Geophysical Research Abstracts
Vol. 13, EGU2011-12002, 2011
EGU General Assembly 2011

Absolute paleointensity determination: An improved phenomenological model

Roman Leonhardt
ZAMG, Conrad Observatory, Wien, Austria (roman.leonhardt@zamg.ac.at)

The phenomenological description of TRM and pTRM acquisition based on its unblocking and blocking characteristics is revisited. Based on new experimental observations of pTRM properties, the earlier models are improved. The new description is simple and is based on a similar amount of parameters as earlier approaches. For the first time, however, it is now possible to develop a phenomenological model which agrees well with experimental observation related to domain state correctly both in sense and amplitude. This new model can be easily applied to any paleointensity protocol. Therefore, a comprehensive investigation of benefits and drawbacks of such protocols is possibly.
Based on experimental observations, earlier phenomenological models are improved in three essential aspects. These improvements allow for describing all usually applied paleointensity determination techniques. Firstly, the effect of in-field heating, which leads to larger magnetizations during pTRM acquisition of MD grains than zero-field heating is included. Secondly, the influence of high-temperature and low-temperature magnetization tails is modified with respect to earlier phenomenological descriptions, in order to comply with experimental observations. Finally, previous magnetization states are regarded for, which leads to a excellent simulation of experimentally observed thermal stabilization effects.
Using this new modelling approach several modifications of the Thellier protocol are investigated and compared with multiple specimen approaches to determine the absolute paleointensity of the ancient magnetic field.