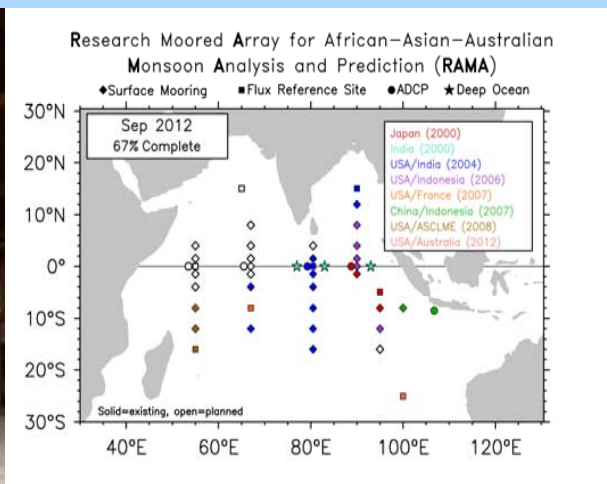


# Update On Indian Ocean Observing System (IndOOS)

## NOAA's PANGEA Resource Sharing Partnerships for the Region



[www.jcomm.info/pangea-concept](http://www.jcomm.info/pangea-concept)

**DBCP-28 Scientific and Technical Workshop**  
**Fremantle, Australia**  
**2 October 2012**

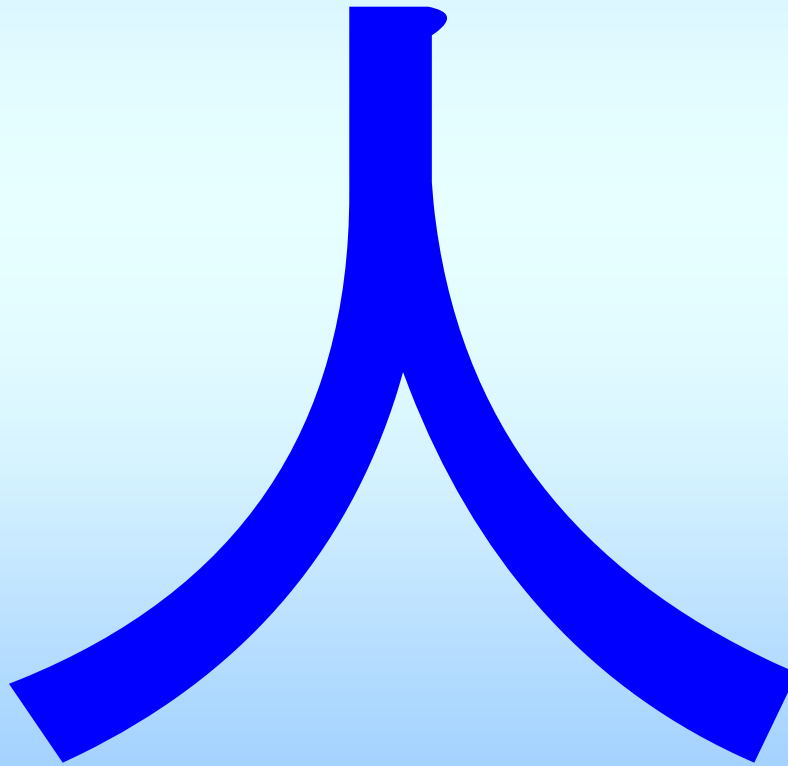
**Sidney Thurston, Ph.D.**

**NOAA Office of Climate Observation (OCO)**  
**Lead, DBCP Capacity Building Task Team**

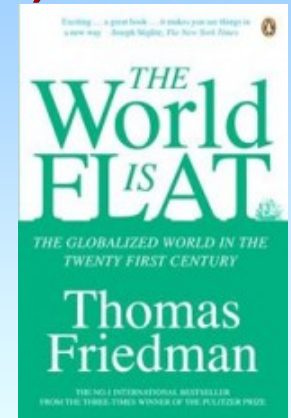
# Presentation Outline

- Brief Review and Motivation Of PANGEA Concept from JCOMM-IV Briefing in Yeosu
- NOAA's Indian Ocean PANGEA Arrangements With:
  - India's Ministry of Earth Sciences
  - Indonesia KKP and BPPT
  - East African Nations via UNDP/ASCLME
- Emerging Partnerships:
  - Korea Institute for Ocean Science and Technology
  - China First Institute of Oceanography
  - Chile CONICYT, SHOA
- Q&A

# Japanese “Hito” - Human



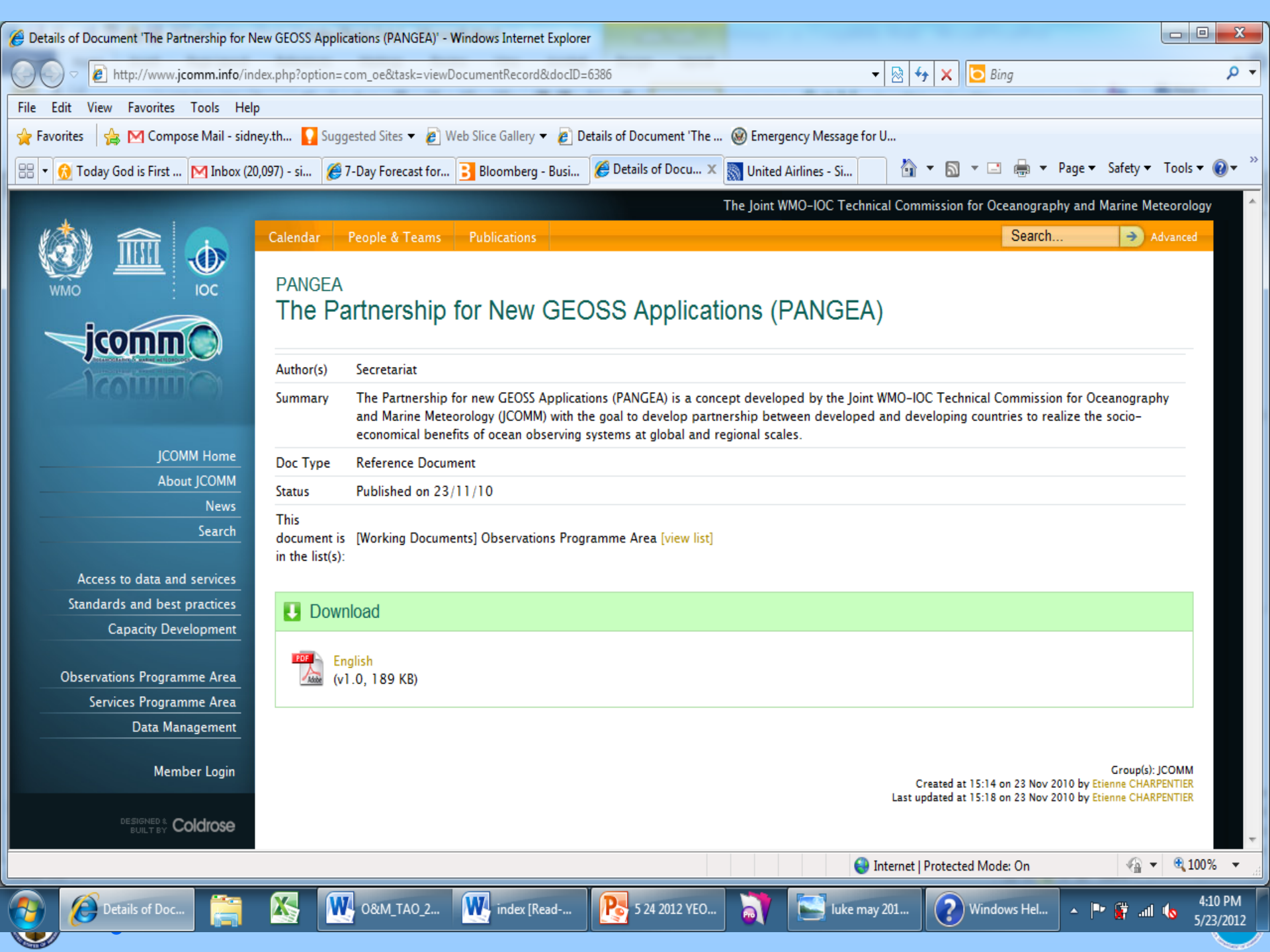
## *The World Is Flat* by Thomas Friedman (2006)



- The global competitive playing field is being leveled
- It is now possible for more people than ever to collaborate in real time with more other people on more different kinds of work from more different corners of the planet and on a more equal footing than at any previous time in the history of the world
- Instead of looking to solve a problem within a vertical silo, you look outward to who has the skills. Brain power is everywhere. Brain power is global.

# Ten “Flatteners”

1. The New Age of Creativity: When the Walls Went Down and Windows Went Up
2. The New Age of Connectivity: Internet Matures
3. WorkFlow Software: Enables Effective Collaboration in Different Locations
4. Uploading: Harnessing the Power of Communities
5. Outsourcing: Sharing Labor
6. Offshoring: Sharing Production
7. Supply Chaining: Increasing Connections Between Suppliers and Customers
8. Insourcing: Allows Small Companies to Become Global Companies
9. In-Forming: Dramatic Change in How Easy It Is to Access Information
10. Steroids: Mobile, Digital, Personal (Shifts Power from Institutions to People)



# PANGEA The Partnership for New GEOSS Applications (PANGEA)

Author(s)	Secretariat
Summary	The Partnership for new GEOSS Applications (PANGEA) is a concept developed by the Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM) with the goal to develop partnership between developed and developing countries to realize the socio-economical benefits of ocean observing systems at global and regional scales.
Doc Type	Reference Document
Status	Published on 23/11/10
This document is	[Working Documents] Observations Programme Area <a href="#">[view list]</a> in the list(s):

**Download**

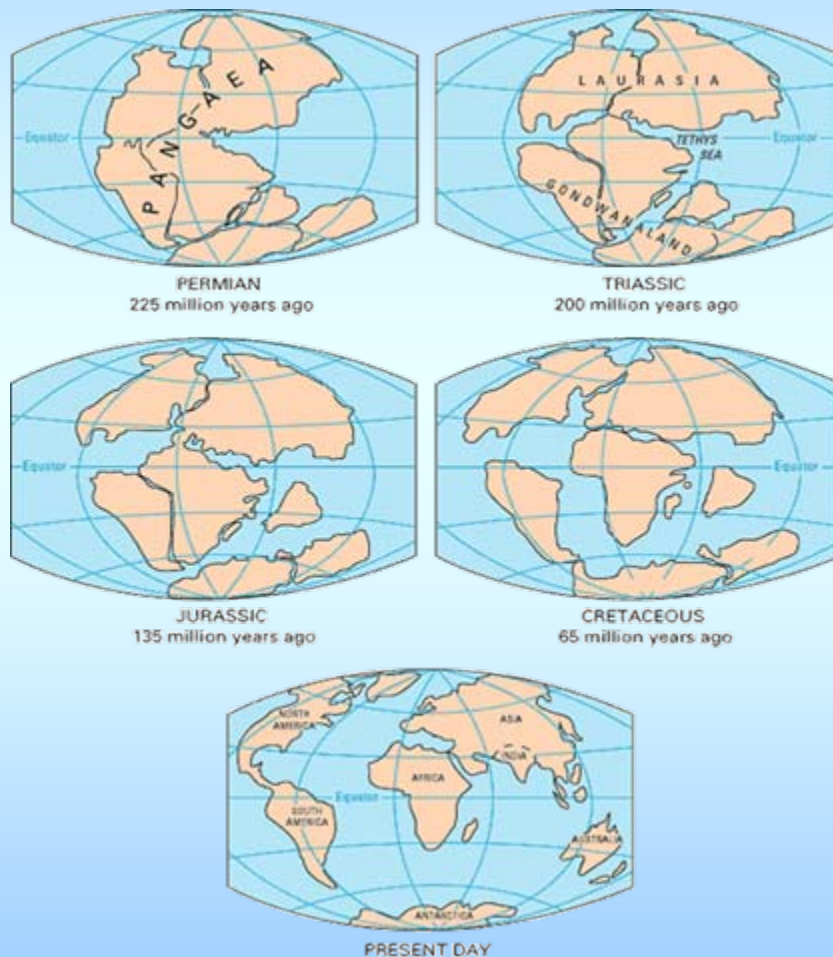
English (v1.0, 189 KB)

Group(s): JCOMM  
Created at 15:14 on 23 Nov 2010 by Etienne CHARPENTIER  
Last updated at 15:18 on 23 Nov 2010 by Etienne CHARPENTIER



# Partnerships for New GEOSS Applications (*PANGAEA*)

[www.jcomm.info/pangea-concept](http://www.jcomm.info/pangea-concept)



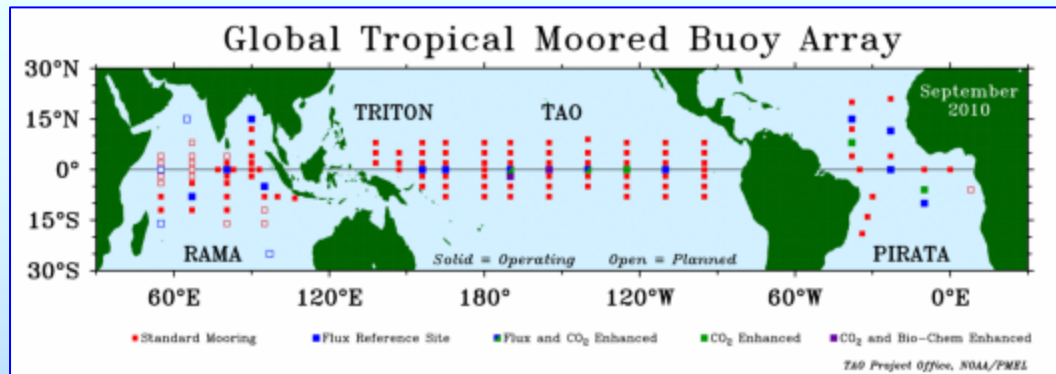
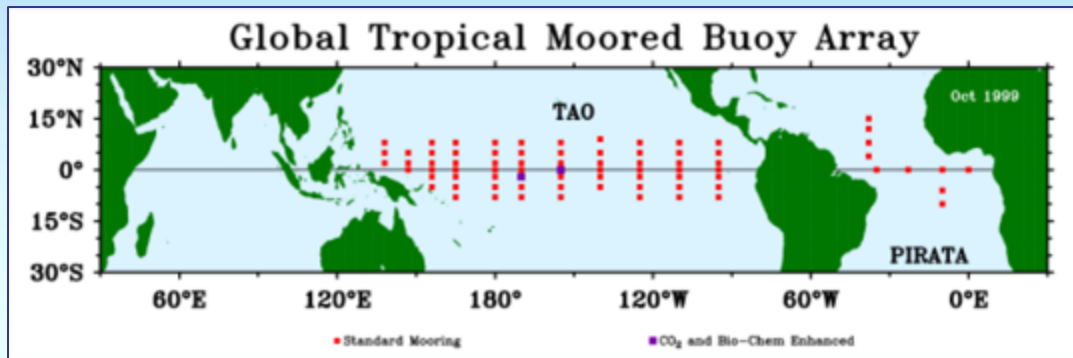
- 230M Years ago the Super-continent PANGAEA Existed
- Reunite Met/Ocean Institutes to Increase in-situ Ocean Observations
- Advanced at WMO EC June 2010
- Mutually Beneficial Resource Sharing Partnerships
- Demonstrate Socio-economic Applications of Ocean Data

# PANGEA Builds On and Complements Other Existing IOC and WMO 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, Data, Expertise, and training are shared Amongst Partners,
- Applications training of ocean data can be tailored to specific socio-economic sectors required by individual Nations and Regions.



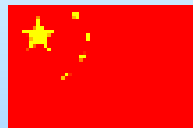
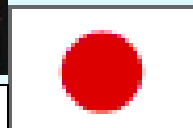
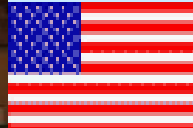
# PANGEA Advances Implementation Of the Global Tropical Moored Buoy Array



## Tropical Moored Buoy Array Program:

A coordinated, multi-national effort to implement a sustained moored buoy observing system in the global tropics for climate research and forecasting

# NOAA's Formal Ocean-Climate Agreements: Shiptime, Data, Expertise, Equipment, Capacity Building, Goodwill Overseas



## Mutually Beneficial Resource Sharing Partnerships

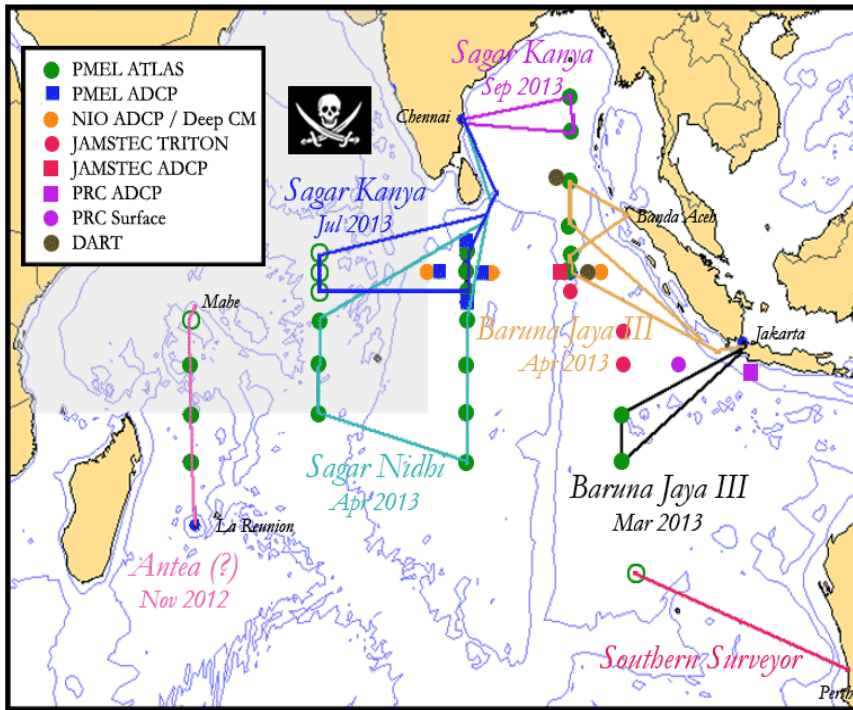
- ✓ In Exchange for Local Shiptime, NOAA Provides Most Equipment & Capacity Building, Training, Education
- ✓ NOAA Is Nurturing International Ownership/Expansion of GOOS—Nations are Self-Organizing to Contribute (Ex. InaGOOS)
- ✓ “Make Full and effective use of International Partnerships and Policy Leadership to Achieve NOAA’s Mission Objectives” (NGSP – Engagement Enterprise)

- Japan - Western Pacific, TAO
- France and Brazil – Atlantic, PIRATA
- India - Central Indian Ocean, RAMA
- Indonesia - Eastern Indian Ocean, RAMA
- UNDP/ASCLME 9 East African Nations - Western Indian Ocean, RAMA
- Korea, Australia, China, Chile – Exploring Partnerships for Indian, Southern and Pacific Oceans



# US RAMA Cruises Oct 2012 – Oct 2013

US RAMA Cruises Oct 2012 - Oct 2013



- Previously established sites will be maintained (21 ATLAS, 1 ADCP, plus recovery of PMEL's multi-year ADCP process study).
- Five additional sites will be implemented.
- Security arrangements will be required for sites along 55° E and 67° E within the piracy exclusion zone
- A total of 147 sea days are required on 7 cruises, 3 of which will require security plans.
- By the end of the year NOAA will support a total of 27 RAMA sites.

# Recent Capacity Building for the Indian Ocean



Capetown April 2010



Jogyakarta September 2011



Mauritius May 2011



Mombasa Kenya May 2012

# Indian Ocean Research Moored Array for African-Asian-Australian Monsoon Analysis and Prediction RAMA

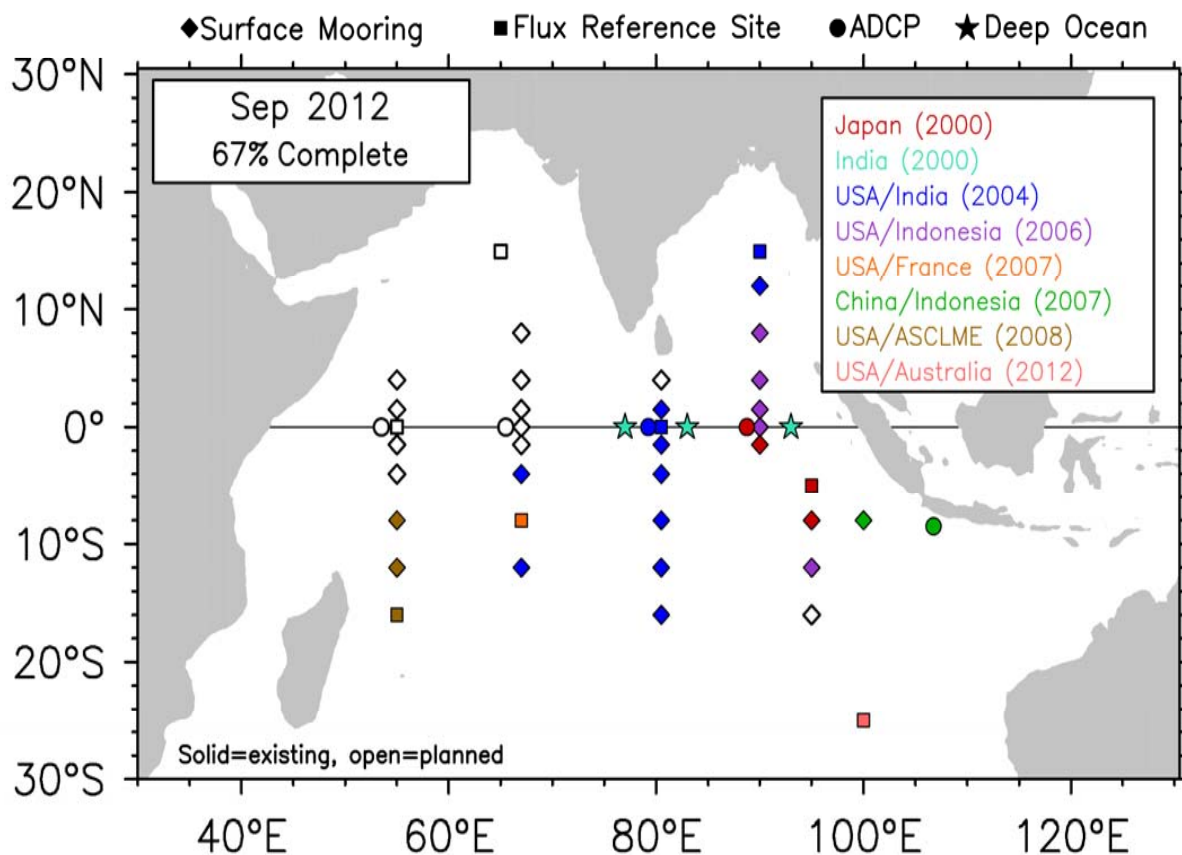
Two-Thirds Of Array Design Has Been Quickly Implemented

Built By Mutually Fruitful PANGEA Partnerships

Most Remaining Sites are Within the Piracy Exclusion Zone

Initial Plan Called for 2012 Completion, Piracy and Global Economic Slump

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



# Western Indian Ocean Piracy Has Impeded RAMA Implementation

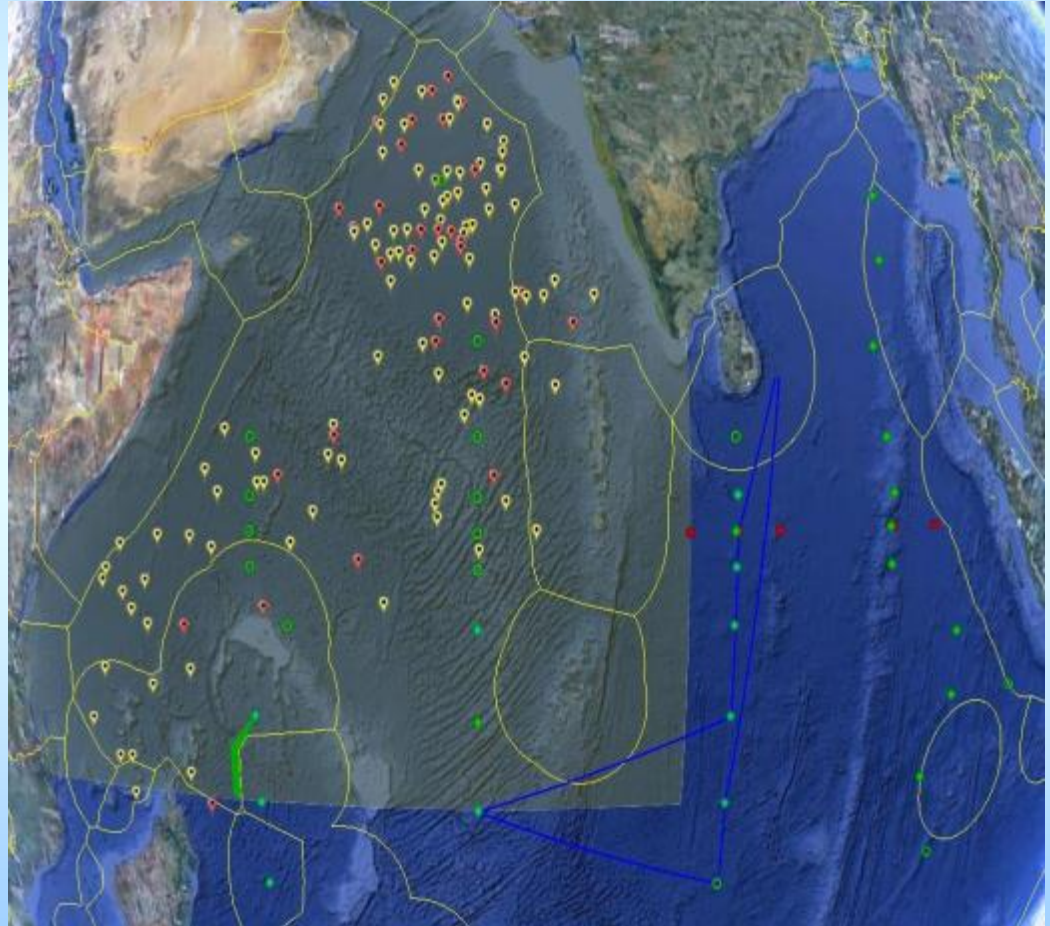
In response to numerous Piracy incidents in the Western Indian Ocean, *Lloyds of London* declared an Exclusion Zone within which additional premiums are required to provide insurance to merchant vessels.

In early 2011 the eastern border of the EZ was extended from 65° E to 78° E.

Green symbols are surface RAMA moorings.

**The EZ includes most implemented and planned RAMA sites along 55° E and 67° E.**

**13 of the 16 remaining RAMA Sites are in the EZ (open green circles).**

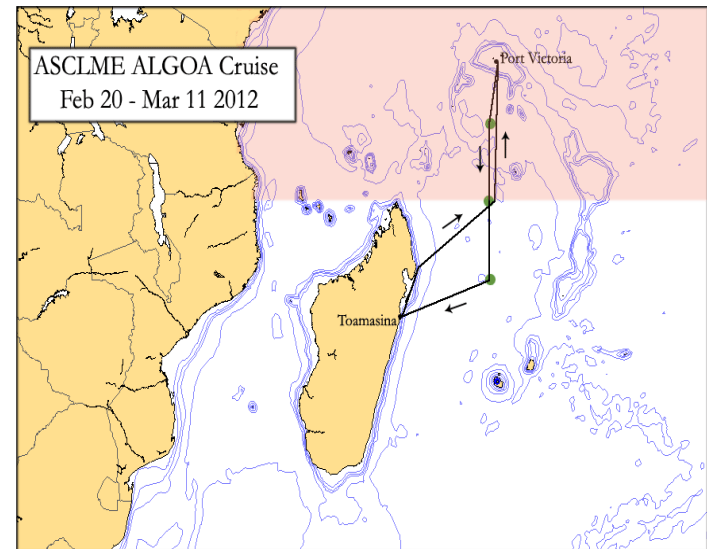




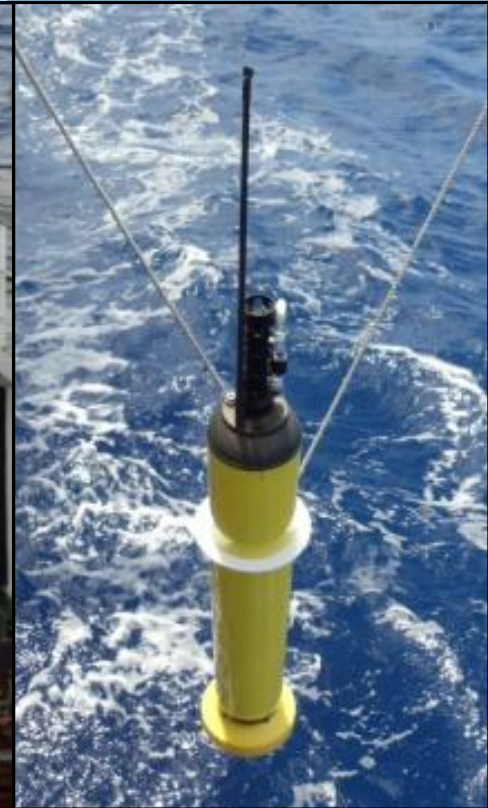
# Agulhas Somali Current Large Marine Ecosystems (ASCLME)



- February 20 – March 11 2012, 3 NOAA RAMA Moorings Deployed During ASCLME Cruise on *R/V Algoa*-
- Seychelles Coast Guard Escort Into Pirate Zone



# NOAA's Partnership with East Africa





# Third DBCP In-Region Capacity Building Workshop for the Western Indian Ocean (WIO-3) Mombasa Kenya 16-20 April 2012 [www.jcomm.info/wio-dbc3](http://www.jcomm.info/wio-dbc3)



- Continue 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,
- Provide Training in Deployments and Management of In-situ Ocean Observations,
- Continue to Build In-Region Modelling Development Teams (MDT) and Observation Development Teams (ODT), including for the implementation of buoy programmes

# WIO-3 Mombasa Kenya

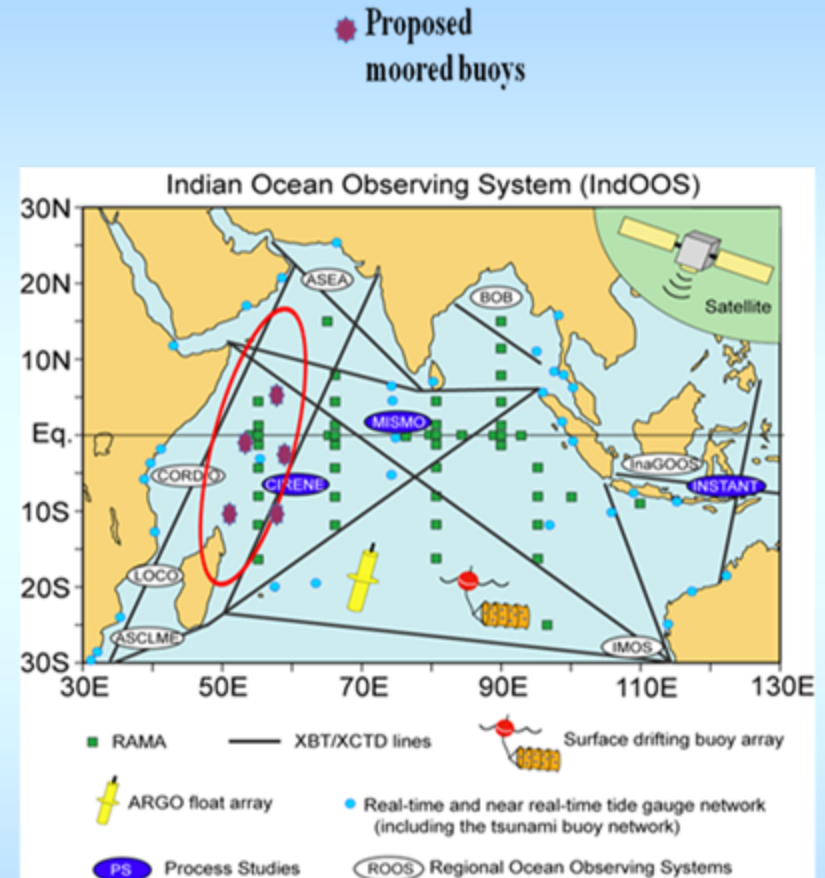


# Representatives

- Agulhas-Somali Current Large Marine Ecosystem (ASCLME)
- African Monitoring of the Environment for Sustainable Development (AMESD)
- Angola
- Australia
- China - First Institute of Oceanography (FIO)
- Democratic Republic of the Congo
- Egypt
- Ethiopia
- France - Institute of Research & Development (IRD)
- India - Ministry of Earth Sciences (MoES)
- IOC/WMO Data Buoy Cooperation Panel
- Kenya (HOST)
- Morocco
- Mozambique
- South Africa
- Sri Lanka
- South West Indian Ocean Fisheries Project (SWIOFP)
- Sudan
- Tanzania
- Togo
- United Kingdom - Scottish Association of Marine Sciences (SAMS)
- USA - National Oceanic and Atmospheric Administration (NOAA)

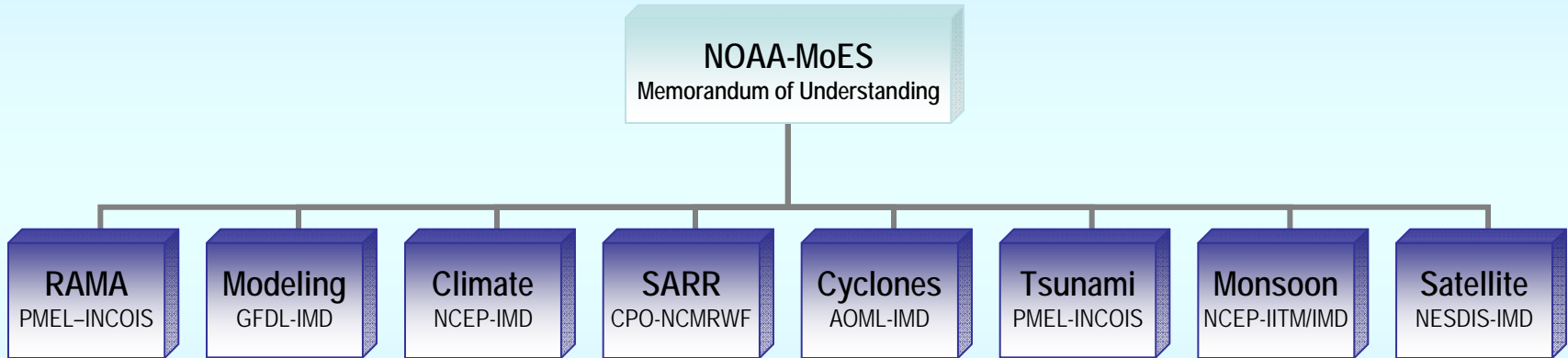
# WIO-3 Resolutions

- Establish A WIO Science Alliance
- VOS/SOOP/DBCP Pilot Project
- In-region Glider Capability
- Kenya PR Dr. Mukabana Requested workshop issues be brought to the attention of the upcoming African Ministers Conference on Meteorology (AMCOMET)





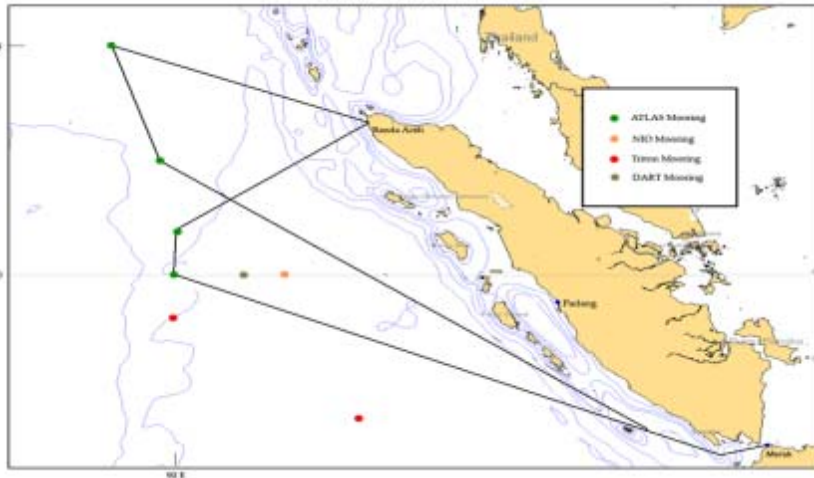
# Robust NOAA - India Ministry of Earth Sciences Partnership for Economic and Societal Benefits





# Indonesia Ministry of Marine Affairs and Fisheries (KKP) & Agency for Assessment and Application of Technology (BPPT) – Spring 2012 Cruise Tracks

Merak - Banda Aceh - Merak

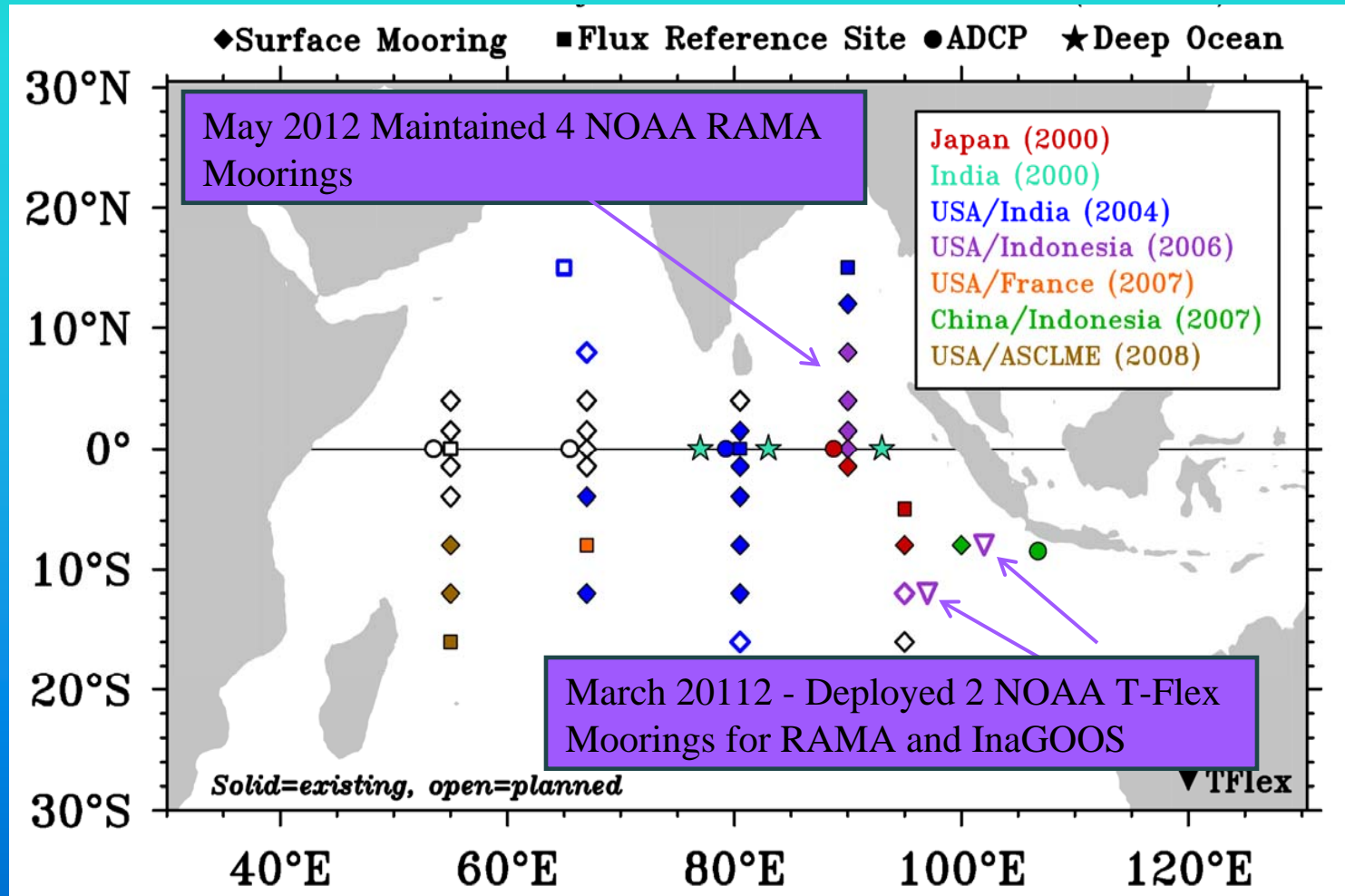


7th Annual Indonesia-U.S. Ocean and Climate Observations, Analysis, and Applications Partnership Meeting  
19-20 September 2011  
Hotel Sahid Raya, Yogyakarta



# Two Spring 2012 Baruna Jaya Cruises:

- Four NOAA RAMA Sites
- T-Flex: NOAA's Contribution to InaGOOS



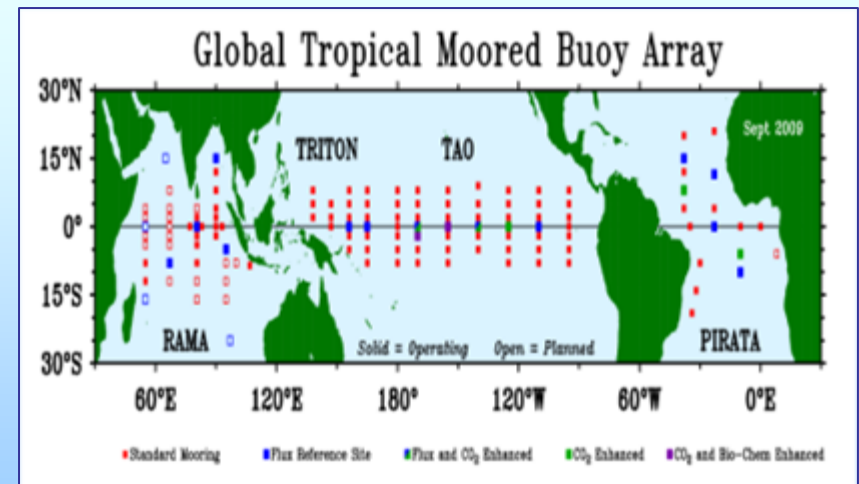
# Indonesia Partnership Visits To NOAA National Data Buoy Center (NDBC) and Coastal Data Development Center (NCDDC) September 8-12, 2011





# Future *Resource Sharing* Partnerships Being Advanced

- With Success in the Indian Ocean, NOAA is Expanding
- Korea's New Research Vessel: Potential New Partner for Pacific Tropical Moored Buoy Array
- China: SOA-First Institute of Oceanography for the Indian and Southern Oceans
- Chile for East Pacific



# KORDI Training Opportunities on NOAA Research Vessel KA



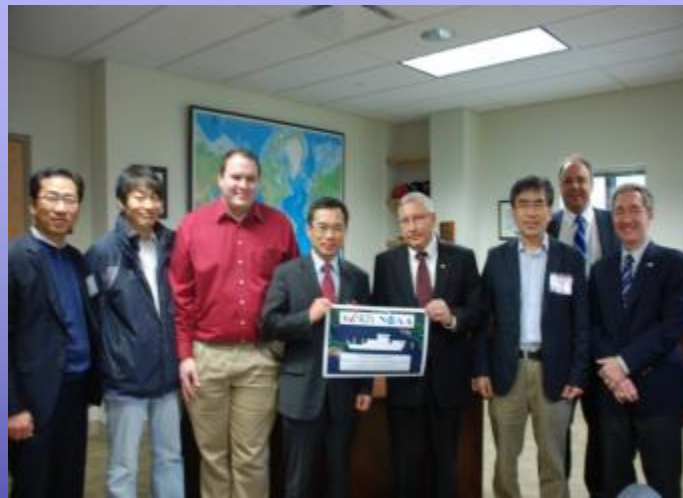
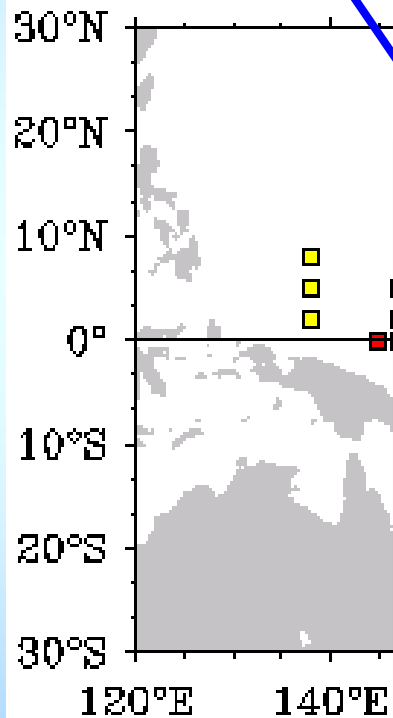
- KORDI Technicians Participated in Two TAO cruises October/November 2010 & 2011 to Receive Training on Buoy Maintenance and Servicing
- KIOST Technicians Will Deploy Two ADCPs on TAO 165E in February 2013

# Two TAO Lines Of Geographic Interest for KIOST-NOAA Collaboration

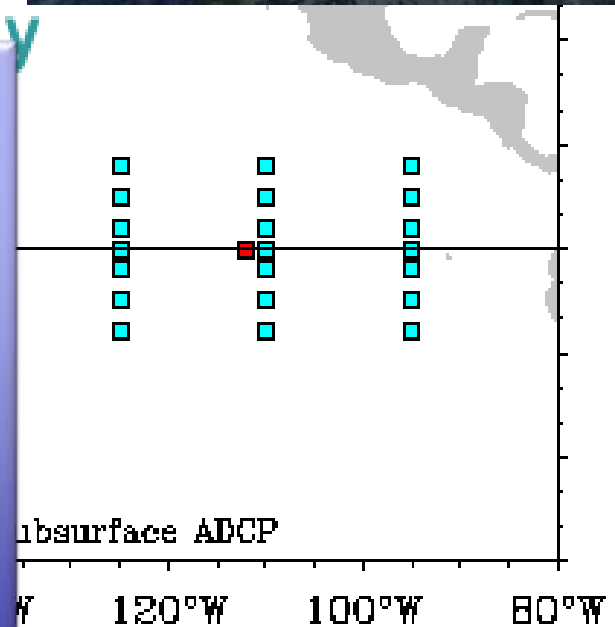
165E

180

TAO/TRITON Array



MLTM/KORDI Visit to NOAA's  
National Data Buoy Center NDBC  
February 2012



# Chilean R/V *Cabo De Hornos* Concepcion, Chile August 2012

Exploring  
CONICYT-SHOA-  
NOAA  
Collaboration on  
Tsunami  
Monitoring, Ocean  
Acidification and  
Eastern TAO  
Support



# All Colleagues Are Most Welcome!

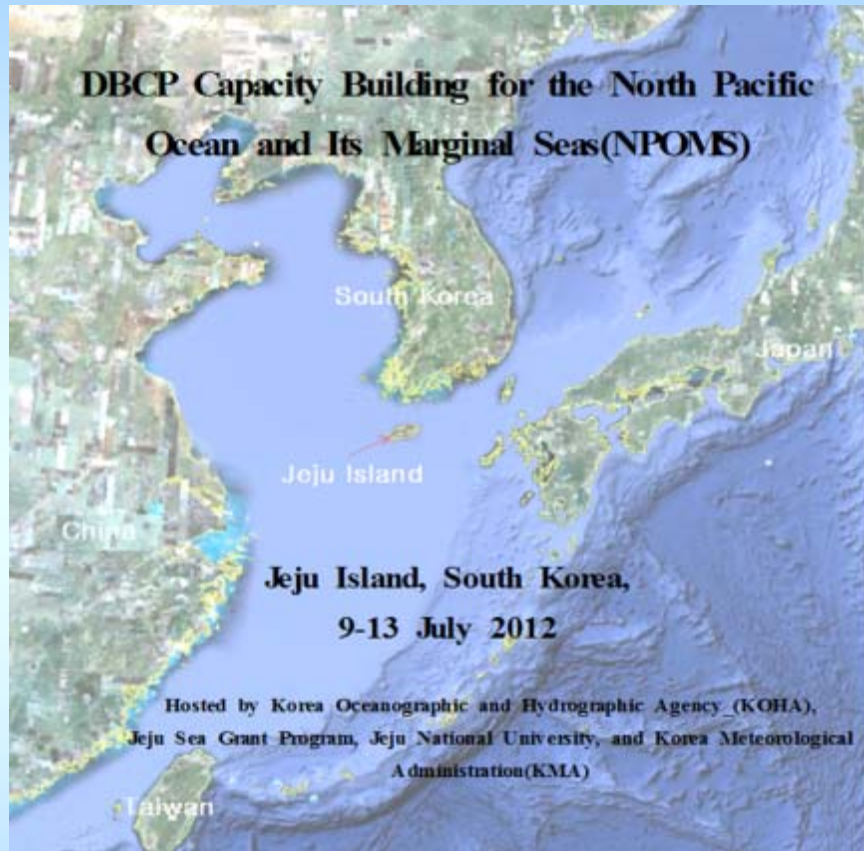
- Meeting of the DBCP Task Team on Capacity Building (TT-CB)
  - Wednesday 3 October 2012
    - 1600 – 1700
  - Esplanade Hotel Room A

WIO-3 Mombasa Highlights and WIO-4 Zanzibar Preparations

Information and Communications Technology (ICT)

2013 DBCP Asia Capacity Building Workshop(s)

# Other 2012 DBCP PANGEA Capacity Building Workshops



## **DBCP/NIOT/BOBP-IGO Regional Workshop on**

### ***The Best Practices for Instruments and Methods of Ocean Observation***

**19 - 21, November 2012.  
Chennai, India**

**Goal: bring together Scientists, Engineers and Technicians working on ocean observation system and Industry to focus on capacity building on best of practice on calibration and testing of instruments.**



# Ways Forward

- Dependency, Donors-Recipients Is No Longer Sustainable Method of Capacity Development,
- PANGEA *Resource Sharing* Partnerships Have Proven to Be an Effective and Inclusive Means to Build Observation-Applications Capacity Around the World,
- The PANGEA concept will be Equally Effective Between any Two Institutes around the World who have Common Goals and Seek to Share Resources,
- Please Stop Me This Week In Fremantle to Discuss How Your Institute May Engage



# Thank You!

[Sidney.Thurston@noaa.gov](mailto:Sidney.Thurston@noaa.gov)



[www.jcomm.info/pangea-concept](http://www.jcomm.info/pangea-concept)