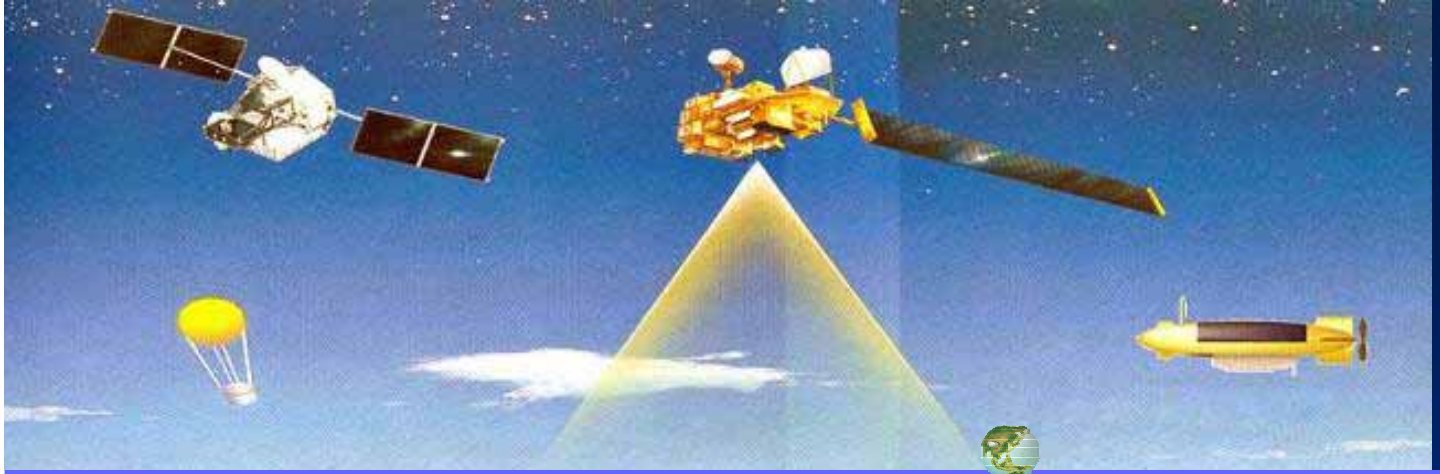
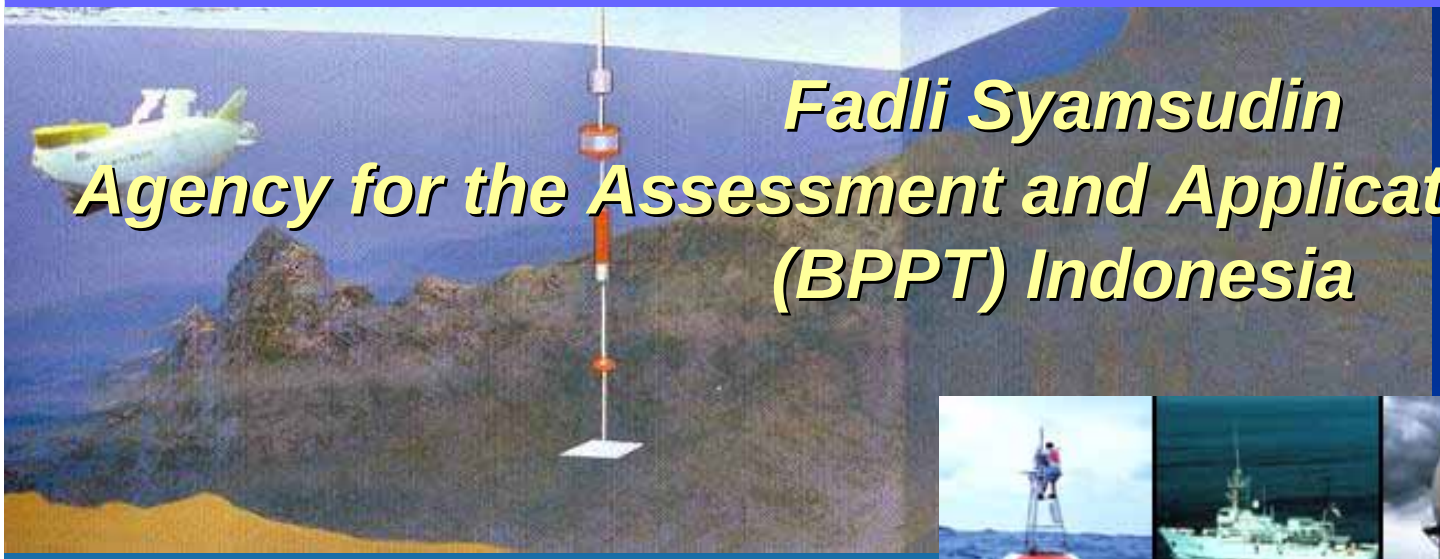


Indonesia supports to EOSS Program....

OCEAN CLIMATE CHANGE MONITORING THROUGH NUSANTARA EARTH OBSERVATION NETWORK (NEONET)



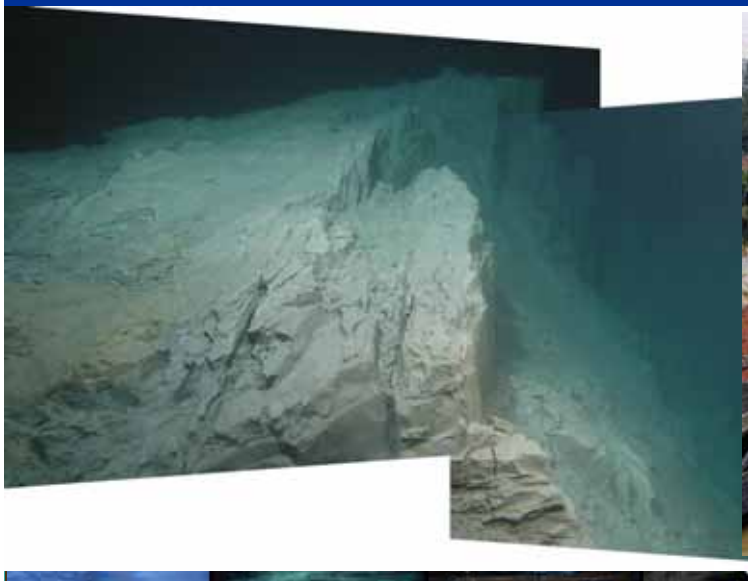
Fadli Syamsudin

Agency for the Assessment and Application of Technology (BPPT) Indonesia

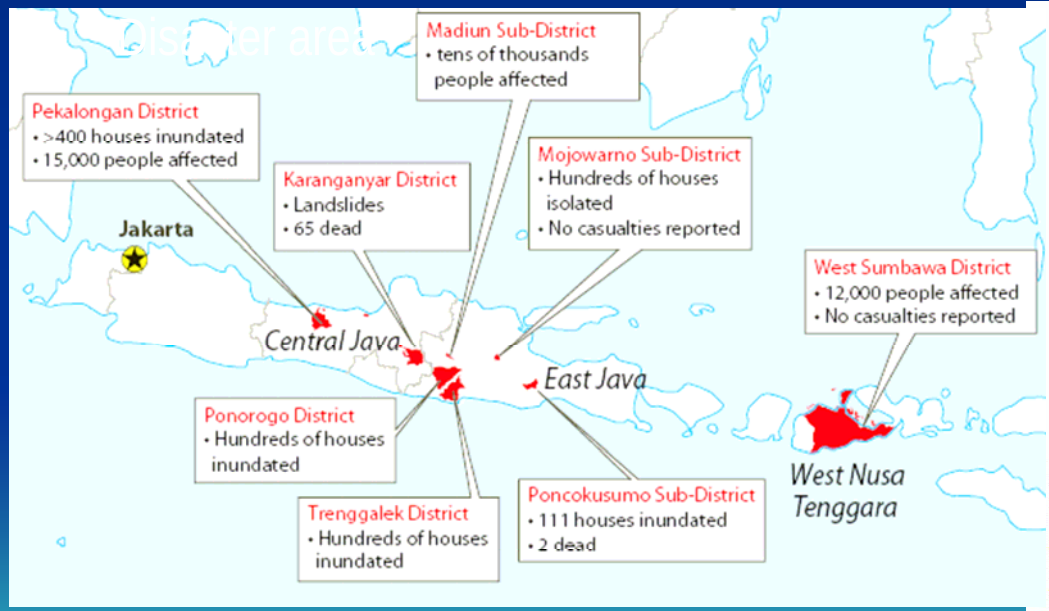
Emerging Needs of Monitoring and Mitigating Ocean Climate Related Disaster

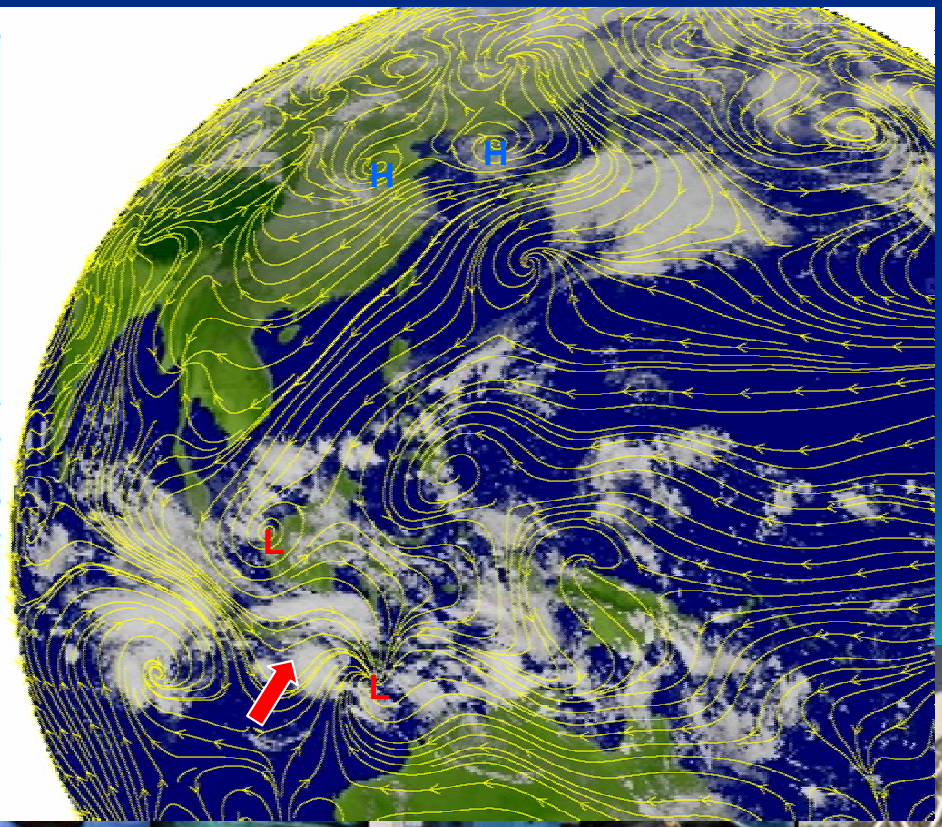
- **Magnificent Earthquake Tsunami Aceh Disaster in December 2004.**
- **Floods and Droughts.**
- **Tropical cyclone induced high swell along southern Indonesian costs.**

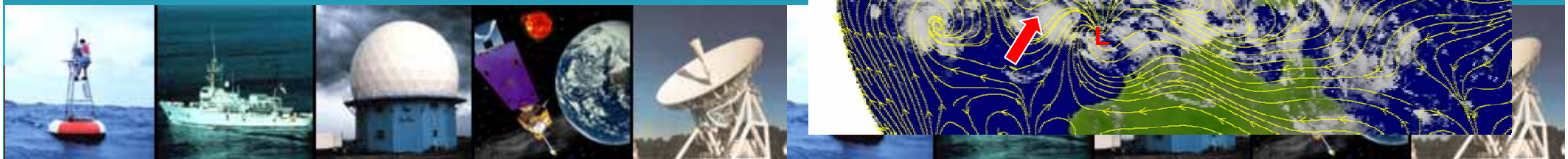
- *Need monitoring system in operational use for mitigating the natural disaster.*
- *In national scale priorities: agricultural sector (food security), transportation, etc.*



Jakarta flood: December 2007





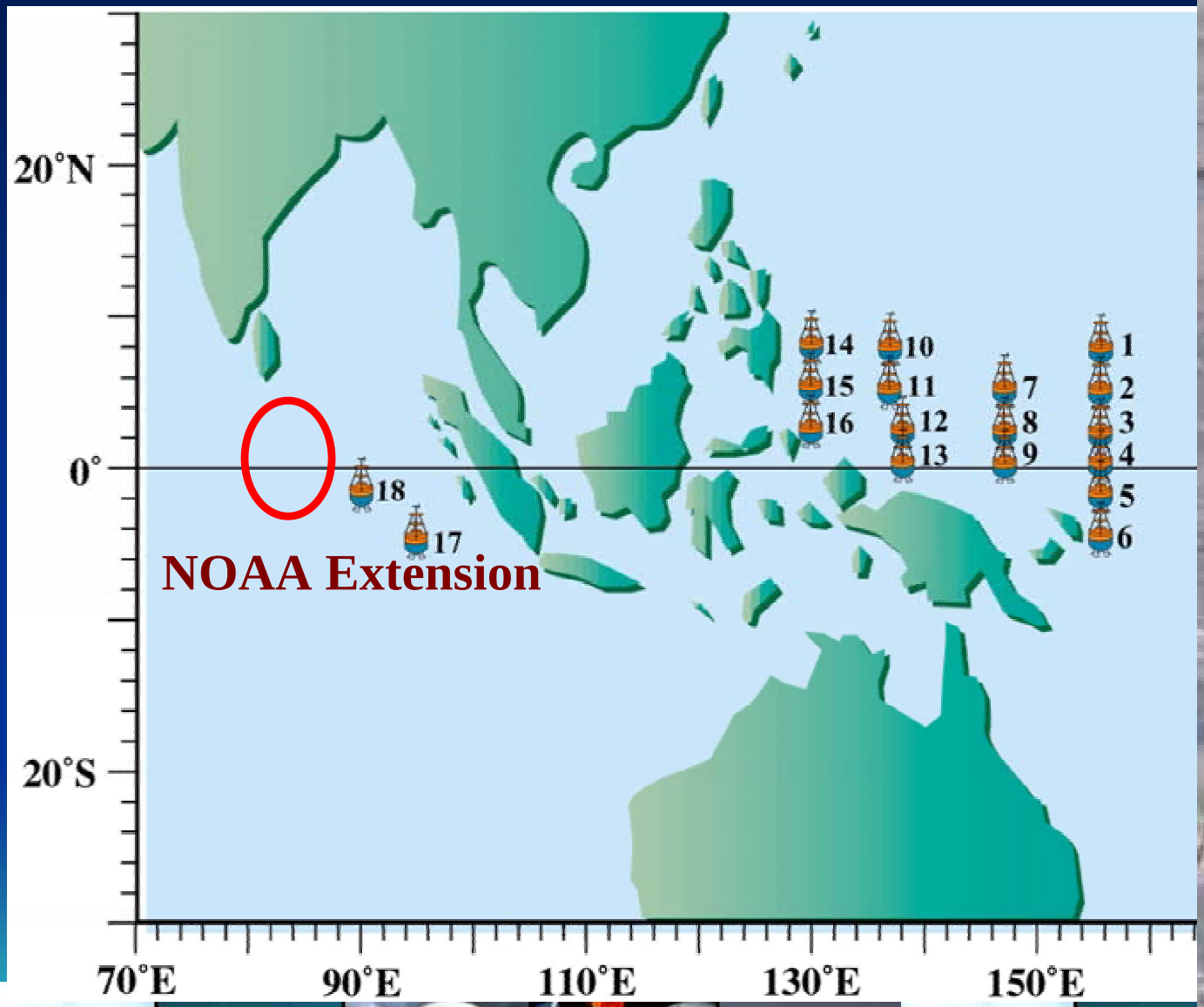


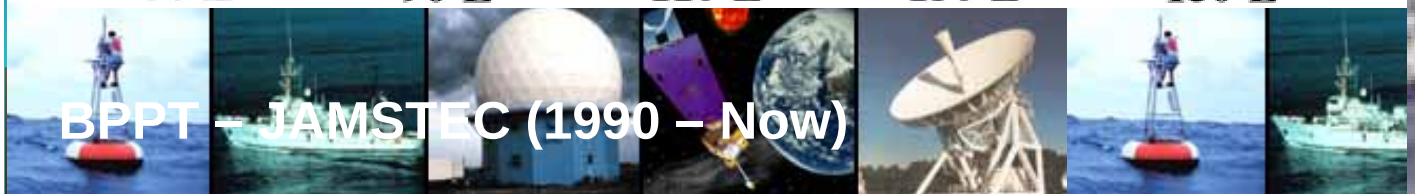
Efforts to establish Ocean Climate Monitoring System Under Nusantara Earth Observation NETwork (NEONET)

- **Indonesian Ocean Observing System (INDOOS): establish a concept of operational oceanography for ocean climate monitoring (2005).**
- **National Tsunami Buoy Development (2006)**
- **NEONET (Early 2008)**
  - **Growing installation of marine and atmospheric sensors in the Indonesia Maritime Continent and surroundings (HARIMAU JEPP Program, TRITON and ATLAS buoys of JAMSTEC and NOAA).**
  - **Summit on Earth Observations (July 2003) & Global Earth Observing System (GEO) establishes an agenda for international cooperation**

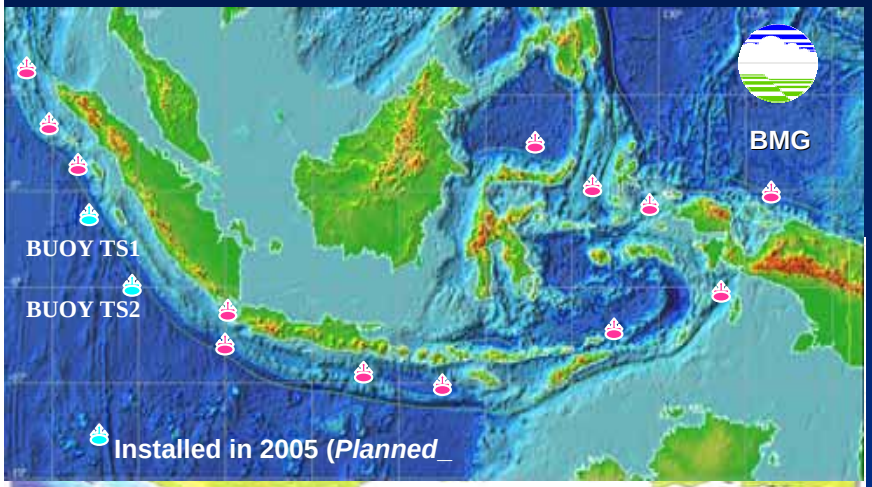

Marine and Atmospheric
Research Facilities

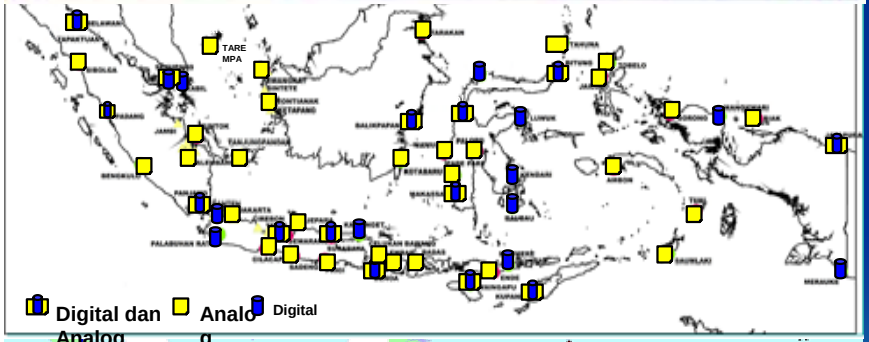
Ocean-Atmospheric Buoy Array

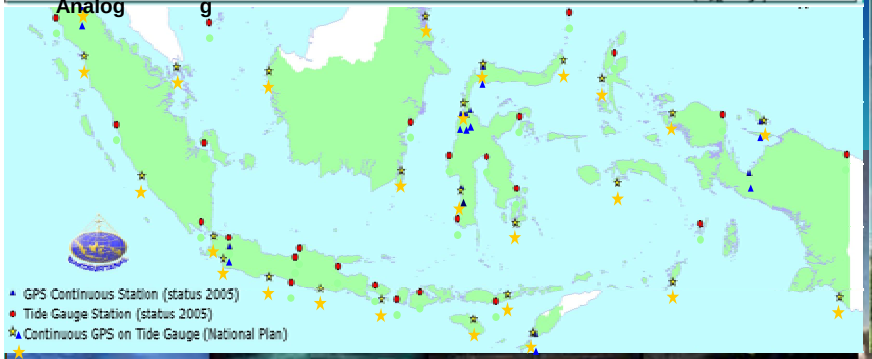




MARINE RESEARCH FACILITIES







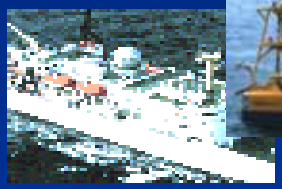
1. BRKP - DKP
2. BAKOSURTANAL
3. LAPAN
4. BMG
5. DISHIDROS
6. BPPT
7. LIPI
8. MGI - DESDM

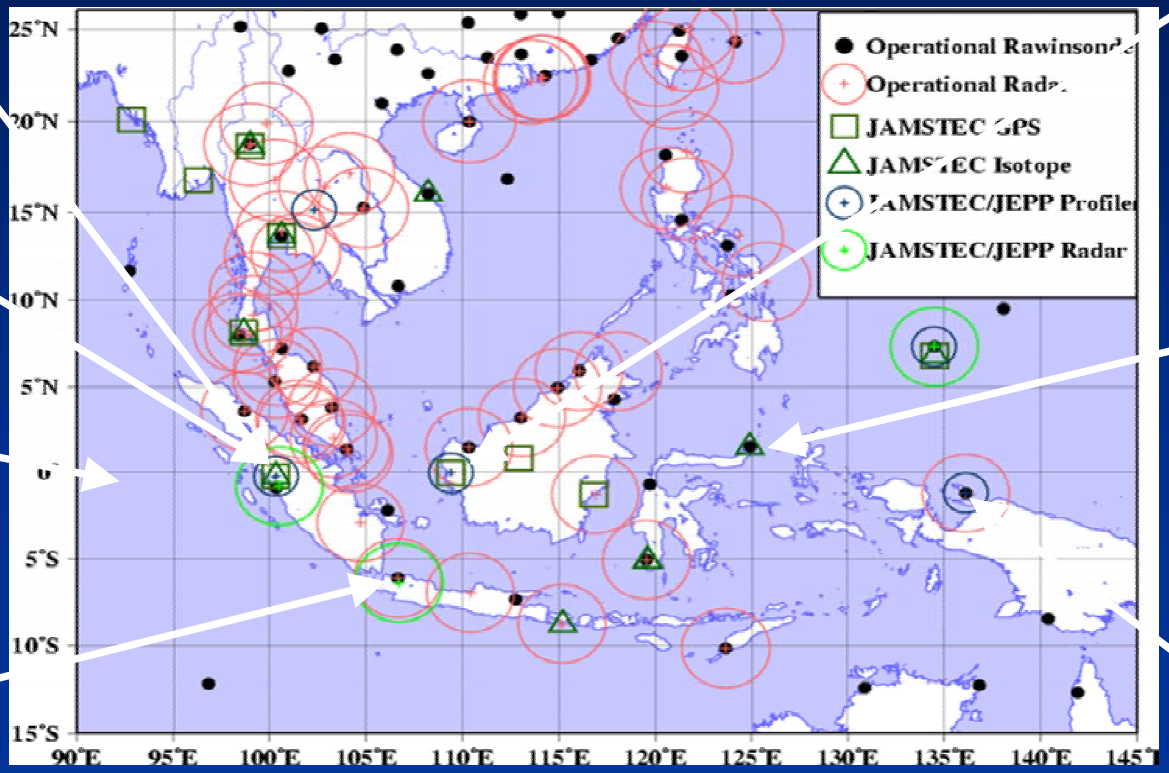
Wahana K/R BPPT & LIPI

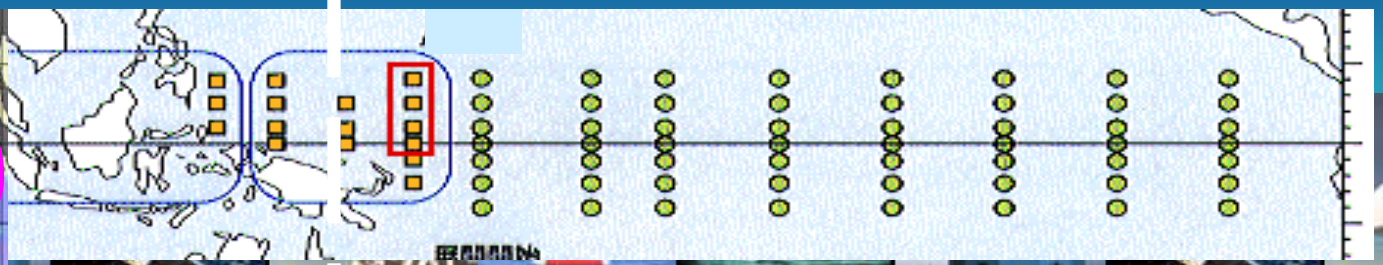
Japan EOS Promotion Program (JEPP) + Indonesian Research/Technology Grant

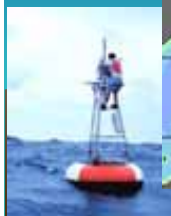
Hydrometeorological Array for ISV-Monsoon Automonitoring (HARIMAU)

http://www.jamstec.go.jp/iorgc/harimau/HARIMAU.html
mdy@jamstec.go.jp

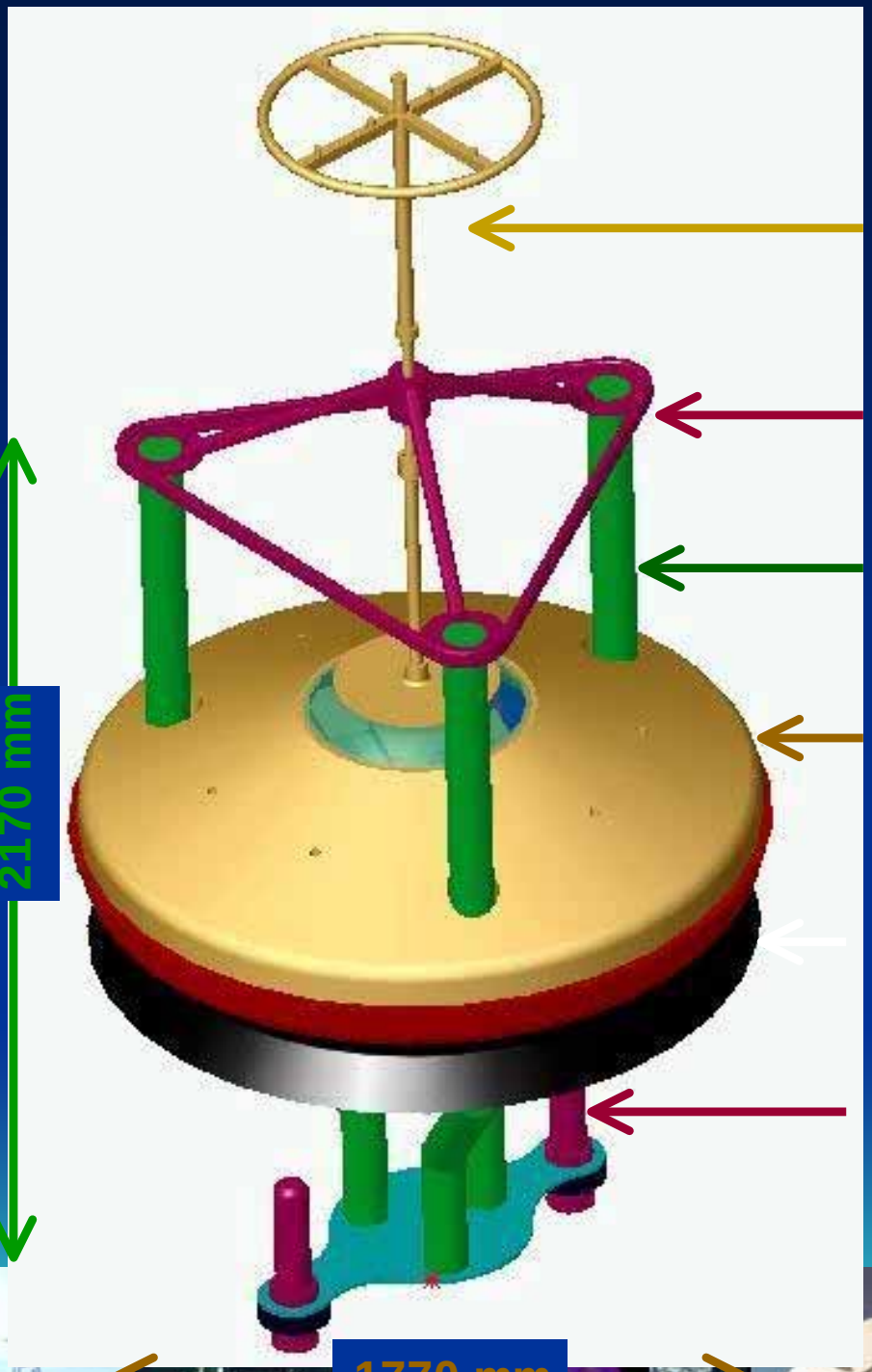









Indonesia Tsunami Buoy Program



Instrumentation mast
[Aanderaa (meteo),
Inmarsat (communication)]

Upper Structure
[supporter]

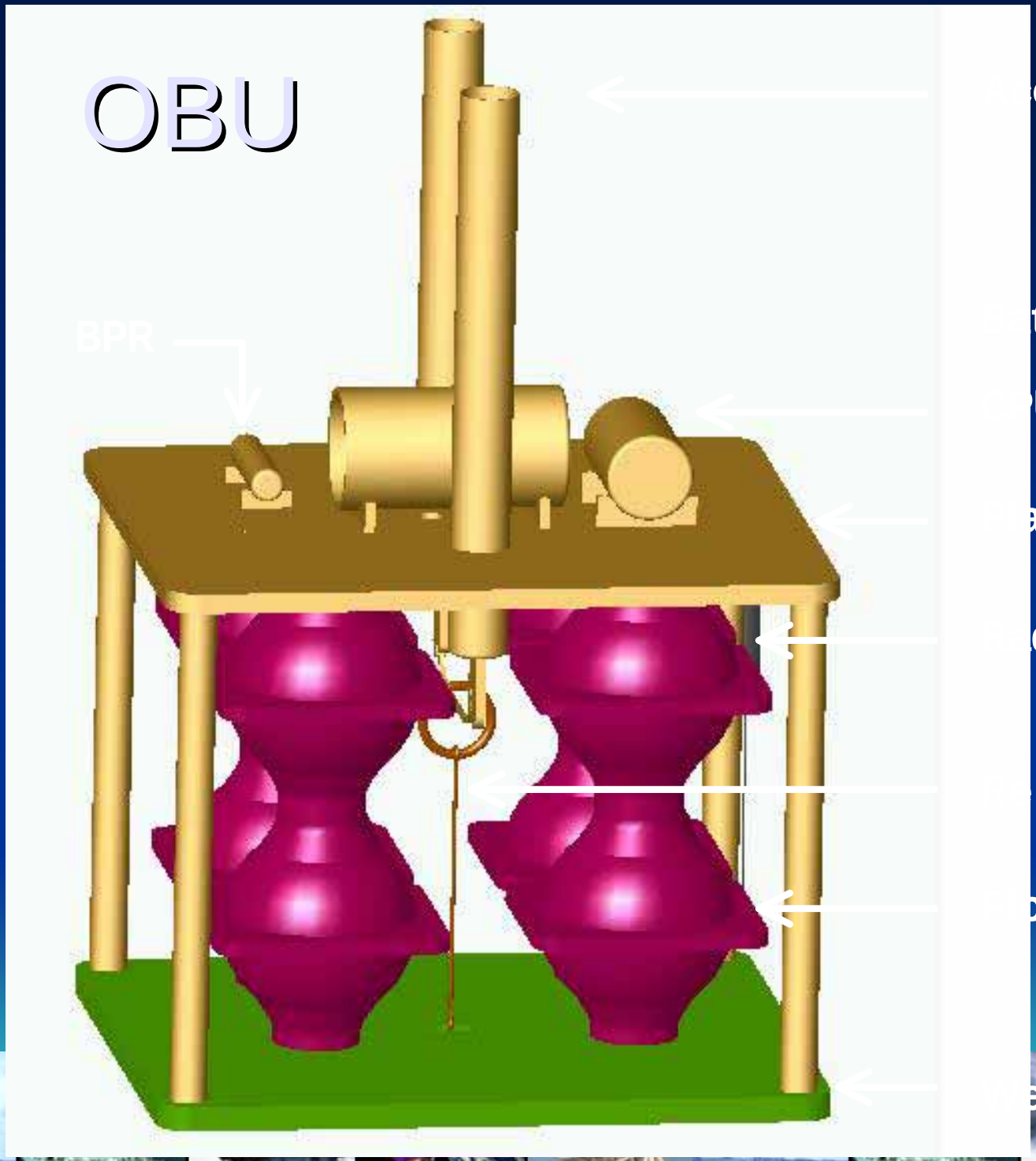
Legs
[connecting Upper Structure
and Bottom Structure

Buoy Hull

Skirt

Acoustic Transducer

Surface Buoy



oustic Release [2]

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Indonesia Tsunami Early Warning System

Operation

Ex Seawatch Tsunameter

RI Tsunameter
RI–US DART ETD

ITWS

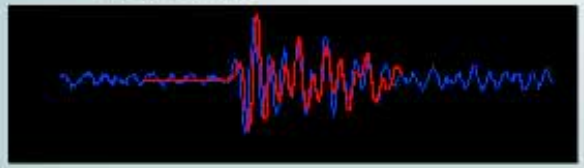
'Simple to Manage' Indonesian Tsunameter

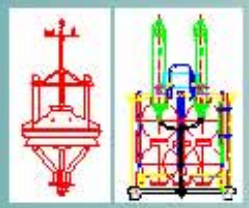
Multipurpose Buoy System
Cable-based Tsunameter

Engineering

Read-down Station

Indonesian Data Buoy Center



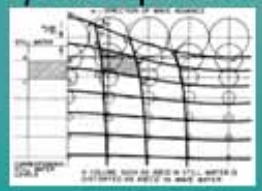


Development

Test facilities

Research

Tsunami Characteristics
System Requirements



Data transmission
Hydrodynamics

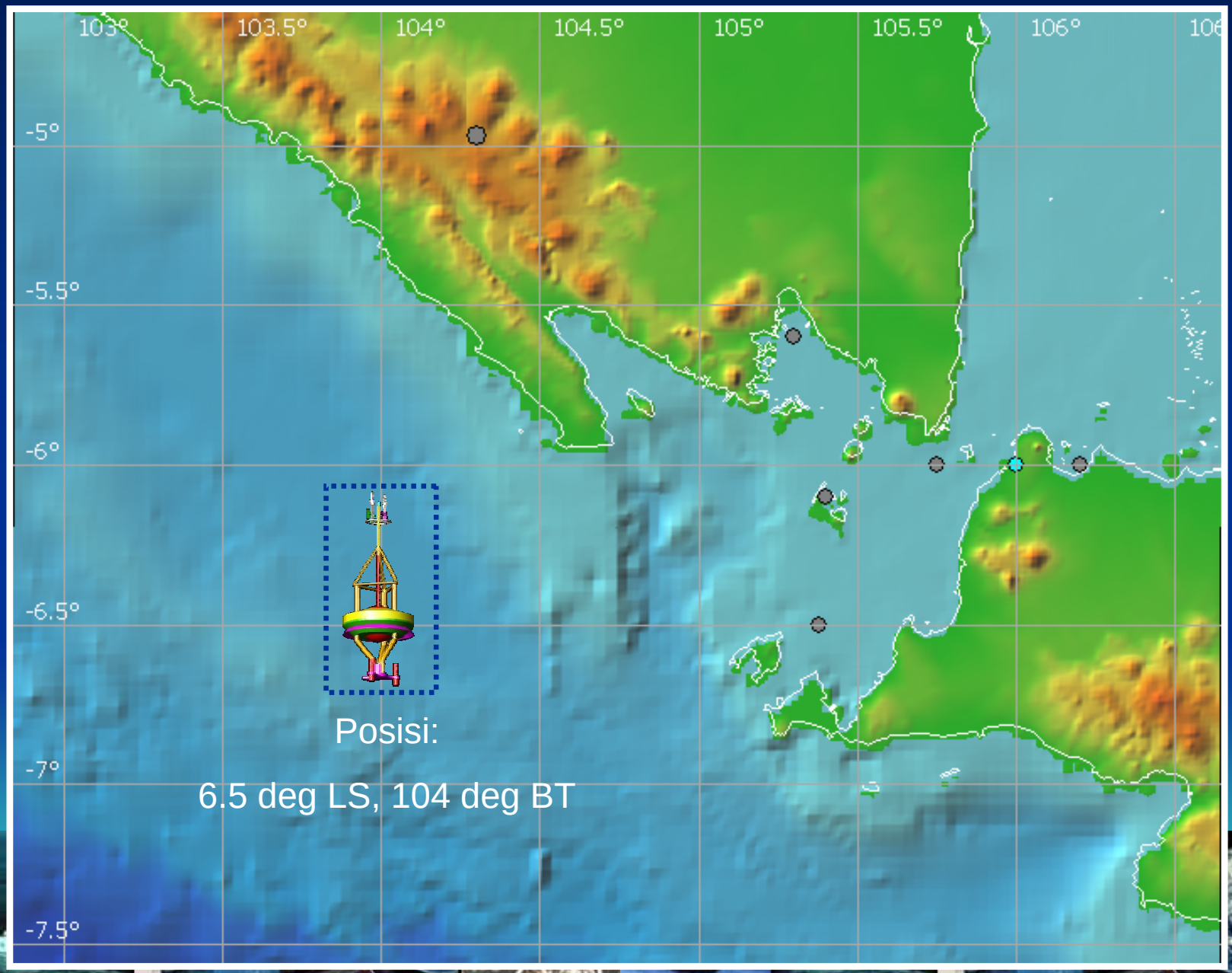
Multi-sensor buoy
Subsea cable utilization

2006 | 2007 | 2008 | 2009 | 2010–2014

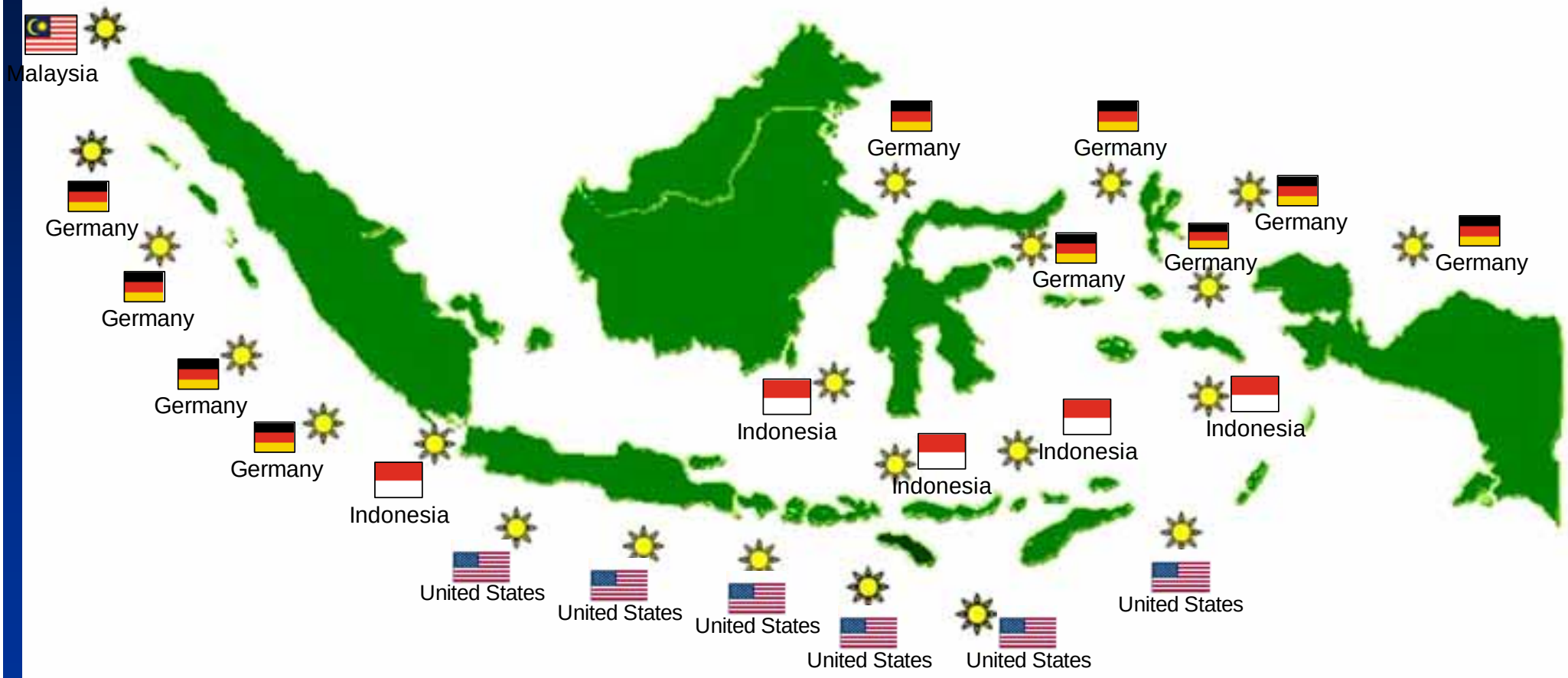
Tsunami Early Warning System Roadmap

	2007	2008	2009	2010–2014
Year				
Market	Indonesian Government	Indian Ocean Countries		10 Countries Local Tsunami
Engineering Product	1 Ex Seawatch Tsunameter 3 RI Tsunameter 1 RI – US DART ETD Read-down Station	5 RI Tsunameter Dedicated Tsunami Network Indonesia Data Buoy Center	Simple to Manage RI Tsunameter	Multipurpose Buoy Cable-based Tsunameter
Engineering Design	Detection System Structural & Hydrodynamic Design Data Transmission System		Eng Design Simple to Manage RI Tsunameter	Eng Design Multipurpose Buoy Eng Design Cable-based Tsunameter
R & D	Tsunami Characteristics Acoustic & Satellite Data Transmission Hydrodynamics Simulation Test Facilities			Ocean Current Energy Fish Finder Subsea Cable
Resource	Budget: Rp 42.5 billion Facilities: BJ, BPPH, B2TKS, Meppo	Rp 40 billion	Rp 20 billion Facilities: BJ, BPPH, B2TKS, Meppo	Rp 50 billion
Competency	Geologist 1, Geophysicist 1, Oceanographer 4, Hydrodynamics 5, Instrumentation 5, IT & Electrical 6, Mechanical & Structure 10			

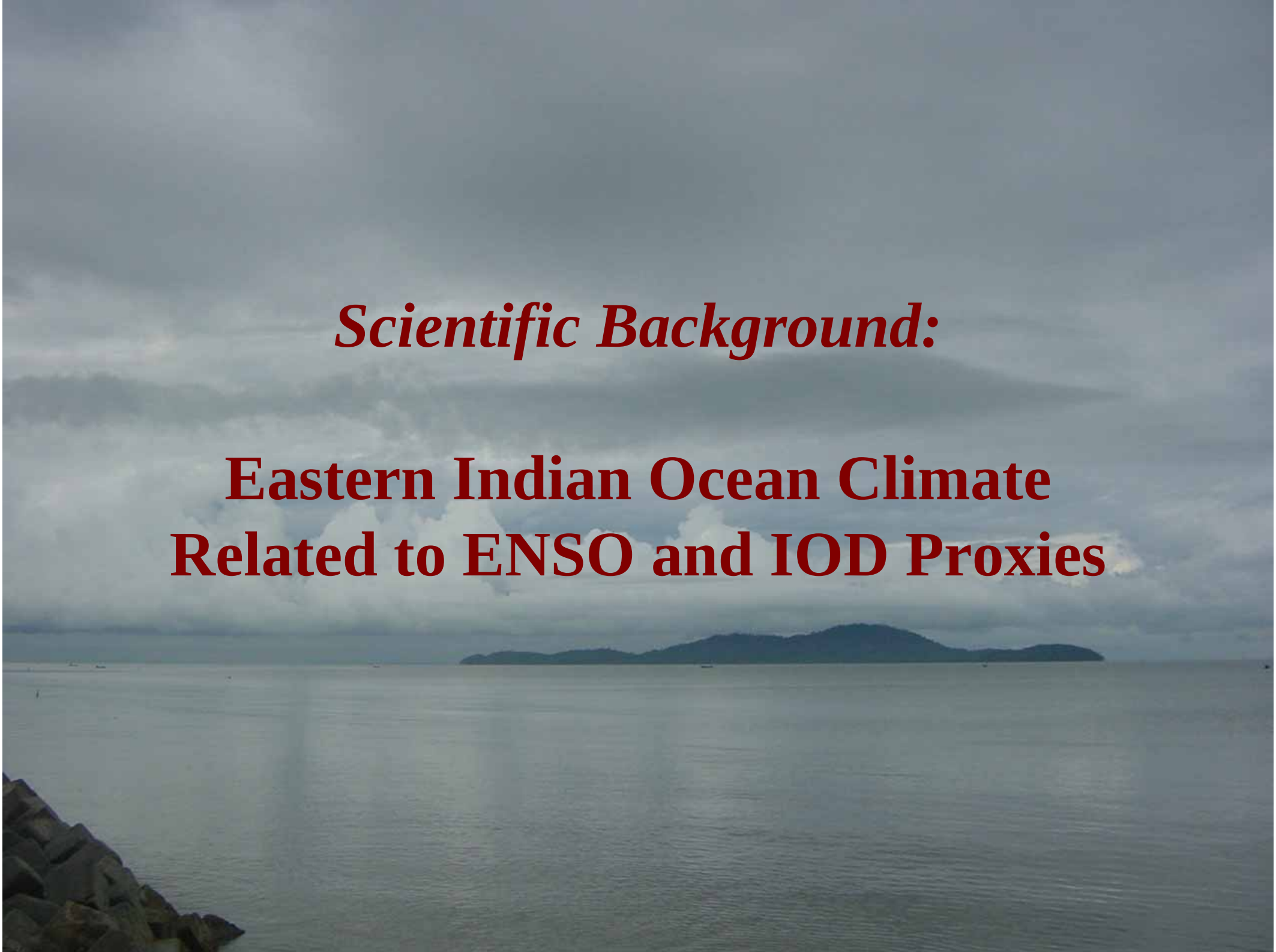
Indonesia Tsunami Buoy (Sangkuriang) Deployment (Oct 2006)



USULAN LOKASI BUOY



No	Kegiatan	2006	2007		2008	
1.	Jerman : Pemasangan kembali buoy #1 (Simeulue) dan #2 (Mentawai)	Nopember				
2.	Indonesia : Pemasangan buoy #1 (Selat Sunda)	Desember				
3.	Jerman : Pemasangan buoy #3 dan #4 (Barat Sumatera)		April			
4.	Indonesia : Pemasangan buoy #2 - #5 (Perairan Dalam)		Mar - Sep			
5.	Amerika : Pemasangan buoy II #1 - #6 (Selatan Jawa hingga Nusa Tenggara)		Feb - Apr			
6.	Revisi jumlah buoy dan penempatannya			Oktober		
7.	Jerman : Pemasangan buoy #5 - #10 (Utara Sulawesi dan Papua)				Maret	
8.	Transfer teknologi Amerika dan peningkatan kapasitas dalam ETD (Easy To Deploy) Buoy					
9.	Pemasangan ETD Buoy					

Scientific Background:

Eastern Indian Ocean Climate Related to ENSO and IOD Proxies

Why Eastern Indian Ocean?

- As the exit gates of the Indonesian throughflow (ITF).

- Indian Ocean Kelvin waves (IOKWs) along the southern coast of Indonesia,

Observations:

[*Arief and Murray*, 1996; *Michida and Yoritaka*, 1996; *Sprintall et al.*, 1999, 2000; *Syamsudin et al.*,2004]

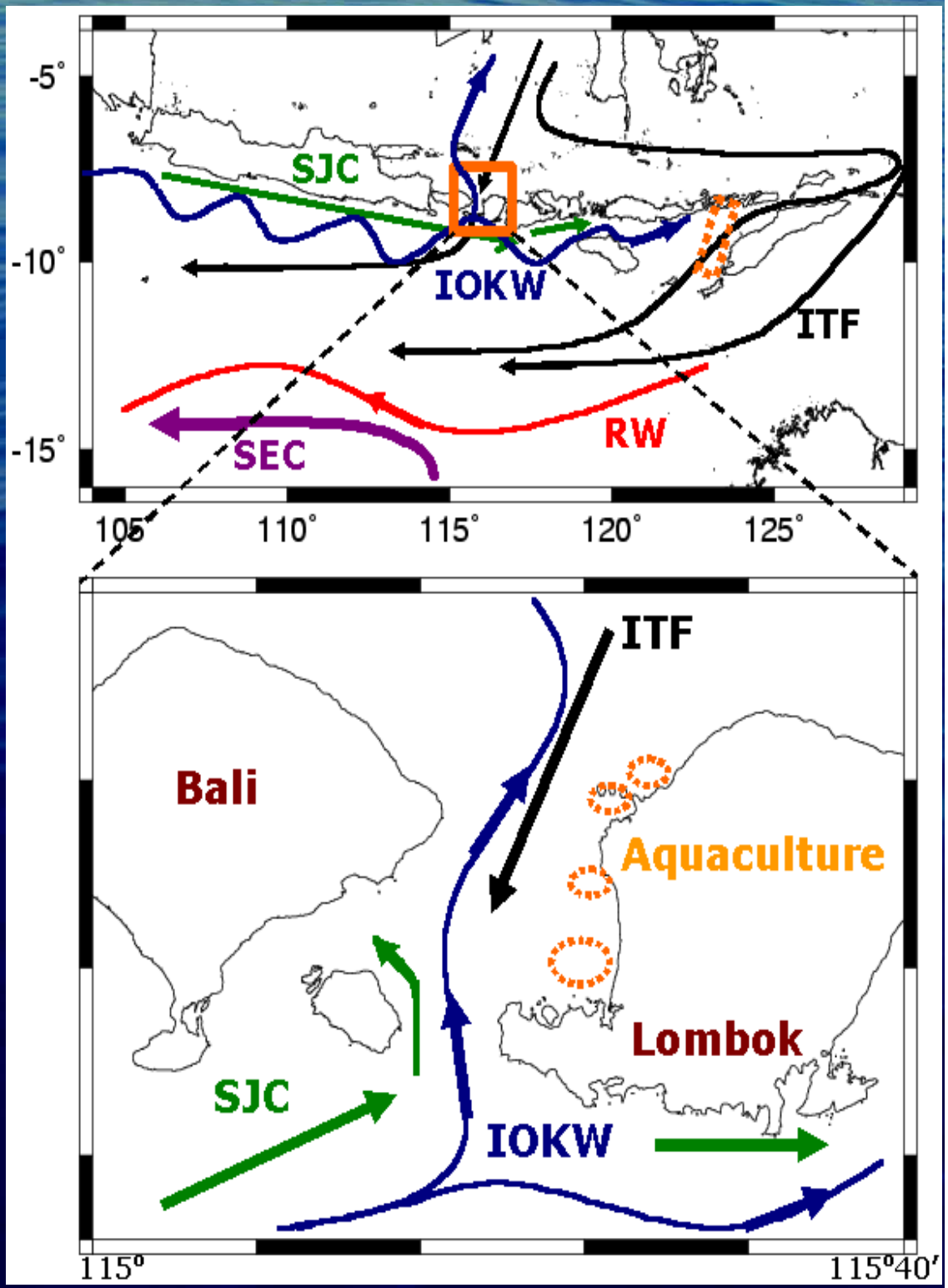
Models:

[*Yamagata et al.*, 1996, *Qiu et al.*, 1999, *Durland and Qiu*, 2003, *Syamsudin et al.*, 2004].

- South Java Current (SJC) found along the southern coast of Indonesia:

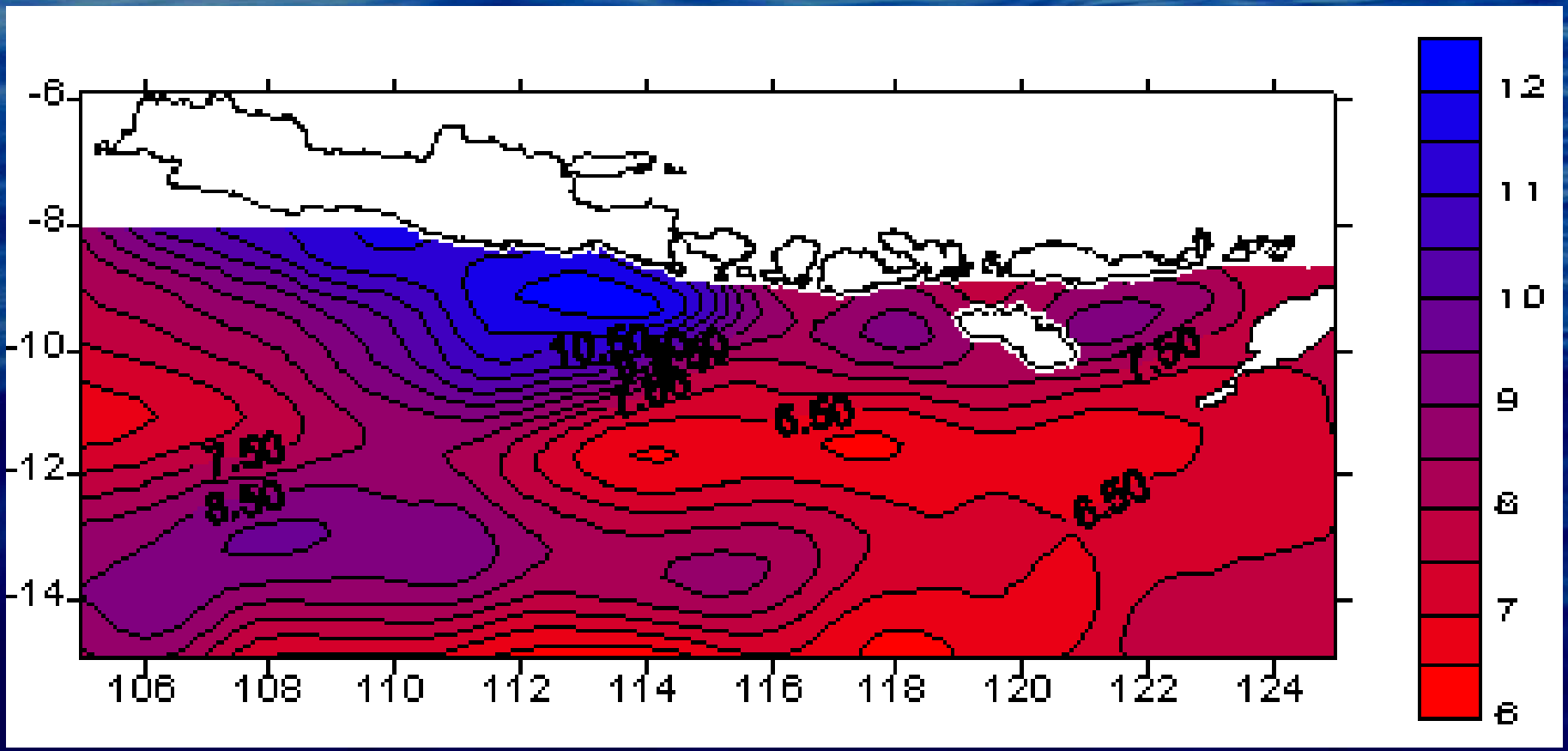
[*Quadfasel and Cresswell*, 1992; *Sprintall et al.*, 1999].

- The regions are rich with sources of interannual, seasonal, intraseasonal, and smaller scale features that have direct impact to environmental changes: aquaculture, marine sport activities, sea-inland transportation, and so on.



Ocean Climate Variability in the Eastern Indian Ocean

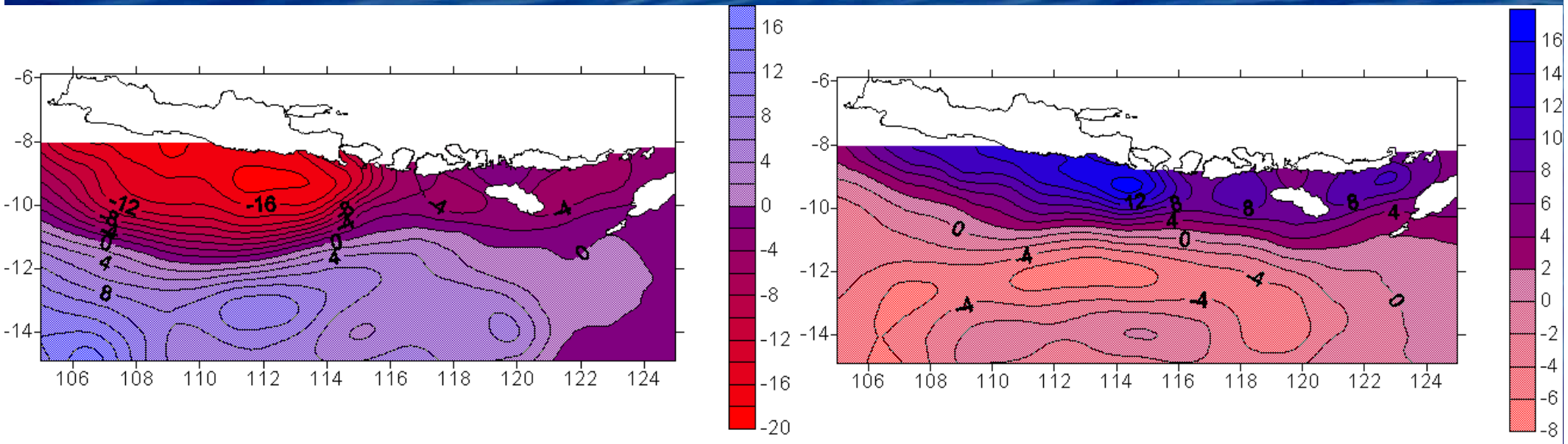
Sea level Variability: RMS analysis of raw SSHA Data



- Coastally trapped region with large RMS values along the southern coast of Indonesia (energetic sea level variations of ±12 cm)
- A meridional zone with large RMS values (11S - 12.5S; 105ºE - 118ºE (confluence regions of SEC and ITF)
- East-West array of isolated regions (the southernmost regions between 12.5 – 14.5 S), implying the existence of energetic mesoscale events

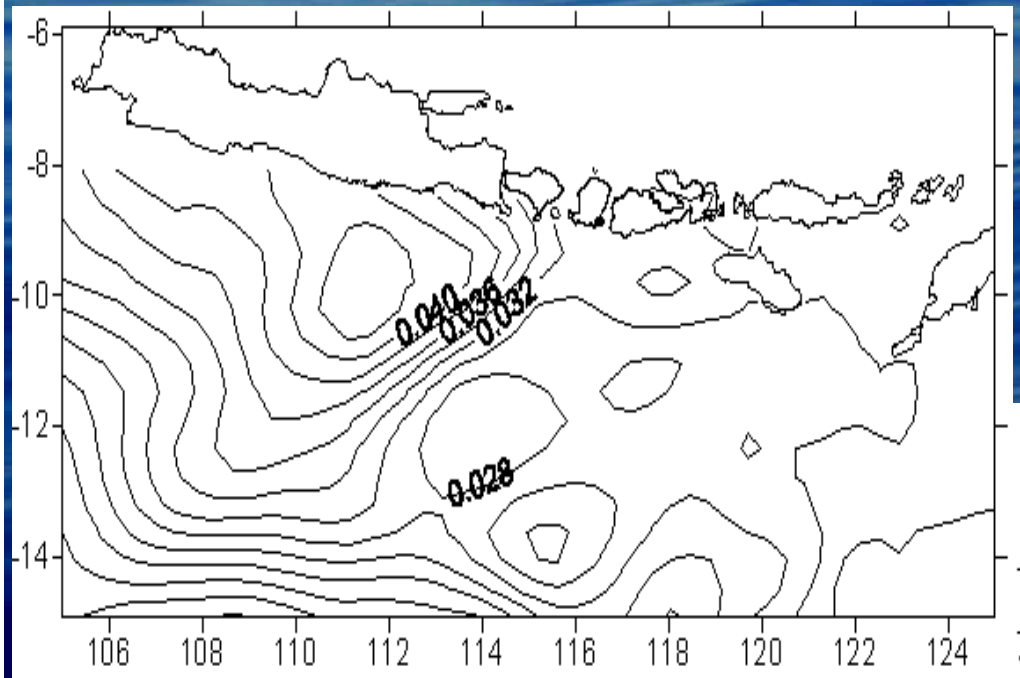
Ocean Climate Variability in the Eastern Indian Ocean

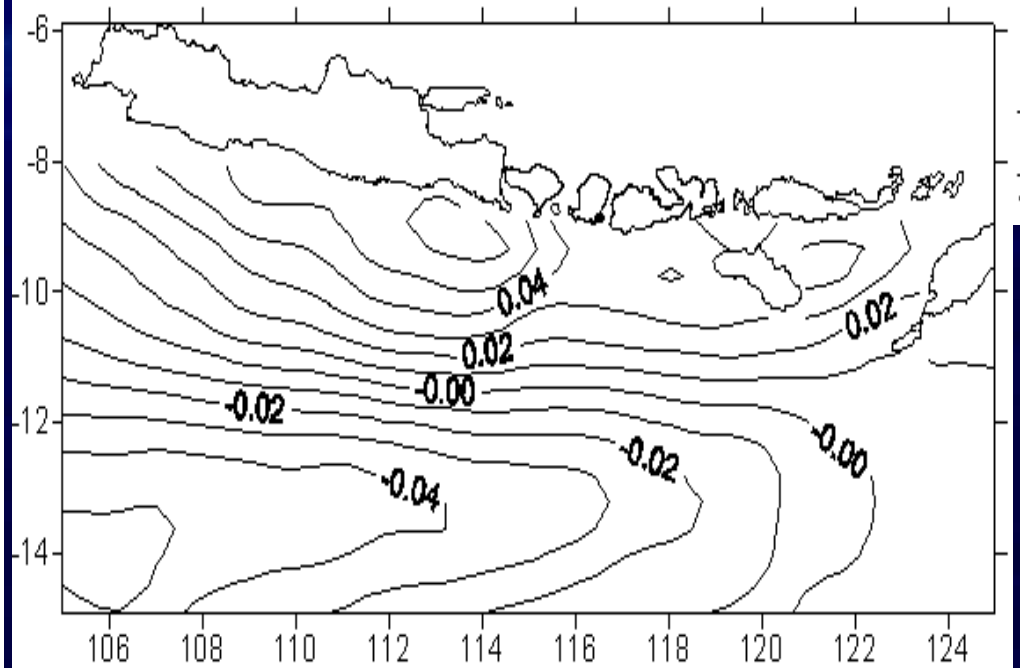
Sea level Variability: Snapshots SSHA data



Typical raw SSHA data when the Indian Ocean Dipole occurred on the 1st. of October 1997 (left panel), and at usual year at 6th of January 1999 (right panel)

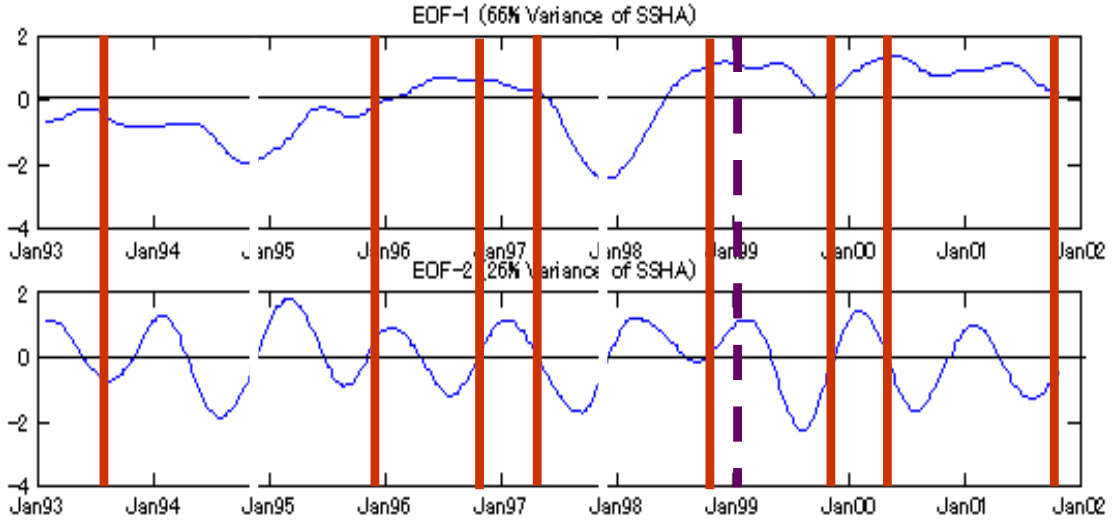
Ocean Climate Proxies to the Regional Climate Change





Results of the EOF Analysis

Vertical line for IOD (black), IOKWs (red) and normal (purple) events



- **EOF mode-1:**
  inter-annual signal: 66%

- **EOF mode-2:**
  seasonal signal: 26%

BPPT TECHNOLOGY ROADMAP ON GLOBAL WARMING

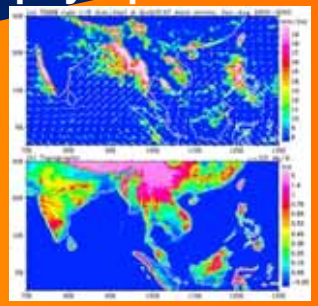
2007 2008 2009 2010 - 2014

Technology Content

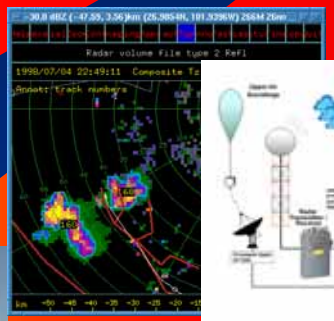
CO_2 Budget

CH_4 Monitoring & Capture in Landfill

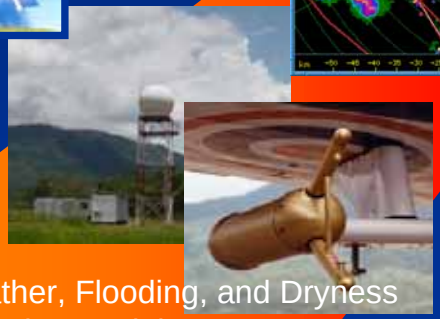
CO_2 reduction by phytoplankton



CO_2 reduction by air-sea interaction



•Weather, Flooding, and Dryness Prediction Models
•Research Vehicle for Atmospheric Aerosol



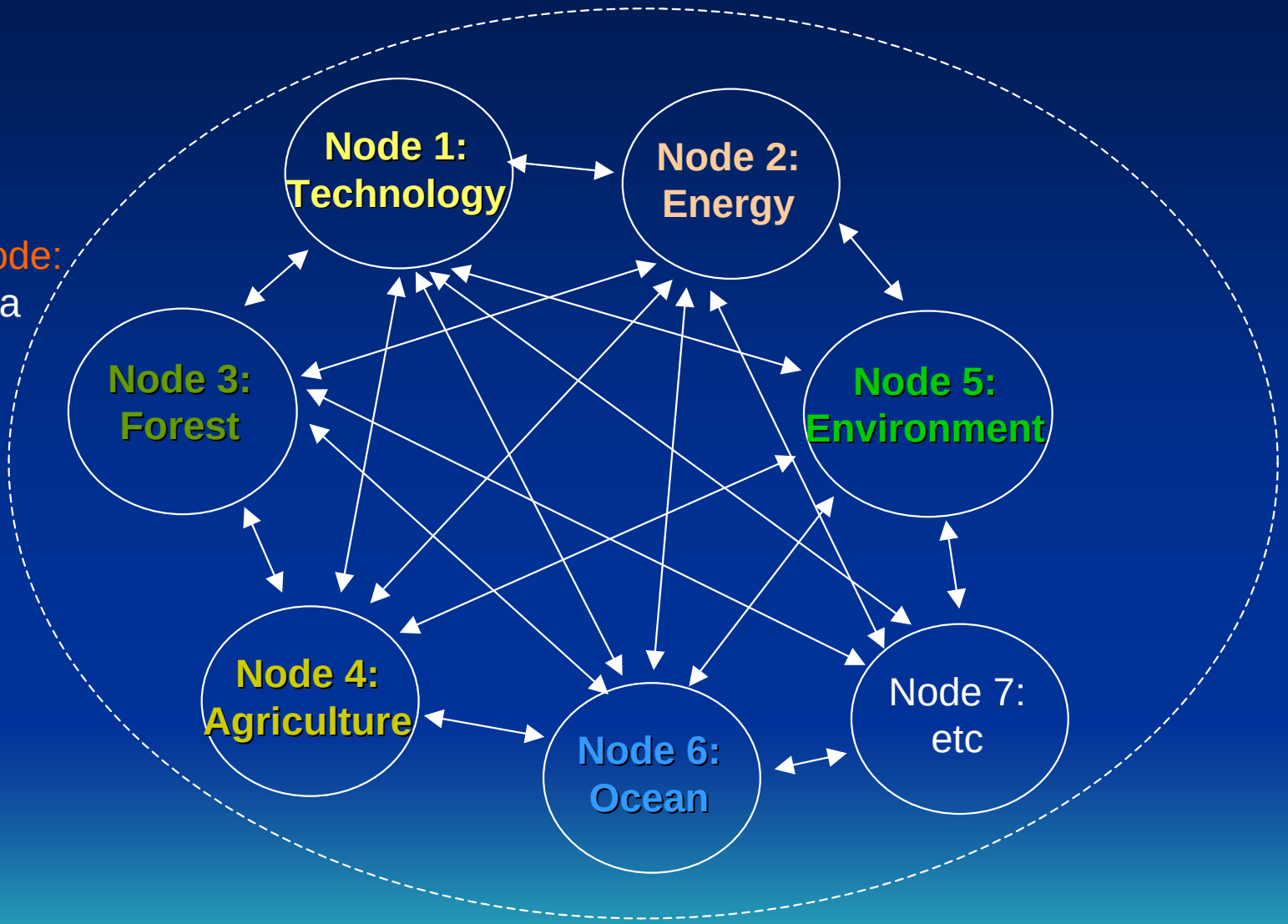
•Weather, Flooding, and Dryness Prediction Models

•Weather, Flooding, and Dryness Prediction Models

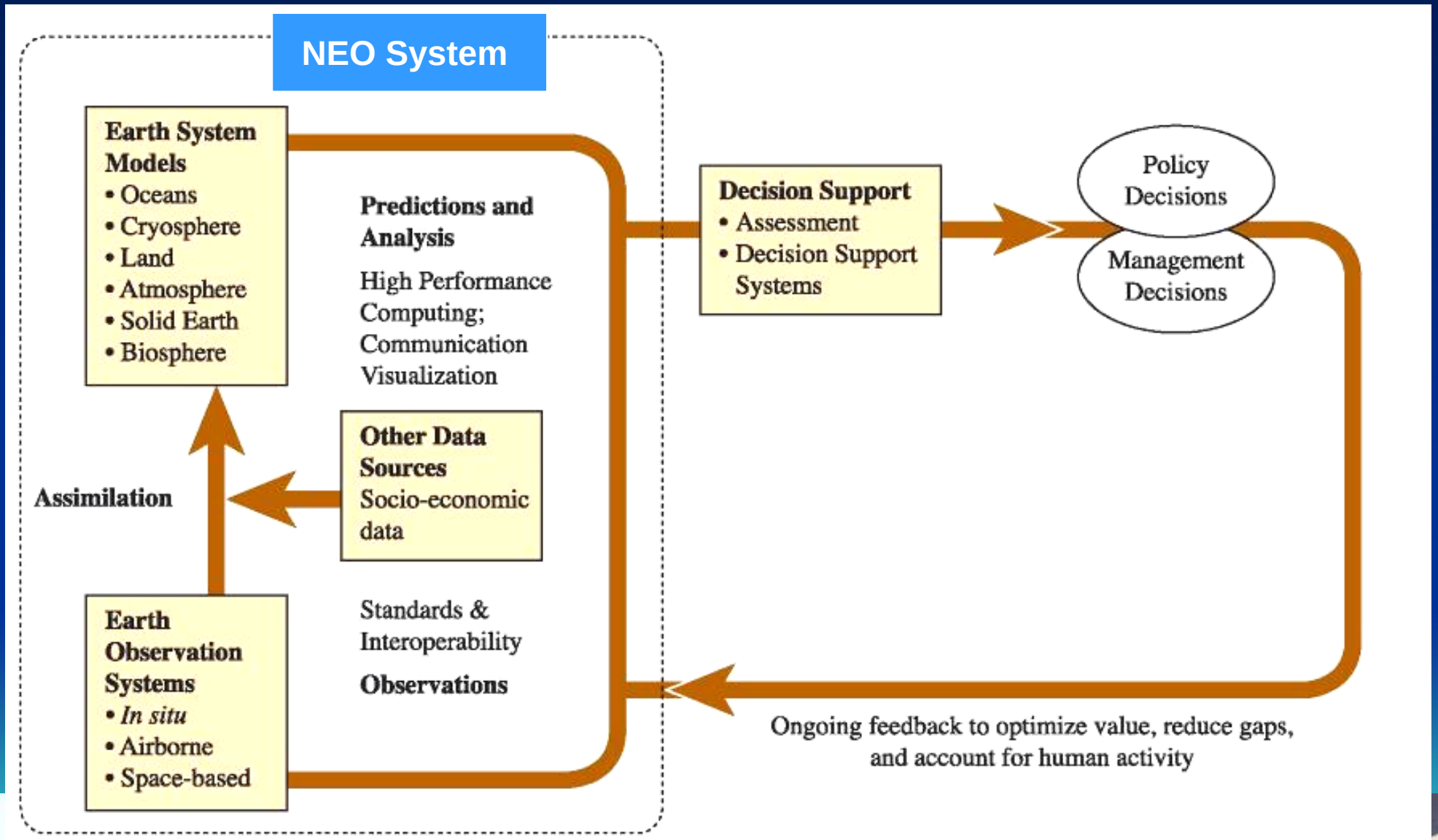
•Flooding Prediction Model

Basic Idea of NEONET

Country Node:
Indonesia



Back to GEOSS Concept (ref: GEOSS)

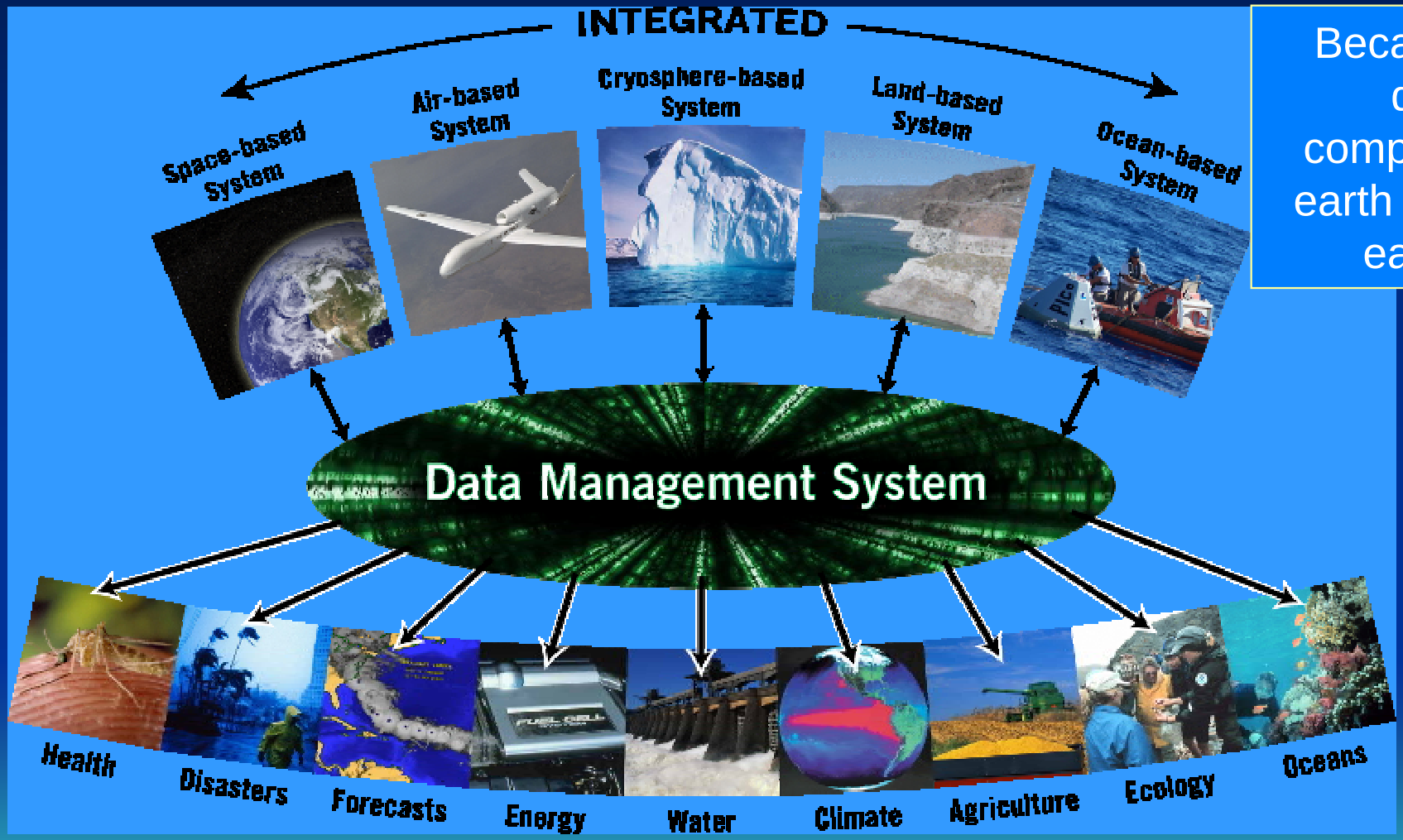


What Does BPPT HAVE?

- HARIMAU, TOCS (JAMSTEC), “Seven SEAs”, GOFC, IGBP, SEISMIC,KB-FG, Hyper-spectral, SiPADI, FDRS/Water bombing, Network of NRA/NRM-df, SAKE, TEWS, SIRMA

- *Infrastructure is ready at the quarter fiscal year 2007*

What “Integrated” Mean? (Not Sectoral)

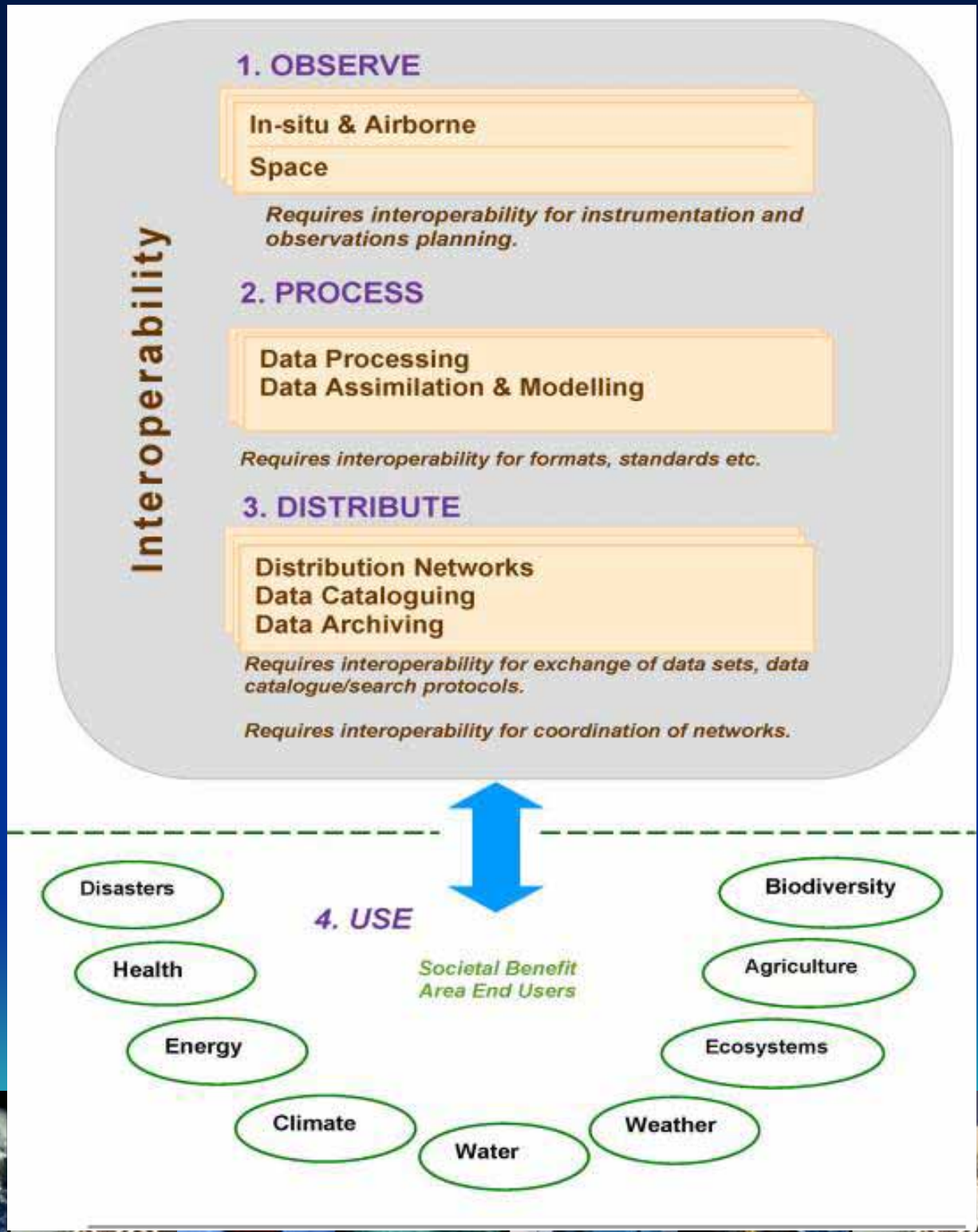


Because all earth dynamics components of the earth are interacted each others.

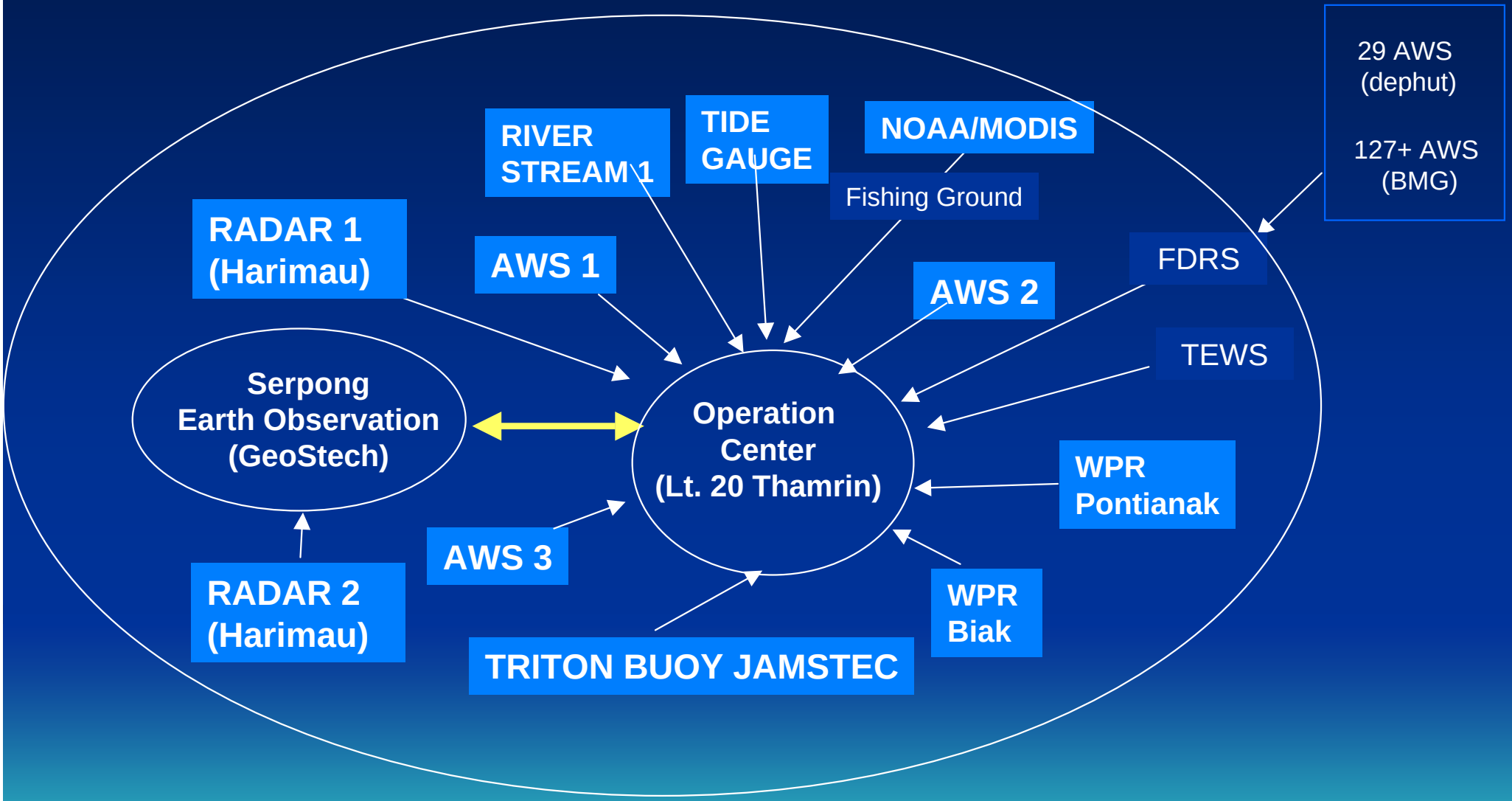
Architectural design:

"interoperable" & "usable"

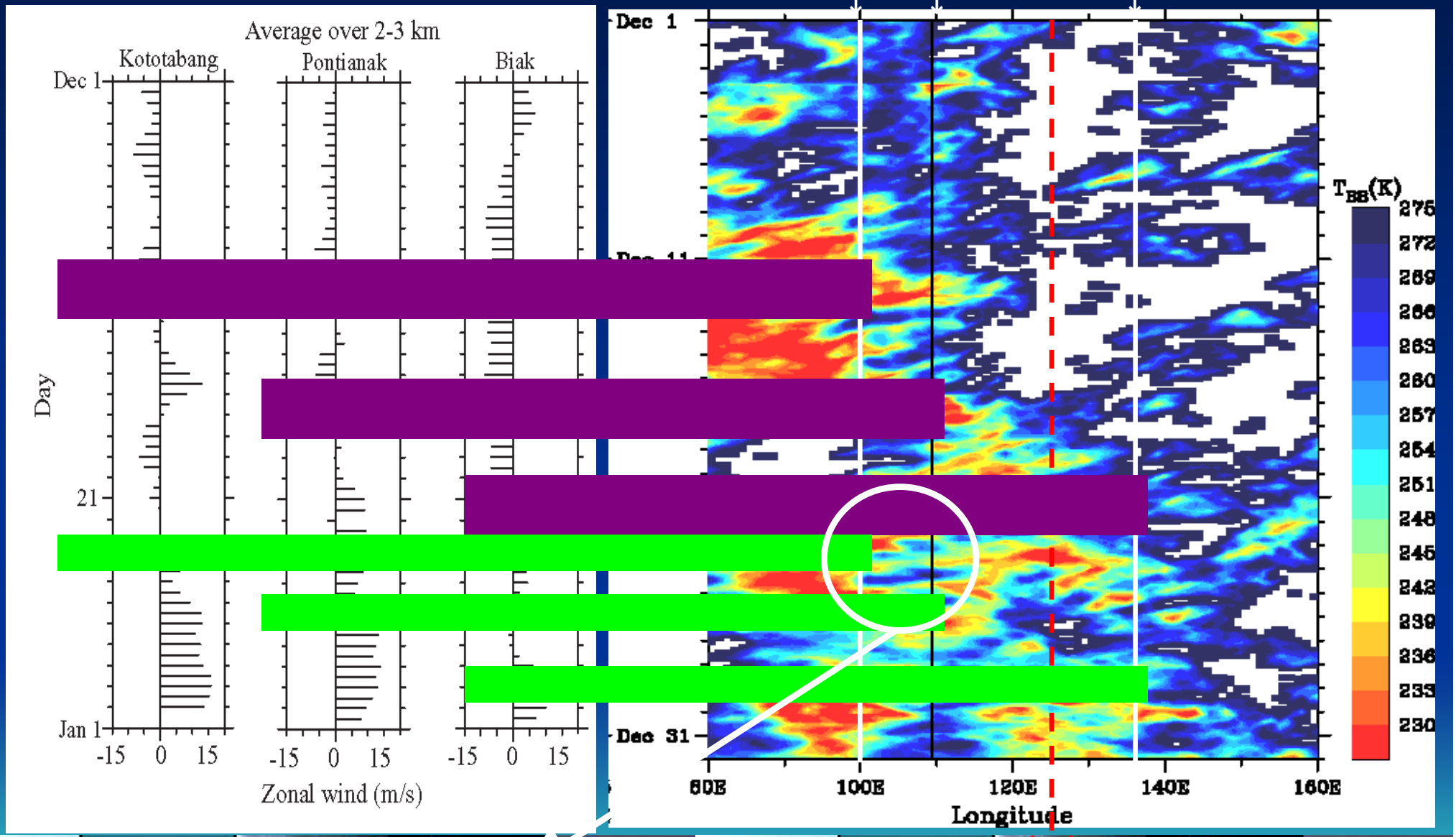
With the **"similar "** system could be used for multi- purposes and multi-sectors



TPSA/BPPT SCALA ☺ (scenario 2008)



ISVs by WPR network

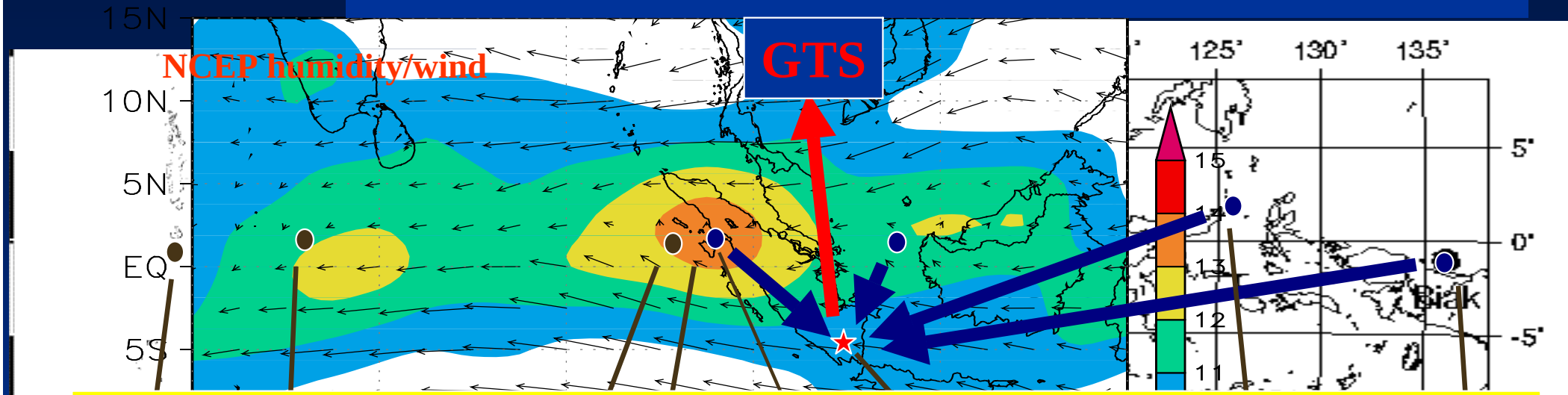


Malay flood

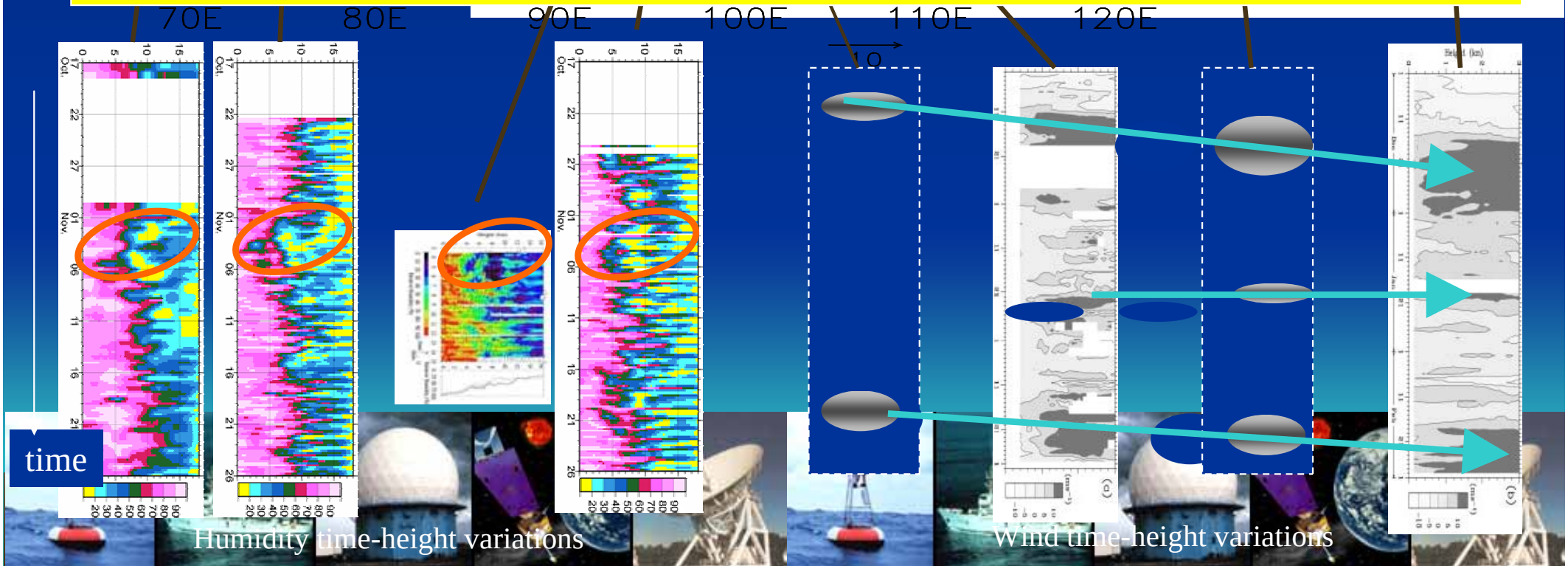
Manado (to be installed on Aug 2008)

(Yamanaka et al., 2008, *J. Disaster Res.*, in press)

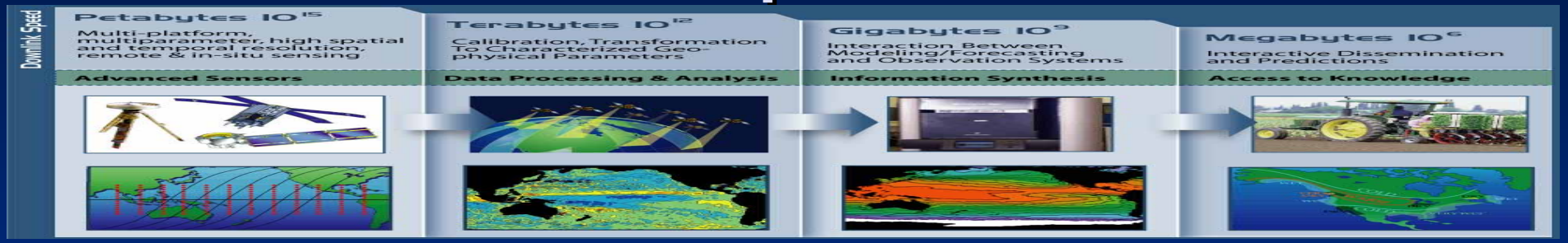
Contribution of HARIMAU network



Accurate global climate change



Road Map NEONET



2007 **2008** **2009** **2010-14**

Sensor → Data → processing → Info → Analysis → Knowledge → "policy"

Drought, Haze, ENSO, Global Warning

TEWS, SIRMA etc.

Jakarta Flood under HARIMAU 08

SISDA

Program: "6 + 3"

- **National Planning**
- **Regional Network**
- **Global Node**

Op. Center & Proto's | **National Implementation**

Starting Point

National Program Announcement
National Scale

IN SHORT CONCLUSION:

Indonesia (BPPT) is planned to fully support GEOSS Program by 2010

- ***In work with this: BPPT has been asking IORGC JAMSTEC to have capacity building workshop on buoy technology development that will be venue In BPPT, Jakarta-Indonesia in the end of July 2008.***

- ***In this capacity building workshop NOAA will be a main contributing partner to accelerate the transfer of buoy technology development in Indonesia.***