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Archeomagnetic results on three First Iron Age salt-kilns from Moyenvic (France)

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Variations of the Earth magnetic field during the first millennium B.C. in Western Europe remain not very well constrained, especially archeointensity. Three salt-kilns (MOA, MOB and MOC) sampled in Moyenvic (Lorraine, Eastern France) have been studied to provide new reference data. Each kiln has been dated by radiocarbon in the First Iron Age or Hallstatt period (between VIII and Vth Century BC). Paleomagnetic experiments have been carried out both in laboratories of Leoben (Austria) and Rennes (France). Rock magnetic experiments and hysteresis results suggest the predominance of pseudo single domain (PSD) grains close Ti-poor magnetite. Archeomagnetic directions have been obtained by thermal and alternating field demagnetizations. High values of mean inclination and declination are observed (declination between 19° to 31° and inclination close to 70°). Classical Thellier-Thellier experiments were first conducted on 51 samples with a laboratory field almost parallel to the direction of the characteristic remanent magnetization (ChRM). Even if pTRM checks are positive, the very large dispersion observed within the paleointensity values determined has suggested that some artefacts have not been well recognized. In a second step, Thellier experiments have been conducted on 36 sister specimens with the laboratory field quasi-perpendicular to ChRM. In these cases, mineralogical evolutions during heating and chemical remanent magnetization acquisitions have clearly been recognized. For the whole sample suite the success rate of the palaeointensity determinations is very low with 80% of the samples rejected. Nevertheless, reliable mean archeointensities have been obtained for two of the three kilns (MOA, 77.0 $\pm$ 15.2 μT and MOB, 89.2 $\pm$ 7.0 μT at the latitude of Paris). The high field strength and the archeomagnetic directions determined, provide further evidence for important changes of the Earth magnetic field in Europe during the first half of the first millennium BC. Large variations of the geomagnetic field during First Iron Age indicate that archeomagnetism should be very efficient to date archaeological structures of this period.