An example of vessel time optimization and collaborations during the PIRATA cruises

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The PIRATA FR28 cruise has been carried out from February 27th to April 5th, 2018, from Mindelo (Cabo-Verde), onboard the R/V THALASSA. PIRATA is a transatlantic cooperation between Brazil, USA and France to maintain a fixed observatory in the tropical Atlantic. It celebrated its 20th anniversary in 2017. As illustrated below, such cruises serve many missions.

Core mission: maintenance and enhancements of moorings.

In the PIRATA multinational observatory, France is in charge of 6 meteo-oceanographic 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), with 3 currentmeter (ADCP) moorings also installed at the first three locations. During this PIRATA FR28 cruise, the French PIRATA team successfully replaced all PIRATA buoys, along with the new CO_2 parameters sensor installed on the buoy at 8°E-6°S in the context of the AtlantOS WP3.5 'PIRATA'. The ADCP mooring at 0°E-0°N, initially deployed in 2016 as a contribution to the PREFACE EU program, was also successfully replaced, thereby offering a two-year-dataset of current measurements from the surface down to about 300m depth. The fish tracking acoustic receivers (OTN, installed in 2014) on each PIRATA buoys were also maintained, contributing to the AtlantOS WP3.7 'European Animal Telemetry Network'. Finally, the turbulence sensors (Xpods) installed from 2014 at 23°W-0°N and 10°W-0°N (5 on each mooring between 20m and 80m) were also replaced (collaboration with Oregon State University, Corvallis, USA ; Principal Investigator: Jim Moum).

These regular operations serve to maintain and continuously improve the core network, but PIRATA-FR cruises also enable many other operations, which would not be possible if dedicated ship-time had to be mobilized for each of them.

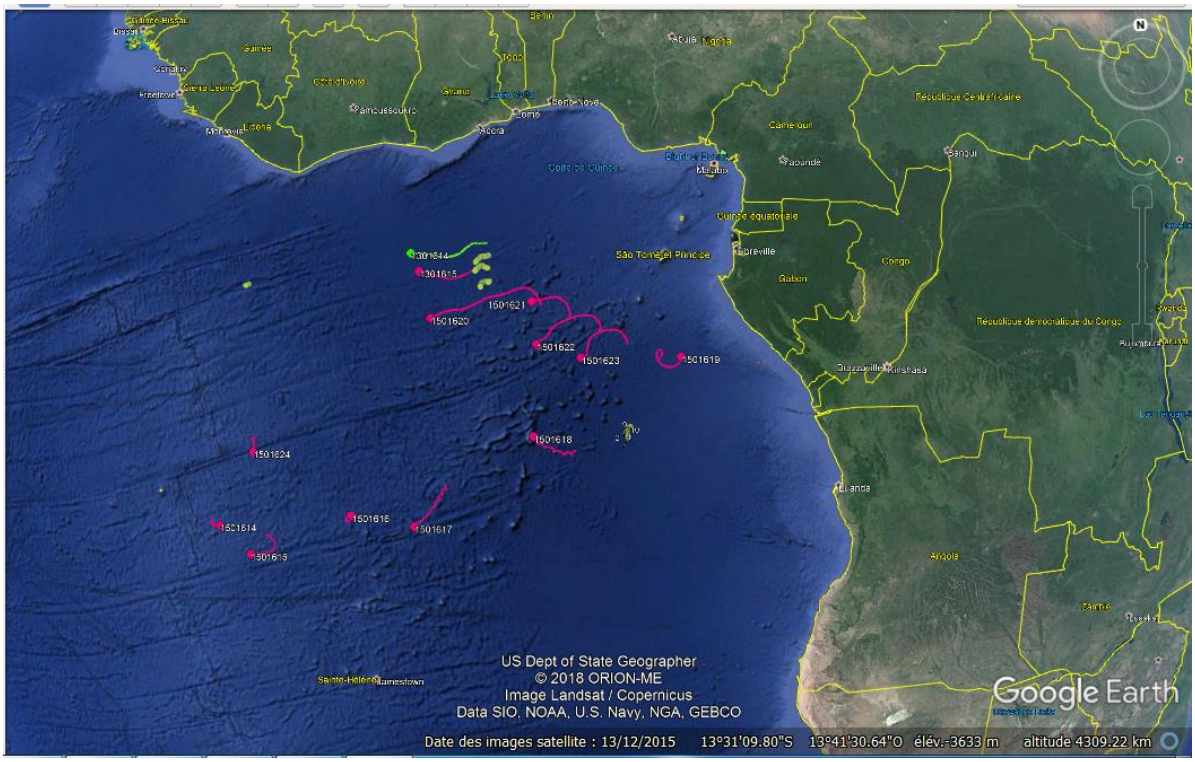
Collection of data:

During this cruise: 44 CTDO_2-LADCP profiles were carried out, about 500 sea water samplings (at the surface and during CTDO_2/LADCP profiles) were collected to analyze salinity, dissolved oxygen, nutrients, carbon parameters (DIC et TA) and primary production (Chlorophyll pigments), 101 temperature profiles were obtained with XBT, and continuous measurements, all along the trackline, were obtained from the R/V thermosalinograph, the FerryBox, the ADCP (38kHz), acoustic sounders (EK80, 6 vertical and one transversal) and the met station onboard the ship. Many data (CTD, XBT, met) were transmitted in near-real time via CORIOLIS to operational centers. Also, biological species (as Sargassum, shells on the buoys…) has been sampled for taxonomy, biological and possibly microplastic analysis.

Deployments of platforms:

- From several years now, IRD and Meteo-France have been collaborating for the deployment of surface drifters and/or thermistance chains. During this particular cruise, 13 SVP-B (drifters equipped with atmospheric pressure sensor) were deployed, mostly in the Gulf of Guinea (very poorly observed otherwise), as EUMETNET and Meteo-France contribution to the AtlantOS WP3 'Enhancement of autonomous observing networks'. Also, 10 SVP were deployed for NOAA (AOML) as contribution to the U.S. Global Drifter Program.
- Argo profilers are deployed during PIRATA-FR cruises from the early steps of the Argo program. This year, as contribution to the AtlantOS WP3.1 'Argo evolution' and for the 1st time in the Tropical Atlantic, 2 Deep-Argo (4000m) were deployed at 6°38'S - 5°E and 0°01'N-9°51'W equipped with T, S and O_2 sensors and with Iridium data transmission. Three other Argo (2000m) were deployed in the equatorial band along 0°E. All are with double configuration (so also allowing some profiles every two days during three months from the surface down to 500m or 1000m depth).

These successful operations prove once again that PIRATA, through its yearly cruises carried out by USA, Brazil and France, are very relevant platforms for several kinds and operations and should be optimized in this way, also in order to valorize as possible the vessel time costs that are the most expensive components for a long-term marine monitoring observing system.



SVP-B drifters (purple), SVP drifter (green), and Argo profilers (yellow dots) trajectories from their deployment positions. See also http://www.brest.ird.fr/us191/cruises/pirata-fr28/ for more details on the works done during the PIRATA FR28 cruise.

Deployment of a Surface Velocity Profiler equipped with a Barometer (Picture: Y.Gouriou, IRD).

A Deep-Argo profiler just after its deployment at 10°W-0°N, close to the just serviced ATLAS buoy observed on the left of the R/V Thalassa (Picture: B.Bourlès, IRD).