MAGNETIC INVESTIGATIONS OF OCEAN SEDIMENTS FROM HOLE 910C FOR DETECTION EXTRATERRESTRIAL MATTER.

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Introduction: Earth accretes tons of extraterrestrial material every day. Ocean sediments are perfect keepers of this material for a long times, sedimentation rate is slow it means that more extraterrestrial matter can be safed in sediments. Previously by authors was shown possibility of using magnetic metods for detection extraterrestrial matter in different types of sediments [1, 2, 3].

Object of study: Samples for investigations were taken from the Hole 910C, Ocean Drilling Program (ODP). The core was drilled in 556.4 m water depth on the southern Yermak Plateau (80°15.896'N, 6°35.430'E), NW Svabard. In total, 507.4 m of sediments were cored, and average recovery was 57%, with 80% between 170 and 504.7 meter below seafloor (mbsf). For this study, the borehole was re-sampled between 150 mbsf and 504.7 mbsf for environmental magnetic, inorganic geochemical, and sedimentological analyses (443 samples). The lithology is mainly silty-clay with some enrichments of fine sands in the lower section (below 400 mbsf) [4].

Methods and results: Differential thermomagnetic analysis was carried out for tracing magnetic minerals according their Curie temperature. Measurements were carried out on Curie express balance. the temperature dependence of induced magnetization in air at a heating rate of 100 °C/min up to a maximum temperature of 800°C. were measured in a constant magnetic field - 400 mT. We have got thermomagnetic curves of the first and second heating. Hysteresis properties were determined by a J-coercivity spectrometer for each sample a modified hysteresis loop, backfield curve, acquisition curve of isothermal remanent magnetization, and a viscous IRM decay spectrum. Each measurement set is obtained in a single run from zero field up to 1.5 T and back to -1.5 T [5].

Acquisition curves of isothermal remanent magnetization and thermomagnetic curves are decomposed into endmembers using non-negative matrix factorization (NMF) [6]. These results are usful for decompose the hysteresis loops, backfield and strong field thermomagnetic curves into the components which now can be interpreted as certain mineralogical fractions.

Some samples according their magnetic properties and mineralogy were choosen for investigation on electronic microscope. After magnetic separation microparticles were analyzed in the laboratory of the Kazan Federal University on the field emission scanning electron microscope "Merlin" Carl Zeiss equipped with an energy-dispersive spectrometer "AZTEC" X-MAX Oxford Instruments.

Investigations along the core are show that the quantity of extraterrestrial matter have variations in time. It can be caused by different reasons such us different concentrations of dust in universe, by impact events and etc. Microscope analysis show presence of magnetite micrometeorites and iron with different concentration of nickel.

The work was carried out according to the Russian Government's Program of Competitive Growth of Kazan Federal University, supported by the subsidy allocate to Kazan Federal University for the state assignment in the sphere of scientific activities.

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