

Tectonic controls of the eolian deposits in Chinese Loess Plateau — A preliminary hypothesis

Bin Wang^{1, 2 *}, Anu Kaakinen², David M. Whipp Jr.³, Hui Tang⁴, Yuan Shang²,
Hongbo Zheng⁵

1. College of Tourism and Environment, Shaanxi Normal University, Xi'an, China

*2. Department of Geosciences and Geography, University of Helsinki, Helsinki, Finland
(*correspondence: bin.wang@snnu.edu.cn)*

3. Institute of Seismology, Department of Geosciences and Geography, University of Helsinki, Helsinki, Finland

4. Department of Geosciences, University of Oslo, Norway

5. School of Geography Science, Nanjing Normal University, Nanjing, China

Previous studies show that the thick eolian dust deposits in the Chinese Loess Plateau (CLP) started to accumulate since the early Miocene or even late Oligocene and they are considered to provide the best terrestrial record of the onset of the Asian interior aridification and the evolution history of the Asian Monsoon. However, large variability in the basal ages of eolian deposits makes the eolian dust depositional history and the controlling dynamics controversial. We present that on the tectonic controls of the eolian dust deposition in the CLP by connecting the two main uplift events of the Tibetan Plateau and the regional tectonic events with the eolian dust accumulation history. The regional tectonic events in the Ordos block (the basement of the CLP) during the late Cenozoic era are less recognized controlling mechanisms for the eolian dust accumulation by sculpturing the surface landscape. The stable tectonic environment of the Ordos block since the late Miocene might have been the main controlling factor enabling the wide deposition of eolian Red Clay after the ~8 Ma. Here we hypothesize that especially with the large-scale monsoon system and central Asian arid land existence since at least the early Miocene, the accumulation and preservation of eolian deposits within the CLP during the Miocene are actually directly controlled by the regional tectonic environment not as much by climatic factors.