Abstract

The use of mosses as biomonitors of atmospheric deposition of trace metals and radionuclides in Russia started more than 30 years ago in connection with the development and problems of the nuclear and military-industrial complexes in Siberia and the Urals. In the 1990s, within the framework of UNECE ICP Vegetation programme, systematic studies using moss were carried on in North-western Russia (Karelia, Kola Peninsula, Kaliningrad, Pskov and Leningrad regions), and the results were presented in the European Atlas Atmospheric Heavy Metal Deposition in Europe – Estimations Based on Moss Analysis. In 1998–2002, JINR participated in the IAEA-coordinated research project “Biomonitoring of air pollution in the Chelyabinsk region (South Ural Mountains, Russia) through trace elements” in one of the most contaminated areas of the world experiencing strong ecological stress from trace metals and radionuclides. JINR took part in the 2000/2001 European moss survey reporting data on some areas of Central Russia (Tula, Yaroslavl and Tver regions) and in the 2005/2006 moss survey in the north-east of the Moscow region and the Republic of Udmurtia. The active moss biomonitoring (moss bag technique) was used to study air pollution in street canyons of the intensely growing megalopolis of Moscow. A combination of instrumental ENAA at the IBR-2 reactor at JINR, Dubna, and AAS at counterpart laboratories provides data on concentrations of about 40 chemical elements (Al, As, Au, Ba, Br, Ca, Cd, Ce, Cl, Co, Cr, Cs, Cu, Dy, Eu, Fe, Hf, Hg, I, In, La, Lu, Mg, Mn, Na, Nd, Ni, Pb, Rb, Sb, S, Sc, Se, Sm, Ta, Tb, Ti, Th, V, W, Yb, Zn), which substantially exceed the requested by the European Atlas number of elements (given in bold). Distribution of the determined elements over the sampled areas is illustrated by the contour maps produced by the Russian software package GIS-INTEGRO with raster and vector graphics. The 2010/2011 moss survey extended study areas in Russia as PhD students, teachers and pupils of secondary schools in the Smolensk, Ivanovo, Kostroma, and Yekaterinburg regions, Stavropol area, and some districts of the Moscow and Leningrad regions were involved in terrestrial moss sampling. The moss technique is supposed to be used for assessing sequences of the Fukushima disaster in the far east of Russia (mapping of radionuclide distribution around the city of Vladivostok). It is also planned to use moss as natural planchette for tracing deposition of cosmic dust in peat bog cores in Western Siberia and some mountainous areas of Russia.

Date: Tuesday, 3 April

Time: 12H00 – 13H00

Title: Air pollution studies in Russia based on moss analysis: past, present and future.

Venue: Lecture Hall Delta (1011)

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