

CTBT Study Group “Participation Report – CTBT International Scientific Studies Conference (ISS09)”

June 17, 2009, Large Conference Room, Japan Institute of International Affairs (JIIA)

[Research overview]

In its capacity as the domestic secretariat for the Comprehensive Test Ban Treaty (CTBT) on behalf of the Ministry of Foreign Affairs, the JIIA Center for Disarmament and Non-proliferation has invited Japanese and foreign researchers/experts in technical, academic and political fields connected with the monitoring and verification of nuclear testing to serve as instructors for research meetings. This study group basically comprises officials from the Ministry of Foreign Affairs, the Ministry of Education, Culture, Sports, Science and Technology, the Meteorological Agency, the Japan Atomic Energy Agency, the Japan Weather Association, and JIIA's Center for Disarmament and Non-proliferation.

[Overview of FY2009 1<sup>st</sup> CTBT Study Group Meeting]

The 1st CTBT Study Group Meeting in FY2009, entitled “Participation Report – CTBT International Scientific Studies Conference (ISS09)” held in Vienna, Austria from June 10-12, featured reports by Kinji Koyama, Visiting Research Fellow, Center for Disarmament and Non-proliferation, Japan Institute of International Relations, Tatsuhiko Hara, Senior Research Fellow, Building Research Institute, and Takahiko Murayama, Engineer, Japan Weather Association, as well as a discussion with CTBT Study Group participants. The following is an overview of the reports for the 1<sup>st</sup> CTBT Study Group Meeting.

[1. ISS09 Summary by ABE Nobuyasu, CDN Director]

Mr. Abe began by expressing his genuine belief that this project, by participating in ISS09 and inviting not only scientists and engineers in CTBT-related technical fields but also politicians, diplomats, and media representatives, offered an opportunity to present the latest technological developments relating to CTBT verification technology, and by expressing regrets that the project had been unable to get as many politicians and diplomatic officials from various countries as had been expected to participate in the meeting. However, he also declared that the ISS09 project itself was extremely significant in the sense that a CTBT verification system was being developed to keep pace with technological progress, and he welcomed the decision to hold a follow-up to ISS09 in 2011 (“ISS11 2011 ISS Symposium”). As for his impressions during ISS09, he noted that the contributions of the technical experts from the US and the presence of diplomats and specialists from EU countries were particularly notable, and that Japan still had much room

to contribute in terms of both technical expertise and presence.

1. ISS09 is an international conference for analyzing the functions of monitoring/observation technology relevant to verification of CTBT compliance (seismic waves, hydroacoustic waves, minute pressure vibrations, and radionuclides) and data analysis methods, analyzing/assessing the verification capabilities of current verification systems, including on-site inspections, and clarifying their status, sharing information on the current status of the CTBT verification regime with the diplomats and policy makers of signatory countries to clarify those areas in which augmentation and improvement are necessary, and indicating ways of building a more effective and efficient verification system (the ISS09 results are to be compiled in a report for distribution to CTBT signatory countries). The CTBT Organization Preparatory Committee has made the ISS09 program available at the following URL:

[http://www.CTBT.Org/fileadmin/user\\_upload/ISS\\_2009/ISS\\_Programme.pdf](http://www.CTBT.Org/fileadmin/user_upload/ISS_2009/ISS_Programme.pdf)

[2. Report by Kinji Koyama, Visiting Research Fellow, CDN]

Next came a report by Kinji Koyama, Visiting Research Fellow, who participated in ISS09 as an integrator. He commented as an ISS09 integrator that care had been taken to arrange an opportunity for technical experts to disseminate information in a fashion readily understandable to a general audience and to answer the questions of non-specialist conference participants (politicians, diplomats, press representatives). During the panel discussion on the minimum scale of explosion (yield) deemed currently detectable, the participants were asked to consider multiple facets of verification technology, and a variety of very interesting viewpoints were forthcoming with respect to seismic waves, hydroacoustic waves, minute pressure vibrations, etc.

Although on-site inspections are the mainstay of the CTBT verification regime, Mr. Koyama did have an undeniable sense that these had been marginalized. Nevertheless, the on-site inspection Integrated Field Exercise (IFE08) hinted at future improvements, and he reconfirmed that the on-site inspections ensuing after failures by the CTBT International Monitoring System (IMS) to detect radionuclides generated by a nuclear explosion were aimed at checking for the presence of these radionuclides. On defining readiness and assessing current readiness, important topics of dispute among CTBT officials in recent years, he stated that CTBT organs only engage in monitoring and verification activities – the premise being that assessment of the data from these monitoring/verification activities is left

to independent analysis by signatory countries to determine if there has been a treaty violation – and added that the inability to initiate on-site inspections due to a lack of readiness on the part of CTBT signatory countries could have a fatally adverse impact on the CTBT's verification regime.

He also declared that, when the “CTBT community” of CTBT technical experts and diplomatic delegations joined politicians, diplomats, journalists and people of various other backgrounds from different countries in debates on the CTBT during ISS09, the parties involved all shared the view that the absence of a “common language” was a major obstacle to mutual understanding and that this issue should be given further consideration prior to ISS11 in two years.<sup>2</sup>

2. The poster session presentations by domestic research organizations in signatory countries numbered more than 200 in total; these reports will be published on CTBT organizations' official websites.

[3. Report by Tatsuhiko Hara, Senior Research Fellow, Building Research Institute]

Mr. Hara, Senior Research Fellow, introduced the Global Seismological Observation Course as his presentation topic for ISS09. The Building Research Institute has accepted a cumulative total of more than 1,300 trainees since the early 1960s. Started in 1995 to promote enforcement of the CTBT, the Global Seismological Observation Course has already been completed by 139 persons from 69 countries, and efforts are being made to help trainees acquire the seismic observation techniques needed for detection of nuclear tests as well as the analytic skills to distinguish between nuclear tests and natural earthquakes. Mr. Hara said that the opportunity afforded him to make a presentation at ISS09 also allowed him to hear the latest arguments put forth by countries on seismological monitoring technology, information that would be extremely useful in studying how best to carry out global seismological observation training in future. He added that he would like to participate and made a presentation at ISS11 in 2011, in particular the panel report on enhancing nuclear test detection capabilities.

[4. Report by Takahiko Murayama, Engineer, Japan Weather Association]

Mr. Murayama offered an in-depth look at his ISS09 presentation topic “An approach for denoising waveform data by auto-regressive algorithm.” He reported on a method of eliminating the background noise inherent to monitoring facilities by applying an auto-regression model to the waveform data for monitored minute air pressure fluctuations

and extracting a pure minute air pressure fluctuation waveform, and he went on to explain its effectiveness. As the presentation started into the minute air pressure fluctuation branch, the meeting organizers, deeming the method fundamental to waveform data analysis in general, moved the presentation on to new methods for processing observed waveform data. A wealth of examples – including offshore earthquakes in Miyazaki Prefecture, crash landings at Narita Airport, and the Mt. Asama volcanic eruption – illustrated the effectiveness of this data analysis, prompting a flood of inquiries from the ISS09 participants. Given the small number of experts worldwide in the field of minute air pressure fluctuation, Mr. Murayama expressed interest in pursuing closer exchange with specialists/researchers in minute air pressure fluctuations from other countries.