

The magnetic properties of the Lake Bolshoe Yarovoe (Altai Region, Russia) sediments

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Magnetic minerals of modern lake sediments provide unique source of information for climate changes, regionally and globally as environmental variations are recorded by them with high resolution. Here we report results of magnetic analysis of the endorheic bitter-salty lake Bolshoe Yarovoe located in the Altai Region, Russia. The lake is the deepest one in the Kulunda Steppe with the average depth 4 m and with the catchment area about 560 km². Five cores were drilled during field research conducted by the Institute of Geology and Petroleum Technologies (Kazan Federal University, Russia) in 2008. Average length of cores is 4 m. The samples were studied using radiocarbon dating, magnetic susceptibility, NRM measurements, coercivity spectrometry, thermomagnetic analysis, TEM and SEM microscopy. The main components of the sediments magnetization, their variability, defined features of sedimentation processes, also the contribution of the paramagnetic, ferromagnetic, superparamagnetic components are identified. Data variability of the paramagnetic component revealed that the lower part of the section is characterized by a gradual increase in revenues of the clay material. The presence of erosion was detected around of 7500 years ago marking occurrence of a fall of the lake level during this period. After this the flow of clay particles was steady with small fluctuations only, indicating the stabilization of sedimentation processes. Ferromagnetic fraction is mainly represented by magnitofossils of different forms, sizes and grain preservation. Such changes may be related to many factors, such as climate, nutrient availability, and environmental variability. Possible relationships between magnitofossil morphology, their magnetic signal and the depositional environment changes are proposed. The work was carried out according to the Russian Government's Program of Competitive Growth of Kazan Federal University.