USES OF ANISOTROPY OF MAGNETIC SUSCEPTIBILITY IN THE STUDY OF EMPLACEMENT PROCESSES OF LAVA FLOWS AND DYKES

EDGARDO CAÑÓN-TAPIA

CICESE, Dept. of Geology. Ensenada, Mexico, email:ecanon@cicese.mx

The anisotropy of magnetic susceptibility (AMS) is a powerful technique that can be used to explore in detail the mineral fabric of many types of rocks. In particular, it is well suited to determine mineral fabric of massive, otherwise featureless rocks, like for example the internal parts of many lava flows and dykes. Like most other mineral fabric indicators, the AMS is mainly acquired at a stage when flow-related deformation promotes a mineral array within the melted rock. Unlike is the case with other petrofabric methods, however, the effort required to obtain three-dimensional information of such mineral array using AMS is much reduced, although due to differences in the shape of various minerals involved in the process of fabric acquisition it is possible to find some differences between magnetic and optically determined mineral fabrics. When attention is given to the systematic variations of the AMS within a lava flow or dyke, however, the AMS method allows us to infer aspects of lava (magma) emplacement that are not easy to study through other traditional petrofabric techniques. Such detailed information can be used to obtain a detailed record of the internal deformation of one flow unit with relative ease and little effort. Despite of these advantages, the abundant information obtained from one single unit through AMS methods might not be interpreted in a simple form. The main complications arise from two contrasting premises. On the one hand it can be assumed that mineral fabric remains constant along one single unit, and therefore departures from an expected value are considered indicative of post-emplacement alteration. Alternatively, it can be considered that changes in the mineral fabric are to be expected due to changing conditions of emplacement. For this reason, a more thoroughly investigation that takes into consideration independent lines of information is always advisable. Nevertheless, AMS remains as the most powerful petrofabric method currently available that allows to gain insights in the three dimensional history of emplacement of lava flows and dykes.

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Edgardo Cañón-Tapia. CICESE, Dept. of Geology.PO Box 434843, San Diego CA, 92143 USA
Tel 52 646 1750559, email:ecanon@cicese.mx