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Resuspension of deposited radioactive material from the Fukushima Daiichi NPP site

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Releases of radionuclides from the Fukushima nuclear accident are typically associated with the atmospheric discharges in the early phase of the accident in spring 2011. Analysis of weekly air filters, however, has revealed sporadic releases of radionuclides long after the Fukushima Daiichi reactors were stabilized. One major discharge was observed in August 2013 in monitoring stations in the Minamisoma area north of the Fukushima Daiichi nuclear power plant (FDNPP). During this event, an air monitoring station in this previously scarcely contaminated area suddenly reported ^{137}Cs activity levels that were 30-fold above the background. Together with atmospheric dispersion and deposition simulation, radionuclide analysis in soil indicated that debris removal operations conducted on the FDNPP site on August 19, 2013 are likely to be responsible for this late release of radionuclides. One soil sample in the center of the simulated plume exhibited a high ^{90}Sr contamination (78 ± 8 Bq kg^{-1}) as well as a high ^{90}Sr/^{137}Cs ratio (0.04); both phenomena have usually been observed only in very close vicinity around the FDNPP. We estimate that through the resuspension of highly contaminated particles in the course of these earthmoving operations, gross ^{137}Cs activity of ca. 2.8×10^{11} Bq has been released.