



Paleomagnetic record of loess-paleosol sequences in the arid Central Asia, implication for chronological refinement

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Geomagnetic excursions obtain valuable information on the geodynamo and geodynamics in the Earth's interior (Gubbins, 1999). Numerous geological sediments including windblown loess widely revealed several excursions that can be well correlated at regional and/or global scale (e.g. Zhu et al., 1994; Sun et al., 2013). However, the exploration of geomagnetic excursions in the arid Central Asia (ACA) is still scarce so far. Previous studies have revealed that most of the loess sections in the ACA underwent poor pedogenesis, limiting post-depositional lock-in effects on the geomagnetic remanences (e.g. Xia et al., 2010). In this study, we conducted a preliminary analysis of paleomagnetic measurements on loess samples covering the period since the last interglacial from the Tianshan Mountain area. Magnetite and maghemite in a pseudo single domain (PSD) state controlled rock magnetic properties in the loess section. By thermal demagnetization, the stable components of natural remanent magnetization unearthed two intervals of directional anomalies with corresponding intensity lows. Furthermore, relative paleointensity (RPI) of the loess section could correlate with global RPI stacks (e.g. Channell et al., 2009), implying the globally RPI consistency. The age control by the RPI comparison and absolute dating indicates that these anomalies are likely associated with the Laschamp and Blake excursions, respectively, although discrepancy exists between the RPI and OSL age models. In addition, based on the RPI age model, the paleoclimate record exhibits similar variations as the global ice volume and the North Atlantic temperature records, confirming relatively chronological rationality of the magnetostratigraphic interpretation. As a result, this study could provide a possibility to solve the chronological problem in the ACA loess.

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