New geochemical and isotopic data of granites and metamorphic rocks from the Boa Fé gold prospect (Ossa-Morena Zone, Portugal)

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The Boa Fé gold prospect is located within the Montemor-o-Novo Shear Zone, in the Ossa-Morena Zone (OMZ), one of the major geotectonic units of the Iberian Variscan chain. The studied samples were obtained in drill cores and they may be divided into: metasediments from the Série Negra lithostratigraphic unit (Ediacaran); metabasites, also from Série Negra; late-Variscan granites.

The metasediments are micashists to paragneisses displaying Qz + Pl + Bt + Ms + Mag + Ilm ± Tur ± Sil ± Crd + Zrn as peak metamorphic assemblage, whilst the metabasites are amphibolites showing the paragenesis Pl + Hbl + Qz + Mag + Ilm ± Bt. In both types of metamorphic rocks, Apy, Lo, Py, Sp, Ccp and Po, related with late hydrothermal events, are commonly found. Immobile trace element compositions of both metasediments and metabasites are compatible with the generation of their protoliths in a magmatic arc setting. Microstructures observed in the metamorphic rocks testify for two major ductile deformation phases, probably corresponding to the Variscan D1 and D2 previously identified in the autochthon of the OMZ. The most penetrative tectonic anisotropy is a crenulation schistosity.

Isotopic compositions calculated for a plausible age for the genesis of late-kinematic granitoids show the following ranges: $-10.6 \leq \varepsilon Nd_{320Ma} \leq -8.9$ and $0.7110 \leq (^{87}Sr/^{86}Sr)_{320Ma} \leq 0.7148$, in the metasediments; $+2.9 \leq \varepsilon Nd_{320Ma} \leq +4.3$ and $0.7093 \leq (^{87}Sr/^{86}Sr)_{320Ma} \leq 0.7125$, in the amphibolites.

The studied late-Variscan granites are strongly peraluminous (A/CNK ≥ 1.2), and have quartz, microcline, Na-plagioclase and muscovite as the most abundant minerals. Biotite, zircon, apatite, opaques, tourmaline and sillimanite occur as accessories. Considering isotope geochemistry, $(^{87}Sr/^{86}Sr)_{320Ma}$ varies between 0.7107 and 0.7169, whilst the εNd_{320Ma} values go from -6.7 to -9.0. These data can be explained by a strong involvement of anatexis of the Série Negra metasediments in the genesis of the granitic magmas.

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