.250 | 0.012 | 0.003 | 0.006 | 4.996 |
| 699-2, rim        | 2.260 | 1.706 | 0.020 | 0.754 | 0.243 | 0.012 | 0.000 | 0.008 | 5.003 |
| 699-2, step in    | 2.289 | 1.680 | 0.020 | 0.721 | 0.275 | 0.013 | 0.002 | 0.008 | 5.025 |
| 699-2, step in    | 2.249 | 1.727 | 0.019 | 0.763 | 0.233 | 0.006 | 0.000 | 0.005 | 5.002 |
| 699-1, core       | 2.470 | 1.507 | 0.015 | 0.542 | 0.424 | 0.026 | 0.000 | 0.008 | 4.993 |



TABLE 7. PLAGIOCLASE

| Sample           | SiO <sub>2</sub> | Al <sub>2</sub> O <sub>3</sub> | FeO  | CaO   | Na <sub>2</sub> O | K <sub>2</sub> O | TiO <sub>2</sub> | Sum  | TOTAL  |
|------------------|------------------|--------------------------------|------|-------|-------------------|------------------|------------------|------|--------|
| 699-1, rim       | 56.02            | 27.55                          | 0.37 | 10.14 | 5.41              | 0.59             | 0.00             | 0.32 | 100.40 |
| 699-1, mid-point | 55.73            | 27.51                          | 0.38 | 10.36 | 5.47              | 0.42             | 0.00             | 0.27 | 100.24 |
| 548-3, rim       | 58.60            | 26.61                          | 0.07 | 8.16  | 6.54              | 0.22             | 0.00             | 0.30 | 100.62 |
| 548-3, step in   | 56.83            | 27.38                          | 0.11 | 9.25  | 6.25              | 0.27             | 0.00             | 0.29 | 100.18 |
| 548-3, step in   | 55.28            | 28.57                          | 0.18 | 10.64 | 5.20              | 0.21             | 0.00             | 0.32 | 100.46 |
| 548-3, core      | 57.75            | 26.67                          | 0.13 | 8.84  | 6.44              | 0.28             | 0.00             | 0.24 | 100.45 |
| 551-1, core      | 57.02            | 27.50                          | 0.17 | 9.52  | 5.85              | 0.34             | 0.00             | 0.32 | 100.74 |
| 551-1, rim       | 60.32            | 25.07                          | 0.11 | 6.63  | 7.26              | 0.59             | 0.00             | 0.31 | 100.32 |
| 551-1, mid-point | 57.22            | 27.16                          | 0.17 | 9.41  | 6.17              | 0.37             | 0.00             | 0.34 | 100.97 |
| 551-3, core      | 59.00            | 26.09                          | 0.13 | 8.15  | 6.67              | 0.46             | 0.00             | 0.28 | 100.85 |
| 551-3, step out  | 61.55            | 24.08                          | 0.11 | 6.03  | 7.65              | 0.70             | 0.00             | 0.27 | 100.49 |
| 551-3, step out  | 57.15            | 27.93                          | 0.16 | 9.57  | 5.91              | 0.34             | 0.00             | 0.27 | 100.33 |
| 551-3, step out  | 61.28            | 24.26                          | 0.10 | 6.01  | 7.65              | 0.70             | 0.00             | 0.25 | 100.24 |
| 551-3, rim       | 61.44            | 24.06                          | 0.12 | 5.97  | 7.82              | 0.68             | 0.00             | 0.26 | 100.37 |
| 551 gm, core     | 59.48            | 24.48                          | 0.14 | 7.67  | 6.93              | 0.50             | 0.00             | 0.30 | 100.50 |
| 551 gm, rim      | 50.73            | 24.77                          | 0.10 | 6.58  | 7.34              | 0.59             | 0.00             | 0.34 | 100.55 |
| 693-4, rim       | 55.36            | 28.49                          | 0.21 | 9.82  | 5.47              | 0.18             | 0.00             | 0.27 | 99.82  |
| 693-4, step in   | 55.54            | 28.14                          | 0.14 | 9.67  | 5.58              | 0.19             | 0.00             | 0.29 | 99.55  |
| 693-4, step in   | 55.66            | 27.75                          | 0.19 | 9.09  | 5.66              | 0.21             | 0.00             | 0.27 | 99.89  |
| 693-4, core      | 56.50            | 27.62                          | 0.18 | 9.07  | 6.00              | 0.27             | 0.00             | 0.31 | 100.01 |
| 697-1, rim       | 59.32            | 25.48                          | 0.07 | 6.99  | 7.45              | 0.22             | 0.00             | 0.30 | 99.88  |
| 697-2, rim       | 60.05            | 25.15                          | 0.06 | 6.28  | 7.83              | 0.33             | 0.00             | 0.25 | 100.01 |
| 697-2, step in   | 55.57            | 27.73                          | 0.09 | 9.72  | 5.77              | 0.21             | 0.00             | 0.30 | 99.38  |
| 697-2, step in   | 58.25            | 26.48                          | 0.10 | 8.04  | 6.77              | 0.39             | 0.00             | 0.27 | 100.21 |
| 697-2, core      | 59.73            | 25.48                          | 0.08 | 6.87  | 7.41              | 0.26             | 0.00             | 0.27 | 100.13 |
| 579-1, rim       | 60.75            | 24.55                          | 0.05 | 5.02  | 8.09              | 0.27             | 0.00             | 0.22 | 99.97  |
| 579-1, step in   | 62.03            | 24.82                          | 0.08 | 6.25  | 7.86              | 0.24             | 0.00             | 0.27 | 99.63  |
| 579-1, step in   | 57.05            | 26.66                          | 0.05 | 8.35  | 5.47              | 0.23             | 0.00             | 0.30 | 99.15  |
| 579-1, core      | 58.36            | 25.27                          | 0.11 | 7.63  | 7.00              | 0.32             | 0.00             | 0.26 | 99.98  |
| 579-2, rim       | 53.21            | 29.76                          | 0.11 | 11.58 | 4.68              | 0.09             | 0.00             | 0.25 | 99.84  |
| 579-2, core      | 56.09            | 27.50                          | 0.04 | 9.29  | 6.08              | 0.16             | 0.00             | 0.25 | 99.51  |
| 379-3, core      | 54.97            | 28.48                          | 0.14 | 10.56 | 5.44              | 0.13             | 0.00             | 0.27 | 100.00 |
| 379-3, mid-point | 54.23            | 28.81                          | 0.14 | 10.79 | 5.32              | 0.14             | 0.00             | 0.32 | 99.77  |
| 379-3, rim       | 56.38            | 27.64                          | 0.15 | 9.78  | 6.08              | 0.24             | 0.00             | 0.29 | 100.61 |
| 471-1, core      | 57.20            | 26.59                          | 0.17 | 8.37  | 6.53              | 0.33             | 0.00             | 0.34 | 99.61  |
| 471-1, rim       | 61.09            | 24.23                          | 0.15 | 5.43  | 8.15              | 0.32             | 0.00             | 0.25 | 99.63  |
| 471-2, rim       | 57.35            | 26.54                          | 0.16 | 8.52  | 6.54              | 0.22             | 0.00             | 0.33 | 99.66  |
| 471-2, core      | 55.79            | 27.87                          | 0.17 | 9.95  | 5.78              | 0.21             | 0.00             | 0.32 | 100.09 |
| 397-2, rim       | 55.89            | 27.77                          | 0.17 | 9.68  | 5.89              | 0.13             | 0.00             | 0.27 | 99.80  |
| 397-2, core      | 57.02            | 26.45                          | 0.25 | 8.40  | 6.55              | 0.27             | 0.00             | 0.29 | 99.26  |
| 397-2, mid-point | 55.73            | 27.93                          | 0.19 | 9.93  | 5.71              | 0.21             | 0.00             | 0.27 | 100.07 |
| 397-3, rim       | 58.19            | 25.11                          | 0.14 | 7.69  | 7.25              | 0.17             | 0.00             | 0.27 | 99.66  |
| 397-3, core      | 53.63            | 29.27                          | 0.13 | 11.33 | 4.84              | 0.14             | 0.00             | 0.24 | 99.65  |
| 257-1, core      | 46.74            | 34.18                          | 0.22 | 15.52 | 1.79              | 0.01             | 0.00             | 0.25 | 99.75  |
| 257-1, rim       | 45.27            | 34.96                          | 0.16 | 17.72 | 1.00              | 0.00             | 0.00             | 0.25 | 99.36  |
| 257-2, core      | 47.72            | 33.45                          | 0.21 | 15.82 | 2.05              | 0.11             | 0.00             | 0.25 | 99.69  |
| 257-1, rim       | 46.58            | 33.50                          | 1.06 | 16.20 | 1.71              | 0.02             | 0.00             | 0.27 | 99.34  |
| 264-1, ave.      | 53.64            | 29.68                          | 0.09 | 11.46 | 4.50              | 0.20             | 0.00             | 0.24 | 99.83  |
| 171 gm           | 54.94            | 28.50                          | 0.36 | 10.63 | 5.10              | 0.31             | 0.00             | 0.00 | 99.42  |
| 171-2, rim       | 49.91            | 32.32                          | 0.21 | 14.98 | 2.84              | 0.12             | 0.00             | 0.00 | 100.39 |
| 184-1, core      | 51.54            | 31.10                          | 0.19 | 13.31 | 3.62              | 0.13             | 0.00             | 0.00 | 100.09 |
| 184-1, rim       | 57.67            | 27.28                          | 0.19 | 8.87  | 6.48              | 0.32             | 0.00             | 0.20 | 100.78 |
| 184-2, core      | 49.86            | 32.19                          | 0.23 | 14.85 | 2.84              | 0.12             | 0.00             | 0.00 | 100.29 |

TABLE 7. PLAGIOCLASE

| Sample           | Si    | Al    | Fe    | Ca    | Na    | K     | Ti    | Sp    | TOTAL |
|------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 599-1, rim       | 2.921 | 1.480 | 0.013 | 0.468 | 0.471 | 0.033 | 0.000 | 0.000 | 4.995 |
| 599-1, mid-point | 2.915 | 1.462 | 0.013 | 0.500 | 0.478 | 0.023 | 0.000 | 0.000 | 4.998 |
| 548-3, rim       | 2.607 | 1.394 | 0.000 | 0.380 | 0.572 | 0.012 | 0.000 | 0.000 | 4.989 |
| 548-3, step in   | 2.548 | 1.446 | 0.024 | 0.443 | 0.525 | 0.014 | 0.000 | 0.000 | 4.988 |
| 548-3, step in   | 2.484 | 1.512 | 0.000 | 0.511 | 0.452 | 0.012 | 0.000 | 0.000 | 4.985 |
| 548-3, core      | 2.583 | 1.405 | 0.024 | 0.422 | 0.558 | 0.016 | 0.000 | 0.000 | 4.996 |
| 551-1, core      | 2.547 | 1.448 | 0.000 | 0.455 | 0.507 | 0.019 | 0.000 | 0.000 | 4.992 |
| 551-1, rim       | 2.684 | 1.315 | 0.004 | 0.315 | 0.627 | 0.034 | 0.000 | 0.000 | 4.988 |
| 551-1, mid-point | 2.557 | 1.429 | 0.006 | 0.450 | 0.534 | 0.021 | 0.000 | 0.000 | 5.000 |
| 551-3, core      | 2.624 | 1.368 | 0.005 | 0.388 | 0.575 | 0.026 | 0.000 | 0.000 | 4.993 |
| 551-3, step out  | 2.733 | 1.259 | 0.004 | 0.286 | 0.658 | 0.040 | 0.000 | 0.000 | 4.986 |
| 551-3, step out  | 2.537 | 1.462 | 0.000 | 0.435 | 0.509 | 0.019 | 0.000 | 0.000 | 4.995 |
| 551-3, step out  | 2.721 | 1.270 | 0.004 | 0.286 | 0.676 | 0.040 | 0.000 | 0.000 | 5.002 |
| 551-3, rim       | 2.729 | 1.260 | 0.005 | 0.284 | 0.674 | 0.039 | 0.000 | 0.000 | 4.997 |
| 551 gm, core     | 2.650 | 1.338 | 0.005 | 0.366 | 0.599 | 0.028 | 0.000 | 0.000 | 4.994 |
| 551 gm, rim      | 2.696 | 1.297 | 0.004 | 0.318 | 0.632 | 0.033 | 0.000 | 0.000 | 4.989 |
| 693-4, rim       | 2.497 | 1.514 | 0.000 | 0.474 | 0.478 | 0.009 | 0.000 | 0.000 | 4.983 |
| 693-4, step in   | 2.509 | 1.499 | 0.004 | 0.468 | 0.488 | 0.010 | 0.000 | 0.000 | 4.984 |
| 693-4, step in   | 2.525 | 1.482 | 0.000 | 0.440 | 0.515 | 0.012 | 0.000 | 0.000 | 4.986 |
| 693-4, core      | 2.539 | 1.462 | 0.000 | 0.437 | 0.522 | 0.014 | 0.000 | 0.000 | 4.988 |
| 697-1, rim       | 2.652 | 1.342 | 0.000 | 0.334 | 0.648 | 0.012 | 0.000 | 0.000 | 4.999 |
| 697-2, rim       | 2.677 | 1.321 | 0.001 | 0.299 | 0.680 | 0.018 | 0.000 | 0.000 | 5.003 |
| 697-2, step in   | 2.517 | 1.479 | 0.002 | 0.472 | 0.506 | 0.012 | 0.000 | 0.000 | 4.995 |
| 697-2, step in   | 2.603 | 1.394 | 0.002 | 0.304 | 0.585 | 0.016 | 0.000 | 0.000 | 4.991 |
| 697-2, core      | 2.661 | 1.338 | 0.002 | 0.327 | 0.639 | 0.014 | 0.000 | 0.000 | 4.988 |
| 579-1, rim       | 2.707 | 1.289 | 0.001 | 0.286 | 0.698 | 0.014 | 0.000 | 0.000 | 5.000 |
| 579-1, step in   | 2.688 | 1.310 | 0.002 | 0.299 | 0.682 | 0.013 | 0.000 | 0.000 | 5.000 |
| 579-1, step in   | 2.581 | 1.420 | 0.001 | 0.402 | 0.566 | 0.013 | 0.000 | 0.000 | 4.991 |
| 579-1, core      | 2.612 | 1.386 | 0.004 | 0.365 | 0.596 | 0.017 | 0.000 | 0.000 | 4.997 |
| 579-2, rim       | 2.412 | 1.590 | 0.004 | 0.566 | 0.411 | 0.004 | 0.000 | 0.000 | 4.991 |
| 579-2, core      | 2.533 | 1.463 | 0.001 | 0.449 | 0.531 | 0.008 | 0.000 | 0.000 | 4.993 |
| 379-3, core      | 2.481 | 1.515 | 0.005 | 0.511 | 0.476 | 0.008 | 0.000 | 0.000 | 5.003 |
| 379-3, mid-point | 2.458 | 1.539 | 0.005 | 0.524 | 0.468 | 0.008 | 0.000 | 0.000 | 5.010 |
| 379-3, rim       | 2.527 | 1.461 | 0.006 | 0.470 | 0.529 | 0.014 | 0.000 | 0.000 | 5.014 |
| 471-1, core      | 2.580 | 1.414 | 0.005 | 0.403 | 0.570 | 0.018 | 0.000 | 0.000 | 4.999 |
| 471-1, rim       | 2.726 | 1.274 | 0.005 | 0.259 | 0.704 | 0.017 | 0.000 | 0.000 | 4.991 |
| 471-2, rim       | 2.583 | 1.408 | 0.005 | 0.411 | 0.571 | 0.012 | 0.000 | 0.000 | 4.998 |
| 471-2, core      | 2.512 | 1.479 | 0.005 | 0.479 | 0.503 | 0.012 | 0.000 | 0.000 | 4.998 |
| 397-2, rim       | 2.520 | 1.476 | 0.005 | 0.467 | 0.515 | 0.000 | 0.000 | 0.000 | 4.995 |
| 397-2, core      | 2.581 | 1.410 | 0.009 | 0.406 | 0.574 | 0.014 | 0.000 | 0.000 | 5.000 |
| 397-2, mid-point | 2.510 | 1.461 | 0.006 | 0.478 | 0.498 | 0.012 | 0.000 | 0.000 | 4.993 |
| 397-3, rim       | 2.615 | 1.382 | 0.005 | 0.359 | 0.613 | 0.009 | 0.000 | 0.000 | 4.999 |
| 397-3, core      | 2.435 | 1.565 | 0.004 | 0.550 | 0.485 | 0.005 | 0.000 | 0.000 | 4.990 |
| 257-1, core      | 2.151 | 1.854 | 0.008 | 0.814 | 0.139 | 0.000 | 0.000 | 0.000 | 4.992 |
| 257-1, rim       | 2.068 | 1.910 | 0.005 | 0.680 | 0.089 | 0.000 | 0.000 | 0.000 | 4.989 |
| 257-2, core      | 2.195 | 1.814 | 0.006 | 0.779 | 0.182 | 0.005 | 0.000 | 0.000 | 4.987 |
| 257-1, rim       | 2.159 | 1.830 | 0.041 | 0.804 | 0.153 | 0.001 | 0.000 | 0.000 | 4.993 |
| 254-1, ave.      | 2.409 | 1.583 | 0.022 | 0.555 | 0.395 | 0.010 | 0.000 | 0.000 | 4.979 |
| 171 gm           | 2.475 | 1.524 | 0.014 | 0.517 | 0.448 | 0.018 | 0.000 | 0.000 | 4.996 |
| 171-2, rim       | 2.268 | 1.731 | 0.008 | 0.730 | 0.250 | 0.007 | 0.000 | 0.000 | 4.995 |
| 184-1, core      | 2.339 | 1.664 | 0.007 | 0.647 | 0.336 | 0.008 | 0.000 | 0.000 | 5.001 |
| 184-1, rim       | 2.568 | 1.432 | 0.005 | 0.423 | 0.559 | 0.016 | 0.000 | 0.000 | 5.005 |
| 184-2, core      | 2.270 | 1.727 | 0.009 | 0.724 | 0.268 | 0.007 | 0.000 | 0.000 | 5.004 |

TABLE 7. PLASIDC-93C

| Sample            | SiO <sub>2</sub> | Al <sub>2</sub> O <sub>3</sub> | FeO  | CaO   | Na <sub>2</sub> O | K <sub>2</sub> O | TiO <sub>2</sub> | SnO  | TOTAL  |
|-------------------|------------------|--------------------------------|------|-------|-------------------|------------------|------------------|------|--------|
| 184-2, rim        | 54.23            | 28.75                          | 0.43 | 10.53 | 5.48              | 0.29             | 0.00             | 0.00 | 99.70  |
| 235A-1, core      | 51.15            | 30.99                          | 0.17 | 14.32 | 3.57              | 0.15             | 0.00             | 0.00 | 100.35 |
| 235A-1, mid-point | 56.79            | 27.43                          | 0.25 | 9.40  | 6.15              | 0.32             | 0.00             | 0.00 | 100.34 |
| 235A-1, rim       | 54.27            | 28.81                          | 0.42 | 11.05 | 5.11              | 0.19             | 0.00             | 0.00 | 99.85  |
| 30-1, core        | 54.96            | 28.01                          | 0.29 | 11.09 | 5.11              | 0.26             | 0.00             | 0.00 | 99.44  |
| 30-1, rim         | 57.40            | 27.31                          | 0.15 | 9.21  | 6.52              | 0.27             | 0.00             | 0.00 | 100.85 |
| 30-2, core        | 53.93            | 29.25                          | 0.09 | 11.11 | 4.93              | 0.22             | 0.00             | 0.00 | 99.52  |
| 30-2, rim         | 57.75            | 27.13                          | 0.12 | 8.90  | 6.25              | 0.30             | 0.00             | 0.00 | 100.45 |
| 111-1, core       | 53.44            | 30.03                          | 0.18 | 11.68 | 4.76              | 0.30             | 0.00             | 0.00 | 100.39 |
| 111-1, mid-point  | 54.90            | 29.23                          | 0.13 | 11.33 | 4.98              | 0.29             | 0.00             | 0.00 | 100.88 |
| 111-1, rim        | 51.19            | 31.09                          | 0.13 | 13.45 | 3.81              | 0.17             | 0.00             | 0.00 | 99.85  |
| 194-2, core       | 55.70            | 27.91                          | 0.14 | 9.92  | 5.99              | 0.11             | 0.00             | 0.00 | 99.77  |
| 194-2, mid-point  | 56.42            | 27.66                          | 0.39 | 9.71  | 6.13              | 0.17             | 0.00             | 0.00 | 100.47 |
| 194-2, rim        | 57.11            | 27.41                          | 0.19 | 9.06  | 6.27              | 0.20             | 0.00             | 0.00 | 100.23 |
| 208-1, core       | 57.84            | 26.72                          | 0.25 | 8.36  | 6.67              | 0.22             | 0.00             | 0.00 | 100.07 |
| 208-1, mid-point  | 57.50            | 26.77                          | 0.27 | 8.57  | 6.48              | 0.33             | 0.00             | 0.00 | 100.02 |
| 317-1, core A     | 56.61            | 27.75                          | 0.48 | 9.39  | 6.04              | 0.27             | 0.00             | 0.00 | 100.54 |
| 317-1, core B     | 56.36            | 27.32                          | 0.43 | 9.55  | 5.97              | 0.22             | 0.00             | 0.00 | 99.86  |
| 372A-3, core      | 56.11            | 27.38                          | 0.21 | 9.06  | 6.32              | 0.18             | 0.00             | 0.00 | 99.26  |
| 372A-3, mid-point | 59.88            | 25.44                          | 0.21 | 6.89  | 7.43              | 0.34             | 0.00             | 0.00 | 100.19 |
| 372A-3, rim       | 60.24            | 24.56                          | 0.13 | 5.78  | 8.03              | 0.38             | 0.00             | 0.00 | 99.11  |
| 377-1, core       | 59.79            | 24.59                          | 0.13 | 6.28  | 7.65              | 0.37             | 0.00             | 0.39 | 99.19  |
| 377-1, step out   | 61.27            | 23.68                          | 0.04 | 5.26  | 8.22              | 0.48             | 0.00             | 0.41 | 99.36  |
| 377-1, step out   | 62.10            | 22.64                          | 0.15 | 4.05  | 8.89              | 0.44             | 0.00             | 0.35 | 98.64  |
| 377-1, step out   | 61.58            | 23.75                          | 0.14 | 5.12  | 8.48              | 0.20             | 0.00             | 0.37 | 99.64  |
| 377-1, rim        | 65.36            | 21.29                          | 0.21 | 2.25  | 10.07             | 0.37             | 0.00             | 0.25 | 99.79  |
| 642a-1, core      | 60.60            | 24.29                          | 0.00 | 5.75  | 8.00              | 0.27             | 0.00             | 0.30 | 99.20  |
| 642a-1, mid-point | 63.77            | 22.52                          | 0.07 | 3.59  | 9.43              | 0.20             | 0.00             | 0.25 | 99.82  |
| 642a-1, rim       | 64.12            | 22.55                          | 0.04 | 3.65  | 9.43              | 0.17             | 0.00             | 0.21 | 100.16 |
| 681-1, rim        | 56.63            | 26.69                          | 0.16 | 9.04  | 6.19              | 0.28             | 0.00             | 0.29 | 99.29  |
| 681a-1, step in   | 56.33            | 26.91                          | 0.16 | 9.45  | 6.00              | 0.21             | 0.00             | 0.28 | 99.34  |
| 681a-1, step in   | 56.20            | 26.47                          | 0.16 | 8.83  | 6.29              | 0.14             | 0.00             | 0.28 | 98.37  |
| 681a-1, step in   | 56.99            | 26.63                          | 0.18 | 9.04  | 6.07              | 0.22             | 0.00             | 0.31 | 99.44  |
| 681a-1, core      | 55.93            | 27.40                          | 0.19 | 9.71  | 5.82              | 0.25             | 0.00             | 0.29 | 99.60  |
| 681a-4, core      | 65.00            | 27.75                          | 0.09 | 10.20 | 5.54              | 0.00             | 0.00             | 0.31 | 98.89  |
| 681a-4, mid-point | 57.20            | 26.37                          | 0.11 | 8.92  | 6.32              | 0.18             | 0.00             | 0.34 | 99.43  |
| 681a-4, rim       | 55.72            | 27.32                          | 0.18 | 9.66  | 5.78              | 0.18             | 0.00             | 0.29 | 99.13  |
| 681a gm 2         | 56.36            | 26.95                          | 0.16 | 9.36  | 6.12              | 0.16             | 0.00             | 0.31 | 99.40  |
| 681a gm 3         | 56.72            | 26.61                          | 0.11 | 9.07  | 6.14              | 0.14             | 0.00             | 0.28 | 99.07  |
| 687-1, rim        | 58.08            | 26.37                          | 0.15 | 8.18  | 6.62              | 0.19             | 0.00             | 0.30 | 99.69  |
| 687-1, mid-point  | 57.63            | 26.46                          | 0.13 | 8.62  | 6.44              | 0.22             | 0.00             | 0.32 | 99.82  |
| 687-1, core       | 56.70            | 26.38                          | 0.20 | 8.75  | 6.46              | 0.29             | 0.00             | 0.28 | 99.05  |
| 687-3, core       | 55.73            | 27.69                          | 0.17 | 9.66  | 5.68              | 0.21             | 0.00             | 0.31 | 99.45  |
| 687-3, step out   | 55.66            | 27.82                          | 0.19 | 10.04 | 5.60              | 0.20             | 0.00             | 0.27 | 99.77  |
| 687-3, step out   | 56.96            | 26.68                          | 0.17 | 8.96  | 6.28              | 0.20             | 0.00             | 0.31 | 99.57  |
| 687-3, rim        | 59.03            | 25.25                          | 0.14 | 7.09  | 7.43              | 0.28             | 0.00             | 0.29 | 99.50  |
| 777b-2, core      | 55.21            | 27.73                          | 0.10 | 10.17 | 5.53              | 0.13             | 0.00             | 0.34 | 99.20  |
| 777b-2, rim       | 56.09            | 27.45                          | 0.08 | 9.67  | 5.80              | 0.07             | 0.00             | 0.30 | 99.46  |
| 639-1A            | 50.27            | 31.56                          | 0.12 | 14.42 | 3.04              | 0.07             | 0.00             | 0.28 | 99.75  |
| 639-1B            | 56.08            | 28.02                          | 0.10 | 9.95  | 5.56              | 0.07             | 0.00             | 0.29 | 100.06 |
| 639-1C            | 52.56            | 30.21                          | 0.08 | 12.41 | 4.11              | 0.08             | 0.00             | 0.31 | 99.75  |
| 639-4, ave.       | 55.59            | 28.09                          | 0.08 | 10.38 | 5.59              | 0.15             | 0.00             | 0.27 | 100.14 |
| 638-1, ave.       | 58.88            | 25.88                          | 0.05 | 7.86  | 6.90              | 0.33             | 0.00             | 0.11 | 100.01 |

TABLE 7. R-061700-055

| Sample            | Si    | Al    | Fe    | Ca    | Na    | K     | Ti    | Sp    | TOTL  |
|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 164-2, rim        | 2.459 | 1.537 | 0.016 | 0.511 | 0.481 | 0.017 | 0.000 | 0.000 | 5.000 |
| 236A-1, core      | 2.323 | 1.659 | 0.006 | 0.697 | 0.314 | 0.009 | 0.000 | 0.000 | 5.000 |
| 236A-1, mid-point | 2.545 | 1.449 | 0.009 | 0.451 | 0.535 | 0.018 | 0.000 | 0.000 | 5.007 |
| 236A-1, rim       | 2.457 | 1.537 | 0.016 | 0.536 | 0.449 | 0.011 | 0.000 | 0.000 | 5.005 |
| 30-1, core        | 2.484 | 1.499 | 0.011 | 0.539 | 0.450 | 0.015 | 0.000 | 0.000 | 4.999 |
| 30-1, rim         | 2.557 | 1.434 | 0.005 | 0.449 | 0.563 | 0.015 | 0.000 | 0.000 | 5.015 |
| 32-2, core        | 2.445 | 1.563 | 0.003 | 0.539 | 0.433 | 0.012 | 0.000 | 0.000 | 4.996 |
| 32-2, rim         | 2.575 | 1.426 | 0.004 | 0.425 | 0.542 | 0.017 | 0.000 | 0.000 | 4.990 |
| 111-1, core       | 2.409 | 1.596 | 0.007 | 0.564 | 0.416 | 0.017 | 0.000 | 0.000 | 5.009 |
| 111-1, mid-point  | 2.450 | 1.541 | 0.005 | 0.543 | 0.430 | 0.016 | 0.000 | 0.000 | 4.996 |
| 111-1, rim        | 2.331 | 1.659 | 0.005 | 0.656 | 0.336 | 0.010 | 0.000 | 0.000 | 5.007 |
| 194-2, core       | 2.512 | 1.484 | 0.005 | 0.479 | 0.524 | 0.006 | 0.000 | 0.000 | 5.011 |
| 194-2, mid-point  | 2.529 | 1.461 | 0.015 | 0.466 | 0.533 | 0.009 | 0.000 | 0.000 | 5.012 |
| 194-2, rim        | 2.556 | 1.446 | 0.007 | 0.434 | 0.544 | 0.012 | 0.000 | 0.000 | 4.999 |
| 208-1, core       | 2.589 | 1.410 | 0.009 | 0.401 | 0.579 | 0.013 | 0.000 | 0.000 | 5.000 |
| 208-1, mid-point  | 2.503 | 1.414 | 0.010 | 0.412 | 0.563 | 0.019 | 0.000 | 0.000 | 5.001 |
| 317-1, core A     | 2.533 | 1.464 | 0.018 | 0.450 | 0.524 | 0.019 | 0.000 | 0.000 | 5.005 |
| 317-1, core B     | 2.540 | 1.451 | 0.016 | 0.461 | 0.521 | 0.013 | 0.000 | 0.000 | 5.000 |
| 372A-3, core      | 2.540 | 1.461 | 0.008 | 0.439 | 0.554 | 0.010 | 0.000 | 0.000 | 5.010 |
| 372A-3, mid-point | 2.665 | 1.335 | 0.000 | 0.339 | 0.641 | 0.019 | 0.000 | 0.000 | 4.997 |
| 372A-3, rim       | 2.704 | 1.299 | 0.005 | 0.278 | 0.699 | 0.022 | 0.000 | 0.000 | 5.007 |
| 377-1, core       | 2.690 | 1.383 | 0.004 | 0.302 | 0.667 | 0.020 | 0.000 | 0.000 | 4.994 |
| 377-1, step out   | 2.744 | 1.250 | 0.001 | 0.252 | 0.713 | 0.026 | 0.000 | 0.010 | 4.996 |
| 377-1, step out   | 2.792 | 1.200 | 0.005 | 0.195 | 0.774 | 0.025 | 0.000 | 0.009 | 5.000 |
| 377-1, step out   | 2.747 | 1.248 | 0.004 | 0.243 | 0.732 | 0.010 | 0.000 | 0.009 | 4.993 |
| 377-1, rim        | 2.886 | 1.108 | 0.007 | 0.106 | 0.861 | 0.021 | 0.000 | 0.005 | 4.994 |
| 642a-1, core      | 2.716 | 1.282 | 0.000 | 0.276 | 0.694 | 0.014 | 0.000 | 0.006 | 4.989 |
| 642a-1, mid-point | 2.824 | 1.175 | 0.001 | 0.169 | 0.808 | 0.010 | 0.000 | 0.005 | 4.992 |
| 642a-1, rim       | 2.825 | 1.170 | 0.001 | 0.172 | 0.805 | 0.009 | 0.000 | 0.005 | 4.987 |
| 681-1, rim        | 2.565 | 1.425 | 0.005 | 0.438 | 0.543 | 0.016 | 0.000 | 0.006 | 4.999 |
| 681a-1, step in   | 2.550 | 1.437 | 0.005 | 0.457 | 0.526 | 0.012 | 0.000 | 0.006 | 4.990 |
| 681a-1, step in   | 2.565 | 1.424 | 0.005 | 0.431 | 0.556 | 0.008 | 0.000 | 0.006 | 4.995 |
| 681a-1, step in   | 2.574 | 1.417 | 0.006 | 0.437 | 0.530 | 0.012 | 0.000 | 0.008 | 4.983 |
| 681a-1, core      | 2.530 | 1.460 | 0.006 | 0.470 | 0.510 | 0.014 | 0.000 | 0.006 | 4.997 |
| 681a-4, core      | 2.506 | 1.490 | 0.002 | 0.497 | 0.489 | 0.000 | 0.000 | 0.008 | 4.990 |
| 681a-4, mid-point | 2.582 | 1.403 | 0.004 | 0.430 | 0.552 | 0.009 | 0.000 | 0.008 | 4.987 |
| 681a-4, rim       | 2.529 | 1.461 | 0.006 | 0.469 | 0.509 | 0.009 | 0.000 | 0.006 | 4.990 |
| 681a gm 2         | 2.551 | 1.438 | 0.005 | 0.453 | 0.537 | 0.008 | 0.000 | 0.008 | 4.999 |
| 681a gm 3         | 2.569 | 1.419 | 0.004 | 0.440 | 0.538 | 0.006 | 0.000 | 0.006 | 4.985 |
| 687-1, rim        | 2.604 | 1.393 | 0.005 | 0.392 | 0.575 | 0.010 | 0.000 | 0.006 | 4.984 |
| 687-1, mid-point  | 2.590 | 1.402 | 0.004 | 0.414 | 0.560 | 0.012 | 0.000 | 0.008 | 4.989 |
| 687-1, core       | 2.574 | 1.411 | 0.006 | 0.425 | 0.557 | 0.015 | 0.000 | 0.006 | 5.005 |
| 687-3, core       | 2.522 | 1.477 | 0.005 | 0.467 | 0.498 | 0.012 | 0.000 | 0.008 | 4.988 |
| 687-3, step out   | 2.512 | 1.479 | 0.006 | 0.484 | 0.488 | 0.010 | 0.000 | 0.006 | 4.987 |
| 687-3, step out   | 2.570 | 1.418 | 0.005 | 0.433 | 0.548 | 0.010 | 0.000 | 0.008 | 4.990 |
| 687-3, rim        | 2.653 | 1.337 | 0.005 | 0.341 | 0.646 | 0.016 | 0.000 | 0.006 | 5.004 |
| 777b-2, core      | 2.507 | ***** | 0.000 | 0.494 | 0.486 | 0.006 | 0.000 | 0.008 | 4.980 |
| 777b-2, rim       | 2.535 | 1.461 | 0.002 | 0.468 | 0.508 | 0.004 | 0.000 | 0.006 | 4.984 |
| 639-10            | 2.296 | 1.698 | 0.004 | 0.705 | 0.260 | 0.004 | 0.000 | 0.006 | 4.981 |
| 639-18            | 2.518 | 1.482 | 0.002 | 0.478 | 0.483 | 0.014 | 0.000 | 0.006 | 4.975 |
| 639-10            | 2.386 | 1.616 | 0.002 | 0.603 | 0.361 | 0.004 | 0.000 | 0.008 | 4.979 |
| 639-4, ave.       | 2.502 | 1.490 | 0.002 | 0.499 | 0.487 | 0.008 | 0.000 | 0.006 | 4.996 |
| 638-1, ave.       | 2.631 | 1.363 | 0.001 | 0.376 | 0.598 | 0.018 | 0.000 | 0.002 | 4.989 |

TABLE 7. PLAGIOCLASE

| Sample            | SiO <sub>2</sub> | Al <sub>2</sub> O <sub>3</sub> | FeO  | CaO   | Na <sub>2</sub> O | K <sub>2</sub> O | TiO <sub>2</sub> | SiO  | TOTAL  |
|-------------------|------------------|--------------------------------|------|-------|-------------------|------------------|------------------|------|--------|
| 638-2, ave.       | 59.61            | 25.27                          | 0.05 | 6.93  | 7.50              | 0.26             | 0.04             | 0.06 | 99.73  |
| s186-4, rim       | 55.53            | 27.85                          | 0.01 | 9.30  | 5.04              | 0.04             | 0.00             | 0.11 | 100.57 |
| s186-4, step in   | 54.95            | 28.60                          | 0.02 | 11.00 | 5.23              | 0.04             | 0.07             | 0.31 | 100.21 |
| s186-4, step in   | 55.80            | 28.32                          | 0.05 | 10.57 | 5.75              | 0.07             | 0.00             | 0.00 | 100.56 |
| s186-4, step in   | 53.64            | 29.65                          | 0.01 | 12.12 | 4.65              | 0.07             | 0.03             | 0.45 | 100.61 |
| s186-4, step in   | 53.78            | 29.99                          | 0.00 | 12.27 | 4.55              | 0.05             | 0.01             | 0.00 | 100.75 |
| s186-4, core      | 54.92            | 28.55                          | 0.00 | 10.98 | 5.36              | 0.07             | 0.02             | 0.16 | 100.16 |
| s117-1, core      | 54.37            | 28.85                          | 0.04 | 11.14 | 5.16              | 0.13             | 0.05             | 0.21 | 99.95  |
| s117-1, step out  | 56.90            | 27.34                          | 0.04 | 9.27  | 6.07              | 0.17             | 0.04             | 0.08 | 99.91  |
| s117-1, step out  | 57.48            | 26.45                          | 0.04 | 7.96  | 6.75              | 0.21             | 0.05             | 0.27 | 99.21  |
| s117-1, rim       | 59.01            | 26.48                          | 0.05 | 7.68  | 6.84              | 0.17             | 0.02             | 0.00 | 100.25 |
| s117-3, core      | 53.50            | 29.51                          | 0.01 | 11.43 | 4.54              | 0.13             | 0.04             | 0.15 | 99.43  |
| s117-3, mid-point | 55.91            | 27.64                          | 0.03 | 9.79  | 5.93              | 0.15             | 0.04             | 0.18 | 99.88  |
| s117-3, rim       | 57.81            | 26.30                          | 0.04 | 7.68  | 6.80              | 0.12             | 0.00             | 0.00 | 98.75  |
| 645a-1, ave.      | 53.82            | 29.52                          | 0.11 | 11.44 | 4.52              | 0.21             | 0.01             | 0.02 | 99.65  |
| 645a-2, ave.      | 54.18            | 29.35                          | 0.12 | 11.00 | 4.71              | 0.21             | 0.05             | 0.00 | 99.63  |
| 681b-3, core      | 55.55            | 28.72                          | 0.10 | 10.39 | 5.45              | 0.07             | 0.00             | 0.22 | 100.26 |
| 681b-3, step out  | 55.47            | 28.36                          | 0.14 | 10.24 | 5.55              | 0.09             | 0.00             | 0.00 | 99.84  |
| 681b-3, step out  | 55.73            | 28.15                          | 0.11 | 10.00 | 5.56              | 0.10             | 0.00             | 0.00 | 99.65  |
| 681b-3, rim       | 56.38            | 27.30                          | 0.17 | 9.11  | 6.09              | 0.18             | 0.00             | 0.00 | 99.23  |
| 681b gm ave.      | 57.20            | 26.99                          | 0.19 | 8.76  | 6.38              | 0.17             | 0.02             | 0.08 | 99.77  |
| 686b-1, core      | 48.35            | 32.94                          | 0.14 | 15.82 | 2.35              | 0.08             | 0.00             | 0.22 | 99.90  |
| 686b-1, outer cor | 50.99            | 27.43                          | 0.14 | 9.13  | 6.27              | 0.17             | 0.00             | 0.14 | 100.26 |
| 686b-1, near rim  | 55.33            | 27.71                          | 0.05 | 9.46  | 6.07              | 0.18             | 0.04             | 0.00 | 99.77  |
| 686b-3, core      | 51.58            | 30.81                          | 0.18 | 13.25 | 3.75              | 0.09             | 0.00             | 0.06 | 99.73  |
| 686b-3, mid-point | 55.86            | 27.88                          | 0.13 | 9.41  | 5.88              | 0.19             | 0.04             | 0.17 | 99.57  |
| 686b-3, rim       | 57.29            | 26.69                          | 0.16 | 8.55  | 6.34              | 0.21             | 0.05             | 0.18 | 99.68  |
| 686e-1, core      | 55.34            | 29.19                          | 0.15 | 10.25 | 5.31              | 0.15             | 0.02             | 0.05 | 99.46  |
| 686e-1, step out  | 55.99            | 27.35                          | 0.14 | 9.61  | 5.85              | 0.16             | 0.03             | 0.10 | 99.23  |
| 686e-1, step out  | 55.99            | 27.61                          | 0.16 | 9.73  | 5.55              | 0.17             | 0.04             | 0.11 | 99.38  |
| 686e-1, step out  | 57.87            | 27.91                          | 0.15 | 9.30  | 5.79              | 0.22             | 0.00             | 0.15 | 100.59 |
| 686e-1, rim       | 57.40            | 27.23                          | 0.14 | 8.83  | 6.14              | 0.23             | 0.05             | 0.18 | 100.21 |
| 686e gm 2, rim    | 58.86            | 26.04                          | 0.18 | 7.31  | 6.84              | 0.29             | 0.00             | 0.31 | 99.84  |
| 686e gm 3, core   | 56.48            | 27.55                          | 0.14 | 9.13  | 5.95              | 0.21             | 0.02             | 0.12 | 99.60  |
| 775a-3, core      | 48.57            | 32.93                          | 0.11 | 15.43 | 2.49              | 0.02             | 0.00             | 0.00 | 99.55  |
| 775a-3, mid-point | 54.20            | 28.89                          | 0.04 | 10.67 | 5.10              | 0.06             | 0.00             | 0.04 | 99.01  |
| 775a-3, rim       | 49.07            | 32.89                          | 0.10 | 15.20 | 2.62              | 0.05             | 0.04             | 0.30 | 100.29 |
| 775a gm, ave.     | 55.76            | 28.52                          | 0.13 | 10.02 | 5.45              | 0.07             | 0.01             | 0.04 | 100.00 |
| 293-1, ave.       | 55.60            | 28.01                          | 0.04 | 9.86  | 5.55              | 0.11             | 0.01             | 0.10 | 99.27  |
| 293-3, ave.       | 56.71            | 27.28                          | 0.05 | 8.86  | 6.04              | 0.14             | 0.00             | 0.00 | 99.08  |
| 776-1, ave.       | 49.17            | 33.05                          | 0.10 | 15.00 | 2.54              | 0.02             | 0.03             | 0.13 | 100.13 |
| 776 gm, ave.      | 50.48            | 32.21                          | 0.11 | 14.35 | 3.17              | 0.01             | 0.03             | 0.02 | 100.38 |
| 771-2, core       | 54.32            | 28.84                          | 0.04 | 10.95 | 5.16              | 0.04             | 0.00             | 0.07 | 99.42  |
| 771-2, rim        | 55.21            | 28.52                          | 0.08 | 10.07 | 5.40              | 0.05             | 0.00             | 0.04 | 99.38  |
| s11v-2, core      | 56.67            | 27.59                          | 0.04 | 9.43  | 5.67              | 0.21             | 0.00             | 0.09 | 99.70  |
| s11v-3, rim       | 57.19            | 27.30                          | 0.07 | 9.70  | 6.30              | 0.11             | 0.00             | 0.07 | 99.74  |
| s134-1, rim       | 57.93            | 26.26                          | 0.12 | 7.94  | 6.71              | 0.26             | 0.05             | 0.16 | 99.43  |
| s134-1, step in   | 58.33            | 26.56                          | 0.09 | 8.05  | 6.66              | 0.28             | 0.04             | 0.25 | 100.25 |
| s134-1, step in   | 56.38            | 27.76                          | 0.11 | 9.10  | 5.96              | 0.24             | 0.00             | 0.25 | 99.80  |
| s134-1, core      | 54.28            | 28.58                          | 0.25 | 10.35 | 5.35              | 0.23             | 0.02             | 0.23 | 99.28  |
| 214b-1, ave.      | 47.05            | 33.72                          | 0.18 | 17.11 | 1.79              | 0.11             | 0.00             | 0.02 | 99.98  |
| 214b-2, ave.      | 46.65            | 32.87                          | 0.18 | 17.23 | 1.68              | 0.05             | 0.07             | 0.11 | 99.84  |
| 214b-3, ave.      | 47.54            | 33.43                          | 0.14 | 16.65 | 2.06              | 0.02             | 0.01             | 0.06 | 99.90  |

TABLE 7. PLAGIOCLASE

| Sample             | Si    | Al    | Fe    | Ca    | Na    | K     | Ti    | Sm    | TOTAL |
|--------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 638-2, ave.        | 2.662 | 1.330 | 0.001 | 0.332 | 0.648 | 0.014 | 0.001 | 0.001 | 4.999 |
| 6186-4, rim        | 2.532 | 1.465 | 0.020 | 0.473 | 0.523 | 0.001 | 0.000 | 0.002 | 4.995 |
| 6186-4, step in    | 2.474 | 1.517 | 0.000 | 0.530 | 0.456 | 0.001 | 0.001 | 0.005 | 4.986 |
| 6186-4, step in    | 2.498 | 1.492 | 0.001 | 0.525 | 0.498 | 0.004 | 0.000 | 0.000 | 4.995 |
| 6186-4, step in    | 2.417 | 1.575 | 0.000 | 0.584 | 0.406 | 0.004 | 0.000 | 0.000 | 4.996 |
| 6186-4, step in    | 2.413 | 1.585 | 0.000 | 0.589 | 0.404 | 0.002 | 0.000 | 0.000 | 4.993 |
| 6186-4, core       | 2.471 | 1.520 | 0.000 | 0.529 | 0.467 | 0.004 | 0.000 | 0.004 | 4.995 |
| 6117-1, core       | 2.456 | 1.535 | 0.001 | 0.538 | 0.452 | 0.006 | 0.001 | 0.005 | 4.994 |
| 6117-1, step out   | 2.552 | 1.445 | 0.001 | 0.445 | 0.527 | 0.009 | 0.001 | 0.001 | 4.980 |
| 6117-1, step out   | 2.593 | 1.406 | 0.001 | 0.384 | 0.592 | 0.012 | 0.001 | 0.005 | 4.993 |
| 6117-1, rim        | 2.624 | 1.387 | 0.001 | 0.365 | 0.589 | 0.009 | 0.000 | 0.000 | 4.975 |
| 6117-3, core       | 2.428 | 1.577 | 0.000 | 0.555 | 0.427 | 0.005 | 0.001 | 0.004 | 4.979 |
| 6117-3, mid-point  | 2.517 | 1.477 | 0.000 | 0.472 | 0.519 | 0.008 | 0.001 | 0.004 | 4.996 |
| 6117-3, rim        | 2.612 | 1.400 | 0.001 | 0.371 | 0.595 | 0.006 | 0.000 | 0.000 | 4.985 |
| 645a-1, ave.       | 2.436 | 1.574 | 0.004 | 0.554 | 0.396 | 0.013 | 0.000 | 0.000 | 4.974 |
| 645a-2, ave.       | 2.448 | 1.563 | 0.004 | 0.532 | 0.412 | 0.012 | 0.001 | 0.000 | 4.971 |
| 681b-3, core       | 2.488 | 1.515 | 0.002 | 0.499 | 0.473 | 0.004 | 0.000 | 0.005 | 4.985 |
| 681b-3, step out   | 2.498 | 1.505 | 0.004 | 0.493 | 0.483 | 0.004 | 0.000 | 0.000 | 4.986 |
| 681b-3, step out   | 2.510 | 1.494 | 0.004 | 0.482 | 0.485 | 0.005 | 0.000 | 0.000 | 4.982 |
| 681b-3, rim        | 2.549 | 1.464 | 0.005 | 0.440 | 0.533 | 0.009 | 0.000 | 0.000 | 4.991 |
| 681b gm ave.       | 2.569 | 1.429 | 0.006 | 0.420 | 0.555 | 0.009 | 0.000 | 0.001 | 4.989 |
| 686a-1, core       | 2.216 | 1.779 | 0.004 | 0.776 | 0.228 | 0.004 | 0.000 | 0.005 | 4.993 |
| 686a-1, outer core | 2.553 | 1.447 | 0.005 | 0.438 | 0.544 | 0.009 | 0.000 | 0.002 | 4.996 |
| 686a-1, near rim   | 2.532 | 1.458 | 0.001 | 0.455 | 0.527 | 0.003 | 0.001 | 0.000 | 4.999 |
| 686b-3, core       | 2.347 | 1.551 | 0.006 | 0.546 | 0.331 | 0.005 | 0.000 | 0.001 | 4.968 |
| 686a-3, mid-point  | 2.521 | 1.483 | 0.004 | 0.454 | 0.514 | 0.010 | 0.001 | 0.004 | 4.991 |
| 686b-3, rim        | 2.576 | 1.425 | 0.005 | 0.412 | 0.551 | 0.012 | 0.001 | 0.004 | 4.985 |
| 686e-1, core       | 2.503 | 1.502 | 0.005 | 0.596 | 0.464 | 0.008 | 0.000 | 0.001 | 4.979 |
| 686e-1, step out   | 2.537 | 1.459 | 0.004 | 0.456 | 0.513 | 0.009 | 0.000 | 0.001 | 4.968 |
| 686e-1, step out   | 2.529 | 1.470 | 0.005 | 0.470 | 0.485 | 0.009 | 0.001 | 0.002 | 4.972 |
| 686e-1, step out   | 2.542 | 1.465 | 0.005 | 0.443 | 0.499 | 0.012 | 0.000 | 0.004 | 4.970 |
| 686e-1, rim        | 2.567 | 1.435 | 0.005 | 0.422 | 0.533 | 0.013 | 0.001 | 0.004 | 4.978 |
| 686e gm 2, rim     | 2.634 | 1.372 | 0.006 | 0.349 | 0.593 | 0.016 | 0.000 | 0.008 | 4.979 |
| 686e gm 3, core    | 2.544 | 1.461 | 0.004 | 0.440 | 0.519 | 0.012 | 0.000 | 0.002 | 4.982 |
| 775a-3, core       | 2.236 | 1.779 | 0.004 | 0.757 | 0.220 | 0.000 | 0.000 | 0.000 | 4.966 |
| 775a-3, mid-point  | 2.463 | 1.547 | 0.001 | 0.519 | 0.449 | 0.002 | 0.000 | 0.000 | 4.981 |
| 775a-3, rim        | 2.235 | 1.766 | 0.002 | 0.742 | 0.231 | 0.002 | 0.001 | 0.006 | 4.986 |
| 775a gm, ave.      | 2.504 | 1.509 | 0.004 | 0.482 | 0.473 | 0.002 | 0.000 | 0.000 | 4.974 |
| 293-1, ave.        | 2.514 | 1.492 | 0.001 | 0.478 | 0.485 | 0.005 | 0.000 | 0.002 | 4.977 |
| 293-3, ave.        | 2.560 | 1.450 | 0.001 | 0.428 | 0.527 | 0.006 | 0.000 | 0.000 | 4.972 |
| 776-1, ave.        | 2.241 | 1.774 | 0.002 | 0.731 | 0.232 | 0.000 | 0.000 | 0.002 | 4.983 |
| 776 gm, ave.       | 2.288 | 1.720 | 0.004 | 0.695 | 0.278 | 0.000 | 0.000 | 0.000 | 4.984 |
| 771-2, core        | 2.451 | 1.540 | 0.001 | 0.530 | 0.453 | 0.001 | 0.000 | 0.001 | 4.987 |
| 771-2, rim         | 2.496 | 1.519 | 0.002 | 0.485 | 0.472 | 0.002 | 0.000 | 0.000 | 4.977 |
| 611v-3, core       | 2.545 | 1.461 | 0.001 | 0.454 | 0.493 | 0.012 | 0.000 | 0.001 | 4.968 |
| 611v-3, rim        | 2.566 | 1.443 | 0.001 | 0.417 | 0.547 | 0.005 | 0.000 | 0.001 | 4.980 |
| 6134-1, rim        | 2.606 | 1.392 | 0.004 | 0.383 | 0.584 | 0.014 | 0.001 | 0.004 | 4.980 |
| 6134-1, step in    | 2.505 | 1.396 | 0.002 | 0.384 | 0.576 | 0.016 | 0.001 | 0.005 | 4.985 |
| 6134-1, step in    | 2.536 | 1.472 | 0.004 | 0.438 | 0.519 | 0.013 | 0.000 | 0.005 | 4.986 |
| 6134-1, core       | 2.469 | 1.532 | 0.009 | 0.524 | 0.471 | 0.013 | 0.000 | 0.005 | 5.003 |
| 214b-1, ave.       | 2.162 | 1.826 | 0.006 | 0.842 | 0.159 | 0.005 | 0.000 | 0.000 | 5.001 |
| 214b-2, ave.       | 2.149 | 1.838 | 0.006 | 0.850 | 0.150 | 0.002 | 0.001 | 0.002 | 4.999 |
| 214b-3, ave.       | 2.184 | 1.809 | 0.005 | 0.818 | 0.163 | 0.000 | 0.000 | 0.001 | 5.000 |

TABLE 7. PLAGIOCLASE

| Sample           | SiO <sub>2</sub> | Al <sub>2</sub> O <sub>3</sub> | FaO  | CaO   | Na <sub>2</sub> O | K <sub>2</sub> O | TiO <sub>2</sub> | SiO <sub>2</sub> | TOTAL  |
|------------------|------------------|--------------------------------|------|-------|-------------------|------------------|------------------|------------------|--------|
| 133-1, ave.      | 54.76            | 28.29                          | 0.17 | 10.56 | 5.12              | 0.29             | 0.00             | 0.10             | 99.38  |
| 133-2, ave.      | 54.85            | 28.26                          | 0.17 | 10.45 | 5.22              | 0.29             | 0.00             | 0.08             | 99.32  |
| 133-3, ave.      | 55.59            | 28.11                          | 0.17 | 10.20 | 5.38              | 0.26             | 0.01             | 0.04             | 99.77  |
| 219a-1, ave.     | 54.92            | 28.78                          | 0.12 | 10.63 | 5.28              | 0.07             | 0.00             | 0.04             | 99.83  |
| 219a-3, ave.     | 55.31            | 28.36                          | 0.17 | 10.20 | 5.66              | 0.07             | 0.00             | 0.13             | 99.91  |
| 219a-4, core     | 47.41            | 34.29                          | 0.11 | 16.40 | 1.79              | 0.01             | 0.05             | 0.08             | 100.14 |
| 219a-4, step out | 54.82            | 29.33                          | 0.08 | 11.07 | 5.17              | 0.04             | 0.00             | 0.09             | 100.60 |
| 219a-4, step out | 54.15            | 29.74                          | 0.05 | 11.41 | 4.75              | 0.04             | 0.03             | 0.00             | 100.18 |
| 219a-4, rim      | 56.60            | 27.98                          | 0.14 | 9.31  | 5.99              | 0.08             | 0.07             | 0.00             | 100.15 |
| 179-1, ave.      | 54.53            | 29.11                          | 0.08 | 10.65 | 4.99              | 0.21             | 0.01             | 0.09             | 99.78  |
| 179-2, ave.      | 55.72            | 27.69                          | 0.08 | 9.73  | 5.77              | 0.29             | 0.00             | 0.10             | 99.37  |
| 179 gm, ave.     | 54.99            | 28.48                          | 0.07 | 10.76 | 5.14              | 0.29             | 0.01             | 0.05             | 99.80  |
| 119-1, ave.      | 55.90            | 27.98                          | 0.07 | 9.69  | 6.01              | 0.07             | 0.00             | 0.12             | 99.84  |
| 119-4, ave.      | 55.12            | 28.06                          | 0.05 | 9.47  | 6.14              | 0.07             | 0.03             | 0.05             | 99.99  |
| 7B-1, incl, gt   | 48.29            | 32.93                          | 0.15 | 16.31 | 2.15              | 0.03             | 0.02             | 0.13             | 99.80  |
| 7B-2, incl, gt   | 47.45            | 33.02                          | 0.11 | 16.51 | 1.88              | 0.03             | 0.00             | 0.03             | 99.03  |
| 7B-5, rim        | 53.14            | 29.91                          | 0.05 | 12.36 | 4.51              | 0.04             | 0.05             | 0.07             | 100.13 |
| 7B-5, core       | 54.91            | 28.36                          | 0.04 | 10.41 | 5.43              | 0.04             | 0.00             | 0.32             | 99.44  |

TABLE 7. PLASTOCASE

| Sample           | Si    | Al    | Fe    | Ca    | Na    | K     | Ti    | Sr    | TOTAL |
|------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 133-1, ave.      | 2.485 | 1.513 | 0.005 | 0.518 | 0.450 | 0.016 | 0.000 | 0.001 | 4.985 |
| 133-2, ave.      | 2.487 | 1.510 | 0.005 | 0.507 | 0.459 | 0.016 | 0.000 | 0.001 | 4.985 |
| 133-3, ave.      | 2.507 | 1.494 | 0.003 | 0.498 | 0.470 | 0.014 | 0.000 | 0.000 | 4.982 |
| 219a-1, ave.     | 2.477 | 1.532 | 0.004 | 0.513 | 0.460 | 0.002 | 0.000 | 0.000 | 4.987 |
| 219a-3, ave.     | 2.493 | 1.506 | 0.005 | 0.492 | 0.454 | 0.004 | 0.000 | 0.000 | 4.996 |
| 219a-4, core     | 2.167 | 1.846 | 0.004 | 0.802 | 0.157 | 0.000 | 0.001 | 0.001 | 4.977 |
| 219a-4, step out | 2.457 | 1.549 | 0.002 | 0.531 | 0.448 | 0.001 | 0.000 | 0.001 | 4.989 |
| 219a-4, step out | 2.436 | 1.575 | 0.001 | 0.549 | 0.415 | 0.001 | 0.000 | 0.000 | 4.978 |
| 219a-4, rim      | 2.532 | 1.474 | 0.004 | 0.446 | 0.518 | 0.004 | 0.001 | 0.000 | 4.979 |
| 179-1, ave.      | 2.465 | 1.547 | 0.002 | 0.518 | 0.435 | 0.012 | 0.000 | 0.001 | 4.977 |
| 179-2, ave.      | 2.521 | 1.476 | 0.002 | 0.471 | 0.506 | 0.015 | 0.000 | 0.001 | 4.994 |
| 179 gm, ave.     | 2.483 | 1.516 | 0.002 | 0.520 | 0.449 | 0.016 | 0.000 | 0.001 | 4.987 |
| 119-1, ave.      | 2.516 | 1.484 | 0.001 | 0.466 | 0.524 | 0.002 | 0.000 | 0.002 | 4.997 |
| 119-4, ave.      | 2.500 | 1.485 | 0.001 | 0.455 | 0.534 | 0.002 | 0.000 | 0.001 | 4.997 |
| 7B-1, incl,gt    | 2.216 | 1.780 | 0.005 | 0.792 | 0.159 | 0.001 | 0.000 | 0.002 | 4.986 |
| 7B-2, incl,gt    | 2.194 | 1.799 | 0.004 | 0.812 | 0.168 | 0.001 | 0.000 | 0.002 | 4.983 |
| 7B-5, rim        | 2.399 | 1.591 | 0.001 | 0.597 | 0.395 | 0.001 | 0.001 | 0.001 | 4.986 |
| 7B-5, core       | 2.487 | 1.509 | 0.001 | 0.505 | 0.479 | 0.001 | 0.000 | 0.000 | 4.990 |



TABLE 8.  
WCB K-feldspar

| SPL  | XTAL   | SiO2  | Al2O3 | FeO  | CaO  | Na2O | K2O   | SrO  | BaO  | ZnO  | TOTAL  |
|------|--------|-------|-------|------|------|------|-------|------|------|------|--------|
| 317  | KS1c   | 64.14 | 18.69 | 0.25 | 0.00 | 1.42 | 14.19 | 0.00 | 1.28 | 0.00 | 99.98  |
| 317  | KS1i   | 63.01 | 18.82 | 0.36 | 0.00 | 1.21 | 14.11 | 0.00 | 1.72 | 0.00 | 99.23  |
| 317  | KS1r   | 64.78 | 18.65 | 0.32 | 0.00 | 1.37 | 14.18 | 0.00 | 1.34 | 0.00 | 100.64 |
| 317  | KS2c   | 65.76 | 18.20 | 0.20 | 0.00 | 1.06 | 14.98 | 0.00 | 0.24 | 0.00 | 100.43 |
| 317  | KS2r   | 65.26 | 18.14 | 0.19 | 0.00 | 1.00 | 14.79 | 0.00 | 0.15 | 0.00 | 99.80  |
| 317  | ks1nav | 64.83 | 18.48 | 0.09 | 0.00 | 0.80 | 15.64 | 0.00 | 0.13 | 0.06 | 100.03 |
| 317  | ks2nav | 64.95 | 18.40 | 0.06 | 0.00 | 0.90 | 15.48 | 0.00 | 0.14 | 0.01 | 99.94  |
| 194  | KS1r   | 64.84 | 18.55 | 0.05 | 0.00 | 1.15 | 14.68 | 0.00 | 1.07 | 0.00 | 100.34 |
| 194  | KS1c   | 65.10 | 18.41 | 0.07 | 0.00 | 1.25 | 14.51 | 0.00 | 1.01 | 0.00 | 100.34 |
| 208  | KS1    | 65.24 | 18.14 | 0.28 | 0.00 | 0.82 | 15.18 | 0.00 | 0.41 | 0.00 | 100.06 |
| 372A | KS2    | 64.31 | 18.68 | 0.26 | 0.00 | 1.72 | 13.45 | 0.00 | 1.80 | 0.00 | 100.21 |
| 372A | ks1nav | 65.46 | 18.53 | 0.04 | 0.01 | 1.48 | 14.53 | 0.00 | 0.07 | 0.03 | 100.16 |
| 377  | ks1av  | 65.10 | 18.30 | 0.09 | 0.03 | 1.52 | 14.50 | 0.00 | 0.16 | 0.04 | 99.75  |
| 377  | ks2av  | 64.18 | 18.77 | 0.09 | 0.07 | 2.57 | 12.21 | 0.00 | 1.89 | 0.03 | 99.82  |
| 579  | ks1a   | 64.24 | 18.74 | 0.01 | 0.08 | 2.13 | 12.58 | 0.00 | 2.23 | 0.00 | 100.01 |
| 579  | ks1c   | 63.99 | 18.80 | 0.04 | 0.04 | 1.63 | 0.79  | 0.00 | 0.04 | 0.00 | 99.95  |
| 579  | ks1d   | 64.83 | 18.69 | 0.04 | 0.04 | 1.23 | 14.29 | 0.00 | 1.03 | 0.00 | 100.16 |
| 579  | ks1e   | 65.48 | 18.25 | 0.02 | 0.00 | 0.50 | 15.61 | 0.00 | 0.11 | 0.05 | 100.02 |
| 579  | ks1av  | 64.64 | 18.62 | 0.03 | 0.04 | 1.37 | 10.82 | 0.00 | 0.85 | 0.01 | 100.04 |
| 579  | ks2av  | 65.38 | 18.30 | 0.04 | 0.02 | 1.39 | 14.40 | 0.00 | 0.14 | 0.02 | 99.70  |
| 579  | ks3av  | 65.07 | 18.41 | 0.03 | 0.01 | 1.38 | 14.37 | 0.00 | 0.09 | 0.04 | 99.40  |
| 642A | ks1av  | 63.71 | 18.77 | 0.01 | 0.03 | 1.13 | 14.20 | 0.00 | 1.71 | 0.02 | 99.59  |
| 642A | ks2av  | 64.41 | 18.59 | 0.01 | 0.03 | 1.58 | 13.64 | 0.00 | 0.90 | 0.06 | 99.22  |
| 642A | ks3av  | 63.66 | 18.73 | 0.00 | 0.02 | 1.01 | 14.27 | 0.00 | 1.55 | 0.03 | 99.27  |
| 471  | ks1av  | 63.92 | 19.02 | 0.05 | 0.05 | 1.79 | 13.32 | 0.00 | 2.11 | 0.02 | 100.29 |
| 471  | ks2av  | 64.03 | 18.74 | 0.07 | 0.04 | 1.61 | 13.91 | 0.00 | 1.48 | 0.00 | 99.88  |
| 471  | ks3av  | 65.69 | 18.57 | 0.04 | 0.04 | 1.89 | 14.20 | 0.00 | 0.15 | 0.01 | 100.57 |
| 687  | ks1av  | 64.76 | 18.32 | 0.10 | 0.03 | 1.11 | 15.23 | 0.00 | 0.05 | 0.05 | 99.64  |
| 687  | ks2av  | 63.26 | 18.68 | 0.04 | 0.04 | 1.12 | 14.45 | 0.00 | 1.57 | 0.01 | 99.17  |
| 687  | ks3av  | 63.69 | 18.80 | 0.04 | 0.04 | 1.24 | 14.25 | 0.00 | 1.86 | 0.03 | 99.94  |

TABLE 8.

WCB K-feldspar

| SPL  | XTAL    | Si    | Al    | Fe    | Ca    | Na    | K     | Sr    | Ba    | Zn    | TOTAL |
|------|---------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 317  | KS1c    | 2.975 | 1.022 | 0.010 | 0.000 | 0.128 | 0.840 | 0.000 | 0.023 | 0.000 | 4.998 |
| 317  | KS1i    | 2.957 | 1.041 | 0.014 | 0.000 | 0.110 | 0.845 | 0.000 | 0.032 | 0.000 | 5.000 |
| 317  | KS1r    | 2.984 | 1.012 | 0.012 | 0.000 | 0.123 | 0.833 | 0.000 | 0.024 | 0.000 | 4.988 |
| 317  | KS2c    | 3.014 | 0.983 | 0.007 | 0.000 | 0.094 | 0.876 | 0.000 | 0.004 | 0.000 | 4.979 |
| 317  | KS2r    | 3.006 | 0.999 | 0.007 | 0.000 | 0.089 | 0.869 | 0.000 | 0.003 | 0.000 | 4.974 |
| 317  | ks1nav2 | 2.993 | 1.005 | 0.002 | 0.000 | 0.070 | 0.921 | 0.000 | 0.001 | 0.001 | 4.993 |
| 317  | ks2nav2 | 2.997 | 1.000 | 0.001 | 0.000 | 0.080 | 0.910 | 0.000 | 0.001 | 0.000 | 4.988 |
| 194  | KS1r    | 2.991 | 1.009 | 0.002 | 0.000 | 0.103 | 0.864 | 0.000 | 0.020 | 0.000 | 4.988 |
| 194  | KS1c    | 2.999 | 0.999 | 0.003 | 0.000 | 0.112 | 0.852 | 0.000 | 0.018 | 0.000 | 4.983 |
| 208  | KS1     | 3.010 | 0.986 | 0.011 | 0.000 | 0.073 | 0.893 | 0.000 | 0.007 | 0.000 | 4.980 |
| 372A | KS2     | 2.977 | 1.019 | 0.010 | 0.000 | 0.154 | 0.794 | 0.000 | 0.033 | 0.000 | 4.987 |
| 372A | ks1nav3 | 3.001 | 1.000 | 0.001 | 0.000 | 0.130 | 0.849 | 0.000 | 0.000 | 0.000 | 4.981 |
| 377  | ks1av   | 3.001 | 0.994 | 0.002 | 0.001 | 0.135 | 0.852 | 0.000 | 0.002 | 0.000 | 4.987 |
| 377  | ks2av   | 2.972 | 1.024 | 0.002 | 0.002 | 0.231 | 0.720 | 0.000 | 0.034 | 0.000 | 4.986 |
| 579  | ks1a    | 2.977 | 1.022 | 0.000 | 0.002 | 0.190 | 0.742 | 0.000 | 0.039 | 0.000 | 4.973 |
| 579  | ks1c    | 2.970 | 1.028 | 0.001 | 0.001 | 0.146 | 0.791 | 0.000 | 0.037 | 0.000 | 4.973 |
| 579  | ks1d    | 2.987 | 1.014 | 0.001 | 0.001 | 0.109 | 0.840 | 0.000 | 0.018 | 0.000 | 4.970 |
| 579  | ks1e    | 3.014 | 0.990 | 0.000 | 0.000 | 0.043 | 0.916 | 0.000 | 0.001 | 0.001 | 4.964 |
| 579  | ks1av   | 2.987 | 1.014 | 0.001 | 0.001 | 0.122 | 0.822 | 0.000 | 0.024 | 0.000 | 4.970 |
| 579  | ks2av   | 3.009 | 0.993 | 0.001 | 0.000 | 0.123 | 0.845 | 0.000 | 0.001 | 0.000 | 4.972 |
| 579  | ks3av   | 3.003 | 1.001 | 0.000 | 0.000 | 0.123 | 0.845 | 0.000 | 0.001 | 0.000 | 4.973 |
| 642A | ks1av   | 2.971 | 1.032 | 0.000 | 0.001 | 0.101 | 0.844 | 0.000 | 0.030 | 0.000 | 4.979 |
| 642A | ks2av   | 2.989 | 1.016 | 0.000 | 0.000 | 0.142 | 0.808 | 0.000 | 0.016 | 0.001 | 4.971 |
| 642A | ks3av   | 2.976 | 1.031 | 0.000 | 0.000 | 0.090 | 0.851 | 0.000 | 0.027 | 0.000 | 4.975 |
| 471  | ks1av   | 2.961 | 1.039 | 0.001 | 0.001 | 0.160 | 0.787 | 0.000 | 0.038 | 0.000 | 4.987 |
| 471  | ks2av   | 2.973 | 1.024 | 0.002 | 0.001 | 0.144 | 0.823 | 0.000 | 0.026 | 0.000 | 4.994 |
| 471  | ks3av   | 2.997 | 0.997 | 0.001 | 0.001 | 0.166 | 0.826 | 0.000 | 0.001 | 0.000 | 4.988 |
| 687  | ks1av   | 2.997 | 0.999 | 0.002 | 0.000 | 0.099 | 0.898 | 0.000 | 0.000 | 0.001 | 4.996 |
| 687  | ks2av   | 2.966 | 1.032 | 0.001 | 0.001 | 0.102 | 0.864 | 0.000 | 0.029 | 0.000 | 4.994 |
| 687  | ks3av   | 2.966 | 1.032 | 0.001 | 0.001 | 0.112 | 0.846 | 0.000 | 0.033 | 0.000 | 4.990 |

TABLE 8.  
WCB K-feldspar

| SPL  | XTAL   | SiO2  | Al2O3 | FeO  | CaO  | Na2O | K2O   | SrO  | BaO  | ZnO  | TOTAL  |
|------|--------|-------|-------|------|------|------|-------|------|------|------|--------|
| 317  | KS1c   | 64.14 | 18.69 | 0.25 | 0.00 | 1.42 | 14.19 | 0.00 | 1.28 | 0.00 | 99.98  |
| 317  | KS1i   | 63.01 | 18.82 | 0.36 | 0.00 | 1.21 | 14.11 | 0.00 | 1.72 | 0.00 | 99.23  |
| 317  | KS1r   | 64.78 | 18.65 | 0.32 | 0.00 | 1.37 | 14.18 | 0.00 | 1.34 | 0.00 | 100.64 |
| 317  | KS2c   | 65.76 | 18.20 | 0.20 | 0.00 | 1.06 | 14.98 | 0.00 | 0.24 | 0.00 | 100.43 |
| 317  | KS2r   | 65.26 | 18.14 | 0.19 | 0.00 | 1.00 | 14.79 | 0.00 | 0.15 | 0.00 | 99.80  |
| 317  | ks1nav | 64.83 | 18.48 | 0.09 | 0.00 | 0.80 | 15.64 | 0.00 | 0.13 | 0.06 | 100.03 |
| 317  | ks2nav | 64.95 | 18.40 | 0.06 | 0.00 | 0.90 | 15.48 | 0.00 | 0.14 | 0.01 | 99.94  |
| 194  | KS1r   | 64.84 | 18.55 | 0.05 | 0.00 | 1.15 | 14.68 | 0.00 | 1.07 | 0.00 | 100.34 |
| 194  | KS1c   | 65.10 | 18.41 | 0.07 | 0.00 | 1.25 | 14.51 | 0.00 | 1.01 | 0.00 | 100.34 |
| 208  | KS1    | 65.24 | 18.14 | 0.28 | 0.00 | 0.82 | 15.18 | 0.00 | 0.41 | 0.00 | 100.06 |
| 372A | KS2    | 64.31 | 18.68 | 0.26 | 0.00 | 1.72 | 13.45 | 0.00 | 1.80 | 0.00 | 100.21 |
| 372A | ks1nav | 65.46 | 18.53 | 0.04 | 0.01 | 1.48 | 14.53 | 0.00 | 0.07 | 0.03 | 100.16 |
| 377  | ks1av  | 65.10 | 18.30 | 0.09 | 0.03 | 1.52 | 14.50 | 0.00 | 0.16 | 0.04 | 99.75  |
| 377  | ks2av  | 64.18 | 18.77 | 0.09 | 0.07 | 2.57 | 12.21 | 0.00 | 1.89 | 0.03 | 99.82  |
| 579  | ks1a   | 64.24 | 18.74 | 0.01 | 0.08 | 2.13 | 12.58 | 0.00 | 2.23 | 0.00 | 100.01 |
| 579  | ks1c   | 63.99 | 18.80 | 0.04 | 0.04 | 1.63 | 0.79  | 0.00 | 0.04 | 0.00 | 99.95  |
| 579  | ks1d   | 64.83 | 18.69 | 0.04 | 0.04 | 1.23 | 14.29 | 0.00 | 1.03 | 0.00 | 100.16 |
| 579  | ks1e   | 65.48 | 18.25 | 0.02 | 0.00 | 0.50 | 15.61 | 0.00 | 0.11 | 0.05 | 100.02 |
| 579  | ks1av  | 64.64 | 18.62 | 0.03 | 0.04 | 1.37 | 10.82 | 0.00 | 0.85 | 0.01 | 100.04 |
| 579  | ks2av  | 65.38 | 18.30 | 0.04 | 0.02 | 1.39 | 14.40 | 0.00 | 0.14 | 0.02 | 99.70  |
| 579  | ks3av  | 65.07 | 18.41 | 0.03 | 0.01 | 1.38 | 14.37 | 0.00 | 0.09 | 0.04 | 99.40  |
| 642A | ks1av  | 63.71 | 18.77 | 0.01 | 0.03 | 1.13 | 14.20 | 0.00 | 1.71 | 0.02 | 99.59  |
| 642A | ks2av  | 64.41 | 18.59 | 0.01 | 0.03 | 1.58 | 13.64 | 0.00 | 0.90 | 0.06 | 99.22  |
| 642A | ks3av  | 63.66 | 18.73 | 0.00 | 0.02 | 1.01 | 14.27 | 0.00 | 1.55 | 0.03 | 99.27  |
| 471  | ks1av  | 63.92 | 19.02 | 0.05 | 0.05 | 1.79 | 13.32 | 0.00 | 2.11 | 0.02 | 100.29 |
| 471  | ks2av  | 64.03 | 18.74 | 0.07 | 0.04 | 1.61 | 13.91 | 0.00 | 1.48 | 0.00 | 99.88  |
| 471  | ks3av  | 65.69 | 18.57 | 0.04 | 0.04 | 1.89 | 14.20 | 0.00 | 0.15 | 0.01 | 100.57 |
| 687  | ks1av  | 64.76 | 18.32 | 0.10 | 0.03 | 1.11 | 15.23 | 0.00 | 0.05 | 0.05 | 99.64  |
| 687  | ks2av  | 63.26 | 18.68 | 0.04 | 0.04 | 1.12 | 14.45 | 0.00 | 1.57 | 0.01 | 99.17  |
| 687  | ks3av  | 63.69 | 18.80 | 0.04 | 0.04 | 1.24 | 14.25 | 0.00 | 1.86 | 0.03 | 99.94  |

TABLE 8.

WCB K-feldspar, *continued*

| SPL  | XTAL   | Si    | Al    | Fe    | Ca    | Na    | K     | Sr    | Ba    | Zn    | TOTAL |
|------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 317  | KS1c   | 2.975 | 1.022 | 0.010 | 0.000 | 0.128 | 0.840 | 0.000 | 0.023 | 0.000 | 4.998 |
| 317  | KS1i   | 2.957 | 1.041 | 0.014 | 0.000 | 0.110 | 0.845 | 0.000 | 0.032 | 0.000 | 5.000 |
| 317  | KS1r   | 2.984 | 1.012 | 0.012 | 0.000 | 0.123 | 0.833 | 0.000 | 0.024 | 0.000 | 4.988 |
| 317  | KS2c   | 3.014 | 0.983 | 0.007 | 0.000 | 0.094 | 0.876 | 0.000 | 0.004 | 0.000 | 4.979 |
| 317  | KS2r   | 3.006 | 0.999 | 0.007 | 0.000 | 0.089 | 0.869 | 0.000 | 0.003 | 0.000 | 4.974 |
| 317  | ks1nav | 2.993 | 1.005 | 0.002 | 0.000 | 0.070 | 0.921 | 0.000 | 0.001 | 0.001 | 4.993 |
| 317  | ks2nav | 2.997 | 1.000 | 0.001 | 0.000 | 0.080 | 0.910 | 0.000 | 0.001 | 0.000 | 4.988 |
| 194  | KS1r   | 2.991 | 1.009 | 0.002 | 0.000 | 0.103 | 0.864 | 0.000 | 0.020 | 0.000 | 4.988 |
| 194  | KS1c   | 2.999 | 0.999 | 0.003 | 0.000 | 0.112 | 0.852 | 0.000 | 0.018 | 0.000 | 4.983 |
| 208  | KS1    | 3.010 | 0.986 | 0.011 | 0.000 | 0.073 | 0.893 | 0.000 | 0.007 | 0.000 | 4.980 |
| 372A | KS2    | 2.977 | 1.019 | 0.010 | 0.000 | 0.154 | 0.794 | 0.000 | 0.033 | 0.000 | 4.987 |
| 372A | ks1nav | 3.001 | 1.000 | 0.001 | 0.000 | 0.130 | 0.849 | 0.000 | 0.000 | 0.000 | 4.981 |
| 377  | ks1av  | 3.001 | 0.994 | 0.002 | 0.001 | 0.135 | 0.852 | 0.000 | 0.002 | 0.000 | 4.987 |
| 377  | ks2av  | 2.972 | 1.024 | 0.002 | 0.002 | 0.231 | 0.720 | 0.000 | 0.034 | 0.000 | 4.986 |
| 579  | ks1a   | 2.977 | 1.022 | 0.000 | 0.002 | 0.190 | 0.742 | 0.000 | 0.039 | 0.000 | 4.973 |
| 579  | ks1c   | 2.970 | 1.028 | 0.001 | 0.001 | 0.146 | 0.791 | 0.000 | 0.037 | 0.000 | 4.973 |
| 579  | ks1d   | 2.987 | 1.014 | 0.001 | 0.001 | 0.109 | 0.840 | 0.000 | 0.018 | 0.000 | 4.970 |
| 579  | ks1e   | 3.014 | 0.990 | 0.000 | 0.000 | 0.043 | 0.916 | 0.000 | 0.001 | 0.001 | 4.964 |
| 579  | ks1av  | 2.987 | 1.014 | 0.001 | 0.001 | 0.122 | 0.822 | 0.000 | 0.024 | 0.000 | 4.970 |
| 579  | ks2av  | 3.009 | 0.993 | 0.001 | 0.000 | 0.123 | 0.845 | 0.000 | 0.001 | 0.000 | 4.972 |
| 579  | ks3av  | 3.003 | 1.001 | 0.000 | 0.000 | 0.123 | 0.845 | 0.000 | 0.001 | 0.000 | 4.973 |
| 642A | ks1av  | 2.971 | 1.032 | 0.000 | 0.001 | 0.101 | 0.844 | 0.000 | 0.030 | 0.000 | 4.979 |
| 642A | ks2av  | 2.989 | 1.016 | 0.000 | 0.000 | 0.142 | 0.808 | 0.000 | 0.016 | 0.001 | 4.971 |
| 642A | ks3av  | 2.976 | 1.031 | 0.000 | 0.000 | 0.090 | 0.851 | 0.000 | 0.027 | 0.000 | 4.975 |
| 471  | ks1av  | 2.961 | 1.039 | 0.001 | 0.001 | 0.160 | 0.787 | 0.000 | 0.038 | 0.000 | 4.987 |
| 471  | ks2av  | 2.973 | 1.024 | 0.002 | 0.001 | 0.144 | 0.823 | 0.000 | 0.026 | 0.000 | 4.994 |
| 471  | ks3av  | 2.997 | 0.997 | 0.001 | 0.001 | 0.166 | 0.826 | 0.000 | 0.001 | 0.000 | 4.988 |
| 687  | ks1av  | 2.997 | 0.999 | 0.002 | 0.000 | 0.099 | 0.898 | 0.000 | 0.000 | 0.001 | 4.996 |
| 687  | ks2av  | 2.966 | 1.032 | 0.001 | 0.001 | 0.102 | 0.864 | 0.000 | 0.029 | 0.000 | 4.994 |
| 687  | ks3av  | 2.966 | 1.032 | 0.001 | 0.001 | 0.112 | 0.846 | 0.000 | 0.033 | 0.000 | 4.990 |