



What forces paleosol formation in Asian Loess?

Christian Zeeden

IMCCE, Observatoire de Paris, PSL Research University, CNRS, Sorbonne Universités, UPMC Univ Paris 06, Univ Lille, 75014 Paris, France (christian.zeeden@obspm.fr)

What forces paleosol formation in Asian Loess?

Christian Zeeden

Proxy records from loess-paleosol sequences have been correlated to different correlation and ‘tuning’ targets in order to establish time scales for loess paleosol sequences. These include northern hemisphere insolation, precession, deep sea isotope records and other well dated reference records. Depending on the correlation target, different phase relations to insolation and astronomical parameters are assumed. However, no correlation target resembles the loess records in detail, making any correlation to some extent challenging. Still, correlative age models have brought loess chronologies much further, especially in combination with magnetic polarity stratigraphy.

Here, statistical analyses of selected magnetic susceptibility records from the Chinese Loess Plateau are presented. Both the phase and amplitude of orbital signatures in Asian loess magnetic susceptibility data are investigated. Results show that a phase relation as of deep sea isotope records, best represented by the LR04 stack (Lisiecki and Raymo, 2005) and the (Imbrie and Imbrie, 1980) ice model, is consistent with high quality datasets and -time scales.

Results suggest that magnetic susceptibility records from the Chinese Loess Plateau are best correlated to a target resembling the phase of e.g. the LR04 benthic isotope stack or the underlying Imbrie and Imbrie (1980) ice model. This implies that paleosol formation of (at least selected) Asian loess-paleosol sequences is dominantly driven by northern hemisphere climate evolution, and not (or to a much less extent) by direct insolation. Which paleoclimatic mechanisms are responsible for this pattern is yet unclear, but a relation to forcing through Pacific sea surface temperatures may contribute. An Indian Monsoon forcing is unlikely to be the main driver of paleosol formation and moisture supply to the Chinese Loess Plateau, as its precession and obliquity phases are offset.