Combined archaeomagnetic and thermoluminescence study of a brick kiln excavated at Fontanetto Po (Vercelli, Northern Italy)

Tema, E.[1,2,*], Fantino, F.[3], Ferrara, E.[4], Lo Giudice, A.[3], Morales, J.[5], Goguitchaichvili, A.[5,**], Camps, P.[6], Barello, F.[7], Gulmini, M.[8]

[1] *Dipartimento di Scienze della Terra, Università degli Studi di Torino, via Valperga 35, 10125, Torino, Italy, evdokia.tema@unito.it*
[2] *ALP-Alpine Laboratory of Palaeomagnetism, via G.U. Luigi Massa 6, 12016, Peveragno, Italy*
[3] *Dipartimento di Fisica, Università degli Studi di Torino and INFN sezione di Torino, via Pietro Giuria 1, 10125 Torino, Italy, fantino@to.infn.it, alessandro.logiudice@unito.it*
[4] *Istituto Nazionale di Ricerca Metrologica, Strada delle Cacce 91, I-10135 Torino, Italy, e.ferrara@inrim.it*
[5] *Laboratorio Interinstitucional de Magnetismo Natural, Instituto de Geofisica, UNAM, Campus Morelia, Michoacan, Mexico, jmorales@geofisica.unam.mx, avto@geofisica.unam.mx*
[6] *Géosciences Montpellier, CNRS and Université Montpellier 2, Montpellier, France, Pierre.Camps@gm.univ-montp2.fr*
[7] *Soprintendenza per i Beni Archeologici del Piemonte e Museo Antichità Egizie, piazza San Giovanni 2 - 10122 Torino, Italy, federico.barello@beniculturali.it*
[8] *Dipartimento di Chimica, Università degli Studi di Torino, via Pietro Giuria 5, 10125 Torino, Italy, monica.gulmini@unito.it*

[*] Corresponding author: Tel.: +39 0116708395; Fax: +39 0116708398; E-mail address: evdokia.tema@unito.it

[**] Now in sabbatical leave at: Laboratorio de Paleomagnetismo, Departamento de Física, Escuela Politécnica Superior, Universidad de Burgos, C/Francisco de Vitoria, s/n, 09006, Burgos, Spain.

Abstract

A combined archaeomagnetic and thermoluminescence study was carried out as part of a rescue archaeological excavation on a kiln discovered during the installation of methane gas pipelines beneath a rice field, along the southern border of Fontanetto Po village (Vercelli province, Italy). A total of 23 independent brick samples have been collected, oriented *in situ* with an inclinometer; the use of magnetic and sun compass was not possible due to the existence of metallic tubes beneath the kiln and a plastic cover above it. Standard archaeomagnetic procedures have been used for the determination of the archaeomagnetic inclination and absolute geomagnetic intensity. Stepwise thermal demagnetization shows a very stable characteristic remanent magnetization and the calculated mean inclination of the 23 samples is I = 65.3^o with α_{95}= 2.4^o and k = 156. Archaeointensity experiments have been performed using the classical Thellier method as modified by Coe, with regular partial thermoremanent magnetization (pTRM) checks. The cooling rate and remanence anisotropy effects upon thermoremanent magnetization (TRM) have been investigated in all the specimens. A total of 19 archaeointensity determinations (at specimen level) that correspond to linear NRM-TRM plots were used for the calculation of the site mean archaeointensity that is 46.4 ± 2.9 μT. Archaeomagnetic dating results show two