

New results on Late Quaternary stratigraphy of Manych depression

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Manych-strait connected Black sea and Caspian Sea in Pleistocene is a great event in the history of the Ponto-Caspian region. The strait located within such geological structure as Manych Depression which is extended sub-latitudinally from the west coast of Northern Caspian to the north-west of the Azov sea. The existence of the Manych-strait is essentially for the stratigraphy and paleogeography. There were several stages when marine waters spilled over from Black sea to Caspian and alternatively. Due to the alternation of sedimentary layers it is possible to correlate pleistocene deposits and paleogeographic events. Nowadays there are a lot of materials and data about the history of Manych-strait. In the profile are distinguished interbedding marine deposits with lacustrine and alluvial formations and subaerial deposit on top. The main question is the paleogeographical reconstruction. We try to solve this problem using our new data and elaborating available information.

In February 2016 complex geomorphologic and paleogeographic works in central part of depression on northern coast of Manych-Gudilo lake were carried out. We performed cable drilling of 2 cores (depth of each 45 m) and hand hammer drilling (8 boreholes, max. depth 12 m) of covering Holocene sediments on different geomorphological levels of depression. From the core (3 cm diameter) continuous sampling was made for spore-pollen, lithological and geochemical analyzes.

The stratigraphic subdivision of the core is based on facial-lithology and macro-malako-faunistic analysis. In the lower part of both cores there is barren formation of interbedding layers of sand and clays. The bottom line is precise, below lays a marine Carangat formation (MIS-5) of sand and clay with well-preserved Black Sea marine mollusk shells (*Cardium edule*, *Paphia senescens*, *Ostrea edulis*, *Loripes lacteus*, *Chione gallina*, *Chlamys glabra*). Higher in the core there is a loam-clay layer including both Black Sea (euryhaline species *Cardium edule*, *Abra ovata*) and Caspian (*Didacna cristata*) fauna. Above lies layer with clay deposits including shells of *Didacna* (*Didacna hyrcana*, *D. cristata*) which symbolized Hirkanian transgression of the Caspian Sea. Upwards through the precise borderline there is silty-loam deposits with shells of freshwater mollusks genus *Viviparus*, *Valvata*, *Dreissena*, *Lymnaea*. This kind of shells attests the period of freshwater Burtass lake. Burtass lacustrine deposits are overlaid by continental loam with an abundance of carbonates and visible gypsum nodulars. This layer is covered by aqueous loam with detritus and shell fragments. On the top of the section lies the subaerial origin silty layer.

The preliminary scheme of the sequence of paleogeographic events in Pleistocene is compiled. The beginning of Late Pleistocene is marked by the penetration of marine water deep within the Manych Depression during the Black Sea interglacial transgression (Karangat Transgression, MIS 5e). The character trait of marine water through this period is relatively high salinity (18-20 ‰, that favors the development of Black Sea mollusks. During the transition to the glacial epoch (MIS 5d-a) the marine waters on Karangat bay had begun retreated back into the Black Sea basin. In the end of this stage there was a strait called Hirkanian, which had desalted brackish waters (8-10‰ of the Caspian sea. The marine epoch in the central part of the Manych depression changed to the durable lacustrine phase of development in the second half of Late Pleistocene (MIS 4-3), Burtass lake existed there. In the beginning of its existence it was flowing through (it so because of the major of fresh- and calmwater mollusks in the base of the layer).

During the continental stage there was an active erosion damage of the burtass deposits. Through this period were formed specific landscape forms – extended ridges – which finally formed in the epoch of degradation of the last glaciation and Khvalynian water removing to the Black Sea basin. After the closing of the Khvalynian strait began the continental epoch, through this time there were forming the subaerial stage, which is continuous nowadays.

Preliminary data shows the difficult history of the Manych depression development. Understanding of the evolution of the landscape of the Ponto-Caspian region is useful for the prediction of the future events. At present the main aim is the detailed study of obtained cores in the laboratory for more accurate and detailed information. After this work we could make an improved reconstruction of the history of landscape development of this region.

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