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Magnetic fabrics in jotunite dykes from the Late-Proterozoic Rogaland anorthosite province (SW Norway)

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In the Late-Proterozoic (ca. 930 Ma) Rogaland anorthosite province of SW Norway, igneous rocks from the jotunite (hypersthene monzodiorite) suite occur as dykes and small plutons (Duchesne et al., 1989). The jotunite dykes extend up to 20 km in length and cut across large anorthosite bodies and mafic cumulates of the Bjerkreim-Sokndal layered intrusion. A study, based on the anisotropy of low-field magnetic susceptibility (AMS) technique (Borradaile and Henry, 1997), was conducted on three major Rogaland jotunite dykes: the Vetteland, Varberg and Lomland dykes. The bulk magnetic susceptibility (usually in the range 50-100 mSI) and the AMS are most probably carried by magnetite grains (ranging in size from 0.1 to 0.5 mm). Average AMS foliations and lineations allow to constrain the geometry of the dykes, as well as the orientation of the magmatic fabric. Variations of the magma flow orientation, as evidenced from one dyke to another, indicate magma feeding through distinct chambers, which strengthens previous conclusions based on geochemistry (Duchesne et al., 1989). A rough location of these magma chambers is given. Sigmoidal structures, that are locally displayed by the AMS axes, are preliminary interpreted as indicating emplacement of the dykes in an external, non-coaxial strain field (Féménias et al., 2004). If this interpretation holds true, the present study would throw a new light on the emplacement mechanism of the Rogaland jotunite dykes. Indeed, these dykes have been considered until now as being post-tectonic and also younger than gravitary deformations that occurred inside the anorthosite province and were related to the anorthosite diapirism (Barnichon et al., 1999) and to the subsidence of the Bjerkreim-Sokndal layered intrusion (Bolle et al., 2002).

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