

Releases of radioactive particles from the Fukushima Daiichi NPP site caused by debris removal operations

G. Steinhauser¹, T. Niisoe², K.H. Harada³, K. Shozugawa,⁴ S. Schneider,¹ H.-A. Synal,⁵ C. Walther,¹ M. Christl,⁵ K. Nanba,⁶ H. Ishikawa,² and A. Koizumi³

¹Institute of Radioecology and Radiation Protection, Leibniz Universität, Hannover, 30419 Germany

²Research Division of Atmospheric and Hydrospheric Disasters, Disaster Prevention Research Institute, Kyoto University, Uji, 6110011, Japan

³Department of Health and Environmental Sciences, Kyoto University Graduate School of Medicine, Kyoto, 6068501, Japan

⁴Graduate School of Arts and Sciences, The University of Tokyo, Meguro-ku, Tokyo, 153-8902, Japan

⁵Laboratory of Ion Beam Physics, ETH Zürich, Zürich, 8093, Switzerland

⁶Institute of Environmental Radioactivity, Fukushima University, Fukushima, 960-1296, Japan

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Presenting author email: steinhauser@irs.uni-hannover.de

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) (see Fig. 1).

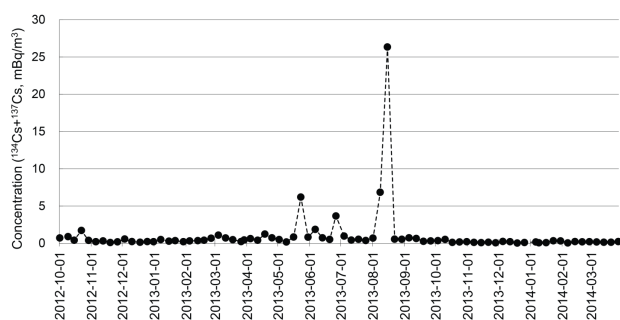


Figure 1. Radiocesium concentration in whole dust samples collected in Minamisoma City (37°38'37" N 140°55'27" E) during October 1, 2012 to March 31, 2014. Data are decay-corrected to the time of sampling. Taken from Steinhauser *et al.* (2015)

During this event, an air monitoring station in this previously scarcely contaminated area suddenly reported ¹³⁷Cs 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 (Figure 2).

One soil sample in the center of the simulated plume exhibited a high ⁹⁰Sr contamination (78 ± 8 Bq kg⁻¹) as well as a high ⁹⁰Sr/¹³⁷Cs 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 ¹³⁷Cs activity of ca. 2.8 × 10¹¹ Bq has been released.

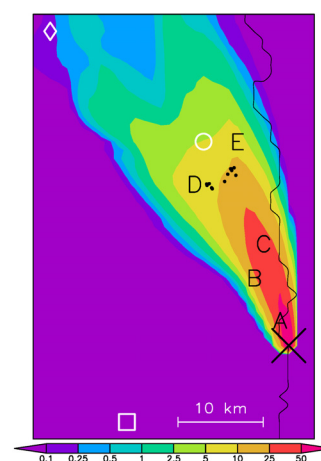


Figure 2. Distribution of ¹³⁷Cs concentration (mBq m⁻³) in the surface air averaged for the period when the radiation burst incident was observed; August 5 to 22, 2013. We considered the emission from the FDNPP involved in the debris removal operations on August 19 only. The black "x" indicates the FDNPP. The three white marks indicate dust monitoring sites Haramachi (○), Tamano (◇), and Kamikawauchi (□), respectively. Black dots indicate soil sampling sites in the present study. Taken from Steinhauser *et al.* (2015)

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