[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-P04]Mobile Noble Gas Background Observation System and Japanese Cooperation

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Two mobile noble gas measurement systems were installed in Horonobe, Hokkaido, and Mutsu, Aomori, Japan with generous voluntary funds from Japan. These Transportable Xenon Laboratories (TXLs) support CTBTO noble gas background measurement campaigns that develop means to distinguish the source of detected *radioactive isotopes of the noble gas xenon (radioxenon)* as either peaceful activities or test explosions. Although these new TXLs cannot be used for core CTBT verification reports, *they* nevertheless *will enable more effective use of the IMS’s monitoring capacity.* Four isotopes of radioxenon are particularly relevant to the detection of a nuclear explosion; the “smoking gun” evidence of whether a nuclear test explosion has occurred. TXLs observe the background

level of radioxenon at different locations and in combination with Atmospheric Transport Modeling (ATM) help CTBTO understand its behavior.