

Long-term assessment of airborne radio-cesium after the Fukushima nuclear accident: re-suspension from soil and vegetation

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Long-term assessment of ¹³⁷Cs re-suspension from contaminated soil and vegetation due to the Fukushima nuclear accident in March 2011 has been conducted using a numerical simulation, a field experiment on the dust deflation at Namie in the restricted habitation area, and air concentration measurements in and out of the area, Namie and Tsukuba, respectively. The analysis period is one year from December 2012, about one and a half years from the accident, up to December 2013. The surface concentration of ¹³⁷Cs at Namie was high in the summer (~1 mBq/m³) and low in the winter (0.1-1 mBq/m³). The ¹³⁷Cs concentration was about one order smaller in Tsukuba (0.01-0.1 mBq/m³). The differences in the two sites are consistent between the observation and the simulation. Ishizuka *et al.* [1] developed a numerical module of ¹³⁷Cs re-suspension associated with dust deflation based on the flux measurement in Namie. Using the module, the simulated ¹³⁷Cs from soil had a potential to account for the observed surface concentration in Namie in the winter, but underestimated by 1-2 orders of magnitude in the summer. We simulated the re-suspension from vegetation applying a seasonal variation as a function of the green fraction. The constant re-suspension rate of 10⁻⁷ [1/h] of vegetation re-suspension quantitatively accounted for the observed surface concentration together with its seasonal variation. Still, so far, the re-suspension mechanism has not been fully understood and thus further investigations for the understanding of the mechanisms and its long-term effects on the environment are needed.

[1] Ishizuka *et al.* (2016) *J. Environ. Radioactiv.* in press.