

The Second GEOSS Asia-Pacific Symposium
The role of Earth observations in tackling climate change

**National Museum of Emerging Science and Innovation,
Tokyo, Japan**

Summary Report (as endorsed on 16 April 2008)

As a part of the implementation of the Global Earth Observation System of Systems (GEOSS) coordinated by the Group on Earth Observations, the Second GEOSS Asia-Pacific Symposium was held in Tokyo, Japan from 14 to 16 April 2008, at the invitation of the Ministry of Education, Culture, Sports, Science and Technology (MEXT), to discuss the role of Earth observations in tackling climate change and its induced effects. People's awareness of climate change has increased recently on a global scale. At the upcoming G8 Toyako Summit in July, climate change will be discussed as the main issue.

The Intergovernmental Panel on Climate Change (IPCC), which was awarded the Nobel Peace Prize, reported last year that "warming of the climate system is unequivocal..." Climate change-related parties and specialists from the Asia-Pacific, a region which is extremely vulnerable to climate change, gathered at the Symposium to improve the role of GEOSS role in monitoring climate change and supporting adaptation to its diverse consequences. Detailed discussions were conducted in four specialized sessions. The "Monitoring and Predicting Climate Change" session addressed the issue of understanding the current and future conditions of climate change. The "Sustainable Water Management" and "Ecosystems and Biodiversity" sessions were dedicated to the analysis of the impact of climate change and adaptation measures pertaining to these strained natural resources. The "Mapping Forests and Tracking Carbon" session was created to improve monitoring of forests and associated carbon.

The main outcomes of each parallel session were as follows:

A. PARALLEL SESSION: MONITORING AND PREDICTING CLIMATE CHANGE

A network of space-based and mobile platforms for atmospheric greenhouse gas (GHG) observation in the Asia-Pacific region would provide new information for understanding GHGs and carbon cycles. Long-term continuation of ecological research and carbon flux observation is essential to improve the evaluation of the terrestrial carbon budget. Ocean climate parameters need various types of observation platforms, such as autonomous buoys, to be operated and enhanced through international collaboration. A better understanding of radiative forcing will require aerosol, cloud and radiation budget monitoring from surface and space. For sustainability of global observation systems for climate in the Asia-Pacific region, where the Monsoon prevails, the operational use of high resolution observation networks on a long-term basis is essential, building where possible on existing infrastructure. Climate change observation activities in Asia need coordination and capacity building in developing countries under the framework of GEOSS.

GEO is expected to strengthen the following GEOSS Tasks:

- Sustained Reprocessing and Reanalysis Efforts
- Key Climate Data from Satellite Systems
- Global Ocean Observation System
- Seamless Weather and Climate Prediction System

B. Parallel Session: Earth Observations for Sustainable Water Management

A comprehensive knowledge of the water cycle and effective management of water resources are paramount to every nation's well-being. In particular, it is critically important to improve the predictions of extreme weather events that often result in flood and drought, in order to take mitigating actions.

Asia-Pacific nations need to coordinate space-based and *in-situ* water cycle observation networks under the framework of GEOSS for developing a global observational network. In addition, they are encouraged to pursue international cooperation for achieving integrated water resource management and adapting to potential impacts of climate change by using observations, analyses and predictions. Promoting capacity building is also important.

GEO is expected to strengthen the following GEOSS Tasks:

- Forecast Models for Drought and Water Resource Management
- Global Water Quality Monitoring
- Integration of In-Situ and Satellite Data for Water Cycle Monitoring
- Capacity Building Program for Water Resource Management

C. Parallel Session: Using GEOSS to manage Ecosystems and Protect Biodiversity

The Asia-Pacific region includes a variety of ecosystems, ranging from low to high latitudes. However, human populations and economies are growing rapidly in this region, thereby causing stronger interactions with global warming. This effect is expected to continue and increase.

To establish an effective observing system for monitoring impacts of global warming and developing adaptive measures, Asia-Pacific nations must coordinate their observation networks and improve interdisciplinary collaboration and observation capacity under the framework of GEOSS, with the aim of conserving ecosystems and biodiversity in the Asia-Pacific region.

GEO is expected to strengthen the following GEOSS Tasks:

- Ecosystem Classification and Mapping
- Regional Networks for Ecosystems
- Global Ecosystem Observation and Monitoring Network
- Capturing Historical Biodiversity Data
- GEO BON (Biodiversity Observation Network)

D. Parallel Session: Mapping Forests and Tracking Carbon

A number of activities have been initiated by GEO Members and Participating Organizations on various aspects of forest mapping and carbon measurement. Nevertheless, forest carbon mapping and tracking are still not an integrated GEOSS activity. Therefore, GEO should ensure the adequate coordination needed to realize a common global forest carbon observation strategy using the best possible satellite, air-borne and in-situ measurements as well as models.

Forest carbon mapping and tracking by satellite (including SAR, optical and LIDAR) has the potential to provide essential information for predicting climate change and taking measures for climate change mitigation. The estimates of carbon emissions from deforestation, degradation and other land-cover changes can be improved by integrating such measurements with in-situ observations and carbon models. In particular, GEO needs to initiate GEOSS activities on coordinating systematic observation strategies for existing and future SAR instruments.

These activities should build on the following existing GEOSS Tasks:

- Forest Mapping and Change Monitoring
- Global Land Cover
- Pilot Communities of Practice
- Virtual Constellations
- Key Terrestrial Observations for Climate
- Global Ecosystem Observation and Monitoring Network

This report represents the common perspective of the participants attending the 2nd GEOSS Asia-Pacific Symposium as reflected by the above summaries of the discussions held in parallel sessions. Earth observation and climate change prediction capabilities developed through the Global Earth Observation System of Systems were recognized as essential to comprehending the current status of the Earth. The Symposium participants emphasized that the implementation of GEOSS must proceed and accelerate in order to address the challenge of climate change in the Asia-Pacific region.