Geophysical Research Abstracts
Vol. 15, EGU2013-11730, 2013
EGU General Assembly 2013

Fusion of radionuclide and waveform information at CTBTO in support of the NPE12

Monika Krysta, Jolanta Kusmierczyk-Michulec, and Noriyuki Kushida
CTBTO, IDC/OD, Vienna, Austria (monika.krysta@ctbto.org)

Different technologies constitute the pillars of the system which monitors compliance with the Comprehensive Nuclear-Test-Ban Treaty (CTBT). Each of the four technologies exploited by the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO) has a monitoring network of its own which together constitute the International Monitoring System (IMS). CTBTO and its State Signatories make an effort to achieve synergy between the complementary information provided by the distinct networks in a process called data fusion.

Seismic, infrasound and hydroacoustic monitoring technologies are based on detections of mechanical waves and referred to as waveforms. In an analysis process performed at the International Data Centre (IDC) those detections are subsequently associated to build events from which the mechanical waves originated. The association is more challenging in case of airborne radionuclide monitoring technology. A support in form of the computational results of atmospheric transport modelling is necessary in this case. But even with such a support, due to turbulent processes in the atmosphere, the events emanating the detected radionuclides are not easily identified. In fact, atmospheric transport modelling indicates the regions where a source could have been located rather than point-like events. However, if this information is appropriately merged with the waveform events, it could support evidence of their nuclear character or lack thereof.

National Data Centres of State Signatories, which are responsible for the CTBT monitoring and verification at the national level, design and conduct annual exercises in order to test performance of the monitoring system and analysis of its detections. Exercise scenario, mixing real and fictitious components, is designed to ensure as broad a national expert involvement as possible. At the same time it offers a framework for testing and advancing data fusion capacity. In this presentation we propose to address data fusion as a component of the National Data Centre Preparedness Exercise 2012 (NPE12). We will present a part of the exercise scenario, namely a series of fictitious detections of radionuclides at the IMS network, and its analysis in terms of atmospheric transport modelling performed at the IDC. We will address the problem of retrieving source information from this fictitious scenario of radionuclide detections and how to subsequently combine it with the waveform events. We will present a list of waveform events which constitute potential sources and which are then subject to analysis by the waveform experts. Furthermore, illustration of a similar analysis performed using the atmospheric transport modelling results provided by the Regional Specialised Meteorological Centres of WMO will be shown. Finally, we will discuss the tools used to perform data fusion analysis and give an account of the on-going developments in this domain at the IDC.