

Effect of Coarse Organic Matter on the Dissolved Radioactive Cesium Concentration in Stream Water from headwater catchment

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This study examined the mechanisms of radiocesium discharge via stream water in a headwater forest catchment. We measured the stream water runoff, the dissolved and particulate Cs-137 concentrations in spring water, stream water, soil water, suspended sediment and coarse organic matter in the forest catchment located in Namie Town of Fukushima Prefecture. We conducted sample collection for 6 times during the monitoring period from June 25 to September 13, 2018. Stream water was sampled at four locations, namely the spring water and the stream water in the experimental watershed, and the middle and the large scale catchments where the experimental watershed stream joins. The soil water was collected by using two types of zero tension lysimeter which consists of only litter layer, and the combination of litter and surface soil (0-10 cm) layers. Coarse organic matter was collected by a screen mesh installed in the downstream channel of the experimental watershed. The dissolved Cs-137 concentrations in stream water and soil water showed similar temporal changes with the increasing trend in July. In addition, the dissolved Cs-137 concentration in stream water was higher than that of spring water, suggesting that the dissolved Cs-137 concentration in stream water increased during the stream water flowing down along the stream channel. In addition to the monitoring study in the experimental watershed, the sampling of stream water was conducted in total of 25 catchments located in Kawamata Town and Nihonmatsu City in Fukushima prefecture, on August 1, 2018. The dissolved Cs-137 concentration in each stream water sample was analyzed. The dissolved Cs-137 concentration in stream water increased with the proportion of forest area to the total catchment area, suggesting that the discharges of dissolved Cs-137 in stream water from forest area maintain the measured high Cs-137 concentrations in stream water.

Keywords: Fukushima Dai-ichi Nuclear Power Plant, dissolved cesium 137, stream water