Quantifying geological uncertainty in metamorphic phase equilibria modelling: a Monte Carlo assessment and implications for tectonic interpretations

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APPENDIX B – INDIVIDUAL PSEUDOSECTION MODELLING RESULTS

Case study 1 – OD68-12. All assemblages on pseudosections include Pl, Ilm, and Qtz (unless stated). Coloured dashed lines follow the same conventions as those shown on Figs 5 and 6 in the main manuscript. Bulk composition numbers match those listed in Table 2 in the main manuscript.
Bulk composition 1 - 20% variation. H2O - 4.28; SiO2 - 50.6; Al2O3 - 16.86; CaO - 3.83; MgO - 7.56; FeO - 11.49; K2O - 1.76; Na2O - 1.88; TiO2 - 1.2; MnO - 0.28; O - 0.26. Grt = 8 ± 1, Crd = 34 ± 1, Bt = 23 ± 1.

Bulk composition 12 - 20% variation. H2O - 3.5; SiO2 - 51.25; Al2O3 - 16.81; CaO - 3.82; MgO - 7.24; FeO - 12.3; K2O - 1.38; Na2O - 1.81; TiO2 - 1.29; MnO - 0.37; O - 0.2. Grt = 12 ± 1, Crd = 33 ± 1, Bt = 18 ± 1.
Bulk composition 17 – 20% variation. H2O – 3.86; SiO2 – 49.68; Al2O3 – 16.61; CaO – 3.18; MgO – 7.86; FeO – 13.84; K2O – 1.56; Na2O – 1.43; TiO2 – 1.31; MnO – 0.44; O – 0.23. Grt = 15 ± 1, Crd = 33 ± 1, Bt = 21 ± 1.

Bulk composition 18 – 20% variation. H2O – 2.87; SiO2 – 51.82; Al2O3 – 17.15; CaO – 3.99; MgO – 7.21; FeO – 12.56; K2O – 1.04; Na2O – 1.85; TiO2 – 0.93; MnO – 0.44; O – 0.15. Grt = 15 ± 1, Crd = 35 ± 1, Bt = 14 ± 1.

Bulk composition 19 – 20% variation. H2O – 3.3; SiO2 – 52.11; Al2O3 – 17.65; CaO – 3.55; MgO – 7.73; FeO – 11.44; K2O – 1.14; Na2O – 1.7; TiO2 – 0.88; MnO – 0.34; O – 0.17. Grt = 10 ± 1, Crd = 43 ± 1, Bt = 15 ± 1.

Bulk composition 20 – 20% variation. H2O – 3.09; SiO2 – 51.41; Al2O3 – 17.12; CaO – 3.63; MgO – 7.51; FeO – 12.81; K2O – 1.12; Na2O – 1.67; TiO2 – 1.05; MnO – 0.43; O – 0.16. Grt = 14 ± 1, Crd = 37 ± 1, Bt = 15 ± 1.
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Case study 2 – W113. Additional pseudosections for sample W113 that are not shown in the main manuscript. All assemblages include Ms, IIm, Qtz, and H2O (unless stated). Coloured dashed lines follow the same conventions as those shown on Figs 8–10 in the main manuscript. Bulk composition numbers for thin sections match those listed in Table 3 in the main manuscript.

Thin section 3. SiO$_2$ – 56.60; Al$_2$O$_3$ – 20.81; CaO – 0.47; MgO – 7.07; FeO – 8.72; K$_2$O – 5.53; Na$_2$O – 0.78; TiO$_2$ – 0.64; MnO – 0.06; O – 0.13.

Grt = 2 ± 1, St = 0, Ky = 0, Bt = 29 ± 1.

Thin section 4. SiO$_2$ – 53.38; Al$_2$O$_3$ – 24.38; CaO – 0.33; MgO – 6.20; FeO – 9.24; K$_2$O – 4.49; Na$_2$O – 0.54; TiO$_2$ – 0.71; MnO – 0.12; O – 0.11.

Grt = 3 ± 1, St = 15 ± 1, Ky = 9 ± 1, Bt = 25 ± 1.

Thin section 6. SiO$_2$ – 64.04; Al$_2$O$_3$ – 15.06; CaO – 0.32; MgO – 6.62; FeO – 6.83; K$_2$O – 5.53; Na$_2$O – 0.78; TiO$_2$ – 0.64; MnO – 0.06; O – 0.13.

Grt = 2 ± 1, St = 0, Ky = 0, Bt = 29 ± 1.

W113 XRF-derived bulk composition with $X_{\text{Fe}^{3+}} = 5\%$. SiO$_2$ – 56.05; Al$_2$O$_3$ – 18.82; CaO – 0.19; MgO – 7.75; FeO – 9.25; K$_2$O – 5.39; Na$_2$O – 1.22; TiO$_2$ – 0.97; MnO – 0.12; O – 0.22. Heavy dashed lines mark assemblage field boundaries for $X_{\text{Fe}^{3+}} = 1\%$ (shown for reference).