RECONSTRUCTION OF THE PAST CONDITIONS OF IVANOVO REGION USING SUBFOSSIL CLADOCERA ANALYSIS OF LAKE RUBSKOYE

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It is widely known that Cladocera is an important group of organisms of modern aquatic ecosystems that inhabit all types of recent continental water bodies. Standard hydrobiological analysis can assess the current state of the lake, while the study of subfossils can explain changes in taxocenoses at all stages of the lake sedimentogenesis. Chitin structures of the Cladocera exoskeleton preserve well in the bottom sediments (carapax, postabdomen, postabdomenal claws, mandibles, head shields, etc.) that allows to identify the remains up to species or generic ranks.

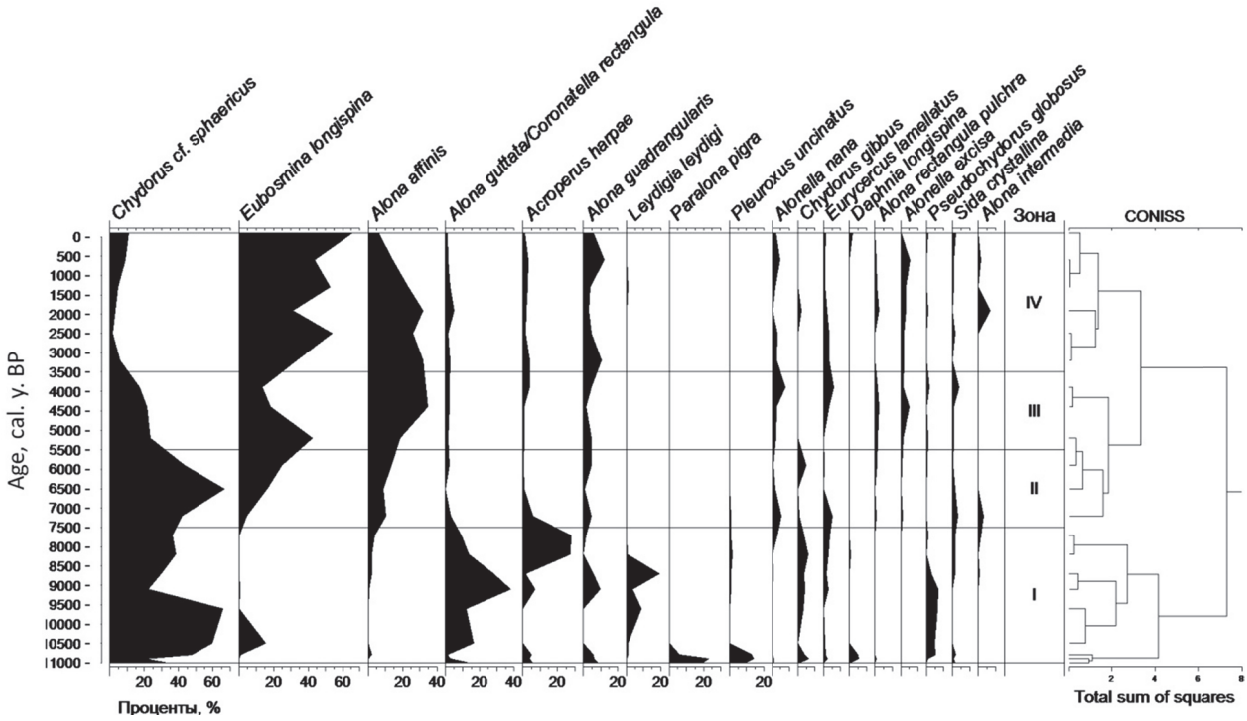

Fig. 1. Statigraphyc diagram of the Rubskoye lake cladoceran community

Rubskoe Lake (N 56°43′33″, E 40°36′51″) being a relict lake of glacial origin, is located in Ivanovo Area and belongs to the territories of special natural importance of the pan-European level. A core of bottom sediments of 4.98 m depth was taken from Lake Rubskoe. Age of lower layer is 11000 cal. y. according to results of radiocarbon dating conducted at the Institute of particle physics of the Federal University of technology of Switzerland (ETN). 23 subsamples of sediments (with the step of 10 cm) were selected for a cluster analysis. Key-books for subfossil and recent Cladocera were used to identify remains from the sediments.

As a result of the samples study, we identified remains of 38 taxa of the Cladocera. According to the Lyubarsky scale, there are no dominant taxa among the cladocerans, *Chydorus* cf. *sphaericus* and *Bosmina* (*Eubosmina) longispina* are subdominants. Typical arctic species inhabiting the lake at earlier stages of its formation are replaced by taxa preferring temperate conditions in course of the water body development. Four faunistic zones were separated according to the statigraphyc diagram of the cladoceran community (Fig. 1). Increasing of *Bosmina (Eubosmina*) *longispina* in the layers of 8500 cal. y. probably associated with increasing of the pelagic zone surface in the water body at that time. In many cases there is an obvious correlation between changes of certain taxa rates in the taphocoenosis of Lake Rubskoe and climatic changes at that time.

The Shannon-Weaver index values are ranged from 1.66 to 3.37, average is 2.56+0,08. Index Pielou values are ranged from 0.29 to 0.6, with an average of 0.46+0,01. Such values characterises the community structure as not sufficiently aligned.

The attempts to explain the faunal succession and detailed analysis of incremental changes will be presented in our communication.

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GEOCHEMICAL SIGNS OF EXTERNAL CONDITIONS OF SEDIMENTATION IN SALT LAKES BY THE DATA OF HIGH-RESOLUTION RECORDS

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Modern lakes are sensors - recorders of external conditions of sedimentation. Essentially they are an integral part of the geochemical system gas + liquid + solid, limited by the catchment area in space and developing in time from the origin of the water basin to the present. The study of such a system is aimed at climatic conditions restore by geochemical variations, measured in the solid phase (bottom sediments). If we follow to the climate definition as the average annual weather oscillations, then the problem is the search for the geochemical response of bottom sediments to the current weather fluctuations first of all, and then - quantification of this response that can be extrapolated for the age layers. Thus, the final reconstruction of paleo-conditions to the complete depth of sampling is based on synchronous hydro meteorological observations and is representative of the chosen system.

Lakes accumulate runoff products representing more or less disintegrated and chemically weathered eroded rocks. Bottom sediments of salt lakes in comparison with freshwater ones contain additional chemically precipitated mineral masses (mainly carbonates and sulphates). In eutrophic lakes and marshes, large quantities of organic matter accumulate. Thus, the constituents of bottom sediments are three basic substances: aluminosilicates, carbonates and organic masses. The geochemical indicators served as signals of external conditions of sedimentation is a direct problem to be solved by regime observations on modern objects. Periodic layered structure (including annual layering) allows revealing geochemical indicators in bottom sediments due to high resolution from tens of microns with the help of modern technology such as XRF scanning. Accordingly, the available ranges of climatic events have a time resolution of year-season. In this case, the annual range of changes (winter-summer) of the main external parameters in the sludge formation system, as a rule, overlaps the amplitude of long-term oscillations of the same parameters. Thus, the correlations between indicators and weather meteorological observations allow us to reveal the geochemical indicators necessary for further calculations of a transfer function, which converts analytical data into the time series of the target parameter. Point numerical estimates are useful in assessing the physicochemical conditions of mineral formation by the equilibrium system diagrams.

The figure shows the main geochemical indicators for the bottom sediments of Lake Shira, representing the composition of the layers and the environmental conditions (Fig. 1).

Geochemical characteristics of bottom sediments constitute a multiple response to changes in the external environment, including short-term events and age-old fluctuations. Some of them can have a significant statistical connection with the desired target parameter. Within the quantitative approach to solving the inverse problem (paleo reconstructions), it is necessary to have an initial time series for the natural target parameter to provide statistically correct training in calculating the multiple regression equation for past reconstructions. For example, the optimal duration of a year's series is 60-100