Geophysical Research Abstracts
Vol. 15, EGU2013-7985, 2013
EGU General Assembly 2013

AMS and IRM studies in the late-variscan Santa Eulália Plutonic Complex (Ossa-Morena Zone, Portugal)

Helena Sant'Ovaia (1), Celeste Gomes (2), José Carrilho Lopes (3), Pedro Nogueira (4), Claudia Cruz (1), and Armando Rocha (2)

(1) Porto, Geology Centre, Geosciences, Environment and Spatial Planning, Porto, Portugal (hsantov@fc.up.pt), (2) CGUC, DCT, Faculdade de Ciências e Tecnologia da Universidade de Coimbra, Portugal, (3) CeGUL, DG-Universidade de Évora; Portugal, (4) CGUP, DG-Universidade de Évora

The Santa Eulália Plutonic Complex (SEPC) is a calc-alkaline granitic body, with an area of 400 km2, and is located in the north of the Ossa Morena Zone of the Variscan Iberian sector, near the limit with the Central Iberian Zone. SEPC is considered late-Variscan because it cross-cuts the regional variscan structures. The host rocks are metamorphic formations from Upper Proterozoic to Lower Paleozoic. The SEPC has two main granitic facies with different compositions and textures. From the rim to the core, there is a medium-to coarse-grained pink granite (G0), which involves large elongated masses of mafic to intermediate rocks (M); and a central grey monzonitic granite (G1) which presents a dominant medium granular facies, and also a slight porphyritic texture close to G0. AMS and IRM studies were conducted to characterise these rocks, from 61 sampling sites: 29 in G0, 27 in G1 and 5 in M. The Km values range between 41.6 and 7343.7 x 10-6 SI in granitic rocks: G0, with Km > 10-3 SI (mean: 1357.4 x 10-6 SI) which supports the presence of magnetite, and G1 with Km< 10-4 SI (mean: 97.0 x 10-6 SI). In M, Km values are homogeneous with a mean of 620.9 x 10-6 SI. The magnetic anisotropy (P%) and the ellipsoid shape (T) were only determined in granites. The mean values of P% are 6.2% and 3.1% in G0 and G1, respectively. T shows the strongest oblate ellipsoids in central G1 (mean: 0.365) and slightly oblate in G0 (mean: 0.099). The magnetic foliations are subvertical ENE-WSW-striking in G0 and G1. Magnetic lineations are subvertical in G0 and moderately plunge to the SE in G1.The saturation IRM (SIRM) mean values are 9.345 A/m in G0, 0.027 A/m in G1 and 2.634 A/m in M. In G0 and M, the IRM acquisition curves show saturation between 0.3 and 0.4 T, followed by a small increase in increasing fields, suggesting that the main carrier of remanence is low magnetite or Ti-magnetite. In G1, the acquisition curves demonstrate paramagnetic and antiferromagnetic fractions, but a small magnetite fraction can also be present. SIRM/K have mean values of 7.119 kA/m, 0.298 kA/m and 3.425 kA/m for Go, G1 and M, respectively. The AMS and SIRM data support that G0 and G1 have a distinct magnetic behaviour. G0 is controlled by a ferrimagnetic fraction. G1, with Km< 10-4 SI, shows a paramagnetic behaviour due to ferromagnesian minerals, such as biotite and ilmenite. In M, Km is typical of gabbros and granodiorites and is due to the high contents of ferromagnesian minerals. The magnetic behaviours of G0 and G1 suggest different redox conditions in the magma genesis. Magnetic anisotropy is higher in G0 due to the presence of magnetite, but microscope observations also show signs of a post-magmatic deformation in G0. Although magnetic foliations are subvertical ENE-WSW-striking in both granites, magnetic lineations are different. The differences reflect distinct redox processes at magmatic sources and different emplacement mechanisms of M, G0 and G1.

Acknowledgements: PTDC/CTE-GIX/099447/2008 (FCT-Portugal,COMPETE/FEDER).