# Spatial mapping of soil and radioactivity redistribution at the hillslope scale using in-situ gamma spectrometry, terrestrial laser scanning and RFID tags after the Fukushima nuclear accident fallout.

Jeremy Patin (1), Yuichi Onda (1), Takehiro Noguchi (1), and Anthony Parsons (2)

(1) Center for Research in Isotopes and Environmental Dynamics, University of Tsukuba, Japan (jeremy@ies.life.tsukuba.ac.jp), (2) Department of Geography, Sheffield University, United Kingdom

In March 2011, the Fukushima Daiichi Nuclear Power Plant disaster, triggered by the Tohoku earthquake and the consequent tsunami, released a large amount of radionuclides in the environment. To provide a rapid assessment of the soil contamination and its potential redistribution, intensive scientific monitoring has been conducted since July 2011 in our study site, located in the Yamakiya district of Kawamata town, in Fukushima prefecture, Japan, about 37 km from the power plant.

In this paper, we summarize and analyze a dataset combining multiple innovative methods deployed inside a 5m x 22m bounded hillslope plot. In addition to runoff volumes and sediments radiocesium concentrations, each major rainfall event was followed by in situ gamma spectrometry measurements. In 2012, to trace the complex behavior of sediments inside the plot, about 300 RFID (Radio-Frequency IDentification) tags representing coarse sediments were scattered and their spatial position was periodically checked using a total station. Finally, several high resolutions Digital Elevation Models were acquired with a terrestrial laser scanner to assess the surface structure and changes.

The observed processes at the event scale include interrill and rill erosion, as well as local deposition and remobilization phenomenon. Not only do they directly provide information on the erosion spatio-temporal variability and the associated radionuclides transfers, but combined together they can constitute a solid basis to improve and challenge process-based distributed erosion models.