

## Overprints of magnetic fabric: A review

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The magnetic fabrics in sedimentary, volcanic, and plutonic rocks primarily originate during deposition, lava or ash flow, and magma flow, respectively. During later rock development, these magnetic fabrics can be overprinted by various processes among which regional metamorphism and ductile deformation tectonic in origin are probably the most frequent and important. Because of the second rank tensor character of the anisotropy of magnetic susceptibility (AMS) it is often difficult to recognize whether a particular magnetic fabric was overprinted or not. The primary magnetic fabric of sedimentary rocks has only limited variability despite of possibly large variability of the deposition conditions. The degree of AMS is relatively low (usually  $P < 1.05$ ), the AMS ellipsoid is always planar ( $T > 0$ ) and the magnetic foliation is near the bedding. The magnetic lineation is mostly parallel to the direction of near-bottom water current, while in some cases it can be perpendicular (for example in turbidites of the A member of the Bouma cycle).

Even since its first investigations into volcanic rocks in the early sixties, the AMS has been considered to reflect the preferred orientation of titanomagnetite grains by grain shape produced by lava flow and the magnetic fabric is then conformable to the shapes of the volcanic bodies. In lava flows, sills, dykes, and other tabular bodies, the magnetic foliation is approximately parallel to the panel and the magnetic lineation is often parallel to the flow direction even though it can also be perpendicular.

The magnetic fabric in granitic rocks primarily originates during the emplacement of these rocks into the upper layers of the Earth's crust. They are usually characterized by the conformity of the magnetic fabric with the intrusion-induced mesoscopic fabric elements, if observable, and/or with the shapes of magmatic bodies, and by the relatively low degree of AMS.

During metamorphic and/or tectonic overprint, the degree of AMS in general increases with progressing deformation and the magnetic foliations and magnetic lineations are reoriented from the primary directions towards parallelism to the doubtless deformational fabric elements in the body considered or in surrounding rocks. The overprint can range from weak, hardly identifiable, to strong transiting to obliteration. Various examples of these stages are shown.