

High-resolution climatostratigraphy for the MIS 19 interglacial from the Chiba Section

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Significance of MIS 19 increases because of its similarity of the orbital situation with the Holocene, and definition of the base for the Middle Pleistocene within it. A sediment core TB2 collected from the Chiba Section yields a super-high resolution (10-yr) paleoceanic record (Hyodo et al., 2017). The record reveals that low sea-level and/or cold (oxic) events spanning 100–500 yr occurred at least 9 times during the later MIS 19 period postdating the geomagnetic reversal, and between these events high sea-level/warm events spanning 500–2000 yr occurred. The short events enable to make millennial scale climatostratigraphic correlation between North Atlantic and Northwest Pacific. In this study, to examine its applicability to continental climate, we analyzed 7–8 m loess-paleosol sequences from Lingtai and Xifeng in the Chinese Loess Plateau. Obtained magnetic and grain size data, proxies of summer monsoon (SM) and winter monsoon (WM), respectively, show long-wavelength variations well correlated with the precession related sea-level variations, as the SM strengthens and the WM weakens during high sea-level periods, and vice versa during a low sea-level period. The SM and WM change pattern is typical to that of glacial-interglacial cycle. In addition, we found six short (several tens cm) events after the geomagnetic reversal, in which the SM strengthens and the WM weakens. An age model based on correlation with the Osaka Bay sea-level record dates these events spanning 500–2300 yr. They are well correlated with the high sea-level and/or warming events, observed in the mid-latitude Northwest Pacific, North Atlantic, and Osaka Bay. Furthermore, around the highest sea-level, we found a WM intensification event uncorrelated with the SM (sea-level) variations during 783–778 ka at Lingtai, and 782–777 ka at Xifeng. The WM intensification event coincides with the cooling event observed in Osaka Bay. Thus, the centennial to millennial-scale climate events during MIS 19 are observed even in continent. The events enable to make high-resolution climatostratigraphy studies in the Eurasian continent.

Keywords: Climatostratigraphy, MIS 19, Centennial to millennial-scale, Chiba Section