

Japan

Introduction

Japan is moving forward with efforts to realize the Post-2025 GEO Strategy "Earth Intelligence for All." In order to utilize Earth Intelligence, we are not only conducting Earth observation, but also sharing data, developing capacity building, and strengthening international cooperation in the Asia-Oceania (AO) region. In this report, we introduce some of Japan's efforts for the development of Earth observation and Earth Intelligence by making use of our strengths.

Importance of Continuous Observation and Data Sharing

Through long-term Earth observation, Japan has gained critical insights into climate change and disaster risk reduction. For the AO region to tackle these challenges, Japan has been promoting the sharing of our continuous observation data.

Notable examples of Japan's contributions include:

1. **ALOS (Advanced Land Observing Satellite) series:** The Japan Aerospace Exploration Agency (JAXA) has been providing free and open access to various optical and SAR archived data acquired by the ALOS series with the aim of contributing to a sustainable and resilient society.

On 1 July 2024, Japan launched the ALOS-4 which has taken over the mission of ALOS-2. ALOS-4 has a 4 times wider observation swath than ALOS-2, which enables coverage of a wider area on Earth over a certain period. It is expected

to play an essential role in various applications, such as disaster response, infrastructure monitoring, agricultural applications, and so on.

2. **GOSAT (Greenhouse gases Observation SATellite) series:** The GOSAT series has been observing CO₂ and methane concentration in the atmosphere since 2009. GOSAT's data is utilized in climate change research and policies globally, including the IPCC AR6 report which references 24 GOSAT-related papers. The Ministry of Environment Japan (MOEJ) supports Asian countries to help improve the precision and transparency of their emission reports by comparing GOSAT observation data with their GHG inventory reports. For example, the Mongolian government supported by the MOEJ, reported "excellent agreement" between GOSAT observation and their national estimates of CO₂ inventory in BUR2 published last November.

Initiatives for Earth Intelligence

Japan takes initiatives beyond international cooperation in the AO region. These efforts contribute to the creation and provision of Earth Intelligence:

1. **BISMaL (Biodiversity Information Sharing Mechanism for Asia and the Pacific):** Japan operates BISMaL, a system for integrating marine biodiversity information around Japan. BISMaL has now accumulated about 60,000 marine taxonomic information details and more

than 4 million biological occurrence records. These data are provided to OBIS, the largest global database on marine biodiversity and are also used to establish and manage Marine Protected Areas in Japan.

In 2023-2024, BISMAL started to integrate with Japanese local governments based on FAIR data principles (Findable, Accessible, Interoperable, and Reusable). By constructing a bilateral data flow, local governments can easily combine and re-analyze their own data with global data.

- CORS Network (Continuously Operating Reference Stations):** The Japan International Cooperation Agency (JICA) has partnered with the Royal Thai Survey Department and the Geo-Informatics and Space Technology Development Agency to enhance the National Continuously Operating Reference Station (CORS) Data Center's capability and utilization since 2022. CORS, which continuously receive position-related radio signals from the Global Navigation Satellite System (GNSS), make it possible to accurately measure positions and elevations on Earth (high-precision positioning). This is used to realize infrastructure development using accurate location information, automatic operation of agricultural machinery (Smart Agriculture), and industrial promotion using automatic driving technology in Thailand.

Significance of Capacity Building

Developing skilled professionals is crucial for utilization of Earth observation data to tackle global challenges and to deliver Earth Intelligence. Programs such as Japan's **OSS-SR (Online Synthesis Systems for Sustainability and Resilience)** train experts in Earth observation utilization and policy making.

OSS-SR is developed on the Data Integration and Analysis System (DIAS) to contribute to local disaster risk reduction internationally. For example, for water-related issues, OSS-SR constructed the Flood Early Warning System on DIAS that integrates and analyzes weather forecasting data, real-time earth observation data, geospatial data and a rainfall-runoff-inundation model. Furthermore, as a platform for capacity development, a series of e-learning courses are provided through the OSS-SR and they empower local stakeholders to address water hazards. Those trained experts take on the role of "facilitators", bridging the science community and the larger society to support policymaking and public investment by utilizing Earth observation data and scientific knowledge.

Conclusion

Japan's commitment to Earth Observations and Earth Intelligence extends beyond national boundaries for the Asia-Oceania region to address regional challenges. By continuously collaborating with AOGEO members, we can collectively address global challenges and create a more informed, resilient world.