Geophysical Research Abstracts
Vol. 16, EGU2014-7298-1, 2014
EGU General Assembly 2014

New constraints on the maximum rate of change of the geomagnetic field intensity in Western Europe during the last two millennia

Miriam Gomez-Paccard (1), Maria Luisa Osete (2,3), Annick Chauvin (1), Manuel Pérez-Asensio (4), and Pedro Jimenez-Castillo (5)

(1) Géosciences-Rennes, UMR 6118, Université de Rennes 1, Campus de Beaulieu, Bât. 15, CS 74205, 35042 Rennes, France. (mgomezpaccard@gmail.com), (2) Departamento Física de la Tierra I, Facultad de Ciencias Físicas, Universidad Complutense, 28040 Madrid, Spain, (3) Instituto de Geociencias (IGEO), CSIC, UCM, Ciudad Universitaria, 28040 Madrid, Spain, (4) Archeologist, Granada, Spain, (5) Escuela de Estudios Árabes EEA-CSIC, c/Frailes de la Victoria, 18010 Granada, Spain

Available European data indicate that during the past 2500 years there have been periods of rapid intensity geomagnetic fluctuations interspersed with periods of little change. The challenge now is to precisely describe these rapid changes. Due to the difficulty to obtain precisely dated heated materials to obtain a high-resolution description of past geomagnetic field intensity changes, new high-quality archeomagnetic data from archeological heated materials founded in well-defined superposed stratigraphic units are particularly valuable. In this work we report the archeomagnetic study of several groups of ceramic fragments from southeastern Spain that belong to 14 superposed stratigraphic levels corresponding to a surface no bigger than 3 m by 7 m. Between four and eight ceramic fragments were selected per stratigraphic unit. The age of the pottery fragments range from the second half of the 7th to the11th centuries. The dates were established by three radiocarbon dates and by archeological/historical constraints including typological comparisons and well-controlled stratigraphic constrains.Between two and four specimens per pottery fragment were studied. The classical Thellier and Thellier method including pTRM checks and TRM anisotropy and cooling rate corrections was used to estimate paleointensities at specimen level. All accepted results correspond to well-defined single components of magnetization going toward the origin and to high-quality paleointensity determinations. From these experiments nine new high-quality mean intensities have been obtained. The new data provide an improved description of the sharp abrupt intensity changes that took place in this region between the 7th and the 11th centuries. The results confirm that several rapid intensity changes (of about $\sim$15-20 μT/century) took place in Western Europe during the recent history of the Earth.