I-type granites and mineral entrainment: a thermodynamic modelling

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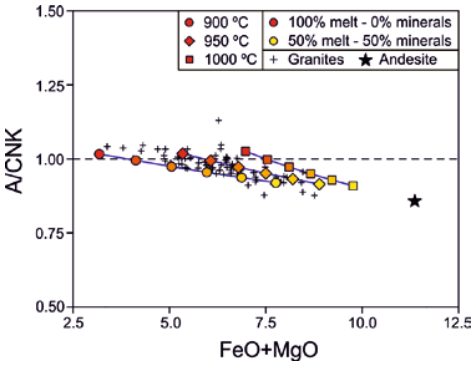
I-type granites show compositional trends with increasing maficity. These trends are thought to be controlled by the nature and amount of entrained minerals, mainly peritectic, in the melt prior to magma segregation from the source [1]. Also, the protoliths of I-type granites are considered to be of andesitic composition and thus of crustal origin [1]. Pseudosections have been made to test these hypotheses, using the software PERPLEX [2] and appropriate thermodynamic databases and solution models for granitic s.l. systems. The calculations were made using the andesitic mel2 composition [3], at 1.5 GPa and from 900 to 1200 ºC. All minerals were allowed to entrain to the melt. The results were compared to published analyses of I-type granites [4].

Preliminary results indicate that, for the chosen model of entrainment of minerals, only modelled magmas formed between 900 and 1000 ºC match the maficity of the granites. The modelled magmas are able to reproduce the positive or negative trends of each compositional variable of the granites, especially the A/CNK. However, the modelled magmas are richer in Si, Na and K and poorer in Ti, Al and Ca than the granites. These latter elements are usually found in peritectic phases, indicating that there may be a selective process of entrainment of peritectic phases over non-peritectic phases.



[1] Clemens *et al.* (2011), *Lithos* **126**, 174-181. [2] Connolly (2009) *G-cubed* **10**, Q10014. [3] Castro *et al.* (2010) *JPet* **51**, 1267-1295. [4] Lee *et al.* (2007) *EPSL* **263**, 370-387.