

Table S1. Bulk-rock chemistry

| | AAE 784 | AAE 980 | RB 2012-2 | RB 2012-3 | AAE 612 | AAE 907 | AAE 1233 |
|-----------------------------|----------------|----------------|------------------|------------------|----------------|----------------|-----------------|
| <i>Major elements (wt%)</i> | | | | | | | |
| SiO2 | 59.55 | 45.95 | 69.72 | 46.14 | 45.36 | 62.42 | 62.98 |
| TiO2 | 0.68 | 0.97 | 0.81 | 2.49 | 0.39 | 0.18 | 0.83 |
| Al2O3 | 18.81 | 21.92 | 12.22 | 14.97 | 23.85 | 12.15 | 15.15 |
| Fe2O3 | - | - | 2.74 | 3.77 | - | - | - |
| FeO | - | - | 4.19 | 13.72 | - | - | - |
| Fe2O3T | 8.83 | 17.02 | 7.40 | 19.02 | 8.07 | 18.25 | 11.53 |
| MnO | 0.16 | 0.34 | 0.11 | 0.17 | 0.08 | 1.32 | 0.36 |
| MgO | 3.98 | 5.61 | 1.75 | 7.68 | 18.33 | 2.43 | 2.80 |
| CaO | 0.16 | 3.31 | 1.98 | 1.92 | 0.29 | 1.51 | 0.62 |
| Na2O | 3.98 | 2.83 | 2.53 | 1.57 | 0.98 | 1.14 | 0.76 |
| K2O | 4.46 | 1.83 | 2.97 | 4.70 | 2.30 | 0.65 | 4.44 |
| P2O5 | 0.10 | 0.10 | 0.16 | 0.40 | 0.23 | 0.28 | 0.19 |
| LOI | 0.43 | 1.36 | 0.58 | 2.41 | 5.73 | 0.31 | 0.39 |
| Total | 101.14 | 101.24 | 99.76 | 99.94 | 105.61 | 100.64 | 100.05 |
| <i>Trace elements (ppm)</i> | | | | | | | |
| Rb | 125.7 | 62.0 | 50.4 | 145.0 | 59.1 | 28.6 | 284.9 |
| Sr | 242 | 239 | 137 | 46 | 20 | 55 | 122 |
| Y | 40.4 | 163.4 | 65.7 | 48.1 | 43.1 | 44.6 | 16.7 |
| Zr | 163 | 150 | 600 | 194 | 82 | 67 | 178 |
| V | 155 | 225 | 20 | 209 | 274 | 57 | 98 |
| Ni | 97 | 176 | 10 | 43 | 23 | 14 | 58 |
| Cr | 187 | 388 | 33 | 179 | 10 | 79 | 116 |
| Nb | 7.7 | 10.3 | 16.6 | 20.6 | 4.4 | <0.5 | 14.7 |
| Ga | 23.7 | 22.3 | 19.9 | 24.8 | 58.9 | 13.0 | 23.5 |
| Cu | 72 | 93 | 54 | 19 | 16 | 46 | 23 |
| Zn | 122 | 126 | 55 | 156 | 68 | 78 | 113 |
| Co | 33 | 56 | 57 | 64 | 36 | 27 | 28 |
| Ba | 1193 | 397 | 954 | 414 | 415 | 185 | 840 |
| La | 36 | 44 | 66 | 8 | 49 | 36 | 33 |
| Ce | 79 | 113 | 154 | 27 | 208 | 73 | 82 |
| U | <0.5 | <0.5 | 0.7 | <0.5 | 6.1 | <0.5 | <0.5 |
| Th | 20.4 | 31.3 | 23.6 | 14.7 | 39.6 | 13.6 | 26.0 |
| Sc | 16 | 41 | 10 | 26 | 9 | 8 | 13 |
| Pb | 16 | <1 | 30 | <1 | <1 | 3 | 10 |

Shaded values have not been used in the calculation of totals

Fe2O3 and FeO for samples RB2012-02, RB2012-03 determined by titration

APPENDIX S2: MINERAL CHEMISTRY

Methods

Quantitative analyses of mineral chemistry were performed at Adelaide Microscopy, the University of Adelaide, using a Cameca SXFive electron microprobe. A beam current of 20 nA and accelerating voltage of 15 kv were used for all point analyses. Calibration was performed on certified synthetic and natural mineral standards from Astimex Ltd and P&H Associates. Data calibration and reduction was carried out in 'Probe for EPMA', distributed by Probe Software Inc.

Results

Representative electron microprobe analyses, the range of values for elements in each mineral and the chemistry of selected minerals is presented below. The calculated end member proportions discussed in the text are as follows: $x(\text{g})$, $\text{Fe}^{2+}/(\text{Fe}^{2+}+\text{Mg})$; X_{alm} , $\text{Fe}^{2+}/(\text{Fe}^{2+}+\text{Mg}+\text{Ca}+\text{Mn})$; X_{py} , $\text{Mg}/(\text{Fe}^{2+}+\text{Mg}+\text{Ca}+\text{Mn})$; X_{gr} , $\text{Ca}/(\text{Fe}^{2+}+\text{Mg}+\text{Ca}+\text{Mn})$; X_{spss} , $\text{Mn}/(\text{Fe}^{2+}+\text{Mg}+\text{Ca}+\text{Mn})$; $y(\text{opx})$, $\text{Al} + \text{Si} - 2$; X_{fe} , $\text{Fe}^{2+}/(\text{Fe}^{2+}+\text{Mg})$; $X_{\text{or(K)}}$, $\text{K}/(\text{Ca}+\text{Na}+\text{K})$; X_{Ab} , $\text{Na}/(\text{Ca}+\text{Na}+\text{K})$; Ca(pl) , $\text{Ca}/(\text{Ca}+\text{Na}+\text{K})$.

Garnet

Garnets in samples AAE 784, AAE980, RB2012-02 and RB2012-03 are predominantly almandine–pyrope rich, with core X_{alm} values of 0.573–0.751 and core X_{py} values of 0.149–0.333. Garnets in samples AAE 907 and AAE 1233 are predominantly almandine-pyrope–spessartine rich, with core X_{alm} values of 0.291–0.403, core X_{py} values of 0.060–0.278 and core X_{spss} values of 0.306–0.467. No samples display garnet zoning trends.

Orthopyroxene

Orthopyroxene in samples RB2012-02 and RB2012-03 have similar $y(\text{opx})$ values of 0.033–0.062.

Biotite

Biotite in samples AAE 784, AAE 980 and RB2012-03 is titanium-rich, with TiO_2 contents of 3.04–5.66 wt%. Biotite in other samples (AAE 612, AAE 907 and AAE 1233) is comparatively titanium-poor, with TiO_2 contents of 0.75–1.91 wt%. Fluorine contents are variable between samples, ranging from 0.33–0.82 wt%, with comparatively high values in samples AAE 784 and AAE 907 (0.67–0.82 wt%; Table 3) and in late biotite in sample AAE 980 (0.46–0.76 wt%). Biotite found as crack fill in sample AAE 980 has a wider range of TiO_2 values (0.67–4.04 wt%) than biotite found in the matrix of the sample (3.04–4.18 wt%) and higher fluorine contents of 0.46–0.76 wt% for crack-fill biotite compared with 0.33–0.44 wt% for matrix biotite.

Cordierite

Matrix cordierite in all samples has X_{Fe} of 0.10–0.76, with sample AAE 907 recording the largest range in X_{Fe} values (0.11–0.60) and RB2012-02 recording X_{Fe} values significantly higher than other samples (0.75–0.76).

Feldspar

K-feldspar in all samples has X_{Or} of 0.80–0.93, with the exception of sample AAE 980 which has a larger range of 0.56–0.91. Plagioclase in all samples has X_{Ab} 0.60–0.83. In sample AAE 784 plagioclase is interpreted as post-peak and is less calcic, with X_{Ab} of 0.82–0.83.

Ilmenite

Ilmenite composition is variable between samples. Samples AAE 784, RB2012-02 and RB2012-03 have TiO_2 contents of 47.09–51.88 wt% and MnO of 0.17–0.88 wt%. In sample

AAE 980, the titanium content of ilmenite is similar (52.44–52.83 wt%), but Mn content is higher, between 1.27–1.67 wt%. Ilmenite in sample AAE 1233 is particularly hematite-rich, with TiO₂ values of 8.46–11.34 wt % and MnO values of 0.04–0.38 wt %.

Table S2.1: Representative electron microprobe analyses

| Mineral | AAE 784 | | | | | | | AAE 980 | | | | | | | |
|--------------------------------|--------------|--------------|--------------|--------------|---------------|--------------|--------------|---------------|--------------|--------------|--------------|--------------|---------------|--------------|--------------|
| | g core | g rim | bi | crd | pl | ksp | ilm | g core | g rim | bi in crack | bi in matrix | crd | pl | ksp | ilm |
| SiO ₂ | 37.44 | 37.91 | 36.14 | 48.85 | 64.38 | 63.95 | 0.00 | 38.28 | 37.91 | 36.11 | 35.16 | 48.34 | 60.02 | 62.95 | 0.00 |
| TiO ₂ | 1.30 | 0.00 | 4.54 | 0.00 | 0.00 | 0.01 | 51.88 | 0.01 | 0.01 | 3.59 | 3.96 | 0.00 | 0.00 | 0.01 | 52.44 |
| Al ₂ O ₃ | 21.47 | 21.67 | 16.06 | 33.39 | 22.66 | 18.62 | 0.03 | 21.71 | 21.66 | 17.22 | 17.40 | 33.14 | 25.05 | 18.66 | 0.01 |
| Cr ₂ O ₃ | 0.09 | 0.15 | 0.17 | 0.00 | 0.00 | 0.00 | 0.08 | 0.10 | 0.05 | 0.05 | 0.15 | 0.00 | 0.00 | 0.00 | 0.06 |
| FeO | 29.86 | 30.83 | 14.52 | 4.85 | 0.08 | 0.02 | 45.02 | 29.60 | 31.60 | 13.35 | 15.78 | 5.76 | 0.07 | 0.00 | 44.86 |
| MnO | 0.74 | 0.83 | 0.02 | 0.02 | 0.00 | 0.00 | 0.18 | 0.86 | 0.75 | 0.00 | 0.02 | 0.04 | 0.00 | 0.00 | 1.67 |
| MgO | 8.07 | 7.66 | 13.15 | 10.66 | 0.10 | 0.00 | 0.55 | 8.34 | 6.70 | 14.70 | 12.82 | 10.24 | 0.00 | 0.00 | 0.18 |
| ZnO | 0.02 | 0.00 | 0.12 | 0.00 | 0.00 | 0.00 | 0.04 | 0.00 | 0.00 | 0.00 | 0.02 | 0.00 | 0.02 | 0.00 | 0.04 |
| CaO | 0.73 | 0.73 | 0.06 | 0.00 | 3.02 | 0.00 | 0.02 | 1.14 | 1.11 | 0.02 | 0.01 | 0.00 | 6.62 | 0.10 | 0.00 |
| Na ₂ O | 0.02 | 0.00 | 0.13 | 0.08 | 9.77 | 1.42 | 0.00 | 0.00 | 0.00 | 0.08 | 0.06 | 0.06 | 8.29 | 1.10 | 0.02 |
| K ₂ O | 0.00 | 0.00 | 9.63 | 0.02 | 0.51 | 14.60 | 0.00 | 0.00 | 0.00 | 9.26 | 9.13 | 0.00 | 0.13 | 14.64 | 0.00 |
| Cl | 0.00 | 0.00 | 0.08 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.01 | 0.06 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 |
| F | 0.00 | 0.04 | 0.71 | 0.00 | 0.00 | 0.00 | 0.05 | 0.00 | 0.05 | 0.46 | 0.33 | 0.00 | 0.00 | 0.00 | 0.09 |
| Total | 99.73 | 99.80 | 95.01 | 97.87 | 100.54 | 98.62 | 97.83 | 100.04 | 99.82 | 94.69 | 94.73 | 97.59 | 100.20 | 97.47 | 99.33 |
| No. Oxygens | 12 | 12 | 11 | 18 | 8 | 8 | 3 | 12 | 12 | 11 | 11 | 18 | 8 | 8 | 3 |
| Si | 2.93 | 2.97 | 2.70 | 4.97 | 2.83 | 2.98 | 0.00 | 2.97 | 2.98 | 2.68 | 2.65 | 4.96 | 2.67 | 2.97 | 0.00 |
| Ti | 0.08 | 0.00 | 0.26 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.20 | 0.22 | 0.00 | 0.00 | 0.00 | 1.00 |
| Al | 1.98 | 2.00 | 1.42 | 4.01 | 1.17 | 1.02 | 0.00 | 1.99 | 2.01 | 1.51 | 1.54 | 4.01 | 1.31 | 1.04 | 0.00 |
| Cr | 0.01 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 |
| Fe ³⁺ | 0.01 | 0.05 | 0.91 | -- | -- | -- | 0.00 | 0.07 | 0.01 | -- | -- | -- | -- | -- | 0.00 |
| Fe ²⁺ | 1.95 | 1.97 | 0.00 | 0.41 | 0.00 | 0.00 | 0.97 | 1.85 | 2.07 | 0.83 | 0.99 | 0.49 | 0.00 | 0.00 | 0.95 |
| Mn ²⁺ | 0.05 | 0.05 | 1.47 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.04 |
| Mg | 0.94 | 0.89 | 0.01 | 1.62 | 0.01 | 0.00 | 0.02 | 0.97 | 0.79 | 1.63 | 1.44 | 1.57 | 0.00 | 0.00 | 0.01 |
| Zn | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Ca | 0.06 | 0.06 | 0.02 | 0.00 | 0.14 | 0.00 | 0.00 | 0.09 | 0.09 | 0.00 | 0.00 | 0.00 | 0.32 | 0.10 | 0.00 |
| Na | 0.00 | 0.00 | 0.92 | 0.02 | 0.83 | 0.13 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 | 0.01 | 0.72 | 0.36 | 0.00 |
| K | 0.00 | 0.00 | 0.01 | 0.00 | 0.03 | 0.87 | 0.00 | 0.00 | 0.00 | 0.88 | 0.88 | 0.00 | 0.01 | 0.58 | 0.00 |
| Cl | 0.00 | 0.00 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 |
| F | 0.00 | 0.01 | 2.70 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.11 | 0.08 | 0.00 | 0.00 | 0.00 | 0.01 |
| Total cations | 8.00 | 8.00 | 7.71 | 11.03 | 5.01 | 5.00 | 2.00 | 8.00 | 8.00 | 7.75 | 7.75 | 11.04 | 5.03 | 5.04 | 2.00 |

Table S2.1 cont.: Representative electron microprobe analyses

| Mineral | RB2012-02 | | | | | | | RB2012-03 | | | | | | |
|--------------------------------|---------------|--------------|---------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|---------------|--------------|--------------|
| | g | opx | mt | ilm | crd | pl | ksp | g core | g rim | opx | bi | mt | ilm | pl |
| SiO ₂ | 37.54 | 48.72 | 0.01 | 0.00 | 37.65 | 60.04 | 64.06 | 37.42 | 37.35 | 49.01 | 36.06 | 0.00 | 0.00 | 60.87 |
| TiO ₂ | 0.03 | 0.09 | 0.23 | 48.80 | 0.02 | 0.02 | 0.02 | 0.03 | 0.02 | 0.08 | 5.42 | 0.09 | 49.70 | 0.00 |
| Al ₂ O ₃ | 21.46 | 2.68 | 0.30 | 0.00 | 21.41 | 25.10 | 18.56 | 21.38 | 21.34 | 3.13 | 14.31 | 0.32 | 0.01 | 23.94 |
| Cr ₂ O ₃ | 0.01 | 0.00 | 0.04 | 0.00 | 0.00 | 0.00 | 0.01 | 0.03 | 0.03 | 0.00 | 0.04 | 0.09 | 0.00 | 0.01 |
| FeO | 32.18 | 32.09 | 102.10 | 48.78 | 31.74 | 0.01 | 0.00 | 32.86 | 33.37 | 31.08 | 18.74 | 102.58 | 47.77 | 0.25 |
| MnO | 0.95 | 0.33 | 0.00 | 0.41 | 0.97 | 0.00 | 0.00 | 0.85 | 0.82 | 0.27 | 0.01 | 0.00 | 0.52 | 0.00 |
| MgO | 5.87 | 15.06 | 0.02 | 0.05 | 5.81 | 0.01 | 0.00 | 5.27 | 4.92 | 15.89 | 11.26 | 0.02 | 0.02 | 0.07 |
| ZnO | 0.02 | 0.07 | 0.00 | 0.00 | 0.04 | 0.02 | 0.00 | 0.00 | 0.02 | 0.05 | 0.02 | 0.01 | 0.00 | 0.01 |
| CaO | 1.95 | 0.21 | 0.00 | 0.00 | 2.01 | 6.23 | 0.07 | 2.04 | 1.88 | 0.22 | 0.01 | 0.00 | 0.01 | 5.76 |
| Na ₂ O | 0.01 | 0.00 | 0.00 | 0.00 | 0.01 | 8.07 | 1.55 | 0.00 | 0.01 | 0.01 | 0.13 | 0.00 | 0.00 | 8.60 |
| K ₂ O | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.23 | 14.55 | 0.00 | 0.00 | 0.00 | 9.38 | 0.01 | 0.00 | 0.15 |
| Cl | 0.01 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 | 0.08 | 0.00 | 0.00 | 0.01 |
| F | 0.01 | 0.06 | 0.26 | 0.07 | 0.03 | 0.00 | 0.00 | 0.02 | 0.01 | 0.02 | 0.54 | 0.24 | 0.10 | 0.00 |
| Total | 100.03 | 99.28 | 102.86 | 98.08 | 99.68 | 99.72 | 98.83 | 99.91 | 99.77 | 99.75 | 95.76 | 103.25 | 98.09 | 99.65 |
| No. Oxygens | 12 | 6 | 4 | 3 | 18 | 8 | 8 | 12 | 12 | 6 | 11 | 4 | 3 | 8 |
| Si | 2.96 | 1.91 | 0.00 | 0.00 | 4.47 | 2.68 | 2.98 | 2.97 | 2.97 | 1.90 | 2.73 | 0.00 | 0.00 | 2.72 |
| Ti | 0.00 | 0.00 | 0.01 | 0.94 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.31 | 0.00 | 0.96 | 0.00 |
| Al | 1.99 | 0.12 | 0.01 | 0.00 | 3.00 | 1.32 | 1.02 | 2.00 | 2.00 | 0.14 | 1.28 | 0.01 | 0.00 | 1.26 |
| Cr | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Fe ³⁺ | 0.08 | 0.03 | 1.95 | 0.11 | -- | -- | -- | 0.06 | 0.05 | 0.04 | -- | 1.95 | 0.07 | -- |
| Fe ²⁺ | 2.04 | 1.02 | 1.03 | 0.94 | 3.16 | 0.00 | 0.00 | 2.12 | 2.17 | 0.97 | 1.19 | 1.03 | 0.96 | 0.01 |
| Mn ²⁺ | 0.06 | 0.01 | 0.00 | 0.01 | 0.10 | 0.00 | 0.00 | 0.06 | 0.06 | 0.01 | 0.00 | 0.00 | 0.01 | 0.00 |
| Mg | 0.69 | 0.88 | 0.00 | 0.00 | 1.03 | 0.00 | 0.00 | 0.62 | 0.58 | 0.92 | 1.27 | 0.00 | 0.00 | 0.00 |
| Zn | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Ca | 0.17 | 0.01 | 0.00 | 0.00 | 0.26 | 0.30 | 0.00 | 0.17 | 0.16 | 0.01 | 0.00 | 0.00 | 0.00 | 0.28 |
| Na | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.70 | 0.14 | 0.00 | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.75 |
| K | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.86 | 0.00 | 0.00 | 0.00 | 0.91 | 0.00 | 0.00 | 0.01 |
| Cl | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 |
| F | 0.00 | 0.01 | 0.03 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.13 | 0.03 | 0.01 | 0.00 |
| Total cations | 8.00 | 4.00 | 3.00 | 2.00 | 12.02 | 5.01 | 5.01 | 8.00 | 8.00 | 4.00 | 7.71 | 3.00 | 2.00 | 5.03 |

Table S2.1 cont.: Representative electron microprobe analyses

| Mineral | AAE 907 | | | | | | | | AAE 1233 | | | | | |
|--------------------------------|---------------|---------------|---------------|--------------|--------------|-------------------|----------------|--------------|--------------|--------------|---------------|--------------|--------------|--------------|
| | g core | g rim | g symplectite | bi | crd | mt coarse-grained | mt symplectite | sp | g | bi | mt | ilm | pl | ksp |
| SiO ₂ | 37.59 | 37.79 | 36.94 | 36.45 | 36.15 | 0.00 | 0.00 | 0.00 | 36.71 | 36.69 | 0.00 | 0.00 | 59.81 | 64.13 |
| TiO ₂ | 0.00 | 0.00 | 0.00 | 1.99 | 0.00 | 0.00 | 0.00 | 0.07 | 0.00 | 1.91 | 0.00 | 10.62 | 0.00 | 0.01 |
| Al ₂ O ₃ | 21.72 | 21.61 | 21.28 | 18.27 | 21.41 | 0.07 | 0.07 | 61.64 | 21.09 | 18.45 | 0.12 | 0.15 | 23.95 | 18.27 |
| Cr ₂ O ₃ | 0.01 | 0.00 | 0.02 | 0.00 | 0.00 | 0.05 | 0.01 | 0.04 | 0.01 | 0.03 | 0.16 | 0.09 | 0.00 | 0.00 |
| FeO | 17.00 | 16.38 | 16.97 | 5.97 | 17.17 | 93.92 | 92.37 | 15.58 | 18.23 | 12.63 | 103.15 | 78.87 | 0.08 | 0.05 |
| MnO | 14.17 | 16.09 | 15.42 | 0.21 | 15.23 | 0.28 | 0.72 | 2.70 | 17.19 | 0.58 | 0.10 | 0.38 | 0.04 | 0.00 |
| MgO | 8.34 | 7.53 | 7.44 | 20.90 | 7.56 | 0.02 | 0.01 | 14.03 | 4.71 | 14.44 | 0.00 | 0.08 | 0.01 | 0.01 |
| ZnO | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 2.42 | 0.00 | 0.05 | 0.00 | 0.00 | 0.10 | 0.07 |
| CaO | 1.27 | 1.44 | 1.11 | 0.00 | 1.09 | 0.00 | 0.00 | 0.00 | 1.41 | 0.00 | 0.00 | 0.00 | 6.05 | 0.03 |
| Na ₂ O | 0.00 | 0.00 | 0.01 | 0.10 | 0.00 | 0.00 | 0.00 | 0.07 | 0.00 | 0.13 | 0.00 | 0.00 | 8.44 | 1.59 |
| K ₂ O | 0.00 | 0.00 | 0.00 | 9.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 9.72 | 0.01 | 0.00 | 0.18 | 14.38 |
| Cl | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 |
| F | 0.00 | 0.00 | 0.00 | 0.74 | 0.00 | 0.27 | 0.24 | 0.00 | 0.02 | 0.46 | 0.28 | 0.19 | 0.00 | 0.00 |
| Total | 100.08 | 100.84 | 99.21 | 93.36 | 98.62 | 94.50 | 93.33 | 96.55 | 99.37 | 94.91 | 103.70 | 90.29 | 98.67 | 98.54 |
| No. Oxygens | 12 | 12 | 12 | 11 | 18 | 4 | 4 | 4 | 12 | 11 | 4 | 3 | 8 | 8 |
| Si | 2.91 | 2.93 | 2.91 | 2.65 | 4.34 | 0.00 | 0.00 | 0.00 | 2.94 | 2.72 | 0.00 | 0.00 | 2.70 | 2.99 |
| Ti | 0.00 | 0.00 | 0.00 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.11 | 0.00 | 0.21 | 0.00 | 0.00 |
| Al | 1.98 | 1.97 | 1.97 | 1.56 | 3.03 | 0.00 | 0.00 | 1.97 | 1.99 | 1.61 | 0.00 | 0.00 | 1.28 | 1.00 |
| Cr | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Fe ³⁺ | 0.19 | 0.18 | 0.21 | -- | -- | 1.96 | 1.97 | 0.03 | 0.12 | -- | 1.96 | 1.55 | -- | -- |
| Fe ²⁺ | 0.91 | 0.88 | 0.91 | 0.36 | 1.72 | 1.02 | 1.00 | 0.32 | 1.10 | 0.78 | 1.03 | 0.22 | 0.00 | 0.00 |
| Mn ²⁺ | 0.93 | 1.05 | 1.03 | 0.01 | 1.55 | 0.01 | 0.02 | 0.06 | 1.17 | 0.04 | 0.00 | 0.01 | 0.00 | 0.00 |
| Mg | 0.96 | 0.87 | 0.87 | 2.26 | 1.35 | 0.00 | 0.00 | 0.57 | 0.56 | 1.59 | 0.00 | 0.00 | 0.00 | 0.00 |
| Zn | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Ca | 0.11 | 0.12 | 0.09 | 0.00 | 0.14 | 0.00 | 0.00 | 0.00 | 0.12 | 0.00 | 0.00 | 0.00 | 0.29 | 0.00 |
| Na | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.74 | 0.14 |
| K | 0.00 | 0.00 | 0.00 | 0.84 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.92 | 0.00 | 0.00 | 0.01 | 0.86 |
| Cl | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| F | 0.00 | 0.00 | 0.00 | 0.17 | 0.00 | 0.03 | 0.03 | 0.00 | 0.01 | 0.11 | 0.03 | 0.02 | 0.00 | 0.00 |
| Total cations | 8.00 | 8.00 | 8.00 | 7.81 | 12.14 | 3.00 | 3.00 | 3.00 | 8.00 | 7.79 | 3.00 | 2.00 | 5.03 | 5.00 |

Table S2.2: mineral chemistry ranges

| | | AAE 784 | | AAE 980 | | RB2012-02 | | RB2012-03 | | AAE 612 | | AAE 907 | | AAE 1233 | |
|---------------|--------------------------------------|---------|-------|---------|-------|-----------|-------|-----------|-------|---------|------|---------|-------|----------|-------|
| | | min | max | min | max | min | max | min | max | min | max | min | max | min | max |
| g core | x(g) | 0.663 | 0.708 | 0.601 | 0.679 | 0.741 | 0.796 | 0.738 | 0.807 | -- | -- | 0.472 | 0.552 | 0.648 | 0.711 |
| | X _{alm} | 0.638 | 0.679 | 0.573 | 0.645 | 0.682 | 0.734 | 0.682 | 0.751 | -- | -- | 0.291 | 0.345 | 0.348 | 0.403 |
| | X _{py} | 0.243 | 0.311 | 0.261 | 0.333 | 0.149 | 0.217 | 0.171 | 0.230 | -- | -- | 0.060 | 0.278 | 0.071 | 0.206 |
| | X _{gr} | 0.020 | 0.022 | 0.028 | 0.047 | 0.054 | 0.060 | 0.050 | 0.072 | -- | -- | 0.035 | 0.046 | 0.037 | 0.044 |
| | X _{spss} | 0.015 | 0.021 | 0.013 | 0.020 | 0.019 | 0.024 | 0.019 | 0.021 | -- | -- | 0.306 | 0.387 | 0.341 | 0.467 |
| g rim | x(g) | 0.675 | 0.780 | 0.650 | 0.792 | -- | -- | 0.761 | 0.788 | -- | -- | 0.495 | 0.504 | -- | -- |
| | X _{alm} | 0.648 | 0.748 | 0.614 | 0.744 | -- | -- | 0.660 | 0.731 | -- | -- | 0.290 | 0.301 | -- | -- |
| | X _{py} | 0.210 | 0.275 | 0.168 | 0.305 | -- | -- | 0.172 | 0.223 | -- | -- | 0.170 | 0.189 | -- | -- |
| | X _{gr} | 0.019 | 0.026 | 0.027 | 0.054 | -- | -- | 0.049 | 0.124 | -- | -- | 0.042 | 0.043 | -- | -- |
| | X _{spss} | 0.015 | 0.023 | 0.015 | 0.028 | -- | -- | 0.018 | 0.019 | -- | -- | 0.362 | 0.371 | -- | -- |
| g symplectite | x(g) | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.493 | 0.535 | -- | -- |
| | X _{alm} | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.271 | 0.325 | -- | -- |
| | X _{py} | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.094 | 0.224 | -- | -- |
| | X _{gr} | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.032 | 0.041 | -- | -- |
| | X _{spss} | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.335 | 0.442 | -- | -- |
| opx | y(opx) | -- | -- | -- | -- | 0.033 | 0.054 | 0.033 | 0.062 | -- | -- | -- | -- | -- | -- |
| bi | F(wt%) | 0.69 | 0.79 | 0.33 | 0.44 | -- | -- | 0.49 | 0.60 | 0.33 | 0.45 | 0.67 | 0.82 | 0.456 | 0.502 |
| | TiO ₂ (wt%) | 4.11 | 5.29 | 3.04 | 4.18 | -- | -- | 5.42 | 5.66 | 0.91 | 0.98 | 0.75 | 1.77 | 1.892 | 1.913 |
| | X _{fe} | 0.37 | 0.4 | 0.36 | 0.41 | -- | -- | 0.48 | 0.49 | 0.17 | 0.20 | 0.14 | 0.24 | 0.324 | 0.329 |
| crack bi | F(wt%) | -- | -- | 0.46 | 0.76 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | TiO(wt%) | -- | -- | 0.67 | 4.04 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | X _{fe} | -- | -- | 0.21 | 0.35 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| crd | X _{fe} | 0.20 | 0.21 | 0.24 | 0.25 | 0.75 | 0.76 | -- | -- | 0.10 | 0.17 | 0.11 | 0.60 | -- | -- |
| ksp | X _{or(K)} | 0.86 | 0.93 | 0.56 | 0.91 | 0.80 | 0.86 | -- | -- | -- | -- | -- | -- | 0.84 | 0.88 |
| pl | X _{ab} | 0.82 | 0.83 | 0.68 | 0.76 | 0.69 | 0.72 | 0.68 | 0.72 | -- | -- | 0.60 | 0.60 | 0.71 | 0.73 |
| | Ca(pl) | 0.14 | 0.18 | 0.23 | 0.31 | 0.27 | 0.30 | 0.27 | 0.31 | -- | -- | 0.39 | 0.39 | 0.27 | 0.28 |
| sp | Zn(wt%) | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 2.07 | 2.53 | -- | -- |
| | Cr ₂ O ₃ (wt%) | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.02 | 0.04 | -- | -- |
| ilm | MnO(wt%) | 0.17 | 0.18 | 1.27 | 1.67 | 0.18 | 0.41 | 0.52 | 0.88 | -- | -- | -- | -- | 0.04 | 0.38 |
| | TiO ₂ (wt%) | 51.50 | 51.88 | 52.44 | 52.83 | 47.09 | 49.16 | 49.70 | 51.03 | -- | -- | -- | -- | 8.46 | 11.34 |

APPENDIX S3: T - M DIAGRAMS

The FeO:Fe₂O₃ ratio and H₂O content of each modelled sample was constrained using calculated T - M_O and T - M_{H_2O} models, respectively. T - M_O diagrams (Fig. S3.1) were calculated with compositions varying from 0% Fe₂O₃ at $M = 0$ (i.e. reduced composition) to 70% Fe₂O₃ at $M = 1$ (i.e. relatively oxidised composition), except for samples AAE784 and AAE1233, for which the mineral modal abundances of the inferred peak assemblages (Table II) and mineral chemistry (Appendix S2) suggested a more oxidised composition. Therefore, the T - M_O diagrams for samples AAE784 and AAE1233 were calculated with compositions varying from 0% Fe₂O₃ at $M = 0$ to 99% Fe₂O₃ at $M = 1$. For samples RB2012-02 and RB2012-03, titrated Fe values were obtained. Thus T - M_O diagrams were calculated from 0% Fe₂O₃ at $M = 0$ to maximum oxidation of the titrated value at $M = 1$. Titrated oxidation values are interpreted to be a maximum value due to low temperature oxidation during weathering and sample preparation.

T - M_{H_2O} diagrams (Fig. S3.2) were calculated across the range H₂O = 0.01 mole% ($M_{H_2O} = 0$) and the LOI value ($M_{H_2O} = 1$) in mole% for each sample. The likely presence of other volatiles means that LOI was assumed to be a maximum value for H₂O content. Iron and H₂O values for the P- T modelling of each sample were chosen to stabilize the peak mineral assemblage in the modal proportions seen in the samples (Table II), as well as utilizing electron microprobe data in combination with calculated mineral compositions for oxide minerals where appropriate. For samples that have been interpreted to preserve evidence of melting, values of O and H₂O were chosen such that the solidus was directly downgrade of the peak assemblage (see Morrissey et al., 2015, pg. 144, and references therein for discussion).

Figure S3.1: Calculated T - M_O forward models for all samples. Bulk compositions at the top of the diagrams are expressed as mole percent. The assemblages in the numbered fields are

defined by the numbered assemblages in the diagram. Dashed line indicates solidus. Bold vertical line indicates chosen composition. Mineral abbreviations from Holland and Powell (1998).

Figure S3.2: Calculated T–M_{H2O} forward models for all samples. Bulk compositions at the top of the diagrams are expressed as mole percent. The assemblages in the numbered fields are defined by the numbered assemblages in the diagram. Dashed line indicates solidus. Bold vertical line indicates chosen composition. Mineral abbreviations from Holland and Powell (1998).

HOLLAND, T., & POWELL, R. 1998. An internally consistent thermodynamic data set for phases of petrological interest. *Journal of Metamorphic Geology*, 16(3), 309-343.
MORRISSEY, L.J., HAND, M., & KELSEY, D.E. 2015. Multi-stage metamorphism in the Rayner–Eastern Ghats Terrane: P–T–t constraints from the northern Prince Charles Mountains, east Antarctica. *Precambrian Research*, 267, 137-163.

Figure S3.1

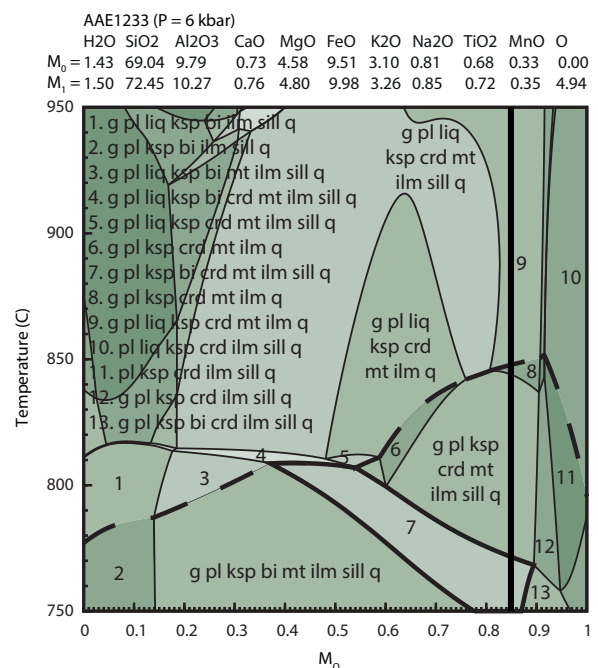
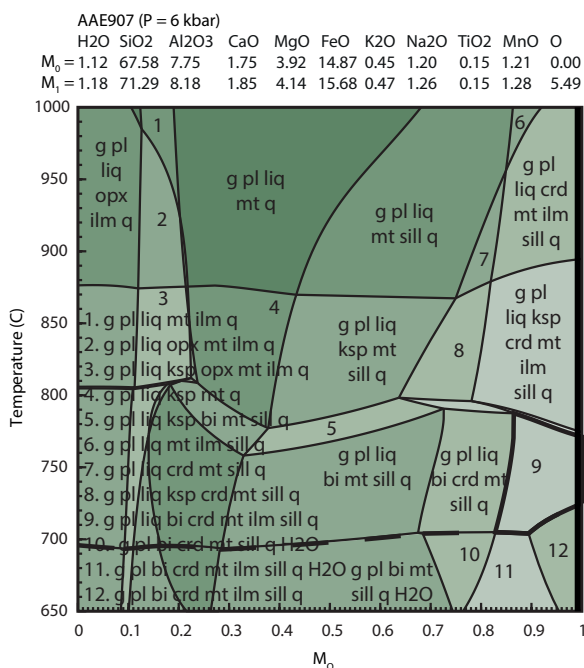
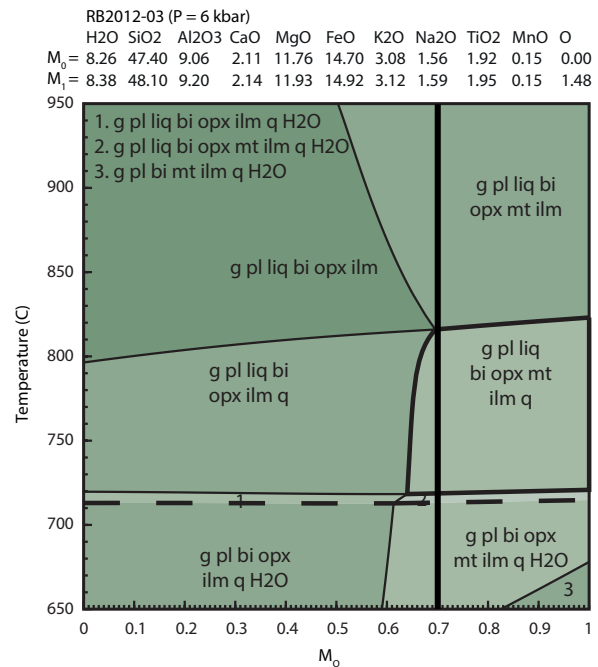
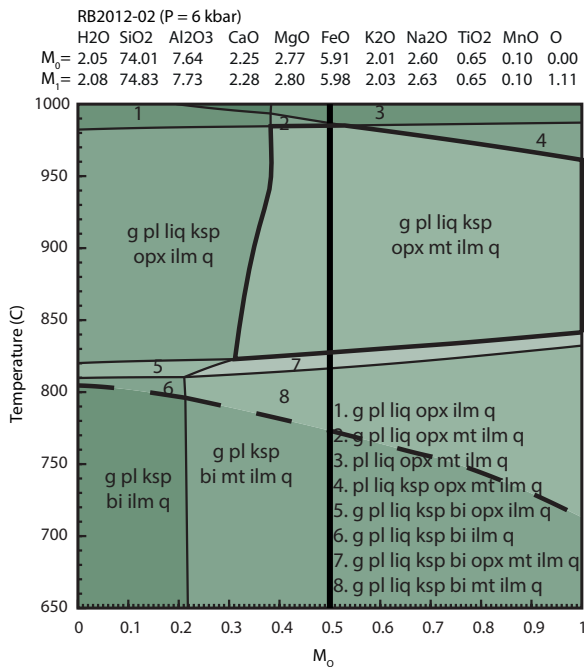
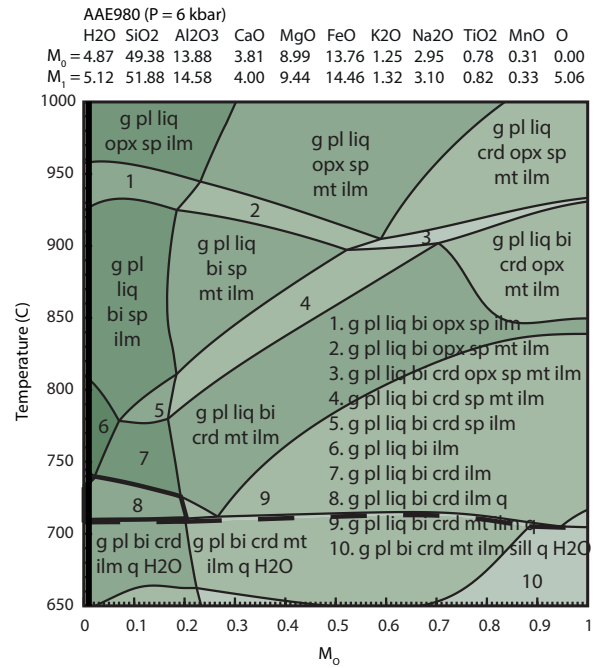
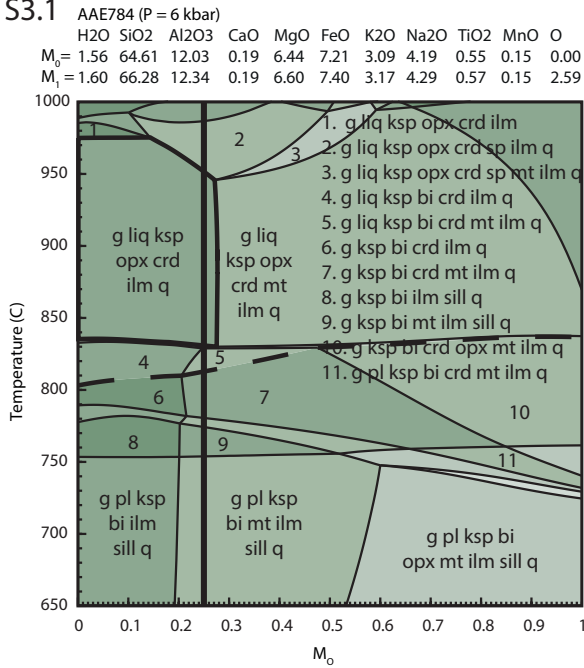
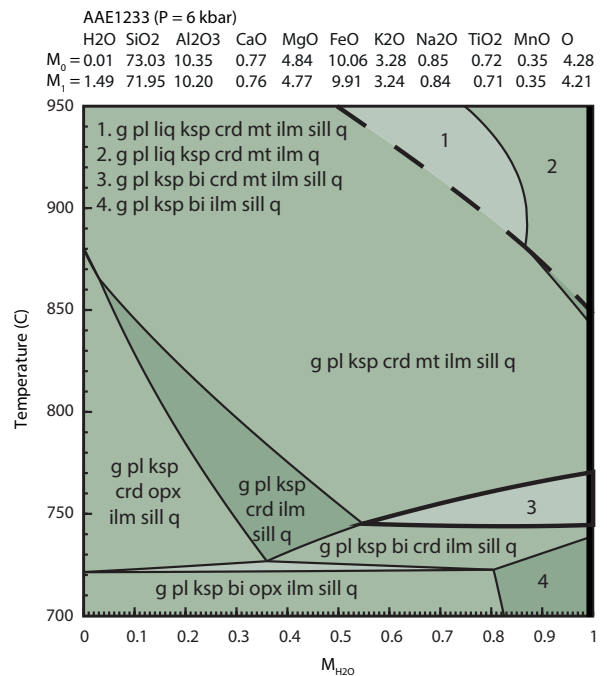
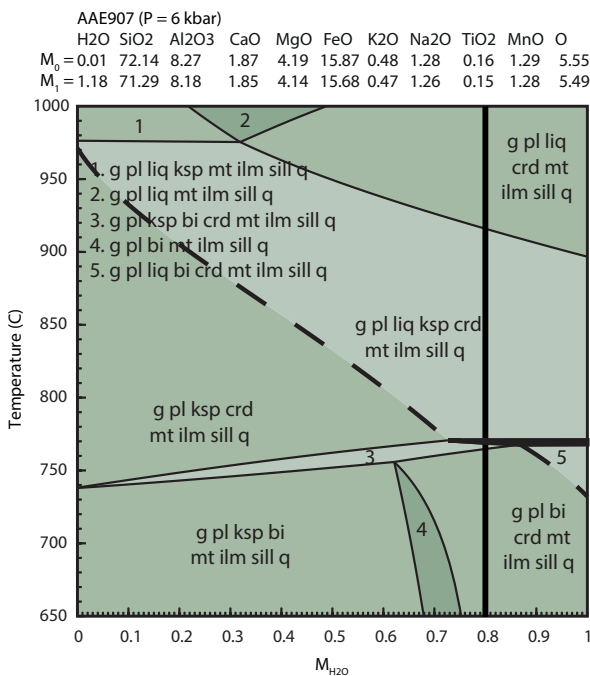
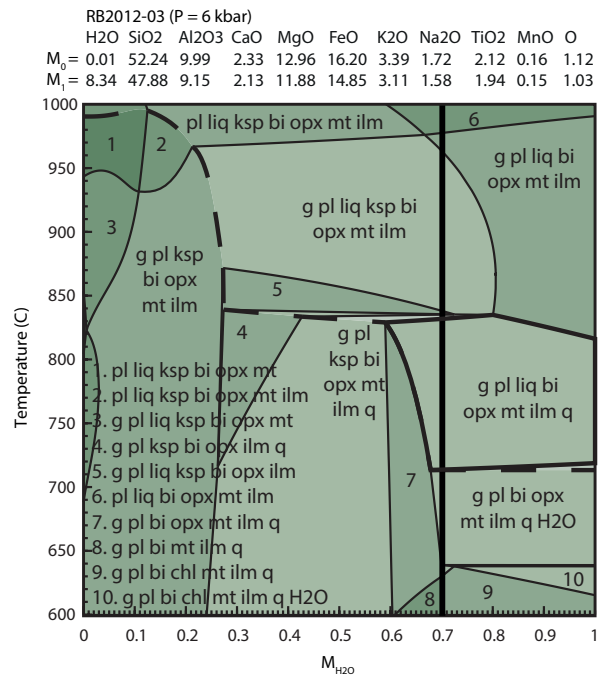
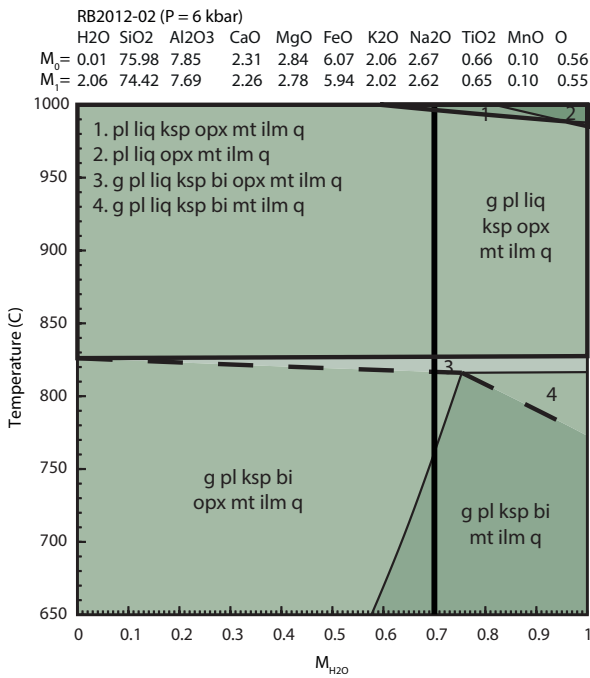
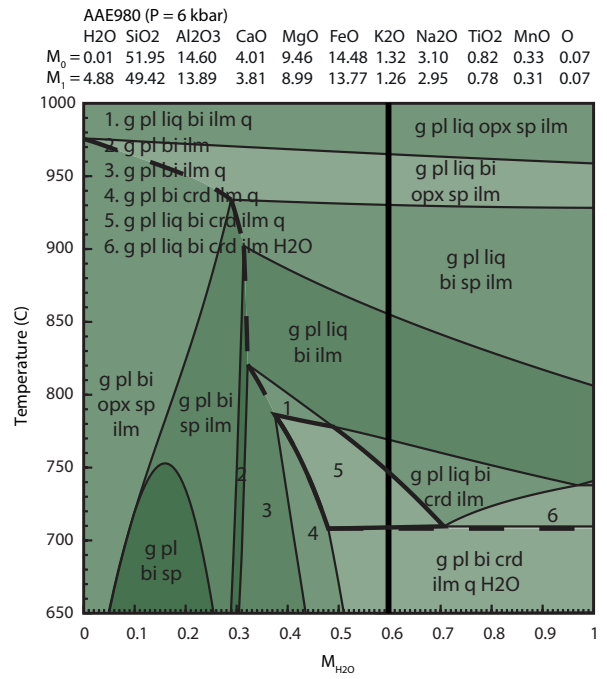
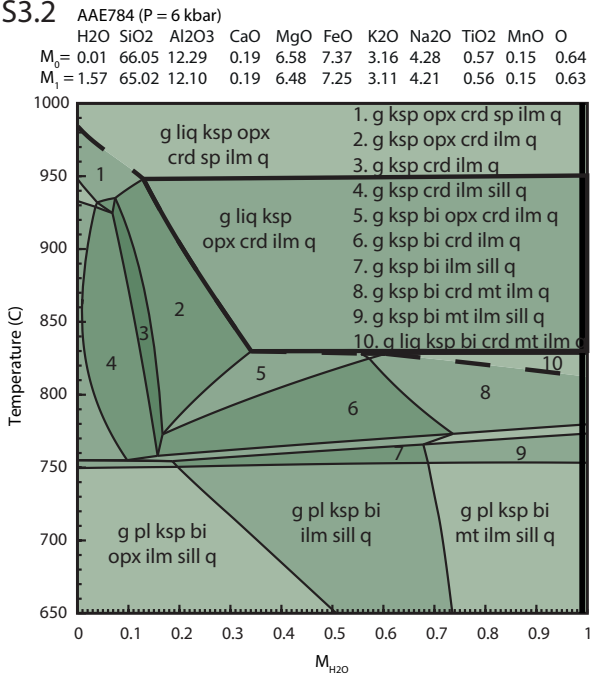


Figure S3.2



| Table S4. LA-ICP-MS in situ U–Pb monazite age data. | | | | | | | | | | | | | | |
|---|-----------------------------|---------------|----------------|---------------|----------------|---------------|----------|----------------------------|---------------|----------------|---------------|----------------|---------------|---------------------------|
| Spot name | Isotope ratios ^a | | | | | | ρ^b | Age estimates ^a | | | | | | Conc. ^c (%) |
| | 207Pb/ 206Pb | $\pm 2\sigma$ | 206Pb/ 238U | $\pm 2\sigma$ | 207Pb/ 235U | $\pm 2\sigma$ | | 207Pb/ 206Pb | $\pm 2\sigma$ | 206Pb/ 238U | $\pm 2\sigma$ | 207Pb/ 235U | $\pm 2\sigma$ | |
| <i>Sample AAE784</i> | | | | | | | | | | | | | | |
| 784-01 | 0.1595 | 0.0017 | 10.5058 | 0.1615 | 0.4780 | 0.0073 | 0.773 | 2450 | 17 | 2519 | 32 | 2480 | 14 | 102 |
| 784-02 | 0.1553 | 0.0016 | 9.6511 | 0.1484 | 0.4511 | 0.0070 | 0.779 | 2405 | 17 | 2400 | 31 | 2402 | 14 | 100 |
| 784-03 | 0.1567 | 0.0016 | 9.8608 | 0.1521 | 0.4567 | 0.0070 | 0.772 | 2420 | 18 | 2425 | 31 | 2422 | 14 | 100 |
| 784-04 | 0.1578 | 0.0016 | 10.2300 | 0.1583 | 0.4703 | 0.0073 | 0.774 | 2433 | 18 | 2485 | 32 | 2456 | 14 | 101 |
| 784-05 | 0.1584 | 0.0017 | 9.9754 | 0.1563 | 0.4570 | 0.0070 | 0.759 | 2439 | 18 | 2426 | 31 | 2433 | 14 | 100 |
| 784-06 | 0.1553 | 0.0020 | 9.8247 | 0.1494 | 0.4590 | 0.0064 | 0.619 | 2406 | 22 | 2435 | 28 | 2419 | 14 | 101 |
| 784-07 | 0.1548 | 0.0022 | 9.0465 | 0.1413 | 0.4241 | 0.0059 | 0.564 | 2399 | 23 | 2279 | 27 | 2343 | 14 | 97 |
| 784-08 | 0.1573 | 0.0016 | 9.7116 | 0.1345 | 0.4482 | 0.0062 | 0.715 | 2426 | 18 | 2387 | 27 | 2408 | 13 | 99 |
| 784-09 | 0.1560 | 0.0018 | 9.7406 | 0.1393 | 0.4530 | 0.0062 | 0.670 | 2413 | 19 | 2409 | 28 | 2411 | 13 | 100 |
| 784-10 | 0.1563 | 0.0017 | 10.9171 | 0.1564 | 0.5068 | 0.0071 | 0.694 | 2416 | 19 | 2643 | 30 | 2516 | 13 | 105 |
| 784-11 | 0.1569 | 0.0018 | 11.4430 | 0.1685 | 0.5291 | 0.0074 | 0.673 | 2423 | 20 | 2738 | 31 | 2560 | 14 | 107 |
| 784-12 | 0.1568 | 0.0019 | 9.6862 | 0.1443 | 0.4484 | 0.0063 | 0.653 | 2421 | 20 | 2388 | 28 | 2405 | 14 | 99 |
| 784-13 | 0.1577 | 0.0018 | 9.7386 | 0.1394 | 0.4482 | 0.0062 | 0.669 | 2431 | 19 | 2387 | 27 | 2410 | 13 | 99 |
| 784-14 | 0.1578 | 0.0017 | 10.5588 | 0.1468 | 0.4855 | 0.0067 | 0.709 | 2432 | 18 | 2551 | 29 | 2485 | 13 | 103 |
| 784-15 | 0.1566 | 0.0024 | 10.7765 | 0.1857 | 0.4992 | 0.0074 | 0.541 | 2420 | 26 | 2610 | 32 | 2504 | 16 | 104 |
| 784-16 | 0.1587 | 0.0019 | 11.3992 | 0.1663 | 0.5211 | 0.0073 | 0.652 | 2442 | 20 | 2704 | 31 | 2556 | 14 | 106 |
| 784-17 | 0.1567 | 0.0020 | 10.4275 | 0.1587 | 0.4830 | 0.0068 | 0.619 | 2420 | 22 | 2540 | 30 | 2474 | 14 | 103 |
| 784-18 | 0.1572 | 0.0017 | 10.1450 | 0.1406 | 0.4682 | 0.0064 | 0.686 | 2426 | 18 | 2476 | 28 | 2448 | 13 | 101 |
| 784-19 | 0.1580 | 0.0017 | 9.5357 | 0.1320 | 0.4380 | 0.0059 | 0.684 | 2434 | 18 | 2342 | 27 | 2391 | 13 | 98 |
| 784-20 | 0.1566 | 0.0018 | 9.4156 | 0.1345 | 0.4363 | 0.0060 | 0.679 | 2419 | 19 | 2334 | 27 | 2379 | 13 | 98 |
| 784-21 | 0.1570 | 0.0017 | 9.8406 | 0.1370 | 0.4549 | 0.0062 | 0.691 | 2424 | 18 | 2417 | 27 | 2420 | 13 | 100 |
| 784-22 | 0.1571 | 0.0017 | 9.8228 | 0.1341 | 0.4537 | 0.0061 | 0.697 | 2425 | 18 | 2412 | 27 | 2418 | 13 | 100 |
| 784-23 | 0.1564 | 0.0019 | 9.9799 | 0.1441 | 0.4630 | 0.0063 | 0.647 | 2417 | 20 | 2453 | 28 | 2433 | 13 | 101 |
| 784-24 | 0.1570 | 0.0017 | 10.5242 | 0.1489 | 0.4863 | 0.0067 | 0.687 | 2424 | 19 | 2555 | 29 | 2482 | 13 | 103 |
| 784-25 | 0.1569 | 0.0017 | 10.5600 | 0.1497 | 0.4883 | 0.0067 | 0.684 | 2423 | 19 | 2563 | 29 | 2485 | 13 | 103 |
| 784-26 | 0.1571 | 0.0021 | 10.9629 | 0.1718 | 0.5063 | 0.0071 | 0.616 | 2425 | 22 | 2641 | 30 | 2520 | 15 | 105 |
| 784-27 | 0.1576 | 0.0021 | 10.0486 | 0.1583 | 0.4627 | 0.0066 | 0.617 | 2430 | 22 | 2452 | 29 | 2439 | 15 | 101 |

| | | | | | | | | | | | | | | |
|-------------------------|--------|--------|---------|--------|--------|--------|-------|------|----|------|----|------|----|-----|
| 784-28 | 0.1568 | 0.0023 | 9.8347 | 0.1650 | 0.4550 | 0.0067 | 0.558 | 2422 | 25 | 2418 | 30 | 2419 | 15 | 100 |
| | | | | | | | | | | | | | | |
| <i>Sample AAE980</i> | | | | | | | | | | | | | | |
| 980-01 | 0.1595 | 0.0021 | 8.7993 | 0.1380 | 0.4004 | 0.0057 | 0.618 | 2450 | 22 | 2171 | 26 | 2317 | 14 | 94 |
| 980-02 | 0.1596 | 0.0021 | 11.8072 | 0.1884 | 0.5369 | 0.0078 | 0.625 | 2451 | 22 | 2771 | 33 | 2589 | 15 | 107 |
| 980-03 | 0.1443 | 0.0019 | 6.9000 | 0.0932 | 0.3017 | 0.0043 | 0.559 | 2470 | 22 | 2443 | 29 | 2412 | 14 | 101 |
| 980-04 | 0.1595 | 0.0017 | 11.1829 | 0.1569 | 0.5089 | 0.0070 | 0.711 | 2450 | 18 | 2652 | 30 | 2539 | 13 | 104 |
| 980-05 | 0.1596 | 0.0020 | 10.0642 | 0.1683 | 0.4578 | 0.0071 | 0.707 | 2451 | 21 | 2430 | 32 | 2441 | 15 | 100 |
| 980-06 | 0.1600 | 0.0017 | 10.3051 | 0.1607 | 0.4675 | 0.0073 | 0.781 | 2455 | 17 | 2472 | 32 | 2463 | 14 | 100 |
| 980-07 | 0.1594 | 0.0017 | 10.0294 | 0.1567 | 0.4566 | 0.0071 | 0.774 | 2449 | 18 | 2425 | 31 | 2438 | 14 | 99 |
| 980-08 | 0.1598 | 0.0017 | 10.1448 | 0.1593 | 0.4607 | 0.0072 | 0.771 | 2454 | 18 | 2442 | 32 | 2448 | 15 | 100 |
| 980-09 | 0.1602 | 0.0017 | 10.4825 | 0.1638 | 0.4750 | 0.0074 | 0.776 | 2457 | 18 | 2505 | 32 | 2478 | 14 | 101 |
| 980-10 | 0.1589 | 0.0017 | 10.0667 | 0.1587 | 0.4596 | 0.0072 | 0.773 | 2445 | 18 | 2438 | 32 | 2441 | 15 | 100 |
| 980-11 | 0.1591 | 0.0017 | 9.7374 | 0.1526 | 0.4441 | 0.0069 | 0.771 | 2446 | 18 | 2369 | 31 | 2410 | 14 | 98 |
| 980-12 | 0.1593 | 0.0024 | 9.4447 | 0.1795 | 0.4302 | 0.0070 | 0.640 | 2448 | 25 | 2307 | 31 | 2382 | 17 | 97 |
| 980-13 | 0.1600 | 0.0017 | 10.2802 | 0.1621 | 0.4662 | 0.0073 | 0.774 | 2456 | 18 | 2467 | 32 | 2460 | 15 | 100 |
| 980-14 | 0.1595 | 0.0017 | 10.0245 | 0.1578 | 0.4560 | 0.0071 | 0.765 | 2451 | 18 | 2422 | 31 | 2437 | 15 | 99 |
| 980-15 | 0.1593 | 0.0019 | 10.5308 | 0.1582 | 0.4797 | 0.0068 | 0.682 | 2448 | 20 | 2526 | 30 | 2483 | 14 | 102 |
| 980-16 | 0.1592 | 0.0017 | 10.6312 | 0.1496 | 0.4846 | 0.0067 | 0.715 | 2447 | 18 | 2547 | 29 | 2491 | 13 | 102 |
| 980-17 | 0.1598 | 0.0022 | 11.6734 | 0.1901 | 0.5302 | 0.0078 | 0.601 | 2453 | 23 | 2742 | 33 | 2579 | 15 | 106 |
| 980-18 | 0.1600 | 0.0017 | 11.2201 | 0.1567 | 0.5091 | 0.0071 | 0.719 | 2455 | 18 | 2653 | 30 | 2542 | 13 | 104 |
| 980-19 | 0.1591 | 0.0022 | 10.7675 | 0.1790 | 0.4912 | 0.0070 | 0.592 | 2446 | 24 | 2576 | 30 | 2503 | 15 | 103 |
| 980-20 | 0.1595 | 0.0017 | 10.8572 | 0.1531 | 0.4941 | 0.0068 | 0.709 | 2450 | 18 | 2588 | 30 | 2511 | 13 | 103 |
| | | | | | | | | | | | | | | |
| <i>Sample RB2012-02</i> | | | | | | | | | | | | | | |
| RB02-01 | 0.1050 | 0.0012 | 4.6462 | 0.0623 | 0.3212 | 0.0040 | 0.589 | 1714 | 21 | 1796 | 19 | 1758 | 11 | 102 |
| RB02-02 | 0.1058 | 0.0015 | 4.4553 | 0.0675 | 0.3056 | 0.0039 | 0.516 | 1729 | 25 | 1719 | 19 | 1723 | 13 | 100 |
| RB02-03 | 0.1057 | 0.0019 | 4.4237 | 0.0819 | 0.3037 | 0.0042 | 0.408 | 1727 | 33 | 1710 | 21 | 1717 | 15 | 100 |
| RB02-04 | 0.1059 | 0.0022 | 4.3870 | 0.0930 | 0.3007 | 0.0043 | 0.351 | 1731 | 38 | 1695 | 22 | 1710 | 18 | 99 |
| RB02-05 | 0.1060 | 0.0014 | 4.4353 | 0.0644 | 0.3038 | 0.0038 | 0.544 | 1731 | 24 | 1710 | 19 | 1719 | 12 | 99 |
| RB02-06 | 0.1052 | 0.0011 | 4.3078 | 0.0591 | 0.2973 | 0.0040 | 0.680 | 1717 | 20 | 1678 | 20 | 1695 | 11 | 99 |

| | | | | | | | | | | | | | | |
|---------|--------|--------|--------|--------|--------|--------|-------|------|----|------|----|------|----|-----|
| RB02-07 | 0.1054 | 0.0020 | 4.3424 | 0.0874 | 0.2989 | 0.0045 | 0.439 | 1722 | 35 | 1686 | 22 | 1701 | 17 | 99 |
| RB02-08 | 0.1043 | 0.0011 | 4.2541 | 0.0585 | 0.2961 | 0.0040 | 0.682 | 1701 | 20 | 1672 | 20 | 1685 | 11 | 99 |
| RB02-09 | 0.1047 | 0.0017 | 4.2666 | 0.0743 | 0.2957 | 0.0042 | 0.515 | 1709 | 29 | 1670 | 21 | 1687 | 14 | 99 |
| RB02-10 | 0.1049 | 0.0013 | 4.2130 | 0.0632 | 0.2916 | 0.0040 | 0.613 | 1712 | 23 | 1650 | 20 | 1677 | 12 | 98 |
| RB02-11 | 0.1044 | 0.0015 | 4.1326 | 0.0661 | 0.2872 | 0.0040 | 0.571 | 1704 | 26 | 1627 | 20 | 1661 | 13 | 98 |
| RB02-12 | 0.1057 | 0.0013 | 4.4341 | 0.0645 | 0.3045 | 0.0041 | 0.630 | 1726 | 22 | 1713 | 20 | 1719 | 12 | 100 |
| RB02-13 | 0.1055 | 0.0016 | 4.4357 | 0.0752 | 0.3051 | 0.0043 | 0.532 | 1724 | 28 | 1716 | 21 | 1719 | 14 | 100 |
| RB02-14 | 0.1058 | 0.0016 | 4.4539 | 0.0749 | 0.3055 | 0.0043 | 0.540 | 1729 | 27 | 1718 | 21 | 1722 | 14 | 100 |
| RB02-15 | 0.1044 | 0.0012 | 4.1865 | 0.0580 | 0.2910 | 0.0039 | 0.674 | 1704 | 20 | 1647 | 19 | 1671 | 11 | 99 |
| | | | | | | | | | | | | | | |

Sample AAE612

| | | | | | | | | | | | | | | |
|--------|--------|--------|---------|--------|--------|--------|-------|------|----|------|----|------|----|-----|
| 612-01 | 0.1565 | 0.0028 | 10.3009 | 0.1989 | 0.4777 | 0.0073 | 0.491 | 2419 | 30 | 2517 | 32 | 2462 | 18 | 102 |
| 612-02 | 0.1053 | 0.0014 | 4.5254 | 0.0719 | 0.3118 | 0.0044 | 0.604 | 1720 | 24 | 1749 | 21 | 1736 | 13 | 101 |
| 612-03 | 0.1049 | 0.0014 | 4.4722 | 0.0706 | 0.3093 | 0.0043 | 0.615 | 1713 | 24 | 1737 | 21 | 1726 | 13 | 101 |
| 612-04 | 0.1045 | 0.0013 | 4.7831 | 0.0735 | 0.3321 | 0.0046 | 0.631 | 1706 | 23 | 1849 | 22 | 1782 | 13 | 104 |
| 612-05 | 0.1049 | 0.0013 | 4.5489 | 0.0699 | 0.3147 | 0.0044 | 0.628 | 1713 | 23 | 1764 | 21 | 1740 | 13 | 101 |
| 612-06 | 0.1560 | 0.0023 | 10.3697 | 0.1756 | 0.4823 | 0.0069 | 0.575 | 2413 | 25 | 2537 | 30 | 2468 | 16 | 103 |
| 612-07 | 0.1051 | 0.0015 | 4.6045 | 0.0718 | 0.3179 | 0.0040 | 0.490 | 1716 | 26 | 1780 | 20 | 1750 | 13 | 102 |
| 612-08 | 0.1067 | 0.0015 | 4.4756 | 0.0670 | 0.3045 | 0.0038 | 0.525 | 1743 | 25 | 1714 | 19 | 1727 | 12 | 99 |
| 612-09 | 0.1046 | 0.0014 | 4.4824 | 0.0656 | 0.3110 | 0.0039 | 0.536 | 1707 | 24 | 1746 | 19 | 1728 | 12 | 101 |
| 612-10 | 0.1060 | 0.0014 | 4.5443 | 0.0669 | 0.3110 | 0.0041 | 0.578 | 1732 | 23 | 1746 | 20 | 1739 | 12 | 100 |
| 612-11 | 0.1555 | 0.0020 | 10.5992 | 0.1561 | 0.4946 | 0.0066 | 0.586 | 2407 | 22 | 2591 | 28 | 2489 | 14 | 104 |
| 612-12 | 0.1051 | 0.0013 | 4.6194 | 0.0650 | 0.3188 | 0.0041 | 0.615 | 1717 | 22 | 1784 | 20 | 1753 | 12 | 102 |
| 612-13 | 0.1041 | 0.0013 | 4.4644 | 0.0633 | 0.3113 | 0.0040 | 0.612 | 1698 | 22 | 1747 | 20 | 1724 | 12 | 101 |
| 612-14 | 0.1047 | 0.0013 | 4.4347 | 0.0627 | 0.3073 | 0.0040 | 0.617 | 1709 | 22 | 1727 | 20 | 1719 | 12 | 101 |
| 612-15 | 0.1039 | 0.0012 | 4.4306 | 0.0622 | 0.3096 | 0.0040 | 0.625 | 1694 | 22 | 1739 | 20 | 1718 | 12 | 101 |
| 612-16 | 0.1057 | 0.0014 | 4.3891 | 0.0664 | 0.3014 | 0.0040 | 0.569 | 1726 | 24 | 1698 | 20 | 1710 | 13 | 99 |
| 612-17 | 0.1050 | 0.0014 | 4.4314 | 0.0661 | 0.3062 | 0.0040 | 0.581 | 1715 | 24 | 1722 | 20 | 1718 | 12 | 100 |
| 612-18 | 0.1052 | 0.0013 | 4.3610 | 0.0646 | 0.3009 | 0.0040 | 0.590 | 1718 | 23 | 1696 | 20 | 1705 | 12 | 99 |
| 612-19 | 0.1044 | 0.0013 | 4.3225 | 0.0638 | 0.3003 | 0.0039 | 0.594 | 1705 | 23 | 1693 | 20 | 1698 | 12 | 100 |
| 612-20 | 0.1043 | 0.0012 | 4.3642 | 0.0602 | 0.3037 | 0.0039 | 0.607 | 1702 | 22 | 1709 | 19 | 1706 | 11 | 100 |

| | | | | | | | | | | | | | | |
|----------------------|--------|--------|--------|--------|--------|--------|-------|------|----|------|----|------|----|-----|
| 612-21 | 0.1042 | 0.0013 | 4.3334 | 0.0602 | 0.3017 | 0.0038 | 0.589 | 1700 | 22 | 1700 | 19 | 1700 | 11 | 100 |
| 612-22 | 0.1528 | 0.0023 | 9.7657 | 0.1568 | 0.4639 | 0.0063 | 0.502 | 2377 | 25 | 2457 | 28 | 2413 | 15 | 102 |
| 612-23 | 0.1545 | 0.0022 | 9.9576 | 0.1563 | 0.4676 | 0.0063 | 0.513 | 2397 | 24 | 2473 | 28 | 2431 | 14 | 102 |
| 612-24 | 0.1529 | 0.0021 | 9.8814 | 0.1466 | 0.4690 | 0.0061 | 0.542 | 2379 | 23 | 2479 | 27 | 2424 | 14 | 102 |
| 612-25 | 0.1547 | 0.0021 | 9.8595 | 0.1491 | 0.4624 | 0.0060 | 0.526 | 2399 | 23 | 2450 | 27 | 2422 | 14 | 101 |
| 612-26 | 0.1550 | 0.0021 | 9.5702 | 0.1406 | 0.4481 | 0.0058 | 0.541 | 2401 | 22 | 2387 | 26 | 2394 | 14 | 100 |
| 612-27 | 0.1552 | 0.0026 | 9.4101 | 0.1626 | 0.4400 | 0.0060 | 0.445 | 2404 | 28 | 2350 | 27 | 2379 | 16 | 99 |
| | | | | | | | | | | | | | | |
| <i>Sample AAE907</i> | | | | | | | | | | | | | | |
| 907-01 | 0.1032 | 0.0013 | 4.4617 | 0.0675 | 0.3138 | 0.0042 | 0.589 | 1682 | 24 | 1759 | 20 | 1724 | 13 | 102 |
| 907-02 | 0.1030 | 0.0013 | 4.3450 | 0.0646 | 0.3061 | 0.0041 | 0.602 | 1679 | 23 | 1722 | 20 | 1702 | 12 | 101 |
| 907-03 | 0.1031 | 0.0014 | 4.3806 | 0.0694 | 0.3083 | 0.0042 | 0.563 | 1681 | 25 | 1732 | 20 | 1709 | 13 | 101 |
| 907-04 | 0.1021 | 0.0013 | 4.3943 | 0.0665 | 0.3124 | 0.0042 | 0.586 | 1662 | 24 | 1753 | 20 | 1711 | 13 | 102 |
| 907-05 | 0.1030 | 0.0014 | 4.4638 | 0.0695 | 0.3146 | 0.0042 | 0.566 | 1678 | 25 | 1763 | 21 | 1724 | 13 | 102 |
| 907-06 | 0.1035 | 0.0013 | 4.4635 | 0.0663 | 0.3128 | 0.0041 | 0.592 | 1689 | 23 | 1755 | 20 | 1724 | 12 | 102 |
| 907-07 | 0.1029 | 0.0014 | 4.3100 | 0.0667 | 0.3039 | 0.0041 | 0.569 | 1678 | 25 | 1711 | 20 | 1695 | 13 | 101 |
| 907-08 | 0.1033 | 0.0015 | 4.3806 | 0.0712 | 0.3078 | 0.0041 | 0.542 | 1684 | 26 | 1730 | 20 | 1709 | 13 | 101 |
| 907-09 | 0.1027 | 0.0017 | 4.3911 | 0.0796 | 0.3103 | 0.0043 | 0.485 | 1674 | 30 | 1742 | 21 | 1711 | 15 | 102 |
| 907-10 | 0.1031 | 0.0013 | 4.4400 | 0.0664 | 0.3124 | 0.0041 | 0.593 | 1681 | 24 | 1752 | 20 | 1720 | 12 | 102 |
| 907-11 | 0.1032 | 0.0016 | 4.4461 | 0.0749 | 0.3126 | 0.0041 | 0.481 | 1682 | 29 | 1754 | 20 | 1721 | 14 | 102 |
| 907-12 | 0.1042 | 0.0020 | 4.3056 | 0.0854 | 0.2999 | 0.0041 | 0.397 | 1700 | 35 | 1691 | 20 | 1694 | 16 | 100 |
| 907-13 | 0.1039 | 0.0020 | 4.3481 | 0.0858 | 0.3037 | 0.0041 | 0.388 | 1695 | 35 | 1709 | 20 | 1703 | 16 | 100 |
| 907-14 | 0.1040 | 0.0016 | 4.5973 | 0.0750 | 0.3208 | 0.0042 | 0.488 | 1697 | 27 | 1794 | 20 | 1749 | 14 | 103 |
| 907-15 | 0.1041 | 0.0015 | 4.2740 | 0.0690 | 0.2981 | 0.0039 | 0.503 | 1698 | 27 | 1682 | 19 | 1688 | 13 | 100 |
| 907-16 | 0.1039 | 0.0019 | 4.3014 | 0.0808 | 0.3005 | 0.0040 | 0.406 | 1694 | 33 | 1694 | 20 | 1694 | 15 | 100 |
| 907-17 | 0.1030 | 0.0014 | 4.4625 | 0.0678 | 0.3143 | 0.0040 | 0.526 | 1679 | 25 | 1762 | 20 | 1724 | 13 | 102 |
| 907-18 | 0.1036 | 0.0018 | 4.5074 | 0.0816 | 0.3157 | 0.0042 | 0.418 | 1690 | 32 | 1769 | 20 | 1732 | 15 | 102 |
| 907-19 | 0.1035 | 0.0019 | 4.3338 | 0.0806 | 0.3038 | 0.0040 | 0.402 | 1688 | 33 | 1710 | 20 | 1700 | 15 | 101 |
| 907-20 | 0.1038 | 0.0012 | 4.4236 | 0.0621 | 0.3092 | 0.0040 | 0.616 | 1693 | 22 | 1737 | 20 | 1717 | 12 | 101 |
| 907-21 | 0.1038 | 0.0013 | 4.4434 | 0.0658 | 0.3107 | 0.0041 | 0.598 | 1693 | 23 | 1744 | 20 | 1721 | 12 | 101 |
| 907-22 | 0.1040 | 0.0015 | 4.2816 | 0.0677 | 0.2987 | 0.0039 | 0.537 | 1697 | 26 | 1685 | 20 | 1690 | 13 | 100 |

| | | | | | | | | | | | | | | |
|--|--------|--------|--------|--------|--------|--------|-------|------|----|------|----|------|----|-----|
| 907-23 | 0.1038 | 0.0014 | 4.3446 | 0.0667 | 0.3038 | 0.0040 | 0.552 | 1693 | 25 | 1710 | 20 | 1702 | 13 | 100 |
| 907-24 | 0.1036 | 0.0013 | 4.4764 | 0.0659 | 0.3136 | 0.0041 | 0.583 | 1690 | 23 | 1758 | 20 | 1727 | 12 | 102 |
| 907-25 | 0.1034 | 0.0015 | 4.4233 | 0.0703 | 0.3105 | 0.0041 | 0.529 | 1686 | 26 | 1743 | 20 | 1717 | 13 | 102 |
| 907-26 | 0.1038 | 0.0013 | 4.3776 | 0.0641 | 0.3062 | 0.0040 | 0.589 | 1692 | 23 | 1722 | 20 | 1708 | 12 | 101 |
| | | | | | | | | | | | | | | |
| <i>Sample AAE1233</i> | | | | | | | | | | | | | | |
| 1233-01 | 0.1039 | 0.0014 | 4.4760 | 0.0703 | 0.3126 | 0.0042 | 0.561 | 1695 | 25 | 1753 | 21 | 1727 | 13 | 102 |
| 1233-02 | 0.1040 | 0.0014 | 4.2805 | 0.0661 | 0.2988 | 0.0040 | 0.570 | 1696 | 25 | 1685 | 20 | 1690 | 13 | 100 |
| 1233-03 | 0.1033 | 0.0013 | 4.4408 | 0.0641 | 0.3120 | 0.0041 | 0.618 | 1684 | 22 | 1750 | 20 | 1720 | 12 | 102 |
| 1233-04 | 0.1040 | 0.0014 | 4.2626 | 0.0658 | 0.2975 | 0.0040 | 0.563 | 1696 | 25 | 1679 | 20 | 1686 | 13 | 100 |
| 1233-05 | 0.1038 | 0.0012 | 4.3609 | 0.0654 | 0.3049 | 0.0043 | 0.669 | 1693 | 22 | 1716 | 21 | 1705 | 12 | 101 |
| 1233-06 | 0.1042 | 0.0012 | 4.3924 | 0.0649 | 0.3060 | 0.0043 | 0.688 | 1700 | 21 | 1721 | 21 | 1711 | 12 | 101 |
| 1233-07 | 0.1044 | 0.0012 | 4.4397 | 0.0660 | 0.3085 | 0.0044 | 0.681 | 1705 | 21 | 1733 | 21 | 1720 | 12 | 101 |
| 1233-08 | 0.1034 | 0.0012 | 4.3747 | 0.0638 | 0.3070 | 0.0043 | 0.699 | 1686 | 20 | 1726 | 21 | 1708 | 12 | 101 |
| 1233-09 | 0.1041 | 0.0012 | 4.3528 | 0.0653 | 0.3036 | 0.0043 | 0.684 | 1698 | 21 | 1709 | 21 | 1703 | 12 | 100 |
| 1233-10 | 0.1048 | 0.0013 | 4.3649 | 0.0666 | 0.3023 | 0.0043 | 0.664 | 1711 | 22 | 1703 | 21 | 1706 | 13 | 100 |
| 1233-11 | 0.1039 | 0.0013 | 4.3727 | 0.0665 | 0.3054 | 0.0043 | 0.667 | 1695 | 22 | 1718 | 21 | 1707 | 13 | 101 |
| 1233-12 | 0.1035 | 0.0014 | 4.4558 | 0.0711 | 0.3126 | 0.0045 | 0.633 | 1687 | 24 | 1753 | 22 | 1723 | 13 | 102 |
| 1233-13 | 0.1040 | 0.0012 | 4.4162 | 0.0664 | 0.3081 | 0.0044 | 0.678 | 1697 | 21 | 1732 | 21 | 1715 | 12 | 101 |
| 1233-14 | 0.1030 | 0.0013 | 4.3189 | 0.0669 | 0.3043 | 0.0043 | 0.653 | 1678 | 23 | 1713 | 21 | 1697 | 13 | 101 |
| 1233-15 | 0.1031 | 0.0012 | 4.3130 | 0.0640 | 0.3034 | 0.0043 | 0.684 | 1681 | 21 | 1708 | 21 | 1696 | 12 | 101 |
| 1233-16 | 0.1032 | 0.0015 | 4.4490 | 0.0743 | 0.3128 | 0.0045 | 0.597 | 1683 | 26 | 1754 | 22 | 1722 | 14 | 102 |
| 1233-17 | 0.1034 | 0.0014 | 4.3982 | 0.0728 | 0.3087 | 0.0045 | 0.603 | 1686 | 26 | 1734 | 22 | 1712 | 14 | 101 |
| 1233-18 | 0.1030 | 0.0014 | 4.3491 | 0.0706 | 0.3064 | 0.0044 | 0.630 | 1679 | 24 | 1723 | 22 | 1703 | 13 | 101 |
| | | | | | | | | | | | | | | |
| aDisplayed ratios and ages are uncorrected for common Pb. | | | | | | | | | | | | | | |
| bError correlation (Rho). | | | | | | | | | | | | | | |
| cDegree of concordance; defined as: $100 \times [(206\text{Pb}/238\text{U age}) / (207\text{Pb}/235\text{U age})]$. | | | | | | | | | | | | | | |