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ABSTRACT BOOK

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Micromorphology of surface soils and Late Pleistocene buried paleosols formed in loess in the arid regions of Eurasia

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Paleoenvironmental reconstruction is based on a comparison of micromorphological characteristics of the Late Pleistocene (MIS3 and MIS5) paleosols (pedosedimentary sequences on the terraces of the Akhtuba and Volga Rivers) with those of surface soils: (a) Solonetz/Kastanozems soil complexes in semi-desert areas of the Caspian Lowland, Southern Russia (b) Calcisols and Gypsisols in Dzungarian and in Ili basin desert areas (China and Kazakhstan); (c) Cryosols in the arid permafrost areas (Yakutia). The intensity of pedogenesis was estimated by comparing the paleosols and loess layers. Micromorphological characteristics on the surface soils and Late Pleistocene paleosols exhibit different type of pedogenesis: (1) Arid pedogenesis — low humus content, gypsum and carbonate pedofeatures, and presence of coarser aggregates (20–40 μm) and denser packing of entrapped particles comparing to loess; (2) Steppe pedogenesis — strong clay-humus and biogenic aggregates, diverse carbonate pedofeatures, krotovinas, and microfeatures of clay mobility; (3) Hydromorphic pedogenesis — gley mottling and Fe–Mn nodules; and (4) Cryogenic pedogenesis — syngenetic (MIS3) and epigenetic (MIS5) frost features (frost cracking and ring-shaped orientation of quartz grains, and specific ooidal aggregation). Contrasting pedogenetic microfeatures confirm variability of the modern and paleolandscape environment in Eurasia arid regions. Detailed micromorphological studies of pedosedimentary sequences in the Caspian Lowland are performed here for the first time.Acknowledgment. The study of desert soils was supported by the Russian Foundation for Basic Research, project no. 18-04-00638. Keywords: micromorphology, paleoenvironmental reconstruction, Pleistocene paleosols, Holocene polygenetic arid soils, loess