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Paleomagnetism of the Rochechouart Meteorite Impact Crater: Field Reversal or Self Reversal?

M. Eitel, S. Gilder, and J. Pohl
Ludwig-Maximilians-Universität, Munich, Germany (michael.eitel@geophysik.uni-muenchen.de)

Paleomagnetic investigations on the Rochechouart (France) impact structure reveal three kinds of stable magnetization directions: solely normal, solely reversed and samples with multiple, often antipodal, magnetization components. Possible explanations for this observation are: (1) the rocks record a geomagnetic field reversal during the time it took the impact melts and suevites to cool through the Curie blocking temperature, and (2) a self-reversal mechanism is to blame. In order to distinguish between the two possibilities, the rocks have been investigated by detailed stepwise thermal demagnetization, rock magnetic and Thellier-Thellier paleointensity experiments. Determinations of the Curie temperatures reveal a well-defined grouping correlating with the sampling locality. The reproducibility of a self-reversal has been tested by imparting a laboratory TRM to the samples followed by stepwise thermal demagnetization. No evidence for a self-reversal was found. In order to examine the reproducibility of a geomagnetic field reversal a further experiment was performed by reversing the direction of the artificial magnetic field during cooling of the rocks. Stepwise demagnetization revealed only a single polarity. We will also present observations from optical, thin section and scanning electron microscopy that provide information about the magnetic mineralogy of the rocks.