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Analysis of data on the distribution of chemical elements, in Fe-Mn nodules.

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Fe-Mn nodules are located in all oceans and in some seas. The characteristic feature of the texture Fe-Mn nodules is central banding or bedding. All the layers are formed by sequential rise submicroscopic layers that differ in composition. The nodules are characterized by alternating layers, which reflect a long and irregular process of their growth. New data on the changes in the conditions of formation of nodules can be obtained because of research on the distribution of elements in iron-manganese nodules. Conditions of formation of nodules associated with climate change and can be used for paleoclimatic reconstructions.
The purpose of this research is determination of physical and chemical conditions of concentration and dispersal as well as evaluation of distribution patterns and periodicities (due to paleoclimatic conditions of sedimentation) for chemical elements. Fe-Mn nodules (Clarion-Clipperton, Pacific Ocean) were studied using complex of local analysis methods, such as: n, f -autoradiography, SR-XFA. An integrated approach has allowed a detailed investigation of the distribution of U, as well as a number of related elements in the fragments of the Fe-Mn nodules. The distributions of U have been studied by the autoradiography method (with the step of 12 micron). Layer-by-layer scanning with the step of 100 microns were performed using SR-XFA which also allowed to determine the concentration of such elements as: Y, As, Sr, Ca, Fe, Mn, Ti and others.
The regular periodicity in the distribution of uranium and other chemical elements in the Fe-Mn nodules were identified by statistical methods (Fourier, wavelet analysis). These oscillations periodicities are determined by oscillations in the formation conditions and primarily by the climatic environment changes.

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