

Terrestrial Trasfer of fallout radionuclides by hydrogeomorphological process by Fukushima NPP accident

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Experimental catchments have been established in Yamakiya district, Kawamata Town, Fukushima prefecture, located about 35 km from Fukushima power plant, and designated as the evacuated zone. Approximate Cs-137 fallout in this area is 200-600k Bq/m². We established 3 forest sites: broad leaf tree forest and two Japanese cedar forest plantation (young and mature). In each site we installed towers of 8-12 meters. Using these towers, we sampled tree leaves, and measure Cs-137 and Cs-134 in the laboratory, and also we have measure Cs-137, Cs-134 content at various height in each forest using a portable High Purity Germanium (HPGe) detector (Ortech; Detective-EX). We also measured the throughfall, stem flow and litter fall inside of the forest. Experimental catchments have been established in Yamakiya district, Kawamata Town, Fukushima prefecture, located about 35 km from Fukushima power plant, and designated as the evacuated zone. Approximate Cs-137 fallout in this area is 200-600k Bq/m². We established 3 forest sites: broad leaf tree forest and two Japanese cedar forest plantation (young and mature). In each site we installed towers of 8-12 meters. Using these towers, we sampled tree leaves, and measure Cs-137 and Cs-134 in the laboratory, and also we have measure Cs-137, Cs-134 content at various height in each forest using a portable High Purity Germanium (HPGe) detector (Ortech; Detective-EX). We also measured the throughfall, stem flow and litter fall inside of the forest. 5 runoff plot from USLE standard plot have been constructed, and also experimental paddy field has been established. Also total 6 suspended sediment samples, turbidity meters were installed in the Kuchibuto river and 2 sites in downstream Abukuma river.

The monitoring is now ongoing but we found significant amount of Cs-134 and Cs-137 has been trapped by cedar forest plantations especially young trees, but not so much in broad leaf trees. The trapped Cs-137 and Cs-134 is then washed by rainfall and found into throughfall.

Runoff from USLE standard plot has been monitored and found to be less than 1% of Cs-137 has been removed in this season. High concentration of suspended sediment has been detected (>50K Bq/kg). To decrease the environmental contamination by radionuclides, minimizing the sediment yield in the catchment will be required.

Keywords: Cs-137, runoff, sediment yield, forest, suspended sediment, land use