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Technogenic contaminations of the soil-plant cover in the Primorsky Krai, Russia

Inna Molchanova (1), Vera Pozolotina (1), Ludmila Mikhailovskaya (1), Elena Antonova (1), Yury Zhuravlev (2), Yana Timofeeva (2), and Maxim Burdukovsky (2)

(1) Institute of Plant & Animal Ecology, Ural Branch of the Russian Academy of Sciences, Ekaterinburg, Russia (molchanova_i_v@mail.ru), (2) Institute of Biology and Soil Science, Far Eastern Branch of the Russian Academy of Sciences, Vladivostok, Russia (Tivofeeva@biosoil.ru)

All economical development of the countries carries out monitoring as with the aim to estimate impact of the industrial enterprises and nuclear-energetic complexes as consequences of the nuclear accidents. The investigation the region of the Far East due to proximity to epicentre of accident on Fukushima-1 NPP is of a great interest. The aim of this work are radioecological investigations and estimate technogenic load on the ecosystems of tightly populated plots of the shore zone of the Vladivostok region. Eight plots were located on the investigated territory. The tree fall, forest litters and soils were sampling from the profile cuts of layer by layer, up to 20 cm. The artificial radionuclides (Sr-90 and Cs-134,137), as heavy metals and microelements (Co, Cu, Zn, Pb and Mn) content in the prepared samples was determined.

The stock of Sr-90 fluctuates from 0.3 to 1.3 kBq/m2 and Cs-137 was from 0.4 to 3.0 kBq/m2 in the examined soils. On the whole, the level of the radionuclides content in the soil cover is within the limits of the background that was formed in the belt between 50º and 60º of northern latitude. The presence in investigated samples of Cs-134 indicates to contribution of accidental fallout of Fukushima-1 into contamination of the components of the natural ecosystems. In a year's time after the accident the stock of this isotope in the soils was 0.01–0.20 kBq/m2. It is by factor of 10-100 lower than the stock of Cs-137. Taking into account that the ratio Cs-134/Cs-137 on the moment of accident was equal to unity (1:1). It can be estimated the quantity of Cs-137 entering into environment during post – accident period. This quantity was an average 0.03–0.30 kBq/m2 (with correction on radionuclides decay).

The observation for the state of the soil cover includes the estimate of the level and peculiarities of distribution in the soils of heavy metals and microelements. Their content in the soils is formed from Clarke number and additional industrial gas-aerosol fallout. The analysis of a large volume data permitted to calculate the maximal level of the elements content in a soil under influence only natural factors. It was established, that maximal content of Co, Zn, Mn in these soils exceed of their Clarke's numbers. Minimal elements content was found for a tree fall. As a rule, this content is by factor of 10–100 lower than the Clarke values. Maximal concentration is in the soil layer. At the same time the additional technogenic fall-out produces the double increasing of the content of Cu and Pb in the soil layer. For the rest elements the concentrations increased on 8–32%.

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