



Environmental change indicated by grain-size variations and trace elements: An example from the sandy-loess sediments from the Doroshivtsy site (Ukraine)

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The recently discovered loess section of Doroshivtsy became famous due to archeological findings of the Gravettian. The profile represents a about 9 m sequence of sandy loess, intercalated by more humic horizons. It is situated in a flat gully and at an undercut slope of the Dniester River close to the village Doroshivtsy in the south-western Ukraine. Radiocarbon dating and luminescence ages are conclusive within the expected age range of the Gravettian period (22-28 ka). The loess section is composed mainly of sandy silt and covers the time span from about 26 to 16 ka. This is one of the very few sections in Europe which provides a high resolution sedimentary record including prehistoric finds of the cooling maximum of the last glacial cycle. Based on the field description and the grain size distribution obtained by Laser Diffraction Particle Size Analyzer (Beckman Coulter LS 13 320 PIDS), the profile can be divided into three main genetic units representing changes during the deposition. The upper part (1-3 m) of the profile is characterized by aeolian loess and sand deposition intercalated with a few gravel lines. The middle part (3-6.5 m) of the profile is influenced by aeolian, denudative and weak soil forming processes. The lower part (6.5-9 m) of the section represents a combination of aeolian loess, re-deposited slope material. Additionally, the whole part is affected by hydromorphic conditions. As the sediment is rather homogeneous sandy silt U-ratio and GSI did not show any distinct variations. However, calculations with different grain-size ratios show that a fine silt to fine sand ratio (SiS-ratio) of 3.5 to 8.1 μm and 69.6 to 161.1 μm provide clear peaks. These variations of the SiS-ratio represent environmental changes which are also observed by structures and weak soil formations in the section during field work and fit also to the different archeological layers. In addition, geochemical analysis show comparable results to the SiS-ratio and provide further evidence for the differentiation of the stratigraphic units. Summarizing we can detect 3 different main units and 11 sub-units which are related to palaeoclimatic and environmental conditions.