The Global Tropical Moored Buoy Array

Kentaro Ando* & Mike McPhaden#

As Tropical Moored Buoy Implementation Panel member

*RIIC/JAMSTEC
#PMEL/NOAA

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
Interacting Variations in Time and Space

- Typhoons, Cyclones & Hurricanes
- MJO
- Indian Ocean Dipole

PIRATA Array Status
PIRATA BAMS paper (Aug. 2008) & new acronym:
Prediction and Research Moored Array in the Tropical Atlantic

The PIRATA Program: History, Accomplishments, and Future Directions


(Courtesy of Prof. Campos)
The INCT-MC-Ocan includes a program of monitoring the SW Atlantic with repeat hydrography, currentometry, wave gauges and an Atlas buoy entirely constructed in Brazil.

The long term goal is to have the ATLAS-B deployed in all PIRATA sites.

The ATLAS-B will provide valuable information for understanding SACZ variabilities

(Courtesy of Prof. Campos)

The Atlas-B Project

RAMA

Resource Formula:

- NOAA provides most equipment (+JAMSTEC, NIO, FIO)
- Regional partners provide ship time

67% of sites occupied at present (31 of 46)
23/01/2014

Planned RAMA Cruises Jul 2013 - Jun 2014

- 8 cruises
- 6 ships
- 7 nations
- 34 moorings
- 208 days

Fired
Upon
Boarded
Hijacked

Open symbols indicate unoccupied sites

Piracy on the Decline
Number of Indian Ocean Incidents

http://www.oni.navy.mil/Intelligence_Community/piracy.htm
Real-time Data Return
July 2012 – June 2013

RAMA Mooring Real-Time Data Return
July 2012 - June 2013

Data Return =
Days of data / Days of data expected

All Sites: 65%

- ATLAS Mooring
- Ballong Mooring
- TRITON Mooring

Data Return:
- 0% - 50%
- 50% - 75%
- 75% - 90%
- 90% - 100%

RAMA Data Access
Tropical Ocean and Global Atmosphere 1985-1994

- Sea level station network
- VOS XBT network
- Surface drifter
- Moored array

TAO/TRITON in crisis

Since 2000, a U.S./Japan collaboration
TAO/TRITON in the beginning

Moored Array Locations

R/V Natsushima

JENEX’87
First contribution for ENSO study by Japan/JAMSTEC
1989-1994: JAPACS
1995-: TOCS (In house project)
1999-: TRITON
TAO Ship Time and Data Return since 2003

Time series of data return from TRITON and m-TRITON

Real-time

- Return Rate of Meteorological Data
- Average of Met data: 73%

- Return Rate of Oceanographic Data
- Average of Ocean data: 85%

- Return Rate of All Data
- Average of all: 79%

Delayed (by recovery)

- Return Rate of Meteorological Data
- Average of Met data: 69%

- Return Rate of Oceanographic Data
- Average of Ocean data: 94%

- Return Rate of All Data
- Average of all: 82%

One year mooring 1.5 year One year mooring 1.5 year
Summary: TAO/TRITON Array in Crisis

- 20 of 55 TAO moorings not transmitting
- Data return from TAO is presently at less than 40% for any given day
- NOAA Ship Ka’imimoana (KA) has been deactivated
- TRITON cruise is assured until 2016, but not after

These will lead loss of climate data, and less capability for climate forecasting.
In particular, meteorological data is only taken by surface buoys.

TPOS(Tropical Pacific Observing System)2020 workshop in SIO
Sponsored by OOPC, NOAA, JAMSTEC, KIOST, and SOA

TOR:
Review the research and operations achievements of the TAO/TRITON component.
Highlight the impacts of the tropical Pacific observing system on the delivery of information/services
Evaluate (review/assess/prioritise) existing and potential requirements for sustained observations of ocean variables in tropical Pacific Ocean* (15°S-15°N).
Evaluate the adequacy of existing observing strategies to deliver requirements for variables
Recommend revisions and/or adjustments to the current suite and configuration of observing systems
Identify potential enhancement or reconfiguration of this sustainable observing suite to address gaps, etc.
Evaluate logistical requirements for implementation of recommended Tropical Pacific Observing System.
Evaluate requirements for delivery of data, and derived products and information, in real time and delayed
Assess readiness of new technologies, their potential impact and feasibility in addressing requirements, etc.
Develop a report of this workshop, with recommendations on the development of a process for the on-going evaluation of the observing system
TPOS2020 workshop
at Scripps Institute of Oceanography (Jan. 27 to 30)
Sponsored by OOPC, NOAA, JAMSTEC, KIOST, and SOA

14 White Papers are now being developed, covering reviews, requirements, and implementations for TPOS2020 in wide ranges from research, assimilation to operational forecast.

Not only moored buoys but also autonomous observing platforms (e.g. underwater gliders, surface gliders, Argo for tropics) will be key elements for a new Pacific observing system, TPOS2020.

The workshop will be a big milestone for the Pacific observation for future, and cause impacts to other basins. The workshop report will be published later after the workshop.