



# Japan's Activities for GEOSS Development

The Third GEOSS Asia-Pacific Symposium  
- Data Sharing for Transverse GEOSS -  
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# 1. Earth Observation Today

## S&T Ministers' Meeting Chair's Summary (June 2008)

- With a view to enabling a clear understanding of the mechanics of climate change, we pointed out the importance of global earth observation, projection and data sharing using the latest science and technology. We are committed to implementing efforts through the UN specialized agencies and programs (WMO, UNEP, IPCC) and **the Global Earth Observation System of Systems (GEOSS)**.

## G8 Hokkaido Toyako Summit Leaders Declaration (July 2008)



- To respond to the growing demand for Earth observation data, we will accelerate efforts within the **Global Earth Observation System of Systems (GEOSS)**, which builds on the work of UN specialized agencies and programs, in priority areas, inter alia, climate change and water resources management, by strengthening observation, prediction and data sharing. We also support capacity building for developing countries in earth observations and promote interoperability and linkage with other partners.

**GEOSS is expected to respond to the growing demand for Earth Observation data.**

## 2. Recent Activities for GEOSS Development in Japan

### Global Earth Observation System of Systems Working Group

Est. under the Council for Science and Technology (MEXT) in Oct. 2008

Discussing Japan's strategy for GEOSS in a body by strengthening cooperation among related ministries, agencies and organizations

#### ➤ 11 Expert Members and Related Ministries

Chair : Prof. Toshio KOIKE (Univ. of Tokyo)

Vice-chair: Dr. Masao FUKASAWA (JAMSTEC)

#### ➤ Tasks for Examination

- (1) Japan's policy for promoting "GEOSS 10-year Implementation Plan"
- (2) Progress management of Tasks related to Japan
- (3) Policy for GEO's various meetings

## 2. Recent Activities for GEOSS Development in Japan

### Examples of GEOSS Tasks led by JAPAN

GEO Grid (US-09-02c) AIST

Global Map (US-09-03a) GSI

Asian Water Cycle Initiative (AWCI) (WA-06-07c) Univ. of Tokyo

Forest Carbon Tracking (CL-09-03b) NIES, JAXA

Global Monitoring of Greenhouse Gases (GMGG) (CL-09-03c) JAXA, NIES

Data Integration and Analysis Systems (DIAS) (DA-09-02a) Univ. of Tokyo



GOSAT launched on Jan. 23, 2009



Japan's Endeavors for Transverse GEOSS

## 2. Recent Activities for GEOSS Development in Japan

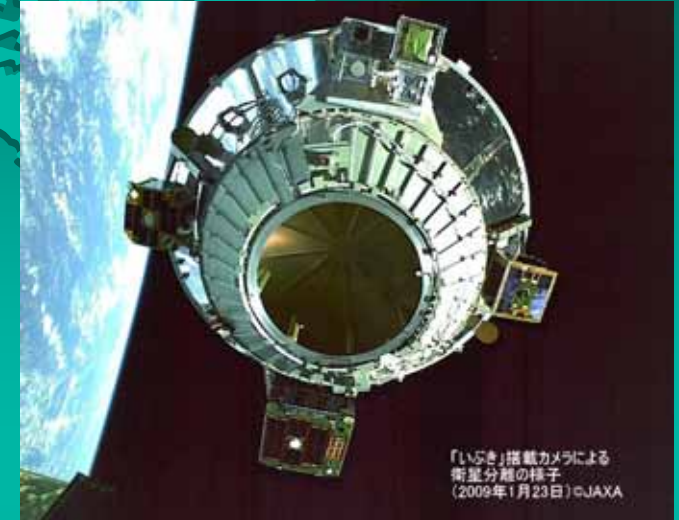
### Global Monitoring of Greenhouse Gases from Space



#### Greenhouse gases Observing SATellite(GOSAT)

Launch: 2009.1.23

Mission: Greenhouse Gases  
Monitoring (CO<sub>2</sub>、CH<sub>4</sub>)  
Data will be available via  
internet around October.



#### Global Monitoring of Greenhouse Gases from Space

This task is led by Japan(JAXA), USA, CEOS, and ESA, and supported IGCO(former IGOS theme) and Forest Community of Practice.

Foster the use of spaced based GHG observations and consolidate data requirements for the next generation GHG missions. It also generate and implement plans for the end-to-end utilization of remote sensing data, particularly GOSAT and OCO.

## 2. Recent Activities for GEOSS Development in Japan

### Earth Observation Missions

#### Advanced Land Observing Satellite-2 (ALOS-2)

Launch: 2013(FY)  
Missions: Global Land monitoring (Radar)

#### Advanced Land Observing Satellite (ALOS)

Launch: 2006.1  
Missions: Global Land monitoring (Optical sensor and radar)

#### Greenhouse gases Observing SATellite(GOSAT)

Launch: 2009.1.23  
Mission: Greenhouse Gases Monitoring ( $\text{CO}_2$ ,  $\text{CH}_4$ )

#### Global Precipitation Measurement(GPM)/Dual-frequency Precipitation

Radar (DPR)  
Launch: 2013(FY)  
Mission: Global Precipitation Monitoring (Japan develop DPR on board GPM)

#### Global Change Observation Mission (GCOM)

< GCOM - W >  
Launch: 2011(FY)  
Mission: Global Sea Surface Temperature, Precipitation, Sea Ice etc

< GCOM - C >  
Launch: 2013(FY)  
Mission: Global Cloud, Moisture, Vegetation etc

#### EarthCARE/Cloud Profiling Radar (CPR)

Launch: 2013(FY)  
Mission: cloud and aerosol particles observation (Japan develop CPR on board ESA's EarthCARE mission.)



# 3. Japan's Endeavors for Transverse GEOSS



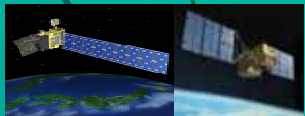
## Data Integration and Analysis System (DIAS)

### GOALS

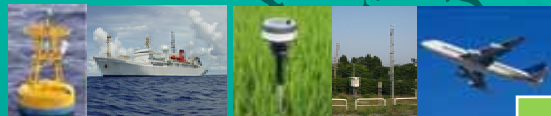
- To create knowledge to be shared among different disciplines
- To create knowledge to be shared throughout the world
- To disseminate data and information that brings awareness

The mission of DIAS is to produce the scientifically and socially valuable information by integrating and analyzing earth observation data, numerical model outputs and socio-economical data effectively.

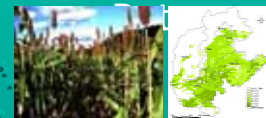
#### Satellite Observation



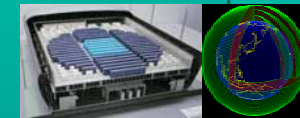
#### In-situ Observation



#### Socio-Economical



#### Weather and Climate Model



### A Prototype of Data Integration and Analysis

#### Application Layer

User Apps.

User Apps.

User Apps.

#### Common Software Layer

•Visualizer

•Data Transformer

•Data Quality Manager etc.

#### Data Management and File System Layer

#### Storage Layer

Disk Array

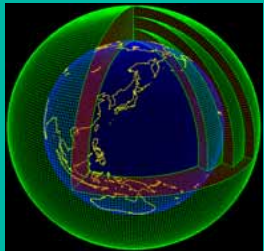
# 3. Japan's Endeavors for Transverse GEOSS



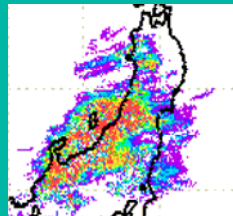
## ~DIAS Applications~

### Integrated Water Resources Management

To generate information for making sound water resources management decisions, the Asian countries cooperatively integrate data from satellites and in-situ observation networks, together with weather prediction model outputs, geographical information and socio-economical data.



Weather prediction model outputs



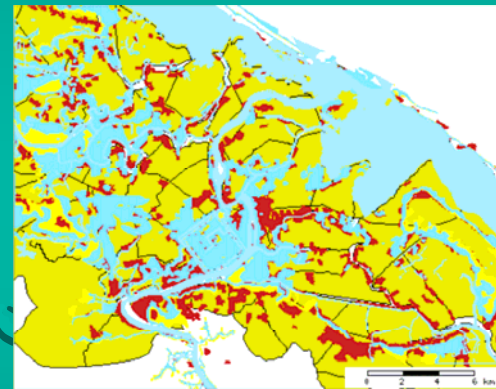
In-situ observation data



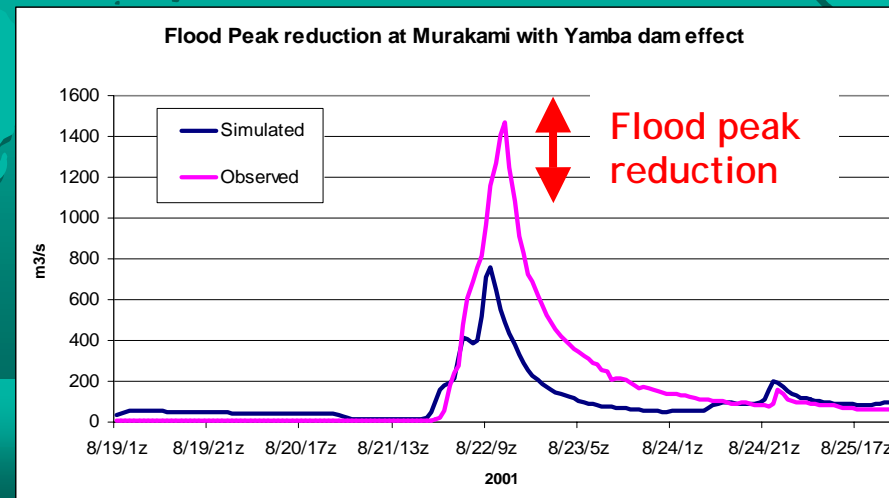
Satellite observation data



River and dam management data



- Risk Potential
- Flood Prediction



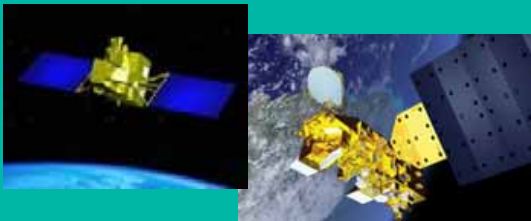
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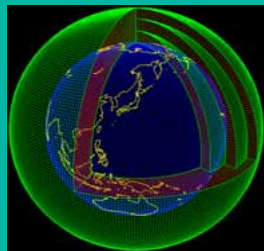
## ~DIAS Applications~

### Greenhouse Gas and Aerosol High-Resolution Analysis Program

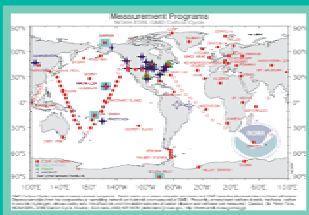
*To generate information for Greenhouse Gas and Aerosol inventories, including those transportations, DIAS integrates data from satellites and in-situ observation networks, together with mass transport model outputs.*



Satellite observation data



Mass transport model outputs



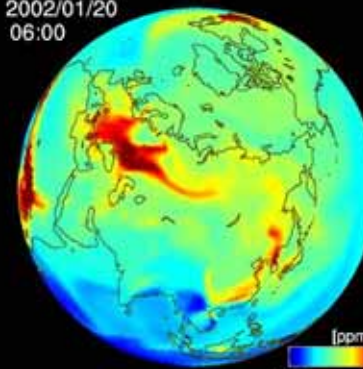
In-situ observation data



- Greenhouse Gas inventories

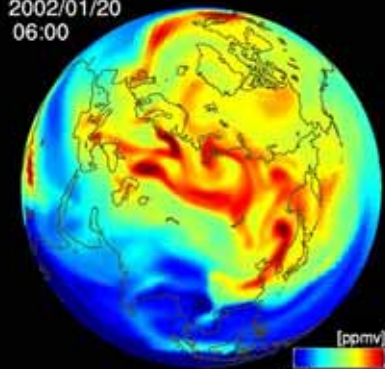
### CO<sub>2</sub> transport simulation focused on Siberia area

2002/01/20  
06:00



Surface CO<sub>2</sub>

2002/01/20  
06:00



Column averaged CO<sub>2</sub>



NICAM-CO<sub>2</sub> model by Yosuke Niwa

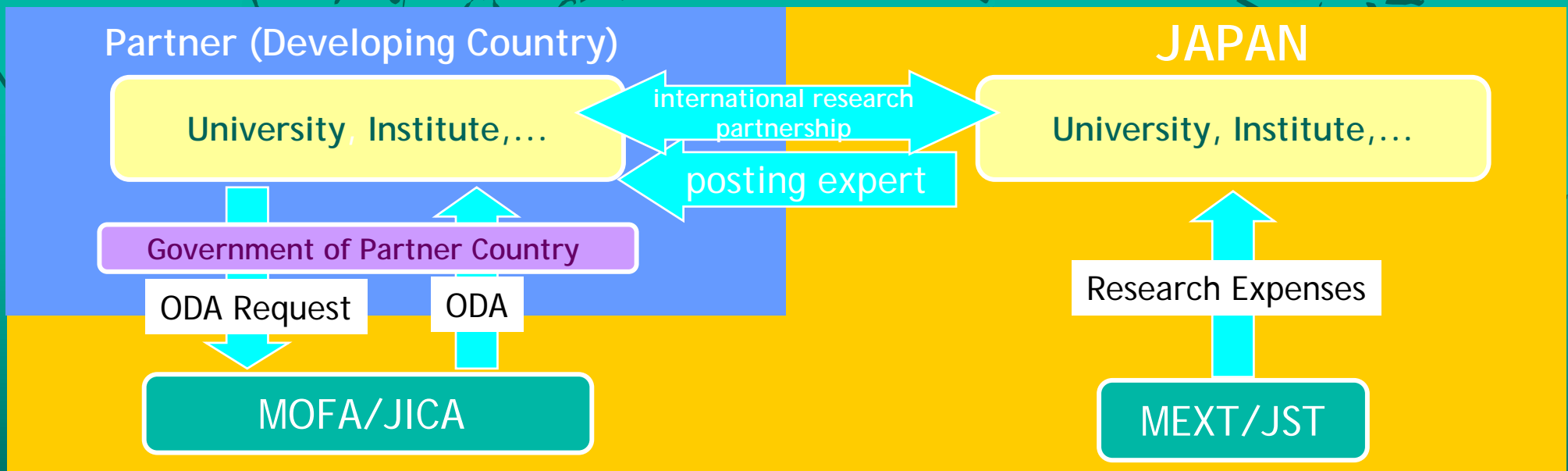


# 4. Int'l Cooperation Activities on S & T Research

## ~S & T Research Partnership for Sustainable Development~

A new Action starting 2008  
by the Ministry of Foreign Affairs (MOFA) and MEXT

Promoting **international research partnership** targeting global issues such as Environment/Energy, Natural Disaster Prevention and Infectious Diseases Control implemented through linkage with **Official Development Assistance (ODA)**.



# 4 . Int'l Cooperation Activities on S & T Research

## ~S & T Research Partnership for Sustainable Development~

Example of Projects

### Decision-making support system for the adaptation in water-related areas under climate change



Principal Investigator:  
Prof. Taikan OKI (Univ. of Tokyo)

Counterpart Country : Thailand



Earth Observation  
considering Climate Change

Natural-Anthropogenic Model for  
hydrology and water resources  
assessments



Decision-making Support System  
for adaptation in water-related  
areas under Climate Change



Developing the National Strategic Plan  
in water sectors for the adaptation  
measures under Climate Change

Early Warning System on the risks of  
water-related disasters by integrating  
observations and models

## 4 . Int'l Cooperation Activities on S & T Research

### ~Asia-Pacific Regional Space Agency Forum(APRSAF)~

- Established in 1993 after the Asia-Pacific International Space Year Conference (APIC) in 1992
- to promote regional cooperation
- to enhance the development of space programs in the region

#### Examples of Projects



Earth  
Observation



Communication Satellite  
Applications



Space Environment  
Utilization



Space Education &  
Awareness

**SAFE (Space Application  
For Environment) Project**

**STAR (Satellite Technology for  
Asia-Pacific Region) Program**

Asia-Pacific Regional Space Agency Forum

# APRSAF

## 5. Expectations to GEO

As 4 years have passed since the approval of 'GEOSS 10 year IP', it's time to move on to the next phase. Asia-Pacific countries are expected to implement steadily following things which adopted at the GEO-V.

- Implementing 2009-2011 GEO Work Plan steadily
- Building the framework for evaluating each tasks
- Registering earth observation data to GEO portal
- Identifying essential earth observation data for each SBAs

And at this symposium, it is expected to discuss what are obstacles to integrate each SBAs data to useful transverse GEOSS datasets and how to break through them at parallel sessions.

These symposium series will provide an opportunity to promote collaboration on the specific theme, through these activities, Asia-Pacific countries will lead to accelerate efforts within the GEOSS.