



## **Diatom Algae hosted in the bottom sediments of Lake Teletskoye, Siberia as indicators of climate change**

(1) E. Mitrofanova, (2) Lawrence C. Nkemdirim

(1) Institute for Water and Environmental Problems Siberian Branch of the Russian Academy of Sciences 1, Molodezhnaya St., Barnaul, 656038, Russia, mitelena@ab.ru; 7-3852-779352;

(2) Department of Geography, University of Calgary, Calgary, Canada, T2N 1N4; nkemdiri@ucalgary.ca, 1-403-614-9092

Diatom productivity has risen sharply in continental lakes since the last glaciation due largely to a decrease in turbidity and corresponding increase in light admittance. The physical characteristics of bottom sediments including those reflected in lamination rates and granulometric indices reflect the dynamics of the water mass. Since the composition and abundance of diatom algae hosted by the sediments are good climate indicators, a time series of temperature can be reconstructed from the sediment layers.

Lake Teletskoye is the deepest lake in South Siberia, Russia. It is tectonic and oligotrophic. Its surface area is 223 km<sup>2</sup>; maximum depth 325 m. The catchment, which includes 70 permanent and 150 ephemeral tributary streams is 227 km<sup>2</sup>. Mean annual water inflow into the lake is 756 km<sup>3</sup>. The mean content of dredge in the lake water is 3.2 mg/l; up to mg/l in spring. Sedimentation rates average 1.45 mm yr<sup>-1</sup>, which is higher than most deep lakes (Lake Baikal, Russia- 0.04 mm, Thingvallavatn, Iceland - 0.5 mm).

Sedimentation processes were analysed in Lake Teletskoye in relations to phytoplankton productivity and abundance. Two peaks of phytoplankton abundance were found – a winter peak (February-March) under ice and a late summer-early autumn peak (August-September). Diatoms are more abundant in spring, early summer and autumn while the winter peak is not associated with diatom development.

About 294 species of diatom algae were found in Lake Teletskoye bottom sediments comprising 69% diatom flora and 39% algae flora, including 115 species that are exclusive to bottom sediments. Cores, up to 1.5 meters in length in the deepest part of the

lake (near River Korbu), corresponded to the last 1000 years approximately. Because specie type and abundance correlates with temperature, a time series of annual and seasonal temperatures was recovered from the sediments. The series shows a relatively warm period at the beginning of the period lasting through 500 years approximately. This was followed by a cool period in mid millennium, a gradual improvement heading into the last century and rapid rise into the last several decades. These patterns are consistent with those recovered from many parts of northern Europe during the equivalent period.