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A new perspective on the Fukushima releases brought by newly available air concentration observations (Tsuruta et al, 2014) and reliable meteorological fields

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In case of nuclear power plant accident, the assessment of the temporal evolution in the amount of radionuclides released (source term) is required to evaluate human health and environment impacts.
It is with in mind that IRSN has developed an operational tool based on inverse modeling techniques to evaluate the source term of a radioactive release. If the release amount is sufficiently strong as for the Fukushima accident, dose rate observations are primarily used to assess the source term (Saunier et al. 2013). Secondly, air concentrations measurements can also be used when available. For minor release events, air concentrations measurements are used.
Five years after the Fukushima accident, many estimations of the source term based on the use of observations in the environment have been published. There is not yet consensus on the magnitudes on the releases rates, mainly due to the high uncertainties on meteorological fields used to assess the source term.
Within the framework of cooperation between IRSN and Meteorological Research Institute (MRI) of Japan Meteorological Agency (JMA), meteorological fields with higher spatial resolution (3 km) have been used (Sekiyama et al. 2013) to improve the simulation of the atmospheric dispersion from the Fukushima accident.
Besides, new dataset of Cs137 atmospheric concentration obtained from the sampling tapes of the Suspended Particle Matter (SPM) monitoring network by the method of Tsuruta et al. (2014) are available. These data are very useful since several plumes, unknown until now, could be identified in addition with the two major plumes on March 15 and March 21. Therefore, the inverse modeling method has been applied to assess a new source term using Tsuruta air concentration measurements, dose rate measurements and meteorological fields provided by MRI.
The simulations performed using this new inverted source term help enhance our knowledge about the Fukushima accident. Several releases events are better reproduced and the agreement between model and observations is improved in comparison with previous simulations.