Geophysical Research Abstracts
Vol. 18, EGU2016-386, 2016
EGU General Assembly 2016

The centuries-old and thousand- year oscillations of uranium distribution in the Lake Baikal sediments, according to the neutron-fission (n,f)–autoradiography

Ivan Kirichenko (1), Sergey Zhmodik (1), Dmitriy Belyanin (1), and Oleg Khlistov (2)

(1) Institute of Geology and Mineralogy of the SBRAS, Novosibirsk, Russian Federation (iskirichenko@igm.nsc.ru), (2) Limnological Institute of the Siberian Branch of the Russian Academy of Science, Russia

The trace elements local distribution data, particularly (U, P, Br, Mo, BiSi et. all) in a lake and oceans bottom sediments reflects the conditions of those sediments formation, and correlates with changes in paleoclimatic conditions.
In papers [Colman et all, 1995; Goldberg et all, 2000, etc.] established that the concentrations of some elements contained in the bottom sediments of Lake Baikal, in particular BiSi, Sr / Ba, Sr / Rb, Ti, U et al., reflect changes in insolation caused by periodic oscillations parameters Earth's orbit (Milankovitch cycles). At the same time, a bottom sediments of the largest continental lake (Lake Baikal), can keep a record of changes less periodicity. Our research focuses on the study of the spatial distribution of uranium with high resolution in the bottom sediments of Lake Baikal.
The purpose of this research is determination the centure-old and thousand- old year oscillations in the concentration of uranium in the sediments of Lake Baikal.
Fragments of the lake sediment columns taken from the axial part of the Akademicheskiy Ridge in Lake Baikal (stations coordinates St -8 (53 32'15"N 107 56'25"E); - and St11 – (53 33'51"N 108 00'05"E) were studied using complex of local analysis methods, such as: n, f - and n, β-autoradiography, SEM.
The distributions of uranium and phosphorus in the authigenic component of sediments along the whole columns length (with the resolution of 10 micron which corresponds to the time resolution of about six months) have been studied by the autoradiography method. Statistical data analysis (Fourier and wavelet analysis) were used for detection oscillations in the uranium concentration
Three main different factors of concentrators were established for uranium and phosphorus in the sediments of the Academic mountain range:1) sedimentation, 2) nutrient,3) diagenetic.
The periodicity (range from 100 to 1,000 years), in the distribution of authigenic uranium in the sediment column were identified by statistical methods (Fourier, wavelet analysis).
Research data is complicated by a noise component of the signal and intermittent behavior of oscillation that is able to show, using the method of wavelet analysis. The study was supported by Russian Foundation for Basic Research (grants RFBR №15-35-21024, 15-05-06950).