



Aeolian dust supply from the Yellow River floodplain as recorded in the loess–paleosol sequences from the Mangshan Plateau

Yuan Shang (1,2), Maarten A Prins (2), Christiaan J Beets (2), Anu Kaakinen (1), Yann Lahaye (3), Simon Troelstra (2), Noortje Dijkstra (2), Bin Wang (4), Roel van Elsas (2), and Hongbo Zheng (5)

(1) Department of Geosciences and Geography, P.O. Box 64, 00014, University of Helsinki, Finland (yuan.shang@helsinki.fi), (2) Department of Earth Sciences, Faculty of Earth and Life Sciences, Vrije Universiteit Amsterdam, De Boelelaan 1085, 1081 HV Amsterdam, The Netherlands, (3) Geological Survey of Finland (GTK), Betonimiehenkuja 4, 02150 Espoo, Finland, (4) College of Tourism and Environment, Shaanxi Normal University, 710119 Xi'an, China, (5) School of Geography Science, Nanjing Normal University, 210023 Nanjing, China

In central China, the Mangshan loess plateau is located along the southern bank of the lower reach of the Yellow River, well outside the main body of Chinese Loess Plateau (CLP). It contains thick and exceptionally fast accumulated loess-paleosol sequences that provide high-resolution records of Quaternary environmental and climate change. The grain-size distributions, accumulation rates and magnetic susceptibility in the upper part (above the paleosol layer S2) of the Mangshan loess sequence shifted remarkably from its lower part, which likely indicate a change of source for Mangshan dust above S2. Unlike the loess deposits in the CLP, which have been derived from the broad area of northern China, the proximal Yellow River floodplain is considered to have served as a main source for the upper part of Mangshan loess sequence. However, so far, no final diagnostic evidence has been shown on the provenance variation of the Mangshan dust.

In this study, we present multiple proxy data and zircon U-Pb ages on the Mangshan loess-paleosol sequences to investigate the dust supply for Mangshan loess. Our results show that the paleosol and loess units in the lower part of the profile (S3-S5, L3-L6) are relative thin and fine-grained and whereas the paleosol (S0-S2) and loess layers (L1 and L2) in the upper part of the sequence are significantly thicker and coarser-grained. The zircon U-Pb age distributions of Mangshan sequence show two predominant age populations: 200-350 Ma and 350-550 Ma. In the lower part of the sequence, the 350-550 Ma age population is more prominent. This is comparable with the zircon age pattern of the sediments in the lower reach of Yellow River, indicating that Yellow River sediments form a major supply for the Mangshan loess deposits at least since 650 ka BP. However, a significant increase of the 200-350 Ma age population is found in the upper part of the Mangshan sequence, likely suggesting an increased contribution of the debris from the regional mountain chains. This may be due to the development of fluvial system north to the Mangshan plateau since 200 ka BP which results in more local material being transported to the Yellow River.