The Effect of 2015 Typhoon Etau on Radiation Dose Rates in River Basins Surrounding Fukushima Daiichi

A. MALINS[1]*, K. SAKUMA[12], T. NAKANISHI[2], M. MACHIDA[1], A. KITAMURA[123]

[1]Center for Computational Science and e-Systems, JAEA, Chiba 277-0871, Japan
*correspondence: malins.alex@jaea.go.jp
[2] Sector of Fukushima Research and Development, JAEA, Fukushima 960-8034, Japan
[3] Radioactive Waste Processing and Disposal Research Department, JAEA, Ibaraki 319-1194, Japan

The flooding in Fukushima Prefecture over Typhoon Etau in September 2015 caused substantial erosion of soil and re-mobilization of radio-cesium fallout from the Fukushima Nuclear disaster. Redistribution of radio-cesium fallout affects radiation dose rates in contaminated environments, both in areas where the inventory decreases by soil erosion and areas where the inventory increases due to deposition of contaminated sediment.

This study utilized the results of a sediment and radio-cesium transport simulation over Typhoon Etau to calculate its effect on gamma radiation dose rates in an area surrounding the Fukushima Daiichi site. The simulation was performed with the General purpose Terrestrial fluid FLOW Simulator (GETFLOWS) code [1]. The study area covered the Odaka, Ukedo, Maeda, Kuma and Tomioka river basins. The effect of radio-cesium redistribution on air dose rates was evaluated using radiation transport modeling [2].

The results show the change in air dose rate after Typhoon Etau within ~40 m resolution grid-cells covering the study area. The general effect of the typhoon was to cause small reductions in dose rates across most of the study area where net soil erosion occurs. Individual predictions of the magnitude of the dose rate change are subject to uncertainty. In particular uncertainty derives from limitations in the knowledge of the depth distribution of radio-cesium in areas of high sediment deposition.

The results can be used to interpret changes in dose rates measured over time in the field. They can also be used to inform decisions for further remediation work.

[1] Mori *et al*. (2015) *Environ. Model. Softw*. **72**, 126-146. [2] Malins *et al*. (2016) *In preparation for Anthropocene*.