

The work was carried out within the framework of the state assignment of the NWPI KarSC RAS and with partial support of the grant of the RSF 18-17-00176.

REFERENCES

1. Belkina N.A. Chemical composition of bottom sediments of the northern part of Lake Ladoga as an indicator of long-term variability of the ecosystem of the reservoir/ N.A. Belkina, D.A. Subetto, N.A. Efremenko, M.S. Potakhin, N.V. Kulik // Proceedings of the Karelian Research Center of the Russian Academy of Sciences. – 2015. – № 9. – P. 53–61. In Russian.
2. Belkina N.A. On the question of how the natural migration of copper in Lake Onega/ N.A. Belkina, V.V. Vapirova, N.A. Efremenko, T.N. Romanova // Principles of ecology. – 2012. – № 1. – P. 23–26. In Russian.
3. Belkina N.A. Quantitative and qualitative composition of organic matter and its transformation in the surface layer of bottom sediments of Onega Lake/ N.A. Belkina // Proceedings of KarRC RAS. – 2017. – № 10. Ser. Limnology. – P. 64–72. In Russian.
4. Belkina N.A. Peculiarities of trace elements distribution in the surface layer of sediments of Lake Onega / N.A. Belkina, D.A. Subetto, N.A. Efremenko, N.V. Kulik // Science and Education. – 2016. – № 3 (83). – P. 135–139. In Russian.
5. Belkina N.A. Phosphorus in bottom sediments of Onega Lake/ N.A. Belkina // Izvestia: Herzen University Journal of Humanities & Science. – 2015. – № 173. – P. 97–109. [In Russian].
6. Belkina N.A. Pollution by oil products of bottom sediments of Petrozavodsk Bay of Onega Lake / N.A. Belkina // Water Resources. – 2006. – Vol. 33, – № 2. – P. 181–187.
7. Belkina N.A. Changes in the oxidation- reduction state of lake bottom sediments under the influence of anthropogenic factors (on the example of the Ladoga and Onega lakes)/ N.A. Belkina // Society. Environment. Development. – 2014. – № 3. – P. 152–158. [In Russian].
8. Belkina N.A. Petroleum hydrocarbons in reservoirs of the White Sea-Baltic Canal/ N.A. Belkina, O.V. Panyushkina // Water, chemistry and ecology. – 2013. – № 11. – P. 16–20. [In Russian].
9. Belkina N.A. Distribution of phosphorus forms in bottom sediments as an indicator of eutrophication of the ecosystem of a large body of water (on the example of the Ladoga and Onega lakes) / N.A. Belkina, O. Sandman, N.V. Ignatieva // Ecological chemistry. – 2006. – № 15 (3). – P. 174–185. [In Russian].

DIATOMS IN THE THANATOCOENOSIS OF THE LAKE ZAPOVEDNOYE (EVENKIYA)

Bolobanshchikova G.N.¹, Rogozin D.Y.^{1,2}, Kulikovskiy M.S.^{3,4}

¹*Federal Research Center «Krasnoyarsk science Center» Siberian Branch of the Russian Academy of Sciences (KSC SB RAS, FRC KSC SB RAS)*

*«Institute of Biophysics Siberian Branch of Russian Academy of Science» (IBP SB RAS)
660036, Krasnoyarsk, Akademgorodok str., 50/50*

²*Siberian Federal University, 660041, Krasnoyarsk, Svobodny str., 79*

³*Institute of Plant Physiology, Russian Academy of Sciences, 127276, Moscow, Botanical Street 35*

⁴*Papanin Institute for Biology of Inland waters Russian Academy of Science (IBIW RAS)*

Diatoms are one of the main proxies of the lake condition in the past. In this work we present the first data on the composition and quantitative distribution of diatoms species from the bottom sediments of the lake Zapovednoe (Evenkiya).

Lake Zapovednoe (60° 31'N, 101° 43'E) is a freshwater lake located at the Verkhnyaya Lakura River in the Tunguska Nature Reserve, about 60 km from the settlement Vanavara. The lake is about 500 m in diameter, a round form and a depth about 47 m. Sampling was carried out in March 2015 from the ice in the central part of the lake with a gravity corer with removable plastic pipes with a diameter of 90 mm (UWITEC, Austria). Data on the distribution of ¹³⁷Cs and ²¹⁰Pb isotopes at the depth of the cores were used for preliminary dating of the upper layers (Darin, Kalugin, unpublished). Sub-samples were processed using 30% hydrogen peroxide and analyzed for diatoms by light microscopy (Bolobanshchikova et al., 2015).

The results showed that the thanatocenosis of the lake Zapovednoye has a rich species composition of the diatoms. More than 40 genera of diatoms were found in the core. We emphasized several genera that play a major role in the quantitative and qualitative results of the analysis. The core has a several zones, in which abundance of these genera changed. Planktonic species correlated with other planktonic species: *Aulacoseira* sp. - *Lindavia* sp. - *Discotella* sp., and benthic species correlating with other benthic species: *Cocconeis* sp. correlated with *Cymbella* sp., and *Fragilaria* sp. correlated with *Epithemia* sp. (fig.1).

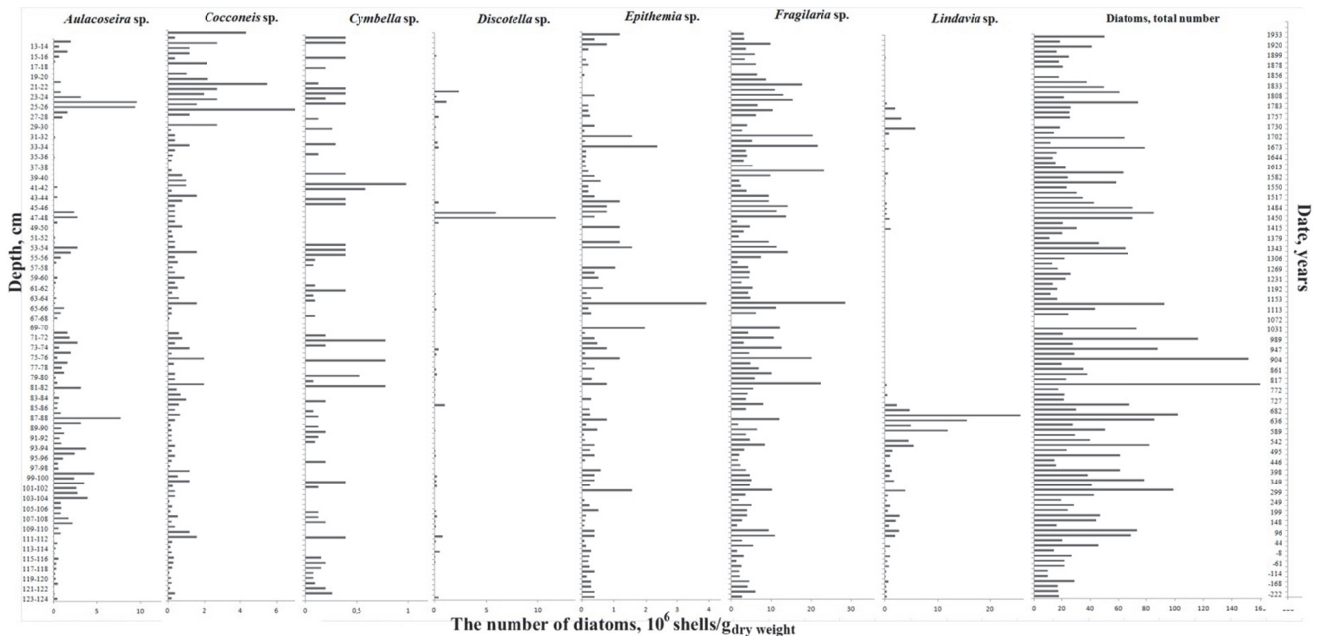


Fig. 1. Distribution of the diatoms in the bottom sediments of the Lake Zapovednoye

Also a periodic explosion of diatoms *Lindavia lemanensis* (Chodat) T.Nakov et al. and *Discostella stelligera* Cleve and Grunow) Houk and Kle are interesting. These species are known to be dependent on the ratio of nutrients - nitrogen (N) and phosphorus (P) (Saros, Anderson, 2015): the high concentration of these elements contributes to increasing of the number *Cyclotella sensu lato* species. Also the abundance of these species is influenced by the availability of light.

In all cases the maximum values of *L. lemanensis* and *D. stelligera* species were preceded by an increase of the number *Epithemia* sp., which has an endosymbiotic N-fixing cyanobacteria. It can be assumed that the change in the number of shells *Cyclotella sensu lato* is probably due to change in level of N-concentration in the lake. Also an increase in planktonic species was preceded by an increase in benthic species *Cymbella* sp., *Cocconeis* sp. and *Fragilaria* sp., except for the lower core layers. Perhaps this indicates the favorable conditions for benthic diatoms and probably entails an increasing of the eutrophication level and sedimentation rate for that moment. We suggest that the changes in the water level of the lake were a main cause of these changes.

We acknowledge the financial support by the Russian Foundation for Basic Research, grant No 16-04-00175.

REFERENCES

1. Bolobanschikova G.N. Analysis of diatoms in the water column and bottom sediments of Lake Shira (Khakassia, Russia) / G.N. Bolobanschikova, D. Yu. Rogozin, A.D. Firsova, E.V. Radionova, N.N. Degermendzhy // Contemporary problems of Ecology. – 2015. – Issue 2. – P. 215–228.
2. Saros J.E. The ecology of the planktonic diatom *Cyclotella* and its implications for global environmental change studies / J.E. Saros, N.J. Anderson // Biological Reviews. – 2015. – Issue 90. – P. 522–541.