INVITATION

To further enhance the strong relationship between the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO) and the scientific and technological community, the CTBTO invites you to the SnT2015 Conference:

Scientists and technologists, science administrators, academics, representatives to the CTBTO’s policy-making organs, representatives of agencies involved in research and development in areas potentially relevant to the Treaty’s verification regime, and media representatives.

CALL FOR PAPERS

Deadline for abstract submission: 1 FEBRUARY 2015

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#SnT2015
Scientific and technical advances in monitoring the globe for nuclear explosions require a deep understanding of the way in which features of the Earth influence the relevant signals as they travel from their point of origin to where they are observed. The signals from monitoring networks, as well as noise, constitute a huge database and support advances in the Earth Sciences on global, regional and local scales.

Seismic and acoustic signals propagate through the Earth, its atmosphere and its oceans. The Earth’s atmosphere also transports radioactive materials around the globe in minute concentrations, and its properties are relevant for different kinds of satellite observations.

This Theme focuses on any dynamic or static properties of the Earth that can be observed with seismic, hydroacoustic and infrasound data, with radionuclide tracer observations, with on-site geophysical measurements or with other monitoring data. Studying these Earth properties in turn helps improve the processing or interpretation of monitoring data.

Many elements of the current monitoring effort are also used in other contexts, for example in the characterization of earthquakes, in the study of climate change, in the measurement of atmospheric transport, and in the monitoring of releases from nuclear facilities. Such civil and scientific uses of IMS data and IDC products are also brought together under this Theme.

TOPICS

1 Infrasound and Atmospheric Dynamics
2 Solid Earth Structure
3 Atmospheric and Subsurface Radionuclide Dispersion and Depletion
4 Exploratory Drilling Techniques for On-Site Inspection
5 Civil and Scientific Applications of IMS data and IDC Products

The CTBTO relies on close cooperation with the scientific community to constantly refine its methods and ensure that the verification regime operates at the cutting edge of scientific knowledge.

To that end, the CTBTO has conducted four multidisciplinary scientific conferences since 2006 that have attracted scientists and experts from a wide range of disciplines.

Over 500 scientists from all continents participated in the most recent conference, SnT2013, from 17 to 21 June 2013.

The exploration of the potential of IMS data for civil uses, such as disaster early warning, and other scientific applications, also requires a close partnership with the wider scientific community.
Events such as earthquakes, explosions or radionuclide releases produce signals and surface features that may be observed locally, regionally or globally. The events can be located in time and space and their characteristics can be estimated from the data that are collected.

This Theme covers the characterization of the source, the signals being emitted and what these reveal about the event and its environment. Only if the source is well characterized can its associated signals and anomalies be correctly analyzed and interpreted. To ensure compliance with the Treaty, it is essential to understand the way that nuclear explosions generate the full variety of signals, as well as being familiar with any other seismic, acoustic or radionuclide signals that could be confused with those of a nuclear explosion.

The Treaty’s provision for on-site inspections depends on a priori knowledge of the observables (telltale signs) that can be expected after a nuclear test and how these might be identified as geophysical anomalies or testing artefacts. The increasing database of recorded events and historical observables also establishes an asset for research on a wide range of scientific applications.
The methods allowed for an on-site-inspection may cover areas of up to 1,000 square kilometres for specific sites of interest. The methods used must be capable of detecting observables related to an event that triggered the on-site inspection, especially those related to a nuclear test, if any. These can include geophysical anomalies from several metres to several hundred metres in depth or radioisotope traces emanating from the surface, and other relevant features.

This Theme focuses on advances in sensors, networks and data processing for monitoring and inspection. Advances may come from the adaptation and fusion of methods already in use by specialists in other areas, such as satellite photography, or from the evolution of novel approaches within the CTBT scientific community that may spin off to other techniques.
The operation and sustainment of a globally distributed network of sensors poses substantial challenges in the fields of logistics and life-cycle management. Near-real-time acquisition and forwarding of continuous and segmented data from the global International Monitoring System, and its subsequent processing and analysis at the CTBTO’s International Data Centre, also pose great challenges. Strict specifications for data availability, quality and timeliness must be achieved and sustained, while the results of processing and analysis pose further issues of quality and timeliness. Special demands are placed upon the handling of OSI data, which will be governed by many requirements outlined in the Treaty and the OSI Operational Manual. Each National Data Centre will have its own focus and accompanying procedures. Of special interest is the integration of IMS data and Treaty monitoring into national operations and procedures.

The optimization of performance has many facets, and contributions are invited on any subject that impinges on the efficiency, quality, timeliness, reliability and cost-effectiveness of the verification process.

**THE FOUR IMS TECHNOLOGIES**

- **170 Seismic** stations monitor shockwaves in the Earth. The vast majority of these shockwaves are caused by earthquakes. But the stations also detect man-made explosions such as the North Korean nuclear tests in 2006, 2009 and 2013.

- **60 InfraSound** stations on the surface can detect ultra-low frequency sound waves – inaudible to the human ear – that are emitted by large explosions.

- **80 Radionuclide** stations measure the atmosphere for radioactive particles; 40 of them also pick up noble gases. Only these measurements can give a clear indication as to whether an explosion was nuclear or not. They are supported by 16 radionuclide laboratories.

- **11 Hydroacoustic** stations “listen” for sound waves in the oceans. Sound waves from explosions can travel extremely far underwater.
FINANCIAL SUPPORT

Financial support may be available to a limited number of participants. Such assistance must be requested at the time of registration and no later than 1 February 2015. Financial support will be considered only for those who have submitted an abstract. Participants are strongly encouraged to first seek travel and participation funds from non-CTBTO sources.

LANGUAGE

English is the working language of the conference. All conference presentations and documents are expected to be submitted in English.

CONTACT

Please visit www.ctbto.org/SnT2015 for updates on the conference, registration or submission of abstracts and for background information. Please send additional enquiries to SnT@ctbto.org.