



Prehistoric ceramics as recorders of the earth's magnetic field intensity : case studies from North-Central Greece and a multidisciplinary approach for material selection

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Archaeomagnetic studies have been performed on Greek materials since the 70's, initially by foreign research groups. Development at national scale and improvements of techniques lead to the elaboration of robust databases which, together with the ones of Bulgaria constitute an almost continuous recording of the three elements of the geomagnetic field for the South Balkans during the last eight millennia. At a local scale, important dispersions and several chronological gaps are observed. The most prominent is the one for the Neolithic and Chalcolithic periods and the effort of the Thessaloniki research group and collaborators to fill this gap resulted in new, accurate results for the direction and intensity of the field using in situ burnt structures. In parallel, several collections of ceramics and pottery belonging to this period have been selected and six of them already studied. Among them, new results from two Chalcolithic – Bronze age sites in Northern Greece are presented here, obtained through a classical Thellier experiment, and following all accompanying corrections –TRM anisotropy and cooling rate. The new results are compared and discussed along with the four previously published ones, which include two Neolithic sites as well, and a better constrained pattern for the intensity variation at this period starts to appear. The use of pottery for intensity studies revealed in two other, unpublished, studies unexpected difficulties, with anomalously high rates of failure, in spite of careful pre-selection based on worldwide established criteria, concerning their magnetic properties and suitability. In order to reduce this risk, an effort is provided in the new study presented here, to insert additional information from other disciplines-optical and magnetic methods. For this purpose First Order Reversal Curves (FORC) diagrams and detailed mineralogical analysis were used in order to better characterize the material's potential for intensity studies. Most FORC diagrams show a mixture of superparamagnetic and monodomain grains, with very little magnetic interactions. A very high-coercivity mineral is sometimes present. Mineralogical analysis has revealed quite high firing temperatures for the sherds and constrained better their firing conditions. This effort is on-going, with the study of new collections, from different geological environments, in progress. The archaeological information on heating techniques and local ceramic production protocols will be of capital importance towards this direction.