

Prediction and Research Moored Array in the Tropical Atlantic - PIRATA

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oujours un temps d'avanc

Rome-IT, 6 Oct 2014

Why tropical Atlantic ?



"The variability of the ocean–atmosphere system in the tropical Atlantic, from intraseasonal to multidecadal time scales, strongly influences regional variations in rainfall, and consequently the economies of the adjacent continental regions. For example, variations in the intertropical convergence zone (ITCZ) and the West African monsoon affect rainfall ₂ and droughts in Africa and northeastern Brazil."















PIRATA Cruises Mar 2011 - Aug 2012



Typical sea work year:

ATLAS moorings deployed: 18

Shiptime: ~ 150 days









PIRATA

2000

PIRATA

Meteorological data:

Tar, Rain, RH, W, SWR, LWR, Patm

Oceanographic data (0-500 m):

T(z) (11 levels), S(z) (5 levels), Currents

pCO2, O2 (2006 on ...)



PIRATA

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pCO2, O2 (2006 on ...)

Ocean Tracking Network (2014 on ...)



PIRATA





<u>Real Time</u>: Daily mean subsurface data and hourly meteorological data at the times of satellite overpasses are placed on the GTS by Service Argos for real-time distribution to operational centers.

<u>Delayed Mode</u>: Measurements carried out at high frequency (from 1 min to 1 h, depending on the parameters) are stored internally and recovered during maintenance operations before being 11 processed, calibrated, and made available to the community.



PIRATA Mooring Data Return 1997 - 2013



The global (1997-2013) data return for all buoys is 82%







Science from PIRATA data



(*) Not included MSc. dissertations and PhD. thesis

Environmental and societal impacts 1. Extreme rainfall events







Fortaleza Rainfall (NNEB)

Recife Rainfall (ENEB)

Environmental and societal impacts

1. Extreme rainfall events

Fortaleza rainfall (NNEB)









Hounsou-gbo et al. (2012, 2014)

Environmental and societal impacts

1. Extreme rainfall events

Recife rainfall (ENEB)









Hounsou-gbo et al. (2012, 2014)

Environmental and societal impacts 2. Coral reefs bleaching

SST \uparrow





Ferreira et al. (2010, 2012)

Environmental and societal impacts 2. Coral reefs bleaching







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Observed bleaching events: 1998 - Strong 2003 - Observed 2007 - Observed 2009 - Strong

Ferreira et al. (2010, 2012)

Environmental and societal impacts 3. Tropical diseases (dengue)



Araujo et al. (2014)

Environmental and societal impacts 3. Tropical diseases (dengue)



Concluding remarks

1. PIRATA Program is an important component of the climate observing system in the tropical Atlantic. It is very useful for ocean/climate science development and for enhancing the performance of climate forecast modeling.

2. PIRATA Program is a successful example of multi-lateral cooperation in Atlantic ocean research.

- 3. Main "PIRATA treasures":
 - High level of multi-lateral commitments
 - Science oriented decisions
 - Open data policy
 - Regular meetings ("tête-à-tête" approach)



TAV PIRATA 17 – 2012 Kiel, Germany



TACE PIRATA 18 – 2013 Venice, Italy



TAV PIRATA 16 – 2011 F. Noronha, Brazil







http://www.tav-pirata19.com/



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