Hanoi Statement 2017

Hanoi, Vietnam
September 20th, 2017

The 10th Global Earth Observation System of Systems (GEOSS) Asia-Pacific Symposium was held in Hanoi from 18th to 20th September 2017, by the Group on Earth Observations (GEO), Vietnam National Space Center (VNSC), Vietnam Academy of Science and Technology (VAST), and Japan's Ministry of Education, Culture, Sports, Science and Technology (MEXT). The Symposium, attended by 210 participants, addressed the theme of "Accelerating the realization of the SDGs with Earth Observations: Lessons from the Asia-Oceania Region", and focused its discussions on contributions to GEO's Societal Benefit Areas (SBAs). The Symposium continued the work of establishing the Asia Oceania GEOSS (AO GEOSS) initiative as a fundamental piece of regional infrastructure and an overarching vision for other EO initiatives in the Asia Oceania region.

A keynote presentation addressing *"Space Application in Vietnam"* was delivered by Assoc. Prof. Pham Anh Tuan, Director General of VNSC. GEOSS related activities were presented by 12 countries and 3 organizations, and were followed by the introduction of the EO4SDG Initiative and an overview of Vietnam's Earth observation data and information needs. The two parallel sessions included cross cutting issues: data sharing infrastructure, and user engagement and communication. The five breakout sessions included the GEOSS Asian Water Cycle Initiative (AWCI), the Asia-Pacific Biodiversity Observation Network (APBON), the GEO Carbon and GHG Initiative, GEO Ocean and Society (Blue Planet), and the GEO Global Agriculture Monitoring Initiative (GEOGLAM). Each working group focused on global challenges and discussed the role of Earth observations in accelerating the realization of the SDGs.

Vietnam affirms EO data has been increasingly used in a wide range of application in Vietnam. The challenges that Vietnam is facing may include: establishing policies and interdisciplinary approaches for incorporating EO with other data for different applications; exploiting the potential of EO for cross-cutting and cross-border issues; building a data sharing system within the Asia-Oceania region; and human resources and capacity building for enhancing the use of EO, particularly for biodiversity and GHG Inventories. These challenges can be overcome through interdisciplinary collaboration, for example VNSC and JAXA signed a MoU to promote sharing of ALOS-2 ScanSAR data to be used within the Vietnam Data Cube project. This project will be a pathfinder for SAR data cubes within the Open Data Cube community (https://www.opendatacube.org/).

The Participants agreed to the following outcomes and resolved to take the following actions toward the next Symposium.

The AWCI (Task 1) and the Task 6 (Monitoring and evaluation of drought in Asia-Oceania region) have jointly launched their platform activities in several participating countries, in collaboration between national and international wide range water communities and earth observations through the AOGEOSS, to take concerted actions for realizing the Sendai Framework for DRR, the Paris Agreement and the SDGs. Each platform identified its milestones, resources and deliverables clearly for establishing integrated data acquisition systems and information exchange cooperation locally, regionally and globally. In this context, inter-linkages is a key to develop holistic, evidence-based, quantitative and qualitative information for addressing flood and landslide, drought and water scarcity, and water environmental degradation.

The APBON (Task 2) and the Task 7 (Environment Monitoring and Assessment) recognizes the importance of further connection of in-situ and remote sensing observations together for biodiversity and ecosystem monitoring. APBON has endeavored to develop a community of practice and promote data sharing in its first decade. In order to tackle the issue of biodiversity and ecosystem sustainability in the region, APBON will (1) promote the integration and synthesis of data and information from in-situ observations with various earth observations using the best available open source technology, (2) test and advance super-site and site-based observations in the region by trans-disciplinary approach, and (3) deliver these results that are useful for decision making, policy development and further advancement of EO, which are beneficial for human well-being and sustainability of socio-ecological systems under the pressure of environmental change.

The GEO Carbon and GHG initiative (GEO-C)(Task 3) is supporting the implementation of the Paris Agreement. The Asia-Oceania Earth observation community is increasingly contributing to GEO-C and a formal coordination at regional level. In particular, we acknowledge the significant progress made in Vietnam with regard to observations of the carbon cycle and GHG emissions and mitigation. GEO-C also recognizes the important role of global efforts such as the Integrated Global Greenhouse Gas Information System (IG3IS) and the Global Carbon Project (GCP) considering the AO region. GEO-C will further work at regional level to address gaps and challenges such as improving dialogue between national GHG inventory agencies and the EO communities, the integration between different approaches and the need for training programs in the region.

The joint ocean session of Task 4 (Ocean and Society) and Task 8 (Ocean and Island) under AOGEOSS initiative recognized the importance of continuation of sharing ocean observation, regional cooperation, technology developments for actionable information for reporting on SDG13 and 14. National/institutional efforts by Australia, Japan, Malaysia, Thailand and Vietnam reported on progress and provided updates of their data and information systems, and identified further opportunities for collaboration and sharing. Pacific Island representatives highlighted the importance of sub-regional cooperation, whilst emphasizing capacity limitations. Applications of ocean observation were also demonstrated, such as monitoring mangrove, erosion, eutrophication, fisheries and maritime awareness to deliver on SDG 14 targets and indicators. The joint group recognized the value of working jointly in future, and agreed to establish a joint Task, which shall cover ocean, coasts and islands, focusing on the utilization and integration of in-situ and remotely sensed data to deliver products that can assist with the realization of SDGs. Participants agreed to work together to identify solutions for metadata standardization, and common parameters to be shared. It was recognized there is a need for: (1) integrated use of remote sensed and in-situ data for societal needs (2) more data and information on the Pacific islands and oceanic areas including the high seas, and (3) integration across the land-ocean interface and the need to work with other GEO initiatives, to deliver accessible information which is used.

GEOGLAM/AsiaRiCE (GG/AR) (Task 5) is making good progress on the GG/AR team's five products (rice plant area, rice crop calendar, rice crop damage assessment, agro-met information and yield estimation and forecasting) in Indonesia, Vietnam, Myanmar, Cambodia, Japan with regional / international activities. GG/AR encourages to implement scale up activity of rice crop area and growth stage monitoring in major rice production area in countries, the sustainability of food production, such as monitoring eutrophication, methane emissions and water use efficiency. GG/AR confirms the necessity to promote integrate usage of multiple satellite data with high performance ground observation such as drone monitoring and advanced IOT. In addition, GG/AR will aim at greater end user engagement and coordination, aiming for a paradigm shift from the maximization to the optimization of production to secure, sufficient and quality

food, and grown sustainability.

Regarding data sharing and data cubes in AO GEOSS, GEO members also noted the evolving discussion around Analysis Ready Data (ARD), the Open Data Cube (ODC) community and the rapid adoption of cloud services in EO users in developing countries within Asia Oceania. The strong relationship between data sharing and data cube technology requires both working groups to ensure interoperability through close collaboration and co-design of systems for AOGEOSS. The shift towards open data and data sharing services, including linked data tools, was highlighted and the critical need for data hubs to provide access to Analysis Ready Data the was seen as a critical first step to achieving the AO GEOSS vision. Data cube technology was a reoccurring theme throughout the meeting with many countries including Australia, China, Vietnam and Cambodia now using ODC. Japan has been developing the Data Integration and Analysis System (DIAS) this system provides the opportunity for data integration and analysis in trans-disciplinary ways. The strong complementary links between ODC and DIAS were discussed with strong support to seek further collaboration and integration between both systems. Finally, capacity development for data sharing and data cube technologies was seen as a critical need.

,Sound informed decision-making and community of practice will lead to long-term sustainable and disaster resilient behavior by humankind in relation to Earth's available environmental resources. Engagement with user communities should play a key role in systematically identifying data needs; ensuring access to data; and delivering the necessary tools and services. User engagement allows the building of strategic partnerships and platforms, at local, national and global levels. This informs, leverages, and optimizes development activities. The end-to-end and structuralized process of identifying players and their needs, ensuring availability of data to develop critical information, and transforming that information into knowledge for end-users defines the scope of AOGEOSS, potentially bringing benefits to users at each step. AOGEOSS is required to convene users, providers from different sectors, and experts in the domain of EO and environmental and disaster information, and facilitate implementation mechanisms, organization of workshops, community exchanges, and targeted networking actions in collaboration with funding agencies and related national and international programs.

The Participants resolve to reconvene at the 11th GEOSS Asia-Pacific Symposium to be held in Japan in 2018.