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Can the anisotropy of out-of-phase magnetic susceptibility help in distinguishing geologically and physically controlled inverse magnetic fabrics in volcanic dykes?

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One of the most important mechanisms of the mass transport within the Earth's crust and the upper mantle is the magma movement within the dykes. In some dykes, the magma movement is represented by almost free flow infilling more or less open fractures in host rocks, while it has character of forceful injection of the host rocks in the other dykes. The magnetic fabric originated by the free flow (called normal type) is characterized by the magnetic foliation approximately parallel to the dyke plane and the magnetic lineation, which is also parallel to the dyke plane, can be vertical, horizontal, or even oblique according to the magma flow in a dyke. On the contrary, the forceful injection mechanism may give rise to the magnetic fabrics called the intermediate and/or inverse fabrics, in which the magnetic foliation is perpendicular to the dyke plane. Unfortunately, the intermediate and inverse magnetic fabric types can also originate in the free flow magma movement if the minerals carrying the AMS are represented by single-domain (SD) grains. In order to distinguish between geologically and physically controlled inverse fabrics, the anisotropy of magnetic remanence (AMR) is often used, because the AMR indicates the shape preferred orientation of ferromagnetic minerals regardless of their domain state (SD vs. MD). Recently, we noticed relatively close correlations between the anisotropy of out-of-phase magnetic susceptibility (opAMS) and AMR, which brought us to the attempt to examine in more detail the nature of this correlation with the aim to find out whether the opAMS, which is measured automatically with the standard AMS using the KLY-5 Kappabridge, may substitute the ARM at least in some cases of volcanic dykes.