Petrophysical characterisation of the episyenitization processes in Guarda granite (Central Portugal)

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The petrography, geochemistry and petrophysical characterization of some episyenitization zones in a late hercynian biotitic porphyritic granite from central Portugal (Guarda granite) was carried out.

The episyenitization processes which have affected the granite from Guarda, implied an important mobility of SiO_2 and Na_2O associated with quartz dissolution and albitization [1].

Furthermore the alteration of ferromagnesian minerals implied the incorporation of Fe and Mg in new mineral phases in oxidizing conditions such as hematite and chlorite. Because of that, the episyenitization affects not only the mineralogical and geochemical composition of the rock, as well as, the petrophysical characteristics of the granite.

In order to characterise petrophysical changes, measurements of magnetic susceptibility of 10 samples collected in a zone which comprise granite with episyenitization and fresh one, were performed using a KLY4-S Kappabridge susceptometer (4×10^{-4} T; 920 Hz, AGICO, Czech Republic) at the "Petrophysical Laboratory" in Porto. The analysis of magnetic susceptibility variations shows a decrease of values from 190×10^{-6} SI (in fresh granite) to 140×10^{-6} SI (in altered granite).

The decrease of magnetic susceptibility is explained by the breakdown of biotite and ilmenite and the neoformation of chlorite and hematite.

This variation of magnetic susceptibility from fresh granite to altered one is also observed in Bohus granite [2]. However in this case, a more intensive decrease was present because the initial granite had magnetite contrarily to Guarda ilmenite granite.

References

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