

EXTRATERRESTRIAL MATTER FROM LAKE BANNOE, SOUTH URAL, RUSSIAD. M. Kuzina¹, K. A. Voronov¹, A. R. Yusupova¹, A. M. Rogov².

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Introduction: Sediments of Lake Bannoe were studied for detection extraterrestrial matter. Bannoe (53°35'48.13"N 58°37'47.28"E) is located in the Southern Urals, Russia. Length of investigated core 5.06 meters and according the radiocarbon dating the lake is ~12.5 thousand years of age. Seismoacoustic investigations shows that sediments are stratified and not distracted at the sampling point. Previous studies [1, 2, 3, 4] shows that micro-meteorites and cosmic dust can be found in different types of sediments and rocks and that magnetic properties can be used for choosing reliable samples for further investigations. Thermomagnetic measurements were carried out for all samples of the core. Six of them which is showing presence of iron-nickel alloys (Curie temperature higher than 690 °C) and in some cases magnetite (Curie temperature ~580 °C) were chosen for magnetic separation and further investigations.

Methods: Differential thermomagnetic analysis was carried out for tracing magnetic minerals according to their Curie temperature. Temperature dependences of induced magnetization up to 800°C at a heating rate of 100°C per minute in a constant magnetic field of 0.4 T were obtained. The curves of the first and second heating allow to evaluate possible mineralogical transformations in a sample. The morphology and elemental composition of magnetic separates studied using scanning electron microscopy "Merlin" Carl Zeiss equipped with an energy-dispersive spectrometer "Aztec X-Max" Oxford Instruments. Surface morphology was investigated at an accelerating voltage of 5 keV on SE mode (secondary electrons). Elemental analysis was carried out at an accelerating voltage of 20 keV with AsB mode.

Results: According to the thermomagnetic analysis samples with Fe-Ni alloys distributed along the core nonuniformly and detected in 48 samples out of 250. The largest number of samples with iron-nickel alloys was found in sediments aged 6200, 8800 and 12000 years ago.

Microscopic investigations showed presence of micrometeorites in studied samples. Shape of particles from round to egg-shape. Size of particles varies from 5 to 30 microns. Almost all microparticles have specific wavy surface. Finding differences in extraterrestrial matter in time would be helpful for understanding changes in the type of material falling to the Earth's surface.

This study was funded by the grant of the President of the Russian Federation for state support of young Russian scientists - candidates of sciences № MK-4100.2021.1.5.

References: [1] Kuzina D.M. et al. 2016. *Meteoritics & Planetary Science* 51:A397. [2] Kuzina D.M. et al. 2017. *Meteoritics & Planetary Science* 52:A188. [3] Pechersky D.M. et al. 2013. *Russian Geology and Geophysics*, 54 (12): 1045-1055. [4] Rudraswami N.G. et al. (2011) *Science* 46:470-491.