

Evaluation of wide area inventory and migration rate of radioactive caesium based on USLE model

NAKAMURA, Noriko^{1*} ; ONDA, Yuichi¹ ; KONDOH, Akihiko² ; WAKIYAMA, Yoshifumi¹

¹Center for research in isotopes and environmental dynamics, University of Tsukuba, ²Center for Environmental Remote Sensing, Chiba University

The radioactive contaminations which flowed out from the Fukushima nuclear power plant first due to the Great East Japan Earthquake are still contained great amounts in the soil around the nuclear power plant, and it causes serious concern over the health of inhabitants. In this study, for the prediction of the migration dynamics of radioactive caesium deposited on the soil around the nuclear power plant, the time-spatial variation of deposition and washoff ratio of ¹³⁷Cs up to the present was calculated based on the soil erosion rate obtained from the USLE and the initial ¹³⁷Cs inventory obtained by the airborne monitoring. The parameters needed for calculation of USLE were determined from the observation results obtained from the study sites established in the Fukushima prefecture. The estimation results from the calculation were compared with the measurements of ¹³⁷Cs washoff ratio obtained from the rivers around the nuclear power plant. As the result, calculated ¹³⁷Cs washoff rate was approximately underestimate than the measured rate however was consistent qualitatively. And in the view of landuse, in the catchment of Abukuma river, the ratio of washoff from the paddy was large in the early period from the accident, however, as time goes on, the ratio of washoff from the paddy has decreased and the ratio of other landuses has increased.

Keywords: the Great East Japan Earthquake, Fukushima nuclear power plant accident, caesium 137, USLE, soil erosion, migration of radioactive contamination