Towards a high resolution paleosecular variation records of the last interglacial-glacial cycle in Central Europe : the loess-paleosol sequence of Dolni Vestonice.

Abstract :

Loess sequences cover around 10 percent of the Earth's surface and are often studied to recover records of climatic variations. The ability of loess sequences to record a reversing magnetic field is known since the early 1980's from Chinese loess and paleosol deposits. The use of loess sequences as archives of paleosecular variation would improve the geochronology of these Quaternary continental deposits beyond the limits of radiocarbon and luminescence age determinations and at higher resolution than the geomagnetic polarity timescale. Lastly, the correlation between loess deposits and with other records of paleosecular variation, paleoclimate and paleoenvironments would be improved. We present here a full paleomagnetic study of the Dolni Vestonice (DV) loess sequence located in the Moravian region of the Czech Republic. The study's objective is to show whether European loess have the ability to record the Earth's magnetic field at the resolution of secular variations both in term of direction and intensity. Paleomagnetic alternating field (AF) demagnetization experiments were conducted on 212 oriented specimens from the DV sequence. Characteristic remanent magnetizations (ChRM) were isolated through a principal component analysis (PCA) and the Fisher mean of the population of ChRMs yields a declinations and and inclinations of 15.2° and 64.1°, respectively, with a 95% confidence interval of 1.7 (ranging from -101.3° to 58.3° for the declinations and 31.3° to 87.6° for the inclinations). Relative paleointensity (RPI) proxies were established using all NRM normalizers available including magnetic susceptibility and demagnetizations of anhysteretic remanent magnetization (ARM) and isothermal remanent magnetization (IRM). The reliability of the RPI proxies is being investigated with respect to the sequence's stratigraphy and magnetic mineral assemblage and through comparison with regional and global temporally coeval RPI records.