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## Rock magnetism as a tool for investigating the use of archaeological artefacts from baked clay

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Even though multidisciplinary approaches applied to the investigation of archaeological findings are widely used, the use of rock magnetic properties is still poorly exploited in the determination of the use of ancient artefacts. In this study, we present the results of a combined archaeological, morphological and magnetic analyses applied on the ring-shape clay artefacts found at the archaeological site of Villa del Foro, in Northern Italy. The materials studied are dated between the sixth and the first half of fifth century BC and are found in large quantities in different trenches of the archaeological excavation. To investigate their thermal history and to exploit their possible use as kiln supports, cooking stands, or loom weights, we have investigated their natural remanent magnetization (NRM) and the magnetic mineralogy changes occurred during laboratory heating. Magnetic analysis used for the determination of the firing temperatures show thermal stability up to 500-600 °C, while further laboratory heating at 700 °C introduces magnetic alteration. Thermal demagnetization of the samples generally shows a strong and stable thermal remanent magnetization. In few cases, a clear secondary component is present, suggesting partial re-heating or displacement at temperatures ranging from 200 °C to 450 °C. Such secondary magnetic component can be indicative of a secondary heating or of a displacement of the rings from their initial firing position while still hot. Even though the studied rings belong to casually different morphological typologies, no connection among type and magnetic behavior was observed, suggesting that the ring's morphology does not define neither their production conditions nor the final use of the artefacts. The estimated firing temperatures of around 600-700 °C are compatible with the heating of the rings during their manufacture rather than related to cooking activities. In combination with the archaeological evidence and the morphological analysis it is thus suggested that the rings were used as weight looms and baked only during their production procedures. Such a pilot study can be used as reference for the identification of similar objects found in Italy

and Europe during the Iron Age and confirms the great potential of rock magnetic analysis in the investigation of the technology and use of ancient baked clays.