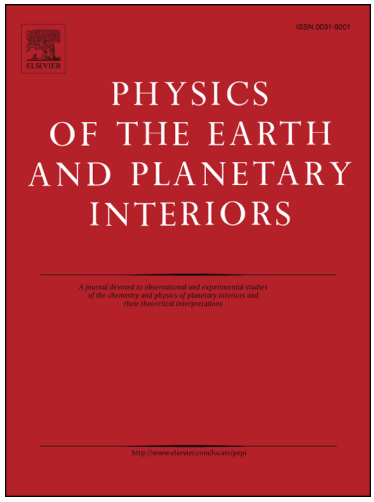

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A high-resolution record of the Matuyama-Brunhes transition from the Mediterranean region: the Valle di Manche section (Calabria, Southern Italy)

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Abstract

High-resolution palaeomagnetic and rock magnetic investigations on the Valle di Manche section (Crotone Basin, Calabria, Southern Italy) provide a detailed record of the Matuyama-Brunhes (M-B) reversal that, to our best knowledge, is the only available record of the last geomagnetic reversal for the Mediterranean on-land marine stratigraphy. The M-B transition can be pinpointed precisely, as it develops within a 3-cm-thick interval located just above a prominent tephra layer (the "Pitagora ash") where the sedimentation rates are about 27 cm/kyr. Demagnetization analyses indicate a stable palaeomagnetic behaviour throughout the section for both normal and reversed polarity directions, with demagnetization vectors aligned toward the origin of Zijderveld diagrams after the removal of a small viscous low-coercivity remanence component. In the lower part of the studied interval, some samples acquired a spurious gyromagnetic remanent magnetization (GRM) during AF demagnetization in high fields. Rock magnetic analyses confirm that magnetite is the main magnetic carrier for all measured specimens, which also have an abundant paramagnetic fraction. Only the lower part of the record, well below the M-B boundary, is characterized by a downward-increasing presence of iron sulphides (greigite). According to our chronology, which is based on a robust, cross-validated age model, the final reverse-to-normal directional change of the M-B transition occurred at ca. 786.9 ± 5 ka (error includes uncertainty in orbital tuning) and was very rapid, of the order of 100 years or less.

Keywords: Magnetostratigraphy, Middle Pleistocene, MIS 19, Matuyama-Brunhes transition,