

A critical reevaluation of paleoclimate proxy records from loess in the Carpathian Basin

I. Obreht¹, C. Zeeden^{2,3}, U. Hambach⁴, D. Veres⁵, S. B. Marković⁶, F. Lehmkuhl⁷

¹Organic Geochemistry Group, MARUM-Center for Marine Environmental Sciences and Department of Geosciences, University of Bremen, Germany; ²IMCCE, Observatoire de Paris, PSL Research University, CNRS, Sorbonne Universités, UPMC Univ Paris 06, Univ Lille, Paris, France; ³LIAG, Leibniz Institute for Applied Geophysics, Hannover, Germany; ⁴BayCEER & Chair of Geomorphology, University of Bayreuth, Germany; ⁵Romanian Academy, Institute of Speleology, Cluj-Napoca, Romania; ⁶Physical Geography, Faculty of Sciences, University of Novi Sad, Novi Sad, Serbia; ⁷Department of Geography, RWTH Aachen University, Germany

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In the Carpathian Basin, loess is the most important archive of Quaternary paleoclimate evolution, but only in the past two decades, systematic and high-resolution investigations were conducted. Those studies remarkably improved our knowledge of the regional past environmental change; paleoclimate inferences based on the magnetic susceptibility and grain-size distribution, as the most commonly used paleoenvironmental proxies for the Carpathian Basin loess, indicate colder and drier climatic conditions during glacials when compared to interglacials. With an increasing number of studies using novel proxies in loess research, such a traditional understanding of dry and cold glacials and humid and warm interglacials in the Carpathian Basin has been questioned.

In order to come up with a coherent and consistent interpretation of the existing paleoclimate data from the Carpathian Basin loess, we have reevaluated and reinterpreted the available data. We discuss and propose a coherent interpretation of rock magnetic, grain-size, malacological, stable carbon and nitrogen isotope, n-alkane and bacterial membrane lipid data for the last glacial cycle loess archives from the Carpathian Basin. We show that glacial conditions in the Carpathian Basin led to a notable increasing North-South gradient in temperature and an even stronger expressed decreasing trend in humidity. Most of the biomarker proxy data conducted in loess for the very dry southern part of the Carpathian Basin show a strong bias towards arid conditions. In particular, paleotemperature reconstructions seem to be misleading. Glacial conditions were drier and colder than previously proposed (summer

temperatures likely under 15 °C during glacials), but notably warmer than in other parts of Western, Central, and Eastern Europe. The vegetation consisted mostly of steppic environments during both, glacials and interglacials. The implications of these results for human evolution in this period will be addressed.