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Data Article

Magnetic record of Mio-Pliocene red clay and Quaternary loess-paleosol sequence in the Chinese Loess Plateau

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ABSTRACT

This article presents magnetic data of a 300-m-thick Mio-Pliocene red clay and Quaternary loess-paleosol sequence near Chaona town in the Central Chinese Loess Plateau. Detailed magnetostratigraphy shows that the aeolian red clay began to accumulate at ca. 8.1 Ma. Here, we presented a high-resolution rock magnetic data at 20–40 cm intervals within 4.5–8 ka span per sample of this section, which has been published in Song et al. (2014) [1] and (2017) [2]. The dataset including the following magnetic parameters: mass magnetic susceptibility (χ), frequency-dependent susceptibility (χ_{fd}), saturation magnetization (M_s), saturation remanent magnetization (M_{rs}), coercive force (B_c), remanent coercivity (B_{cr}), saturation isothermal remanent magnetization (SIRM) and S-ratio. Magnetic susceptibility and hysteresis parameters were measured at Lanzhou University and Kyoto University, respectively. This data provides a high-resolution rock magnetic evidences for understanding East Asia Monsoon change, Asian interior aridification and tectonic effect of the uplift of the Tibetan Plateau since middle Miocene period.

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Specifications Table

| | |
|----------------------------|--|
| Subject area | <i>Geology</i> |
| More specific subject area | <i>Quaternary geology and paleoclimate</i> |
| Type of data | <i>graphs, figures</i> |
| How data was acquired | Bartington MS2 susceptometer, 2 G cryogenic magnetometer (Model 760); Alternating Gradient Magnetometer Micromag™ 2900 model. |
| Data format | <i>Raw and analyzed.</i> |
| Experimental factors | <i>Samples dry completely in room temperature before measuring.</i> |
| Experimental features | Magnetic susceptibilities were measured using a Bartington MS2 susceptometer at frequencies of 470 Hz and 4700 Hz. The magnetic remanence was measured on an American DSM2 spinner magnetometer or 2 G cryogenic magnetometer (Model 760). 11–18 steps of progressive alternating field demagnetization were carried out for most of the samples at 2–10 mT intervals to 70 mT, and progressive thermal demagnetization was done for some typical samples at 20–100 °C intervals in about 22 steps from a room temperature to 710 °C; and Magnetic hysteresis parameters were determined by an Alternating Gradient Magnetometer Micromag™ 2900 model. |
| Data source location | 35°06'N, 107°12'E; Chaona town, Lingtai County, Gansu Province, China |
| Data accessibility | <i>Data are within this article and related references</i> |
| Related research article | <i>Song et al. 2005; 2007; 2014; 2017.</i> |

Value of the Data

- Provide a high-resolution rock magnetic records of the last 8 Ma for local or global environmental changes comparison.
- It is helpful to understand the East Asia Monsoon revolution and Asian interior aridification.
- Provide some clues for understanding the uplift process and effects of the Tibetan Plateau during late Cenozoic period.
- Useful to researchers and experts working in environmental magnetism, paleoclimate change, past global changes, Quaternary geology and other related fields.

1. Data

The Late Cenozoic red clay-loess-paleosol sequence in the Chinese Loess Plateau provides a high-resolution record of paleoclimatic and tectonic changes in Asian. Detailed magnetostratigraphy of a 300-m-thick late Miocene-Pliocene red clay and Quaternary loess-paleosol sequences near Chaona town in the central Chinese Loess Plateau shows that the red clay began to accumulate at ca. 8.1 Ma [3,4]. Different time scales based on astronomically tuning [5] or independent untuning grain-size age models [1,6] were established. During the past decade, grain size [7], the pollen [8,9], carbonate [10], and heavy mineral [11–13] content, together with the magnetic susceptibility enhancement mechanism [14–16], and their palaeoenvironmental significance [17–19], have been investigated.

Here, we presented a high-resolution rock magnetic data at 20–40 cm intervals within 4.5–8 ka span per sample in this Section [1,2]. The dataset including the following magnetic parameters: mass magnetic susceptibility (χ), frequency-dependent susceptibility (χ_{fd}), hysteresis parameters including saturation magnetization (M_s), saturation remanent magnetization (M_{rs}), coercive force (B_c) and remanent coercivity (B_{cr}), Saturation isothermal remanent magnetization (SIRM) and S -ratio.

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