

Paleopedological research of the dynamics alteration in environment of the Lower Volga region in the last macrocycle

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Caspian Sea reflects in its development global climate changes, glacial-interglacial rhythms in Russian plains and mountain areas. It is stratigraphic region for drawing up a single stratigraphic and paleogeographic plan of the Upper Pleistocene of Northern Eurasia. To date, accumulated a considerable amount of material on the Quaternary history of Ponto-Caspian, based on stratigraphic, paleogeographic and geomorphological studies. However, paleopedological work in the region have been starting for the first time. Studying paleopedology in soil-sediment thickness have paramount importance, as they can reliably break down the steps of the surface on which stabilization was carried out pedogenesis with further sedimentation, and allow us to trace the stages of evolution of the environment of the region.

The site (Srednyaya Akhtuba) located on the left bank of the Akhtuba River, 20 km from the Volzhsky city, the upper part of Lower Volga region. This marine terrace represented by 6 pedogenetic levels, including 7 soils (MIS1-MIS5) (Yanina, 2014) separated by sediments (precipitation) of different structure and genesis.

The upper part of the section (0-150 cm) presented by a typical for the dry steppe area soil Kastanzem (WRB, 2014) (MIS1). Parent rock material is a great pack (>1m) of the Caspian marine sediments, represented by a series of layers of chocolate clays (MIS2) with interbedding of sands. Lower, is a pack (520-670 cm), formed during Atelian regression of the Caspian Sea (MIS3-MIS4), presented by one well-developed soil with truncated humus horizon and two loessic layers with signs of soil formation (rhizolithes, manganese nodule, cryogenesis structure and etc) MIS3 stage. The lower part of Atel-Ahtuba strata (910-1530 cm) is presented by carbonate loess without noticeable pedogenetic transformation.

From a depth of 1530 cm begins thick layer of loess-soil series, presented by MIS5a-e Mezin pedocomplex, dedicated to the Late Khazar-Girkan transgression, with three well-preserved soils. The upper soil, Gleyic Phaeozem, has accretionary humus horizon (about 1 m), many krotovinas, and network of frost wedges 40-50 cm. Wedges start in the overlying Atel-Akhtuba loess layer indicating the beginning of the last glacial cycle (MIS4). The middle soil, Gleyic Chernozem, has first 5 cm humus horizon intermixed with Bg horizon of the upper soil (welded paleosol). Until the middle of the profile (1740 cm) are the end of the loess permafrost wedges. Gleyic features are due to seasonal overflowing. The lower soil of Mezin pedocomplex (MIS5e), Mollic Calcic Gleysol, formed in loess sediments accumulated during penultimate glaciation (MIS6) and has reworked upper boundary (10-13 cm), well-defined humus horizon with gley process.

Three soils of Mezin pedocomplex have common features: semi terrestrial genesis with gleyic features due to long-term seasonal overflowing; well developed humus horizons and complex assemblage of carbonate neof ormations, formed under steppe environment.

Pedogenetic horizons serve as good stratigraphic markers that will help to correlate late Pleistocene soil-sedimentary sequences of the whole Caspian-Azov-Black sea region, East European Plain and link it with global stratigraphic schemes.

Detailed analytical and further field studies are required to reveal further pedogenetic response to environmental changes in the area.

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