

# PIRATA-26 Meeting Report

(Banyuls, France, Conference Centre, 16-20 October 2023)

*Prepared by F. Hernandez and L. Cotrim with material from all SSG and PRB members*

*Reviewed by M. McPhaden in April 2024*

*v1.1 – 22/04/2024*



The PIRATA SSG and PRB sessions were held the 19-20 October 2023, back-to-back and in parallel to the EU TriAtlas Final General Assembly and Scientific Conference, started Monday the 16th of October 2023. The detailed conference program is attached in annex.

**SSG members present/online:** Moacyr Araujo (UFPE, Brazil), Peter Brandt (GEOMAR, Germany), Leticia Cotrim (UERJ, Brazil, co-chair), Gregory Foltz (NOAA/AOML, USA), Hervé Giordani (Météo-France/CNRM, France), Fabrice Hernandez (IRD/LEGOS, France, co-chair), Julien Jouanno (IRD/LEGOS, France), Jérôme Llido (IRD/LEGOS, France), Mike McPhaden (NOAA/PMEL, USA), Paulo Nobre (INPE, Brazil), Renellys Perez (NOAA/AOML, USA, remote)

**PRB members present/online:** David Legler (NOAA, USA, chair, remote), Frédéric Marin (IRD/LEGOS, France), Hervé Roquet (Météo-France, France, remote), Gilvan Sampaio (INPE, Brazil, remote)

**Invitees:** Gael Alory (UPS, France), Bernard Bourles (IRD, France), Thierry Cariou (IRD, France), Alex Costa (UFPE, Brazil), Isabelle Dadou (UPS, France), Florent Gasparin (IRD/LEGOS, France), Mareike Körner (GEOMAR, Germany), Pierre Rousselot (IRD, France), James Todd (NOAA, USA, remote), Philip Tuchen (NOAA, USA)


**Missing participants and excused:** Adrienne Sutton (NOAA/PMEL, USA, SSG), Regina Rodrigues (UFSC, Brazil, SSG)

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*Table of participants, as seen in the picture above, from left to right, first standing, then the 3 kneeling persons.*

<b>Name</b>	<b>Institution</b>	<b>Country</b>	<b>SSG/PRB/Invitee</b>
Frédéric Marin	IRD/LEGOS	France	PRB
Alex Costa	UFPE/DO/LOFEC	Brazil	Invitee
Thierry Cariou	IRD/IMAGO	France	Invitee
Jérôme Llido	IRD/LEGOS	France	SSG
Gregory Foltz	NOAA/AOML	USA	SSG
Bernard Bourlès	IRD/IMAGO	France	Invitee
Moacyr Araujo	UFPE	Brazil	SSG
Fabrice Hernandez	IRD/LEGOS	France	SSG
Mike McPhaden	NOAA/PMEL	USA	SSG
Hervé Giordani	Météo-France	France	SSG
Leticia Cotrim	UERJ	Brazil	SSG
Paulo Nobre	INPE	Brazil	SSG
Pierre Rousselot	IRD/IMAGO	France	Invitee
Florent Gasparin	IRD/LEGOS	France	Invitee
Julien Jouanno	IRD/LEGOS	France	SSG

SSG National reports:

	<p>The session started with a tribute to Jacques Merle, that passed away the 10<sup>th</sup> of October 2023. Bernard Bourles reminded Jacques's career at ORSTOM that became IRD, his contribution to the Tropical Atlantic studies with the FOCAL/SEQUAL experiment, his support to innovative techniques like satellite altimetry, and support to rising project of operational oceanography like Mercator in France. He wrote the book "Océan Climat" (IRD Publisher). He was pioneering in the use of merchant ship Met data. Once retired, he maintained a strong linkg with the academia by participating actively to the "Club des Argonautes" (<a href="https://argonautes.club/">https://argonautes.club/</a> )</p>
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Then started the presentation of the national reports:

Mike McPhaden (US):

- Presented the overall statistics of the array (see figure below), depicting the status at the 18/10/2023, and noticing the incredible wealth of the accumulated dataset (e.g., temperature, dynamic heights, trade winds at 15N/38W, 0/23W, 6S/10W):
  - An overall data return of 80% the last year, with 13/18 sites with more than 75% data return since the beginning of PIRATA, and 4 at 60%-75% (considering the 70% data return of the very recent 20S/10W mooring). The mooring survival statistics witnessing larger vandalism at 4N/38W and 0/0. The buoy at 4N/38W was moved or adrift since 11/6/2023, now located at 10.77N 17.30W. The buoy at 8S/30W stopped transmitting after 280 days of deployment.
  - The mooring survival metrics (number of moorings intact, or recovered with partial damage, over number of moorings deployed) witnesses the vandalism that occured along the 38W sectors, at 0/0 and 6S/8E (not any more deployed now).
  - The PIRATA data download at the PMEL site is still growing, with FTP requests growing in the frame of last years tendency, but an unexplained tremendous increase of downloads through Web requests, bringing to 3 millions requests the last 12 months
- Summarized the PIRATA cruises performed between 10/2022 and 10/2023 (84 days at sea over the 120 scheduled, see map below). Only 12 over 18 buoys were serviced over the past 12 months due to interruption of the PIRATA-BRXXIII cruise (see below). The 20N/38W and 8S/30W have not been serviced respectively for the last 693/501 days. The 20N/38W buoy could not be recovered/deployed during PNE cruise due to sea-state and having to rescue a sailboat.

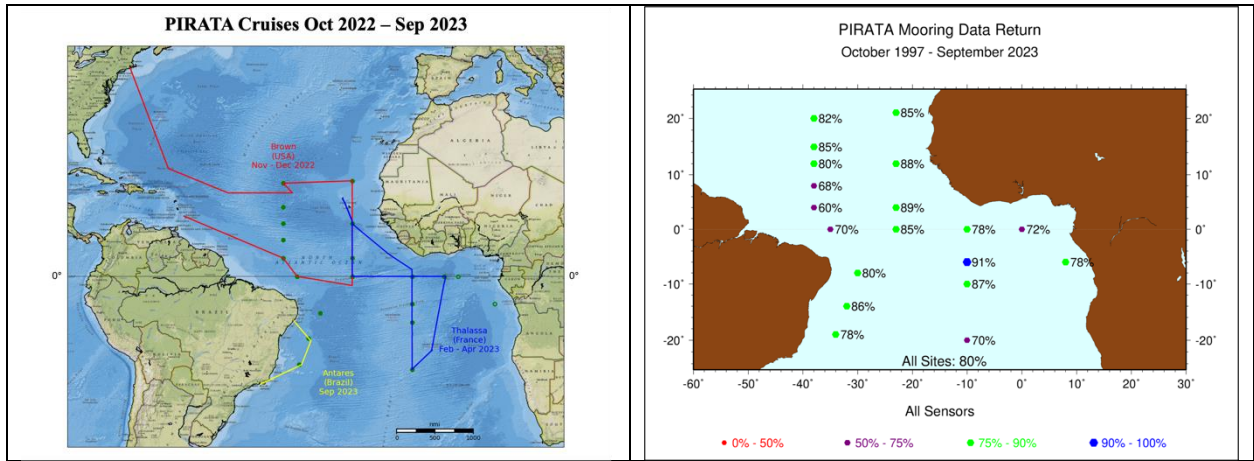
US: RON BROWN	12 Nov - 19 Dec 2022: 39 days (4 buoys)
FR: THALASSA	5 Mar - 9 Apr 2023: 36 days (6 buoys)
BR: ANTARES	16-24 Sep - 2023: interrupted after 9 days (2 buoys)

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- Then informed on the possible dates for the planned PIRATA maintenance cruises for 2024 (see also below presentations for US, FR, BR contributions):

US: GORDON GUNTER	TBD, between January-March 2024
FR: THALASSA	3 Mar - 8 Apr 2024: from Mindelo, Cape Verde
BR: ANTARES ?	TBD, After ship repair, first quarter of 2024 ?

- Reminded how the T-Flex available buoys were deployed in 2022. Currently 10 T-Flex buoys are deployed in PIRATA (9 in RAMA). It is scheduled in 2024 to have an additional T-Flex buoy at 20S/10W.
- Described the ongoing development, started five years ago, of a new TELOS buoy data acquisition/transmission system, more robust, efficient, and consuming less power with more recent electronics. The TELOS system is more flexible, with SeaBird inductive protocols. It should be introduced in 2024/25 in PIRATA.



- Finally Mike McPhaden described the funding issue that occurred beginning of October 2023. The NOAA National Weather Service, receiving the PIRATA funds by US Congress Law since 2005, for the first time, decided to not transfer the allocated \$600K/yr to the NOAA Research Department in charge of PIRATA. This will result in a 37% funding cut with dire consequences for PIRATA operations (e.g., immediate decommissioning of 7 moorings). NOAA Research is responding forcefully that a NWS failure to transfer these funds will damage forecasting and research efforts, and undermine the partnership with France and Brazil.

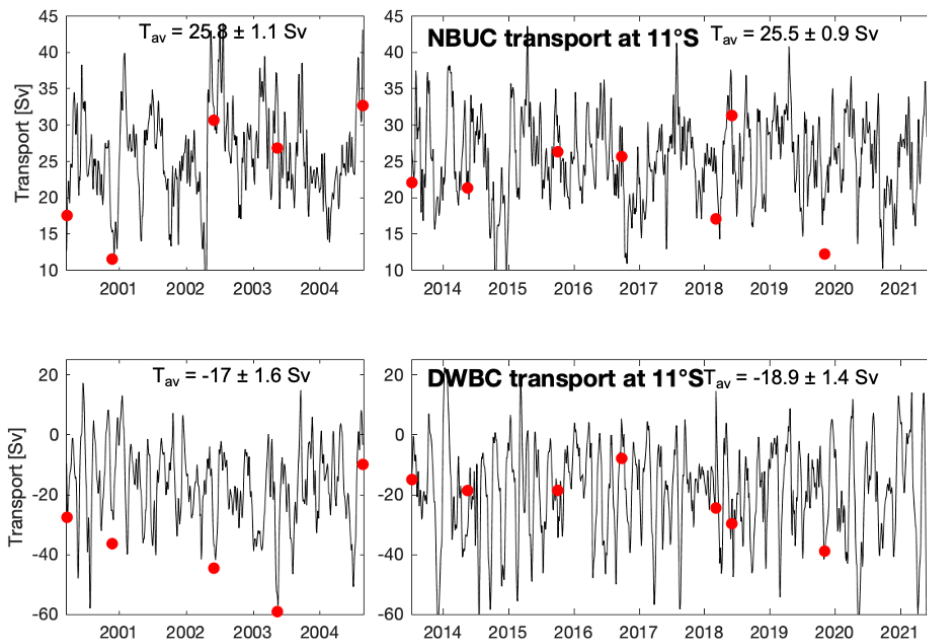
Peter Brandt (Germany)

Peter Brandt presented the German contributions to the PIRATA program:

- The Trans-Atlantic Equatorial cruises in 2019 and 2022, with new results concerning the SST and chlorophyll variability (enhanced in the cold tongue during boreal summer, lower in boreal spring).
- The program at 0/23W (R/V Merian cruise last May/June 2023, next scheduled in March 2025, PI Rebecca Hummel), witnessing the EUC variability, but also the monitoring of carbon flux.
- The 11S TRACOS array, first implemented along the Brazilian shelf, aiming at characterising the AMOC, the NBUC/DWBC transports (revisit by the R/V Merian cruises, see figure below). Now associated with a mooring on the eastern side (Africa), allowing bottom pressure measurements on both sides. The eastern side was serviced by the R/V Meteor last apr/may 2023, next cruise scheduled in 2025 (PI Marcus Dengler).

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- The oxygen measurements performed on the PIRATA moorings at 23°W, witnessing an overall decadal decay that might be linked with the warming of the ocean upper layers. This program will be continued in 2024.
- The collaborations with Mindelo are ongoing, with the Cape Verde Ocean Observatory (CVOO) started in 2006, and accumulating lots of ocean parameters. From 2025 onward, a Mobilis DB4000 surface buoy including CO<sub>2</sub> (water/air) measurements and Met-Package (DWD) will be deployed in addition. The CVOO will provide similar (and more) measurements than the PIRATA buoys. Peter Brandt offers to consider the possibility to add the CVOO measurements in real time into the PIRATA dissemination system at PMEL (PI of CVOO: Björn Fiedler, Arne Körtzinger).
- Then Peter Brandt presented the FUTURO project, focusing on Northwest African Upwelling: Cape Verde, Mauritania, Senegal, The Gambia, Guinea Bissau. This program is multidisciplinary, with intensive air/sea field campaigns in 2027-2029, and aiming at associating all anthropogenic stressors to ecosystem services in the upwelling regions. With the complete sampling of a full seasonal cycle.
- FUTURO will be also a form of celebration for the 100-yr of the Meteor expedition (1925-1927) across the tropical and south Atlantic.
- Peter Brandt reminds that the German dataset are published in the PANGAEA site



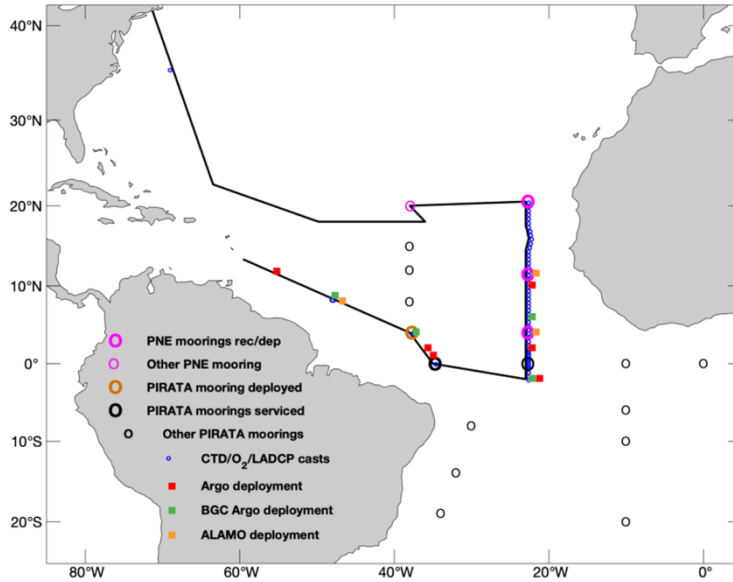
*Transports from the TRACOS array along the Brazilian shelf, red dots for the ship measurements during the surveys.*

### Gregory Foltz (US-PNE):

- Presented details of the US PNE22 cruise carried out has scheduled late 2022 (see figure below). The buoy was deployed at 4N/38W (not done in may 2022 by the PIRATA BRXXII cruise), but with some delays (success at the 3<sup>rd</sup> attempt). Then buoys were recovered at 4N, 11.5N and 20.5N at 23W. The buoy at 20N/38W could not be properly serviced. A priority rescue of a sailing boat in distress “consumed” the last shipdays necessary to pursue the mooring recovery (see figure below). Then the R/V Ron Brown had to return back to the US without having the time to finish the work. Additional scientific measurements were performed during the cruise (9 Sargassum collection and 75 RadioSounding). Moreover 2 postdocs and 2 graduated students embarked during this cruise.

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- 57 CTD+O<sub>2</sub>+LADCP casts to 1500-m-depth were carried out (6 to the bottom), as well as underway S-ADCP, TSG, pCO<sub>2</sub>, M-AERI measurements, and Argo and BGC-Argo deployments.



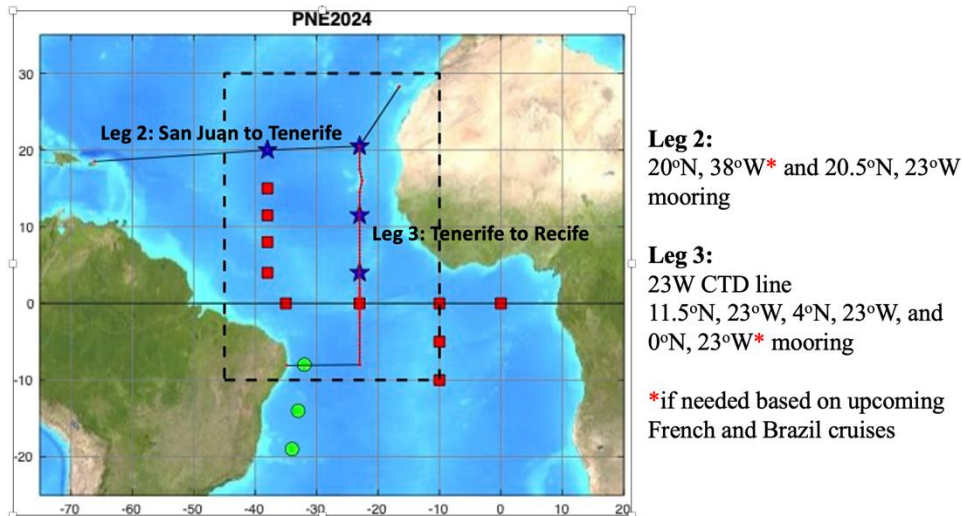
PIRATA-US cruise 2022: on the R/V Ronald H. Brown Nov 2 – Dec 9, 2022: Bridgetown, Barbados to Newport, Rhode Island.



Sailboat rescue near 20°N, 38°W, the boat has demated

- The next PNE cruise will be scheduled on the R/V Gordon Gunter (Jan 15 – April 19: Pascagoula, Mississippi to Pascagoula, Mississippi), chief scientist Renellys Perez, with additional scientific contribution of AEROSE and WHOI. This ship is usually dedicated to fisheries, and 3 transit legs are scheduled in addition to the 2 scientific legs (see figure below). Provision to recover/deploy the 4 PNE moorings and a visit to 0/23W. 65 CTD+O<sub>2</sub>+LADCP are scheduled, but in case of delays, some XCTD will be performed instead.
- During the next cruise, the TACOS program will be carried on. The Aquadopp sensors at 20N/38W will be recovered, but 15 sensors will be deployed at 11.5N/23W.

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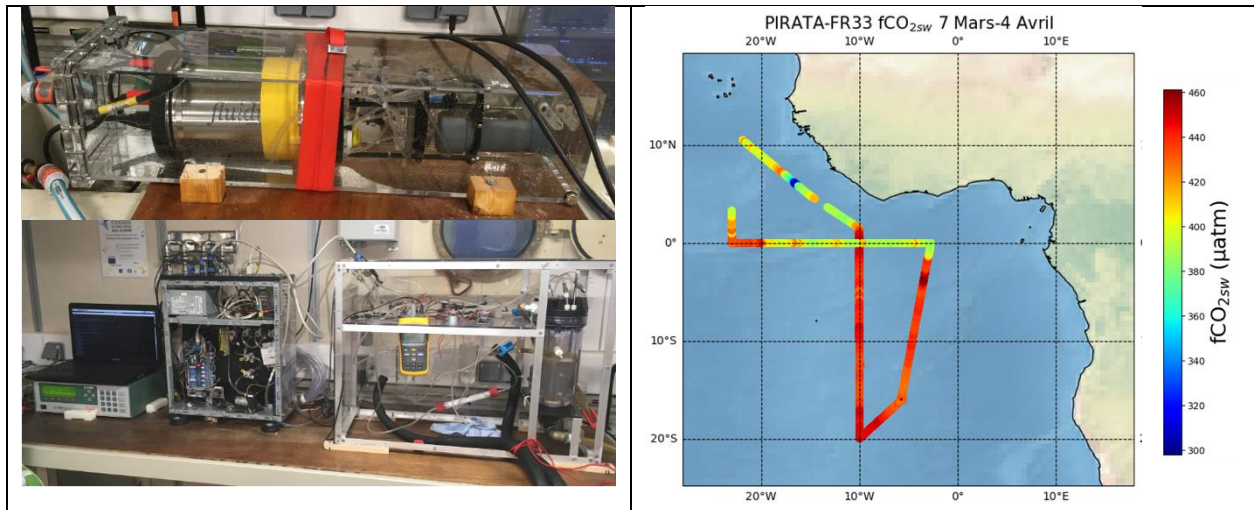
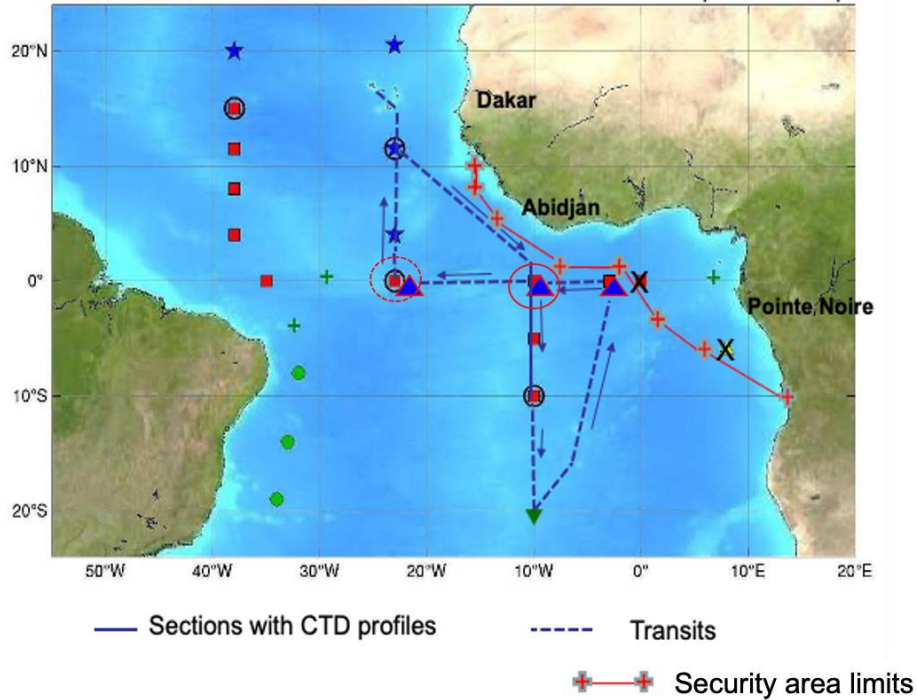


PNE website at AOML: <https://www.aoml.noaa.gov/pirata-northeast-extension> where the PIRATA bibliography is updated by Renellys Perez: 392 publications associated directly with PIRATA were counted.

### Jérôme Llido (France).

- Described the PIRATA-FR33 cruise, performed 3/3/2023 to 9/4/2023 (37 days) on the R/V Thalassa. Six ATLAS/TFLEX moorings were serviced : 0°-10°W; 6°S-10°W; 10°S-10°W; 20°S-10°W; 0°-3°W; 0°23°W, with the addition of the ADCP mooring serviced at 0/10W (see figure below).
- All buoys are equipped with OTN .The 0/10W and 6S/10W moorings are equipped with the CARIOCA CO2 sensor. The 0/10W, 0/23W moorings are equipped with 9 Xpods. Additional T/C and Aquaddop sensors are deployed in several moorings.
- On route, 10 SVP-B buoys, 5 Argo and 2 BGC-Argo profilers were deployed,
- 80 XBT and 56 CTD+02+LADCP casts were carried out, with 73 sea water sampling for S, O2, nutrients, Chlorophyll pigments (110), POC/PIC (33), pH, TA, DIC/TA, DIC/C13, O18, POM, and 99 samplings for phytoplankton taxonomy (microphytoplankton, pico & nanophytoplankton). Noting that Total Alkanity analysis was carried out on-board for first time (new best practices proposed by Thierry Cariou). In addition 45 biological samplings at the buoys : Barnacles: 32 (for microplastics & isotopes); 15 tuna pieces (for Hg analysis in the food chain). Sargassum observations were also performed.
- Underway continuous measurements were performed with S-ADCP (38kHz, 150kHz & DVL 600kHz) ; TSG ; acoustics measurements (EK80, 6 frequencies) ; and pCO2 + pH at the surface (pH prototype development, see images below).
- A dedicated experiment on the equatorial mixed layer and diurnal cycle has been carried out (PI: F. Gasparin), with Argo floats programmed to surface every 3h, a 48-h CTD station at 0/10W and 0/23W, and additional T/C and current measurements in the mixed layer at 0/10W.


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Left: pH prototype sensor (top) and pCO<sub>2</sub> instrument (bottom). Right: fCO<sub>2</sub> measurements

- Jérôme Llido, Thierry Cariou (IRD/IMAGO) and Pierre Rousselot (IRD/IMAGO) mentioned that specific presentations on best practices for PIRATA cruises were carried out during the conference, and proposed to share tools and expertises among PIRATA cruises data providers.
- PIRATA-FR cruises data are now reported by DOI. All are referenced at <https://campagnes.flotteoceanographique.fr/series/14/>
- The PIRATA-FR34 cruise is scheduled on the R/V Thalassa from 28/2/2024 to 4/4/2024 (37 days, from Mindelo, Cape Verde), and would service the same 6 PIRATA sites than 2023. 60 CTD casts are also scheduled. Additional sensor are planned to equip the mooring site as indicated below:





### The next PIRATA-FR34 cruise

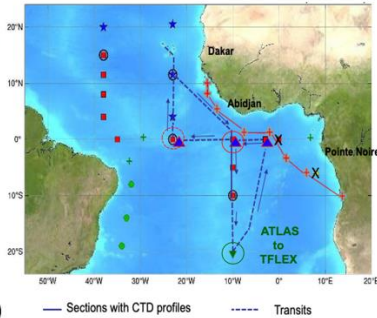
**February 28 – April 4, 2024 (i.e. 37 days, from/to Mindelo, Cape Verde)**


on board R/V THALASSA with 15 scientists

- **6 ATLAS/TFLEX moorings (rec/dep)** : 0°-10°W; 6°S-10°W; 10°S-10°W; 20°S-10°W; 0°-3°W; 0°23°W
- **1 ADCP mooring (rec/dep)** at 0°-3°W
- 60 CTD02/LADCP ...


**Additional sensors on moorings**

- 2 x SBE37 T/C at 0°-10W (15m & 25m) *to be confirmed*
- 2 x SB37 T/C-ODO - sites *to be defined*
- Aquadopps maintained at 7m : 0°-23°W, 0°-10°W, 0°-3°W and at 23m : 0°-10°W
- + 1 Aquadopp at 0°-10°W (28m) & 1 Aquadopp at 0°-3°W (23m)
- + 1 ADCP 600kHz at 0°-3°W





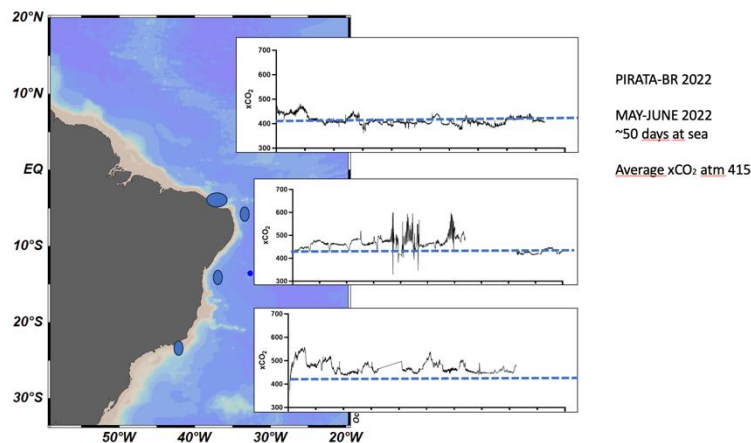
PIRATA 26 SSG meeting, Banyuls sur mer, October 19-20, 2023



- Hervé Giordani and Jérôme Lido remind the ongoing action for installing sea level pressure sensors on PIRATA buoys. The funding by MétéoFrance still need to be correctly addressed in 2024. However, Mike McPhaden proposes to buy and test in 2024 four prototypes in order to equip two PIRATA sites (TBD by Météo-France). This proposition is an alternative of the cost increase (10 k\$) of the reference instruments, compared to the new sensors (2 k\$) that were designed recently by another manufacturer.
- Jérôme Lido reminds the SSG that PIRATA-France is secured by the label « National Observations Service for Ocean-Atmosphere » by CNRS, which ensures vessel time and funds every year. The 2024 PIRATA-Fr activity are yet scheduled. However, the new label need to be obtained for the period 2024-2029. The request should be prepared before end of 2023. But a new governmental policy concerning the carbon footprint of scientific activities is now effective in France. The new label request need to tackle this issue, with proposition to reduce carbon footprint of PIRATA-FR activities, including operations at sea. The second aspect of this concerns biogeochemical data in PIRATA-FR: nowadays these data are not specifically considered by the PIRATA MoU and SSG recommendations are expected.
- In parallel to the existing framework of « National Observations Service for Ocean-Atmosphere » for PIRATA-France, an effort, for several years, is ongoing to better structure ocean observing systems in France, in order to allow a better recognition at the European Level, and potentially benefit for a European support as European Research Infrastructure program (like EuroArgo).
- The PIRATA-France funding is reminded as follows:
  - A IRD budget increase of 65k€ in 2023 compared to 52k€ the previous years
  - The secured budget allowance of 30k€/yr by Meteo-France for the period 2022-2025 (convention renewed in July 2022)
  - An allowance by Observatoire Midi-Pyrénées (OMP) of 3k€/yr
  - Structural funding of CNRS of 14k€ in october 2023 through the “Ocean Hauturier In Situ” (OHIS) program
  - An overall budget of 1.5M€/yr for 40 days of shiptime
- And the extra purchase of sensors through different funding/programs in 2023:
  - EU TRIATLAS : 6 T/C sensors SBE-37-IMP , 2 SBE37-ODO, 2 Aquadopp currentmeters
  - IRD : 2 Aquadopp currentmeters
  - CNES : 2 Aquadopp currentmeters
- This year, an extra budget was obtain to organize the PIRATA meeting in Banyuls:
  - 7k€ IRD, 3k€ METEO-FRANCE, 1k€ Université TOULOUSE III, 2.5k€ LEGOS

Paulo Nobre (Brazil)

- Reminded the PIRATA-BR-XXII cruise on the NOc Antares in 2022 (25/05 - 15/07) during which 7 buoys were serviced (with the shallow associated CTD-O2), with underway pCO<sub>2</sub> measurements (L. Cotrim see image below). The 4N/38W was serviced during the PNE cruise in November 2022.
- In 2023 the PIRATA-BR-XXIII cruise was planned to serve with the NOc Antares 9 buoys (8 BR sites and the 20N/38W PNE site), from Rio, 13/9/2023. Unfortunately, PIRATA-BR-XXIII only served the 19S/34W and 14S/32W, due to a generator failure (see map presented by M. McPhaden above). Underway pCO<sub>2</sub> and TSG measurements were carried out, as well as shallow CTD-O<sub>2</sub>/nutrients/alkalinity stations at the two buoys sites. After repair, the cruise is scheduled to resume during the first quarter of 2024.
- The PIRATA-Brazil funding is provided by the Brazilian Federal state and covered (not including personnel cost):
  - PMEL import/export for 50 k\$
  - 45 days of NOc Antares
  - NOc Antares Engine and Air Conditioning: 1,2M\$ and 100 k\$
  - Logistics: 100 k\$
  - Expendable: 40 k\$
- Paulo Nobre provided an update of the Institutional Developments in Brazil regarding Ocean Sciences and Observations:
  - The National Institute for Oceanic Research - INPO has been created and a yearly contract of US\$2,000,000 for operations signed with the Ministry of Science, Technology and Innovation – MCTI. J. Trotte Dunha and A. Polejack involved in INPO.
  - CNPq Call for proposals has granted US\$1,000,000 for a GOOS-research project networking Universities and Research Institutes in Brazil.
  - MCTI has granted US\$6,000,000 for the establishment of an ocean oil spill monitoring System, coordinated by INPE.



## SSG discussions and recommendations to PRB:

### Carbon budget on PIRATA-FR activities (impact on shiptime):

This issue needs to be addressed for the next label “National Observations Service for Ocean-Atmosphere » for PIRATA-France. The CNRS requests 40% carbon footprint reduction by 2030, including the sea experiments. The following is discussed:

- The PIRATA MoU “protects” the PIRATA-FR shiptime: preventing from reducing the ship-speed, or removing shiptime-days.
- The “making more science underway” request is already adopted by PIRATA-FR, and science onboard can not occupy shiptime that may reduce the service of PIRATA buoys.
- The buoy service frequency of one year is mandatory: this is the way to limit the impact of a) vandalism, b) biofouling, c) instrument trends, d) loss of power (battery lifetime usually not exceeding one year)
- An option consists in optimizing the yearly service among Br, Fr, US in order to better optimize shiptime
- The SSG proposes to tackle the issue. The answer has to focus on QUALITY, QUANTITY, EFFICIENCY. For instance, analysing the carbon footprint of the full LEGOS, of the PIRATA activity (including shipping material from PMEL to France and Brazil), with an assessment based in cost/benefit metrics (e.g., what is the cost of “not monitoring” part of the Tropical Atlantic for Nat. Weather Prediction centres ?)
- The SSG acknowledge that shiptime carbon footprinting reduction is managed at another level of decision (e.g., changing the R/V propulsion technology...)

### Other cruise and shiptime issues (also recommendation SSG-25)

- Greg Foltz indicated that shiptime in Nov-Dec 2024 onboard the R/V Ron Brown is not yet guaranteed
- The SSG invites PIRATA-Br to find ways to use the R/V Vital de Oliveira whenever possible, instead of NOc Antares, in order to ensure more comprehensive surveys (e.g., S-ADCP on board the Vital de Oliveira)

### Financial issues at NOAA

To support the NOAA/PMEL to get back the allocated funds for PIRATA from NOAA/NWS, the SSG proposes to prepare a letter reminding:

- That NOAA has a commitment defined by the MOU
- That the PIRATA array would loose 7 buoys over 18 if there is this 40% budget cut. And consequently, shiptime would be reduced, this will also reduce the associated programs (on board measurements, contribution to the GDP and Argo programs etc....)

**→ A letter from PRB to NOAA has been prepared and signed by all institutions in late December 2023**

### Recommendation SSG-25 on PIRATA mooring technology evolution, and proposition for SLP sensors by Météo-France

- The proposition by M. McPhaden to upgrade the buoy technology in 2024/2025 with the TELOS transmission system is approved by the SSG.

Proposition by Météo-France for adding Sea Level Pressure sensor

Input from Mike McPhaden:

*At present, 7 of 18 surface moorings are equipped with a surface BP sensor (see map below). The 2021 TAOS review report recommends that “All PIRATA surface buoys should be equipped with sensors for barometric pressure.” The stumbling block in the past has been cost. We have been using the industry standard Paros scientific sensor which is very accurate but one of the most expensive measurements in the PIRATA sensor suite. Today, Paros sensors cost almost US \$10K each.*

*Over the past few years we have been testing a new, low cost BP sensor manufactured by Druck. Attached is a table showing 8-12 month side-by-side comparisons from two tests of Paros-Druck sensors. The Druck sensor can meet our requirements at 5 times lower cost.*

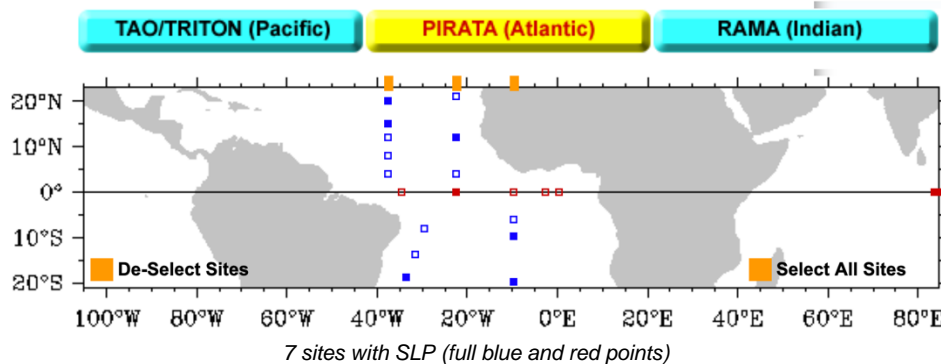
Data difference statistics (T-Flex 1017 minus TELOS TELO0001) at station PAPA (deployment period 22 Jul 2018 to 13 Jun 2019) and at WHOTS Hawaii (21 Nov 2019 to 27 Jul 2020) from high temporal-resolution (1–10 minute) data.

	N	$\Delta$ Mean	$\Delta$ Stdev	$\Delta$ RMS	$\Delta$ Min	$\Delta$ Max	R <sup>2</sup>
BP at PAPA (hPa)	47009	-0.007	0.106	0.107	-0.600	0.800	1.000
BP at HI (hPa)	34779	-0.074	0.118	0.118	-8.800	1.400	0.999

*Assuming the US National Weather Service does not kill PIRATA as mentioned above, PMEL plans to buy 4 new Druck sensors to bring the total number of sites in PIRATA with BP to 11. Our intent is to deploy these as soon as possible, though it will probably be after the upcoming cruises in early 2024 because of the lead time needed for acquiring and preparing the sensors. So we will be looking at late 2024 to early 2025 for first deployments.*

*In the meantime, SSG advice on where to deploy these would be appreciated. A technical issue is that we can only deploy Druck sensors on T-Flex moorings. However, if a preferred site is presently occupied by an ATLAS mooring, we can use an existing Paros sensor from our inventory at that site and use Druck sensors elsewhere.*

Additional remarks from Renellys Perez and PIRATA programs in 2024: the 5 TFLEX sites that currently don't have an SLP sensor are 20.5N/23W, 4N/23W, 8S/30W, 14S/32W, and 6S/10W. The 20.5N/23W and 4N/23W moorings will be serviced by the NOAA R/V Gordon Gunter in Feb-March 2024, and optionally the 8S/30W. The PIRATA-FR early 2024 will service 6S/10W. PIRATA-BR-XXIII just serviced 14S/32W, this site should not be revisited before 2025.



Météo-France proposes to support financially the acquisition of these new Druck sensors. However, funding issues need to be correctly addressed internally in 2024 at Météo-France mentioned Hervé Roquet.

→ In Avril 2024, Hervé Giordani reported that: **6 Druck pressure sensors were purchased by Météo-France, 2 by IRD, and 4 additional sensors are going to be purchased by the PMEL**, this will result in 12 new Barometric Pressure sensors for PIRATA. These additional 12 sensors will result in every one of the 18 PIRATA moorings being equipped with Barometric Pressure in 2025. Funds for 10 additional spare sensors need to be found for the necessary replacement on the moorings in 2026.

#### German proposition to include the Cape Verde CVOO mooring site into the PIRATA program

This proposition means that the CVOO would appear into the PIRATA data distribution framework (at PMEL) has the 19<sup>th</sup> buoy of the network.

This is considered very favorably. However, a transition period is requested in order to ensure that measurements and processing match the PIRATA technical framework and practices on data processing. PMEL requests the list of sensors, and opens discussion with Geomar.

#### Biogeochemical data in PIRATA (Feedback from EuroSea)

Leticia Cotrim showed from EuroSea that PIRATA contributes to the carbon budget monitoring in the Tropical Atlantic. However, the status of biogeochemical data in the PIRATA programs needs to be clarified. It is agreed that the BGC community is already well organized, and by platforms or projects/programs, distributes at the global scale the different kind of carbon derived parameters:

- Underway pCO<sub>2</sub> measurements from PIRATA-Br (PI: L. Cotrim) and PIRATA-Fr (PI: N. Lefevre) are processed and transmitted to SOCAT
- CARIOCA sensors on PIRATA moorings are already in SOCAT with the label "PIRATA"
- Bottle samples data are sent to GLODAP
- Renellys Perez informs that PIRATA-US data are sent with the label "PNE". That should be changed to "PNE-PIRATA" to ensure that every data is clearly associated with the PIRATA program

#### Cruise data availability, processing, best practices (also recommendation SSG-25)

Standard data from the moorings are all homogeneously processed by PMEL. Additional sensors on moorings, like ChiPod or CARIOCA are processed under the responsibility of the PI of the additional projects. For the processing of all other data under the responsibility of PIRATA (underway measurements, CTD casts...) Pierre Rousselot and Thierry Cariou clearly expressed that there is not "best practice" but "best practices" and it is recommended inside PIRATA to all adopt the same "best practice" for the different sensors. Paulo Nobre reminds that CTD data are directly sent to PMEL. It is suggested in 2024 to start homogeneizing the processing methods/algorithm/software among US, FR and BR. Pierre Rousselot agrees to start to exchange (visit ?) with PMEL in 2024 (technical meeting, task force).

It is also recommended to attribute DOI to PIRATA data

#### Collaborations (Spanish Programs)

Fabrice Hernandez invited Jose-Luis PELEGRI (Prof at ICM, Barcelona) and Alonso HERNANDEZ-GUERRA (Prof at Gran Canarias University) to the conference PIRATA-TriAtlas in Banyuls. Only JL Pelegri attended the meeting. Both are physical oceanographers, PI, for years, of different spanish programs in the South and Tropical Atlantic, leading several spanish initiatives in that area, with a wide relationship with the spanish tropical community. JL Pelegri presented during the conference the SAGA project, with moored instrument along 10°W, south of 20°S. Every year, they take the opportunity of the return journey of the spanish research vessel visiting the spanish Antarctic base, in order to carry out

dedicated sea experiment on the way back to Europe, crossing the south and tropical Atlantic. Moreover, there are several Canary Island initiatives toward the African coast and the upwelling systems (Marroco, Mauritania, Senegal) that might be aligned in scientific questions with the PIRATA community interests. Finally, the relationship started with GEOMAR showed all the benefit of having well organised tropical community working together with the PIRATA program. This allows opportunity of collaboration and help on experiments at sea, exchanges of expertise, potential collaborations on new projects....

JL Pelegri and the SSG could discuss and exchanges on opportunities for collaborations during the conference. We propose to invited JL Pelegri, A. Hernandez-Guerra or other person they recommend at the next SSG meeting, in order to better discuss potential collaborations.

#### Role in the TAOS, mechanism to “invite” new project on-board PIRATA cruises

It is recommended to give more visibility to the PIRATA US, FR and BR cruises (shiptime agenda distributed one year in advance) in order to give the chance to external scientists to propose dedicated projects and being embarked on PIRATA cruises

#### SSG membership status

- The SSG takes note of the decision of Adrienne Sutton to leave PIRATA. The SSG thanks Adrienne for her contribution and the expertise on biogeochemistry she provided. Biogeochemistry is now very relevant in observing system discussions, in particular when talking about best practices. It is recognized that another biogeochemist from the US community, preferentially a woman, should be invited. The name of Leticia Barbero is mentioned.
- It is also approved the support of one/two early career scientist to join the SSG/PRB meetings and discussions. It is recommended to fund the participation of an early career scientist at the next meeting in 2024 (organized by PIRATA-US)

#### Next PIRATA meeting (US organization)

- The SSG recognizes the benefit of having back-to-back science associated conference with PIRATA SSG and PRB annual meeting. This has been a success since the common meeting between the AMMA project and PIRATA
- Mike McPhaden indicates that Washington DC might be an option, considering the invitation of the “TAOS review community” (suggested by R. Perez).
- Another option: Kiel and the GEOMAR new building venue, also the anniversary of the Meteor Expeditions