Geophysical Research Abstracts
Vol. 15, EGU2013-1462, 2013
EGU General Assembly 2013


# The environmental magnetic fingerprint of periglacial loess in Eastern Germany

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In the framework of a comprehensive stratigraphic study of loess Eastern Germany, a detailed rock magnetic study was carried out of four last glacial/interglacial loess-palaeosol sequences. Magnetic susceptibility and laboratory-induced remanences have been determined to compare individual sections and to identify the specific rock magnetic characteristics of the Saxonian Loess Province.

According to the model of pedogenic magnetic enhancement, an increasing neoformation of ferrimagnetic minerals in the course of pedogenesis was observed only in the uppermost Late Weichselian lithological units consisting of almost unweathered loess and indicating dryer climatic conditions. In contrast, the rock magnetic characteristics of the lower Middle and Early Weichselian units exhibit a significant destruction of primary magnetic minerals caused by such secondary processes as climatically controlled waterlogging and reworking. The main observation, an increasing $\chi_{fd}$ with decreasing $\chi$ with stratigraphic depth, argues for a general magnetic depletion in conjunction with decreasing magnetic grain sizes caused by weathering of larger primary particles.

The magnetic fingerprint of the Saxonian loess is characterised by prevailing magnetic depletion processes, which effectively rules out the application of the wind vigour model. Moreover, the observed magnetic characteristics differ significantly from that of other loess regions. Therefore, we propose a new magnetic facies model for more humid (Central European) loess provinces dominated by typical periglacial conditions, including widespread permafrost, which control the intense reworking and waterlogging (gleyification) processes.