

Re-suspension processes of radioactive cesium emitted by the FNDPP accident

Kazuyuki Kita^{1*}, Misako Tanaka¹, Takeshi Kinase¹, Hiroyuki Demizu², Yasuhito Igarashi³, Masao Mikami³, Naohiro Yoshida⁴, Sakae Toyoda⁴, Keita Yamada⁴, Atsushi Shinohara⁵, Hiroto Kawashima⁶, Yuichi Onda⁷

¹Faculty of Science, Ibaraki University, ²Faculty of Engineering, Ibaraki University, ³Meteorology Research Institute, ⁴Interdisciplinary Graduate School of Science and Engineering, Tokyo Institute of Technology, ⁵Graduate school of Science, Osaka University, ⁶Akita Prefectural University, ⁷Center for Research in Isotopes and Environmental Dynamics, Tsukuba University

Radionuclides emitted in the Fukushima dai-ichi nuclear power plant (FNDPP) accident have been deposited on the soil, ocean and vegetation. Re-suspension of radioactive cesium from the soil and vegetation to the atmosphere may be one of significant path in the diffusion of radionuclides after the accident.

We have measured the concentration of atmospheric Cs-134/137 radioactivity at several sites in Fukushima region, where deposition amount of Cs-134/137 is relatively high. Atmospheric suspended particle are collected with high/low-volume air samplers mounted at these sites, and gamma-ray emission from them were measured with Ge detector. The measured concentration of atmospheric Cs-134/137 was positively correlated with the wind speed highest during the atmospheric particle sampling period since November 2011, indicating that Cs-134/137 is mainly supplied to the atmosphere by re-suspension with the wind blow. However, contribution of the dispersion of soil particle by the wind is probably limited because variation of atmospheric Cs-134/137 radioactivity concentration mainly occurs in fine particle (diameter < 0.4 micro meter). Assuming that atmospheric Cs-134/137 radioactivity concentration is determined to balance the re-suspension from the surface and the deposition to the surface, we estimated the efficiency coefficients of re-suspension and deposition. We will show factors affecting re-suspension efficiency, and will discuss processes involved in the re-suspension to the atmosphere.

Keywords: Fukushima daiichi nuclear plant accident, environmental radioactivity, re-suspension