

PIRATA FR 26 CRUISE ; SUMMARY

General Program

PIRATA (« *Prediction and Research Moored Array in the Tropical Atlantic* ») is an operational oceanography program initiated in 1997 on behalf the international program CLIVAR (*Climate Variability and predictability*), and carried out through a multinational cooperation between France, Brazil and USA, committed through a Memorandum of Understanding. It constitutes the backbone observation network in the tropical Atlantic Ocean (CLIVAR, OOPC, GOOS, GCOS) for climate prediction and research, and contributes to OceanSITES.

Since 2001, the French Component of PIRATA is recognized as « National Observation Service » and funded by IRD, Meteo-France, the Midi-Pyrénées Observatory and occasionally by CNRS/INSU. In 2009 and 2015, PIRATA was positively evaluated by CNRS/INSU.

PIRATA is a major tool for ocean-atmosphere interactions studies in the tropical Atlantic, and their role in the regional climatic variability at different time scales (intra-seasonal to decadal). From 1997 to 2005, PIRATA maintained 10 meteo-oceanic ATLAS buoys, and maintains 18 buoys from 2013 (after successive extensions of three buoys off Brazil, 2 along 23°W, 2 along 20°N and one off Congo at 6°S-8°E). The meteo-oceanic ATLAS buoys allow to better describe and to understand the evolution of the upper layers thermal structure, ocean-atmosphere heat and fresh water fluxes, momentum spatial and time variations... The observations (oceanic: temperature and salinity from the surface down to 500m depth; meteorological: wind, air temperature, precipitation, radiations at the surface) are daily transmitted via ARGOS and made available in quasi-real time through internet.

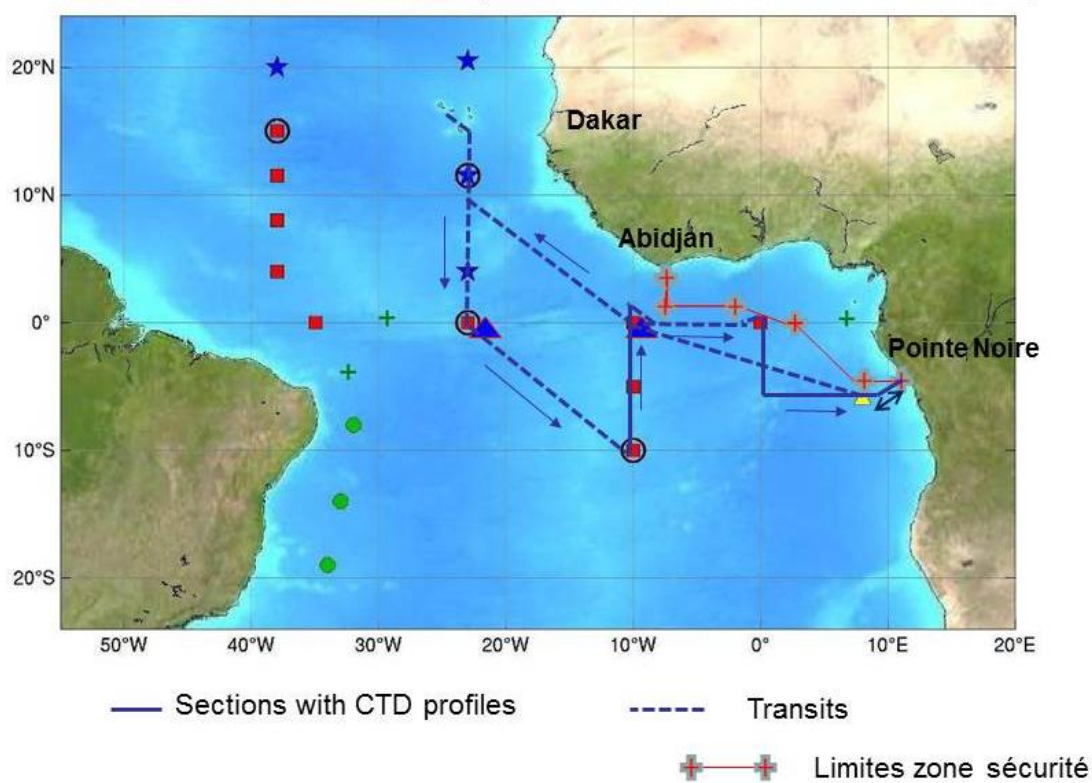
France is in charge of 6 ATLAS moorings (at 23°W-0°N, 10°W-0°N, 0°E-0°N, 10°W-6°S, 10°W-10°S, 8°E-6°S) and 2 currentmeter (ADCP) moorings (at 23°W-0°N and 10°W-0°N, this last one deployed in 2006 in the frame of EGEE/AMMA and part of PIRATA-France from 2008). From this year 2016, ATLAS buoys will be progressively replaced by new T-FLEX systems. These new systems will allow: i) to deploy more oceanographic sensors along the mooring line with data transmission in real time; ii) to ensure more reliable data transmission with higher time resolution (every hour with Iridium); iii) to double atmospheric sensors in order to reduce data acquisition loss induced by sensors failure; iv) to add systematically current sensors at subsurface (Aquadopp); v) to increase the sensors security in order to limit the impact of eventual vandalism actions or chocks; vi) to ensure a higher flexibility of the sensors types that could be added along the moorings (so to be less limited by sensors technology); vii) to ensure a longer autonomy of moorings (that could be extended up to 18 months).

PIRATA FR26 cruise program:

The PIRATA-FR26 cruise should allow:

- The servicing of the 6 ATLAS sites at 23°W-0°N, 0°E-0°N and along 10°W (10°W-10°S, 10°W-6°S, et 10°W-0°E) and at 6°S-8°E. Two sites will be equipped with new T-FLEX systems, at 23°W-0°N and 10°W-10°S.
- To replace the CO2 parameters sensor installed at 10°W-6°S.
- To deploy a new ADCP mooring at 0°E-0°N, that is a commitment of PIRATA-FR towards the PREFACE EU program and the TAV/CLIVAR (eg TACE) partners; such a mooring will allow some current measurements at three longitudes along the equator. To be noticed that the ADCP moorings at 10°W-0°N and 23°W-0°N were serviced in 2015, respectively in March during PIRATA FR25 and in October during a GEOMAR cruise.
- To replace turbulence sensors (Xpods), installed from 2014 at 23°W-0°N et 10°W-0°N (5 on each mooring).
- To replace acoustic receivers (OTN), installed from 2014 at the 6 ATLAS buoys (one per site).
- To carry out CTDO2-LADCP profiles (from the surface down to 2000m depth) every ½° (latitude/longitude) along 10°W (done yearly), 0°E, 6°S and off Congo.
- To carry out temperature profiles (XBT) during transits.
- To deploy 6 ARGO profilers (contribution to CORIOLIS), three of them with double programming (so allowing some profiles every two days during three months from the surface down to 300m depth).
- To deploy 15 surface drifting buoys (SVP-B), for Meteo-France (contribution to the AtlantOS EU program).
- To carry out sea water samplings (at the surface and during CTDO2/LADCP profiles) to analyze salinity, dissolved oxygen, nutrients, carbon parameters (DIC et TA) and primary production (pigments).
- To carry out, as done in 2015, acoustic measurements (EK60 sounder) all along the trackline of the vessel (R/V Thalassa) and, if possible, to proceed to plankton sampling (from the surface down to about 200m) with a « bongo » net at the ATLAS sites.
- Finally, to continuously register all along the trackline of the vessel the sea surface temperature, salinity with the thermosalinograph, fluorimetry and meteorological parameters.

Cruise map :



Cruise schedules:

The cruise was initially organized in two legs, with intermediate and final calls at Abidjan (Côte d'Ivoire).

Due to a piracy event on February 11st, 2016 of Abidjan (tanker attacked, hijacked and released), these calls had to be canceled for security reasons. This information and this decision were made on February 18th. The cruise map and planning along with the scientific team had to be modified consequently... Thus, the PIRATA-FR26 cruise will be done in only one 38-days leg, from Mindelo (Cabo-Verde), with a reduced scientific team of 10 people.

The overall schedule will be :

Monday , March 7th, 2016 : boarding in Mindelo

March 8th, 2016 : departure from Mindelo

April 12nd, 2016: back to Mindelo

April 13rd, 2016: disembarking and end of the cruise.

Detailed cruise calendar :

Day n°	Date	Transit Station	Latitude Longitude	Vessel mean speed (nds)	Activity
J1	07/03	Call	16°5N/24°55W	0	Mindelo (Cabo Verde), boarding and Material installation (1 day)
J2	08/03	Departure	16°5N/24°55W	11	Departure ; transit to 23°W-0°N
J2-J6	08-12/03	Transit		11	Transit: XBT and surface samplings (1 CTD test)
J6-J7	12-13/03	Station	0°N/23°W	0	ATLAS buoys servicing ; CTD profiles
J7-J10	13-16/03	Transit		11	Transit: XBT and surface samplings
J10-J11	16-17/03	Station	10°S/10°W	0	ATLAS buoys servicing ; CTD profiles
J11-J12	17-18/03	profiles	10°S->6°S	10,5	10°W section : CTD profiles CTD every ½°
J12-J13	18-19/03	Station	6°S/10W	0	ATLAS buoys servicing ; CTD profiles
J13-J15	19-21/03	profiles	6°S->0°N	10,5	10°W section (continuation): CTD profiles CTD every ½°
J15-J16	21-22/03	Station	0°N/10°W	0	ATLAS buoys servicing ; CTD profiles
J16-J17	22-23/03	profiles	0°N->1°30'N	10,5	10°W section (continuation): CTD profiles CTD every ½°
17-J19	23-25/03	Transit		11	Transit: XBT and surface samplings
J19-J20	25-26/03	profiles	1°N->0°N	10,5	Début section 0°E (1°N->0°N)
J20-J21	26-27/03	Station	0°N/0°E	0	ATLAS buoys servicing ; CTD profiles ; ADCP mooring deployment ;
J21-J23	27-29/03	profiles	0°N->6°S	10.5	0°E section: CTD profiles CTD every ½°
J23-J25	29-31/03	profiles	0°E->8°E	10.5	6°S section: CTD profiles CTD every ½°
J25-J26	31/03-01/04	Station	6°S/8°E	0	ATLAS buoys servicing ; CTD profiles
J26-J27	01-02/04	profiles	8°E-11°E	10.5	Section until off Pointe-Noire
J28-J37	03-12/04	Transit	Retour	11	XBT and surface samplings
J37-J38	12-13/04	Call & end	16°5N/24°55W	0	Arrival (12/04) and end (13/04) at Mindelo

Scientific team:

Name	First name	Specialty	Responsibility and play onboard	Organism
BACHELIER	Céline	Electronics	ATLAS, ADCP, CTD/LADCP	IRD
BAURAND	François	Chemistry	S, O2 and nutrient analysis	IRD
BOURLES	Bernard	Physics	Chief scientist	IRD
GOURIOU	Yves	Physics	Data acquisition CTD/LADCP	IRD
GRELET	Jacques	Electronics	ATLAS, ADCP, CTD/LADCP, treatment	IRD
HABASQUE	Jérémie	Physics & acoustic	Acoustic, CTD/LADCP	IRD
HERBERT	Gaëlle	Physics	Data acquisition CTD/LADCP, treatment	IRD
ROUBAUD	Fabrice	Electronics	ATLAS, ADCP, CTD/LADCP	IRD
ROUSSELOT	Pierre	Physics	Data acquisition CTD/LADCP, treatment	IRD
YOUENOU	Agnès	Chemistry	S, O2 and nutrient analysis	IFREMER
TOTAL number				10