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Vertical distribution of ^{137}Cs in alluvial soils of the Lokna River floodplain (Tula oblast) long after the Chernobyl accident and its simulation

Mamikhin S., Golosov V., Paramonova T., Shamshurina E., Ivanov M.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© 2016, Pleiades Publishing, Ltd. Profiles of vertical ^{137}Cs distribution in alluvial meadow soils on the low and medium levels of the Lokna River floodplain (central part of the Plavsk radioactive spot in Tula oblast) 28 years after the Chernobyl fallout have been studied. A significant increase in the ^{137}Cs pool is revealed on the low floodplain areas compared to the soils of interfluves due to the accumulation of alluvium, which hampers the reduction of the total radionuclide pool in alluvial soils because of radioactive decay. The rate of alluvium accumulation in the soil on the medium floodplain level is lower by three times on average. An imitation prognostic model has been developed, which considers the flooding and climatic conditions in the region under study. Numerical experiments have quantitatively confirmed the deciding role of low-mobile forms in the migration of maximum ^{137}Cs content along the soil profile in the absence of manifested erosion-accumulation processes.

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Keywords

alluvial soils (Fluvisols), floodplain accumulation, imitation model, Plavsk radioactive spot, radioactive contamination of soils