Archaeomagnetic directional data: catalogue and a preliminary secular variation curve for Greece.

E. De Marco (1), D. Kondopoulou (1), S. Spassov (2)

(1) Geophysical Laboratory, Aristotle University of Thessaloniki 54124, Greece, (2) Centre du Physique du Globe, Institut Royal Météorologique de Belgique, Dourbes B-5670, Belgium

In order to enhance the information on the past geomagnetic field in the Mediterranean area, field surveys and sampling campaigns have been carried out in Greece since several decades. Recently, archaeomagnetic studies have been performed at six archaeological sites, located in northern Greece (Katerini, Edessa, Olimpiada, Thessaloniki) and one on Paros (Southern Cyclades), covering the Classical-Hellenistic epoch, as well as the Roman and the Byzantine era. Different burned structures have been investigated, such as ceramic kilns and ovens.

Rock magnetic and palaeodirectional analyses have been performed on the sampled material to identify the remanence carrying minerals and to determine the main palaeodirection for each site. Moreover, a palaeomagnetic data set has been compiled, gathering all available mean directions from all investigated archaeological and volcanic sampling sites on the Greek territory, in order to obtain a preliminary palaeosecular variation (PSV) curve. The data set has been updated with the most recent historical field data and our recent findings, hence, providing a wide chronological span from the Minoan times ($\sim$2000 BC) until the last century. Athens was chosen as the reference point for the construction of the curve and the data points were subjected to some selection criteria. (e.g. $\alpha_{95} < 9$; K > 20). A total amount of 80 data points, has been used to construct a Greek preliminary Greek PSV curve, albeit the occurrence of considerable time gaps.

Several statistical analyses have been attempted: a 200 years window moving average technique, in 50% overlapping, was applied to the data, as well as the Bayesian spline smoothing technique (Lanos et al. 2005, Geophys. J.Int., 160, 440-476), the latter based on roughness penalty and taking into account the directional and tempo-

ral error margins as well as stratigraphic constraints. The obtained smoothed curve with an error envelope is compared with the PSV reference curves of neighbouring countries, as well as with data from lake sediments. In particular, the comparison with the Bulgarian PSV curve shows a general agreement, despite the gaps in time that are present in both curves due to the lack of archaeomagnetic data for certain periods. Further comparisons were done with the CALS3K.2 global geomagnetic field model at the latitude of Athens.

The construction of a preliminary PSV curve for Greece contributes to increase our present knowledge of the Earth's magnetic field and provides the possibility of applying archaeomagnetism as a dating technique in Greece, where a very rich cultural and archaeological heritage is present.