First full-vector archaeomagnetic data from Central Asia for the last 2k years: evidence for a large non-dipole field contribution between 200 BCE and 200 CE

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Résumé

To understand the global behaviour of the Earth's magnetic field, it is necessary to have a good temporal and spatial coverage of the full-vector geomagnetic field. In order to provide the first full-vector archeomagnetic data from Central Asia, 9 kilns from southern Uzbekistan dated between 200 BCE and 1429 CE have been sampled and analysed. During this work, demagnetizations by alternating fields and Thellier-Thellier paleointensity experiments applying current quality criteria have been carried out. In order to determine the magnetic behaviour of the magnetic minerals which conform the samples, different rock magnetism experiments have been carried out, including Lowrie Test and thermomeagnetic curves. The new results, together with the available data for Central Asia, show a clear deviation from the global geomagnetic field models between 200 BCE and 200 CE, especially in intensity. A rapid variation in the intensity have been observed also for this period. Both the movement of the geomagnetic pole and the dipole moment obtained through the SHAWQ family models have been analysed and compared with the new data obtained, showing a possible non-dipole behaviour over this period. The analysis of the radial magnetic field at the core-mantle boundary, together with the analysis of the non-dipole magnetic field at the surface, show a reversed flux patch in Uzbekistan, which could be associated with the low intensities observed at the surface.

Mots-Clés: archaeomagnetism, geomagnetism, non, dipole feature, Uzbekistan, Central Asia.

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