



## Archaeomagnetic Records from Early Bronze to Iron Age Mediterranean Settlements

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Recent studies on the geomagnetic field variations over the Middle East have started to take particular attention due to the presence of numerous high intensity periods proposed by various authors. Considering the recent volume of papers focused on archaeomagnetism in this region, the lack of published work centered in Turkey and Cyprus is surprising since both regions have a long cultural heritage and history of trade and immigration from neighboring countries. Here we present a large dataset of directions and intensities from seven archaeological sites in the Mediterranean with 21 subsets of directional and 40 subsets of intensity data covering a long sequence of levels from ~3300 to 700 BCE. The sample sets are composed of both ex-situ potsherds and in-situ features such as mud-bricks, basalts and an ash layer. The results from the rock magnetic experiments run on at least three samples from each set indicate that the magnetic mineral assemblage is composed mostly of pseudo-single domain grain magnetite or titano-magnetite with various Ti content. The majority of the demagnetization diagrams are single component and 14 out of 21 sets have a well-defined characteristic remanent magnetization direction. The directional results show a swing of  $37.6^\circ$  in declination and  $26.9^\circ$  in inclination within an age interval of ~2000 years. The archaeointensity experiments involved both microwave and thermal methods. To avoid the anisotropy effects, the applied field is either set parallel to the samples NRM or the angle between the pTRM acquired at the last step used for the best-fit segment and the applied field direction,  $\gamma$ , was checked and found to be less than  $7.5^\circ$ . For the samples that are measured in random directions with respect to their NRM, prior to the intensity experiments, the anisotropy of magnetic susceptibility was individually measured and the anisotropy degree is found to be less than 2.5%. For all the potsherds, one or two samples from each set are subjected to cooling rate experiment since the rest failed to meet alteration criteria. The measured cooling rate factor is applied to the whole group of the same type. The effect of cooling rate on mud-bricks was found to be minimal.

In general, the directional results are in agreement with the global field models except for two data points, one that plots  $\sim 10^\circ$  shallower and to the west and the other, also shallower, by  $\sim 20^\circ$ . Both are highly coherent with previous data from Turkey. The archaeointensity values spanning ~2200 to 700 BCE are in the range of  $6.54 \times 10^{22}$  to  $17.44 \times 10^{22}$  Am<sup>2</sup>. The measured intensities are much higher than the field models but mostly in agreement with the data in the literature. Recently published archaeointensity values from neighboring countries suggest that there was a period of relatively high field intensity at ~1000 BCE, the geographic extent of which has been the subject of much debate. This study potentially extends the geographic range of this intensity high.