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

years. The most relevant reconstructions for the temperature of surface air, the amount of atmospheric precipitation, the hydrological regime, including the level of water bodies correspond to the weather scale (monthly, seasonal, annual, 10-year).

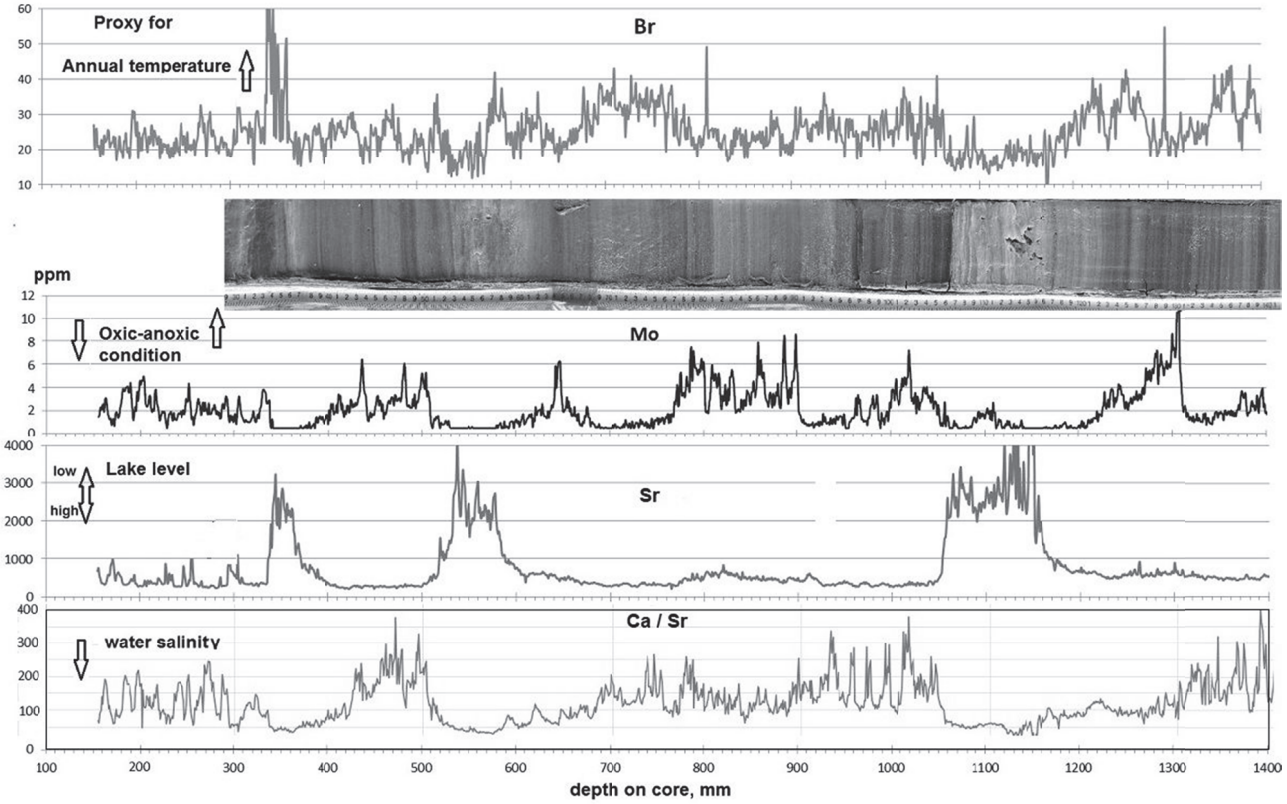

Fig. 1. The composition of the layers in the bottom sediment column of the lake Shira

Dark intervals on the core foto, correspond to the meromictic state of the lake, they are more clayey and saturated with organic matter. The light intervals, which also appear in Sr profile, mark the holomictic state of the lake and a lower level with increased salinity; they are mainly composed of carbonates in composition, a few of organic matter.

A new set of techniques for analytical microstratigraphy based on X-ray fluorescence analysis on synchrotron radiation (XRF SR) allows the creation of detailed weather and climate reconstructions on annual scale. The submillimeter scanning of the samples provides high performance, variability and low detection limits that are not available with conventional discrete sampling methods. Accordingly, it becomes possible to identify sources of matter in bottom sediments from local to global, and events of different duration - from "instantaneous" catastrophic to long-period orbital types. Thus, docking of qualitative stratigraphic models of sedimentation with absolute chronologies (time series) is appeared. In part, these developments are implemented in our publications, which contain the following results (see the list of references). * Detection of catastrophic events and evaluation of their actual duration: volcanic eruptions, earthquakes, relief change, meteoric bombardment, dust storms, forest fires, ice cover and melt, floods, typhoons, level and salinity of lakes, anthropogenic pollution. * The rate of sharp climatic changes such as Younger Dryas and modern warming. * Estimates of the lag of the regional climate response of biomes "steppe" and "taiga" in palynological reconstructions. * Interpolation of sparse sampling data through training - calibration of the geochemical transfer function, for example, in palynological series for the same samples, creating new time series such as "proxy to proxy" on a year-decade scale. * Extension (extrapolation) of dendrochronological time series by learning the transfer function of geochemical indicators for synchronous changes in shorter tree-ring series. * Comparison (correlation) of independent lithologic-geochemical, isotopic and biological time series, combination them in one function and building on this basis combined reconstruc-

tions of the external environment. * Analysis of trends and climate cyclicity of different orders allows to predict climatic parameters for 50 years and beyond.

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MECHANISM OF VARVES FORMATION IN THE OBDEKH RIVER PALEOVALLEY (PSKOV REGION, RUSSIA)

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Varves are a unique paleogeographic archive allowing to reconstruct the paleohydrology regime of lakes, the nature of sedimentation and changes of the environments and climate in the catchment area with an annual resolution. Classic varves accumulated in the extensive proglacial lakes on the North-West of the Russia in the Late Valday (Late Weichselian) are found in the lower parts of lowlands and ancient buried paleo-incigions. The varves in depressions on the lowlands are studied by a number of researchers. They have been known better than those into the paleo-incisions.

The series of varved clays are found in the Obdekh R. paleovalley during our investigations. The valley is located at the base of the eastern slopes of the Haanja Upland. Specific features of varve formation are predetermined by the morphology of the paleovalley and its deglaciation character. The cross profile of the valley has the shape of a trapezium. The width of the valley is 400-1000 m and the width of the bottom - 100-200 m. The depth of the modern river valley is 40-50 m, while that of the buried paleovalley is about 100 m. The thickness of the Late Pleistocene glacial deposits filling the paleovalley reaches 50 m. There are two structural terraces on the right slope. The left slope is steep and