



The Early-Middle Pleistocene loess deposits in the middle Dniester basin (Ukraine) as a recorder of paleoenvironmental changes

Andrij B. Boguckij (1), Maria Lanczont (2), Teresa Madeyska (3), Jerzy Nawrocki(4)

¹Faculty of Geography, Ivan Franko National University, Lviv, Ukraine

²Institute of Earth Sciences, Maria Curie-Skłodowska University, Lublin, Poland
lanczont@biotop.umcs.lublin.pl

³Institute of Geological Sciences, Polish Academy of Sciences, Warsaw, Poland
tmadeysk@twarda.pan.pl

⁴National Geological Institute, Warsaw, Poland

jnaw@pgi.waw.pl

The middle Dniester River basin is located in the Southern Podilia, in the peri-Carpathian part of the continental bridge between Baltic and Black Sea. During the Pleistocene this area was a borderland between the part of Europe occupied by Scandinavian ice-sheets and periglacial zone, and that affected by milder, southern atmospheric circulation. Therefore, this region is very important for the study of paleoclimate changes during the older Pleistocene, which are recorded in loess deposits covering watershed areas of the Southern Podilia plateau.

The key profile of loess deposits is located in the vicinity of Skala Podil'ska on the Zbruč River. They are exposed in a quarry of the Silurian limestones and different Badenian marine sediments. The Quaternary sequence, about 23 m thick, occurs at 260 m a.s.l. (i.e. 150 m above the floor of the Dniester River valley, and 65 m above the floor of the Zbruč River valley). This sequence consists of four (I-IV) main units. The lowest unit I, representing fluvial cycle, is about 4 m thick, and contains channel gravels (only local Neogene material), sands and muds. This sequence is a first trace of the pra-Dniester river system, which appeared on the surface of emerged marine sedi-

ments in the (upper?) Pliocene. The unit II is up to 3 m thick, and consists of loess-like deposit with forest paleosol in the top. The unit III, over 5 m thick, it is an intraloess series of lacustrine loams. It probably represents a short episode of intensive accumulation in a small closed basin. The upper unit IV is a paleosol-loess sequence with the thickness of 10 m. It contains three fossil pedocomplexes, each of them composed of 2-3 soils. Soils of lower and middle pedocomplexes are strongly dissected by the systems of deep fissures. Loess between these sets of paleosols is not fully preserved, in places it occurs only within the fissures of lower pedocomplex. Paleosols of lower set overlying lacustrine deposits are distinctly of red colour (forest soils). Soils of middle and upper pedocomplexes are chernozems. Almost the whole profile is characterized by abundant occurrence of carbonates of different forms and origin. Carbonate concretions form regular layers in lacustrine sediments, and agglomerations within and near fissures of the paleosol-loess sequence. The isotope records ($\delta^{13}\text{C}$ and $\delta^{18}\text{O}$) indicate similar origin of large, secondary carbonate concretions occurring in the series of lacustrine and loess deposits, and various origin of small authigenic carbonate forms in loess series.

Interglacial nature of most paleosols in the Skala Podil'ska profile is confirmed by high values of magnetic susceptibility, the highest in red colour soil, which probably corresponds to the soil S5 from the Zahvizdja profile and the pedocomplex PK4 from the Roxolany profile (also located in the Ukraine). Such an interpretation implies the assumption that stratigraphic hiatus occurs between lacustrine sediments and red colour soil. This hiatus should contain two glacials and separating them interglacial. The near-surface paleosol, in which the Blake paleomagnetic event is recorded, can be related to the Eemian interglacial. Thus, during the Vistulian Glacial there had to be unfavourable conditions for loess accumulation on watershed surfaces of the Southern Podilia plateau. This fact is also confirmed in other loess profiles studied in this region.

The investigations were supported under the State Committee for Scientific Research, grant No. 6P04D 034 25.