Geophysical Research Abstracts
Vol. 17, EGU2015-6682, 2015
EGU General Assembly 2015
© Author(s) 2015. CC Attribution 3.0 License.

Rainfall erosivity in the Fukushima Prefecture: implications for radiocesium mobilization and migration

J. Patrick Laceby (1), Caroline Chartin (2), Francesca Degan (3), Yuichi Onda (4), Olivier Evrard (1), Olivier Cerdan (5), and Sophie Ayrault (1)

(1) Laboratoire des Sciences du Climat et de l'Environnement (LSCE/IPSL) – Unité Mixte de Recherche, Gif-sur-Yvette Cedex, France, (2) Georges Lemaître Centre for Earth and Climate Research,Earth and Life Institute, Université Catholique de Louvain, Belgium, (3) GéoHydrosystèmes Continentaux, Département Géosciences-Environnement, Faculté des Sciences et Techniques, Université François Rabelais de Tours, France, (4) Center for Research in Isotopes and Environmental Dynamics (CRIED), Tsukuba University, Tsukuba, Japan, (5) Bureau de Recherches Géologiques et Minières, Orleans, France

The Fukushima Dai-ichi nuclear power plant (FDNPP) accident in March 2011 led to the fallout of predominantly radiocesium (^{137}Cs and ^{134}Cs) on soils of the Fukushima Prefecture. This radiocesium was primarily fixated to fine soil particles. Subsequently, rainfall and snow melt run-off events result in significant quantities of radiocesium being eroded and transported throughout the coastal catchments and ultimately exported to the Pacific Ocean. Erosion models, such as the Universal Soil Loss Equation (USLE), relate rainfall directly to soil erosion in that an increase in rainfall one month will directly result in a proportional increase in sediment generation. Understanding the rainfall regime of the region is therefore fundamental to modelling and predicting long-term radiocesium export. Here, we analyze rainfall data for ∼40 stations within a 100 km radius of the FDNPP. First we present general information on the rainfall regime in the region based on monthly and annual rainfall totals. Second we present general information on rainfall erosivity, the R-factor of the USLE equation and its relationship to the general rainfall data. Third we examine rainfall trends over the last 100 years at several of the rainfall stations to understand temporal trends and whether ∼20 years of data is sufficient to calculate the R-factor for USLE models. Fourth we present monthly R-factor maps for the Fukushima coastal catchments impacted by the FDNPP accident. The variability of the rainfall in the region, particularly during the typhoon season, is likely resulting in a similar variability in the transfer and migration of radiocesium throughout the coastal catchments of the Fukushima Prefecture. Characterizing the region's rainfall variability is fundamental to modelling sediment and the concomitant radiocesium migration and transfer throughout these catchments and ultimately to the Pacific Ocean.