

Middle Pleniglacial pedogenetic dynamics of the peri-Carpathian zone

J. Hošek¹, L. Lisá², K. Adameková³, A. Bajer⁴, P. Moska⁵

¹Czech Geological Survey & Centre for Theoretical Study, Charles University, Czech Republic; ²Institute of Geology of Czech Academy of Science, Czech Republic;

³Department of Geology, Faculty of Science, Masaryk University, Czech Republic;

⁴Faculty of Forestry and Wood Technology, Mendel University in Brno, Czech

Republic; ⁵Department of Radioisotopes, Institute of Physics, Silesian University of Technology, GADAM Centre of Excellence, Poland

DOI: 10.18154/RWTH-2019-10414

In loess-paleosol sequences (LPSs) the transition from the lower (MIS 4) to the middle Pleniglacial (MIS 3) was accompanied by significant erosion events, as recorded in various terrestrial archives across Central Europe. As a result, potentially existing paleosol horizons of the particular period have been widely erased from the LPSs and only little is known about pedogenesis in this vast area. This study tries to fill this gap in our knowledge through studying three pedo-sedimentary records (Kamenica nad Hronom, Turá and Bíňa) situated along the Hron River in southwest Slovakia, i.e. northwestern edge of the Carpathian Basin. The study sequences represent the most complete pedo-sedimentary record of the MIS 3 within the northern Carpathian Basin, where a high dynamics of erosion during the last Pleniglacial significantly limited sediment accumulation and soil preservation.

The paleoenvironmental development within the studied area is presented and discussed on the basis of soil micromorphology, rock-magnetic and geochemical measurements supported by luminescence dating. Based on the OSL dating of studied profiles, the pedogenesis occurred between 60 and 20 ka (MIS 3 – MIS 2). The most developed paleosol horizons were dated to the early stage of the MIS 3 (60-50 ka) and correlated with the Greenland interstadials GI-17/16, GI-14/13 and/or GI-12 (the northwestern European interstadials Oerel, Glinde and Moershoofd). Another, less intensive phase of pedogenesis occurred ca. 35 ka and probably corresponds to the late MIS 3 interstadials GI-8–5 (Denekamp).

Our observations support the idea that during the middle Pleniglacial the northern rim of the Carpathian Basin was climatically different from the central and southern areas, where the dry to semi-arid conditions prevailing during the

entire MIS 3 resulted in hardly distinguishable differences between loess and initial pedogenic layers. We suggest that the recorded paleosols can be related to the interregional climate differences of the Carpathian Basin: within the northerly located peri-Carpathian zones, a moister climate predominated during the Pleniglacial, in contrast to the drier continental areas to the South. Thus, a sharp climatic transition existed separating a semi-arid steppe region from a climatic zone under the persistent influence of Atlantic air masses.