New Archeointensity Data from Late (Pottery) Neolithic Pre-Halaf and Halaf Settlements Yarim Tepe 1 and 2 (Northern Iraq)

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Main objective of this study is to recover the geomagnetic field intensity variations in the Middle East during the 7th and 6th millennia BC, with a particular interest on rapid variations. We will report on new archeointensity data obtained from two ancient settlements, discovered by Soviet archeologists in Northern Iraq between 1969 – 1976 Yarim Tepe 1 and Yarim Tepe 2. Yarim Tepe 2 is dated from the Late Neolithic Halaf period (5950 – 5300 BC) and is represented as a 7-m thick sequence of cultural deposits, divided into 9 archaeological levels (building horizons). Yarim Tepe 1 is dated from the Late Neolithic Pre-Halaf period (6300 – 5950 BC, including three regional cultural phases: Hassuna I, II and III) and represents a 6.5-m sequence of cultural deposits, divided into 12 archaeological levels. A very important collection of artifacts from Yarim Tepe 1 and 2, in particular several thousands of potsherds, is stored at the repository of Archaeological Institute in Moscow, where our sampling was undertaken. We collected 29 groups of fragments from Yarim Tepe 2 and 22 groups from Yarim Tepe 1 from superimposed stratigraphic layers of about 20 cm thickness in average. Each group consists of at least 3 (up to 10) fragments. All data were carried out using the three-axis vibrating sample magnetometer Triaxe, which allows magnetization measurements of a small samples (< 1 cm3) directly at high temperatures. Archeointensity results were obtained using the experimental protocol developed for the Triaxe magnetometer. This protocol takes into account both the anisotropy and cooling rate effects on thermoremanent magnetization acquisition. Together with other data previously obtained from Syria and Bulgaria the new archeointensity results show the occurrence of rapid geomagnetic field fluctuations during the 7th and 6th millennium BC. Data from Yarim tepe 2 also confirms the occurrence of a short-lasting geomagnetic field intensity peak around 5500 BC, with intensity variation rates as high as 0.35 – 0.15 µT/year over a few decades. We will also present X-ray data obtained on a set of potsherds from Yarim Tepe 1 and 2, which provide interesting new constraints on the heating temperatures reached during the production of the ceramics.