Atmospheric Transport Modelling Activities at CTBTO in the Aftermath of the Fukushima Release

M. Krysta, J. Coyne, M. Nikkinen, A. Gheddou, and U. Stöhlker

CTBTO, IDC/OD, Vienna, Austria (monika.krysta@ctbto.org)

For an accidental radioactive release from the Fukushima nuclear power plant, a spatial location of the source term was known and some reasonable hypotheses were made concerning the time of the emission. Consequently, tests of the performance of an atmospheric transport model operational at CTBTO, FLEXPART, were made. Initially, FLEXPART was run daily in an analysis-forecast mode using NCEP meteorological fields to predict the dates when detections of the radioactive material at the IMS radionuclide stations should be expected. In parallel, ECMWF meteorological analyses were used to drive FLEXPART in a purely diagnostic mode to check for possible better matches between model outputs and radionuclide measurements than those forecast by the NCEP-driven runs.

Secondly, once the operational forecasting period at CTBTO came to an end, the ATM activities have been re-focused on the problem of inferring source location from the radionuclide measurements. In addition to radionuclide measurements, a source location algorithm needs outputs of FLEXPART backtracking calculations, Source Receptor Sensitivity (SRS) fields. The SRS fields allow to make a link between radionuclide stations and possible source locations and are computed at CTBTO for each IMS radionuclide station on a daily basis. Various subsets of detections made in the aftermath of the Fukushima release were used to test source location algorithm implemented in our visualisation and analysis software, WEB-Grape. Finally, similar analyses were performed replacing CTBTO SRS fields with the SRS fields provided by the co-operating Regional Specialised Meteorological Centres (RSMCs) of WMO. In fact, the RSMCs support abnormal detections of radionuclides within the IMS network with the SRS calculations performed using their own atmospheric transport models fed with their own meteorological fields. The added value of the SRS fields provided by the RSMCs shall be illustrated.