

# PIRATA

*Pilot Research moored Array in the Tropical Atlantic  
(1997 - 2008)*

*Prediction & Research moored Array in the Tropical Atlantic  
(2008 - ???)*

## Tripartite Programme

- FRANCE (IRD & Météo-France)
- BRAZIL (INPE & DHN)
- USA (NOAA/PMEL & AOML)

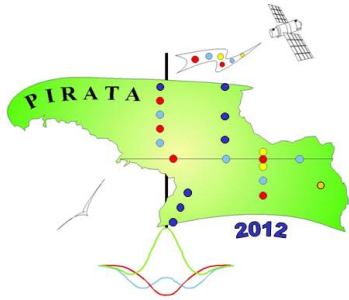


Photo: A.Kartavtseff

Co-Chairs of the SSG:

*Bernard Boulès (IRD/LEGOS-France), Rick Lumpkin (NOAA/AOML, USA)*





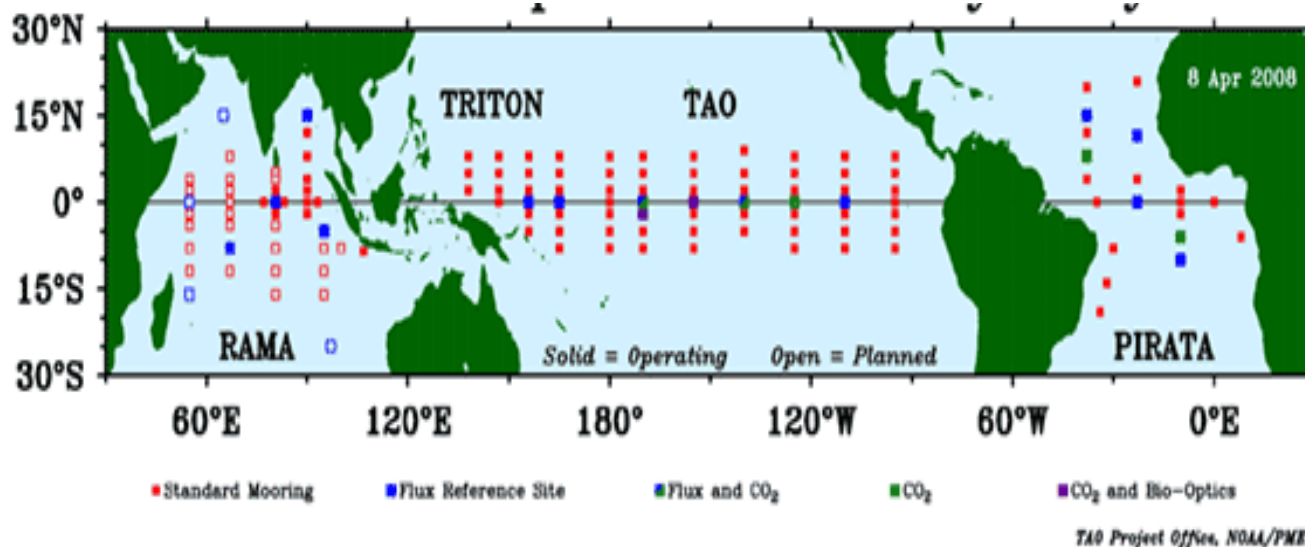
## What is PIRATA ?

PIRATA (Pilot Research Moored Array in the tropical Atlantic) is a multinational observation network established in 1997 by Brazil, France and United States of America, to improve our knowledge and understanding of ocean-atmosphere variability in the tropical Atlantic.

Reviewed and endorsed by CLIVAR & OOPC (in 2006)

MoU between Brazil, USA & France

Atlantic contribution to the Global Tropical Moored Buoy Array



## PIRATA ATLAS buoys:

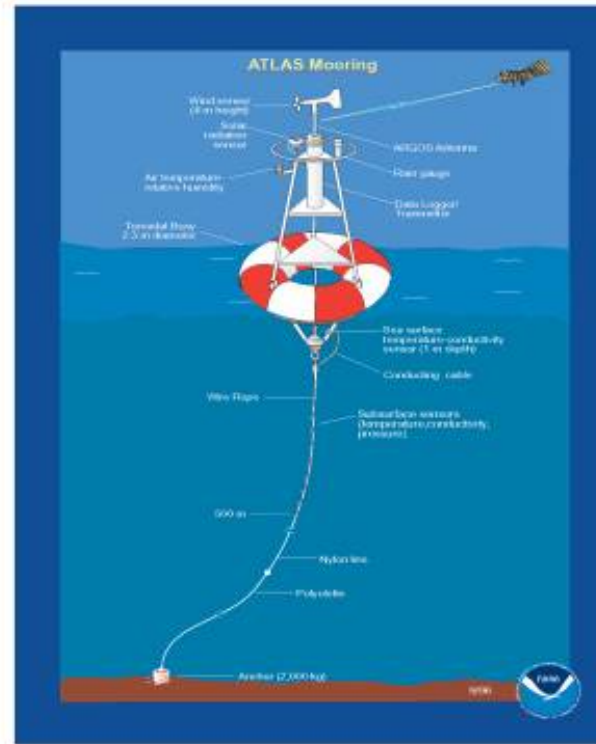
### Measured Parameters :

#### Atmosphere:

- wind (direction, speed)
- relative humidity
- air temperature
- precipitation
- incident radiation

#### Ocean:

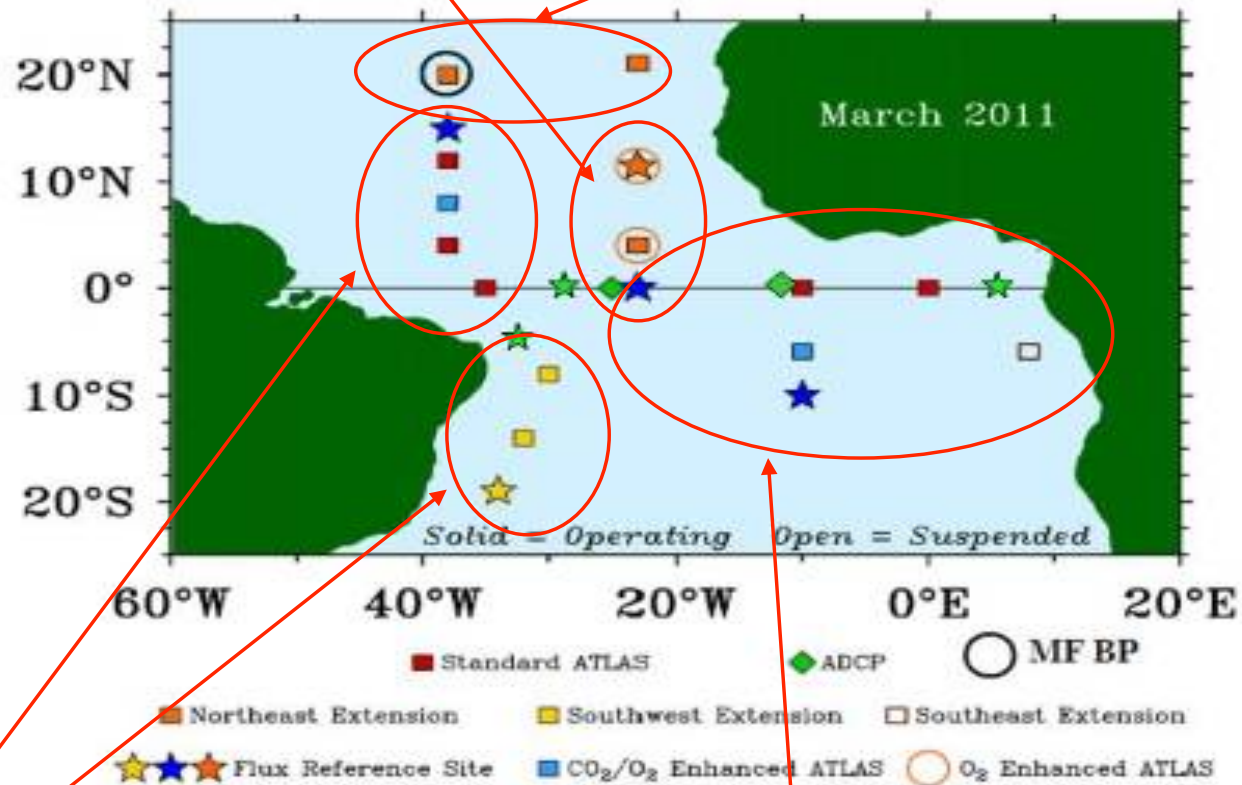
- temperature  
(11 levels from surface to 500m)
  - salinity  
(4 to 9 levels between 0 & 120m)
  - pressure (at 300 & 500m)
  - surface currents at 3 sites
- **Daily averaged data transmitted in real time by Argos;**
  - **High frequency data (10mn) available after servicing operations**



**PIRATA network servicing:**

17 ATLAS buoys  
from 2007

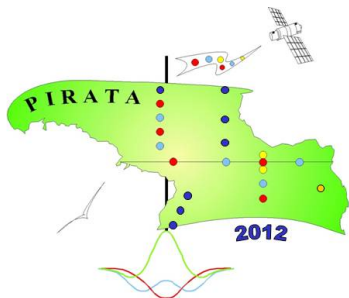
=> Yearly servicing



**Maintained by USA:** 4 Atlas buoys : 2 deployed in 2006, at 4N & 11N/23W, 2 at 20N/23W & 38W deployed in 2007

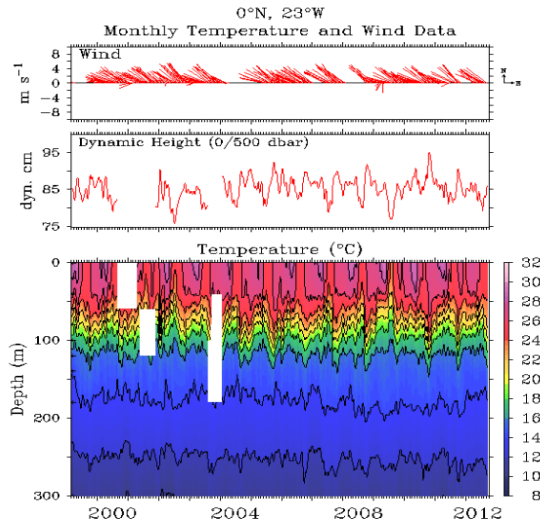
**Maintained by Brazil:** 8 Atlas buoys

**Maintained by France:** 6 Atlas buoys  
+ At 23°W-Equator : surface ADCP mooring since 2001;  
Buoy at 6S-8E deployed in 2006 and retrieved in 2007  
(test period for a Southeastern Extension by South Africa & BCLME).  
Contribution by US & Germany for 23W-Eq site from 2006.

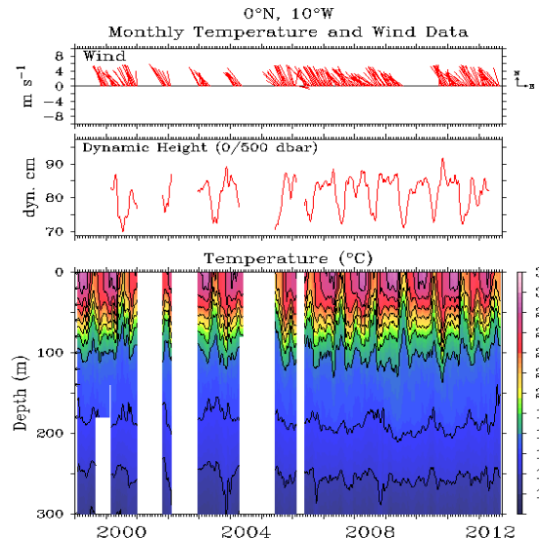


# Ex of PIRATA ATLAS time series (east of 23°W) available through the Pirata web site:

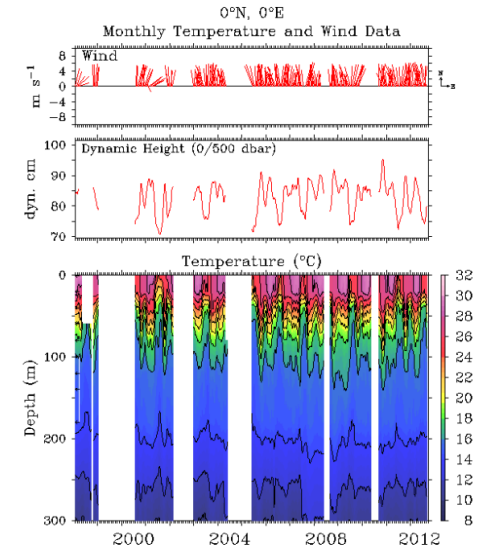
**Eq-23°W:**



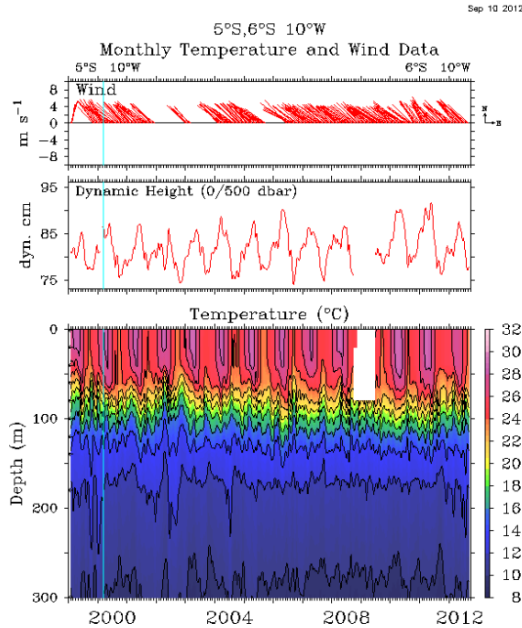
**Eq-10°W:**



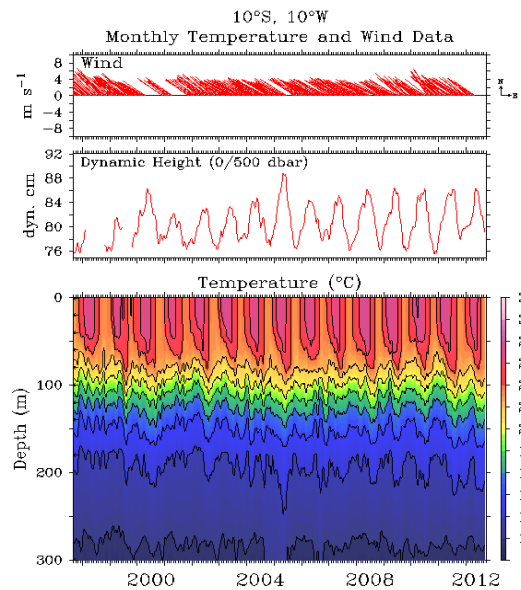
**Eq-0°E:**



**6°S-10°W:**

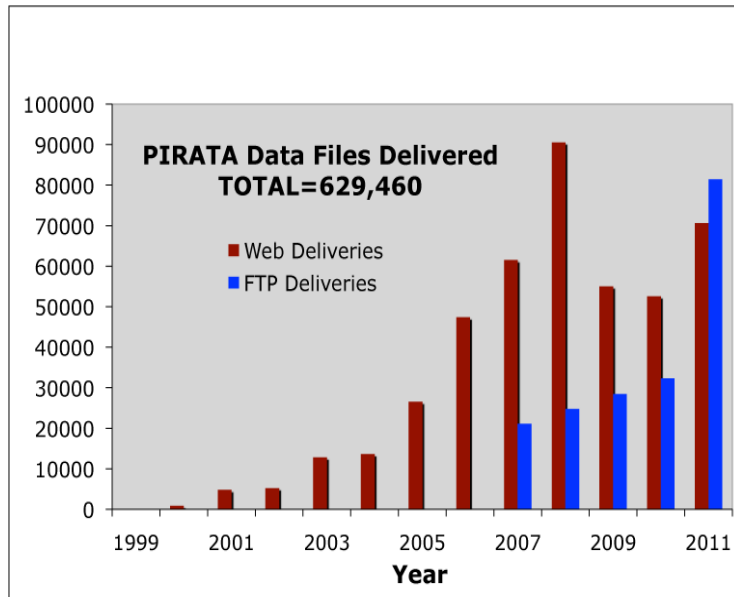
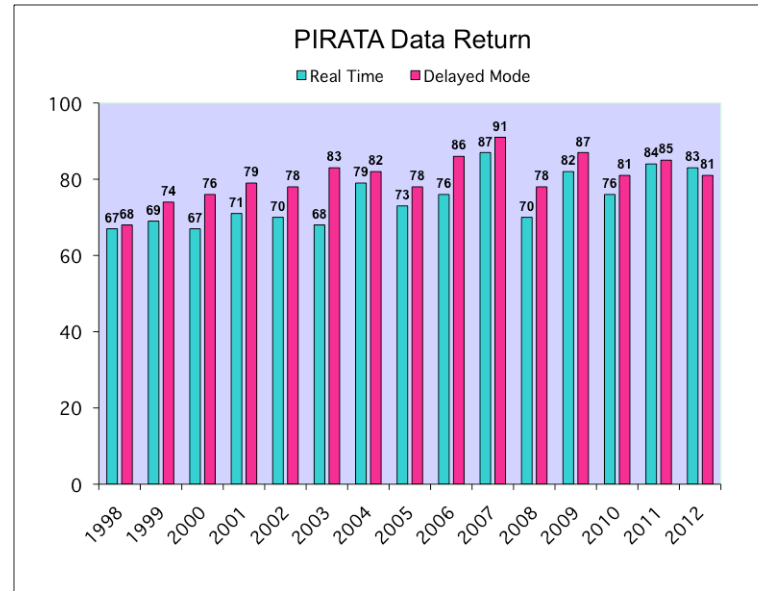


**10°S-10°W:**

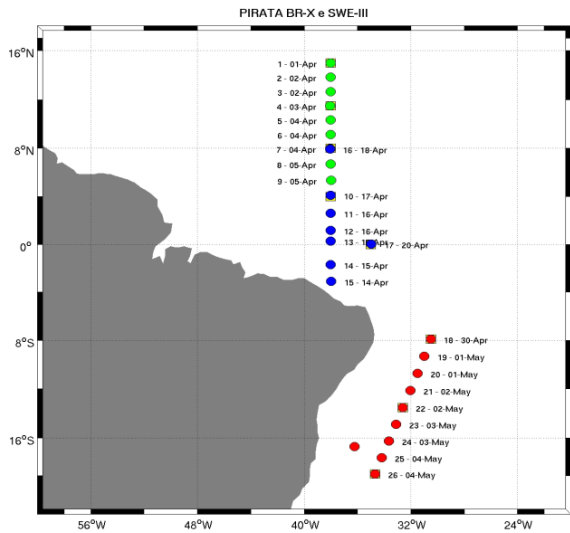


# PIRATA data return & delivering

**PIRATA ATLAS data return over the period 1998-2012:**  
 increasing from 1998 to 2007.  
 Vandalism pb in 2008...  
 But higher than 80% from 2009...  
 Similar to the Pacific network

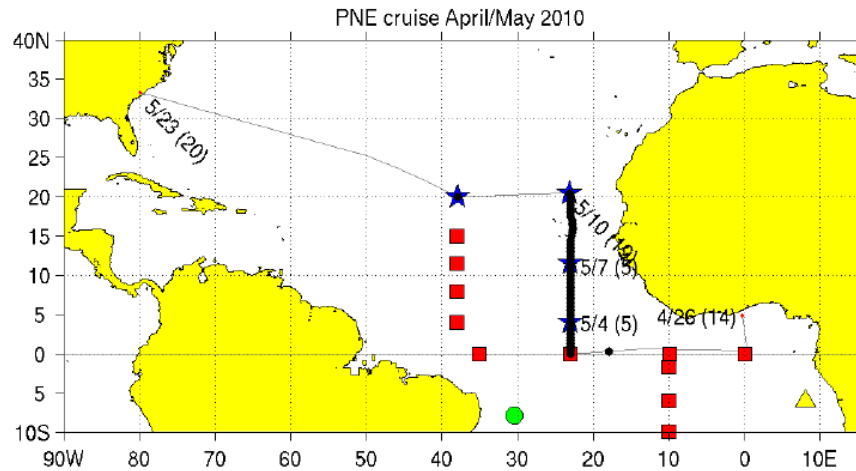


**PIRATA files delivered over the period 1999-2011:**  
 rapid increasing demand due to growing visibility of PIRATA in the research community and the increasing value of the data for climate and related studies as the length of the time series increases.



YEARLY CRUISES => repeated sections (ctdo2/ladcp...)

38°W section: Brazilian cruises

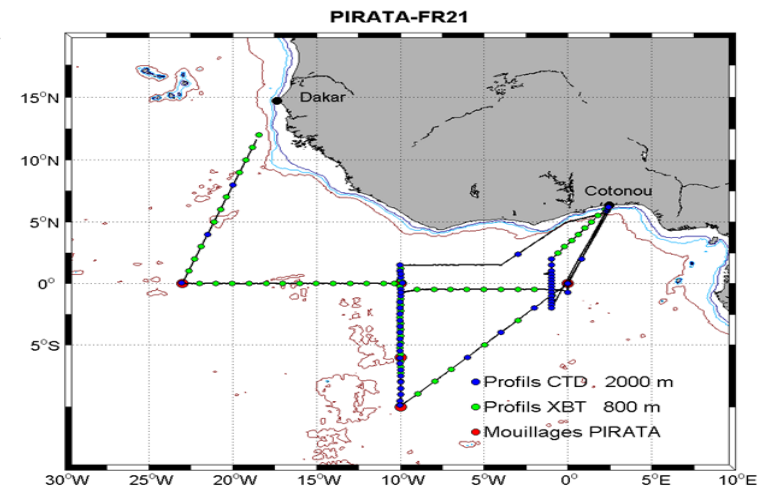


23°W section: US cruises

(+ German cruises, etc..)

10°W section: French cruises

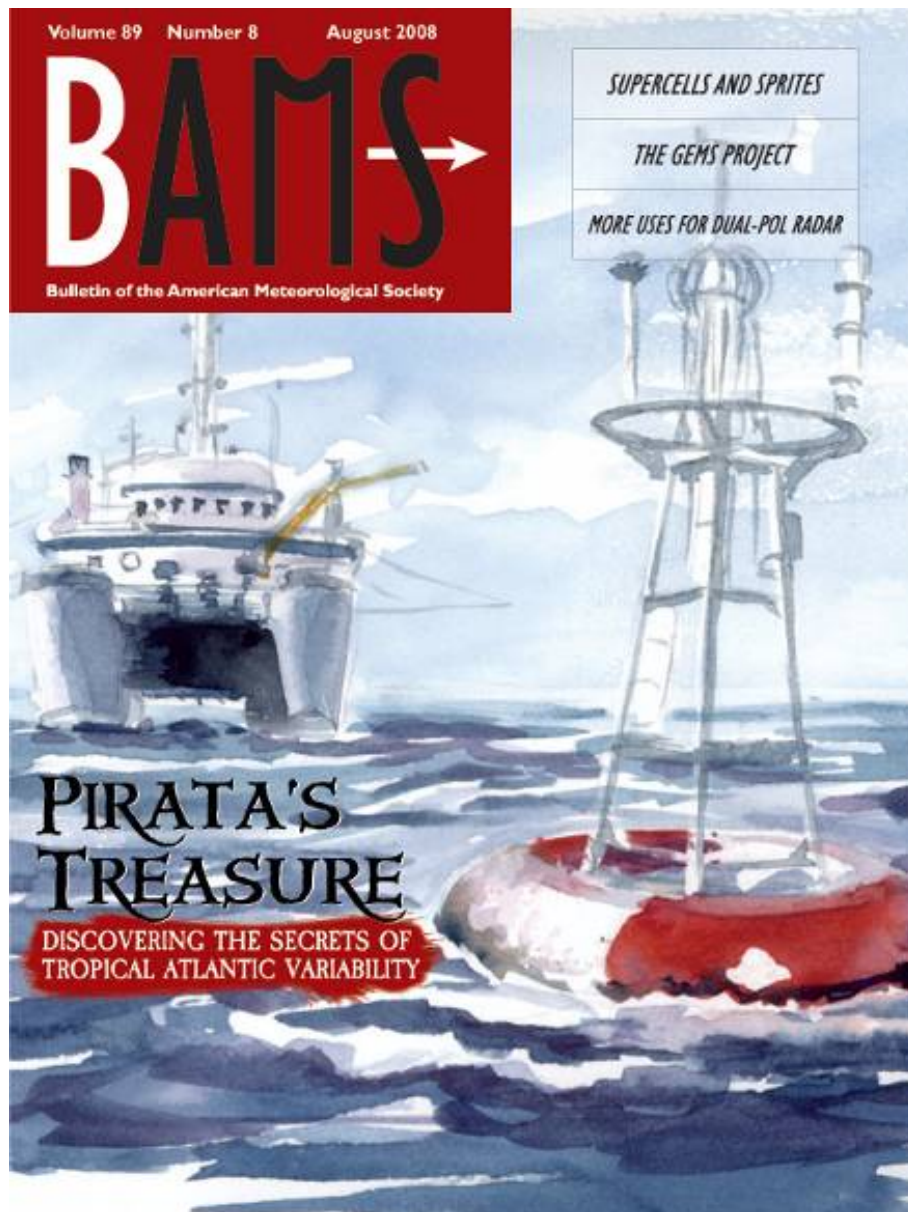
OPPORTUNITIES for:  
 ARGO profilers deployment  
 Quasi real time data for operationnal services



## *PIRATA contributions to Tropical Atlantic Climate and Ocean Science*

- => PIRATA data sets are increasingly valuable for more weather and climate forecasting.**
- => PIRATA became a major Atlantic contribution to the global ocean observation system in support of climate (GODAE, ARGO, GOOS, GOSUD, OceanSITES, AMMA, TACE, VAMOS...).**
- => The PIRATA array and its extensions constitute the main backbone of the Tropical Atlantic Observing System**
  
- +**
- => PIRATA other observations (ADCP moorings, tide gauges...) & PIRATA yearly oceanographic cruises are sources of a large number of measurements along same sections & time series, + platform for “piggy-back” measurements (eg CO<sub>2</sub>);**
- => PIRATA constitutes an important tool & context for :**
  - international cooperations, contribution to other programs (eg AMMA,...),**
  - capacity building in developing countries (eg in Africa: regional Master 2 in Benin, PhDs, training at sea...)**





## The PIRATA Program: History, Accomplishments, and Future Directions

By Bernard Boulrès, Rick Lumpkin, Michael J. McPhaden, Fabrice Hernandez, Paulo Nobre, Edmo Campos, Lisan Yu, Serge Planton, Antonio J. Busalacchi, Antonio D. Moura, Jacques Servain, and Janice Trotte

(89(8), 1111-1125, doi/10.1175/2008BAMS2462.1, 2008)

### Abstract

The Pilot Research Moored Array in the tropical Atlantic (PIRATA) was developed as a multinational observation network established to improve our knowledge and understanding of ocean–atmosphere variability in the tropical Atlantic. PIRATA was motivated by fundamental scientific issues and by societal needs for improved prediction of climate variability and its impact on the economies of West Africa, northeastern Brazil, the West Indies, and the United States. In this paper the implementation of this network is described, noteworthy accomplishments are highlighted, and the future of PIRATA in the framework of a sustainable tropical Atlantic observing system is discussed. We demonstrate that PIRATA has advanced beyond a “Pilot” program and, as such, we have redefined the PIRATA acronym to be « **Prediction and Research Moored Array in the Tropical Atlantic** ».

## The PIRATA South Eastern Extension issue...

- Priority scientific issues (eg: SST bias...) and endorsed
- 1 ATLAS buoy funded by South Africa in 2005
  - => One year test deployment in 2006-2007
- 2<sup>nd</sup> buoy needed for implementation
- Vessel time could be ensured by France (at 6S-8E)
- EU TAV (FP7-ENV proposal) or/and Brazil funding?

