

Ramzaev et al. ^{137}Cs around two underground nuclear sites in Asian Arctic JER 92

Ramzaev, V., Mishine, A., Golikov, V., Brown, J. E., and Strand, P. 2007.

Surface ground contamination and soil vertical distribution of ^{137}Cs around two underground nuclear explosion sites in the Asian Arctic, Russia. *Journal of Environmental Radioactivity*, 92 (Issue 3), 123-143.

Vertical distributions of ^{137}Cs have been determined in vegetation-soil cores obtained from 30 different locations around two underground nuclear explosion sites - "Crystal" (event year - 1974) and "Kraton-3" (event year - 1978) in the Republic of Sakha (Yakutia), Russia. In 2001-2002, background levels of ^{137}Cs surface contamination densities on control forest plots varied from 0.73 to 0.97 kBq m² with an average of 0.84 ± 0.10 kBq m² and a median of 0.82 kBq m². ^{137}Cs ground contamination densities at the "Crystal" site ranged from 1.3 to 64 kBq m²; the activity gradually decreased with distance from the borehole. For "Kraton-3", residual surface contamination density of radiocaesium varied drastically from 1.7 to 6900 kBq m²; maximal ^{137}Cs depositions were found at a "decontaminated" plot. At all forest plots, radiocaesium activity decreased throughout the whole vertical soil profile. Vertical distributions of ^{137}Cs in soil for the majority of the plots sampled ($n = 18$) can be described using a simple exponential function. Despite the fact that more than 20 years have passed since the main fallout events, more than 80% of the total deposited activity was found in the first 5 cm of the vegetation-soil cores from most of the forested landscapes. The low annual temperatures, clay-rich soil type with neutral pH, and presence of thick lichen-moss carpet are the factors which may hinder ^{137}Cs transport down the soil profile.

<http://dx.doi.org/10.1016/j.jenvrad.2006.10.001>