High Resolution Palaeomagnetic and Environmental Magnetic Data from the Last Interglacial to Glacial Transition in a Loess-Palaeosol Sequence (LPS) from the Lower Danube (Romania) - Implications for the Chronology of the S1 Pedocomplex in Eurasian LPSs

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Abstract

The transition from the last interglacial period (Eemian) to the glacial state (Early Würmian) is in northern hemispheric continental settings well recorded in Greenland Ice and Eurasian lake sediments which, however, are geographically unevenly distributed. Nonetheless, in the mid-latitude terrestrial realm loess-palaeosol sequences (LPS) represent geographically widespread and occasionally temporally highly resolved archives of Pleistocene palaeoclimate and particularly of this palaeoclimatically important transition. In order to improve our knowledge about this transition, a multi-proxy approach was applied to 216 oriented samples covering c. 4 m from the top of the last interglacial palaeosol (S1) into the overlaying loess units. The study site is located in the lower Danube Basin (Romania). The samples were subjected primarily to palaeomagnetic analyses and secondly to environmental magnetic and colorimetric measurements. A characteristic pattern in relative palaeo-intensity in the lower half of the sequence and a drop towards the top of the section gives evidence for the presence of a recorded geomagnetic excursion, the post-Blake event. This feature, dated to 99 – 98 ka, serves as an absolute time marker and forms the backbone for the multi-proxy age model combining the results of environmental magnetism, colorimetric analyses and palaeomagnetic data. The age model for the Vlasca section (VS) reveals a time interval of c. 110 – 95 ka and put the demise of the S1 pedogenesis largely into the Eemian (marine isotope stage (MIS) 5e). This contradicts the assumption of equivalence of the entire MIS 5 with the S1 pedocomplex, which is a key legacy of loess research since c. 50 years. The VS provides high- and continuous sediment accumulation with a mean resolution of 39 years / cm. Moreover, clearly expressed millennial-scale oscillations in environmental magnetic parameters can be correlated with Dansgaard-Oeschger cycles, based on their internal structure and average duration of _˜1470 years.

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