



Siberian regional climate change recorded in annually-laminated lake sediments (Lake Shira, Khakassia, Lake Kucherla, Altai)

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During field work in 2009 were sampled cores of bottom sediments of Lake Shira (Khakassia) and Lake Kucherla (Altai). Sediments contain annually laminated layers (varves). The average thickness of layers in the Lake Shira sediments is 1.3 mm, in the Lake Kucherla sediments – 2.3 mm. Cores were impregnated with epoxy resin and then are prepared solid samples thickness of 2 mm for X-ray scan.

X-ray scanning was carried out in the Siberian Synchrotron Radiation Center (Budker Institute of nuclear physics SB RAS, Novosibirsk) using the excitation energies of 18 and 24 keV by the methods described in papers [1, 2]. Scanning X-ray fluorescence analysis on synchrotron radiation (SR-XRFA) as a high-efficiency method of microelement analysis is adapted to determine more than 35 elements with minimal step 0.1 mm. A detailed study of the varves with a spatial resolution of 100 microns showed seasonal variation of trace-element composition within the annual layers. It was counting the number of annual layers using the geochemical variations of sediment. Key geochemical indicators of terrigenous (Ti, Ga, Rb, Sr, Zr) and organogenic (Zn, Br, U) components of sediments were identified.

Comparison of meteorological data for the past 50 years with the lithological and geochemical parameters of sediments showed a stable dependence of trace-element composition of sediments with the climate variation in the region. Investigated lakes contain high-resolution records of regional climate changes.

[1] K.V. Zolotarev et all. Nucl. Instrum. and Meth. A470 (2001),376.

[2] A.V. Daryin et all. Nucl. Instrum. and Meth. A 543 (2005) 255.