

Spatio-temporal variability of the deposited radioactive materials in forest environments after the Fukushima Daiichi NP

KATO, Hiroaki^{1*}, Yuichi ONDA¹, Yoshitaka KOMATSU¹, Hiroki YODA¹

¹Faculty of Life and Environmental Sciences, University of Tsukuba

Soil, vegetation and other ecological compartments are expected to be highly contaminated by the deposited radionuclides after the Fukushima Daiichi nuclear power plant (NPP) accident triggered by a magnitude 9.1 earthquake and the resulting tsunami on March 11, 2011. Study site have been established in Yamakiya district, Kawamata Town, Fukushima prefecture, located about 35 km from Fukushima power plant, and designated as the evacuated zone. The total deposition of radioactive materials at the study site ranged from 0.02 to >10 M Bq/m² for Cs-137. The mature cedar, young cedar, and broad-leaf stands were selected as experimental site for the monitoring of spatio-temporal variability of the deposited radionuclides after the accidental release of radioactive materials. In order to measure the vertical distribution of radioactivity in forest, a tower with the same height of tree have been established at each experimental site. The measurement of radioactivity by using a portable Ge gamma-ray detector (Detective-DX-100, Ortec) and radionuclide analysis of leaf samples at different height revealed that a large proportion of radionuclides which deposited on forest were trapped by canopies of the cedar forests. In contrast, in the broad-leaf forest highest radioactivity was found at the forest floor. Furthermore, spatio-temporal variability of radioactivity at the forest floor indicated that huge amount of caesium still remains on the canopy of coniferous forest, and subsequently transfers to forest floor in association with throughfall, stemflow, and litter fall.

Keywords: Fukushima NPP accident, Radionuclides, Forest, Spatio-temporal variability