Geophysical Research Abstracts
Vol. 16, EGU2014-11456, 2014
EGU General Assembly 2014

Simulating sediment and Cs 137 transfer and deposition in dams of Fukushima prefecture

Akihiro Kitamura (1), Masaaki Yamaguchi (2), Haruo Sato (3), and Mikazu Yui (4)

(1) Japan Atomic Energy Agency, Japan (kitamura.akihiro@jaea.go.jp), (2) Japan Atomic Energy Agency, Japan (yamaguchi.masaaki@jaea.go.jp), (3) Japan Atomic Energy Agency, Japan (sato.haruo@jaea.go.jp), (4) Japan Atomic Energy Agency, Japan (yui.mikazu@jaea.go.jp)

Sediment and cesium 137 discharged into dams and reservoirs and accumulated onto dam and reservoir beds in eastern Fukushima prefecture after the Fukushima Dai-ichi Nuclear Power Plant (FDNPP) accident are simulated by a simple and fast simulation model which we developed by utilizing the universal soil loss equation and the geographical information system. Modeling of soil erosion, transport and deposition, and cesium 137 dispersion were implemented to simulate cesium 137 transport and its future distribution based on the 100m-size grid system. Raster based calculation protocols are formulated using ModelBuider function included in ArcEditor of version 10.0. We applied this model to various dams and reservoirs of eastern Fukushima prefecture and simulated results are compared with some of the measurement data that have been achieved thus far since the FDNPP accident. In the present calculations, we assumed the amount of water into a dam or reservoir is equivalent to the amount of water out from the dam or reservoir. Any operational controls that may have taken in each dam or reservoir are ignored. Annual soil loss from each dam basin, annual soil inflow into each dam, annual soil deposition in each dam, and annual soil discharge from each dam are simulated. Concentrations of radio-cesium 137 in the deposited sediments for the Ogaki dam and Ogi dam, for examples, were calculated and compared with rough estimates of the corresponding values based on the field survey results, and reasonable agreement was observed. Also, the annual soil deposition on the Ogi dam bed is simulated and again compared with rough estimate of the corresponding value based on the field survey, and the order of magnitude was matched. Furthermore, we simulated the effect of decontamination in Ogaki dam basin as an example and it was shown that an intensive decontamination for particular land use area could effectively decrease the discharged amount of radioactive cesium.