

# **CTBT: Science and Technology Conference 2023 - SnT2023**

**Monday 19 June 2023 - Friday 23 June 2023**

**Hofburg Palace & Online**

## **Scientific Programme**

**Themes and Topics of SnT2023**

*Keywords* indicate what might fit under the Topic, including priorities. Possible submissions are not limited to the keywords.

## **Theme 1. The Earth as a Complex System**

### **T1.1 The Atmosphere and its Dynamics**

*Keywords:* Infrasound wave propagation and attenuation, transport of radionuclides, global circulation, volcanoes, climatology, meteorology, noise sources

### **T1.2 The Solid Earth and its Structure**

*Keywords:* Seismicity, earthquake observatories, seismic and acoustic wave speed and attenuation, tectonics, locating seismic disturbances, subsurface properties, pathways for radionuclides

### **T1.3 The Oceans and their Properties**

*Keywords:* Oceanography, hydroacoustics, ocean observatories, long-range propagation, refraction and diffraction, 2D and 3D models, T-phase modelling, acoustic coverage, ocean acoustic tomography and thermometry, undersea volcanoes, tsunamigenic events, soundscapes, marine mammals

### **T1.4 Multi-Discipline Studies of the Earth's Subsystems**

*Keywords:* Data analysis, modelling, physics, waveform data fusion, phase conversion, coupling across interfaces, 2022 Hunga Tonga Hunga Ha'apai eruption, interference between anthropogenic aspects and the earth's system processes

## **Theme 2. Events and Nuclear Test Sites**

### **T2.1 Characterization of Treaty-Relevant Events**

*Keywords:* Democratic People's Republic of Korea announced tests, detection, understand the full extent of signals that may be generated by a nuclear explosion, location in time and space, analysis, characterization of the source, discrimination, screening criteria, differentiate nuclear tests from other human-made or natural events

### **T2.2 Challenges of On-Site Inspection**

*Keywords:* Observables that may be expected after a nuclear test, how these could be identified as geophysical, radioactive, temperature or other anomalies or artefacts of testing, surface and subsurface features, site and event characterization including experience from the past, identify and distinguish observables generated by historic and recent tests

### **T2.3 Seismoacoustic Sources in Theory and Practice**

*Keywords:* Earthquakes, explosions, signals being emitted, anomalies, signals that could be confused with those from a nuclear explosion

## **T2.4 Atmospheric and Subsurface Radionuclide Background and Dispersion**

*Keywords:* Natural and human-made sources of radioisotopes, release of radionuclides, atmospheric transport modelling, anomalies of atmospheric radioactivity, isotopic ratios that could be confused with those from a nuclear explosion, radionuclide migration

## **T2.5 Historical Data from Nuclear Test Monitoring**

*Keywords:* Historical records, digitizing, archive preservation, discrimination, metadata, event bulletin, lessons learned for current monitoring and future on-site inspection, data for training and exercises

# **Theme 3. Monitoring and On-Site Inspection Technologies and Techniques**

## **T3.1 Seismic, Hydroacoustic and Infrasound Technologies and Applications**

*Keywords:* Forwarding of continuous and segmented data, data assimilation, design of sensor systems, advanced sensor, novel technologies

## **T3.2 Radionuclide Technologies and Applications**

*Keywords:* Sampling and sample processing, data acquisition, particulate sample systems, gamma-gamma coincidence counting, new generation noble gas systems, radionuclide laboratories

## **T3.3 On-Site Inspection Techniques**

*Keywords:* Visual observations, remote sensing including multi-spectral, satellite imagery, unmanned measurement platforms, measurements of radioactivity and energy resolution analysis, environmental sampling and analysis in mobile and field based facilities, seismic and non-seismic geophysical techniques, drilling, equipment

## **T3.4 Integrating Data from Different Monitoring Technologies**

*Keywords:* Fusion of data, large data analysis including supplementary data like wind fields, other data to supplement International Monitoring System data for expert technical analysis, diverse sources of remotely sensed data, augmented reality

## **T3.5 Analysis of Seismic, Hydroacoustic and Infrasound Monitoring Data**

*Keywords:* Signal processing, data analysis algorithms, reduce analyst workload, artificial intelligence, bulletin quality, new approaches, adaptation and integration of methods used in other fields

## **T3.6 Analysis of Radionuclide Monitoring Data**

*Keywords:* Spectrum calibration and analysis algorithms, enhance quality of automated processing, reduce analyst workload, artificial intelligence, estimation of radionuclide concentrations from known sources, improve event screening, Nuclear Explosion Signal Screening Open Intercomparison Exercise

## **Theme 4. Sustainment of Networks, Performance Evaluation, and Optimization**

### **T4.1 Performance Evaluation of the International Monitoring System and On-Site Inspection and their Components**

*Keywords:* Performance metrics, network coverage, data availability, quality and timeliness, resilience, lessons learned from the COVID-19 pandemic, preparedness exercises, feedback on International Data Centre products and services, lessons learned from On-Site Inspection build-up and field exercises, national operations and procedures

### **T4.2 Systems Engineering for International Monitoring System and On-Site Inspection**

*Keywords:* Power systems, system refurbishment and modernization, communication infrastructure, sensor network design and operation

### **T4.3 Enabling IT Technologies**

*Keywords:* Data protection, cyber security for Treaty monitoring and on-site inspection, accessibility of data, Internet of Things, authentication of samples, simulation, computational models

### **T4.4 International Monitoring System Sustainment**

*Keywords:* Stations, laboratories, global communications infrastructure, repair, predictive and preventative maintenance, life cycle, causes of failure, state-of-health parameters, recapitalization, improvements to efficiency and cost effectiveness, reliability and security

### **T4.5 On-Site Inspection Team Functionality**

*Keywords:* Methodology, concept for operations and building capacities, health and safety of inspectors, training, table-top and build-up exercises, equipment maintenance, sustainment of OSI readiness

## **Theme 5. CTBT in a Global Context**

### **T5.1 CTBT Science and Technology Policy**

*Keywords:* Supporting countries' position on CTBT, role of SnT towards entry-into-force of the CTBT, and lessons learned from/to other arms control agreements and arrangements, multilateralism, broader context of international organizations, reinforcing confidence building, role of National Data Centres, evidence-based policy making, expert advice to national authorities, science-policy interface, innovative solutions within the framework of the CTBT

## **T5.2 Synergies with Global Challenges**

*Keywords:* Civil and scientific applications of International Monitoring System data, natural hazards, disaster risk reduction, tsunami early warning, climate change studies, sustainable development goals, nuclear and radiological emergencies, international collaboration, CTBTO virtual Data Exploitation Centre (vDEC)

## **T5.3 Regional Empowerment**

*Keywords:* Capacity building and training, technical assistance, regional networking, cooperation among National Data Centres, multilingualism

## **T5.4 Outreach**

*Keywords:* Treaty advocacy, education, science communication, public information, raising awareness and understanding, outreach initiatives, human resources development, CTBTO Youth Group, next generation of experts, diversity and gender equality

## **Invited talks**

## **PTS talks**

## **Panel discussion**

## **Side Events**