



New paleoreconstruction of transgressive stages in the northern part of Lake Ladoga, NW Russia.

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Lake Ladoga is one of the largest lakes in the world and the largest in Europe. The watershed of lake Ladoga covers the North-Western part of European Russia and the Eastern Finland. Lake basin is on the border between the Baltic shield and the East European Platform.

The most consistent paleoreconstructions of Lake Ladoga history are based on bottom sediments of smaller lakes, which used to be a part of Ladoga in the past. The stages of Ladoga evolution are directly connected with the history of the Baltic Ice Lake (BIL) and of the Ancylus Lake. Water level of these lakes was significant higher than nowadays level. Lake Ladoga in its present limits used to be an Eastern gulf of BIL and Ancylus Lake. The preceding paleoreconstructions of Ladoga water level oscillations were undertaken by G. de Geer, J. Ailio, E. Hyypä, K. Markov, D. Kvasov, D. Malakhovskiy, M. Ekman, G. Lak, N. Davydova, M. Saarnisto, D. Subetto and others. The new data on multivariate analysis of bottom sediments of lakes which used to belong to Ladoga, collected in the last few years, allows to create several maps of Ladoga transgressive stages in Late Glacial period and post-glacial time.

A series of maps showing the extent of Ladoga transgression was created based on lake sediments multivariate analysis and a GIS-modeling using the digital elevation data with an accuracy of several meters and an open-source software (QGIS and SAGA). Due to post-glacial rebound of the lake watershed territory, GIS-modeling should comprise the extent of the glacioisostatic uplift, so the chart of a present-day uplift velocity for Fennoscandia of Ekman and Mäkinen was used. The new digital elevation models were calculated for several moments in the past, corresponding to the most probable dates of smaller lakes isolation from Lake Ladoga. Then, the basin of Ladoga was “filled” with water into GIS program to the levels sufficient for the smaller lakes to join and to split-off. The modern coastlines of Ladoga and of the other water bodies on the discussed territory to compare with transgressive stages were obtained by calculating the Normalized Difference Water Index (NDWI) from Landsat-8 images (<http://landsat.usgs.gov/>).