



Atmospheric Transport Modelling and Radionuclide Analysis for the NPE 2015 scenario

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The Comprehensive Nuclear-Test-Ban Treaty (CTBT) prohibits all kinds of nuclear explosions. The International Monitoring System (IMS) is in place and at about 90% complete to verify compliance with the CTBT. The stations of the waveform technologies are capable to detect seismic, hydro-acoustic and infrasonic signals for detection, localization, and characterization of explosions.

For practicing Comprehensive Nuclear-Test-Ban Treaty (CTBT) verification procedures and interplay between the International Data Centre (IDC) and National Data Centres (NDC), preparedness exercises (NPE) are regularly performed with selected events of fictitious CTBT-violation.

The German NDC's expertise for radionuclide analyses and operation of station RN33 is provided by the Federal Office for Radiation Protection (BfS) while Atmospheric Transport Modelling (ATM) for CTBT purposes is performed at the Federal Institute for Geosciences and Natural Resources (BGR) for the combination of the radionuclide findings with waveform evidence. The radionuclide part of the NPE 2015 scenario is tackled in a joint effort by BfS and BGR. First, the NPE 2015 spectra are analysed, fission products are identified, and respective activity concentrations are derived. Special focus is on isotopic ratios which allow for source characterization and event timing. For atmospheric backtracking the binary coincidence method is applied for both, SRS fields from IDC and WMO-RSMC, and for in-house backward simulations in higher resolution for the first affected samples. Results are compared with the WebGrape PSR and the spatio-temporal domain with high atmospheric release probability is determined. The ATM results together with the radionuclide fingerprint are used for identification of waveform candidate events. Comparative forward simulations of atmospheric dispersion for candidate events are performed. Finally the overall consistency of various source scenarios is assessed and a fictitious government briefing on the findings is given.