



Sensitivity study of the wet deposition schemes in the modelling of the Fukushima accident.

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The Fukushima-Daiichi release of radioactivity is a relevant event to study the atmospheric dispersion modelling of radionuclides. Actually, the atmospheric deposition onto the ground may be studied through the map of measured Cs-137 established consecutively to the accident. The limits of detection were low enough to make the measurements possible as far as 250km from the nuclear power plant. This large scale deposition has been modelled with the Eulerian model IdX. However, several weeks of emissions in multiple weather conditions make it a real challenge. Besides, these measurements are accumulated deposition of Cs-137 over the whole period and do not inform of deposition mechanisms involved: in-cloud, below-cloud, dry deposition.

A comprehensive sensitivity analysis is performed in order to understand wet deposition mechanisms. It has been shown in a previous study (Quérel et al, 2016) that the choice of the wet deposition scheme has a strong impact on the assessment of the deposition patterns. Nevertheless, a “best” scheme could not be highlighted as it depends on the selected criteria: the ranking differs according to the statistical indicators considered (correlation, figure of merit in space and factor 2). A possibility to explain the difficulty to discriminate between several schemes was the uncertainties in the modelling, resulting from the meteorological data for instance. Since the move of the plume is not properly modelled, the deposition processes are applied with an inaccurate activity in the air. In the framework of the SAKURA project, an MRI-IRSN collaboration, new meteorological fields at higher resolution (Sekiyama et al., 2013) were provided and allows to reconsider the previous study.

An updated study including these new meteorology data is presented. In addition, a focus on several releases causing deposition in located areas during known period was done. This helps to better understand the mechanisms of deposition involved following the Fukushima release.

Quérel et al, 2016, accepted for publication in IJEP

Sekiyama et al., 2013, Ensemble simulation of the atmospheric radionuclides discharged by the Fukushima nuclear accident. Presented at the EGU General Assembly, Vienne, pp. EGU2013–1695.