



Seismological investigation of the National Data Centre Preparedness Exercise 2013

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The Comprehensive Nuclear-Test-Ban Treaty (CTBT) prohibits all kinds of nuclear explosions conducted on Earth – underground, underwater or in the atmosphere. The verification regime of the CTBT is designed to detect any treaty violation. While the data of the International Monitoring System (IMS) is collected, processed and technically analyzed at the International Data Centre (IDC) of the CTBT-Organization, National Data Centres (NDC) of the member states provide interpretation and advice to their government concerning suspicious detections.

The NDC Preparedness Exercises (NPE) are regularly performed dealing with fictitious treaty violations to practice the combined analysis of CTBT verification technologies. These exercises should help to evaluate the effectiveness of analysis procedures applied at NDCs and the quality, completeness and usefulness of IDC products for example.

The exercise trigger of NPE2013 is a combination of a tempo-spatial indication pointing to a certain waveform event and simulated radionuclide concentrations generated by forward Atmospheric Transport Modelling based on a fictitious release. For the waveform event the date (4 Sept. 2013) is given and the region is communicated in a map showing the fictitious state of "Frisia" at the Coast of the North Sea in Central Europe.

The potential connection between the waveform and radionuclide evidence remains unclear for exercise participants. The verification task was to identify the waveform event and to investigate potential sources of the radionuclide findings. The final question was whether the findings are CTBT relevant and justify a request for On-Site-Inspection in "Frisia".

The seismic event was not included in the Reviewed Event Bulletin (REB) of the IDC. The available detections from the closest seismic IMS stations lead to a epicenter accuracy of about 24 km which is not sufficient to specify the 1000 km² inspection area in case of an OSI. With use of data from local stations and adjusted velocity models the epicenter accuracy could be improved to less than 2 km, which demonstrates the crucial role of national technical means for verification tasks.

The seismic NPE2013 event could be identified as induced from natural gas production in the source region. Similar waveforms and comparable spectral characteristic as a set of events in the same region are clear indications. The scenario of a possible treaty violation at the location of the seismic NPE2013 event could be disproved.