Paleoenvironmental anaysis of two loess profiles at the Ságvár Lyukas Hill in western Hungary

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Paleoenvironmental investigations are undertaken for two loess profiles at the Ságvár Lyukas Hill in western Hungary. The site is known for its Upper Paleolithic findings (Lengyel, 2008-2009). It is located ca. 12 km south-east of Siofok at Lake Balaton within a loess landscape, which exhibits dominantly northwest-southeast striking valleys. Figure 1 shows a loess map with the location of the site. Granulometric, geochemical, rock magnetic and luminescence analyses were carried out showing weak variations.

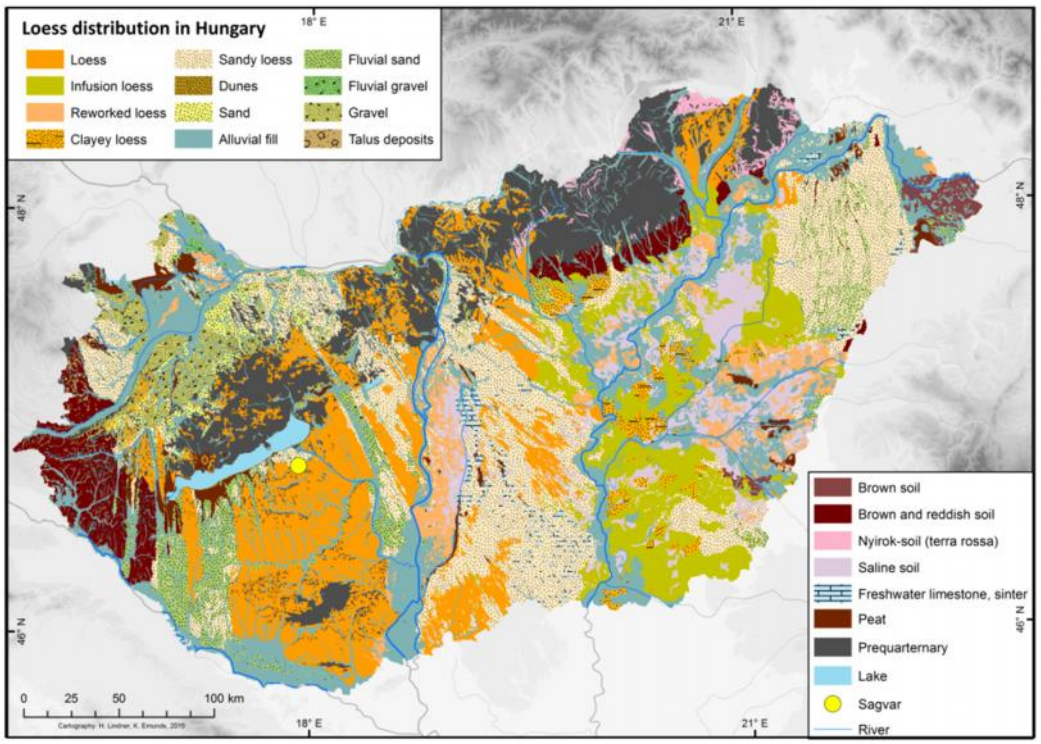

Fig. 1 Map shows the loess distribution of Hungary and the location of the investigated section (yellow circle). The map is based on the geological map of Hungary (Péter, 2005).

Firstly, grain size measurements were conducted by using a Laser Diffraction Particle Size Analyzer (Beckman Coulter LS 13 320 PIDS). For the calculation of the grain size distribution the Mie theory was used. Median grain sizes show no clear pattern, and vary around 51µm

for both profiles. Fine grains <5μm contribute ~11% in the first profile and 12-18% in the second profile. Coarse grains >200μm contribute less than 0.5% in both profiles.

Secondly, geochemical composition was determined by X-ray fluorescence. At the first profile carbonate contents vary around 19%, silica oxides contribute with 55%. The second profile shows greater variations throughout the profile: stronger carbonate concentrations are found in the upper part of the profile (20%), where the silicate content is weakest (54%). The lower part exhibits carbonate contents of 16%, and silicate contents of ~58%. Iron concentrations show a similar trend as the fine grain size fraction <5μm.

Thirdly, frequency dependent magnetic susceptibility (χfd) measurements were carried out. They show a background magnetic susceptibility of ca. 30*10-8 m^3/kg (Ságvár I) and 25 *10-8 m^3/kg (Ságvár II). The magnetic susceptibility is clearly enhanced in the cultural layer sampled in the first profile. At Ságvár II the magnetic susceptibility shows a semi-sinusoidal pattern with maxima at ~ 60 and 190 cm, and minima around 110 and 220 cm.

Finally, preliminary luminescence data is presented. Polymineral fine grains (4-11μm) of four samples were measured with the pIRIR290 protocol (cf. Thiel et al., 2011); dose rates were calculated by means of radionuclide concentrations, conversion and attenuation factors (Liritzis et al., 2013; Guerin et al., 2012; Huntley and Baril, 1997; Bell, 1980), an assumed water content of 10±5%, and the cosmic dose rate (after Prescott and Hutton, 1994). Prior to the measurement of the equivalent dose, dose recovery and preheat plateau tests were performed. Dose recovery ratios, preheat plateaus, recycling ratios, negligible recuperation, and low residuals underline the good behavior of the samples. The samples were dated to 21.5±1.7 ka, 22.6±1.8 ka, 23.8±1.9 ka, and 24±1.9 ka. The narrow time range of the ages might explain the low variability within the other proxies investigated. Ages are in agreement with previously published 14C data (Lengyel, 2008-2009).

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