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Localization of Possible Source Region for Multiple Radionuclide Detections Using a Logical Approach Evaluating ATM-SRS Fields

The calculation of Source Receptor Sensitivity (SRS) fields calculated in backward mode is state of the art of Atmospheric Transport Modeling for CTBT verification purposes. The Lagrangian Particle Dispersion Models FLEXPART and HYSPLIT are available for that purpose using mostly ECMWF or NCEP analysis data for simulations on global domain. Various localization approaches for atmospheric backtracking in case of detections at multiple stations exist. The IDC software tool Webgrape calculates a correlation based Possible Source Region (PSR) comparing simulated detection scenarios quantitatively with the real one. Our new method is based on an additive coincidence score value combining binary sensitivities of detecting and non-detecting samples pointing to areas of high source location probability. The presented test cases comprise detections related to the Fukushima release 2011, scenarios of the NDC Preparedness Exercises NPE2012 and NP2010, and recent detections at Schauinsland, Germany (DEX33). Although the standard backward simulations have their operational and political advantages in the CTBT context, additional forward simulations for specific cases are essential to provide a most consistent picture of a potential release scenario.

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