

# Correlation of two loess sections from Šarengrad, eastern Croatia

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In the easternmost part of Croatia, from Vukovar to Ilok, loess and loess like deposits up to 30 m thick predominate, forming a loess plateau (Fig. 1). In Šarengrad, two loess-palaeosol sections are exposed on the southern bank of the Danube River, about 180 m apart. They have been investigated by the means of sedimentological, palaeopedological, palaeontological, mineralogical, geochemical, magnetic susceptibility) and geochronological methods (Galović et al., 2009, in press; Hupuczi et al., 2010; Wacha et al., 2010).

The scope of this work is to compare the investigated sections based on their geochronological results which show a significant age difference between two nearby sections. The sections were studied in vertical profiles with a total thickness of 16.20 m (Šarengrad I) and 23 m (Šarengrad II) (Fig. 1).

Šarengrad I section consists of four palaeosols intercalated in the loess. The oldest, hydromorphic palaeosol is carbonate-free and contains Fe/Mn-concretions increasing with depth. The carbonate-rich loess horizon has a thickness of 140 cm and includes spherical carbonate concretions. An IRSL age estimate yielded  $86.6 \pm 8.6$  ka (Fig. 1) (Galović et al., 2009, in press). This layer is truncated and covered by laminated sediment. Large carbonate concretions up to 40 cm in diameter with flattened upper surface precipitated at the contact between loess sediment and the well-developed argillic dark brown palaeosol. It is characterized by Fe/Mn-oxides/hydroxide concretions, rubification and illuviation processes, and carbonate coatings around soil aggregates. On top of that palaeosol loess deposited. Elongated carbonate concretions precipitated along vertical cracks in the loess. The loess horizon is covered by a brown palaeosol and cumulic horizon. The uppermost palaeosol is weakly developed and covered by loess which is superimposed by recent pedogenesis at the top of the investigated sequence. An IRSL age of  $55.3 \pm 5.5$  ka was determined for the loess (Fig. 1), giving evidence that most of the middle pleniglacial, pleniglacial and late glacial record are missing at the Šarengrad I section (Galović et al., 2009).

Šarengrad II section consists of fluvial and marshy sediments and two palaeosols intercalated in the loess (Wacha et al., 2010). The base of the investigated Šarengrad II section consists of yellow to light-brown micaceous, fine-grained sand and sandstone of fluvial origin (Fig. 1). The sand fines upwards into greyish sandy-silty clay and clay with red tint due to dispersed limonite. This clay is overlain by greyish variegated clay with red and brown stripes and patches representing marshy sediments. They are overlain by greyish-yellow micaceous clayey silt (a gradual transitional layer between swamp deposits and loess) with numerous gastropod remains and carbonate accumulation and cementation. That layer is the base of the overlying brown forest type of palaeosol. IRSL dating results of loess below the palaeosol gave an age estimate of about 344 ka. This fossil soil is covered by loess horizon containing manganese dots and white calcareous veins and flakes. The calcareous nodules are dispersed in the whole loess layer, occasionally forming layer-like intercalations. Two IRSL samples were collected from this loess horizon giving age estimates of about 275 ka and 230 ka. Above the thick loess horizon a double fossil soil is exposed. Dating results of the samples from the Šarengrad II section indicate ages much older than the Last Glacial/Interglacial, suggesting a Middle Pleistocene loess-palaeosol record. Based on the

IRSL dating results for the most lower sample (about 344 ka), the lower palaeosol can be correlated to oxygen isotope stage (OIS) 9 and the double palaeosol to OIS 7. Similar double palaeosols have commonly been described in European loess stratigraphy.

The dating results of the two investigated loess-palaeosol sections from Šarengad show that the deposition of loess started at least prior to 350 ka covering fluvial and marshy sediments (Šarengad II) and lasted until the last glacial (Šarengad I). Loess in this area is intercalated by at least seven brown palaeosols which can be correlated to interglacials and interstadials. A more detailed investigation is mandatory for a more precise palaeoenvironmental reconstruction.

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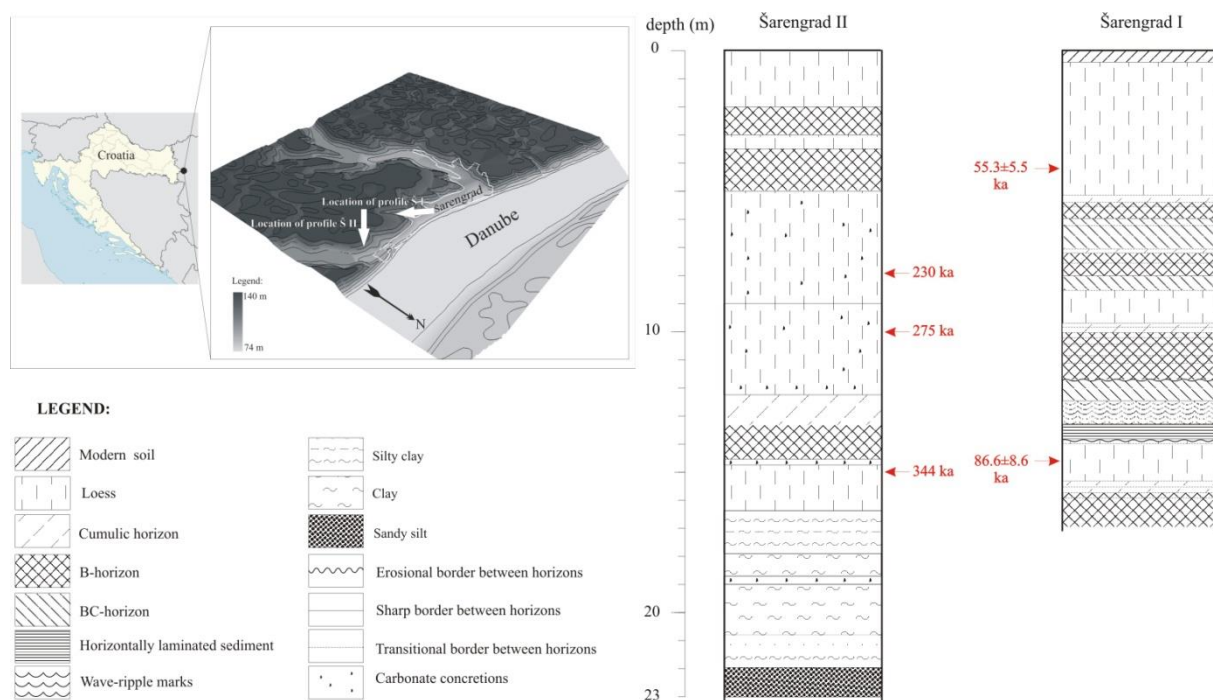


Figure 1: Map showing the position of investigated sections, field description of sections and IRSL age of analysed loess samples.