



Radionuclide source scenario and forward atmospheric transport modeling for the National Data Center Preparedness Exercise 2012

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For verification with compliance of the Comprehensive Nuclear-Test-Ban Treaty (CTBT) the International Monitoring System (IMS) operates stations observing seismic, hydroacoustic, and infrasound signals as well as radioisotopes in the atmosphere. While the IMS data is collected, processed and technically analyzed in the International Data Center (IDC) of the CTBT-Organization, National Data Centers (NDC) provide interpretation and advice to their government concerning suspicious detections occurring in IMS data. NDC Preparedness Exercises (NPE) are regularly performed dealing with fictitious treaty violations to practice the combined analysis of CTBT verification technologies and mutual exchange of information between NDCs and with the IDC as well. For NPE 2012 the trigger scenario was based on a selected seismic event from the Reviewed Event Bulletin serving as starting point for fictitious radionuclide dispersion. Hypothetical xenon and iodine radioisotope source terms with isotopic ratios fitting to a nuclear explosion were assumed. The simulated concentrations at dedicated IMS stations were calculated using the NOAA HYSPLIT model driven by NCEP GDAS analysis data with 0.5 degree horizontal resolution.

Noble gas and particulate emissions were treated separately considering wet and dry deposition for the iodine. Only stations which were operational and sending data at that time were taken for the creation of virtual samples according to the actual collection times. The actual meteorological conditions during the days following the NPE 2012 event and the location of the IMS stations lead to a detection pattern which allowed for sufficient backtracking results using the data and software provided by IDC. For participants without ATM capacity two additional entrance levels were offered upon request: Either a space-time-box containing the trigger event or even the complete REB entry containing source and waveform parameters.