

Predominant process for transport of radiocaesium released by the TEPCO's Fukushima Daiichi Nuclear Power Plant Accident

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Understanding the environmental dynamics of the radiocaesium (particularly Cs-134 and 137) released from the Fukushima Daiichi Nuclear Power Plant provides the firm foundation for a remediation of the Fukushima environment because it is the main radionuclide to radiological dose within the contaminated area. One of the main sources of radiocaesium under the current situation is a mountain forest, where the decontamination work has not been carried out as yet. Therefore, transport process, flux and chemical form of the radiocaesium flowing from the mountain forest are crucial issues for an evaluation of a radiation exposure, taking into a dynamics behavior of radiocaesium from the highest contaminated mountain forests down through the river to eventual deposition in the sea. This paper discusses the predominant process of the radiocaesium transport in the mountainous region, Fukushima, Japan.

The four investigation areas, which have different characteristics of vegetation, geomorphology and soil type, were selected in the Abukuma Mountain, eastern part of Fukushima. The soil samples were obtained from ridge, slope, and valley bottom in the areas by soil sampler and scraper plate to the depth about 40 cm and 20 cm, respectively. The observation plots, which have an area of 40 to 60 m², for a monitoring of surface runoff and soil loss are also installed. The concentration of radiocaesium in the uppermost soil horizon is related to the geomorphological aspects, that is, the concentration trends to be higher in the depositional area than in the erosional area. Additionally, the radiocaesium concentration of solid phases (soil particles and fragmented organic materials) including in surface runoff is one to two orders of magnitude greater than that of a liquid phase (running water).

Therefore, predominant process of the radiocaesium transport is the surface runoff accompanied with a detachment of soil particles from the mountain slope.

Keywords: radiocaesium, environmental dynamics, mountain forest, nuclear accident, Fukushima