

Radiocesium Inter-Annual Variations and Spatial Dynamics in Watershed in Iitate, Fukushima, Japan

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A large amount of radiocesium, ^{137}Cs and ^{134}Cs , were released and deposited on the soil surface due to the accident at Fukushima Daiichi Nuclear Power Plant, FDNPP, due to the Great East Japan Earthquake that occurred on March 11, 2011. Among them, ^{137}Cs is easily absorbed by clay minerals and soil organic matter, and its physical half-life is 30.2 years. ^{137}Cs are redistributed to waterways, rivers, lakes and coastal areas by rainfall-runoff process, so long-term influences on residents' lives and agricultural, forestry and fishery products in the area surrounding the accident are concerned. In order to evaluate the influence of secondary contamination of ^{137}Cs , it is necessary to grasp the temporal and spatial dynamics in the watershed including areas with high ^{137}Cs deposits.

In this study, fixed point observations were conducted on two rivers, Hiso river and Mano river, in Iitate village, Fukushima Prefecture from 2013 to 2018. In addition, multiple observation points were set up in watersheds, and simultaneous water sampling was done at multiple points. We measured SS concentration and ^{137}Cs concentration from water samples, grasped the long-term change in ^{137}Cs runoff, and identified the catchment area where ^{137}Cs runoff was noticeable.

The ^{137}Cs concentration of SS dropped drastically with extreme large flood due to Typhoon Etau in 2015, and the concentration remained low until 2018. The same result was obtained in 2018. In Hiso river, ^{137}Cs concentration of SS in 2018 increased slightly compared to 2017. This is thought to be the effect of the decontamination work in the Nagadoro district.

As a result of simultaneous multipoint observation, spatial distribution of ^{137}Cs concentration in the watershed was changing as merging the branch streams into the main stream. In addition, it was revealed that sediment with high ^{137}Cs concentration flowed in from Nagadoro district where decontamination works were incomplete.

Keywords: Radiocesium, Soil erosion, Annual Variations, Spatial Dynamics