

## **Evaluating inverse phase equilibria modeling of residual migmatites and granulites**

O. BARTOLI<sup>1\*</sup>

<sup>1</sup>Geoscience Department, Padova University, Padova, 35131, Italy (\*correspondence: omar.bartoli@unipd.it)

Suprasolidus continental crust is prone to loss and redistribution of anatectic melt to shallow crustal levels. These processes ultimately lead to differentiation of the continental crust. The majority of granulite facies rocks worldwide has experienced melt loss and the inverse phase equilibria modeling is becoming an increasingly popular approach. It involves the stepwise down-temperature reintegration of a certain amount of melt into the residual bulk composition along an inferred  $P$ - $T$  path, and various ways of calculating and reintegrating melt compositions have been developed and applied.

Here different melt-reintegration approaches are tested using El Hoyazo granulitic enclaves (SE Spain) and Mt. Stafford residual migmatites (central Australia). Various sets of  $P$ - $T$  pseudosections were constructed progressing step by step, to lower temperatures along the inferred  $P$ - $T$  paths. Melt-reintegration has been done following one-step and multi-step procedures proposed in the literature. For El Hoyazo granulites, inverse modeling was also performed reintegrating the measured melt inclusions and matrix glass compositions and considering the melt amounts inferred by mass-balance calculations.

The overall topology of phase diagrams is pretty similar, suggesting that, in spite of different methods adopted, reintegrating a certain amount of melt can be sufficient to reconstruct a plausible prograde evolution of residual ( $\text{SiO}_2 \geq 55$  wt.%) migmatites and granulites. However, significant underestimations of melt productivity may occur and have to be taken into account when inverse modeling is applied to highly residual ( $\text{SiO}_2 < 55$  wt.%) rocks and/or rocks for which  $\text{H}_2\text{O}$  retention from subsolidus conditions is high.