

Saito, S., Arima, M., Nakajima, T., and K. Tani., under revision. Petrogenesis of the Kaikomagatake granitoid pluton in the Izu Collision Zone, central Japan: Evidence for contribution of the K-rich Izu-Bonin rear-arc crust to the source region. Submitted to Contributions to Mineralogy and Petrology.

New geochemical and geochronological data of early Cambrian of SW Iberia: Calc-alkaline magmatism in the transition from active to passive continental margin in North Gondwana

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The Ossa-Morena Zone (SW Iberia) displays a well-preserved record of the history of the northern Gondwana margin in Late Ediacaran-Early Cambrian times. This period of time is marked by the late-stage evolution of the Cadomian magmatic arc and related back-arc basins (c. 590-545 Ma), and the onset of rifting and widespread magmatism (c. 530-500 Ma) that led to the opening of the Rheic Ocean. Here we present new geochemical and geochronological data on some Cambrian granitoids of Ossa-Morena Zone (Barreiros, Barquete, Salvatierra de los Barros, Calera and Tablada bodies) hosted by Serie Negra, a late Ediacaran Succession made of metagreywackes, metapelites, black metacherts and metabasites. The Cambrian granitoids have compositions that vary between quartz-diorite/tonalite to granites, depending on the proportion of restitic material entrained from their source or their crystal fractionation grade. They show low REE contents with slightly higher degree of fractionation showing LREE $(La/Sm)_N = 2.15$ and HREE $(La/Sm)_N = 1.05$, and have negative Eu-anomalies (average $Eu/Eu^* = 0.40$). They also exhibit negative Nb, Sr and Ti anomalies and average $Nb/Th = 1.98$, $Nb/Y = 0.6$, $Zr/Th = 13.64$ ratios that are close to those found in the Bulk Continental Crust. Sm-Nd data display moderate negative ϵ_{Nd} values, ranging from -3.5 to +0.04. The corresponding T_{DM} ages range from 1,30 to 2,57 Ga. The older model ages are suspect, because they correspond to samples with high $^{147}Sm/^{144}Nd$ ratios (0.16-0.18), interpreted to reflect late-stage fractionation of the Sm/Nd ratio, due to separation of a LREE-enriched mineral such as monazite. These ancient model ages and Th/Nb ratios close to upper continental crust values document a significant crustal component. These new whole rock data document the calc-alkaline composition of the Barreiros, Salvatierra de los Barros, Tablada and Calera granites and point to older continental crust materials as predominant contributor to the source of parental magmas. These granites are interpreted as the result of the evolution of mainly crustal magmas dominated by feldspar fractionation in the magma, in an early Cambrian rift-related event (Sanchez-Garcia et al., 2010). Their calc-alkaline signature of these granites is interpreted as result of inheritance of crustal materials derived of subduction-related igneous rocks from the Cadomian arc. New ID-TIMS U-Pb geochronology zircon data yielded an early Cambrian age (c. 524 Ma, U-Pb zircon CA-ID-TIMS dating) for the Barreiros granite. The age obtained reinforces the idea of the relevance of calc-alkaline magmatism associated with rifting in the early Cambrian recently demonstrated by SHRIMP U-Pb geochronology data obtained for the Barquete granite (c.526 Ma; Pereira et al., 2011).

References

- Pereira, M.F., Chichorro, M., Solá, A.R., Silva, J.B., Armstrong, R., Sanchez-Garcia, T., Bellido, F., (2010). Tracking the Cadomian magmatism with inherited zircon ages by in-situ U-Th-Pb SHRIMP geochronology (Ossa-Morena Zone, SW Iberian Massif). *Lithos*, doi: 10.1016/j.lithos.2010.
- Sánchez-García, T., Bellido, F., Pereira, M.F., Chichorro, M., Quesada, C., Pin, C., Silva, J.B., 2010. Rift related volcanism predating the birth of the Rheic Ocean (Ossa-Morena Zone, SW Iberia), *Gondwana Research* v. 17, 2-4: 392-407

Anisotropy of Magnetic Susceptibility in Portuguese Variscan granites

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Anisotropy of Magnetic Susceptibility (AMS) studies of granites are currently carried out as they enable the definition of petrofabrics, the correlation between magnetic susceptibility and rock geochemistry and between magnetic anisotropy and strain rate. Usually in granites, mesoscopic planar fabrics, marked by mica and feldspar, are parallel or nearly parallel to the magnetic planar fabric which is perpendicular to the minor axe of the AMS ellipsoid (K_{min}), while linear fabrics, marked by the alignment of crystals are parallel to the direction of the major axe (K_{max}). Magnetic fabrics give information about the magmatic flow direction, magma flattening and stretching, emplacement mechanisms and rooting zones. In this study we summarize the AMS data from 900 sampling stations of the Variscan Portuguese pluton granites: Porto, Vila Pouca de Aguiar, Chaves, Valpaços, Castelo Branco, Vila da Ponte, Caria, Castro Daire, Romeu (Moreira and Ribeiro, 1994), Monção, Gralheira, Serapicos, Minheu, Nisa (Ribeiro et al. 1995), Viseu and Lavadores. All the facies presented in this study show paramagnetic behaviour (magnetic susceptibility $< 10^{-4}$ SI), except for the granite of Lavadores whose magnetic susceptibility ($> 10^{-3}$ SI) is compatible with the presence of magnetite. In paramagnetic granites, the magnetic susceptibility is a lithological indicator and is a useful parameter in distinguishing facies in composites massifs, as is the case of the granitic bodies of Vila Pouca de Aguiar, Castro Daire, Águas Frias, Nisa, Viseu and Romeu. The two-mica facies present lower values of magnetic susceptibility than the biotite facies, allowing a categorization for Variscan granites based on this parameter. AMS can be used as a "marker" for the intensity of deformation that the magma experienced during emplacement. Post-tectonic granites as those of Vila Pouca de Aguiar, Caria, Vila da Ponte, Chaves and Monção have a magnetic anisotropy expressed by the parameter P ($(K_{max}/K_{min}-1) \times 100$) less than 2.5%. Syntectonic granites, such in Porto and Viseu, which present deformation microstructures, have P higher than 6%. Generally the magnetic foliations are concentrically distributed, parallel to the contours of the granitic bodies with variable plunges in Vila Pouca de Aguiar, Águas Frias, Castelo Branco, Vila da Ponte and Caria. In Castelo Branco, Castro Daire, Gralheira and Viseu-Cota plutons the magnetic foliations dip exceeding 70° , suggesting a great thickness, which can be related to a syntectonic emplacement. On the contrary, in Valpaços, Vila Pouca de Aguiar, Águas-Frias and Vila da Ponte the magnetic foliations have moderate dips, always below 30° , denoting thin granite intrusions. In the cases where the emplacement was controlled by major structures (e.g. deep faults) as in Vila Pouca de Aguiar and Chaves plutons, the magnetic lineations are usually subparallel to these major structures. In Gralheira and Serapicos granites magnetic lineations reflect the magma stretching caused by a shear deformation related to the D3 Variscan phase. In Vila da Ponte and Caria granites, the magnetic lineations materialized late Variscan stress fields. In all the studied granites, magnetic lineations have low to moderated plunges, pointing