



## **Acid to intermediate/basic plutonic associations in NW Iberia: evidence of distinct mantle sources in late-Variscan times**

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In the Iberian segment of the Variscan chain large volumes of granitoids outcrop in the internal zones, being mainly associated to the last Variscan ductile deformation phase D3. This work focuses on acid to intermediate/basic plutonic rocks of NW Iberia belonging to two distinct age groups, based on the emplacement ages relative to the deformation phase D3: (1) the synorogenic late-D3 group, with U-Pb emplacement ages between 311 and 306 Ma; (2) the late- to post-orogenic (post-D3) group, for which U-Pb emplacement ages of 299-290 Ma have been obtained.

A previous study based on the available Sr, Nd isotope data for three post-D3 plutons from NW Iberia indicated isotope compositions in the range  $(^{87}\text{Sr}/^{86}\text{Sr})_i = 0.7030 - 0.7069$  and  $\epsilon\text{Nd}_i = -1.0$  to  $-2.5$  for the granites. This composition is clearly less evolved than that of the synorogenic granites in the region [ $(^{87}\text{Sr}/^{86}\text{Sr})_i > 0.7064$  and  $\epsilon\text{Nd}_i < -4.4$ ]. This contrast is now reinforced by additional Sr, Nd isotope data of another post-D3 pluton, the Monção-Porriño pluton. Rare hectometric intermediate rock bodies outcrop in this pluton and have  $(^{87}\text{Sr}/^{86}\text{Sr})_i = 0.7054-0.7061$  and  $\epsilon\text{Nd}_i = 0.4$  to  $-0.7$ . On the other hand, the intermediate rocks of the synorogenic late-D3 group have  $(^{87}\text{Sr}/^{86}\text{Sr})_i = 0.7053-0.7080$  and  $\epsilon\text{Nd}_i = -2.9$  to  $-5.5$ .

The intermediate rocks of the synorogenic late-D3 group are associated to shoshonitic gabbro-norites that were probably derived from an enriched and isotopically homogeneous mantle source [ $(^{87}\text{Sr}/^{86}\text{Sr})_i = 0.7049$  to  $0.7053$  and  $\epsilon\text{Nd}_i = -2.1$  to  $-2.5$ ]. For these plutons a continuous trend between the mafic, intermediate and acid terms is observed on the  $\epsilon\text{Nd}_i$  vs.  $\text{Sr}_i$  diagram. For the post-D3 intermediate rocks a continuous trend with the host granite is also observed on that diagram. An interaction between

coeval magmas of contrasting composition (mantle- and crust-derived) explains these compositional trends and also the net-veining structures and disequilibrium textures observed in the intermediate terms are compatible with magma mingling/mixing.

The fact that the isotope compositions of the less evolved terms from the two age groups are so contrasted indicates that the mantle sources were distinct. With the less evolved term of the post-D3 group having a positive  $\epsilon\text{Nd}_i$  parameter, the hypothesis of an enriched mantle source, such as is proposed for the late-D3 group, is very much unlikely. This study permits to envisage that the extensional tectonics to which are associated the post-D3 plutons triggered the ascension of liquids from a more depleted mantle source.