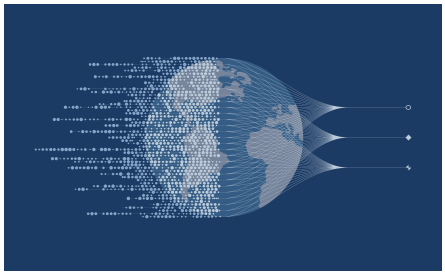

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# of Bayesian methods and uncertainty quantification to source location and interpretation of IMS radionuclide measurements.

One of the aims of using Atmospheric Transport Modelling (ATM) in National Data Centres (NDC) is to locate the geographical areas likely to contain the source at the origin of a set of measurements at International Monitoring System (IMS) stations, and to provide an estimate of the associated release quantity. One of the main challenges lies in uncertainty quantification. For this purpose, recent studies have shown the potential of using ensemble and Bayesian methods.
In this study, we examine the contribution of FREAR (Forensic Radionuclide Event Analysis and Reconstruction, a recently-available open source tool) and its bayesian inverse modelling method to estimating source location and releases from a series of real case detections. The discussion will focus on providing lessons learnt on uncertainty quantification from an operational NDC point of view, based on comparisons to other inverse modelling methods (such as cost function, and Possible Source Region) and on the use of different sets of meteorological data (including deterministic and ensemble meteorology).

E-mail

sylvia.generoso@cea.fr

In-person or online preference

Primary author: Ms GENEROSO, Sylvia (Commissariat à l'énergie atomique et aux énergies alternatives (CEA))

Co-authors: Ms MORIN, Mireille (Commissariat à l'énergie atomique et aux énergies alternatives (CEA)); Mr GROSS, Philippe (Commissariat à l'énergie atomique et aux énergies alternatives (CEA)); TOPIN, Sylvain (Commissariat à l'énergie atomique et aux énergies alternatives (CEA)); DE MEUTTER, Pieter (Belgian Nuclear Research Centre (SCK CEN)); HOFFMAN, Ian (CTBTO Preparatory Commission)

Presenter: Ms GENEROSO, Sylvia (Commissariat à l'énergie atomique et aux énergies alternatives (CEA))

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