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The strength of the Earth's magnetic field from Pre-Pottery to Pottery Neolithic, Jordan

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Constraining the secular variations of the Earth's magnetic field strength in the past is fundamental to understanding short term processes of the geodynamo. Such records constitute a powerful and independent dating tool for archaeological sites and geological formations. In this study, we present 10 new and robust archaeointensity results from Pre-Pottery to Pottery Neolithic and, for one of the first times, flint (burnt chert) from Jordan. Two of these results constitute the oldest archaeointensity data for the entire Levant, ancient Egypt and Mesopotamia extending the archaeomagnetic dating reference for the Holocene. Virtual Axial Dipole Moments (VADM)s show that the Earth's magnetic field in the Southern Levant was weak (about half the present field) at around 7,600 years BCE, recovering its strength to greater than the present field around 7,100 BCE and gradually weakening again around 5,200 years BCE. In addition, successful results obtained from burnt flint demonstrate the potential of this rarely used material in archaeomagnetic research, in particular for prehistoric periods from the first use of fire to the invention of pottery.