Variations in ^{137}Cs activity concentration in suspended sediment of the Niida river

*Yoshifumi Wakiyama[1], Yuichi Onda[2], Varentine Golosov[3,4], Alexei Konoplev[1], Yasunori Igarashi[1], Tsugiko Takase[1]

1. Institute of Environmental Radioacitivity, Fukushima Universiy, 2. Center for Research in Isotopes and Environmental Dynamics, University of Tsukuba, 3. Institute of Ecology and Environment, Kazan Federal University, 4. Faculty of Geography, Lomonosov Moscow State University

The upstream portions of the Niida river, flowing through the northern part of Hamadoori area, were exposed to radiological contamination of ^{137}Cs from the Fukushima accident. Downstream portions of the Niida are composed of urban and agricultural areas. Therefore understanding ^{137}Cs transfer throughout the river continuum is an important issue for mitigating radiological risk to residents. This study aims to understand ^{137}Cs dynamics in the Niida river basin and present ongoing observations of ^{137}Cs activity concentrations in suspended sediments of the river. Samples have been collected at Warabidaira on the Hiso river, Notegamikita n the upstream reach and Sakekawabashi in the lower reach of the Niida river since July 2014. At each location time-integrated suspended sediment samplers were installed. The mean ^{137}Cs activity concentrations during July to December 2014 at Warabidaira, Notagamikita and Sakegawabashi were 28.3, 13.4, and 17.5 kBq kg^{-1}, respectively. Those concentrations during May to October 2017 decreased to 11.9, 6.8, and 5.9 kBq kg^{-1}, respectively. These decreasing trends can be expressed by exponential equations of elapsed time since the accident. The difference between observed ^{137}Cs activity concentrations and ^{137}Cs activity concentrations estimated by the equations appears to be proportional to Fe_2O_3 contents in the suspended sediments. Furthermore, ^{137}Cs activity concentrations in suspended sediments sampled at Notegamikita during typhoons of August 2016 and October 2017 were higher as water levels increased, compared to times when water levels were decreasing. By contrast, maximum ^{137}Cs activity concentration was found in samples taken at the Niida-bashi point on downstream area in time of peak discharge.These results suggest that the difference in sources of suspended sediment are reflected by the ^{137}Cs activity concentrations of suspended sediments. However, further analyses of particle size distributions and carbon contents of the suspended sediments can help interpretation of sediment .

Keywords: Cesium-137, Typhoon, temporal trend

