Geophysical Research Abstracts
Vol. 14, EGU2012-13674, 2012
EGU General Assembly 2012

Contributions of Fe-K subalkaline granites for the geodynamic evolution of the Iberian Massif (Northern Portugal)

P.P. Simões (1), H.C.B Martins (2), and G. Dias (3)

(1) Centro de Geologia da Universidade do Porto/ Universidade do Minho, Campus de Gualtar, 4710-057 Braga (pimenta@dct.uminho.pt), (2) Centro de Geologia, Faculdade de Ciências, Universidade do Porto, Rua do Campo Alegre, 4169-007 (hbrites@fc.up.pt), (3) Centro de Geologia da Universidade do Porto/ Universidade do Minho, Campus de Gualtar, 4710-057 Braga (graciete@dct.uminho.pt)

In the Iberian Massif large volumes of granitic rocks were emplaced during the Variscan orogeny, mainly during the last ductile deformation phase D3. After that, an extensional tectonic regime controls the emplacement of several Fe-K subalkaline post-D3 plutons. Geochemical and isotopic results of post-D3 biotite granites in northern Portugal (Peneda-Gerês, Vila Pouca de Aguiar, Monção-Porriño and Águas Frias plutons) are presented and their contributions to the geodynamic evolution of the Iberian Variscides. They are porphyritic to coarse-medium grained biotite granites with potassium feldspar megacrysts, with rare mafic microgranular enclaves and some are associated to minor bodies of intermediate rocks and/or two mica granites. Accessory minerals include zircon, apatite, allanite, xenotime, ilmenite and sphene. Amphibole is present only in the Peneda-Gerês and Monção-Porriño plutons.

Emplacement ages based on U-Pb zircon analyses indicate a value of 290-299 Ma. They are meta- to peraluminous granitoids, having evolved chemical compositions, with high SiO_2. Isotopic studies reveals initial 87Sr/86Sr ratios of 0.7033 to 0.7079 and εNd of -1.5 to -2.6 while rare hectometric intermediate rock bodies outcrop in the Monção-Porriño shows initial 87Sr/86Sr ratios of 0.7054 to 0.7061 and εNdi of 0.4 to –0.7. The isotopic composition of these post-D3 biotite granites is clearly less evolved than that of the synorogenic granites in the region, indicating that the mantle sources were distinct, and shows an important change in magma composition associated to the extensional regime. An origin by mantle input followed by mantle-crust interaction is proposed, implying the contribution of a less enriched mantle component than that involved in the genesis of synorogenic granites in northern Portugal (hybrid Mg-K subalkaline granites and calc-alkaline to aluminopotassic granites)

This study permits to envisage that the extensional tectonics triggered the ascension of liquids from a more depleted mantle source implying an input of juvenile magma with mixing of crustal magmas, probably derivate from metaigneous sources, in lower crust, to produce hybrid granites. This also indicates an accretion process with a crustal growth episode.