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A combined palaeomagnetic and environmental magnetic investigation of Late Glacial loess from the Middle Danube Basin (Süttö, Hungary)

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In July 2008 and in August 2009 sampling for palaeomagnetic and environmental magnetic research was carried out at a 20 m thick Upper Pleistocene loess-palaeosol sequence near Süttö (North Hungary) in order to establish a high resolution palaeomagnetic record.

Aeolian dust was deposited worldwide during dry/cold periods of the recent geological past. Alternating environmental conditions (dry/cold; humid/warm) after deposition led to loess-paleosol sequences (LPSS) covering wide parts of the continents and providing high resolution archives of palaeoclimatic changes during the Pleistocene.

LPSS cover more than 30% of the surface of Hungary. In order to establish an absolute chronology for late Quaternary deposits from Hungary, different loess-palaeosol sequences have been investigated by luminescence dating performed by the Leibniz Institute for Applied Geophysics (LIAG) in Hannover in collaboration with the Department of Physical Geography of the Eötvös Loránd University of Budapest.

The objectives of our study are: firstly, to establish a palaeomagnetic directional record for additional, independent dating; secondly, to construct a palaeosol-loess stratigraphy based on variations of the magnetic susceptibility (MS) and other rock magnetic proxies with depth in order to reconstruct the palaeoclimatic evolution; thirdly, to build a relative palaeointensity record and to compare this record with the high resolution global palaeointensity stack GLOPIS 75 (Laj et al. 2004).

During our first sampling campaign we took small cylinders and overlapping blocks. Based on the results of this campaign we collected samples with narrow spacing (1 cm) at the most interesting part of the profile. Most samples show a clear palaeomagnetic signal and magnetic cleaning (thermal or alternating field) yielded stable characteristic remanences with well defined palaeodirections. Thus, the profile at Süttö represents a succession of palaeodirections characterised mainly by normal polarity but also with indications of inversely magnetised intervals in superposition.

Results of luminescence dating argue for a Last Interglacial age of the Süttö pedocomplex at the base of the sequence (Novothny et al. 2009). Our magnetic susceptibility record correlates through the whole sequence quite well with the loess layers and soil horizons.

Supported by the results of luminescence dating and stratigraphic arguments our working hypothesis is that the Mono Lake ($\sim$32 ka) and Laschamp ($\sim$41 ka) geomagnetic episodes (e.g. Channell 2006) have been recorded in the Süttö profile. Comparing the intervals of assumed geomagnetic excursions with lows in the relative palaeointensity record corroborates our assumption.