from 2 to 10 and show positive correlation with degree of deformation. Shape parameter of magnetic ellipsoid (T) values varies from -0.58 to 0.78 and most of magnetic ellipsoids are oblate. Hence, we can use AMS method as a reliable tool, for interpretations of compositional evolutions of granitoidic rocks.

A triumvirate of Fe-Ti oxide ore-bearing gabbro-granitoid complexes in the Panxi Region of the Permian Emeishan Large Igneous Province, SW China

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The Late Permian (~260 Ma) Emeishan large igneous province of SW China contains three nearly identical gabbro-granitoid complexes which host giant Fe-Ti oxide deposits. The Fe-Ti oxide deposits are within the lower portions of evolved layered gabbroic intrusions which are spatially and temporally associated with A-type granitic plutons. The 264 ± 3 Ma Taihe layered gabbroic intrusion hosts a large magmatic Fe-Ti oxide deposit and is coeval with the Taihe peralkaline A-type granitic pluton which is dated at 261 ± 2 Ma. Within the A-type granitic pluton are microgranular enclaves which have compositions intermediate between the gabbro and host granite. Primitive mantle normalized incompatible element plots show corresponding reciprocal patterns between the mafic and felsic rocks. The chondrite normalized REE patterns show Eu-anomalies changing from positive (Eu/Eu* = 1.5 to 2.2) in the gabbroic intrusion, to negative in the enclaves (Eu/Eu* = 0.4 to 0.6) and granites (Eu/Eu* = 0.2 to 0.5). Whole rock εNd(T) values of the gabbroic intrusion (εNd(T) = +2.5 to +3.3) are similar to the enclaves (εNd(T) = +1.0 to 2.0) and granite (εNd(T) = +1.5 to +1.9) whereas the zircon εHf(T) values of the gabbro (εHf(T) = +8.9 ± 0.6) are indistinguishable from the granites (εHf(T) = +9.2 ± 1.0), suggesting that all rock types originated from the same mantle source. Geochemical modeling indicates that the gabbros and granites can be generated by fractional crystallization of a common parental magma similar to high-Ti Emeishan flood basalt. The compositional jump from the gabbro to the enclaves is attributed to the crystallization of the Fe-Ti oxide minerals. The results of this study and previous studies suggest that the magmatic conditions (e.g. pressure, composition, fO_2) which lead to the formation of at least three Fe-Ti oxide bearing gabbro-granitoid complexes were relatively common during the development of the Emeishan large igneous province.

Granitic magmatism along the Central Iberian/Ossa Morena Zone boundary (SW Iberia): geochronology, composition, and geodynamic significance

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This study attempts to summarize the geochronology and petrogenesis of three spatially related granitic bodies (Portalegre, Carrascal and Nisa-Albuquerque) emplaced at different times along the Central Iberian/Ossa-Morena Zone boundary, in order to constrain the Paleozoic crustal evolution of

this complex segment of crust, previously affected by older (Cadomian) orogenic events. Portalegre and Carrascal plutons are two parallel NW-SE elongated elliptical-shape intrusions bounded by transcurrent faults. They are Pre-Variscan, whereas the Nisa-Albuquerque batholith, which crosscuts the former, is late Variscan. The group of pre-Variscan plutons differs in many aspects. The Portalegre granite (c. 493 Ma) is geochemically evolved, peraluminous, and shows predominant crustal isotopic signatures (εNd_i=-2.88 to -0.85 and $\delta^{18}O$=9.8-10.8 ‰). The age pattern from the inherited zircon cores indicates the involvement of sources with a wide range of age-components: an important Late Neoproterozoic (c. 548 Ma and c. 681-611 Ma) population, and older (c. 1.1-0.95 Ga and c. 2.6 Ga) components (Solá, 2007). The Carrascal pluton is a composite bimodal intrusion (granites c. 479-486 and associated gabro/diorites c. 471 Ma), relatively younger than the Portalegre pluton, where interaction processes between mantle-derived and crustal melts are ubiquitous. Granites are slightly peraluminous and the range in their isotopic signature ($^{87}Sr/^{86}Sr_i$=0.704-0.707, εNd_t=-0.80 to +2.59) suggest derivation from hybrid protholiths, where mafic magmas have interacted with crustal magmas through MASH processes at the mantle/lower-crust interface. Inherited zircons are almost absent. The mafic association (gabbro/diorite and a few ultramafic rocks) have relatively primitive isotopic signatures ($^{87}Sr/^{86}Sr_i$=0.703-0.705, εNd_t=+1.26 to +3.26), suggesting that were derived from a relatively depleted mantle source region more or less contaminated with crustal components (Solá, 2007). The Nisa-Albuquerque batholith is made up of a main peraluminous granite (c. 307-309 Ma, surrounding a discontinuous central core that includes minor tonalite (c. 306 Ma). The zircon in the Nisa-Albuquerque granite records a history of a magma genesis involving mixing between 1) a metaluminous magma progressively contaminated by a small sedimentary component, and 2) a more voluminous peraluminous magma originated from a large sedimentary source. The inherited zircon age pattern (c. 660-505 Ma and 2.56-1.85 Ga) closely matches the age pattern of some metasedimentary units in SW Iberia (Ossa-Morena Zone affinity). The zircon in tonalite records nothing of the age of the magma's source rocks, but the moderately high $\delta^{18}O_{zir}$ (c. 7.4 ‰) does preclude derivation of the magma directly from the mantle. Both the chemical and isotopic compositions of the tonalite zircon make it highly unlikely that the tonalitic magma was a component in the main granite magma mixture (Solá et al., 2009). In this segment of the crust the granitic magmatism was episodic and occurred in two stages: during the Lower Paleozoic (c.490-470 Ma), associated with an intracontinental rifting event and in the Upper Carboniferous related to the end of Variscan Orogeny (c. 309-306 Ma). Crustal recycling and magma-mixing were important mechanism in granite petrogenesis in both events. Interaction processes between mantle-derived and crustal melts occurred only in the rift related event (Carrascal pluton). The inherited zircon cores indicate the involvement of Cadomian basement in granite magma sources during those two events, reinforcing the idea that Cadomian magmatism played a significant role in Paleozoic crustal evolution of Iberia. The presence of a few Grenvillian zircon forming events in the protholiths of Portalegre granites is significant in the regional geodynamic context of the Iberian Massif.

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