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Two year monitoring of soil and radiocesium redistribution at the hillslope scale after the 2011 Fukushima nuclear accident fallout

Jeremy Patin, Yuichi Onda, and Hiroki Yoda
Center for Research in Isotopes and Environmental Dynamics, University of Tsukuba, Japan (jeremy@ies.life.tsukuba.ac.jp)

This study started a few months after the Fukushima Daiichi Nuclear Power Plant disaster, triggered by the Tohoku earthquake on 11 March 2011 and followed by a massive released of radionuclides in the environment.

In order to monitor the redistribution of radiocesium (134Cs and 137Cs), known to strongly sorb to soil particles, 5m x 22m bounded runoff plots were installed near the main contamination plume, 35 km from the power plant. Five typical land use of the region were investigated: bare soil, steep uncultivated hillslope, grassland, abandoned grazing land and young cedar forest. Since July 2011, runoff volumes were recorded and exported sediments were collected and assessed for their radiocesium content by laboratory gamma spectrometry. The bare soil plot, most susceptible to erosion, was subject to complementary monitoring by in situ gamma spectrometry and land survey.

From this intensive monitoring, it appeared that despite the heavy rains and typhoons, low amounts sediments and radiocesium were exported for the various land uses, with the exception of the bare soil conditions. For the later, the fine exported sediments continuously exhibited relatively high contamination, and the complementary monitoring revealed complex sub-processes, such as zones of accumulation of sediments with areal activities locally 3 times higher than the initial radiocesium deposit.