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Transfer of radionuclides to river by Fukushima Daiichi NPP

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A number of studies have been conducted to monitor and model the time series change of radiocesium transfer through aquatic systems after significant fallout, especially from the Chernobyl disaster. Our research team has been monitoring the environmental consequences of radioactive contamination just after the Fukushima Daiichi NPP accident in Yamakiya-district, Kawamata town, Fukushima prefecture. Research items are listed below.

1. Radiocesium wash-off from the runoff-erosion plot under different land use.
2. Measurement of radiocesium transfer in forest environment, in association with hydrological pathways such as throughfall and overlandflow on hillslope.
3. Monitoring on radiocesium concentration in soil water, ground water, and spring water.
4. Monitoring of dissolved and particulate radiocesium concentration in river water, and stream water from the forested catchment.
5.Measurement of radiocesium content in drain water and suspended sediment from paddy field.

Our monitoring result demonstrated that the Cs-137 concentration in eroded sediment from the runoff-erosion plot has been almost constant for the past 3 years, however the Cs-137 concentration of suspended sediment from the forested catchment showed slight decrease through time. On the other hand, the suspended sediment from paddy field and those in river water from large catchments exhibited rapid decrease in Cs-137 concentration with time. The decreasing trend of Cs-137 concentration were fitted by the two-component exponential model, differences in decreasing rate of the model were compared and discussed among various land uses and catchment scales. Such analysis can provide important insights into the future prediction of the radiocesium wash-off from catchments with different land uses.

Keywords: Cs-137, Fukushima Daiichi NPP, soil erosion, suspended sediment, river, flux