[EE] Evening Poster | M (Multidisciplinary and Interdisciplinary) | M-AG Applied Geosciences

[M-AG31]CTBTO - Four IMS Technologies for Detecting Nuclear Explosion on the Planet and Their Applications to Earth Science

convener:Nurcan Meral Özel (Comprehensive Nuclear-Test-Ban Treaty Organization), Hiroyuki Matsumoto(Japan Agency for Marine-Earth Science and Technology), Yosuke Naoi(国立研究開発法人日本原子力研究開発機構, 共同), Lassina Zerbo(Comprehensive Nuclear-Test-Ban Treaty Organization)
Thu. May 24, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)
The Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO) was founded in 1996 in response to the adaption of the Treaty in 1996 by the United Nations General Assembly, which bans nuclear explosions on the Earth's surface, in the atmosphere, underwater and underground. The Treaty has a unique and comprehensive verification regime to make sure that no nuclear explosion goes undetected. The regime is supported by International Monitoring Systems (IMS) composed of the four state-of-art technologies; 1) Seismic, 2) Hydroacoustic, 3) Infrasound, and 4) Radionuclide, by the International Data Centre (IDC), and by the On-Site Inspections (OSI).
IMS will, when complete, consists of 337 facilities worldwide to monitor the planet for signs of nuclear explosion. Around 90 % of the facilities are in operation and sending the data to the IDC in Vienna, Austria. The seismic stations detected the past six announced underground nuclear explosion test by DPRK and identified the location, depth, and their magnitudes. IMS radionuclide stations detected the trace amount of the noble gas in twice of them. Radionuclide station in Takasaki, Japan, detected the noble gas released from the site, 50 days after the announced test.
The huge amount of data collected by the stations can be used for other purposes such as civil and scientific applications in addition to detecting nuclear explosions. They can provide Tsunami Warning centres with near real-time information about an underwater earthquake. During the Fukushima Daiichi Power Plant accident, in March 2011, the IMS network's radionuclide stations tracked the dispersion of radioactivity on a global scale. The data could also help better understand the oceans, volcanos, climate change, the movement of marine mammals, and many other issues.
This session will provide the overview of CTBTO and its IMS, the scientific discussion on each technology, and its outcomes.

[MAG31-P01]Waveform Analysis of the DPRK September 2017 event and comparison with previous DPRK events.

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Keywords:Waveform Analysis, Nuclear Test, Induced Earthquake

According to the analysis result with IMS (CTBTO International Monitoring System) seismic data, the hypocenter of DPRK September 2017 event was located close to those of previous DPRK Nuclear Tests in 2006, 2009, 2013, January 2016 and September 2016. The seismic waveform shapes of IMS stations near the hypocenter were quite similar with those of previous 5 times NTs. The seismic signals from this event indicated some features of explosion and the event scale was biggest (mb = 6.0) in the past NTs.

Japan NDC-1 (National Data Centre-1) tried to discriminate this event. The indexes, such as regional P/S ratio, P/S Spectral Ratio and mb:Ms, also indicated features of explosion. As for infrasonic analysis with I30JP and I45RU observation data, I45RU could detect infrasonic signal from this explosive event.

After this biggest 2017 NT event, several earthquakes were occurred near the test site. Analyzing waveform data of these induced events, S-wave amplitude of waveform at close IMS stations is larger than that of P-wave and the feature of these events is presumed to be natural earthquake rather than man-made explosion.