RELIABILITY OF AMS IN A PARAMAGNETIC GRANITE, COMPARISON WITH IMAGE ANALYSES, QUARTZ CPO AND LT-AMS (MARIMANHA, PYRENEES)

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The Anisotropy of Magnetic Susceptibility (AMS) at room temperature has been used for decades as a means to gain further understanding of petrofabrics within granites. Hence, the orientation of the magnetic ellipsoid is used as a kinematic marker for the emplacement mechanism of granitic bodies. In order to secure a correct interpretation of AMS as a result of magmatic fabric, one factor must be considered: the carrier of the AMS. In the case of the paramagnetic Marimanha igneous body, the carrier of the magnetic fabric is biotite (Antolín et al., 2007), which represents 20-25 % vol. as seen in thin section. Five sites chosen from the five petrographic zonations of the plutonic body are further studied via image analyses of biotites and crystallographic preferred orientations (CPOs) of quartz. On one hand there will be an external control of the AMS with the image analyses of biotite and on the other, more information of the orientation of quartz grains provide new data about the behavior of crystals during emplacement. In addition, the relationship between paramagnetic and diamagnetic grains will be established. The image analyses followed two approaches, on one side, the orientation of the biotite is studied in three perpendicular thin sections and on the other, the basal planes of biotites are represented as lines, whose orientation is subsequently studied again in the same thin sections. The crystallographic orientations of quartz c-axes were measured using electron backscatter diffraction (EBSD) analyses. In addition, cooled samples (down to 77ºK) are analyzed to obtain the LT-AMS and to compare with the AMS at room temperature.
Preliminary results from this weakly oriented granitoid suggest that the paramagnetic mineral biotite is the carrier of the AMS at room and at low temperature. Image analyses seem to have different solutions for every site and do not correspond directly to AMS results. The orientation of quartz c-axes is different in the five sites. These results are discussed in terms of crystal orientation, rock composition and influence of the shape and degree of anisotropy of the orientation ellipsoid.

AMS, image analyses, crystallographic orientation

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