

# BIOLOGICAL PROXIES FROM SEDIMENTS OF BOLSHOY KHARBHEY LAKE (NORTHERN RUSSIA) AS INDICATORS OF ECOLOGICAL AND CLIMATIC CHANGES

Larisa Frolova<sup>1</sup>, Larisa Nazarova<sup>1,2</sup>, Oleg Tumanov<sup>1</sup>, Lilia Gafiatullina<sup>1</sup>, Timur Shneidman<sup>3</sup>

<sup>1</sup>Kazan Federal University, Kazan, Russia,

<sup>2</sup>Alfred Wegener Institute for Polar and marine research, Periglacial Research, Potsdam, Germany

<sup>3</sup>Joint Institute for Nuclear Research, Dubna, Russia

(larisa.frolova@kpfu.ru)

Northern ecosystems are the most vulnerable to increasing anthropogenous influence owing to their specific characteristics. Climate change is most strongly expressed in the Arctic and northern ecosystems are most unstable and especially sensitive to external ecological influences (Kienast F. et al., 2011; Rautio & Nevalainen 2013). We investigated short sediment cores (~ 200 years) from the lakes of Kharbey lake system, eastern part of Bolshezemel'skaya tundra in the northeast of Europe 67°31-36' N, 62°51-56' E and 129.8 m above sea level.

The situation in a water ecosystem is reflected by zooplankton and benthos communities. Cladocera (Branchiopoda, Crustacea) fossil assemblages in lacustrine sediments are increasingly important for reconstructing past ecological and climate change (Korhola et al. 2005; Korhola & Rautio, 2001; Rautio & Nevalainen 2013). In subfossil Cladocera assemblages from Harbey lake 22 taxa were identified. Changes in structure of sub-fossil Cladocera assemblages towards modern time, change in ratio of planktonic and benthic species, increase of species abundance as indicators of growth of trophic status, indicate rise of the lake level, which is probably related to increase of the depth of a seasonal soil melting. Multiproxy study has shown that the major compositional changes in cladoceran, diatom, and chironomid communities are synchronous. The chironomid-inferred summer temperature rises during the last 100 years, which can be related to the end of LIA in the region and support previous investigations (Solovieva et al., 2005).

This work was funded by the subsidy allocated to Kazan Federal University for the state assignment in the sphere of scientific activities.

## References

- Kienast F, Wetterich S, Kuzmina S, Schirrmeister L, Andreev A, Tarasov P, Nazarova L, Kossler A, Frolova L, Kunitsky V. Paleontological records prove boreal woodland under dry inland climate at today's Arctic coast in Beringia during the last interglacial (2011) *Quaternary Science Reviews* . 30.17/18: 2134-2159.
- Korhola A, Rautio M. 2001. Cladocera and other branchiopod crustaceans. In: J.P. Smol, H.J.B. Birks & W.M. Last (eds.), *Tracking Environmental Change Using Lake Sediments. Volume 4: Zoological indicators*. Kluwer Academic Publishers. pp. 5-41.
- Korhola, A., Tikkanen, M., Weckstro'm, J., 2005. Quantification of Holocene lakelevel changes in Finnish Lapland using a cladocera - lake depth transfer model. *Journal of Paleolimnology* 34, 175-190.
- Rautio M & Nevalainen L. 2013. Cladocera. *Encyclopedia of Quaternary Sciences*, vol. 3, pp. 271-280. Elsevier.
- Solovieva N., Jones V.J., Nazarova L., Brooks S.J., Birks H.J.B., Grytnes J.A., Appleby P.G., Kauppila T., Kondratenok B., Renberg I., Ponomarev V. (2005) Palaeolimnological evidence for recent change in lakes from the northern Urals, arctic Russia. *Journal of Paleolimnology* 33:463-482.