Introduction of the Asia-Oceania Global Earth Observation System of Systems (AOGE OSS)
GEO Initiative (GI-22)

Prof. Xiang ZHOU
Institute of Remote Sensing and Digital Earth, CAS
11 May 2017
Kunming, China

Contents

1. Overview
2. AOGE OSS Objectives
3. Functional Architecture
4. AOGE OSS Activities
5. Governance Structure
Overview

• **Asia-Oceania region**
  – Complex geographic
  – Large population (70% of world’s)
  – Climate change drastically
  – Natural disasters occur frequently
  – Unbalanced socioeconomic development
  – Deteriorating ecological environment

• **Asia-Oceania GEOSS**—a regional cooperation program on Earth observation with broad involvement

• **Strengthen comprehensive ability of Earth observation and applications for sustainable development at regional level.**

Objectives

- Engage with and Coordinate all stakeholders, partners and sponsors working together on Earth observation activities in Asia Oceania region;
- Investigate user needs and address gaps on implementation of GEOSS and develop technological approaches;
- Utilize infrastructure, resources and capacity to develop integrated and sustained observations;
- Provide a platform for regional countries to advance data sharing and services;
- Establish regional collaboration network by technology supporting and knowledge sharing;
- Support decision-making and regional sustainable development with Earth observation information.
AOGEOSS Functional Architecture

- Biodiversity and Ecosystem Sustainability
- Disaster Resilience
- Energy and Mineral Resources Management
- Food Security and Sustainable Agriculture
- Infrastructure and Transport Management
- Public Health Surveillance
- Sustainable Urban Development
- Water resources Management

AOGEOSS

Regional applications

Improving regional observing ability

Data and information products processing

Technology cooperation network

Earth observation data sharing service

AOGEOSS Activities

The AOGEOSS activities are specified into two categories.

- Regional applications and services: Boxes with blue background represent existing AP activities; other boxes represent newly proposed ones
- Foundational tasks

Applications and services

- Task 1. AWCI
- Task 2. AP-SON
- Task 3. Carbon and GHG Initiative
- Task 4. Ocean and Society
- Task 5. Agriculture and Food Security
- Task 6. Monitoring and evaluation of drought in Asia-Oceania region
- Task 7. Environment Monitoring and Assessment
- Task 8. Ocean and Islands
- Task 9. Himalayan GEOSS
- Task 10. Data Sharing
- Task 11. AO-DataCube
- Task 12. Users Engagement and Communication

Foundational tasks

Demand Driven
**TG1: GEOSS Asian Water Cycle Initiative (AWCI)**

- 2005 Nov.: 1st Symp. in Tokyo
- 2006 Sept.: TTM in Bangkok
- 2007 Jan.: 2nd Symp. in Tokyo
- 2007 Sept.: 1st ICG in Bali
- 2007 Dec.: 3rd Symp. in Beppu
- 2008 Apr.: 2nd ICG in Tokyo
- 2008 Nov.: 3rd ICG in Beijing
- 2009 Feb.: 4th ICG in Kyoto
- 2009 Dec.: 5th ICG in Tokyo
- 2010 Mar.: 6th ICG in Bali
- 2010 Oct.: 7th ICG in Tokyo
- 2011 Mar.: 1st CCAAT in Tokyo
- 2011 Oct.: 8th ICG in Tokyo
- 2012 Sept.: 9th ICG in Tokyo
- 2013 Jun.: 2nd CCAAT in Tokyo
- 2013 Nov.: Asia-Africa Water Cycle Symposium in Tokyo
- 2014 May: 10th ICG in Tokyo
- 2014 Sept.: 3rd CCAAT in Islamabad
- 2015 Sept.: AASymp in Beijing

---

**TG2: Asia Pacific Biodiversity Observation Network (AP-BON)**

**Proposed Activities for Developing Global Biodiversity Monitoring System**

- Identification of existing researches on biodiversity
- Distribution of Monitoring sites
- Development of standardized data collection
- Data integration, storage and analysis
- Capacity building for data collection and data analysis
- Provision and dissemination of the information
- UTER
- NASCA (CotM3)
- Other initiatives

**Decision Making in Biodiversity Conservation**

- Collaboration
- Data collection and its standardization
- Data integration and analysis
- Capacity building

**Years**

- 2012
- 2014
- 2016

- Forest loss in Cambodia
- Fish diversity
- Dipterocarpus diversity

**Maps**

- The Biodiversity Observation Network in the Asia-Pacific Region
- Targeting East Asia and Pacific Region
- Networking among Biodiversity Centers
- Forest loss in Cambodia
- Fish diversity
- Dipterocarpus diversity
**TG3: The GEO Carbon and GHG Initiative (GEO-C):**
*Toward policy-relevant global carbon cycle observation and analysis*

The Global Carbon Cycle: a complex interaction of different systems in different domains – directly linked to climate change

**UNFCCC Paris Agreement <Article 7.7>**

c) Strengthening scientific knowledge on climate, including research, systematic observation of the climate system and early warning systems, in a manner that informs climate services and supports decision-making.

---

**TG4: Ocean and Society**

**GEOSS-AP Ocean Data Networking System**

**Data site of Asia Pacific countries:**
- **Japan**: NEAP-GODIS Regional Real Time Data Base
- **Australia**: Indian National Centre for Ocean Information Services
- **India**: Central Database System and Data Standard for Marine and Coastal Resources
- **China**: NEAP-GODIS Regional Delayed Mode Data Base
- **Thailand**: Not yet have Data site. Inquire by E-mail
- **Vietnam**: NEAP-GODIS Korea National Delayed Mode Data Base

**GEOSS-AP Ocean Data Networking System Web Portal:**

Web data portal build via core framework (GIFRE System). To encourage ocean research activities by searching the oceanographic data easily and speedily. To give opportunities the countries which don’t have the public data base site to disclose their data information about their oceanographic data.

Extension of the current Ocean Data Networking, which will ensure national security and help efforts of individual observation projects for data exchanges through collaborative works. In particular, we seek possible extension to biogeochemical and ecosystem observation (e.g. ocean acidification)
TG5: Agriculture and Food Security

Task 5 is GEOGLAM Asia RICE crop team activity and ground based observation / field survey network in Asia for Agriculture and Food Security.

Objectives:
- Applying Earth Observations and other Space-based technologies for drought monitoring, evaluation, and management

TG Leaders:
- UNESCAP, CAS

Tasks:
1. Create a drought monitoring cooperative mechanism 2017
2. Establish a framework to monitor and evaluate drought 2018
3. Develop a comprehensive decision support system 2018
4. Generate policy-relevant advice for drought 2019

Objectives: Applying Earth Observations and other Space-based technologies for drought monitoring, evaluation, and management

- Drought in 2011 Yangtze River Basin and Inner Mongolia

Earth Observation based
Cloud spatial data management
Support Online analysis
Web based open source architecture
**TG7: Environmental Monitoring and Assessment**

Co-Leaders: CAS, NRSCC, UTS, ISPRS, ...

Users: National Government, Future Earth, UNEP-IEMP...

NRSCC has continually carried out and released Annual Report on Remote Sensing Monitoring of Global Ecosystem and Environment (GEO ARC) from 2012.


3 main sub-tasks include: Ecological System, Land use/cover; Atmospheric Environment

[http://www.geodoi.ac.cn/WebCn/Default.aspx](http://www.geodoi.ac.cn/WebCn/Default.aspx)


---

**TG8: Oceans and Islands**

**Goal**

- To advance and exploit synergies among the many observational programme devoted to island, coastal and ocean, to improve engagement with a variety of users for enhancing the timeliness, quality and range of services delivered;
- to raise awareness of the societal benefits of ocean observations at the public and policy levels
- Focus on coastal countries and small island states

**Tasks**

- Identify and articulate user needs.
- Produce new marine and coastal observation network by supporting and linking partners.
- Improve the Coastal Applications of the Data Cube and Modelling the Hydrodynamics and Biogeochemistry of the ocean environment.
- Evaluate the sea level rise risk for the developing states in the western and eastern Pacific.
TG9: Himalayan GEOSS

- Cryosphere & Atmosphere
- Ecosystem and Biodiversity
- Adaptation to Climate Change
- Disasters Risk and Emergency Response
- Integrated water Resources Management

Himalayan GEOSS

Integrated Regional Database
EO applications and solutions
Capacity building and networking
Fostering Regional Cooperation
Promote Himalayan SDI

TG10: AOGEOSS Data Sharing Infrastructure

Vision:
- To bridge the EO gap between data rich and data hungry countries in AO region
- To promote geospatial data service cooperation
- To support AO_GEOSS tasks
- To participate in GEO as a regional GEOSS data platform
Create dialogue to assess data format requirement among data-rich countries including Australia, China, Japan, Korea and Thailand. Datasets are encouraged to be developed based on GCI tools and DAB protocols.

Consolidating operational users' needs and dynamic features of large volumes EO data to support development of AO Data Cube (AODC) data set format. eg. The Australia Geoscience Data Cube (AGDC) and Chinese Geoscience Data Tile DEM (CNGDT)

Advocate and support incorporation of pilot researches using standardized AODC format, with the help of activities in task 1 to task 9.

Advocate and support incorporation of data catalogues among member countries and POs.

**TG12: User Engagement and Communication**

GEOSS Asia-Pacific Symposium “Regional Convening Power”

**Purpose**

To provide researchers, engineers and practitioners from the AP region a forum to exchange information and to discuss cooperation on specific initiatives and other activities in each thematic area, to promote the effort of GEOSS and to make further cooperation in the AP region.

**History**

1st: Tokyo, Japan  
2nd: Tokyo, Japan  
3rd: Kyoto, Japan  
4th: Bali, Indonesia  
5th: Tokyo, Japan  
6th: Ahmedabad, India  
7th: Tokyo, Japan  
8th: Beijing, China  
9th: Tokyo, Japan

**AOGEOSS Working Meeting**  
5th October 2016, Beijing (Co-leads)

**AOGEOSS Side Meeting**  
13th November 2016, St. Petersburg

**AUS-CHN Bilateral Meeting**  
7th April 2017, Sydney
Governance Structure

- Caucus Principles
- Coordination Board
- AP Symposium
- Secretariat
- Task Groups
- Rules of Procedure for Decision-making Process
- Wide participation from Different countries and geographic balance

Participation

AO GEOSS initiative was launched in the GEO PLENARY on November 2016 and included in GEO work plan 2017-2019.

Participants (till March 2017):

- **GEO Members and countries in AO region (12)**
  - Australia, Bangladesh, China, India, Japan, Korea, Laos, Mongolia, Myanmar, Nepal, Pakistan, Vietnam.
- **POs and other societies(13):**
  - UNEP-IEMP, UNESCO-HIST, WMO, UNESCAP, CEOS, ICSU/Future Earth, ICSU/IRDR, ICIMOD, POGO, ISDE, ISPRS, GRSS, APSCO.
Thanks!

AOGE OSS
Better Observation for Better Future