PALAEOENVIRONMENTS ON THE KOLA PENINSULA DURING ISOLATION OF THE OSINOVOYE LAKE FROM PRA-IMANDRA BASIN (N-W RUSSIA)

Rasputina M.V.[1], Sapelko T.V.[2], Tolstobrova A. N.[3], Korsakova O.P.[4], Tolstobrov D.S.[5]

[1,3,4,5]Geological Institute of the Kola Science Center RAS, Apatity, Russia
[2]Russian Academy of Sciences Institute of Limnology, Saint-Petersburg, Russia

In this paper we consider climate changes on the Kola Peninsula in early Holocene. To achieve this goal we studied bottom deposits from Osinovoe Lake (67°34′18″ N., 32°38′11″ E), which was isolated from pra-Imandra basin at that time and now locates in the Imandra Lake depression (Fig. 1). Osinovoe Lake is an oval-shaped open basin. The shoreline altitude and its size are 129.0 m a.s.l. and c. 10 km2, respectively. The adjacent drainage area is occupied by a locally waterlogged mossy and sphagnum spruce-birch forests.

A field study was carried out in 2011. Bottom lake sediments were drilled from ice in winter. Cores of 1.0 m length and 52 mm diameter were sampled with overlapping of several centimeters using a handled corer that allowed an undisturbed depositional succession to be obtained.

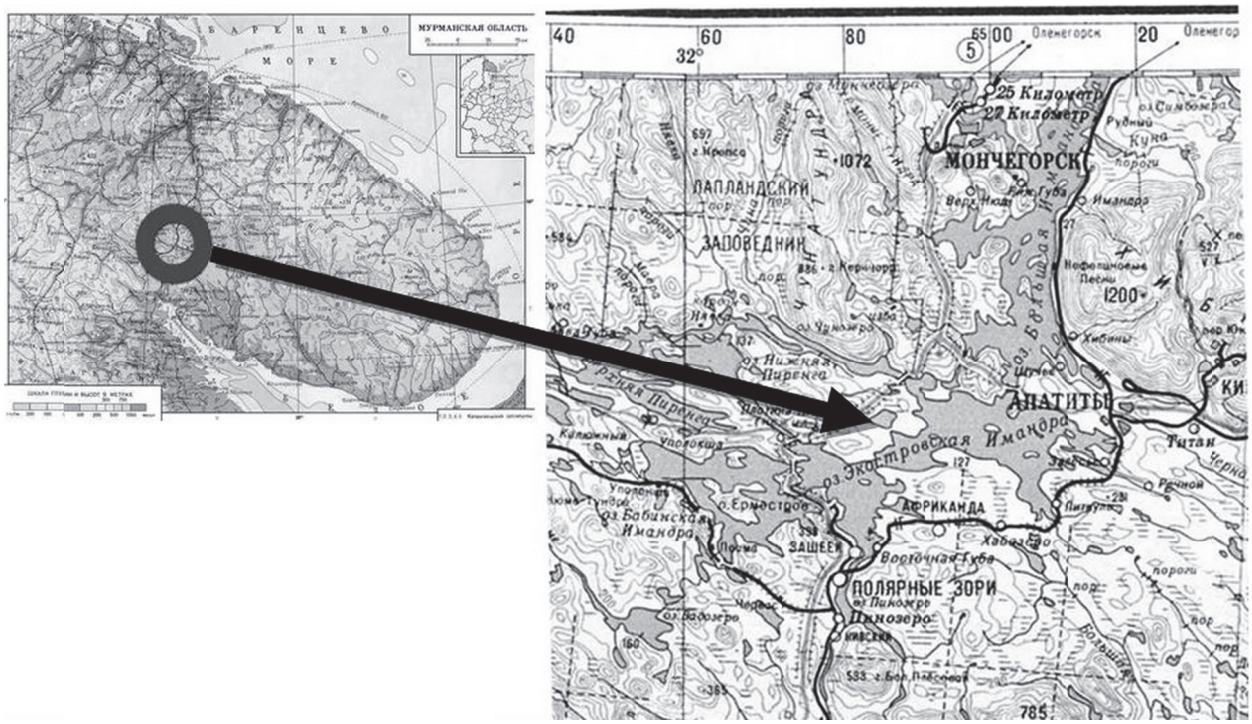

Fig. 1. Location of the Lake Osinovoe, Kola Peninsula

In total, 1.25 m of sediments was recovered. We investigate sediment sequences by litological, diatom and spore and pollen methods; radiocarbon dating has also been conducted. Obtained data allow us to assume that Osinovoe Lake basin isolated from paleo-lake Imandra 11.317-11.156 cal.yr. ago and exists as an autonomous basin [Tolstobrova et. al., 2016]. According to diatoms, a shallow-water basin overgrown with macrophytes was in the studied lake depression prior to its isolation; spore and pollen data show evidence that *Typha latifolia* and Nymphaeaceae dominated the hydrophytes. In the period of isolation, the taxonomic composition of diatoms has changed; diatom concentration taxonomic diversity increased, halophils decreased, while indifferents and acidophils and number of boreal diatoms species increased [Tolstobrova et. al.,2016]. Pollen of *Betula* represent a highest persentage in the spore-pollen spectra, along with a significant number of *Belula nana* and *Pinus* pollen grains. The herb pollen is mostly represented by Poaceae and Chenopodiaceae.

According to diatom data [Tolstobrova et. al., 2016], the biological efficiency of the basin significantly increased during isolation time. The number of *Pinus* pollen increased and single grains of *Picea* emerged, while *Betula nana* totally disappeared.

At the latest stage of isolation and during post-isolation time, the diatoms continued to change towards the increase of indifferents and halophobs. After isolation, Osinovoe Lake became a relatively deep oligotrophic reservoir. *Betula* and *Pinus* dominate in the pollen spectra and proportion of *Picea* increases. Up to sediment succession, *Betula nana* disappears and Poaceae and spores (mostly Polypodiaceae and Lycopodiaceae) decrease. Diatoms and the spore-pollen record suggest an environmental warming, which took place during that time.

At the early stage of autonomous Osinovoe Lake development, *Betula* pollen dominated the pollen spectra, proportion of Pinus pollen increased and *Betula* pollen gradually declined. Single Picea pollen grains appeared in the samples correlated to the middle stage of isolation; its proportion rose during the lake development.

Obtained results are in good correlation with those earlier published by Elina with coauthors [Elina et al., 2010] and Solovieva &Jones [Solovieva &Jones, 2002]. This fact confirms a suggestion that pine-birch forest with dominated *Betula* and *Pinus* additive, similar to contemporary Boreal forests (northern taiga), grew in the central Kola Peninsula in the early Holocene. We obtained preliminary data and recognized paleoenvironment affected by the climate change in the paleo-Lake Imandra catchment area.

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LONG-TERM TRANSFORMATIONS ASSESSMENT FOR THE LAKE ECOSYSTEMS OF THE NORTHERN EUROPE AND WESTERN SIBERIA BY THE METHOD OF DIATOM COMPLEXES TAXONOMIC PROPORTIONS GRAPHIC ANALYSIS

Razumovskiy L.V.

Water Problems Institute of the Russian Academy of Sciences, Moscow, Russia

Initially, the method of graphical analysis (MGA) was developed in the spatial studies of diatom data complexes from modern lake sediments of the Kola Peninsula. Later lakes from different regions of European Russia were studied (Razumovsky, Moiseenko, 2009; Razumovsky, 2012). More than 150 lakes were explored in total. The diatomic complexes structural transformations in time was studied by bottom sediment columns from 21 lakes, which are located in different landscape and climatic regions of the European Russia from the Kola Peninsula to Caucasus (Razumovsky, 2012; Razumovsky, 2014).