Geophysical Research Abstracts
Vol. 15, EGU2013-1450, 2013
EGU General Assembly 2013

Pyrrhotite fabric in mantle and lower crust rocks as revealed by the field-dependent AMS

Frantisek Hrouda
Agico Ltd, Magnetism, Brno, Czech Republic (fhrouda@agico.cz)

In the Moldanubian Zone of the European Variscides, numerous bodies of ultramafic rocks occur embedded in granulite. In some of these rocks, pyrrhotite was identified as one of important magnetic minerals by temperature variation of susceptibility and field variation of susceptibility. A question arises whether the pyrrhotite is the primary or it originated epigenetically. The question can be solved through the investigation of the relationship of the pyrrhotite sub-fabric to the whole-rock fabric. If both the fabrics are coaxial, the pyrrhotite fabric is probably primary, while if the fabrics differ, it is probably epigenetic.
The pyrrhotite sub-fabric can be investigated through low-field variation of the anisotropy of magnetic susceptibility (AMS). Namely, if the rock shows low-field variation of susceptibility and AMS, one can resolve the whole-rock AMS into the field-independent and the field-dependent components. The former component is typically is due to mafic silicates and/or pure magnetite, even though the field-independent initial susceptibility of minerals with field-dependent susceptibility can also play a role. The latter component is exclusively due to pyrrhotite, hematite or high-Ti titanomagnetites. The susceptibility vs. field curves are initially very steep, later being much less steep in pyrrhotite, while they show moderate steepness in the entire curve course in high-Ti titanomagnetites. In this way, one can differentiate between pyrrhotite and high-Ti titanomagnetites.
The pyrrhotite AMS sub-fabric is roughly coaxial with the whole-rock AMS fabric both in ultramafic bodies and host granulites. However, these fabrics are oriented in different ways in ultramafites and in granulites. All this indicates that pyrrhotite is primary mineral in both types of rocks.