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Detailled AMS analysis of recent dykes. Inferences about the flow regime and progression magnetic trends.

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Anisotropy of Magnetic Susceptibility (AMS) has been applied to characterize the flow and emplacement conditions in tabular intrusions. The results in dykes have shown different models of relationship between the AMS ellipsoids and rock-fabric. These models include: a) imbrications during the flow observed in the margins of the intrusion (in the proximity of the dyke walls), b) magnetic lineation parallel to the flow, c) magnetic lineation normal to the flow (rolling of particles) or d) not evident relations between the flow and the magnetic axis. This complexity makes that, even when no mineralogical complexities exist, a contrast with outcrop evidences, shear indicators, orientation of grain, bubbles or vacuoles are needed.

This complexity can be increased when this methodology is applied to old dykes, where not only the flow has influenced the AMS. In cases where the emplacement is syn-tectonic, or where deformational processes after the emplacement exist, the relation between flow regime and AMS can be more complex.

To understand the changes and the model of emplacement in dykes, 12 recent dykes in sub-vertical position have been chosen to analyze the changes in orientation and the magnetic parameters along profiles border-center-border. The usual methodology recommends the sampling preferentially in the margin of the dykes. In this sense, the sampling has been focused in the margins but sampling also the whole extension. The average of cores for dyke is 54 (98 samples).

The emplacement conditions of these dykes are related with a fracturation net parallel to the MAR in a passive manner. The dykes come from the Corvo and Flores islands, situated over North American Plate in the Western Azores (Portugal).

Ten of the sampled dykes show clusters of axes and not significant variations in orientation of the magnetic ellipsoid between the sampling along the cross-sections border-center-border and the samples from both sides. Only two of the sampled dykes show significant variations in orientation of the magnetic ellipsoid. In these two cases, imbrications of the magnetic foliation can be observed in relation with the dyke walls, while in the center of the dykes the magnetic lineation is parallel to the flow, parallel to the intersection lineation between the magnetic foliation of both sides and parallel to the flow indicators at outcrop scale.

The study of the magnetic parameters shows symmetrical trends along the cross-sections. In a border-center section it can be observed an increase of the lineation parameter parallel to a decrease of the foliation and the degree of anisotropy. The changes in the shape of the ellipsoid progress from oblate fabrics in the margins and triaxial to prolate fabrics in the center of the dykes. This progression happens with independence of the change in orientation of the magnetic ellipsoid, showing that the flow regime follow the same changes along a border-center section.

The flow in some cases can be better defined if the whole dyke is sampled, or even just the center of it, in contrast with the expected results in the borders that can be influenced by the local irregularities of the flow and the dyke wall. These results imply that the whole dyke sampling is recommended mainly when other processes different to the flow can be present in the dykes, as deformation syn or post- emplacement.