



## **Ultra-high rates of loess sedimentation at Zhengzhou since Stage 7: implication for the Yellow River running through the Sanmen Gorge**

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Mangshan loess plateau is located 25 km to the west of Zhengzhou, on the south bank of the Yellow River, where the river flows out through the Sanmen Gorge, releasing most of its suspended loads owing to dramatic decrease in gradient. Magnetostratigraphic study, together with measurements of magnetic susceptibility and grain size distribution has established the stratigraphy for the Mangshan loess deposits and has identified the section to contain loess-palaeosol sequences from S11 to S0. The Bruhnes/Matuyama boundary was found to be located at the lower part of L8, confirming that the loess-palaeosol sequence of Mangshan resembles to what is observed elsewhere in the Chinese Loess Plateau.

The upper part (S2 upwards) of Mangshan loess displays extremely high sedimentation rate (50 cm/ka), lower susceptibility values and coarser grain-size distribution, compared with the lower part (L3 downwards) of the Mangshan profile, and with other sections elsewhere in the Loess Plateau in central China, indicating a drastic shift of eolian/depositional regimes in the area. Our results suggest that the Mangshan loess has had a second sediment source since S2 deposition, in addition to the deserts that act as a common source for most of the loess deposits in central China. This sediment source is believed to be the proximal Yellow River flood plain, and the ancient alluvial fan lying at the east mouth of the Sanmen Gorge as well. The flood plain and alluvial fan were formed when the Yellow River cut through the Sanmen Gorge. Therefore, the formation of the upper part of the Mangshan loess section (S2 upwards) bears implication for inferring the age of this significant event in the Yellow River's history. Age estimation of the formation of the alluvial fan based on Mangshan loess suggests

that the Yellow River may have run through the Sanmen Gorge at about Marine Stage 7.