AWCI ICG Session
towards the 2nd Stage

Agenda

1. Review of Activities
2. Core Activities
3. Governance

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1. How can we realize the plan for AWCI and AfWCCI in terms of:

a. gaining the commitment and technical support from national agencies and organizations .

PDM is a national proposal / need to involve all partners since beginning Harmonization of different responsibilities in a country is difficult / national commitment in essential for data / UN (HyCOS) framework is important and then MOU among national countries.

b. Gaining financial support from the funding agencies (JICA, ODAs, World Bank)
Building a regional and/or topic-oriented consortium / identifying areas of interest of donors

c. mainstreaming the PDM proposals into national priorities and plans.

a & c are closely related together / Considering the GEO background, we should show what we can do./ We need a well documented proposal toward strategic objectives, including Climate Change and Water disaster risk reduction.

Refer to the GEO post-2015 question.
Why do we need AWCI and AfWCCI?
How can we realize societal benefits in an easier way by the PDM?

2. What is(are) the most effective framework(s) for advancing AWCI and AfWCCI activities and building bridges to national governments and international organizations:
   a. Climate change
   b. Sustainable Development Goals
   c. UN Water
   d. Disaster reduction

- ✓ CC is major.
- ✓ We need regional bridges between national and international frameworks.
- ✓ We need to show ways how to realize goals (SDGs) in the field of water by introducing Earth observations and data integration.
- ✓ Sensitivity to administration should be discussed in collaboration with government people.
- ✓ We need bring our achievements in this symposium to the GEO plenary.

3. How can we solve the infrastructure issues that may exist in order to:

a. Support data sharing i) within government departments: serious, ii) among agencies and citizens, iii) government to government and iv) to the world
   data sharing: snowball effects after Landsat / Consortium within a country for data sharing

b. Put in place data transmission and information communications technologies
   basic infrastructure (internet) is necessary/ applicability to available facilities

c. Have a more coordinated approach to training and capacity development

d. Provide the scientific information and models e.g., for downscaling needed to advance the projects.

   Universities' role is important.
   - Education, capacity building
   - Scientific knowledge is needed in society:
     AWCI: research → operational
   - Integrated and interdisciplary approaches by University

4. Governments have a major need for assessment capabilities (e.g., for climate change, land use and other factors that affect the environment.) What key services should AWCI and AfWCCI projects offer to their governments? How will the PDM projects contribute to the governments? To what extent can PDM studies be transferred to other basins and generalized to the national scale? What steps can be taken to get government agencies to adopt and provide the services that will be developed from the PDM project?

    We need to improve our understanding and raise public awareness.
    We need to educate people, decision makers.

5. AWCI and AfWCCI are components of GEO. Please define the interactions by identifying how:

a. your project could support GEO
   data supply / MOU for data sharing among regional member countries

b. your project could benefit from specific GEO services (define which services)
   Platform where data and information can be shared
   GCI offers one stop data dissemination service.
   Cost-free data, immediate concern data availability
   Promoting cooperation among various SBAs.
   Afri-GEOSS
   Success stories should be shared and applied to other region.

Indonesia

- agriculture
- water pollution
- disaster
- ecosystem degradation
- health

population increase
→ land use change, nitrogen excess, agriculture management+lifestyle
→ water pollution(sediment, nitrogen), flood and drought, lean & over weight

a.Needs, Issues: improving rainfall stations, water quality data

b.Linkage to Regional and Global Coordination Framework: remote sensing, WHO initiative

c.Building capacity: existing resident involvement project (ADB)

d.Planning Strategy: integrated research proposal, remote sensing, residents participation survey

Pakistan

- disaster(flood, drought, GLOF)
- agriculture
- water pollution (ground water)
- snow and glacier (advanced science)
- economic growth and social equality

High natural Variability + Climate Change
→ Flood, drought, heat wave → human & economic loss
→ Economic growth and inequality

a.Needs, Issues: socio-economic and health data

b.Linkage to Regional and Global Coordination Framework: UN, donors, global partnership, model linkage

c.Building capacity: APN, educating climate change, drought early warning, adaptation package

d.Planning Strategy: Climate Smart, Planning Commission of Pakistan

Sri Lanka

- Climate change
- Disaster(flood)
- Energy (hydro power)
- Coastal environment

Climate Change + Coast-line Development
→ Flood, sediment transportation, shore erosion

a.Needs, Issues: comprehensive land management, visualizing capability of new risks and their social impacts to prevent

b.Linkage to Regional and Global Coordination Framework: SAFE, satellite remote sensing,

c.Building capacity: sharing research outputs with society

d.Planning Strategy: integrated research plan

Viet Nam

- Disaster(flood)
- Wastewater treatment and Water quality
- Health

Flood Hazard + Climate Change (Heavy rainfall, Sea level rise) + Dam construction + Infrastructure
→ health, urban planning

a.Needs, Issues: good water practice, inadequate sewerage system, upstream works, in-situ event data

b.Linkage to Regional and Global Coordination Framework: UN statistics

c.Building capacity:

d.Planning Strategy: tailor-made field survey, model linkage, holistic view by end-to-end cooperation

a. Needs, Issues:

- improving hydromet stations, in-situ event data , health data, water quality data, socio-economic data
- comprehensive land management
- visualizing capability of new risks and their social impacts to prevent

b. Linkage to Regional and Global Coordination Framework:

- remote sensing, model linkage
- UN, UN water initiative, donors, global partnership

c. Building capacity:

- existing resident involvement project:ADB, APN, SAFE, educating climate change
- early warning
- adaptation package: change of loser to gainer ratio
- sharing research outputs with society

d. Planning Strategy:

- integrated research proposal
- residents participation survey: crowd-sourcing
- support to develop government strategy
- holistic view by end-to-end cooperation

Barriers to Mainstreaming Adaptation

Mainstreaming – the way climate change issues are incorporated into water sectoral planning

Why not mainstreaming?

- Uncertainties in climate science
- Limited public awareness
- Limited structural & non-structural measures
- Weak human resources
- Weak public & private finance
- Adpating to Climate Change is too costly

Knowledge Gap

Capacity Gap

Finance Gap

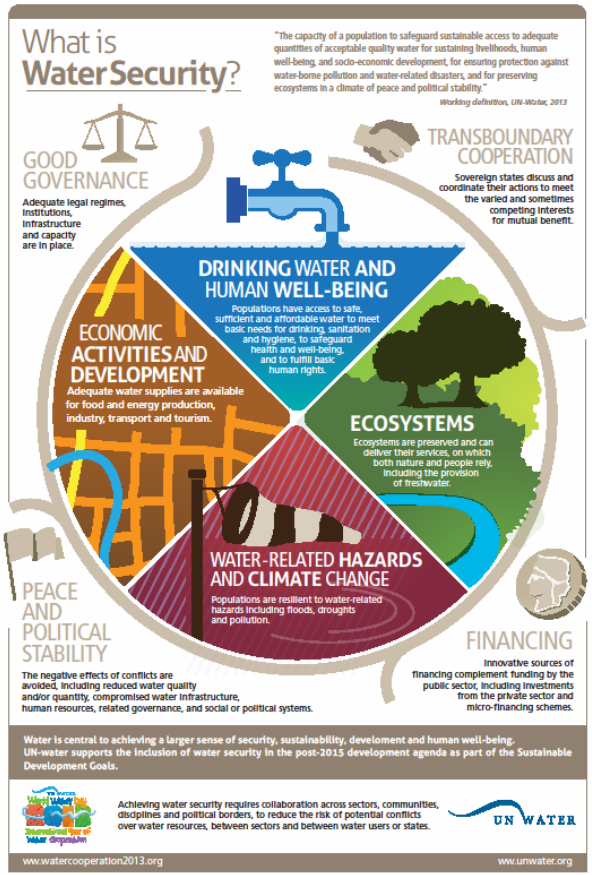
ADBInstitute

Key points from overview presentations

(Doug Cripe) emphasized that many options for formulating the program are available for GEO in its next phase.

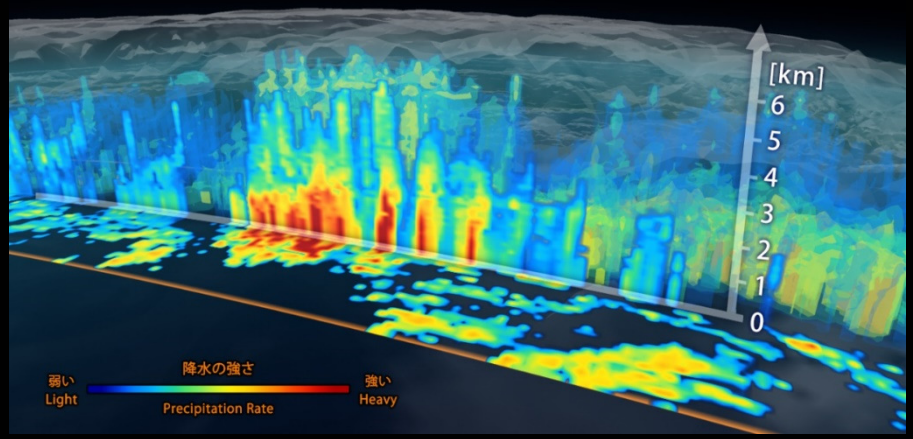
(Toshio Koike) reported that the AWCI/AfWCCI Symposium was very helpful in promoting convergence in planning methodologies and areas of collaboration between Asia and Africa

(Rick Lawford) noted that new opportunities are emerging for Earth Observations between WEF Nexus and SDGs. The diverse approaches in the AWCI could provide testbeds for some of these initiatives.



Highlights from Morning presentations

JAXA) staff reported on major advances in Earth Observations are emerging from the recent satellite launches



Yoichi Iwami demonstrated that ICHARM provides excellent examples of bringing global information to the local level and providing indicators of flood intensity for the severity of flood events.

Kentaro Kido reported that NARBO continues to advance the cause of IWRM through the development of partnerships.

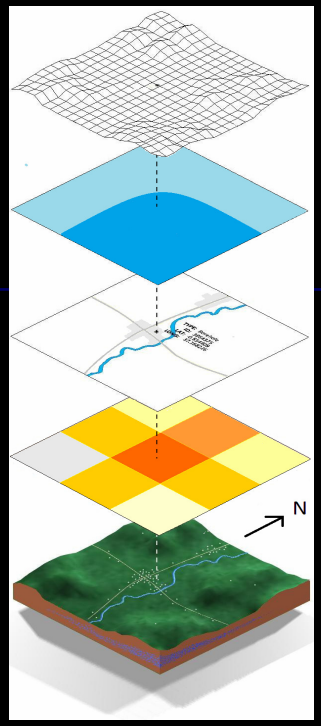
More morning highlights

Muneta Yokomatsu demonstrated a methodology for using physical EO data to drive an economic model that could show the value of and demonstrated the value of investments in disaster reduction infrastructure.

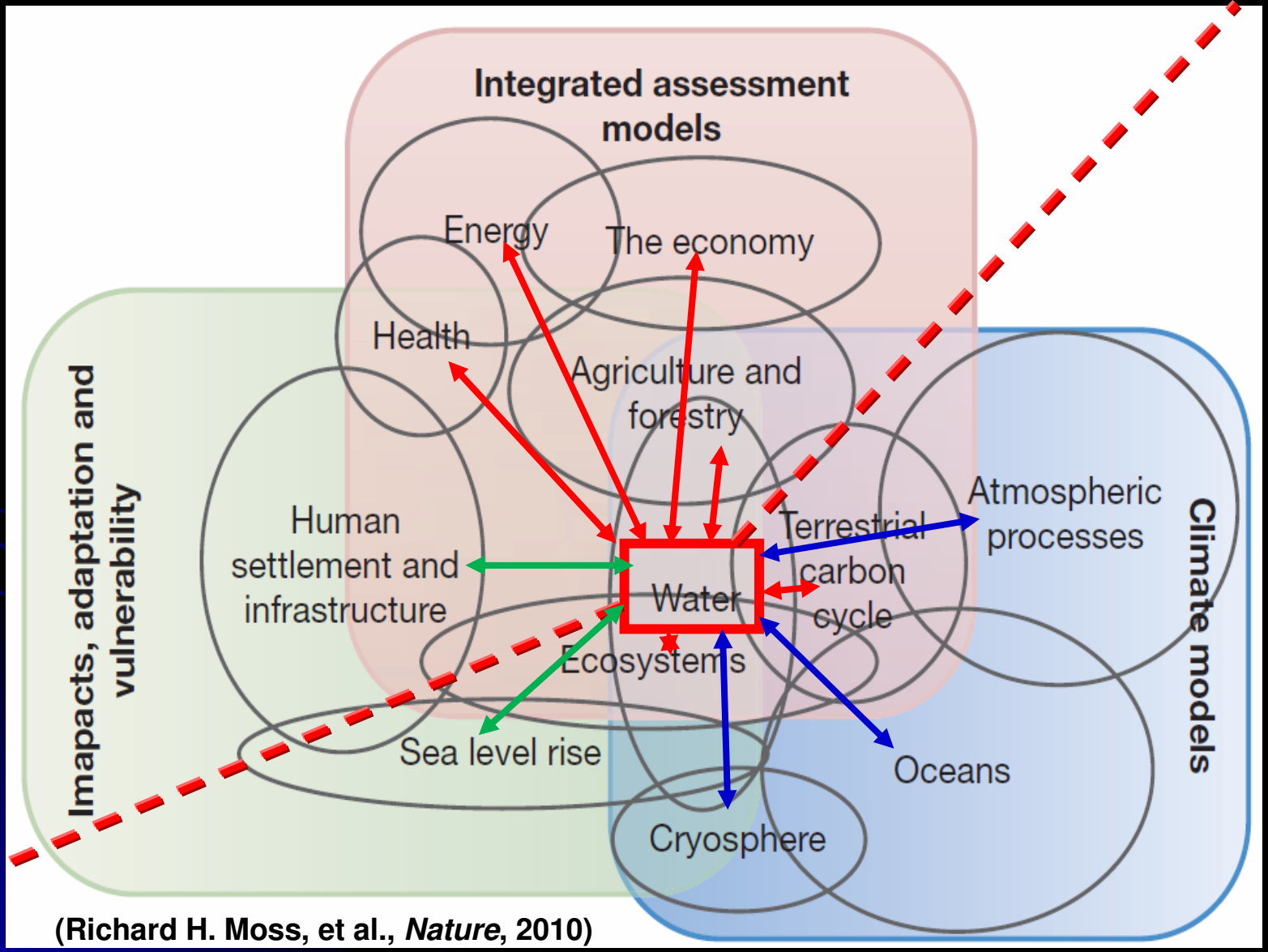
Kenichiro Tachi provided a recipe for flood response

1. **Make Disaster Risk Reduction a Priority**
2. **Know the Risks and Take Action**
3. **Build Understanding and Awareness**
4. **Reduce Risk**
5. **Be Prepared and Ready to Act**

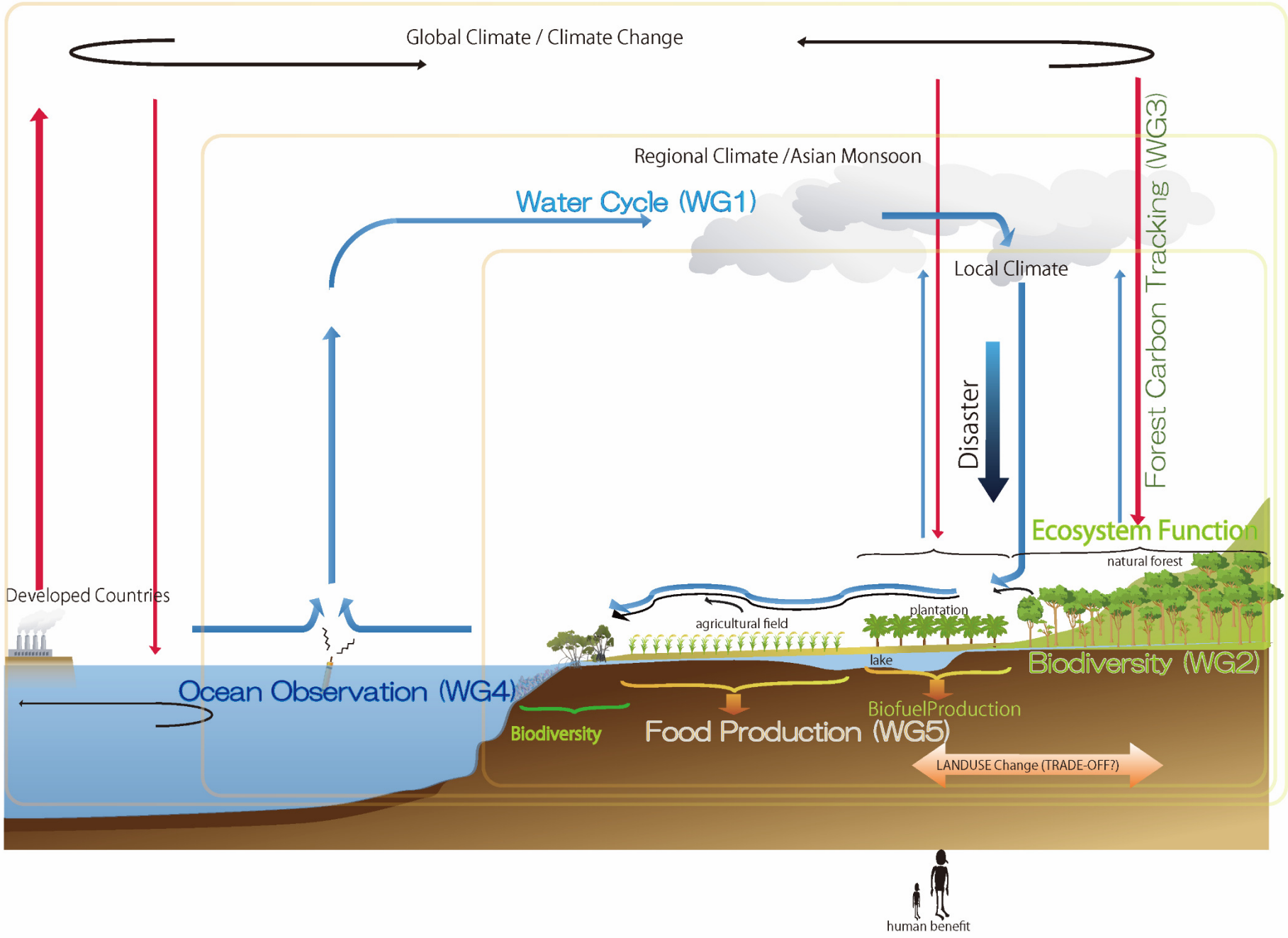
Rifat Hossain demonstrated the range of options available for using EO to address WASH issues and outlined plans for addressing WW, WQ and WRM as they are expressed in the UN Proposed Water SDG.

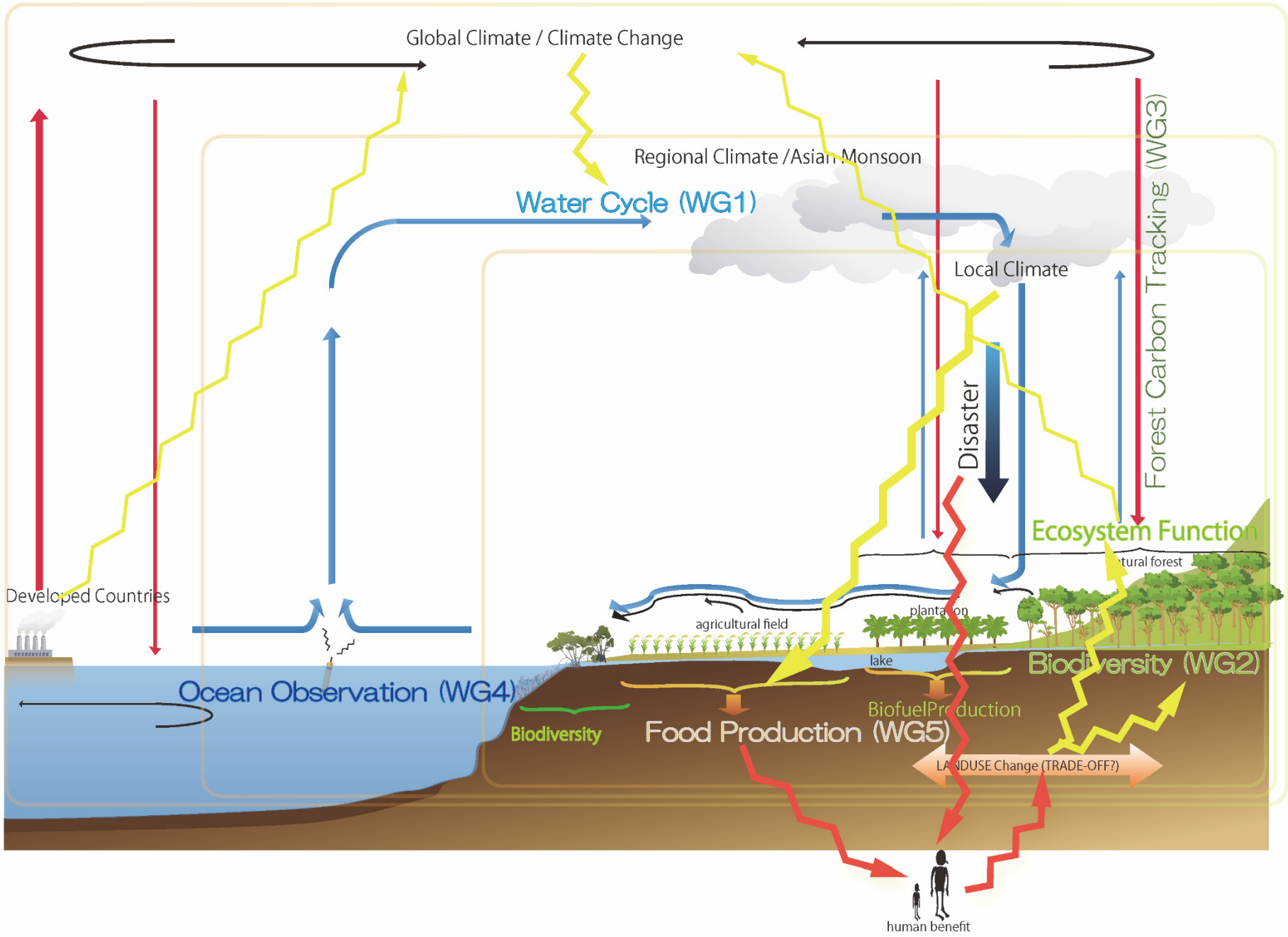


Water is a Key
bridging between climate processes and societal benefits.



(Richard H. Moss, et al., *Nature*, 2010)


Global Climate / Climate Change
Regional Climate /Asian Monsoon
Water Cycle (WG1)
Local Climate
Disaster
Forest Carbon Tracking (WG3)
Ecosystem Function
natural forest
plantation
agricultural field
lake
Biodiversity (WG2)
Developed Countries
Ocean Observation (WG4)
Biodiversity
Food Production (WG5)
BiofuelProduction
LANDUSE Change (TRADE-OFF?)
human benefit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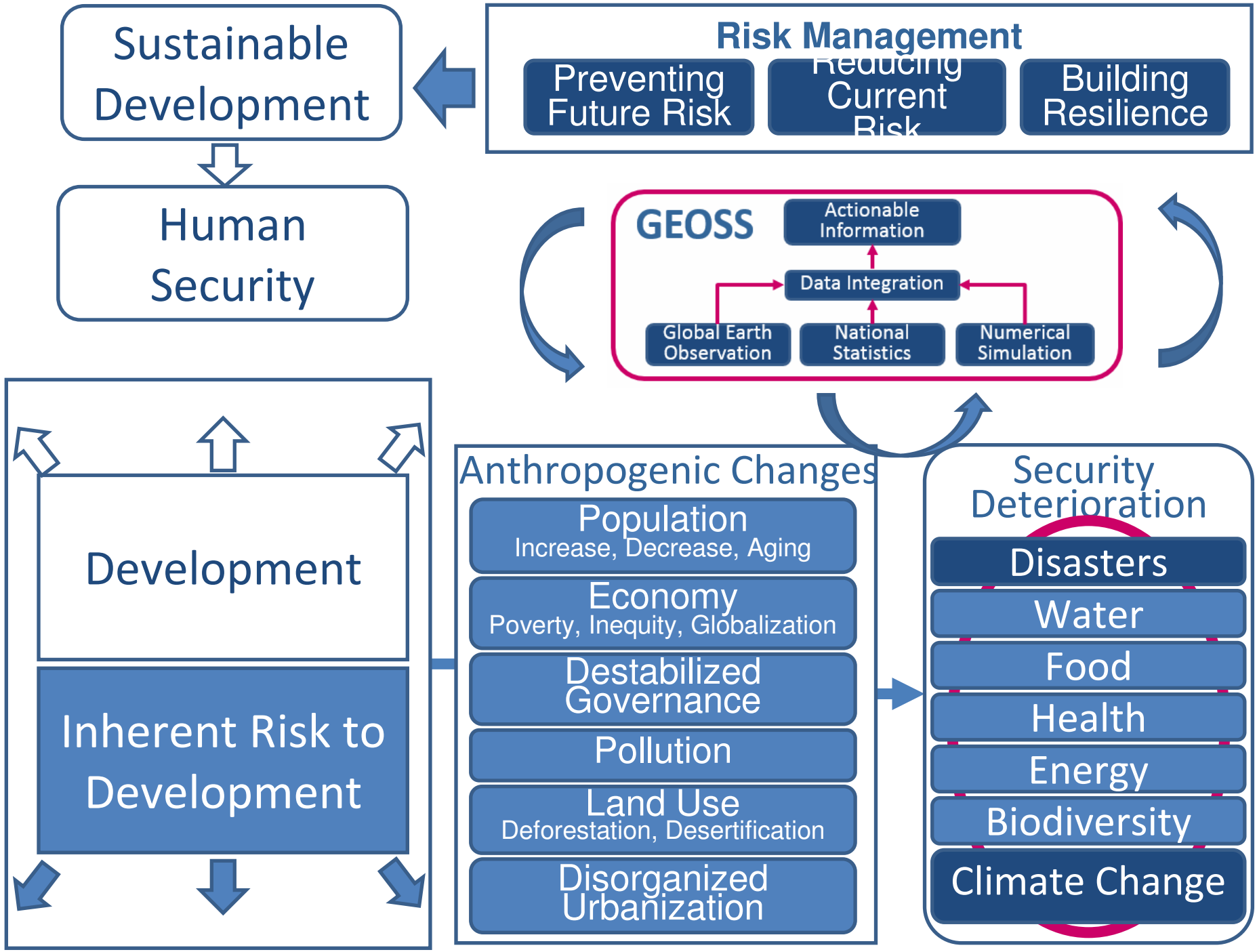
Sustainable Development
Human Security
Risk Management
Preventing Future Risk
Reducing Current Risk
Building Resilience
GEOSS
Actionable Information
Data Integration
Global Earth Observation
National Statistics
Numerical Simulation
Development
Inherent Risk to Development
Anthropogenic Changes
Population
Increase, Decrease, Aging
Economy
Poverty, Inequity, Globalization
Destabilized Governance
Pollution
Land Use
Deforestation, Desertification
Disorganized Urbanization
Security Deterioration
Disasters
Water
Food
Health
Energy
Biodiversity
Climate Change

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1. Review of Activities
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Phase1

- Data Archiving
- Hydrological Modeling
- Climate Change Impact Assessment
- Capacity Building

Phase2

- Project Development Based on the PDM
  Stakeholder Meeting, Docmentation
- Development of Inter-linkage Framework
  Workshop, Stakeholder Meeting, Project Design
- Regional Core Collaborative Activity
  Climate Change Adaptation: Early Warning
  1. Spatial Distribution of Rainfall Monitoring
  2. Near Real-time Rainfall Information
  3. Flood, Drought, (Snow and Glacier)

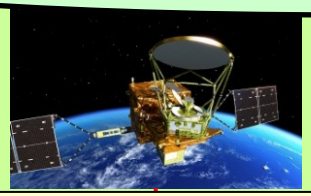
	Water Cycle Targets								
	DW	GW	F	D	G/S	Q	LD	CC	
Kenya									
Morocco									saving water
Tunisia									users conflict
Niger River									
Volta River									
Lake Chad									
Bangladesh									
Cambodia									
India									
Indonesia									
Lao PDR									
Malaysia									
Mongolia									Desertification
Myanmar									
Nepal									
Pakistan									
Sri Lanka									
Thailand									
Uzbekistan									
Vietnam									

Overview of GPM-GSMaP Algorithm

Microwave Imager / Sounder

new

GPM Core GMI



GCOM-W1 AMSR2

DMSP SSM/I, SSMIS

NOAA/MetOp AMSU (sounder)

Good: high-frequent (wide swath, multi-satellites)
Bad: cannot measure vertical structure (need info. from radar)

GSMaP Microwave Radiometer Algorithms

Precipitation Radar

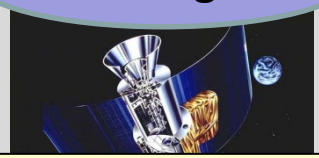
TRMM PR

Rainfall Data Base

Rainfall Data from each Microwave Radiometer

Merged Microwave Rainfall Data

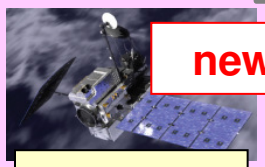
IR Imager



Geostationary Satellite

Microwave-IR Merged Algorithm (CMV, K/F)

Global Rainfall Map
+Gauge-calibrated Rainfall
(0.1x0.1 deg. box, Hourly)



new

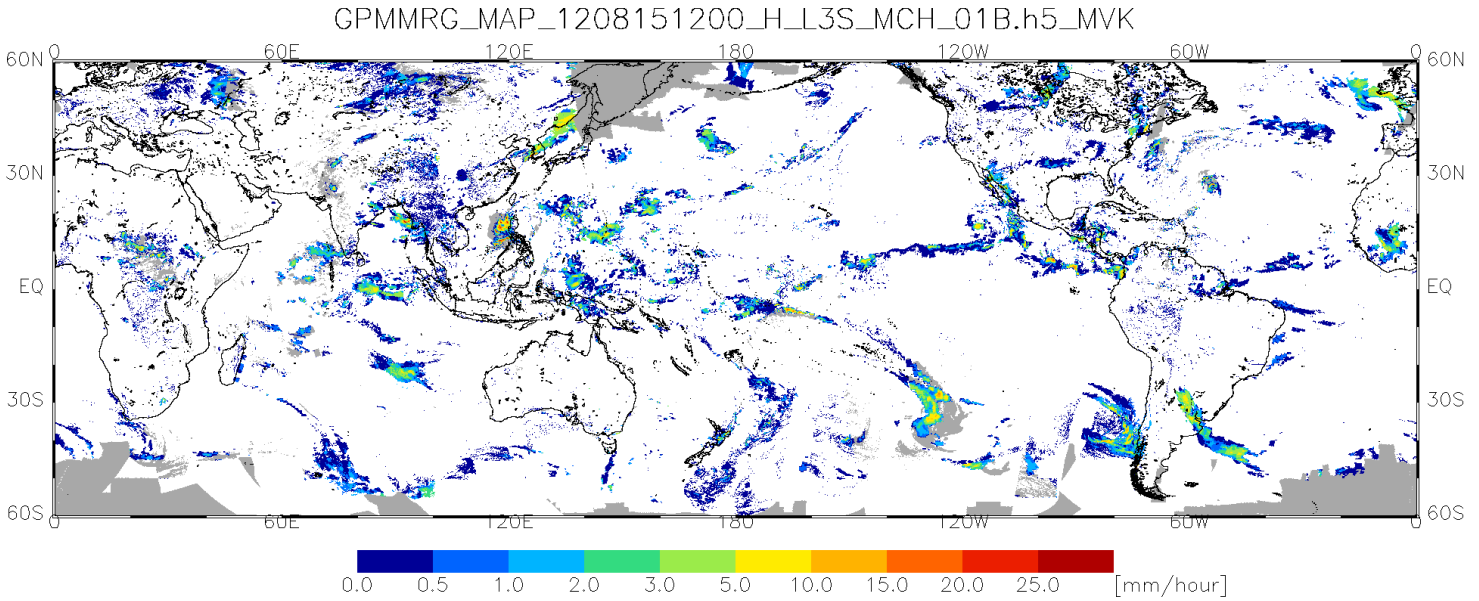
GPM Core DPR

(Okamoto et al. 2005, Kubota et al, 2007, Aonashi et al. 2009, Ushio et al. 2009, Shige et al. 2009, Kachi et al. 2011, Taniguchi et al., 2013, Mega et al., 2014, etc.)

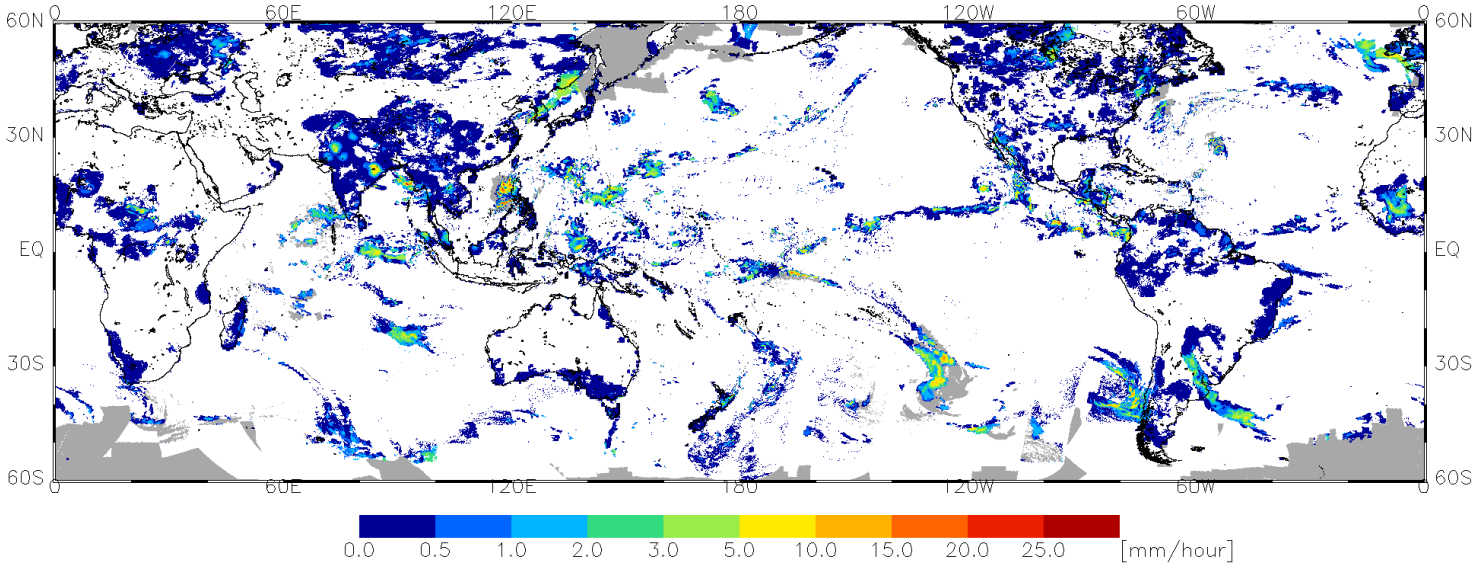
GSMaP web site -- http://sharaku.eorc.jaxa.jp/GSMaP/

Example of GPM-GSMaP

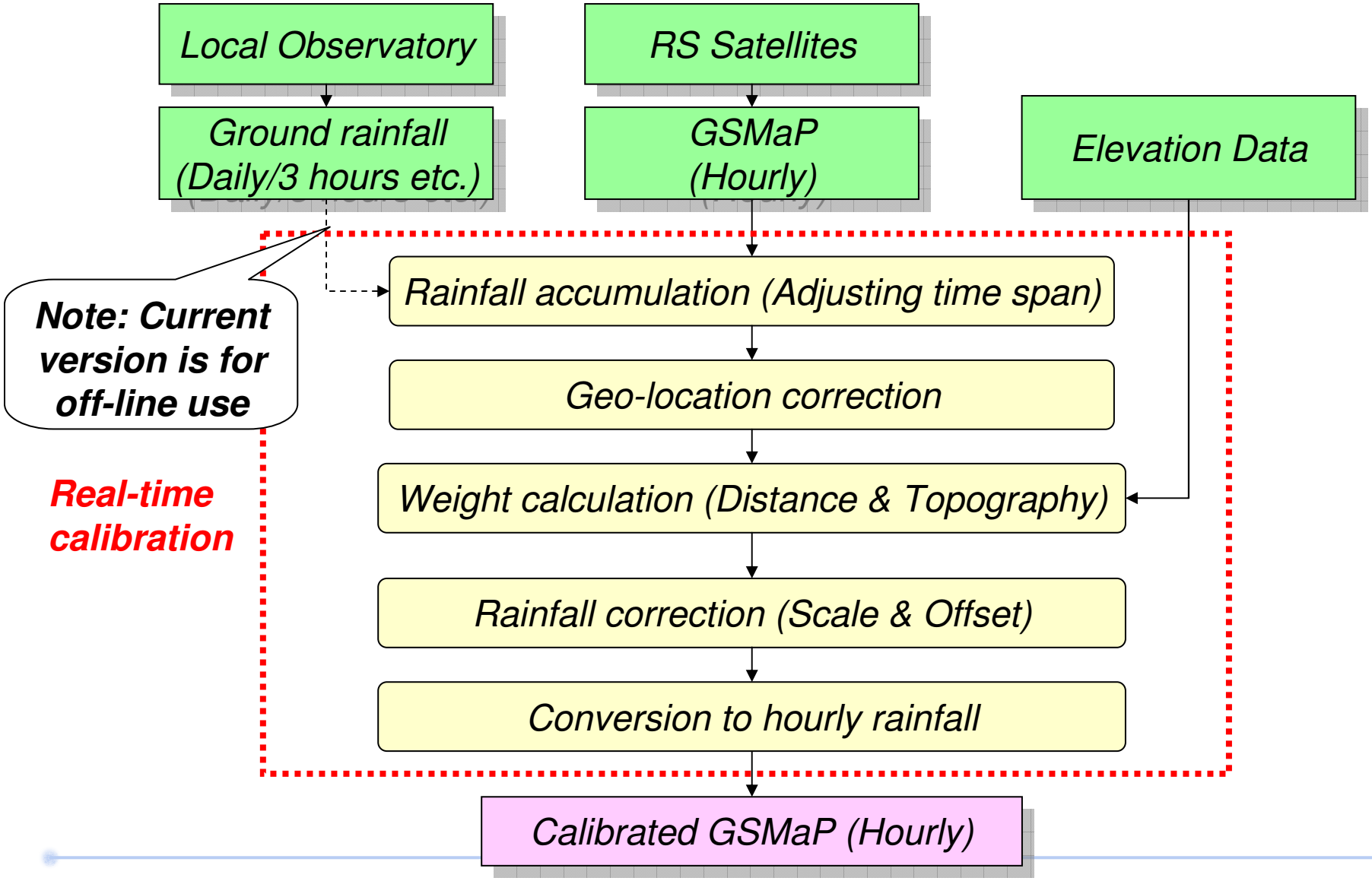
Hourly rainfall
12Z 15 Aug. 2012



Gauge-calibrated
hourly rainfall
12Z 15 Aug. 2012



Flow chart of real-time calibration



Rainfall correction

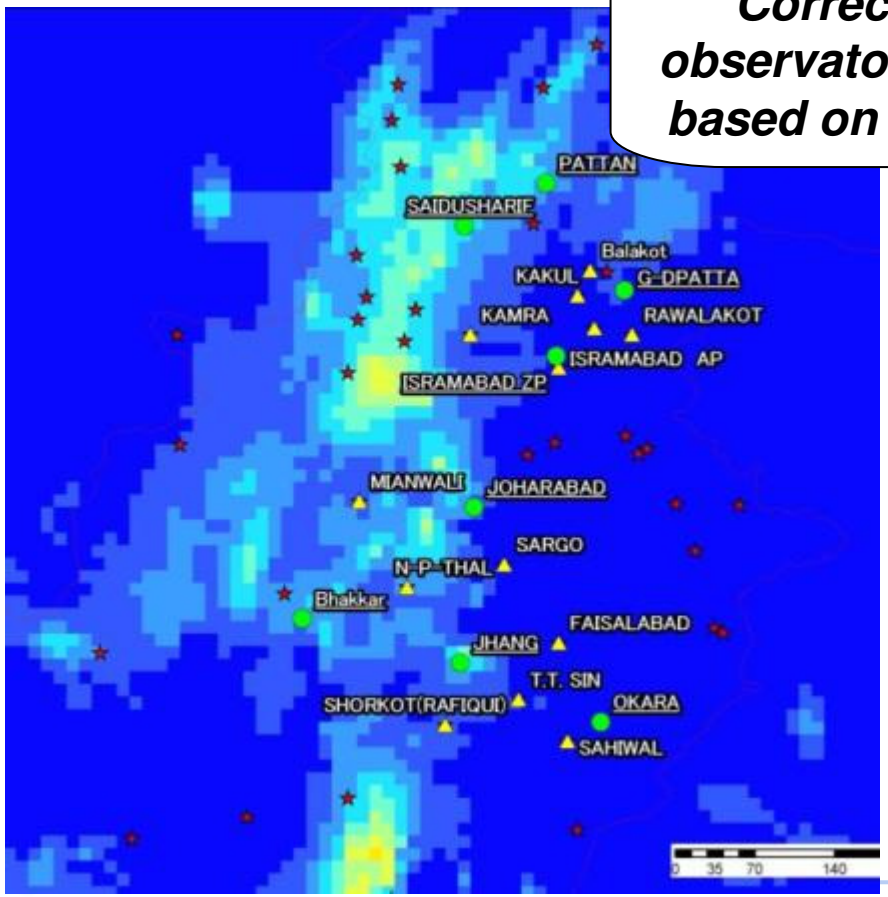
NTT DATA

Formula

High Rainfall : *(Corrected rainfall) = (Original rainfall) * (Scale factor) * (Weight)*

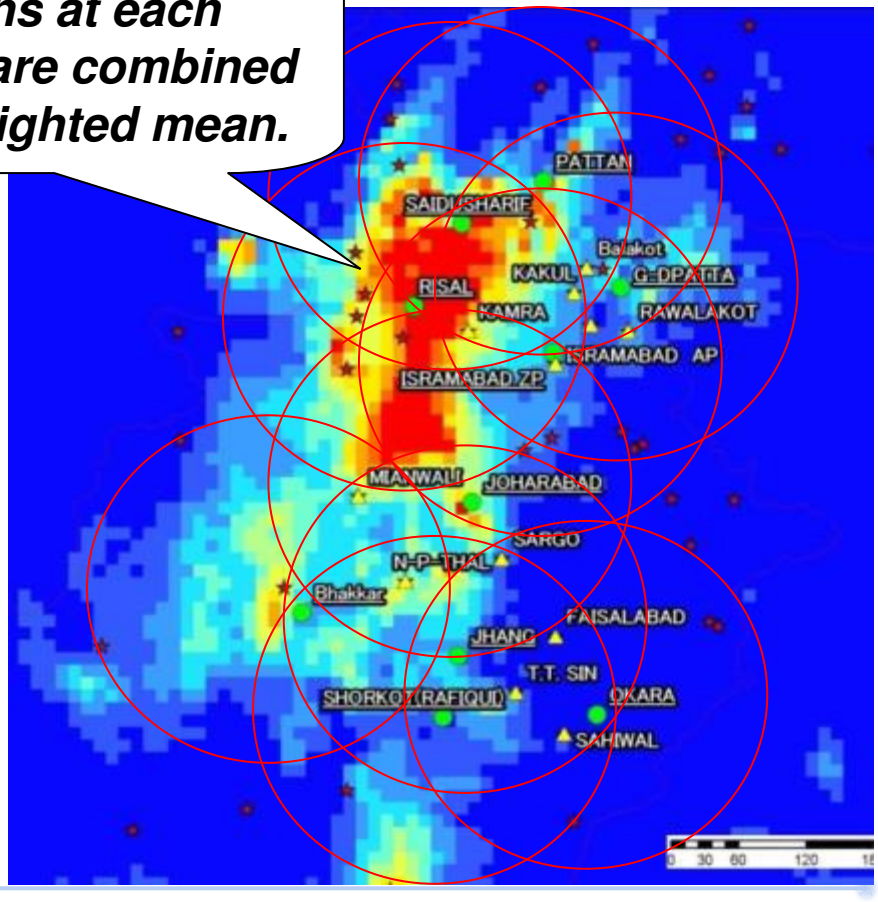
Small Rainfall : *(Corrected rainfall) = (Original rainfall) + (Offset factor) * (Weight)*

Before



Corrections at each observatory are combined based on weighted mean.

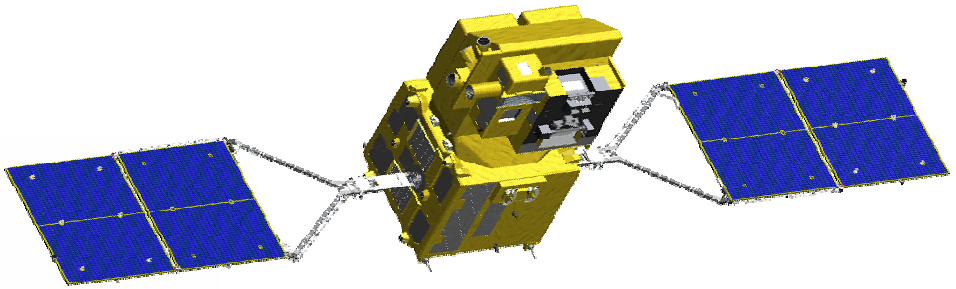
After



GCOM Satellites

- 2 types of medium-sized satellites covering observation of essential climate variables

"SHIZUKU"



GCOM-W (Water)

Instrument	Advanced Microwave Scanning Radiometer-2
Orbit	Sun Synchronous orbit Altitude : 699.6km (on Equator) Inclination: 98.2 degrees Local sun time: 13:30+/-15 min
Size	5.1m (X) * 17.5m (Y) * 3.4m (Z) (on-orbit)
Mass	1991kg
Power gen.	More than 3880W (EOL)
Launch	May 18, 2012
Design Life	5-years

GCOM-C (Climate)

Instrument	Second-generation Global Imager
Orbit	Sun Synchronous orbit Altitude:798km (on Equator) Inclination: 98.6 deg. Local sun time: 10:30+/- 15min
Size	4.6m (X) * 16.3m (Y) * 2.8m (Z) (on orbit)
Mass	2093kg
Power gen.	More than 4000W (EOL)
Launch	JFY 2016
Design Life	5-years

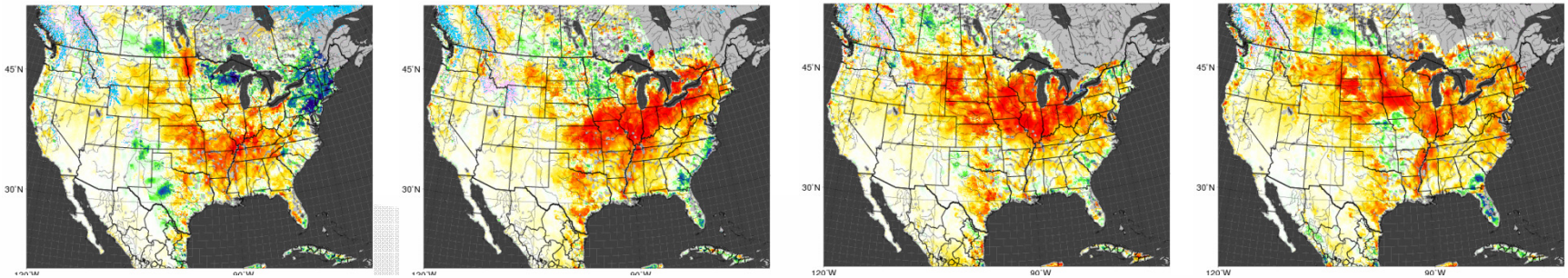
AMSR2 Standard Products

	Products	Areas	Res.	Required Accuracy		Current Accuracy	PI
				Release	Standard		
GEO	Integrated water vapor	Global, over ocean	15km	±3.5kg/m^2	±3.5kg/m^2	2.9kg/m^2	Kazumori
	Integrated cloud liquid water	Global, over ocean	15km	±0.10kg/m^2	±0.05kg/m^2	0.05kg/m^2	Kazumori
	Precipitation	Global, except cold latitude	15km	Ocean ±50% Land ±120%	Ocean ±50% Land ±120%	Ocean 47% Land 91%	Aonashi
	Sea surface temperature	Global, over ocean	50km	±0.8℃	±0.5℃	0.56℃	Shibata
	Sea surface wind speed	Global, over ocean	15km	±1.5m/s	±1.0m/s	1.1m/s	Shibata
	Sea ice concentration	Polar region, over ocean	15km	±10%	±10%	9%	Comiso and Cho
	Snow depth	Land	30km	±20cm	±20cm	16cm	Kelly
	Soil moisture	Land	50km	±10%	±10%	4%	Koike

Research algorithms are not listed here.

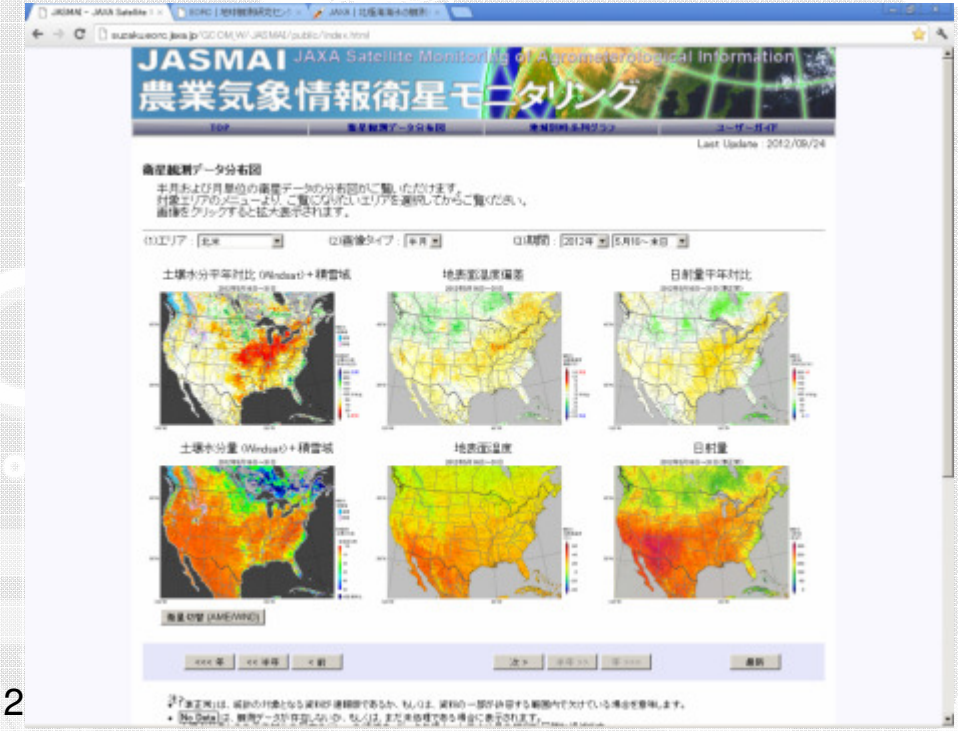
Agro-Meteorological Monitoring

May 1 – 15, 2012 | May 16 – 31, 2012 | June 1 – 15, 2012 | June 16 – 30, 2012



Snow Area by MODIS: Dry Snow, Wet Snow

Soil Moisture Anomaly Ratio by Microwave: Wet — 300 200 150 120 100 90 70 30 0 [%] — Dry



The ALOS-2 satellite successfully launched on May 24, 2014!

Plan to release first light 1 month after the launch, and data by 6 months.

1. End Poverty

1d. Build resilience and reduce deaths from natural disaster by x%

Disaster Prevention Investment

Flood simulation

1. Develop of flood models to reproduce actual flood damage.

2. Demonstrate counter measure effects for reducing damage.

3. Translate flood model outputs into economic model inputs

Economic simulation

4. Develop economic models to reproduce actual economic parameters.

5. Simulate effect of the counter measures on economy and society with several senarios.

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Effective and sustainable governance and management structure

Need to establish the structure

- International coordination body (regular meetings)
- National task teams
- Leading Scientific Team
- Working groups

Involvement of stakeholders into process: opportunities for dialog; share ideas on a concept for effective interlinkages. At national and/or international level.

Funding mechanism – promotion and coordination structure

- APN funding programmes for research and capacity building activities
- Closer collaboration with ODAs:
  - -Country PDMs: project implementation support (ICG, Lead Scientist, National task teams)
  - -Further negotiation on support for AWCI framework management (ICG and Lead Scientist).

Membership of the coordination and leading body

International coordination body (group) ICG: one representative per country; should be at positions with decision-making potential in the relevant sectors (most probably water and water resources, but also climate, disaster…) in respective countries. Responsibilities: coordinating national teams; collaborate with leading scientific team, conveying voices from end-users, stakeholders; deliberations at ICG meetings – sharing experiences, suggestions…

Leading scientific team: representatives of academia and experts. Responsibilities: scientific leadership, leading working groups, assuring technology and advisory service on it (models, techniques, EO and access to it, capacity building,….)