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Periodization of holocene climatic cycles based on synchronous variations in the magnetic and geochemical parameters of the sediments of lake Bolshoe Yarovoe (Southwestern Siberia)

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Abstract

© 2020, V.S. Sobolev IGM, Siberian Branch of the RAS. Variations in the magnetic and geochemical properties of the sediments of Lake Bolshoe Yarovoe (Altai Territory) were studied. The data were derived from five core columns (up to 4.5 m long) covering a time interval of more than 8000 years. In addition, coercive spectra were obtained for 792 samples taken every 2 cm. Coercive spectra were then used to identify soft magnetic (10-15 mT) and hard magnetic (35-50 mT) components. The soft magnetic component is detrital, and the hard magnetic component is biogenic, which is confirmed by microscopic studies. Moreover, the samples contain micrometeorite particles. Variations in geochemical properties allow reconstruction of the environmental history of the lake. Sediments in the lower part of the section vary both in the content of ferrimagnetic components and in geochemical properties, which indicates a sharp environmental change between ~6100 and ~7600 years ago. Quasiperiodic alternation of warm (dry) and cool (humid) periods is observed higher in the section, between ~4100 and ~6100 years ago. The variations in the magnetic components are consistent with the environmental changes and can be used for the historical reconstruction.

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Keywords

Coercive spectra, Ferrimagnetic components, Holocene climate, Lacustrine sediments, Magnetic properties, Magnetotactic bacteria

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