

Partnerships for New GEOSS Applications (PANGEA) Resource Sharing to Implement the Global Ocean Observing System for Climate



**4th WMO Port Meteorological Officers Conference (PMO-IV)
And Support to Global Ocean Observation Using Ship Logistics
Orlando, FL USA
8-10 December 2010**

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International Coordinator, NOAA Office of Climate Observation

Partnerships for new GEOSS Applications (PANGEA)

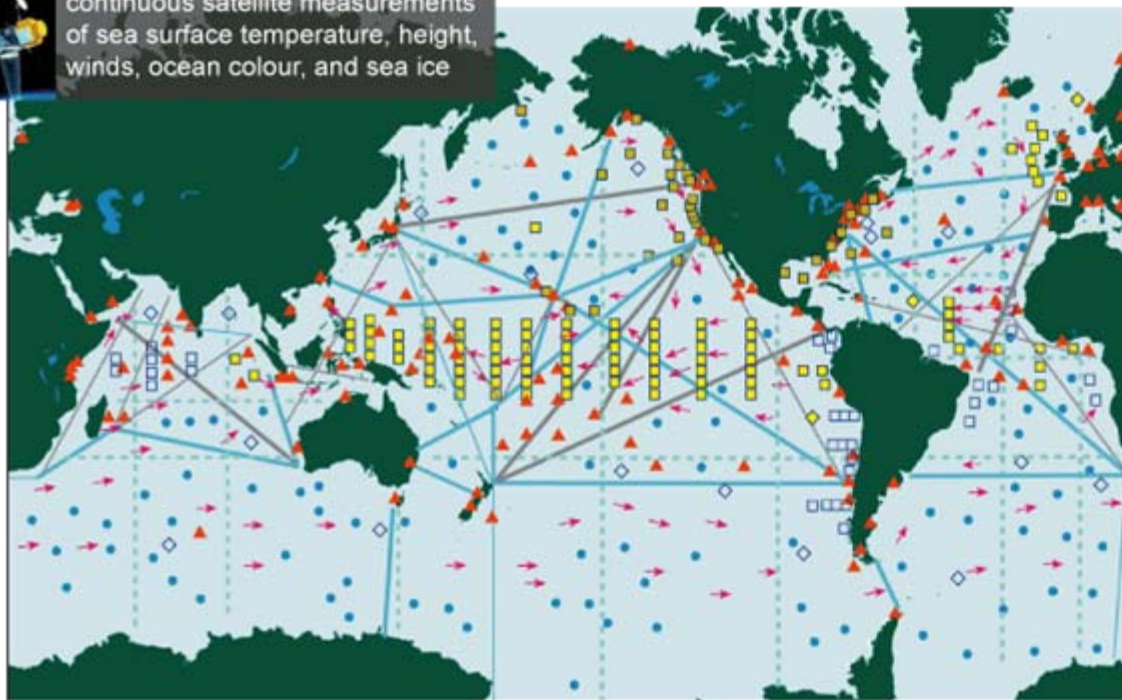
- Developed by the Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM),
- Building partnerships between Institutes & Countries to Implement Observations and realize the socio-economical benefits of ocean observing systems at global and regional scales.

Initial Global Ocean Observing System for Climate

Status against the GCOS Implementation Plan and JCOMM targets

Total *in situ* networks **61%** May 2010

continuous satellite measurements of sea surface temperature, height, winds, ocean colour, and sea ice



87% **Surface measurements** from volunteer ships (VOSclim)

200 ships in pilot project



100% **Global drifting surface buoy array**

5° resolution array: 1250 floats



62% **Tide gauge network** (GCOS subset of GLOSS core network)

170 real-time reporting gauges



81% **XBT sub-surface temperature section network**

51 lines occupied



100% **Argo profiling float network**

3° resolution array: 3000 floats



43% **Repeat hydrography and carbon inventory**

Full ocean survey in 10 years

Reference time series 24%

58 sites



48% **Global reference mooring network**



29 moorings planned



79% **Global tropical moored buoy network**



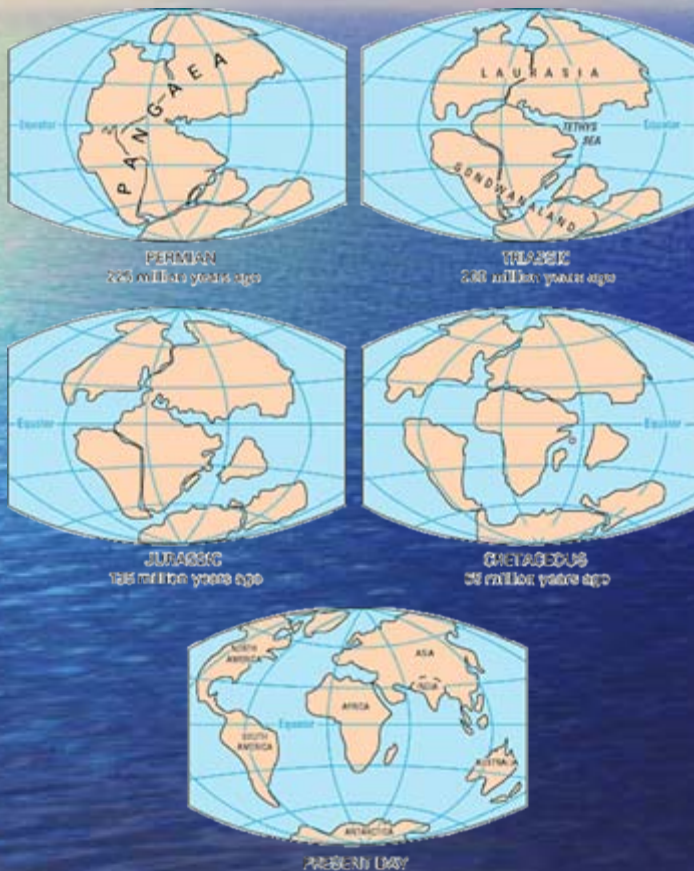
119 moorings planned

GCOS



- A total of 8483 *in situ* platforms are maintained globally.
- Of these, 4207 are supported by NOAA.

Partnerships for New GEOSS Applications (*PANGEA*)

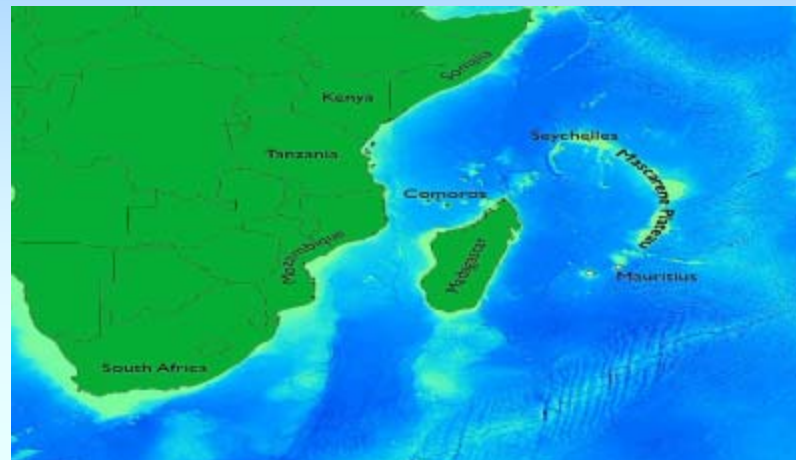


- 230M Years ago the Super-continent PANGAEA Existed
- Reunite Met/Ocean Institutes to Increase in-situ Ocean Observations
- Advanced at WMO EC June 2010
- Mutually Beneficial Resource Sharing Partnerships
- Demonstrate Socio-economic Applications of Ocean Data

PANGEA Builds On and Complements Other Existing Capacity Building Programs

- Build Human, Infrastructure and Institutional Capacity,
- National Advocacy: Government Officials responsible for making policy and setting budgets are invited to participate in workshops ,
- In-country practical applications training of ocean data provided to large and diverse groups of regional participants,
- Critical resources such as Regional ship time, instrumentation and training are shared between Partners: No Charter Funds are Transferred,
- Applications training of ocean data can be tailored to specific socio-economic sectors required by individual Nations and Regions,

The First DBCP In-Region Western Indian Ocean Capacity Building Workshop Capetown, South Africa 19-23 April 2010

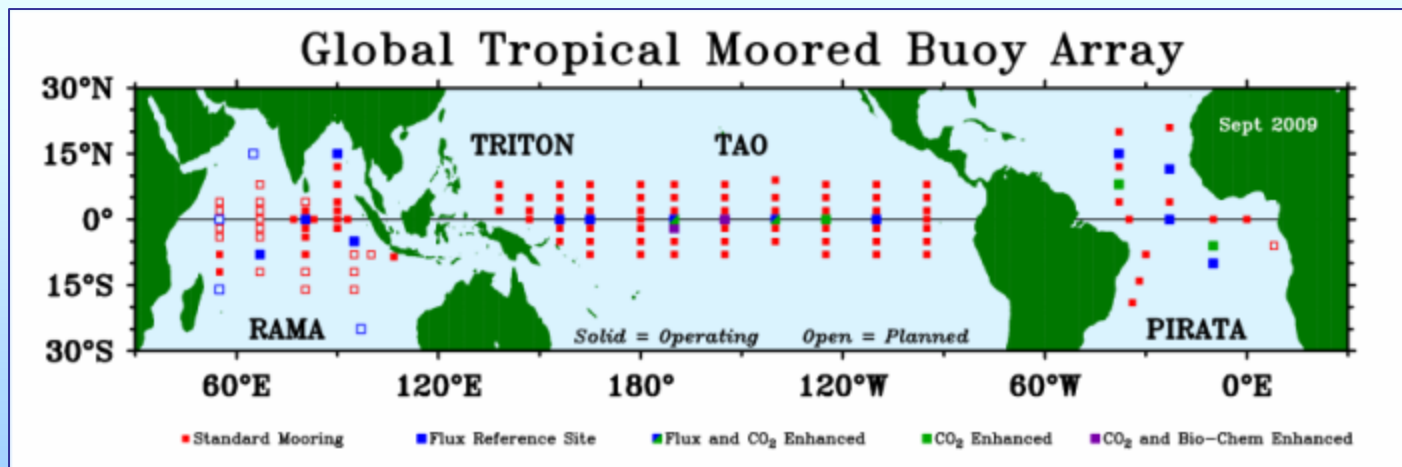
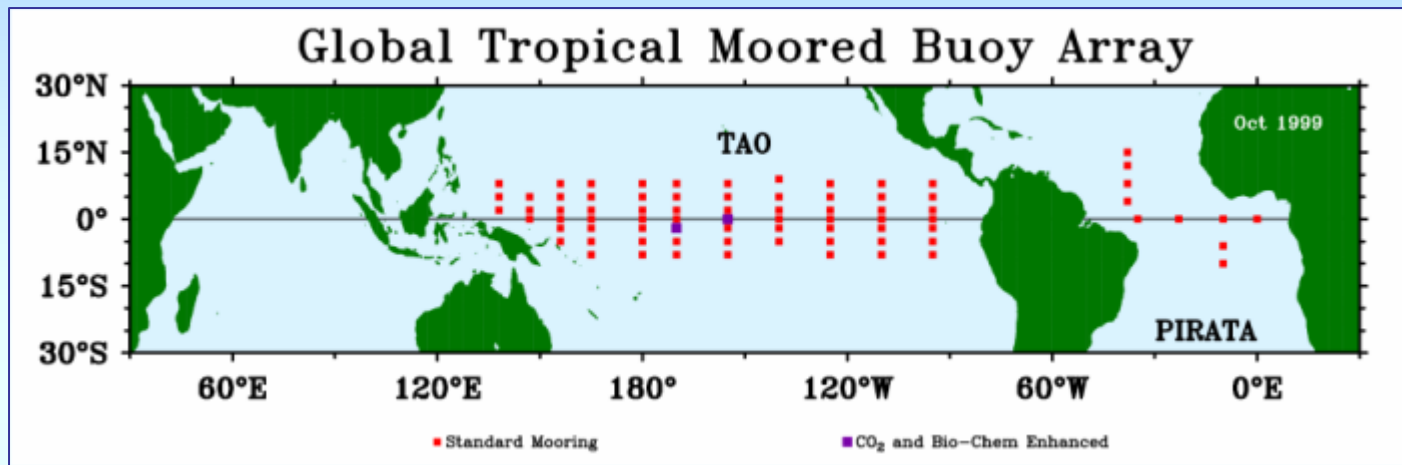


- Implementation and Operations Of Indian Ocean Data Buoy Networks and their Applications for Enhancing Regional Predictive Capability
- Begin to Build Capacity Within Regional Institutes to Apply New Indian Ocean Observing System (IndOOS) Data, such as from RAMA and others, for Enhanced Predictive Capability for the Region,
- Demonstrate the Crucial Role of Ocean Observations for Understanding and Predicting Regional Weather, Ocean and climate,

Second DBCP In-Region Western Indian Ocean Capacity Building Workshop Mauritius, 2-7 May 2011

- WMO/IOC JCOMM Data Buoy Cooperation Panel (DBCPC)
- South African Weather Service (SAWS)
- Mauritius Oceanography Institute (MOI)
- National Oceanic and Atmospheric Administration (NOAA), USA
- UNDP/GEF Agulhas-Somali Current Large Marine Ecosystems Project (ASCLME)
- African Monitoring of the Environment for Sustainable Development (AMESD)
- Global Learning and Observations to Benefit the Environment (GLOBE)

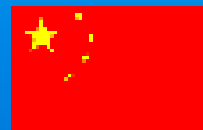
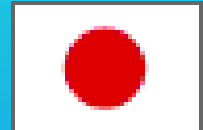
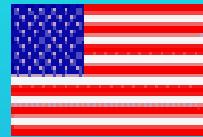
Global and Indian Ocean Buoys 1999 → 2009



NOAA's International Cooperation For IndOOS and RAMA



*RV Baruna Jaya III
Sept 2007*



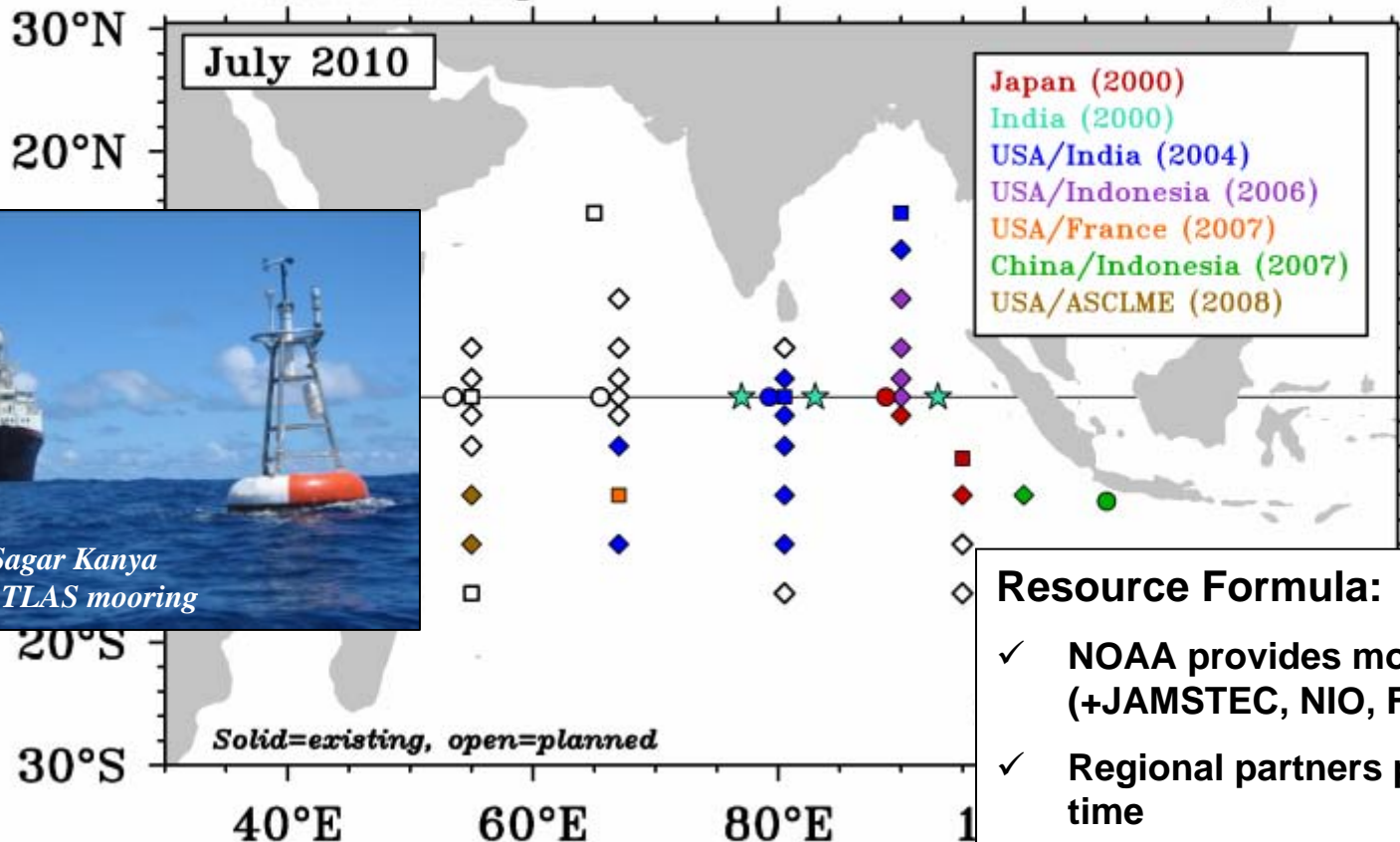
Formal Bilateral Agreements Between NOAA and Agencies in:

- India - signed in 2008
- Japan - signed in 2008
- Indonesia - signed in 2009
- ASCLME (9 East African countries) -
Planned in Spring 2011

RAMA

Research Moored Array for African-Asian-Australian Monsoon Analysis and Prediction (*RAMA*)

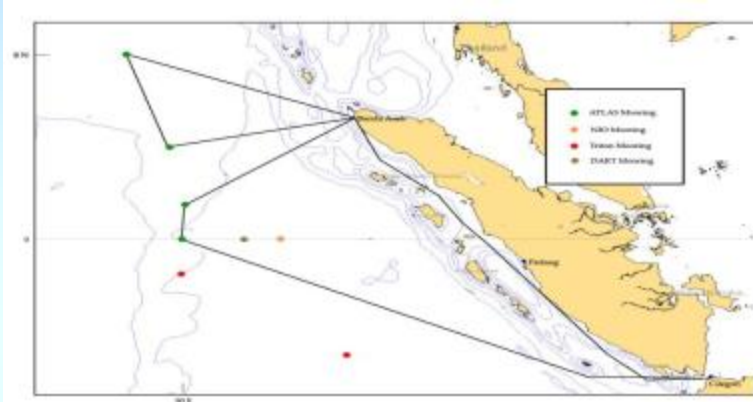
◆ Surface Mooring ■ Flux Reference Site ● ADCP ★ Deep Ocean



59% of sites occupied at present (27 of 46)



Indonesia Ministry of Marine Affairs and Fisheries (KKP) & Agency for Assessment and Application of Technology (BPPT)



- **June: 30 Day Baruna Jaya Cruise to Service 3 NOAA RAMA Moorings Off NW Sumatra**
- **September: 6th Capacity Building Workshop *Remote and In-situ Tools for Evaluating Climate Change Impacts*, 7th Workshop *Broader ASEAN***
- **September: BPPT Leadership Visit NOAA AOML/NDBC to Discuss Indonesian GOOS (InaGOOS), RAMA, Drifters, Argo and Data Management**
- **March: PMEL Provides Two T-FLEX Packages for InaGOOS to BPPT 8S100E and 12S 95E**
- **May: BPPT Baruna Jaya Cruise Services Four (4) PMEL RAMA Moorings**

6th KKP-BPPT-NOAA Capacity Building Workshop
Remote Sensing and In-situ Tools for Evaluating Climate Change Impacts
Monday, 20 September through Saturday, 25 September 2010
Bandung ITB

- 6 NOAA Experts Will Serve as Trainers
 - Biologists/ Ecologists
 - GIS Specialists
 - Data Management Technicians
- Participants: KKP/BRKP, BPPT, BMKG, NGOs, Universities, ASEAN
- Ocean Observing Systems to Include InaGOOS and RAMA
 - Nearshore Moored Arrays
 - Intertidal Instrumentation
 - Periodic Sampling
 - Voluntary Ship Observing Program
 - Satellite Data
- What Can Satellite Data Tell Us?
 - Coral Bleaching via Satellite Data Analysis
 - Coral Bleaching via Thermistors
- The importance of Data Sharing and Data Quality
- Extreme Climate Event Modeling – e.g., Coastal Inundation and Flooding

NOAA Climate Scholarship (NCS)

Asmi Marintan Napitu

Columbia University USA September 2010



- **NOAA Provides Tuition Remission and Stipend Scholarships to Qualified KKP & BPPT Colleagues for Graduate Studies in Oceanography, Ocean science/Engineering in the United States**
- **Asmi's Current Position: Junior Researcher at Institute for Marine Research and Observation, Agency for Marine and Fisheries Research (AMFR / BRKP – DKP), Perancak –Bali**
- **Columbia/LDEO Prof Arnold Gordon will Be Advisor**
- **Understanding of Long-term Ocean Variability over Indonesian Waters and its Implication to Fisheries Productivity**
- **Investigation, through observational and numerical model, of long-term Sea Surface Temperature warming trend and its relation with freshwater influx from South China Sea and major rivers in order to understand climate variability in Indonesia seas**



India Ministry of Earth Sciences



- **Science Colloquium New Delhi September 2008, 2009**
 - *Research moored Array for African-Asian-Australian Monsoon Analysis and prediction (RAMA)*
 - *Climate Model and Ocean Assimilation Analyses for the Indian Ocean Region*
 - *Climate Monitoring and Prediction System for the South Asian Region*
 - *South Asian Regional Reanalysis (SARR)*

- ***Pending Agreements***
 - *INSAT-3D Satellite Data*
 - *Carbon Cycle Greenhouse Gas Measurements and Research*
 - *Frame work for India–US Collaboration On Tropical Cyclone Research*
 - *Establish “Monsoon Desk” at NOAA’s Climate Prediction Center, Washington, DC*

- **August: NOAA Hosts Government of India Technical Team Visit to Advance Climate, Agriculture, Weather and Water Forecasting, Washington, DC**

- **6 October: Third MoES-NOAA Science Meeting, Washington DC**

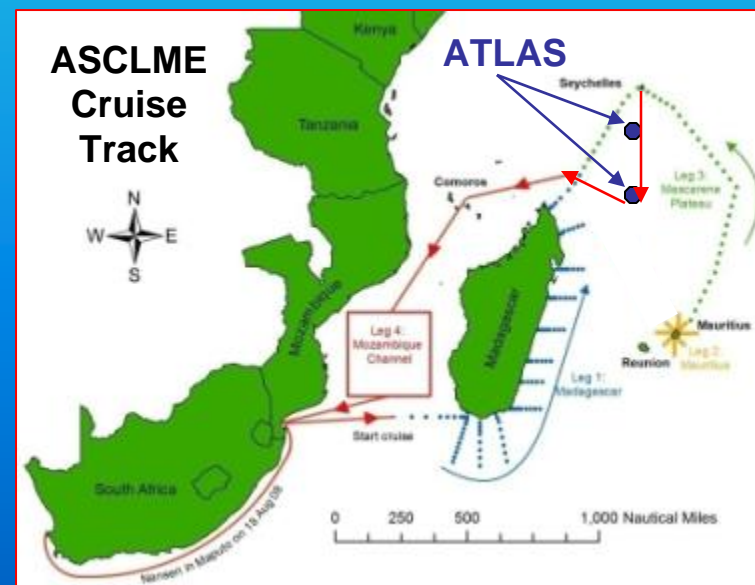
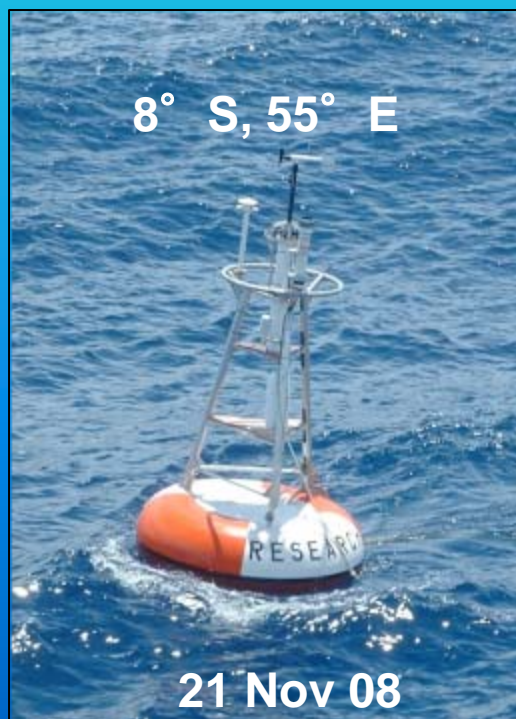


Agulhas Somali Current Large Marine Ecosystems (ASCLME)



• Last Week, 3 NOAA RAMA Moorings deployed during ASCLME cruise on *R/V Algoa*-

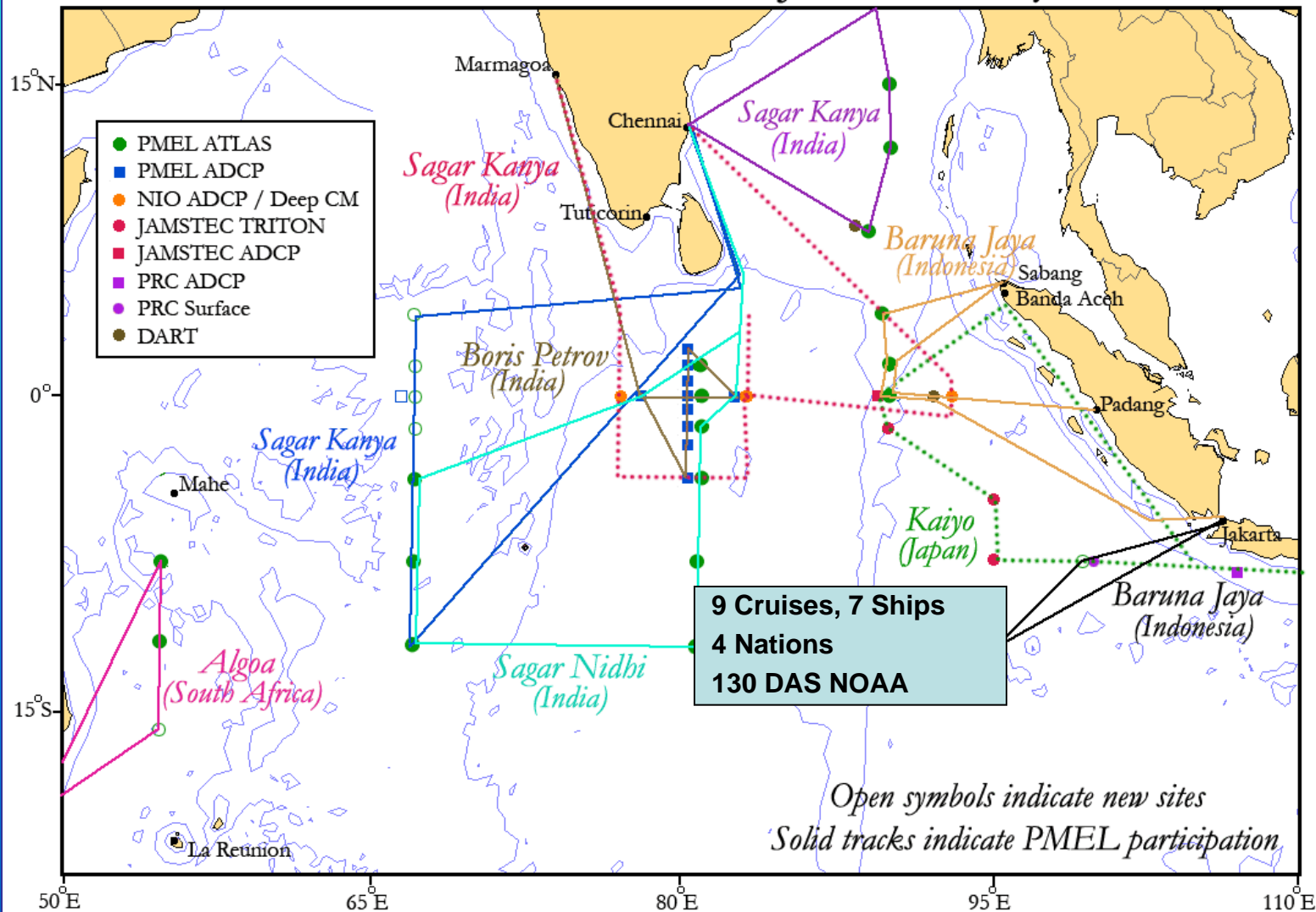
• Seychelles Coast Guard Escort Into Pirate Zone



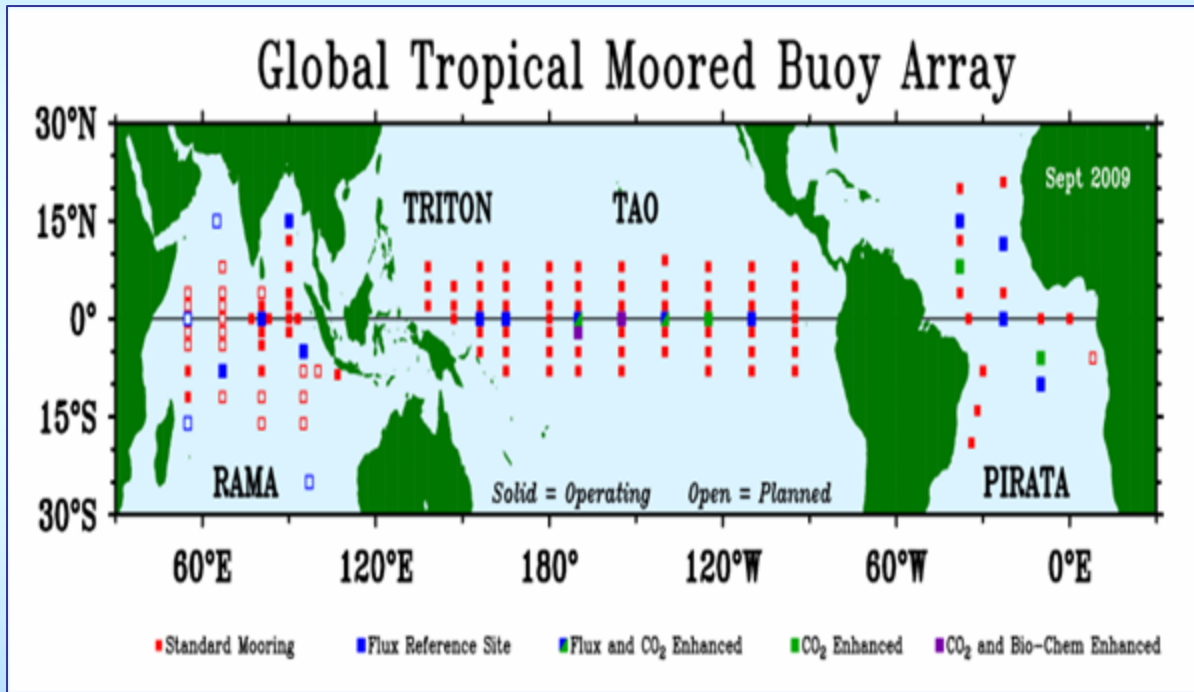
RAMA Cruises

June 2010-May 2011

Planned Indian Ocean Cruises Jun 2010 - May 2011



Future Global Resource Sharing Partnerships Being Advanced



- Korea:
- China:
- Others? We Seek Your Input

Thank You

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NOAA Climate Program Office
<http://www.jcomm.info/pangea-concept>

