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Various environments of interglacials recorded by Pleistocene paleosoils in Hungary (Central Europe)

György Varga and Éva Kis

Research Centre for Astronomy and Earth Sciences (Hungarian Academy of Sciences), Institute of Geography, Budapest, Hungary (varga.gyorgy@csfk.mta.hu)

Based on stable isotope analyses of worldwide reference curves from deep sea, ice core and speleothem records, it has long been apparent that duration, intensity and climatic conditions of different interglacial periods were significantly diverse. As a consequence of negligible fresh, detrital material admixture during interglacials, the soil formation intensity and maturity of various kinds of past soils have been holding vital information on the environmental conditions at the time the soils formed. This, in turn, means that several physical and chemical properties of soils allow us to reconstruct past climatic regimes.

Loess-paleosol sequences in Hungary (Central Europe) provide insight into the cyclic nature of glacial-interglacial variations of the last 1 million years. The paleosoils have been recognized as the product of warmer and moister interglacials, when the (glacial) loess material was altered by chemical weathering and pedogenic processes. 12 pedogene units from MIS-19 to MIS-5 strata were analysed in the course of this study, with a special attention to MIS-11 and MIS-19 periods, because of these can be regarded as analogues of the Holocene interglacial (due to the similarities in obliquity and eccentricity). Grain size, geochemical and (clay)mineralogical studies were elaborated and were gathered from previously published papers to quantify past weathering intensity and paleoenvironmental conditions by geochemical climofunctions.

The Upper and partly, the Middle Pleistocene loess deposits are intercalated by steppe, forest-steppe and brown forest soils, while the older pedogene horizons are different kinds; these are red, Mediterranean-type soils. The MIS-5 pedocomplex consist of three parts at several Hungarian sites, however the pedogene units cannot be correlated unequivocally with the three MIS-5 warmer substages, due to the scarce absolute age data. The MIS-7 and MIS-9 stages are represented by three forest steppe soils. The MIS-11 pedocomplex and MIS-17 and MIS-19 units are thick and well-developed forest soils, formed under a more humid climate compared to the younger pedogene strata. The geochemical data and climofunctions have been supported well these findings. Contrary to the global loess-paleosol sequences, the MIS-13 and MIS-15 soils are not so dominant in the Hungarian series.

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