



## **In situ re-magnetization experiments of loess on the Chinese loess plateau; evidence for localized pDRM**

Reidar Løvlie (1), Ronghua Wang (1), and Xisheng Wang (2)

(1) University of Bergen, University of Bergen, Department of Earth Science, Bergen, Norway (reidar.lovlie@geo.uib.no), (2) Key Laboratory of Paleomagnetism, Institute of Geomechanics, Chinese Academy of Geological Sciences, Beijing 100081, China

The time frame for the loess/paleosol sequences on the Chinese loess plateau (CLP), representing a high-resolution continental paleoclimate record for the last ca 2.6 Ma, is based on paleomagnetic reversal stratigraphy. However, fundamental processes acting and controlling the acquisition of a stable remanent magnetization in loess have been largely unknown until lately.

Recent laboratory re-deposition experiments of natural loess-material from CLP have demonstrated that a stable magnetization is acquired and retained after the very first wetting of deposited, dry loess (dust) (Zhao and Roberts 2010, Wang and Løvlie 2010). Subsequent wetting apparently does not affect the initially acquired magnetization, implying the absence or minor importance of pDRM in loess.

However, these experiments were performed on geologically unrealistic time scales (hours-days) and at ambient, constant laboratory temperatures. We have therefore performed in situ experiments of L1 loess at two localities on CLP to investigate if natural variations in temperature and precipitation during autumn-winter-summer seasons (8 and 15 months) may impose any re-magnetization.

We find evidence for varying degrees of partial re-magnetization conceivably reflecting re-alignment of magnetic grains within L1. The most important result is the spatial variation in the degree of re-magnetization observed within the retrieved blocks of loess ( $\approx 15 \text{ dm}^3$ ). The observed subtle partial re-magnetization on time scales of these experiments may conceivably add up by seasonal re-magnetization during 5000-10000 years, effectively causing partial magnetic overprinting and smoothing of paleomagnetic records.

### References:

Zhao, X. and Roberts, A.P., 2010. How does Chinese become magnetized? *Earth and Planetary Science Letters*, 292, 112–122.

Wang R. and Løvlie R., 2010. Subaerial and subaqueous deposition of loess: Experimental assessment of detrital remanent magnetization in Chinese loess. *Earth and Planetary Science Letters*, 298, 394–404.