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
Tropical Moored Buoy Systems

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

“ATLAS-B”

NDBC “ATLAS Refresh”

“Conehead”

PMEL “T-Flex”

Mini-TRITON

Chinese “ATLAS”

ATLAS

TRITON
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

TIP Workshop
Oban, UK
26 September 2010
Dongchull Jeon, KORDI
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
RAMA Present Status
59% of sites occupied

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

Up to 6 more sites proposed for 2011

Japan (2000)
India (2000)
USA/India (2004)
USA/Indonesia (2006)
USA/France (2007)
China/Indonesia (2007)
USA/ASCLME (2008)

Solid = existing, open = planned

To be added Oct 2010
Added in 2010
RAMA Cruises
June 2010-May 2011

Planned Indian Ocean Cruises Jun 2010 - May 2011

9 cruises
7 ships
4 nations
~140 Days

Open symbols indicate new sites
Solid tracks indicate PMEL participation
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.

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)

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.
- May 2010: Third test of 2 buoys deployed; one has been vandalized.
RAMA Data Access

Tropical Atmosphere Ocean Project

Data display and delivery

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.

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

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