

Report of the

**Tropical Moored Buoy
Implementation Panel**

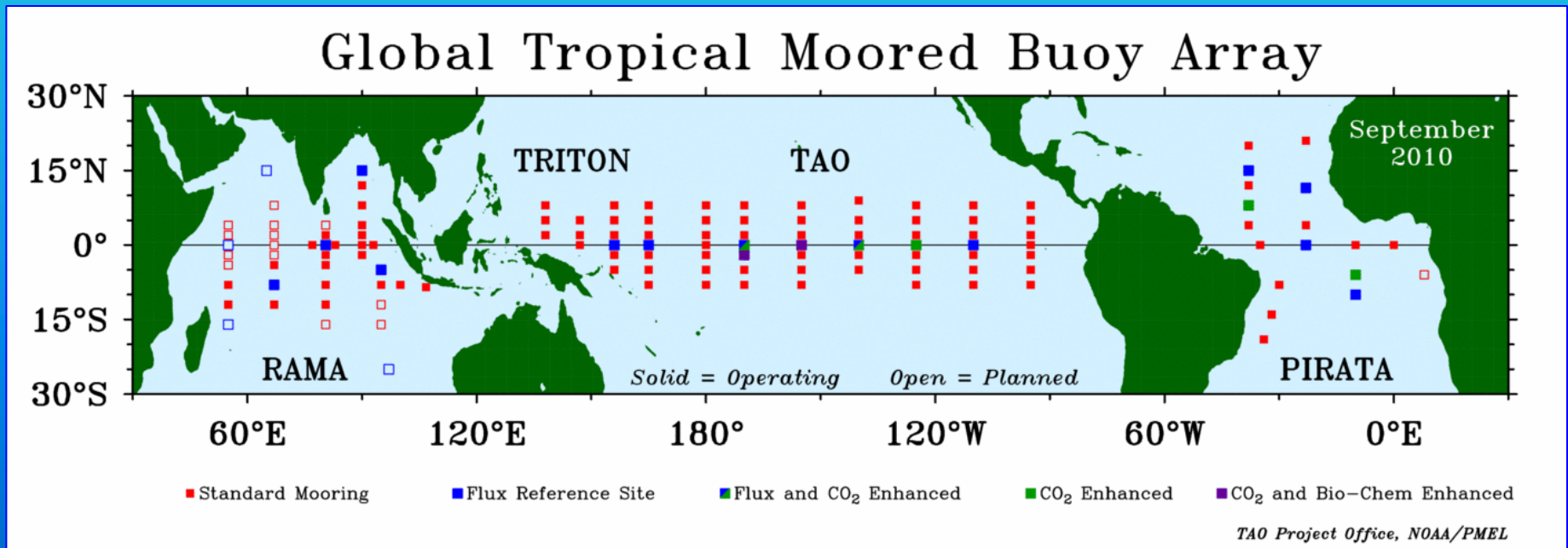
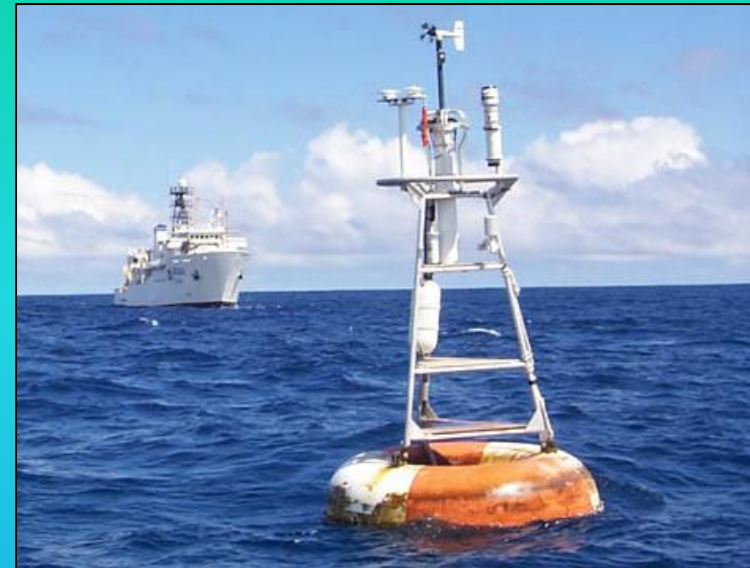
to the

**26th Session of the
Data Buoy Cooperation Panel**

September 27-30, 2010

Oban, United Kingdom

Global Tropical Moored Buoy Array:
A coordinated, sustained, multi-national effort to develop and implement moored buoy observing systems for climate research and forecasting throughout the global tropics

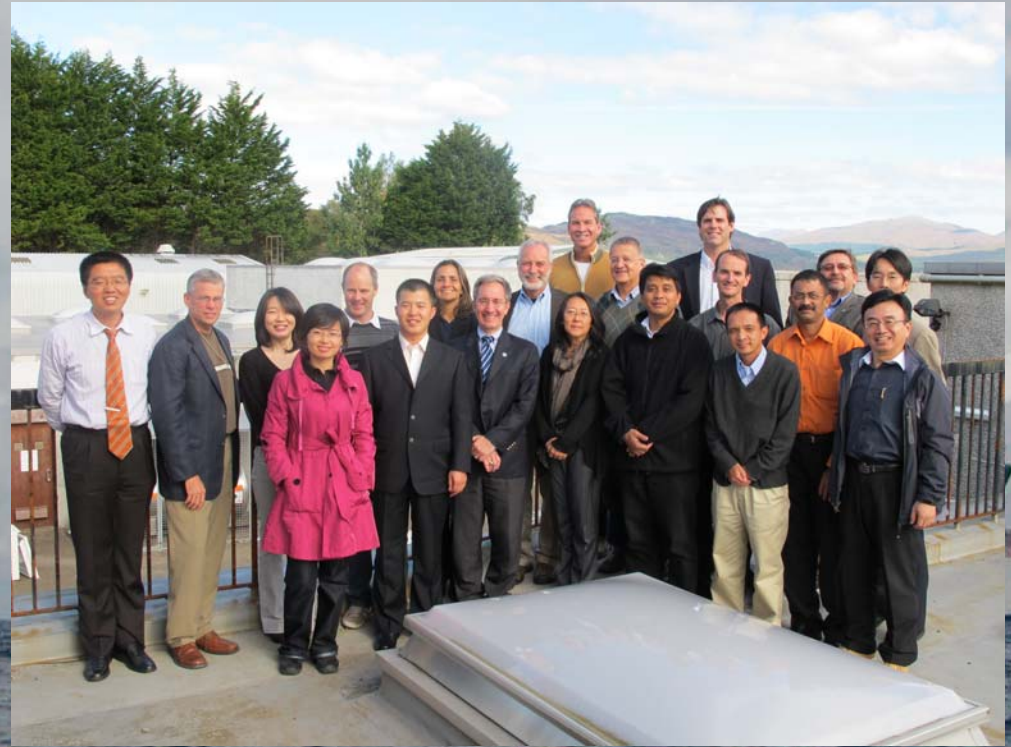


A contribution to GOOS, GCOS, and GEOSS

Tenth Session of the Tropical Moored Buoy Implementation Panel (TIP-10)

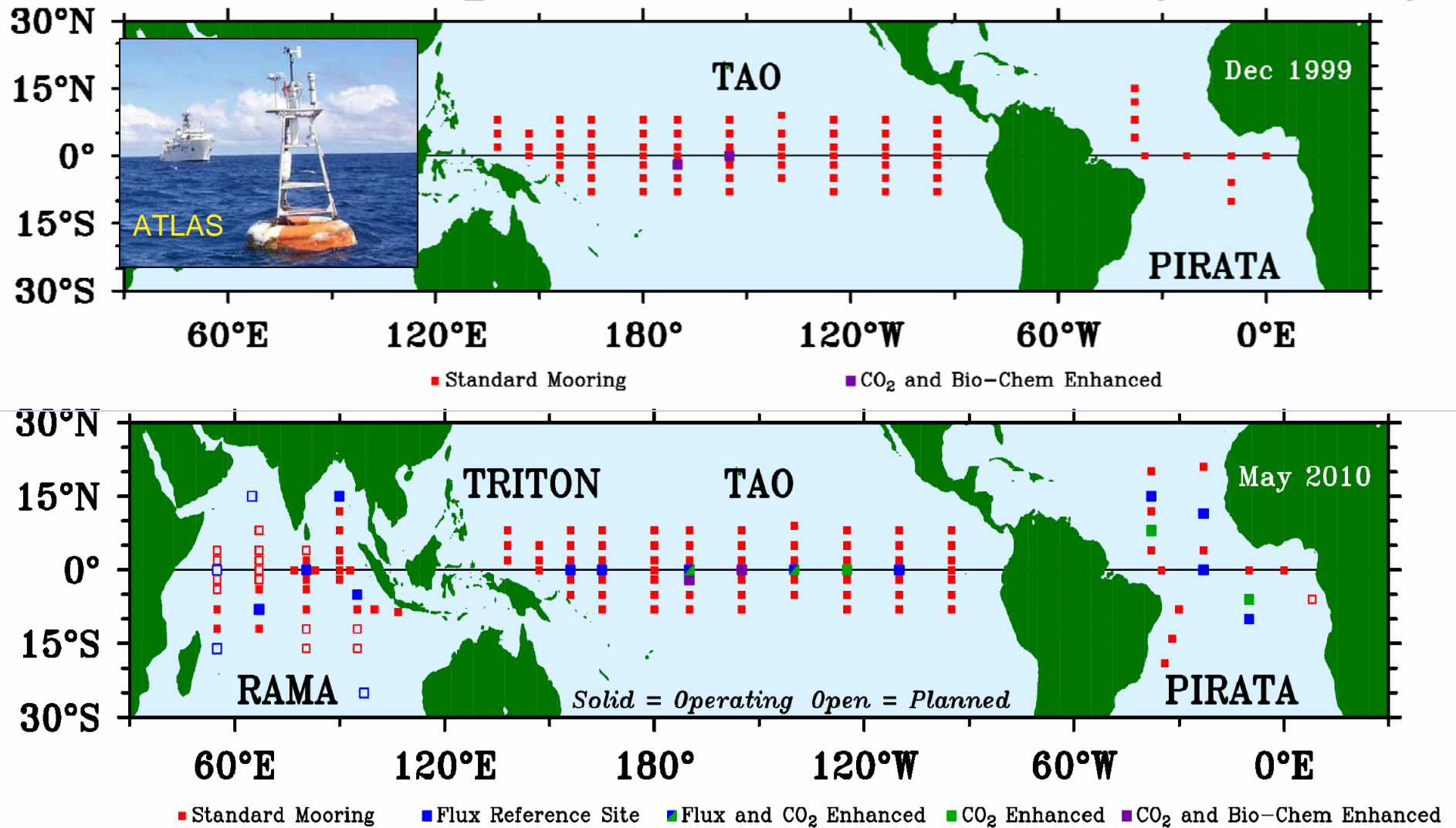
Purpose of meeting:

- 1) To review measurement standards for tropical moored buoy programs;
- 2) To update the status of moored buoy array developments in the tropical Pacific, Atlantic, and Indian Oceans;
- 3) To recommend actions to strengthen international cooperation



*TIP Workshop
Oban, UK
26 September 2010*

Global Tropical Moored Buoy Array



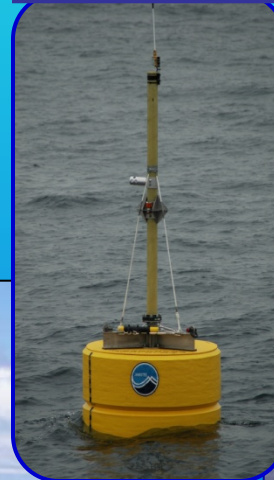
Tropical Moored Buoy Systems

TIP-10 Purpose #1:
To review standards
for tropical moored
buoy systems and
measurements

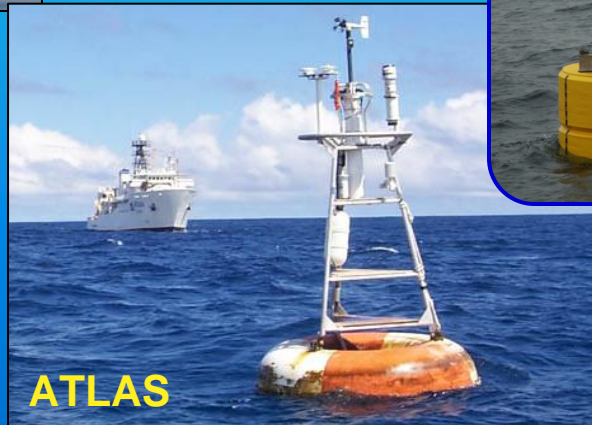
"ATLAS-B"



Mini-TRITON



**PMEL
'T-Flex'**

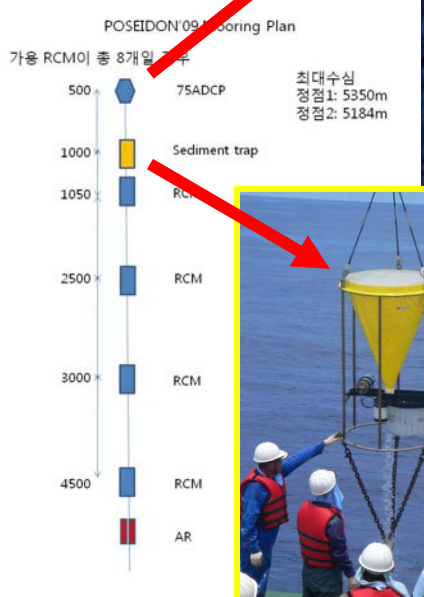
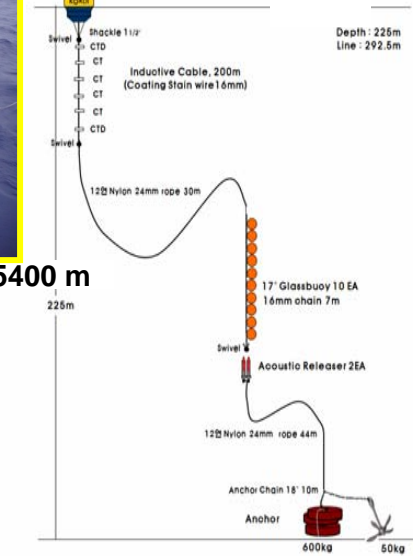
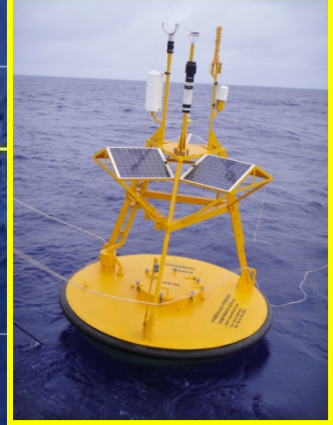
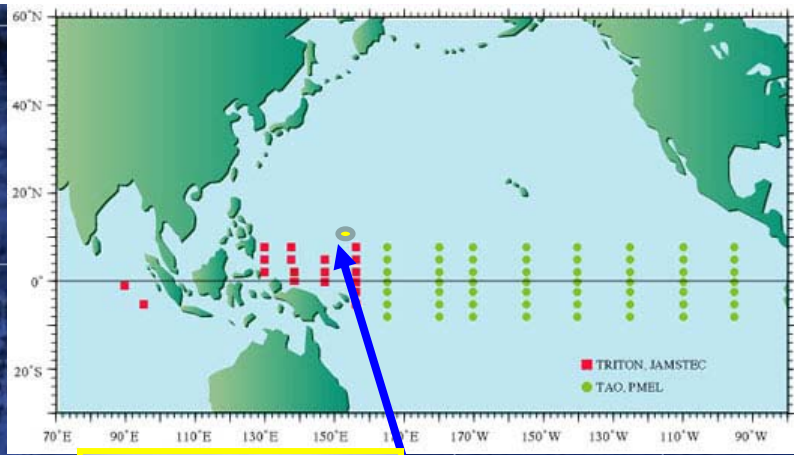
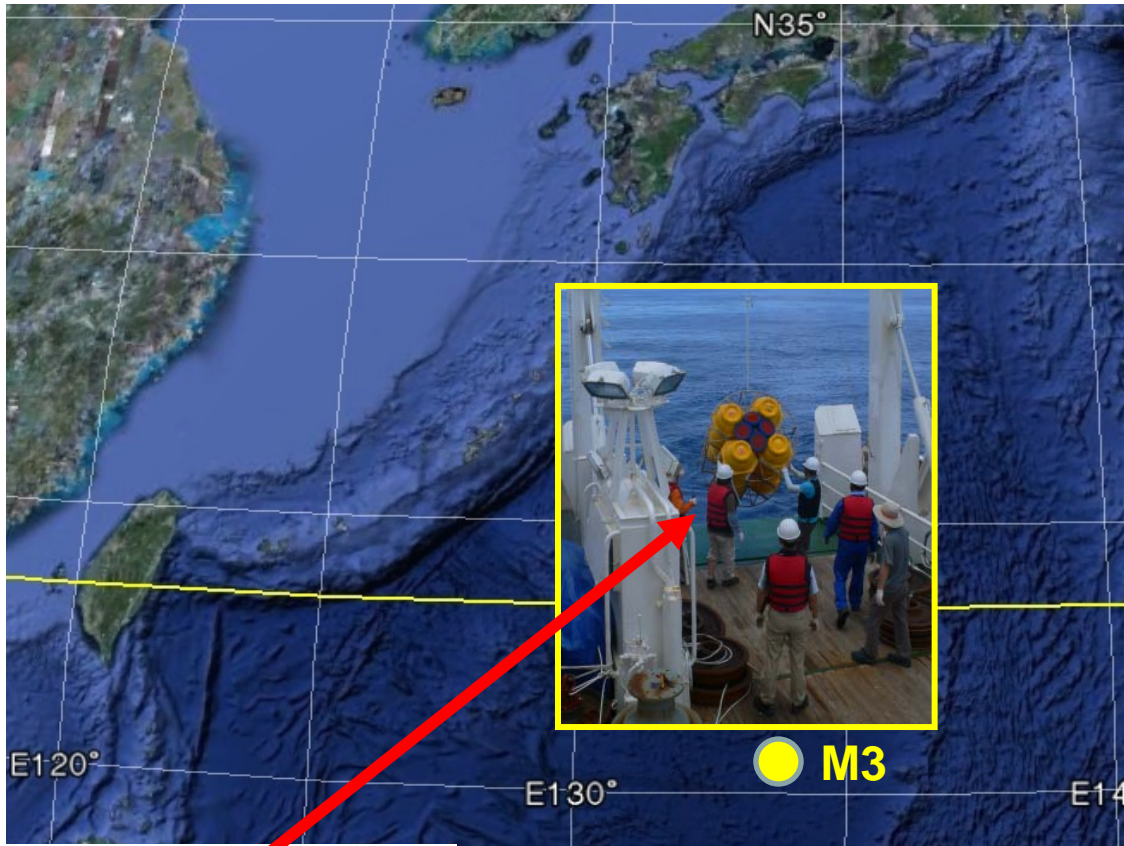
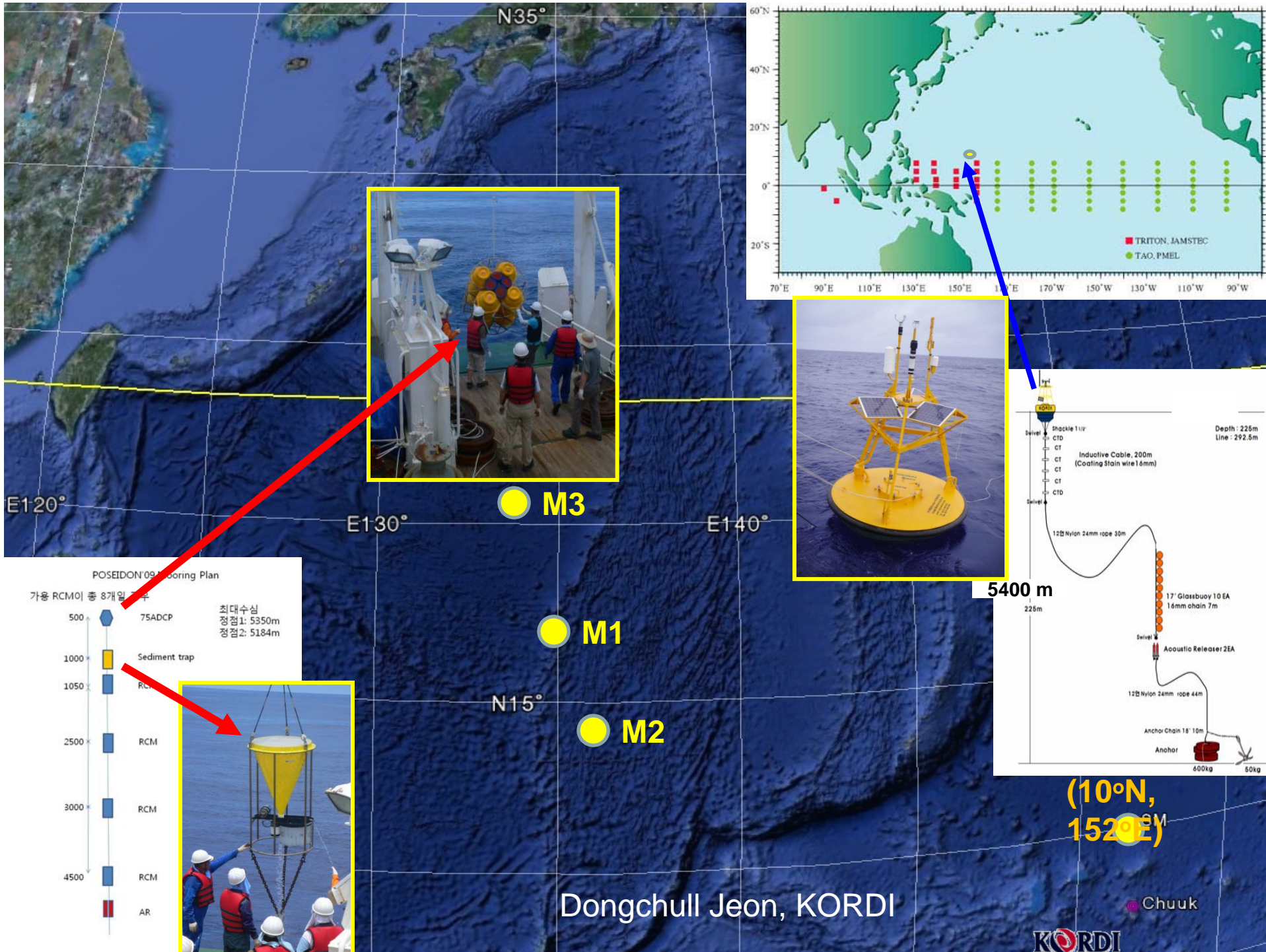


Tenth Session of the Tropical Moored Buoy Implementation Panel (TIP-10)

Outcome #1

Establish tropical moored buoy technical coordination group with Paul Freitag (PMEL) as lead coordinator

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Dongchull Jeon, KORDI



Chuuk

Tenth Session of the Tropical Moored Buoy Implementation Panel (TIP-10)

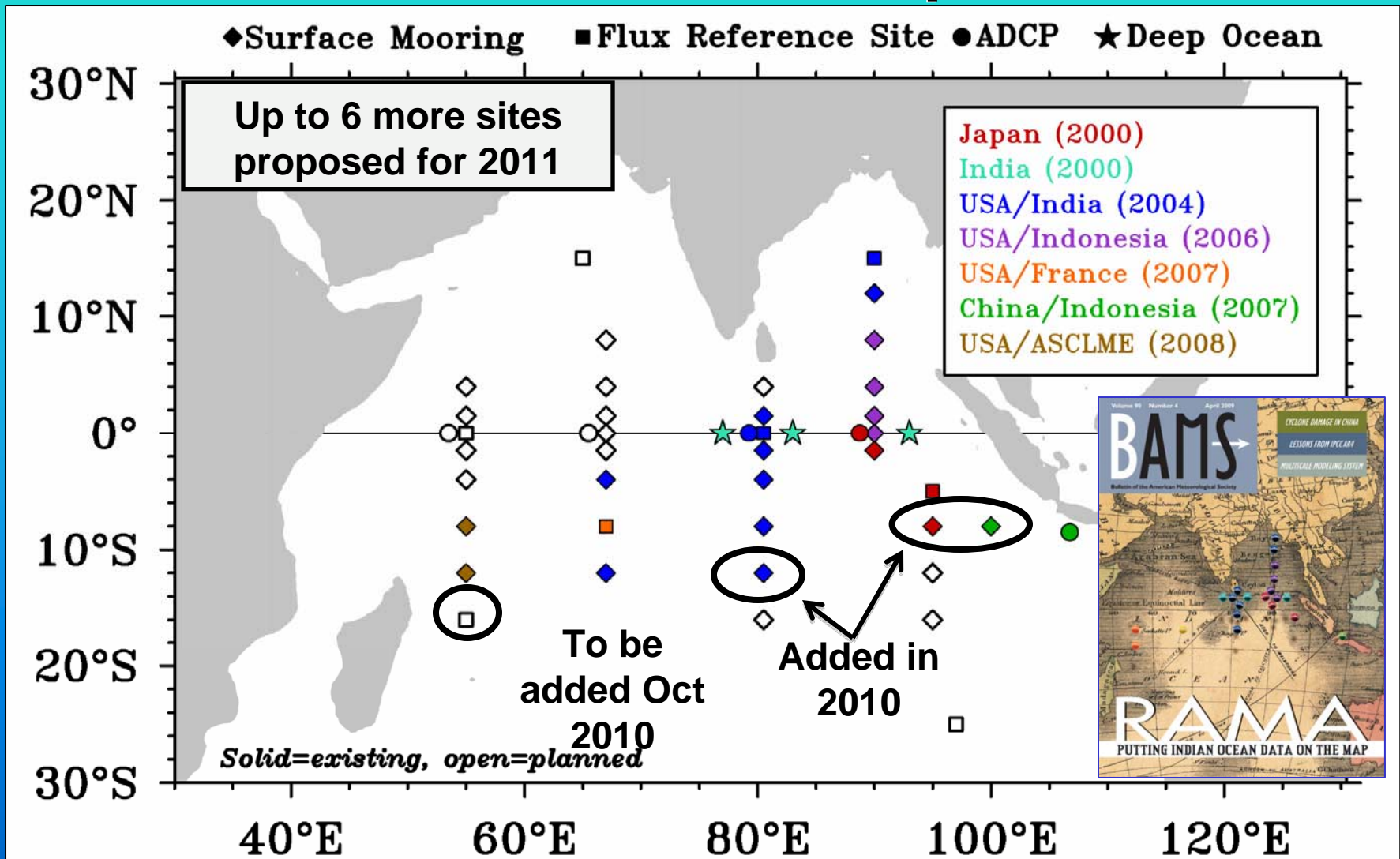
Outcome #2: Array Expansion Protocols (a la PIRATA)

1. Interested group submits proposal to SSG (scientific rationale, technical feasibility, system compatibility, data policy)
2. Proposal sent out to three reviewers
3. Proposal revised & resubmitted to SSG
4. Successful projects commissioned for three year pilot phase
5. Successful pilot leads to permanent inclusion into array

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RAMA Present Status

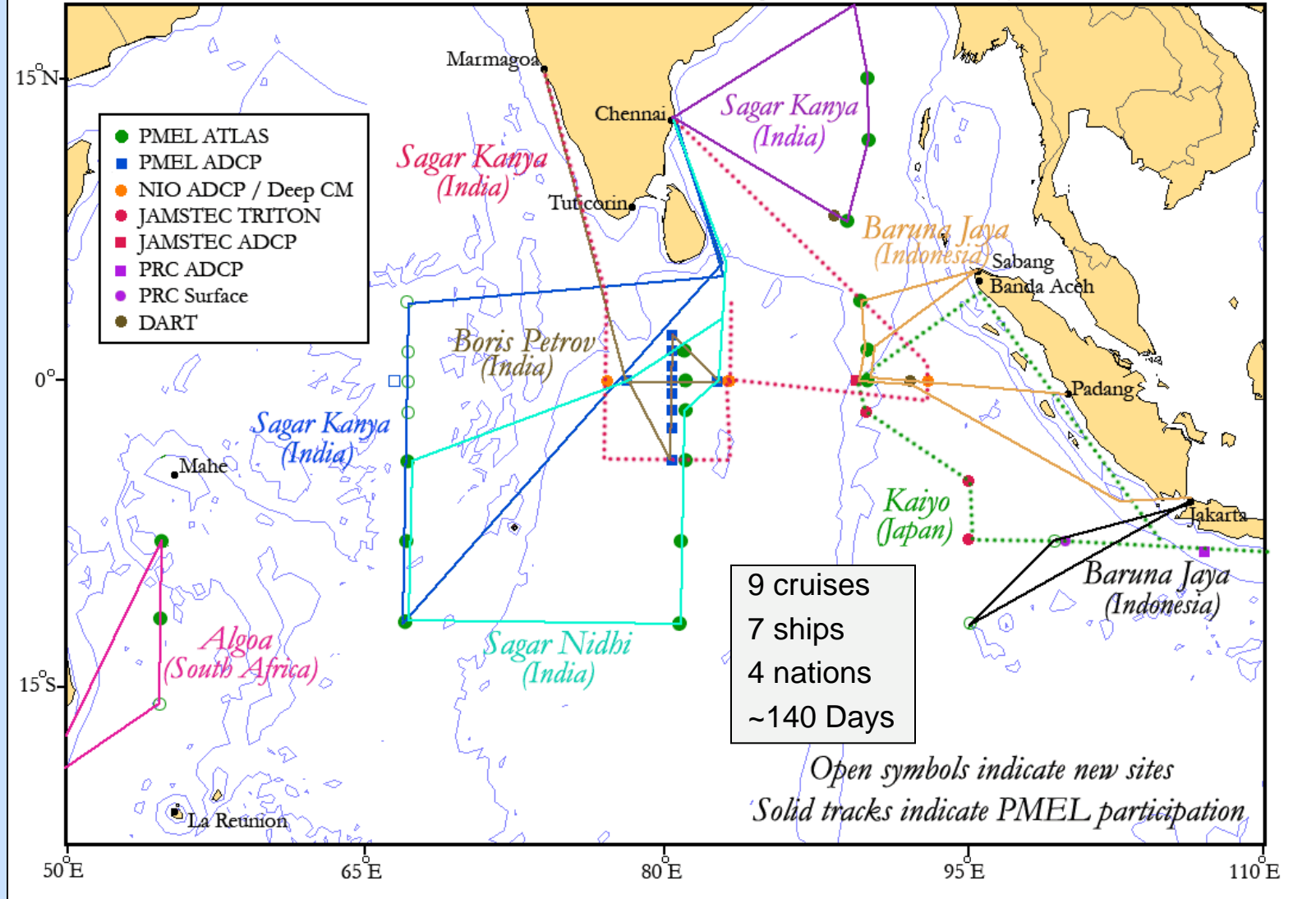
59% of sites occupied



RAMA Cruises

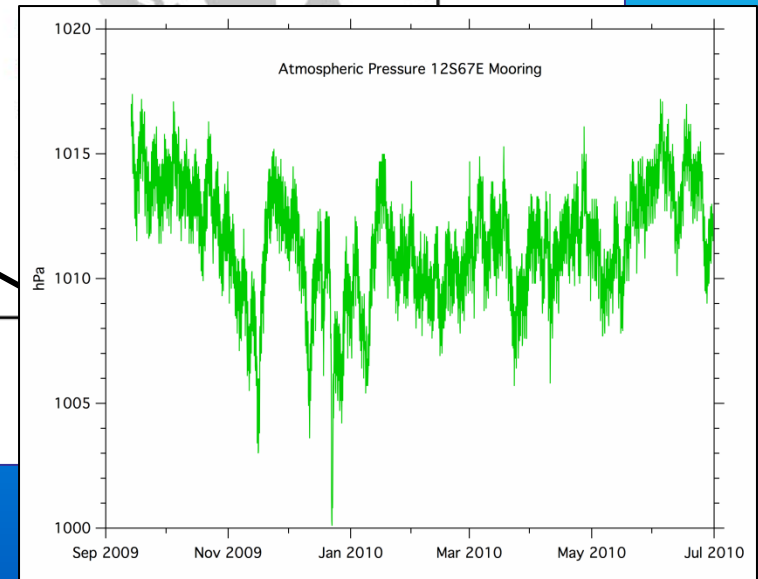
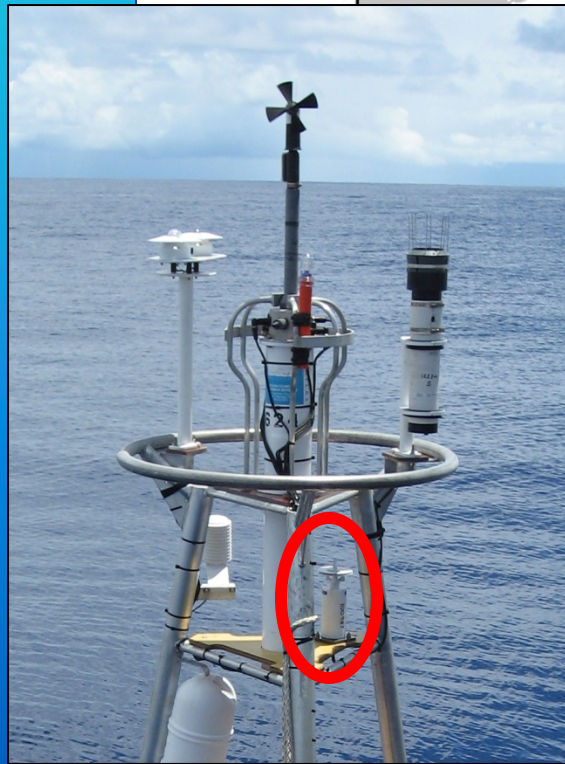
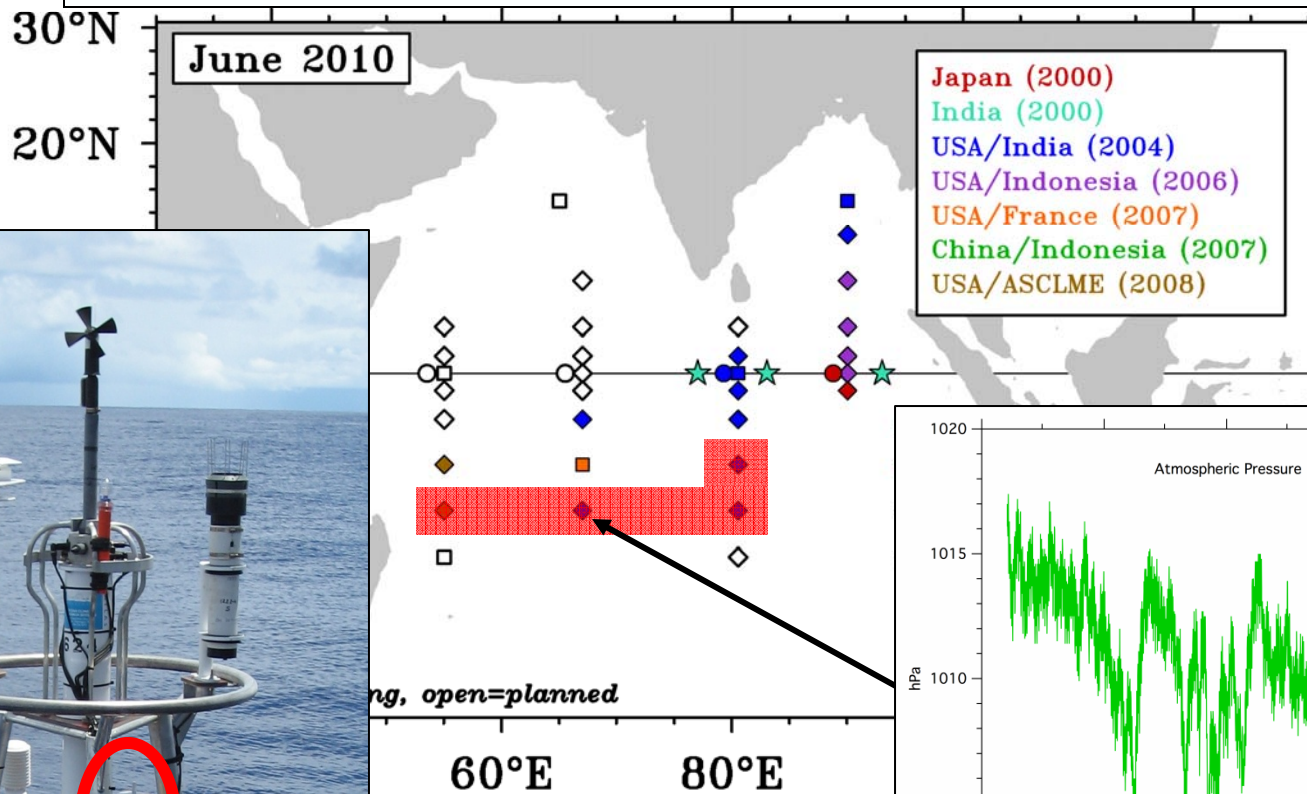
June 2010-May 2011

Planned Indian Ocean Cruises Jun 2010 - May 2011



New RAMA Partnerships

Meteo-France initiated support for sea level pressure measurements at 4 RAMA sites to improve cyclone forecasting. Three sites are on-line with a 4th scheduled for Oct 2010.

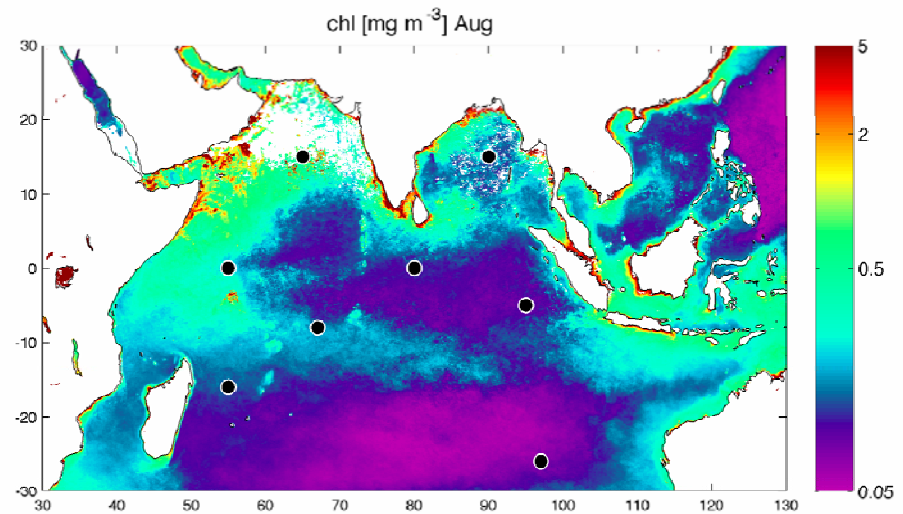


Biogeochemical Measurements: A SIBER⁺-RAMA-Indoflux* Initiative

Objectives: To provide data for

- A) Defining biogeochemical variability in key regions of the Indian Ocean and for understanding the physical, biological and chemical processes that govern it;
- B) Developing models of ocean-atmosphere-biosphere interactions;
- C) Assessing the impacts of climate change on oceanic primary productivity and air-sea CO₂ exchange.

Monthly SeaWiFS Chl-a Concentrations
(Solid Dots are RAMA Flux Reference Sites)



Target Locations: Arabian Sea, Bay of Bengal, Equator, Seychelles-Chagos Thermocline Ridge

Key Measurements: CO₂, pH, Fluorescence, Particle Backscatter, O₂

*Indoflux=Indian national network of monitoring stations for climate change (land-based)

⁺SIBER=Sustained Indian Ocean Biogeochemical and Ecosystem Research Program

First Biogeochemical Measurements in RAMA

Fluorometer to measure chlorophyll concentrations

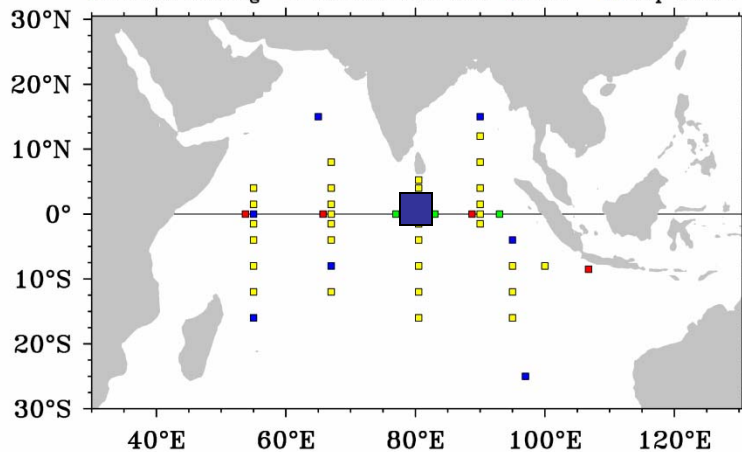
Deployed 0° , 80.5° E at 25 m depth

22 May 2010 from ORV Sagar Kanya

Pete Strutton, Univ. Tasmania, PI

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

■ Surface Mooring ■ Flux Reference Site ■ ADCP ■ Deep Ocean

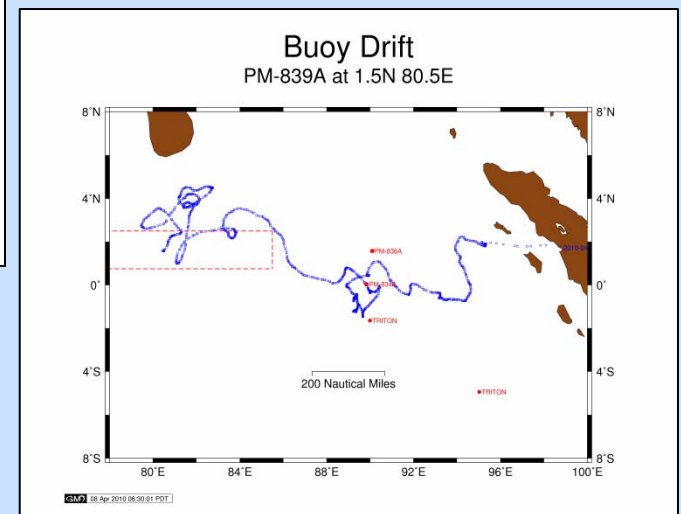
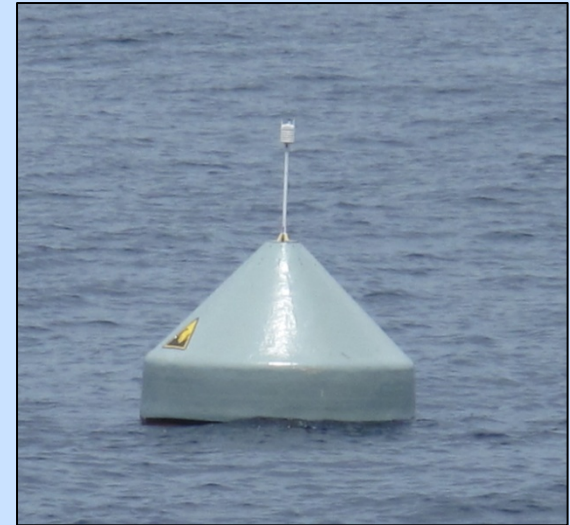


Deployment of a similar system on an ATLAS mooring in the Pacific from a NOAA ship

Conehead Buoys

Engineering effort to make buoys more vandal resistant: remove buoy attachment points and make surface smooth so it is hard to board.

- **August 2008: 2 prototypes deployed; Both were recovered one year later intact with nearly complete data return.**
- **Aug/Sept 2009: Second deployment of 2 buoys; One set adrift and recovered in Indonesia.**
- **May 2010: Third test of 2 buoys deployed; one has been vandalized.**



RAMA Data Access

Tropical Atmosphere Ocean project

Home Project overview **Data display and delivery** El Niño & La Niña Site Map

T·A·O Data display and delivery Find

To select mooring sites, click orange boxes to select lines of sites, click and hold on your mouse to draw a box around sites, or click single sites. Red indicates which sites are selected. Solid squares show where all selected variables are available. Half filled squares show where some are available. Empty squares show where none are available. This page may take a few moments to load on slower networks and computers.

TAO/TRITON (Pacific) PIRATA (Atlantic) **RAMA (Indian)**

De-Select Sites

Time Series Profiles Time Section Lat Lon Map Depth Section

One Variab One Site Separate Plot Overlay
 SW Rad LW Rad Rain Wspd Uwnd Vwnd Wdir Wnd Ve RH
 Air T SLP SST T(z) SSS S(z) SSD D(z) Heat
 Dyn Ht 20C Ucur Vcur Cur Vec Uadcp Vadcp Long Lat

2004 October 2.. 2010 June 2.. Monthly

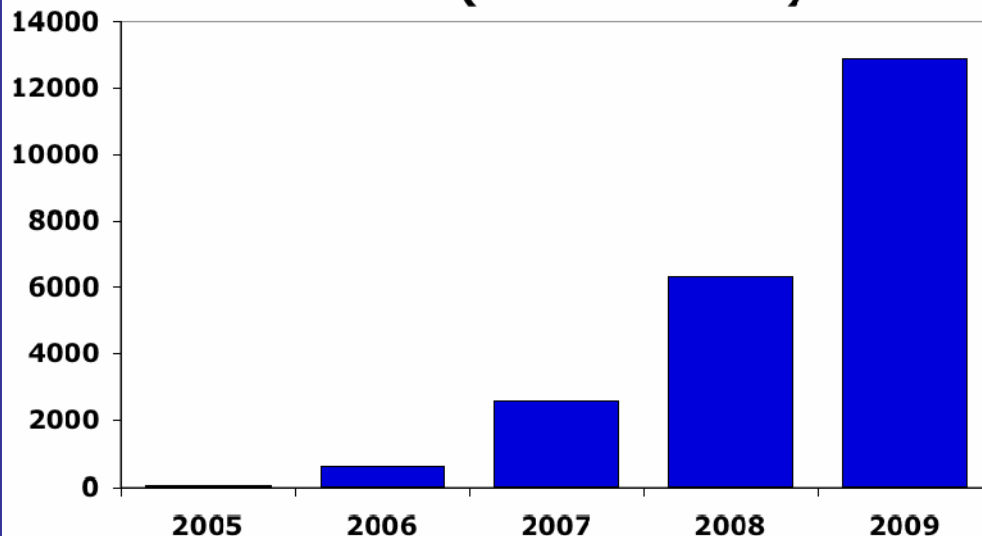
files by site ascii None

[Definitions](#) [Availability](#) [Clear](#) [Deliver](#) [Display](#)
[Problems?](#) [Non-JAVA Version](#) [Old Data Display](#) [Old Data Delivery](#) [Comments or Suggestions?](#)
 Mac OS X Users: [Safari and Firefox are the recommended browsers](#)
[Acknowledgment for use of TAO, PIRATA, and RAMA data](#)

Home | Project overview | Data display | Data delivery | El Niño & La Niña | Site map

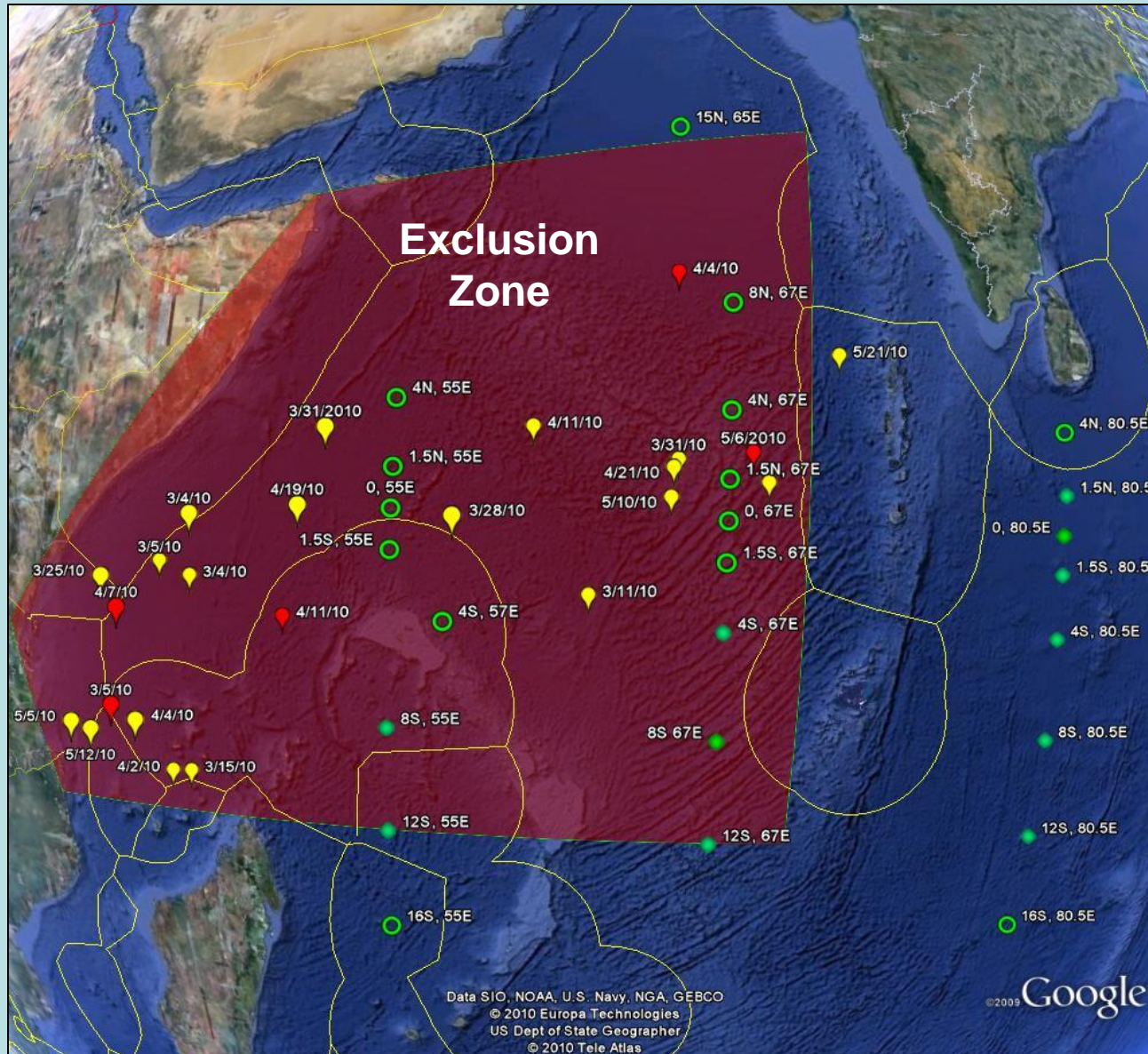
TAO Project Office
 NOAA | Pacific Marine Environmental Laboratory
 7600 Sand Point Way NE
 Seattle, WA 98115
oar.pmel.taotech@noaa.gov
[Credits](#) | [Disclaimer](#) | [Privacy Policy](#)

RAMA Data Files Delivered via the Web (Total=22365)



<http://www.pmel.noaa.gov/tao/>

Piracy and Security



NOAA requires cruise specific security plans that address the threat of piracy to allow its personnel on board ships operating in the Exclusion Zone.

Example: Seychelles Coast Guard escort of South African R/V Algoa to service 8° N, 55° E ATLAS mooring in October 2010.

IndOOS Resource Forum

Established in 2009 by IOGOOS; advised by CLIVAR/GOOS Indian Ocean Panel

Terms of Reference:

- To review the requirements for the implementation of IndOOS;
- To facilitate and coordinate resources that may be applied to the system, especially ship time for RAMA;
- To encourage scientific and technological initiatives in the participating countries to meet the objectives of IndOOS;
- To report on its activities to the Heads of the institutions providing resources.

