

Dust provenance change of Chinese Loess Plateau during the past 7Ma

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Aeolian deposit (e.g. loess, paleo-soil and Red Clay) in Chinese Loess Plateau is one of the most valuable climate archives on land in late Cenozoic. Surveying the origin of these aeolian sediments is essential for the interpretation of the climate proxies potentially over the past 25Ma. However, disputes still exist on whether or not there is shift of dust origin in tectonic time scale or glacial-interglacial time scale. Detrital zircon dating method is applied on aeolian sediments of Lantian site in south part of Chinese Loess Plateau, which is at the foot of Qinling Mountain in order to reveal the provenance evolution during the past 7Ma. The results indicate that the composition of aeolian sediments shifted at around 2.6 Ma. Detrital zircon age reveals that the tertiary Red Clay is mainly derived from the North Tibet Plateau and Qinling Mountain. This indicates that the origin area for the tertiary Red Clay is relative local. Quaternary Loess of this site is basically mixture of sediments from North Tibet Plateau and Gobi Altay Mountains. The composition of local sediments from Qinling Mountains is relatively low. Sediment in L1 layer contains the highest proportions of Gobi Altay Mountains material, which show completely different pattern from other loess sediments. Besides this, there are no consistent composition shifts between glacial and interglacial periods. The time of dust origin shift is in coincident with initiation of the Northern Hemisphere ice sheet. This suggests that the onset of the Northern Hemisphere ice sheet enhanced the surface erosion of the area of Gobi Altay Mountains. This process contributed more detrital material to be blown to the air. Furthermore, enhanced winter monsoon played an important role in the transportation of dust material. However, the reason for the unique characteristics of loess in L1 is not clear.