ATMOSPHERIC DEPOSITION OF COSMIC DUST STUDIED BY MOSS ANALYSIS.

M. V. Frontasyeva[1], V. A. Tselmovich[2], and E. Steinnes[3], [1]Joint Institute for Nuclear Research (JINR), str. Joliot-Curie, 6, Dubna, 141980, Moscow Region, Russian Federation, marina@nf.jinr.ru, , [2]Borok Geophysical Observatory, branch of Shmidt's Institute of Physics of the Earth, RAS, Russia, 152742, Borok, Nekouz, Yaroslavl Region, tselm@mail.ru, [3]Norwegian University of Science and Technology, Trondheim, Norway, eiliv.steinnes@ntnu.no

Introduction: It is a well established phenomenon that extraterrestrial dust particles (micrometeorites) survive atmospheric entry and reach the Earth's surface. Collection of extraterrestrial dust for research focuses on the environments where terrestrial sedimentation rates and input of artificial particles of anthrogenic origin is minimal, including deep-sea sediments, Antarctic ice and snow, as well as natural planchettes of mosses and peat-bog cores.

Materials and Methods: Experimental observations of particles considered as cosmic dust in moss samples (*Sanionia uncinata*) collected in King George Island [1], highlands of Georgia [2], lowlands of Belarus and Tver Region of Russia are presented. Microanalysis of moss samples using scanning electron microscopy (SEM) showed the presence of clastic, anthropogenic particles and particles of cosmic dust. The results from Georgia are compared with those for moss samples collected in pristine areas of Norway [3]. The identification of particles as micrometeorites is achieved on the basis of their compositional, mineralogical, and texture analyses using SEM microscopy with EDAX techniques and epithermal neutron activation analysis (ENAA) carried out at the reactor IBR-2 of the Frank Laboratory of Neutron Physics, JINR [4].

Results and conclusion: The majority of particles undergo melting during their passage through the atmosphere. Most abundantly, particularly at large sizes, cosmic spherules, i.e. completely melted droplets, were observed. These spherical particles provide a useful proxy for the total flux of dust because they are relatively easy to identify. They are the background magnetic component of cosmic dust, mainly microspheres and particles of native metals. Most often, it was possible to detect native Fe, Fe-Ni and Fe-Cr minerals.

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References:

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