

ECOLOGICAL CHARACTERISTICS OF GREAT SERTEYA PALEOLAKE BASED ON PALEOECOLOGICAL RESEARCH AT THE SERTEYA II SITE IN WESTERN RUSSIA

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The landscape of the Serteya region was formed in the late Pleistocene during the last Valdai (Weichselian) glaciation and in the Holocene. In the late Valdai, the first generation of lakes was created between dead-ice blocks. In the Holocene, the blocks of ice melted and, as a result, the second generation of lakes developed. In the lower Serteya River Valley, four paleolake basins created in the subglacial channel were recognised. Those lakes were subsequently drained by the Serteyka River channel from the lower section (Kalicki et al., 2015). The Great Serteya Palaeolake Basin functioned probably until the Modern Period.

The Serteya region landscape provided great food resources for Neolithic communities. The numerous archaeological sites from the Mesolithic to the Middle Ages have been documented there since the 1960s. Approximately 30 of the sites date back to the Neolithic Period and to the period between 8300 cal. BP and 3800 cal. BP. In last years, the North-Western Expedition of Hermitage State Museum in Sankt Petersburg has been intensively exploring interesting Neolithic settlement remains at the Serteya II site. The Neolithic cultural layer lies ca. 1.2-2.0 m below the water table of melioration canal. During an archaeological underwater excavation, remains of six pile-dwellings were discovered. The location of these constructions in the Great Serteya Palaeolake Basin in lacustrine sediments is very important. Archaeological structures, artefacts and ecofacts are very well preserved within gyttja layers. The pile-dwelling settlement functioned mainly between 4200-3800 cal. yr. BP. The Neolithic settlement existed during the 4.2 ka BP cooling event, which might be strictly related to the climate conditions and hydrological regime (Mazurkevich et al., in press).

The purpose of our multi-proxy research is a detailed reconstruction of the paleoenvironmental conditions which accompanied the prehistoric community of the Serteya region. Geomorphological analysis and geological mapping allowed to reconstruct the landscape of the study site and its development from the Mesolithic to the Middle Ages. The two cores of organic deposits collected from the Serteya II site were analysed with the use of paleoecological methods, among others: pollen, plant macrofossils, diatoms, Cladocera, Chironomidae, molluscs, geochemical and sedimentological analyses. Based on those proxies, the following palaeoenvironmental and paleoclimate features were reconstructed: seasonal water level fluctuations, trophic status of the waters, continentality, and palaeotemperature (average July temperature). Data obtained from multi-proxy research provided informa-

tion about local and global factors as well as the human-environment relationship. The results allowed us to recreate the background of the prehistoric settlement. The water-level changes of the palaeolake were strong limiting factors for the human settlement.

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PRELIMINARY RESULTS OF PALYNOLOGICAL INVESTIGATION OF BOTTOM SEDIMENTS FROM LAKE TURGOYAK (CHELUABINSK REGION, RUSSIA)

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Lake Turgoyak is a unique natural object. It is one of the largest water bodies of Chelyabinsk region. Turgoyak is a repository of pure natural water, the quality of water is close to such like in the Baikal Lake [1]. Water surface area of the lake is 26.4 km. The average depth of the lake is 19.1 m, the maximum depth is 36.5 m. Water transparency is 10-17.5 m. The climate of the lake basin is continental with a steady snow cover in cold winter and short summer with high rainfall in July [2]. As a natural monument Turgoyak has a particularly important environmental and recreational value. Due to bottom sediments that contain and store the information on ecological situations of the past the lake has important paleoclimatic value [3]. Biological paleoindicators such as diatoms, remains of vascular plants and invertebrates (cladocera, chironomidae, ostracoda), spores and pollen used for more accurate qualitative and quantitative reconstruction of past conditions [4]. The border location of the Urals, as the climate divide, makes paleoclimatic and paleoecological investigations of Lake Turgoyak especially important [5].

The article presents preliminary results of pollen analysis of the core of bottom sediments from Lake Turgoyak. In 2017, a 560 cm long sediment core was recovered from 5 m depth of the lake (55°09' N, 60°04' E). The core was retrieved with a modified Mackereth corer. A total 30 samples were taken at a 20-cm average intervals and were treated for pollen analysis using standard procedure [6]. Pollen residues were analyzed under a light microscope Axio Imager A2 (Carl Zeiss) with 400x magnification. Identification of pollen and spores was performed using pollen atlases [7-8]. The microscopic analysis revealed a high pollen concentration and generally good preservation, which allowed the identification of at least 300 terrestrial pollen grains per sample in upper part of the core (the first 21 samples). The lower part of the core did not contain a number of pollen grains sufficient for statistical processing. Percentages of taxa were calculated based on a pollen sum of all pollen taxa taken as 100%. The results are displayed in a diagram (Fig. 1) produced with Tilia/TiliaGraph and CONISS software [9]. The first 400 cm of precipitation was included in the diagram. The pollen diagram is subdivided in three pollen zones (PZs) based on changing pollen taxa composition and abundance. The pollen record is dominated by *Pinus sylvestris* and *Betula* throughout the core. *Picea*, *Artemisia* and *Chenopodiaceae* pollen grains are presents in all PZs.