Geophysical Research Abstracts
Vol. 20, EGU2018-18347, 2018
EGU General Assembly 2018

Analogue modelling of magnetic fabric in ductile shear zones

Matej Machek, Zuzana Roxerova, and Vladimir Kusbach
Institute of Geophysics of the CAS, v. v. i., Praha 4, Czech Republic (mates@ig.cas.cz)

The AMS has become an extensively used method in structural geology as useful, precise and quick technique to measure the internal rock structure. However, the lack of comprehensive information about the governing processes of AMS in rocks can make interpretation difficult. There is discussion concerning origin of the magnetic fabric, its correlation with the bulk deformation and rock strain memory. The aim of the study is to bring new insights into the time and space relationships between finite strain microstructure and AMS fabric by providing new comparative data from analogue shear zones.
Relationship of AMS with increasing strain has been previously studied experimentally in deformed sandstones, plasticine, magnetite bearing sand bonded with cement and during preparation and compaction of calcite and muscovite aggregate and simple shear experiments on mixture of silicone and wax.The apparatus for analogue modelling is designed as a large shear-box enabling strain rate/shear zone of variable width. The experiments are carried out with the coloured plaster of Paris with 1wt % of powder retarding the solidification reaction. The used material displays a strain-rate dependent (thixotropic) rheology and is capable to well-reproduce the strain localization and very well corresponds to natural rocks. Experimentally produced shear fabric in plaster is analyzed in terms of AMS due to homogeneously admixed fine-grained magnetite. By varying experimental strain rate we are able to simulate ductile to brittle behavior of the shear zones and document AMS evolution by the strain localization.