

Multidisciplinary study of an enclave swarm in the Évora granitoid

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The enclave swarm of Pomarinho is located in the SW edge of Évora granitoid [1], in the SW sector of the Ossa-Morena Zone (Iberian Variscides). The swarm, with a privileged 3D exposure, was sampled for geophysical, petrographic and geochemical studies in order to better understand the chemical and mechanical processes involved in the genesis of that structure.

The enclaves have tonalitic and granodioritic compositions, whereas the host correspond to a very homogeneous light-coloured granodiorite. Major and trace elements as well Sr and Nd isotopic data suggest a derivation of the enclaves and the host granodiorite from a common primitive melt through magmatic differentiation. The parental melt is related to a mantle source, with no or only small contribution of metasedimentary crustal materials [2].

The tonalitic enclaves have Mg-hornblende [$Mg/(Mg+Fe^{2+})=0.56-0.68$] and biotite [$Mg/(Mg+Fe^{2+})=0.50-0.53$], whereas in granodioritic enclaves the biotite [$Mg/(Mg+Fe^{2+})=0.47-0.50$] is the main mafic phase. Plagioclase of tonalitic enclaves have compositions of An_{23-42} with normal zoning whereas plagioclase of granodiorite is more evolved with An_{13-44} . One granodioritic enclave testifies for a more complex mechanisms once it preserves plagioclases with a widest compositional range (from An_{18} to An_{69}) in agreement with the role of a more primitive parental melt.

In order to infer the petrofabric, two types of magnetic fabrics were evaluated: anisotropy of magnetic susceptibility (AMS) and anisotropy of anhysteretic remanent magnetization (AARM). AMS results from granite and swarm enclave samples collected along two profiles show very similar results, defining an overall mean tensor with $K1 = 179.1^\circ/33.4^\circ$, $K2 = 315.4^\circ/47.6^\circ$ and $K3 = 73.0^\circ/22.9^\circ$ for 71 samples from granite and 25 of the enclave. AARM measurements from granite define an ellipsoid with principal axes that share the same orientation of the AMS ellipsoid. In what concerns the enclaves, AARM ellipsoid shows a distinct orientation, with principal axes defined by $R1 = 248.7^\circ/31.0^\circ$, $R2 = 89.0^\circ/57.3^\circ$ and $R3 = 344.4^\circ/9.2^\circ$.

The absence of agreement between the orientations of AMS and AARM ellipsoids for samples of the enclave could be related with the presence of single domain magnetite (giving rise to an inverse magnetic fabric) or with the existence of distinct alignments of the paramagnetic and ferromagnetic fractions due to changes of the stress field during their recrystallization.

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[1] Carvalhosa (1983) *Comun. Serv. Geol. Portugal*, **69** (2), 201–208.

[2] Moita, et al., (2011) *Abstract, Hutton Symposium.*, pp: 99-100.