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Dyke propagation and magma flow direction inferred from anisotropy of magnetic susceptibility. Preliminary results from the basaltic shield of Tenerife (Canary Islands)

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The basaltic shield of Tenerife crops out in the Teno, Roque del Conde and Anaga massifs and consists of a volcanic pile of basaltic lavas, minor basaltic pyroclastic rocks, and phonolitic domes and intrusions on top of the pile. This succession is intruded by sub-vertical dykes mostly of mafic composition, although phonolitic dykes also occur. The dykes of the basaltic shield were preferably intruded along three different rift systems, roughly oriented N-S, ENE-WSW and NW-SE.

Despite the overall upwards direction of magma flow during dyke emplacement, significant radially directed horizontal flow components can contribute to the net magma trajectories. While magma is flowing in a dyke, simple shear caused by flow along the static wall rock will cause imbrications of the elongated particles against the margins of the dyke. The anisotropy of magnetic susceptibility (AMS) reproduces the fabric of a rock, which is characterized by the arrangement of elongated minerals considered as rigid markers that have acquired a flow alignment in a viscous medium.

Dyke profiles across the basaltic shield of Tenerife have been sampled for AMS analysis in order to deduce dyke propagation and magma flow direction during the shield stage of the island. Samples were collected close to both margins of the dykes to find imbrications against the dyke walls, and other flow indicators such as vesicle and phenocrysts lineation, buds and cusps were also collected in the field to infer the az-

imuth of dyke propagation and magma flow. Normal fabrics and triaxial anisotropy predominate in all dyke systems. Preliminary results suggest that dyke propagation in the NW-SE dyke system of the Teno massif was upwards and towards the NW and magma flow within dykes range from subhorizontal to subvertical mainly to the NW. Cross cutting relationships between dykes observed in the field indicate that in Teno the dykes of the ENE-WSW system postdate the dykes of the NW-SE and N-S systems. The Roque del Conde massif shows only a N-S dyke system with predominant dyke propagation upwards and towards the S, and magma flow ranging from subhorizontal to subvertical mainly to the S.