



## **Exercise Scenario and combined Radionuclide/Seismic/Infrasound data analysis in Austria during the Preparedness Exercise 2010 of the National Data Centres**

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The Preparedness Exercise 2010 of the National Data Centres of CTBT States Signatories was the first annual exercise constructed around a realistic noble gas release scenario expected after a leaking underground nuclear test. A yet undisclosed seismic event was used as the release location of four radioxenon isotopes. By means of atmospheric transport modelling (ATM), a complex measurement scenario at IMS radionuclide stations was obtained and communicated in near-real-time to the exercise participants.

The authors describe the release assumptions, the resulting radionuclide measurement scenario and the subsequent data analysis. This investigation included a ATM/backtracking based source location analysis using the WebGrape software provided by CTBTO, the analysis of the isotopic ratios of the released radioxenon isotopes, and last but not least the analysis of seismic/infrasound events within the possible source region identified.

A number of conclusions can be drawn. First, a radionuclide-driven preparedness exercise proved to be particularly useful to test the joint capabilities of the NDCs and of the IDC, compared with the seismic driven, so called “negative evidence” exercises where radionuclide measurements are only used to confirm the non-nuclear character of an event. Second, the exercise provided indications on what radioxenon isotopes could potentially be measured after a nuclear test and that the analysis of isotopic ratios would yield useful results. Third, the results confirmed that a combined across-technologies data analysis is important to verify the treaty, as it allowed, in the exercise case, the clear identification of a candidate event. Fourth, results demonstrated the need for continued efforts in the field of atmospheric transport modelling and data fusion.