

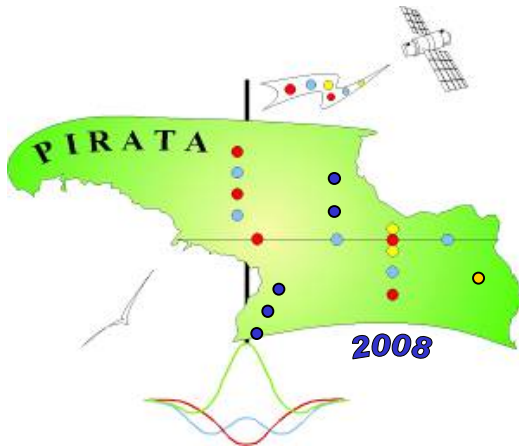
PIRATA

(Prediction and Research moored Array in the Tropical Atlantic)

French national report & status



- *A few recalls & french cruises*
- *PIRATA status in France (O.R.E.)*
- *About the PIRATA FR 19 cruise*
- *Planed cruises in 2010 & 2011*
- *PIRATA SEE status*
- *Other activities since PIRATA 14*
- *Perspectives*



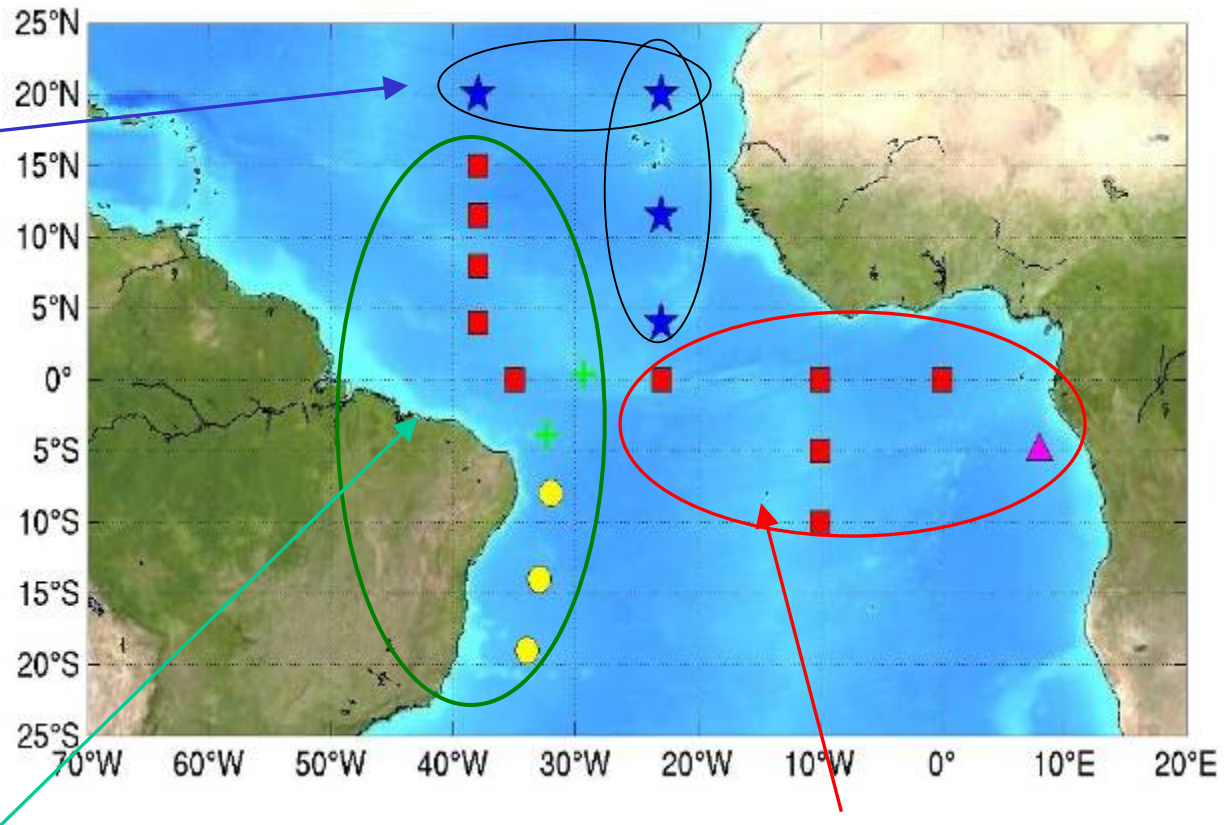
Members in FRANCE of the PIRATA-SSG:

- *Bernard BOURLES (IRD-LEGOS, Brest; resp..ORE PIRATA in France; co-chairman of the PIRATA SSG)*
- *Fabrice HERNANDEZ (IRD-US025, Toulouse)*
- *Hervé GIORDANI (Météo-France, CNRM/DMN/EERM, Toulouse)*



Recall : PIRATA present network

Maintained by USA:
4 Atlas buoys



Maintained by Brazil: 8 Atlas buoys

Maintained by France : 5 Atlas buoys:

- + 1 Atlas for Pirata SEE (from 2006 to 2007, and from ???)
- + At 23°W-Equator : surface ADCP mooring since 2001
- + at 10°W-Equator : surface ADCP mooring since June 2006 as part of AMMA, PIRATA-France & TACE.

=> 17 buoys yearly serviced from 2007 !



PIRATA status in France : « Observatoire de la Recherche en Environnement »

2009 was an important year for PIRATA in France...

End of the national « Research Observatory for Environment »

Changed in 2010 as « SOERE: Service d'Observation et d'Expérimentation, sur le long terme, pour la Recherche et l'Environnement »

⇒ National evaluation in late 2009 of the ORE PIRATA : positive...

⇒ « **SOERE label** » **obtained** (important) for endorsements of national programs and/or research organisms)

+ Convention for the PIRATA maintenance established between IRD & Meteo-France has been renewed and actualized in 2008

⇒ PIRATA is supported by IRD, Météo France and also by the Observatoire Midi-Pyrénées
(as PIRATA mostly help by IRD/LEGOS, part of the OMP)



PIRATA status in France : « Observatoire de la Recherche en Environnement »

Fundings since 2003 & perspectives (vessel time & salaries & laboratory infrastructures not taken into account):

	METEO FRANCE	IRD	ORE & SOERE INSU	O.M.P./U.P.S.	Total:
2003:	22,430 €	38,000 €	11,287 €	0 €	71,717 €
2004:	22,430 €	67,000 € ¹	20,317 €	0 €	109,747 €
2005:	22,430 €	105,000 € ²	18,900 €	0 €	143,330 €
2006:	22,430 €	50,000 €	2,300 €	0 €	74,730 €
2007:	22,430 €	50,000 €	0 €	5,000 €	77,430 €
2008:	22,430 €	49,000 €	0 €	5,000 €	76,430 €
2009:	40,000 €	49,000 €	0 €	5,000 €	94,000 €
2010:	40,000 €	45,000 €	20,000€for material acquisition	5,000 €	110,000 €

¹ : 30k€added due to the material transport by air freight for PIRATA FR-12 => 79,747€ without this overcost

² : 70k€only due to the chartering of the SUROIT for PIRATA FR-13 (-> 23°W-Equator)

=> total of 73,330€in 2005 without this overcost

=> « normal » functioning almost constant around 70-75,000 €/ year

=> Part of the additional ressources in 2009-2010 have first been dedicated :

- to partly replace some sensors of the meteorological station at Sao Tomé
 - to cover the important increase of the material transports (by sea -containers- and plane -acoustic releases and sensors after each cruise-), also due to the different calls by using the R/V ANTEA.
- + NEED in 2010 to buy new ADCP for moorings!



Actual French contribution to PIRATA in 2009 (for cruises & Sao Tome) :

Total costs in 2009 :

-vessel time : 44 days of R/V ANTEA (at ~10k€/day)	=>	440 k€
-technical support, cruises, transports etc... (ie working funds)	=>	75 k€
Total:		515 k€(ie around 720k\$) (without salaries...)

2009 Engineers/Technicians PIRATA dedicated time (estimated) :

- <u>participation to cruises (days at sea) :</u>	
- PIRATA FR18 (J.Grelet, F.Roubaud, N.Khatir, R. Chuchla, F.Baurand, D.Dagorne) :	160 days
- <u>cruises preparation, cruises data treatment etc. (J.Grelet, F.Roubaud, N.Khatir) :</u>	30 days
- <u>Trip & maintenance at São Tomé (Y.Gouriou, F.Roubaud)</u>	15 days
Total:	195 days



French PIRATA dedicated cruises : 20 french cruises from 1997 to 2009

CRUISE NAME	DEPARTURE DATE	ARRIVAL DATE	VESSELS NAME	Nb Days
PIRATA-FR1	September 9, 1997	September 16, 1997	Antéa	8
PIRATA-FR1b	January 30, 1998	February 3, 1998	Antéa	4
PIRATA-FR2	October 30, 1998	November 10, 1998	Antéa	11
PIRATA-FR3	January 23, 1999	February 1, 1998	Antéa	9
PIRATA-FR4 (EQUAL99)	July 13, 1999	August 21, 1999	Thalassa	39
PIRATA-FR5	October 25, 1999	November 8, 1999	Antéa	14
PIRATA-FR6	March 8, 2000	March 19, 2000	Le Suroit	11
PIRATA-FR7 (EQUAL00)	July 23, 2000	August 21, 2000	Thalassa	29
PIRATA-FR8	November 17, 2000	December 3, 2000	Atalante	16
PIRATA-FR9	October 20, 2001	November 11, 2001	Atalante	22
PIRATA-FR10	December 6, 2001	December 21, 2001	Atalante	15
PIRATA-FR11	December 17, 2002	January 3, 2003	Le Suroit	17
PIRATA-FR12	January 28, 2004	February 20, 2004	Atalante	23
PIRATA-FR13	May 24, 2005	June 2, 2005	Le Suroit	13
PIRATA-FR14 (EGEE1)	June 7, 2005	June 23, 2005	Le Suroit	16
PIRATA-FR15 (EGEE3)	May 24, 2006	July 6, 2006	Atalante	39
PIRATA FR 16	May 19, 2007	June 1, 2007	Antéa	14
PIRATA FR 17 (EGEE5)	June 4, 2007	July 5, 2007	Antéa	31
PIRATA FR 18	September 2, 2008	October 5, 2008	Antéa	33
PIRATA FR 19	June 13, 2009	July 24, 2009	Antéa	44



=> ~ 418 days at sea



=> Vessels time availability in France

From 2006, the PIRATA-FR cruises are carried out with the IRD R/V ANTEA

- EGEE 4 has been done in November-December 2006 ;
- PIRATA-FR16 & FR17 in spring 2007;
- EGEE 6 in fall 2007 -with TACE moorings operations-;
- PIRATA-FR18 in fall 2008 & FR19 in summer 2009.

35m length, 10 scientists, 3 moorings onboard => 3 legs per PIRATA cruise.



VESSEL TIME PROCESSES:

Yearly vessel time demand (reduced) forms to fill in order to get vessel time;

Yearly evaluation (reduced) of Pirata cruises & valorization;

Vessel costs increase...

BUT PIRATA international commitments -MoU- + efficient contribution to ARGO/GODAE (CORIOLIS/MERCATOR) acknowledged as part of CORIOLIS+ SOERE label

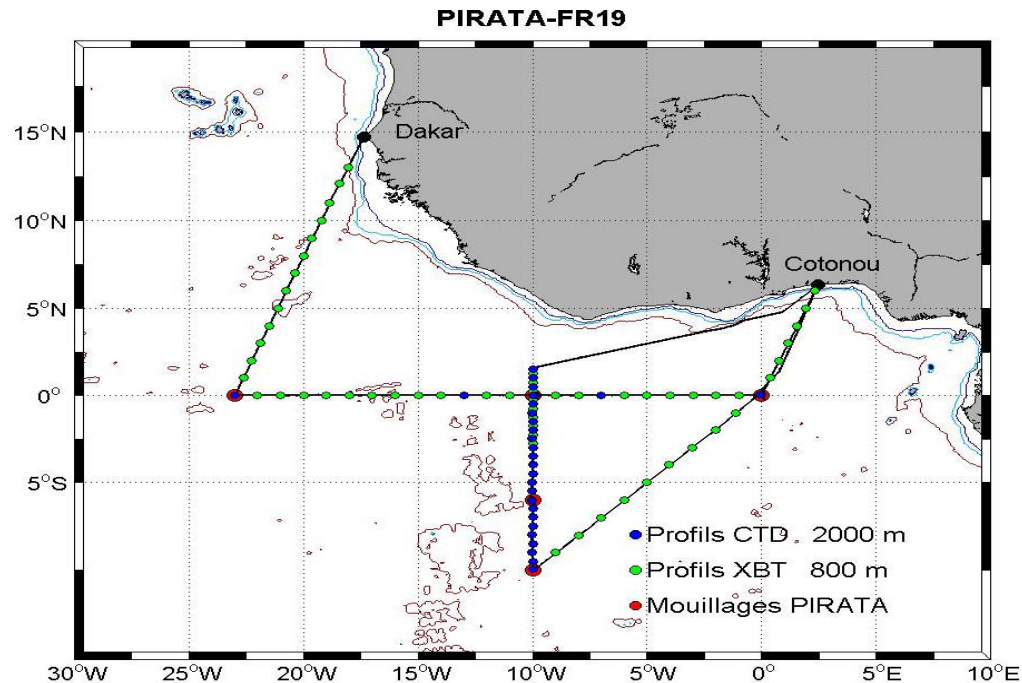
=> yearly vessel time NOW ENSURED)

What have been done in 2009 « on the field » ?

PIRATA FR19 cruise:

June 13 – July 24, 2009

(from Dakar in Senegal to Cotonou in Benin then 2 legs from Cotonou)

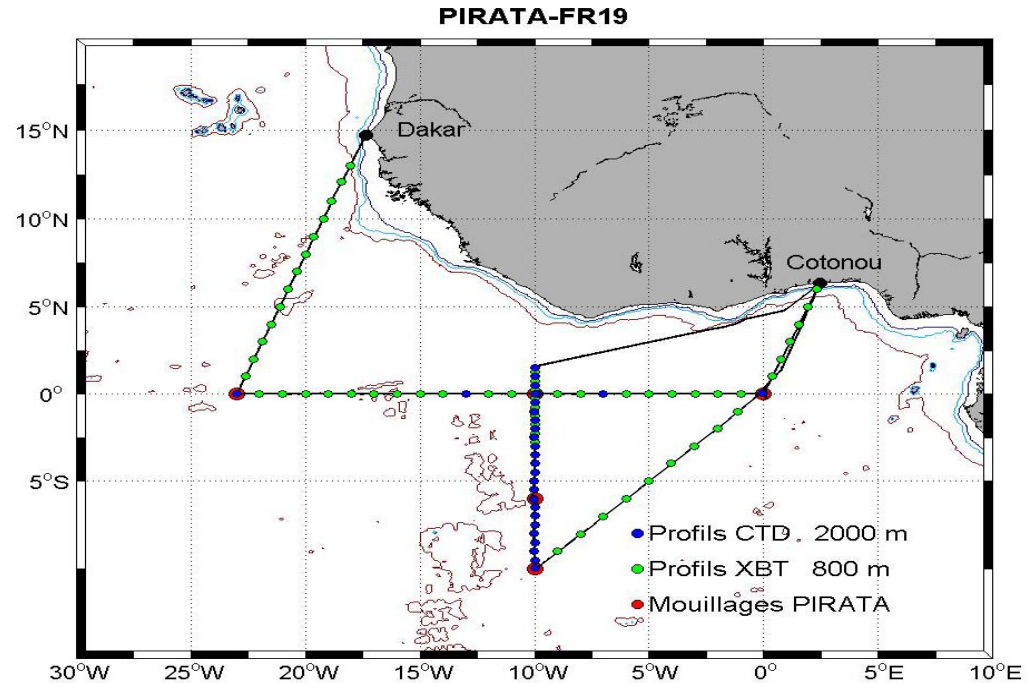


- Leg 1: Dakar-Cotonou: 13-29/06/2009: Atlas buoys at 23W, 10W & 0E- Eq
- Leg 2: Cotonou-Cotonou: 02-19/07/2009: Atlas buoy at 10s, 6s, 0 along 10W and again 0-0 (replacement)
- Leg 3: 21-24/07/2009: Formation for M2 students off Cotonou

What have been done in 2009 « on the field » ?

PIRATA FR19 cruise:

- 31 CTD/LADCP casts
- 56 XBT profiles (every $\frac{1}{2}$ degrees along transits and 10W)
- 4 Provor ARGO profilers deployed at 13W-Eq, 7W-Eq, 0E-0N, 10W-8°30'S
- water samplings (S, O₂, nutrients)
- TSgraph along the track line.



Problems :

- Failure of sensors on the buoy at 23W-Eq
=> maintenance operation during the NOAA/AOML PIRATA NEE cruise
- The first operation at 0-0 was to retrieve the vandalized buoys and let on place in 2008

+

NO VM-ADCP data (failure of acoustic base...) during this cruise.

The VM-ADCP of the ANTEA should be replaced in spring 2010 in South Africa



What have been done in 2009 « on the field » ?

About São Tomé Island (0°N, 6°E)

1) Meteorological station from October 2003

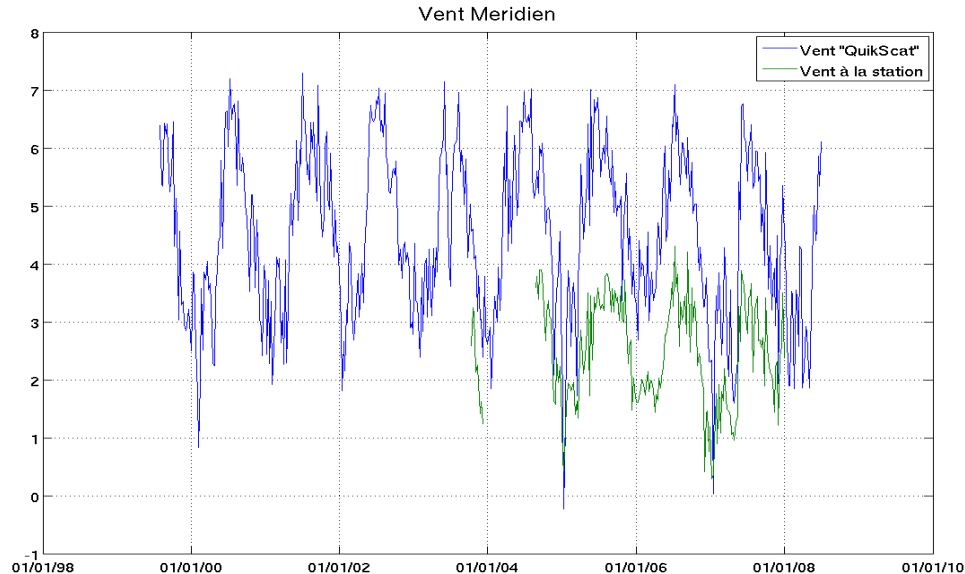
- DATA transmission through the GTS from October 2006.
- Autonomous ONSET thermometer installed in 2005 (=> SST)

2) Tide gauge maintained by IRD since 1980s.

- Pressure, Atm. pressure + SST & SSS.
- Part of GLOOS / GPS positioned (in December 2002)

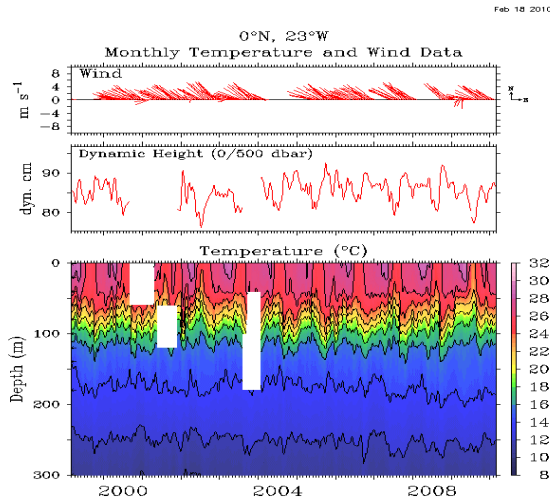
Dedicated mission carried out in April 2009, for replacement of sensors, material (mast), ONSET thermometer,

But... problem with wind data (low values due to orographic effect) :



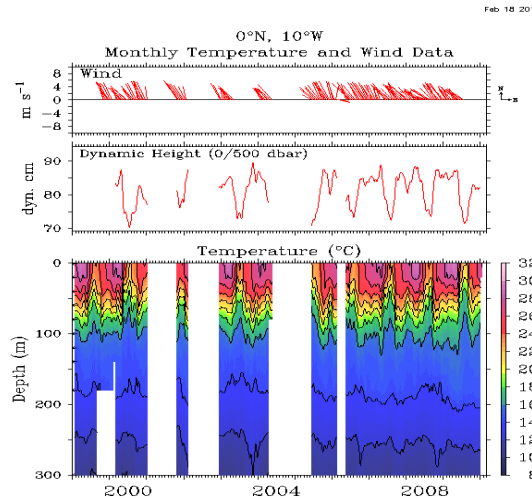
PIRATA ATLAS time series till Feb 10, 2010 east of 23°W:

Eq-23°W:



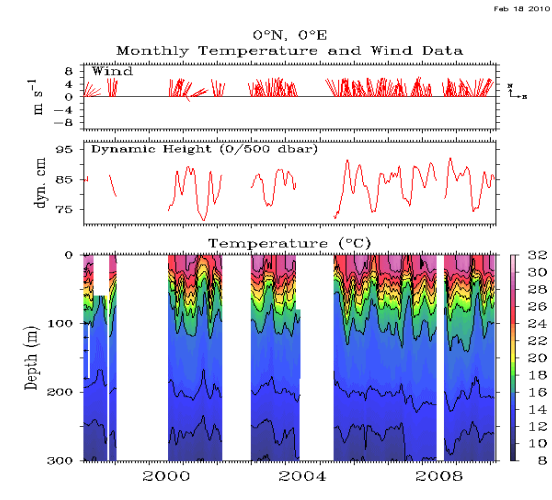
TAO Project Office/PMEL/NOAA

Eq-10°W: no pb from 2006, but winds



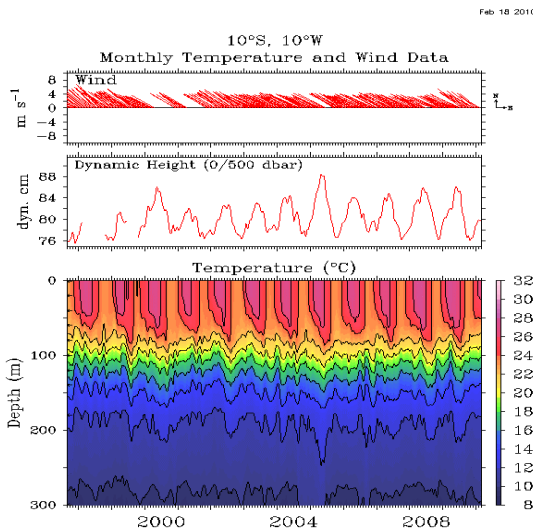
TAO Project Office/PMEL/NOAA

Eq-0°E: no pb in 2009...!



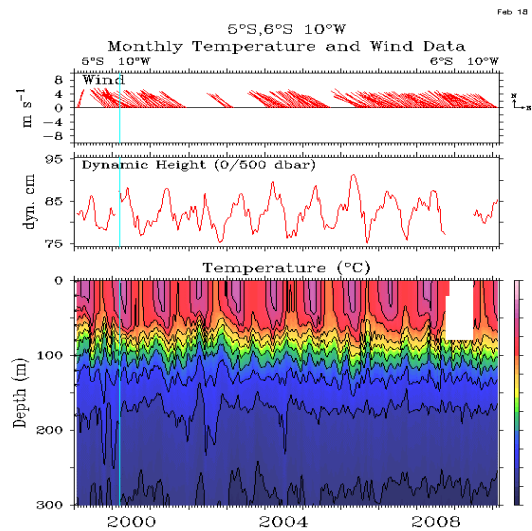
TAO Project Office/PMEL/NOAA

10°S-10°W:



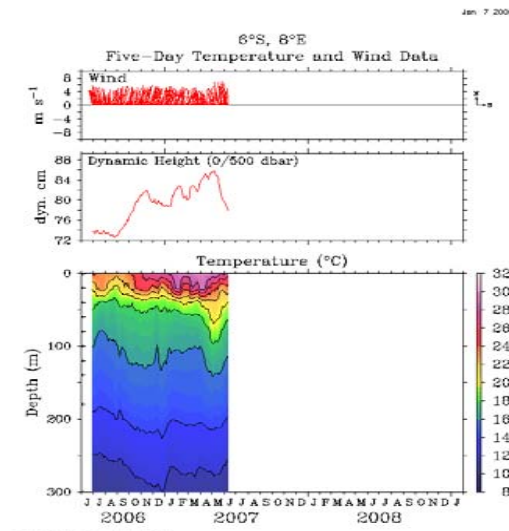
TAO Project Office/PMEL/NOAA

6°S-10°W:



TAO Project Office/PMEL/NOAA

6°S-8°E: no pb during 1year test



TAO Project Office/PMEL/NOAA

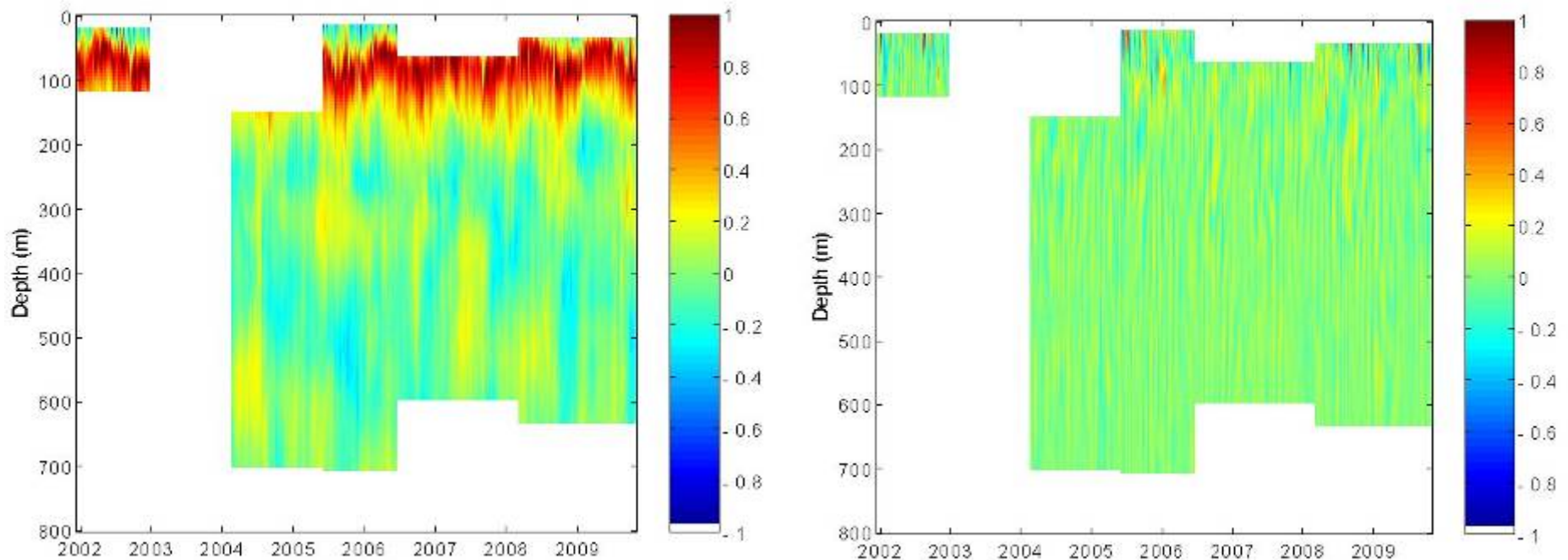
PIRATA ADCP time series till 2009 at 23°W:

The ADCP mooring is monitored thanks to IFM-GEOMAR since 2006.

Many problems encountered with the PIRATA ADCP (limited to above 100m depth) in 2003-2008 => suppress the period 2003-2005 and 2006-2008 !!!

=> Deployed in 2008 and retrieved in 2009.

=> a new ADCP (IRD) has been deployed in Nov 2009.

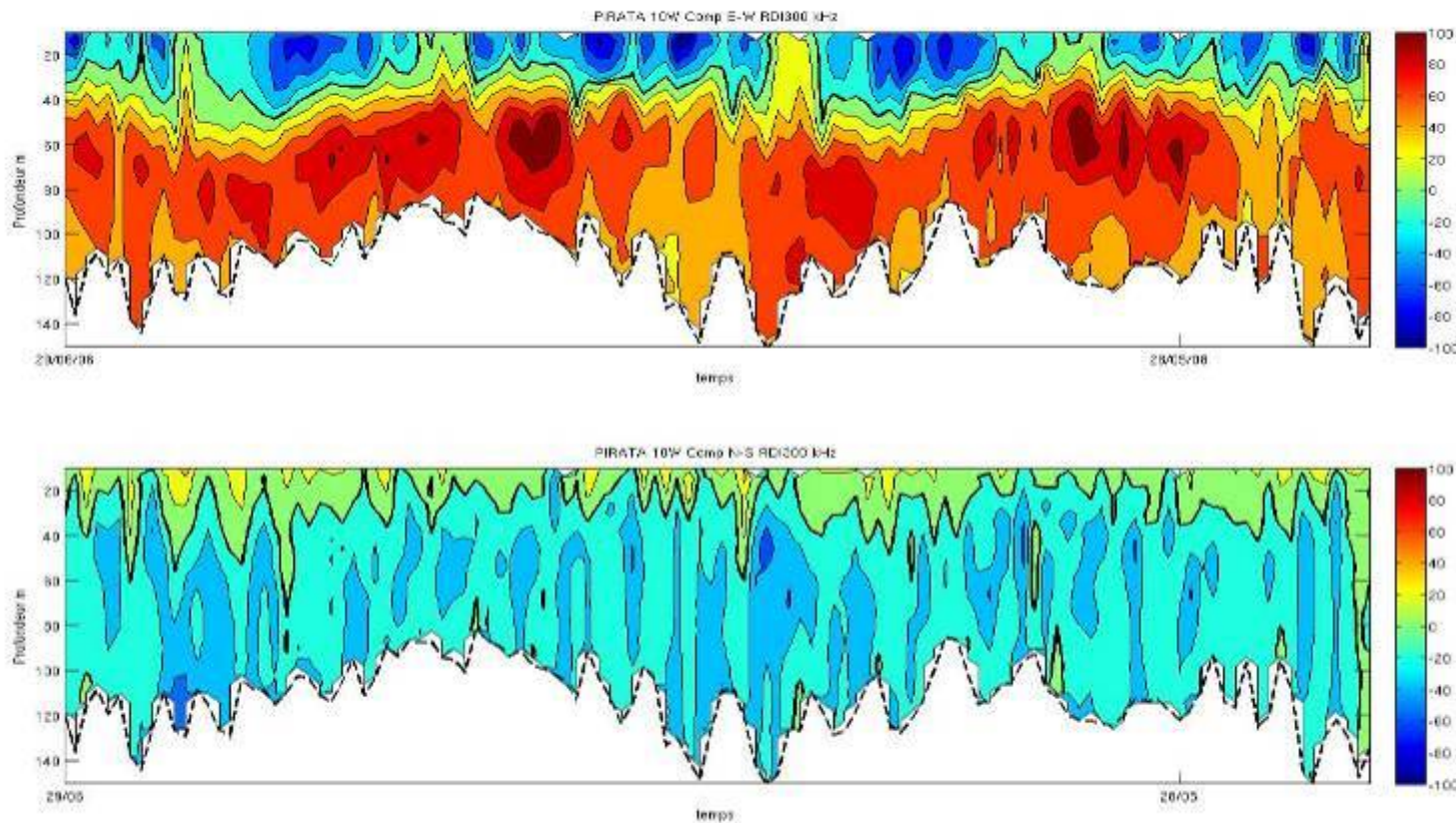


(Courtesy P.Brandt)



French AMMA/TACE/PIRATA ADCP from 2006 at 10°W:

The ADCP mooring has been deployed thanks to IFM-GEOMAR in 2006.
Replaced in October 2008 during the Pirata FR18 cruise.
Will be replaced in September 2010 during the next PIRATA FR20 cruise.
(new 150 kHz ADCP available wished... not funded at now but other solution is maybe on the way!). Question: is one 300kHz well relevant?



(First « raw » treatment; Courtesy: Rémy Chuchla)



About the pCO₂ sensor installed at 6°S-10°W from 2006:

The buoy has been sending since June 6th, 2006

CO₂ and O₂ data in real-time using ARGOS transmission

The sensor was yearly replaced during the PIRATA FR17, FR18 & FR19 cruises

Description of the PCO₂ sensor installed on the Pirata Buoy (6S/10W) the 6 june 2006 :



Argos Antenna :
half wave, 1W,
transmission every 90s
24h/24, electrically
insulated from
aluminium structure.

Aluminium box with Argos
emitter, electronics, batteries,
atmospheric pressure sensor.
Weight : 10 kg

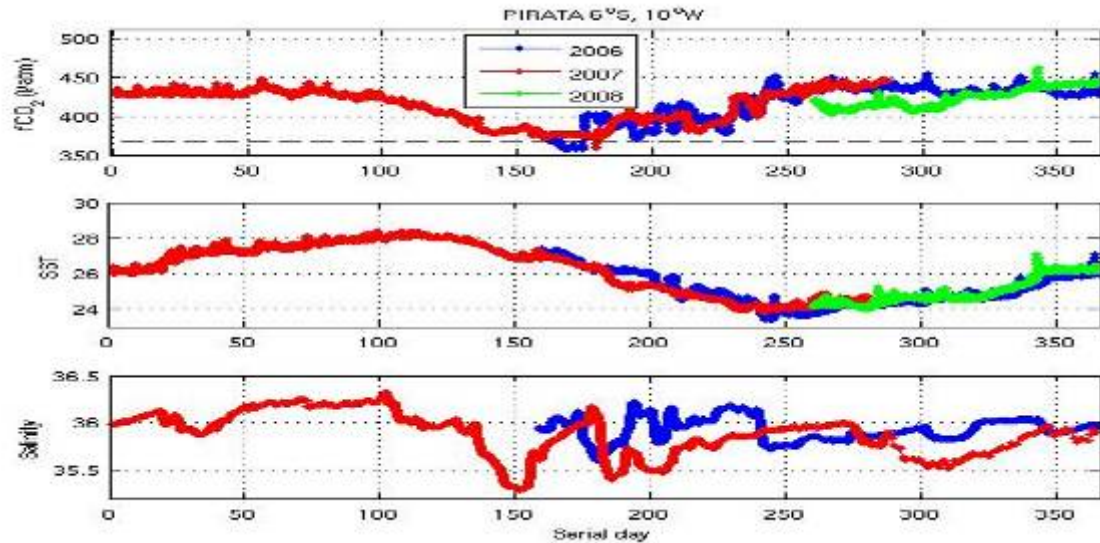
Support in white 20 mm
marine plywood

Fiberglass container with Pco₂
sensor (Carioca type), electronics,
Oxygen sensor (Optode 3830
from Aanderaa), water pump;
Buoyancy : +7kg

316 stainless steel fixing

Time-series stations are needed to characterize natural variability and long-term trends of CO₂ in the ocean.

PI: N. Lefevre, IRD-OCEAN, Paris



Monthly fCO₂, SST & SSS at 6°S, 10°W

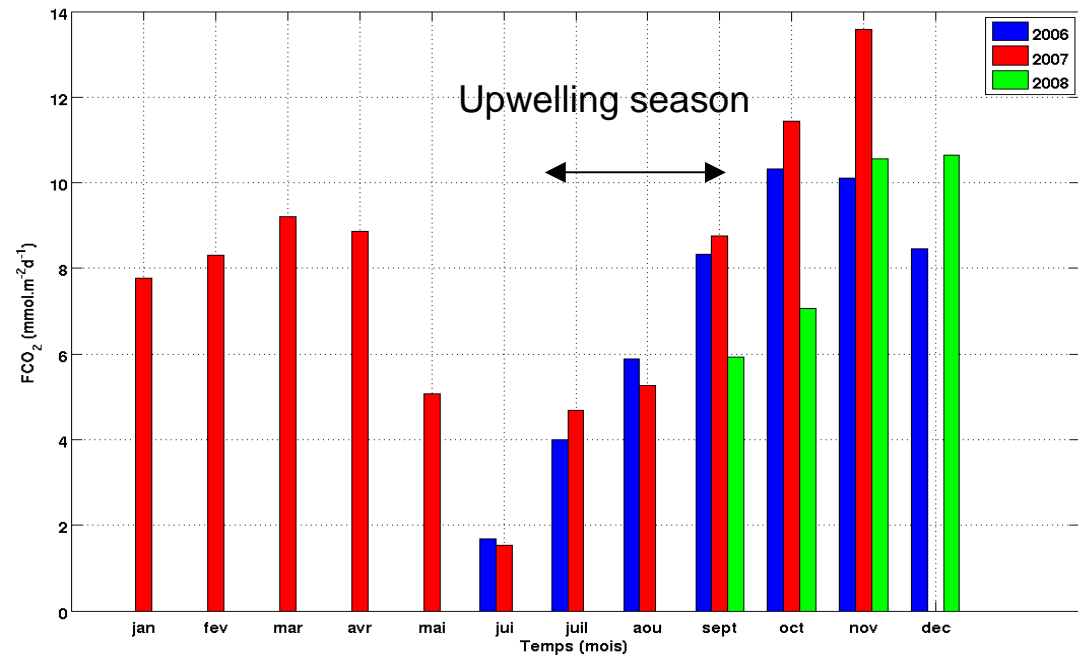
JAN

DEC

Monthly CO₂ flux at 6°S, 10°W

Some results:

- Source of CO₂ throughout the year
- Unexpected decrease in June not well understood yet.



Advances in the quantification of air-sea CO₂ flux require observations in undersampled area

CARBOOCEAN:

2 VOS lines

- **France - French Guiana (*MN Colibri*)**

(14 voyages Feb 2006 to Mar 2009)

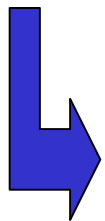
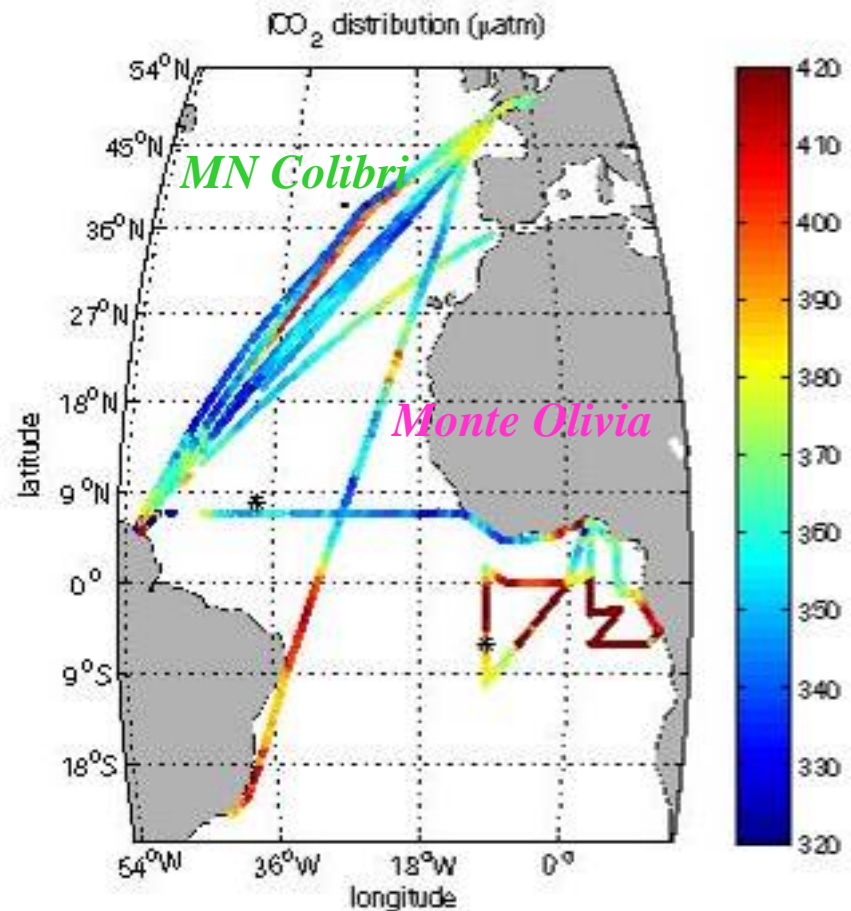
- **France - Brazil (*Monte Olivia*)**

(11 voyages July 2008 to March 2009)

2 PIRATA moorings

6°S, 10°W since 2006

8°N, 38°W since 2008



Completed by national funding for conducting French cruises:

- Africa to French Guiana

- Eastern Equatorial Atlantic

What have been done in 2009 « in the labs » ?

NEW French PIRATA website:

<http://www.ifremer.fr/ird/pirata/>

=> More information

⇒Easier access to data sets (cruises, Sao Tome...)

⇒ Reports & documents

Thanks to Guillaume Charria & Jacques Grelet



What have been done in 2009 « in the labs » ?



PIRATA Prediction and Research Moored Array in the Tropical Atlantic



PIRATA France

Welcome

About PIRATA

PIRATA-FR Cruises

São Tomé Island

Project ressources

Data and Products

Reports and Publications

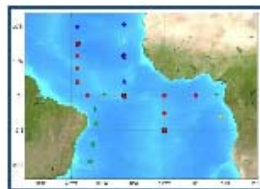
PIRATA links

Contact

Contact Information



About PIRATA



The PIRATA project is a joint effort between Brazil, France and the United States to collect oceanic and meteorological observations in the tropical Atlantic. [More...](#)

News !

PIRATA-15 SSC/PRB Meeting & Tropical Atlantic Meeting 2-5 March 2010, Miami, Florida

The goal of a joint Tropical Atlantic science meeting is to establish more exchanges and collaborations between observational and numerical modeling communities, and maintain links between ongoing research, process study efforts, and sustained observational programs in the region. Previous joint Tropical Atlantic meetings, encompassing interests of the TACE/CLIVAR, PIRATA, and AMMA projects and communities, have been held in Karlsruhe, Germany (November 27-30, 2007) and in Toulouse, France (February 2-6, 2009). The 2010 Tropical Atlantic meeting of TACE and PIRATA will be held on March 2-5 (the week after Ocean Sciences) in Miami, Florida, jointly organized by Rick Lumpkin (NOAA/AOML) and Bill Johns (University of Miami/RSMAS).

Last PIRATA FR19 cruise in June-July 2009



The last PIRATA cruise from Dakar-Senegal to Cotonou-Benin.

[PIRATA-FR19 logbook.](#)



PIRATA 15 Meeting, Miami, March 5, 2010

What have been done in 2009 « in the labs » ?

a) Two thesis going on at IRD & Meteo-France:

-Malick Wade (mixed layer processes in the GG) :

co-funded by Meteo-France & IRD

-Stephane Law-Chune (high resolution processes in the upper layer off Angola from Mercator results):

co-funded by Meteo-France & Region Midi-Pyrénées.

+ one in Abidjan/Côte d'Ivoire...

b) Meteo-France acquired (and delivered to AOML)

a « paroscientific » pressure sensor for the ATLAS buoy at 38°W-20°N.

c) Theoretical & numerical works by H.Giordani (CNRM/Meteo-France)

about mixing processes in the mixed layer in the GG

d) 1 post doc funded by IRD (Julien Jouanno)



Last words about « what have been done in 2009 « in the labs » ?

PIRATA FR18 (2008) CTD-02 calibration:

done only last week...

- i) Only 6 CTD casts at different depths (500, 1000 & 2000m, +1 for test)
- ii) CTD sensors calibrated in winter-spring 2009 at RDI... and I forgot this step as I thought it was already achieved!

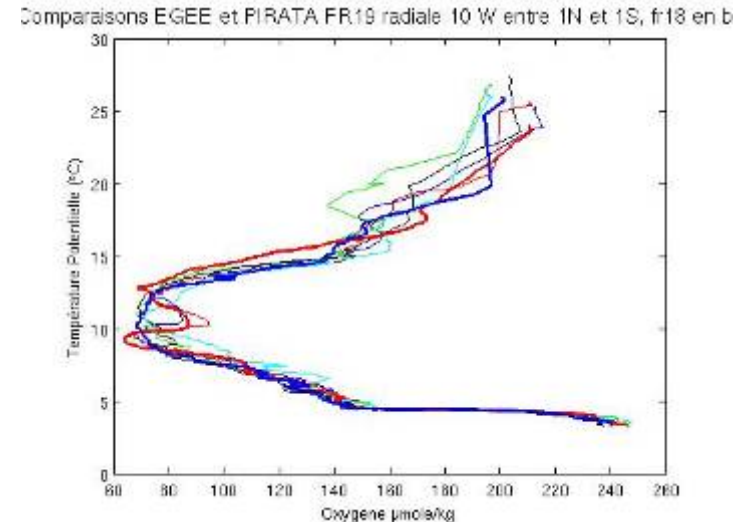
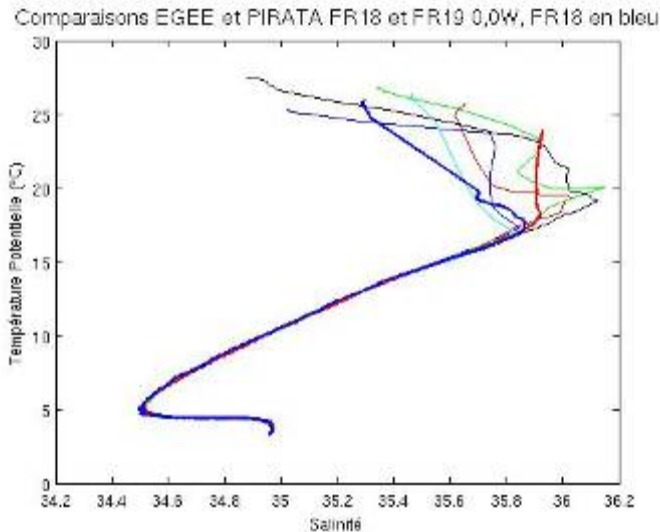
(Remy Chuchla, in charge of this work, came in Benin in April for PROPAO and the new Master 2 and we have been overbooked... + FR19 cruise in May-June)

=> SORRY for the DELAY

=> DO NOT HESITATE to recall me if too long delay after the cruise!!!!

PIRATA FR19 (2009) CTD-02 calibration:

done in late summer 2009, and then available on the web site in fall 2009



Next PIRATA FR 20 cruise scheduled in sept/october 2010

1) Currentmeter mooring operations at 23°W-Equator :

- the surface ADCP (PIRATA) has been replaced during the IFM-GEOMAR cruise in November 2009 => no operation planed

2) ATLAS mooring at 23°W-Equator :

- the ATLAS buoy replacement planed (but if opportunity with PIRATA NEE cruise?)

3) Moorings in the Gulf of Guinea :

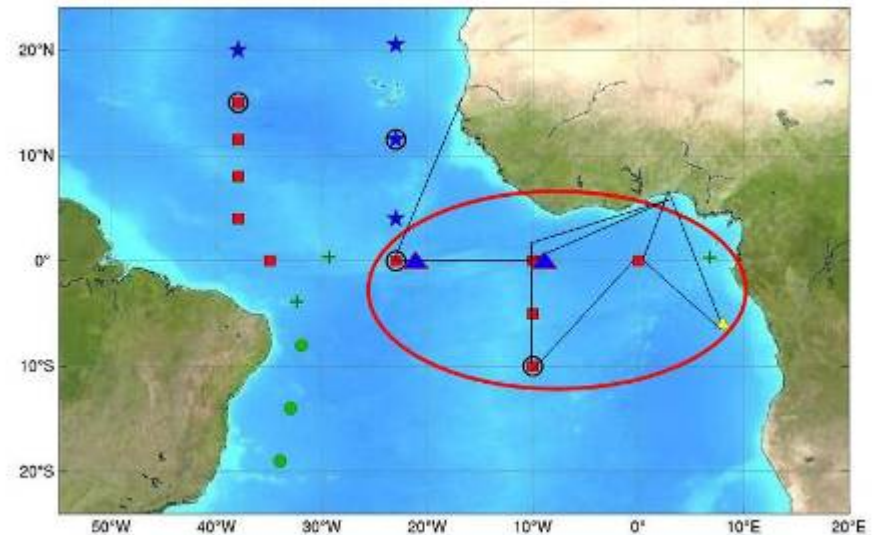
- the 4 ATLAS buoys will be replaced.
- PIRATA SEE ????

4) Currentmeter mooring at 10°W-Eq : (in the framework of TACE&AMMA& PIRATA-France)

- the surface ADCP (PIRATA) has to be replaced but better if a new ADCP is acquired in France....(not ensured!)

5) Miscellaneous:

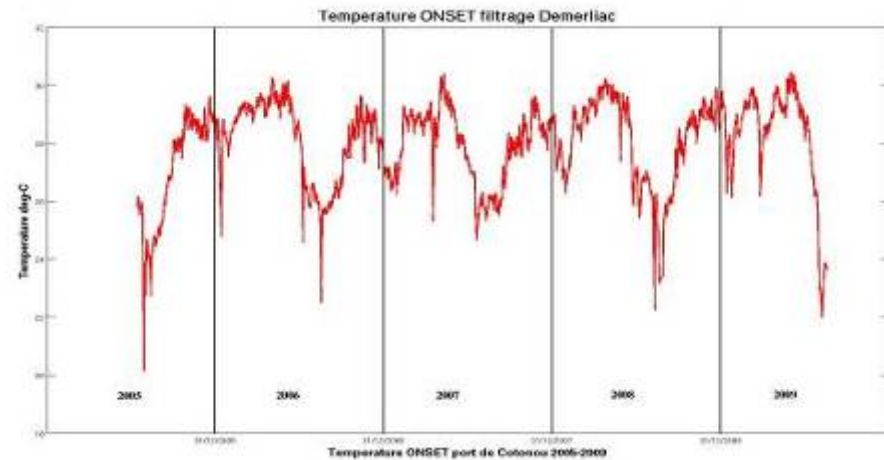
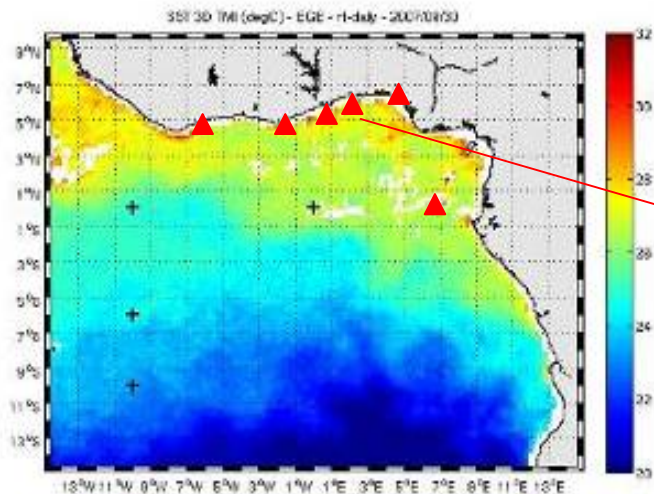
- 10 ARGO (Hapex) profilers will be deployed
- CTD/LADCP casts, XBT, samplings, pCO2



Other linked Works:

3) Information about the new PROPAO program in the Gulf of Guinea:

- 3 years (2007-2010) program funded by the French Foreign Affairs Ministry to support scientific programs dedicated to West African climate and societal impacts of climate changes.
- Regional Program of Physical Oceanography in West Africa, involving Nigeria, Benin, Togo, Ghana, Côte d'Ivoire and France (IRD/LEGOS; B.Bourlès in Cotonou/Benin from 2007 for this purpose).
- Goals: 1) to maintain an autonomous coastal network of temperature sensors ; 2) establish a regional data bank for studying coastal SST, upwelling, links with local & regional climate and resources, and coastal environment (erosion...); 3) Formation and capacity building: a regional Master in Physical Oceanography has been launched in 2008 at the Cotonou University.

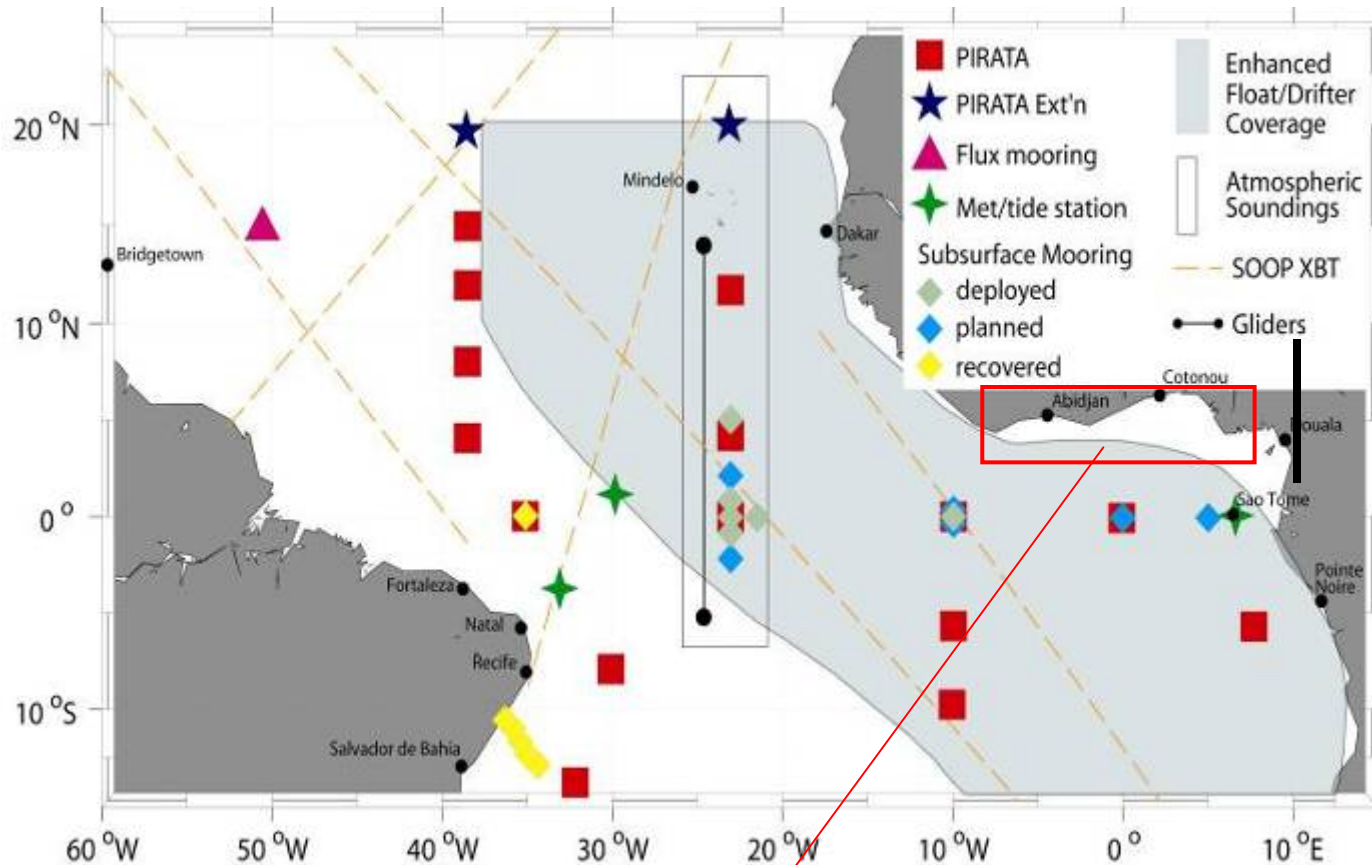


SST in Cotonou from July 2005 to August 2009 (Benin)




Goals for the next years :

- Extend the PROPAO network eastward and westward, with SST autonomous sensors along with tide gauges
- PROPAO could become an African contribution to the TA observing network




New Regional Master of Physical Oceanography and Applications in Benin:


- Launched in september 2008 thanks to IRD support & fundings
- Established in relation between University of Cotonou (International Chaire Unesco of Mathematics, Physics and Applications; CIPMA) and University Paul Sabatier of Toulouse
- Responsibles: N.Houkonnou (CIPMA/Benin), N.Hall (UPS/France) & B.Bourlès (IRD/Benin&France)
- Regional, English/French: 10 students in 2008-2009, 11 in 2009-2010 (Benin, Togo, Cameroon, Nigeria, Ghana, RCI)
- Support and involvement from 2009 of the TOTAL oil company for applications & training.
- 3 potential PhD (looking for grants...)
- **Additional inputs/supports/help (training periods) welcomed!!! SEE PRESENTATION ON THURSDAY**



United Nations
Educational, Scientific and
Cultural Organization



INTERNATIONAL CHAIR IN MATHEMATICAL PHYSICS AND APPLICATIONS (ICMPA)
UNESCO CHAIR IN MATHEMATICAL PHYSICS AND APPLICATIONS
established in 2006 at the University of Abomey-Calavi (Republic of Benin)








University of Abomey-Calavi

UNITWIN/UNESCO Chairs – Twinning networks and university networks

MULTI-UNIVERSITY MASTER'S DEGREE AND DOCTORAL TRAINING PROGRAMME IN PHYSICAL OCEANOGRAPHY AND APPLICATIONS

Considering the needs of capacity building in environmental sciences, climate and coastal environment, a regional master in **“Physical Oceanography and Applications”** is being organized by the International Chair of Mathematical Physics and Applications (ICMPA-UNESCO Chair) of the University of Abomey-Calavi at the Faculty of Sciences and Technology, involving the following universities, research institute and organizations:

Intergovernmental Oceanographic Commission (IOC) of UNESCO	Paul Sabatier University (France)	University of Abomey-Calavi (Benin)	Institut de Recherche pour le Développement (France)	Total (France)
<p>Mr Justin Ahanhanzo, Coordinator and Team Leader, Intergovernmental Oceanographic Commission of UNESCO (IOC/UNESCO) UNESCO, 1 Rue Miollis, 75732 Paris Cedex 15, France Tel: +33 1 45 68 36 41 Fax: +33 1 45 68 58 10/12/13 E-mail: j.ahanhanzo@unesco.org http://ioc.unesco.org</p>	<p>Prof. Nicholas Hall, Laboratoire d'Etudes en Géophysique et Océanographie Spatiales (LEGOS), 18 Avenue Edouard Belin, 31401 Toulouse cedex 9, France Tel: +33 5 61 33 29 19 Fax: +33 5 61 25 32 05 E-mail: Nick.Hall@legos.obs-mip.fr</p>	<p>Prof. Mahouton Norbert Houkonnou, International Chair of Mathematical Physics and Applications (ICMPA- UNESCO Chair), 072 B.P. 50 Cotonou, Republic of Benin, Tel: +229-21 38 61 27/ +229 95 06 26 89 Fax: +229-21 31 31 38 E-mail: norbert_houkonnou@cipma.net or houkonnou1@yahoo.fr</p>	<p>Dr Bernard Bourlès, Laboratoire d'Etudes en Géophysique et Océanographie Spatiales (LEGOS) Centre de Recherches Halieutiques et Océanologiques du Bénin (CRHOB), Représentation IRD de Cotonou, 08 BP 841 Cotonou, Republic of Benin Tel: +229 21 30 03 54 / + 229 90 08 94 56 Fax: +229 21 30 88 60 E-mail: bernard.bourles@ird.fr</p>	<p>Mme Valérie Quiniou-Ramus TOTAL S.A. DGEP/IDO/TEC/GEO – 21E09, Tour Coupole, 2, Place Jean Millier La Défense 6 - Cedex 45 92078 Paris La Défense, France Tel: +33 1 47 44 44 83 Fax: +33 1 47 44 49 48 E-mail: Valerie.Quiniou@total.com</p>
				

Official languages: English and French. English is the preferred choice, though, given the international attendance

Other informations: A few publications

French publications with peer reviews in 2009 (9 to my knowledge...)

-Athie, G., F. Marin, A-M. Treguier, B. Boulrès and C. Guiavarc'h, Sensitivity of near surface Tropical Instability Waves to sub-monthly wind forcing in the tropical Atlantic, *Ocean Modelling*, 30, 241-255, 2009

-Bourras, D., A. Weill, G. Caniaux, L. Eymard, B. Boulrès, S. Letourneur, D. Legain, E. Key, F. Baudin, B. Piguet, O. Traullé, G. Bouhours, B. Sinardet, J. Barié, J.P. Vinson, F. Boutet, and C. Berthod: Turbulent air-sea fluxes in the Gulf of Guinea during the EGEE-AMMA experiment. *J. Geophys. Res.*, 114, C04014, doi:10.1029/2008JC004951, 2009.

-Caniaux, G., H. Giordani, J.L. Redelsperger, F. Guichard, E. Key, and M. Wade: Couplings between the Atlantic Cold Tongue, the Santa Helena Anticyclone, and the African Monsoon in boreal Spring and Summer, 2009. *J. Climate*. In 2nd revision, 2009.

- Giordani, H., and G. Caniaux : Diagnosing vertical motion at the equatorial Atlantic. Submitted in the *J. Phys. Oceanogr.*, 2009.

-Kolodziejczyk, N., B.Boulrès, F.Marin, J.Grelet & R.Chuchla, The seasonal variability of the Equatorial Undercurrent and the South Equatorial Undercurrent at 10°W as inferred from recent in situ observations, *J. Geophys. Res.*, 114, C06014, doi 10.1029/2008JC004976, 2009.

-Lebel, T., D.J. Parker, B. Boulrès, C. Flamant, B. Marticorena, C. Peugeot, A. Gaye, J. Haywood, E. Mougin, J. Polcher, J.L. Redelsperger, C.D. Thorncroft: The AMMA field campaign: multiscale and multidisciplinary observations in the West African region. *Q.J.R.Meteorol.Soc.*, doi 10.2002/qj.486, 2009..

-Marin, F. G.Caniaux, B.Boulrès, H.Giordani, Y.Gouriou and E. Key, why were sea surface temperature so different in the eastern equatorial Atlantic in June 2005 and 2006, *J.Phys. Ocean.*, 39, 1416-1431, doi: 10.1175/2008JPO4030.1, 2009.

-Reverdin, G., F. Marin, B.Boulrès and P. L'Herminier, XBT temperature errors during French research cruises (1999-2007). *J. Atm. Oc. Tech.-Oceans*, 26, 2462-2473, doi: 10.1175/2009JTECHO655.1, 2009.

-Rouault, M., J.Servain, C.J.C.Reason, B.Boulrès, M.J. Rouault, and N.Fauchereau, Extension of PIRATA in the Tropical South East Atlantic: An initial One-Year Experiment, *Afr. J. of Mar. Scien.*, 31-1, 63-71(9), 2009.



Final remarks for following discussions:

1) A few issues :

- need to send a little bit earlier the material if possible; (OK last year)
- with the ANTEA, schedules have to be done with a lower transit speed
=> additional days => additional costs...
- need of “official communication” for fishers... SEE BELOW!
- Fish repellent system:
One solution way with the NEOTEK system (flipper repellent)???
autonomous, 150€each, to be tested (5-160kHz signal transmission).
(to be checked by J.Grelet...)
announced in 2009 but not done...
- Sao Tome winds...

2) Recommandations (mostly from Amma)...:

- Strong demand for additional salinity & current measurements in the mixed layer
- In situ data needed in spring, before the CT onset => attempt to organize French Pirata cruises in boreal spring (maybe progressively).
- Need of data farther in the Southern basin... (not new! but vessel time & availability!).

(refer to Thursday discussions...)





The AQUAmark 300 Pinger

The AQUAmark 300 is an acoustic pinger designed to reduce the unintentional catch of harbor porpoises in commercial gillnet and driftnet fisheries.

Large scale trials in the Bay of Fundy and in Denmark in 1996 and 1997 showed a highly significant reduction in bycatch on nets fitted with acoustic elements. In Europe, the AQUAmark 100 and 200 models,

which transmit a variety of complex ultrasonic signals, have been in commercial use for over three years with several thousand devices in service.

The AQUAmark technology has been adapted to meet the NOAA Fisheries Take Reduction Plan pinger regulations, resulting in the AQUAmark 300 product.



Features



- Fit and forget! No battery change with a sealed-for-life design. Typically lasts 2 to 4 years with seasonal use.
- No noise on deck! Wet switch means that it only operates when immersed, to save battery life.
- No leaks! Fully encased construction means there are no seals to get damaged.
- No battery waste! Return spent units to us or our appointed agents for a discount on replacement devices.

Outline Specification

Frequency	100kHz ± 2kHz
Duration	300ms ± 15ms
Repeat Interval	4s ± 0.2s
Sound Level	132dB re 1 µPa at 1 metre ±4dB
Dimensions	164mm (6.5") long ± 50mm (2.3") diameter at widest point
Weight	410 g (15 oz) in air; 155 g (5 oz) in water
Attachment	Dual point attachment through 11mm (0.4") holes 19mm (0.75") from ends, or by placement in ball bags
Maximum depth	200 m (110 fathoms)
Shelf life	Up to 4 years
Battery life	Up to 1 year with continuous immersion, dependent on temperature. 2 - 4 years in typical fishery with seasonal or discontinuous deployment, as devices switch off when not in water.

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Aquatec Subsea Limited, High Street, Harday Wintney, Hants, RG27 8NY, UK

Telephone: + (44) (0)1252 843072. Facsimile: + (44) (0)1252 843074. email: info@AquatecSubsea.com. www.AquatecSubsea.com

DS47 Rev 1.2

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Meets NMFS Regulations

ABOUT VANDALISM :

last recent news

(obtained thanks to Alain Fonteneau, IRD, Sète, France).

The West Pacific Tuna Commission of the
Western and Central Pacific Fisheries Commission (WCPFC)
adopted a resolution in December 2009
that prohibits any fishery actions at and around
the scientific buoys in the Pacific!

See next slide...





CONSERVATION AND MANAGEMENT MEASURE PROHIBITING FISHING ON DATA
BUOYS

Conservation and Management Measure 2009-05

The Western and Central Pacific Fisheries Commission:

Aware that many nations, including Commission Members, operate and deploy data buoys throughout the Convention Area and oceans worldwide to gather information used to make improved weather and marine forecasts, provide assistance to fisheries by generating data on sea surface and subsurface measurements, provide assistance to search and rescue efforts at sea, and collect critical data used to conduct research on meteorological and oceanographic topics and climate prediction;

Knowing that highly migratory species, in particular tuna species, aggregate in the vicinity of data buoys.

Noting that a reduction of fishing around data buoys may assist the Commission in its efforts to reduce the mortality of juvenile bigeye and yellowfin tunas;

Recognizing that the World Meteorological Organization and the Intergovernmental Oceanographic Commission have determined that vandalism and damage to data buoys by fishing vessels are significant problems in the Pacific Ocean and worldwide;

Concerned that vandalism or damage to data buoys results in significant loss of data critical to weather forecasting, to the study of marine conditions, to tsunami warnings, to support for search and rescue efforts at sea, and that Commission Members expend considerable time and resources to locate, replace and repair data buoys damaged or lost by fishing methods or vandalism;

Noting that information about the description, type and location of several data buoy programs is publicly available through the Internet;

Further noting the mandate given to the Commission to adopt generally recommended international minimum standards for the responsible conduct of fishing operations;

Adopts the following conservation and management measure in accordance with Article 10 of the Convention:

1. CCMs shall prohibit their fishing vessels from fishing within one nautical mile of or interacting with a data buoy in the high seas of the Convention Area, which includes, but is not limited to, encircling the buoy with fishing gear; tying up to or attaching the vessel, or any fishing gear, part or portion of the vessel, to a data buoy or its mooring; or cutting a data buoy anchor line.
2. For the purposes of this measure, data buoys are defined as floating devices, either drifting or anchored, that are deployed by governmental or recognized scientific organizations or entities for the purpose of electronically collecting and measuring environmental data, and not for the purpose of fishing activities.
3. CCMs shall prohibit their fishing vessels from taking on board a data buoy unless specifically authorized or requested to do so by the Member or owner responsible for that buoy.
4. CCMs shall encourage their fishing vessels operating in the Convention Area to keep watch for moored data buoys at sea and to take all reasonable measures to avoid fishing gear entanglement or directly interacting in any way with those data buoys.
5. CCMs shall require their fishing vessels that become entangled with a data buoy to remove the entangled fishing gear with as little damage to the data buoy as possible. CCMs are encouraged to require their fishing vessels to report to them all entanglements and provide the date, location and nature of the entanglement, along with any identifying information contained on the data buoy. CCMs shall notify the Secretariat of all such reports.
6. Fishing activities inconsistent with paragraphs 1 and 2 above shall be deemed fishing activities that undermine the WCPF Convention and WCPFC conservation and management measures and shall constitute a serious violation in accordance with Article 25 of the Convention.
7. Notwithstanding paragraph 1, scientific research programs notified to and authorized by the Commission may operate fishing vessels within one nautical mile of a data buoy so long as they do not interact with those data buoys as described in paragraph 1.

Alain Fonteneau will submit this text at

The International Commission for the Conservation of Atlantic Tunas
(ICCAT)

and

The Indian Ocean Tuna Commission
(IOTC)

during their next Scientific Committees Meetings
(October and December 2010 respectively)

in order to adopt the same resolution for these Oceans.

*Even the positive impact of such resolutions
is not guaranteed, at least texts will exist!...*

Final remarks for following possible discussions :

1) **2009 was generally a good year for PIRATA in the GG! (see data return by M.McPhaden).**

2) **major problem : the cruises (even consequent progresses !) and vandalism...**

- **Vessel time for PIRATA SEE booked but until when? (difficult to justify)!**
+ **join proposal with TOTAL (*other presentation*)**

- **other vessel than ANTEA (eg SUROIT) would improve the efficiency & probably costs**
(+ **weaken the number of legs!**)

3) **Recommandations by AMMA-Ocean, TACE, CLIVAR-AIP...**

for next contributions of PIRATA to process studies and observation enhancement

See below

Recommendations from AMMA-ocean (France & EU)

(B.Bourlès, G.Caniaux & P.Brandt et al.)

Weather system scale (less than 10 days).

The wind bursts occurring over the tropical Atlantic dynamics deserve additional investigation, e.g. their origin and occurrence, their impact on the ocean and air-sea exchanges and their potential use as predictive events for the conditions encountered in the Gulf of Guinea. For example, most process studies initiated in the frame of AMMA/EGEE indicate that other observations are needed concerning the atmospheric circulation related to the Santa-Helena anticyclone and the influence of south hemispheric southeasterlies strengthening on the response of the ocean. This seems to be a key question for preconditioning and influencing the cold tongue emplacement and for its potential influence on the WAM. The Santa-Helena anticyclone remains one of the less well studied features of the coupled system at the beginning of the WAM.

⇒ **Access to the measurements on South Atlantic Islands**

⇒ **ATLAS buoys farther in the south (Pb vessel etc...)???** (recurrent issue)

multi-annual scale (inter-annual, decadal, and climate change).

a question is the respective position and coupling between the three following large scale features: the Santa-Helena Anticyclone, the Atlantic cold tongue, and the Azores Anticyclone/Saharian heat low that lead to the natural interannual - multidecadal variability of the WAM.

∴

+

« Notable gaps exist in the southern part of the central and eastern tropical Atlantic basin. In the framework of PIRATA, a proposal has been endorsed for a South-Eastern Extension -PIRATA SEE- that has been tested during a one-year experiment at one location off Congo in 2006-2007. Such a proposal is presently in stand by for funding support problem but should be strongly supported and endorsed. Also, the CLIVAR AIP strongly recommended in 2006 a PIRATA extension toward the southern ocean, around 23°W-10°S mostly motivated by improvement of the climate and weather prediction. However PIRATA has to deal with vessel time availability... that is a major issue.”

Observations dedicated to process studies.

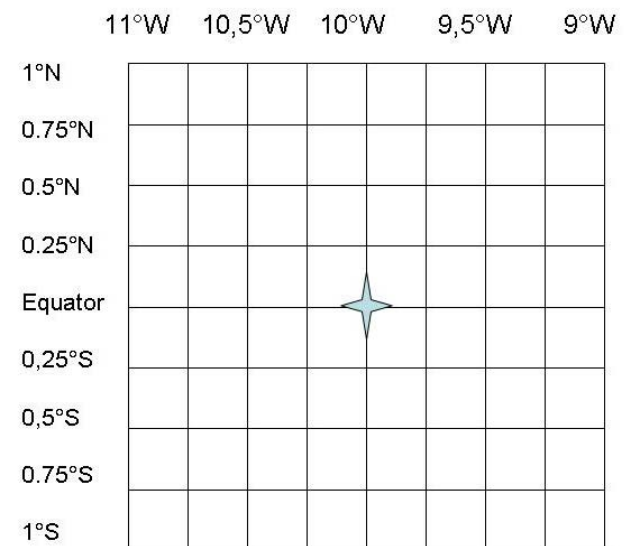
Processes responsible, and their relative importance, for the upwelling along the southern African coast in the north of the Gulf of Guinea are still not precisely known (local wind, remote wind forcing and equatorial/coastal Kelvin waves, Guinea current variability,...). Potential impacts of this upwelling on regional climate and WAM onset are still an issue of concern and the analysis of its variability, from seasonal to interannual scales, could provide important inputs in the frame of climate change. This particular upwelling was too poorly studied during AMMA.

An oceanic experiment should be dedicated, at the time of the upwelling onset (ie during the preconditioning phase of the cold tongue), to the survey of the ocean-atmosphere coupling, the setup of the meridional temperature and radiative flux gradients, on both sides of the equatorial thermal front. Such an experiment could be carried out during a specific Pirata cruise between 23°W and 0°E.

The estimate of the vertical velocity is a crucial point to validate numerical models with respect to their differences in the vertical motions in the eastern equatorial Atlantic. Specific in situ experiments should be encouraged through i) the definition and implementation of a currentmeter mooring arrays (4) around 10°W-Eq, ii) a particular cruise around this area (with “grid-like” trajectory).

Once the PIRATA SEE implemented, such a particular experiment is to be encouraged in the Congo-Gabon upwelling area in order to estimate the thermal balance and the advections at a very local scale. This could be achieved through cruises making an hydrological survey (a “grid-like” trajectory) over a specific zone (for instance including an Atlas buoy).

*About 8 day experiment with
0-500m CTD/LADCP profiles every
1/4° in latitude/longitude around the buoy*



About the CT onset & preconditioning, thermostadt issues,...

⇒ Attempt to organize cruises in winter-spring

(⇒ shifting earlier the french Pirata cruises).

⇒ Extend southward the easternmost sections.

Impacts of Intraseasonal Waves

It is thought that TIWs warm and wind-generated Yanai waves in the Gulf of Guinea cool the SST. However, **a dedicated observational study testing these hypotheses is lacking.** A dedicated TIW process study is recommended for 2011 possibly including upwelling moorings as suggest above to determine vertical motions. Meridional and zonal divergences are also needed for the evaluation of mixed layer heat budget. **Changes in the heat budget will be observed with ship and glider sections (already planned by IFM-GEOMAR) during onset and height of equatorial upwelling. Drifting thermistor chains would also be a valuable tool for this study.**

It is recommended to also include longwave radiation sensors at the PIRATA buoys at least at 10°W, 0°N.

=> longwave radiation sensors at the PIRATA buoys at least at 10°W, 0°N.

⇒ Cruises in late spring with gliders etc...

could be attempted in 2011 with IFM-GEOMAR & French Pirata cruise