

A reconstruction of vegetation and paleohydrological changes from peatland in Kansk forest-steppe, Yenisei Siberia

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Peatlands are an important natural archive for past climatic changes. Climatic changes throughout the Holocene have been reconstructed from peat using a wide array of biological and other proxies. Many different proxy indicators can be derived from peat cores allowing for a multi-proxy approach to climatic reconstructions. Peat-based climatic and environmental reconstructions are currently available from many sites in Yenisei Siberia, mainly for its northern territories.

The purpose of this paper is to study some features of peatland development and environmental reconstructions from the Holocene period in the south part of Yenisei Siberia (Kansk forest-steppe zone).

The main method used in this research is macrofossil analysis. It can be used to reconstruct the development of local vegetation and surface wetness on peatlands. The macrofossil analysis in the peat resulted from the study of the vegetation in a particular place over a period of time, and it allowed the reconstruction of environmental changes that have occurred since the Late Glacial. Then we used ecological scales of moisture and reconstructed surface wetness for the entire period of the bog formation. Radiocarbon dating was carried out at Sobolev Institute of Geology and Mineralogy, Russian Academy of Sciences, Novosibirsk.

Peatland "Pinchinskoye" was selected for investigation in Kansk forest-steppe. It is located on the right bank of the Yenisei River in the floodplain of Esaulovka River. Peat cores of 350 cm were selected in the southern part of the peatbog, including 225 cm of peat (with loam layers in the range of 90 to 135 cm), 75 cm of organic and mineral sapropel with the inclusion of fossil shells of mollusks and different plant macrofossils and 50 cm of the loam below.

The process of peat accumulation dated back 8400 ± 140 years, which is the oldest date for the forest-steppe zone of Yenisei Siberia.

The climate of Boreal period of the Holocene was chilly. Under these conditions, in the territory of the peatland "Pinchinskoye" there was a small lake. The birch forest with different grasses was growing along the banks of the lake. The lake level dropped significantly at the beginning of the Atlantic period around 7000 BP in a warm and dry climate. This launched the lake overgrowth and eutrophication. Birch forests and then spruce forests rich in herbs with green moss emerged in the peatland. An increase in moisture was recorded for the Sub-Boreal period (4900-2400) and, as a result, the prevalence of marsh communities with bog bean and fern. Increasing water level of rovers led to the spill and silting up of the bog surface in 2020 ± 60 BP at the beginning of the Sub-Atlantic period. After the decline of the water level, the process of peat accumulation continued and spread out throughout the whole trough flat. Sedge, cotton grass, sphagnum moss and green moss predominated in the composition of plant communities in Sub-Atlantic period, starting from 1500 BP. In the last 500 years, the peatland moved to the mesoeutrophic phase of development.