

Three climatic cycles recorded in a loess-palaeosol sequence at Semlac (Romania) – implications for dust accumulation in the Carpathian Basin and the northern Hemisphere

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Semlac is regarded as a key section for the Carpathian Basin because of the good preservation of the fine silt. The site is situated at the Mureş River in its lower reaches (Banat region, western Romanian). The more than 10 m thick loess sequence includes four fossil soil-complexes developed in homogenous relatively fine silty loess and dates back to marine isotope stage (MIS) 10. This setting offers possibilities to a) improve the understanding of the type and composition of the lowland loess sequences in the Carpathian Basin for the last interglacial palaeosol complex and beyond, b) reconstruct the temporal evolution of the local loess-palaeosol successions and c) compare the loess of the region to loess-sequences in adjacent areas (Carpathian Basin, Lower Danube) and to dust proxy data in the northern hemisphere. A strikingly sinusoidal course of physical property data in depth and time point to relatively homogenous, quasi-continuous background sedimentation of dust, which are interpreted as resulting from long-range transport. This is in contrast to a commonly observed more glacial-interglacial pattern with sharp boundaries of paleosols.

An integrated age model based on correlation to reference records and luminescence dating is compiled. Applying this age model we compare climate proxy data from Semlac to both global data and to data from the very southeast of the Carpathian Basin (Vojvodina, Serbia).

The obtained results provide new insight into the dust accumulation regime in the eastern part of the Carpathian Basin and offer new palaeoenvironmental information for the region. Results from Semlac represent an important step towards establishing a catena from the thin loess-like sediments of the Banat foothills in the East towards the thicker and seemingly more complete loess sections of the southeastern and central Carpathian Basin.

Disentangling grain size data from soil formation proxies gives quantitative estimates for the contribution of original sediment and weathering (through soil formation) to the present clay fraction. Patterns of clay from direct sedimentation are dissimilar to grain size proxies from China, suggesting western and eastern Eurasian loess to have different mechanistic origins which may be caused by different palaeoclimatic circumstances.