



Towards the understanding of the West African paleosecular variation: a new geomagnetic field intensity reference curve for the last 2000 years

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Archeomagnetic records from West Africa are still sparse: at present, the Geomagia50.v3 archeomagnetic database records only 46 archeointensity data from the whole continent of Africa for the past 2000 years. A reference curve for West Africa that is composed of data from this area is going to be crucial to archeomagnetically date the abundant archeological artefacts.

Therefore, we introduce first absolute geomagnetic field intensities from iron smelting furnaces located at the metallurgical sites of Doumbala and Siola (Ivory Coast), together with new archeointensities results from Korsimoro (Burkina Faso). To obtain the archeointensities, we applied the classic Thellier-Coe double-heating and the calibrated Pseudothermellier method, which has never been applied to archeological artifacts before. An ample amount of radiocarbon ages confines the samples to a time range between 700-1900 AD. The newly obtained intensities were combined with data from the Geomagia50v3 database from the past 2000 years and with additional volcanic data that are not included in this database. The data cover a circular area with a radius of 2500 km around a central relocation point (19.15°N, 4.26°E). The relocation error for this large area ranges between -2 μT to about 1 μT . Therefore, we accepted these data, in order to obtain a sufficient quantity of data for the reference curve.

To obtain a representative curve we tested first a cubic smoothing spline fit and then a stochastic modelling approach. First analyses indicate that the two methods provide very similar curves with small divergences only at periods when data are rather inconsistent. By comparing several paleosecular variation curves from all over the world, we observe a slight westward drift of two strong intensity features. Furthermore, the two curves exhibit a decrease of intensity starting at 800 AD.