



Central and South Atlantic Related Research in Brazil

Fabio Hazin

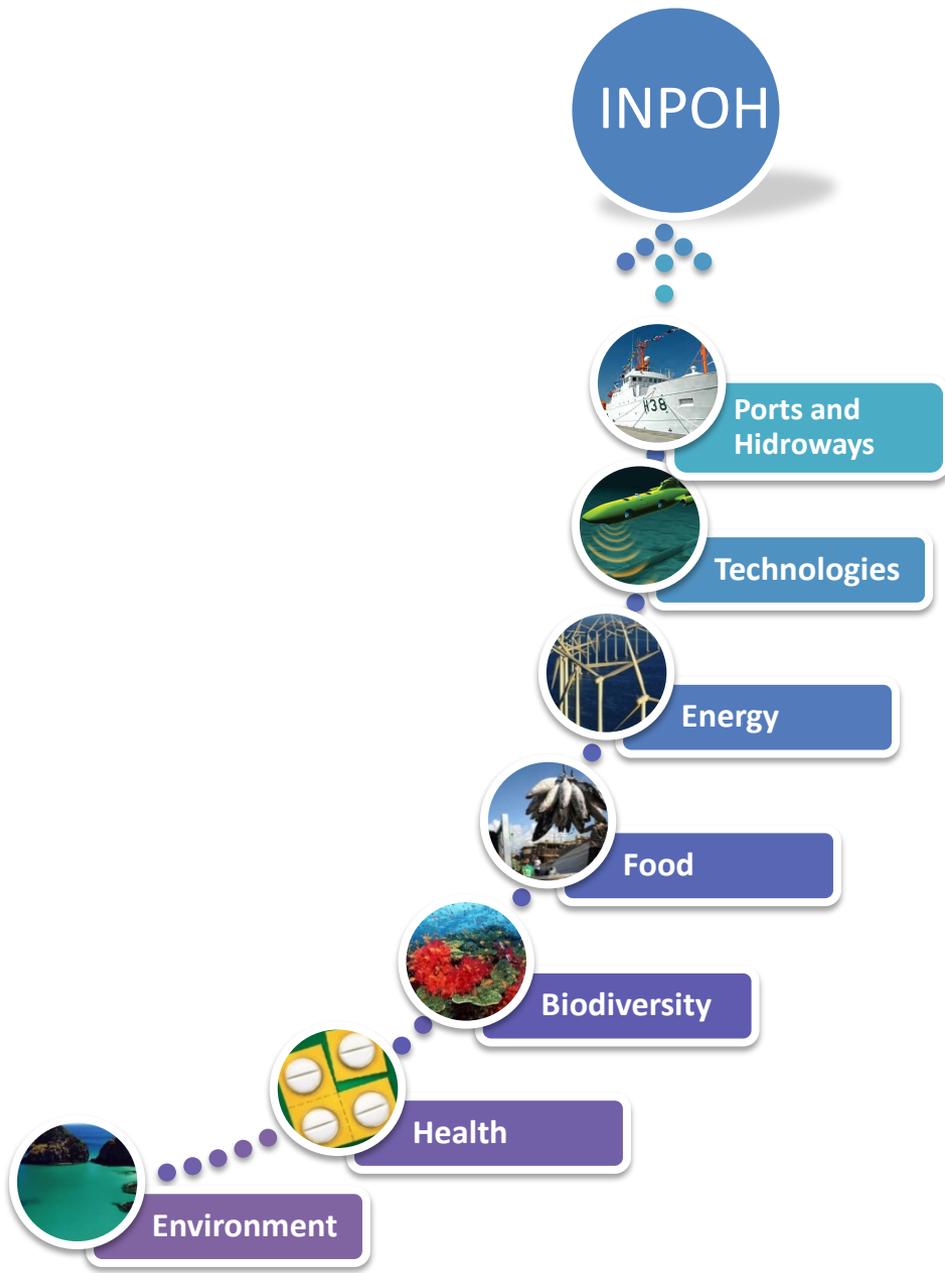
National Secretary for Fisheries
Ministry of Fisheries and Aquaculture



National S&T Strategy for the Oceans and the Coastal Zone

- 1) Establishment of a ST&I national policy framework for the oceans that will define the strategic guidelines and national means of implementation of research activities in the marine environment - **POLICY**
- 2) Implementation of the National Institute for Ocean Research and Waterways (INPOH) intended to promote interdisciplinary scientific research on the oceans and its interactions with the atmosphere and landmass, providing the operational and administrative infrastructure necessary to achieve those goals - **GOVERNANCE**
- 3) Contribution from a new platform - Research Vessel “Vital de Oliveira” to the generation of scientific and technological knowledge, and increased sampling effort on the South and Tropical Atlantic - **MEANS;**

National Institute for Ocean Research and Waterways - INPOH



Main objectives:

- To improve R&D in the fields of: oceanography, biodiversity, ocean-atmosphere interactions, fisheries & aquaculture, port and river hydraulic studies, and underwater instrumentation.
- To provide technical and logistic support to public and private institutions.
- To promote the improvement of required infrastructure.

New Oceanographic Vessel (RV Vital de Oliveira)

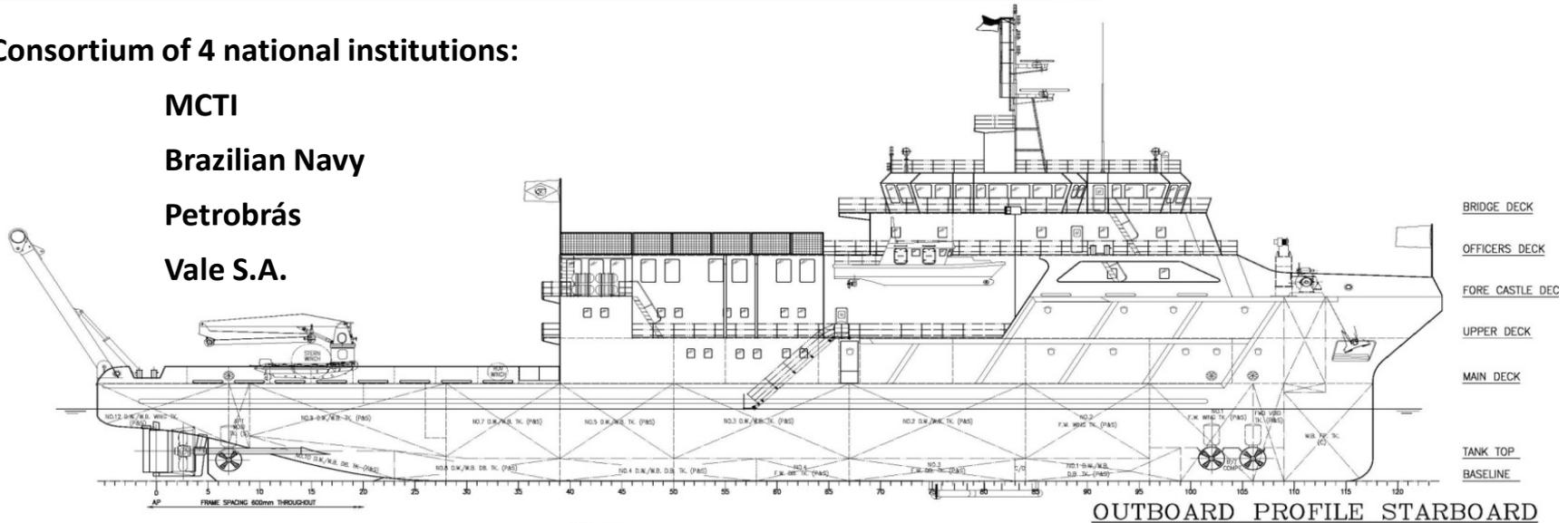
Consortium of 4 national institutions:

MCTI

Brazilian Navy

Petrobrás

Vale S.A.



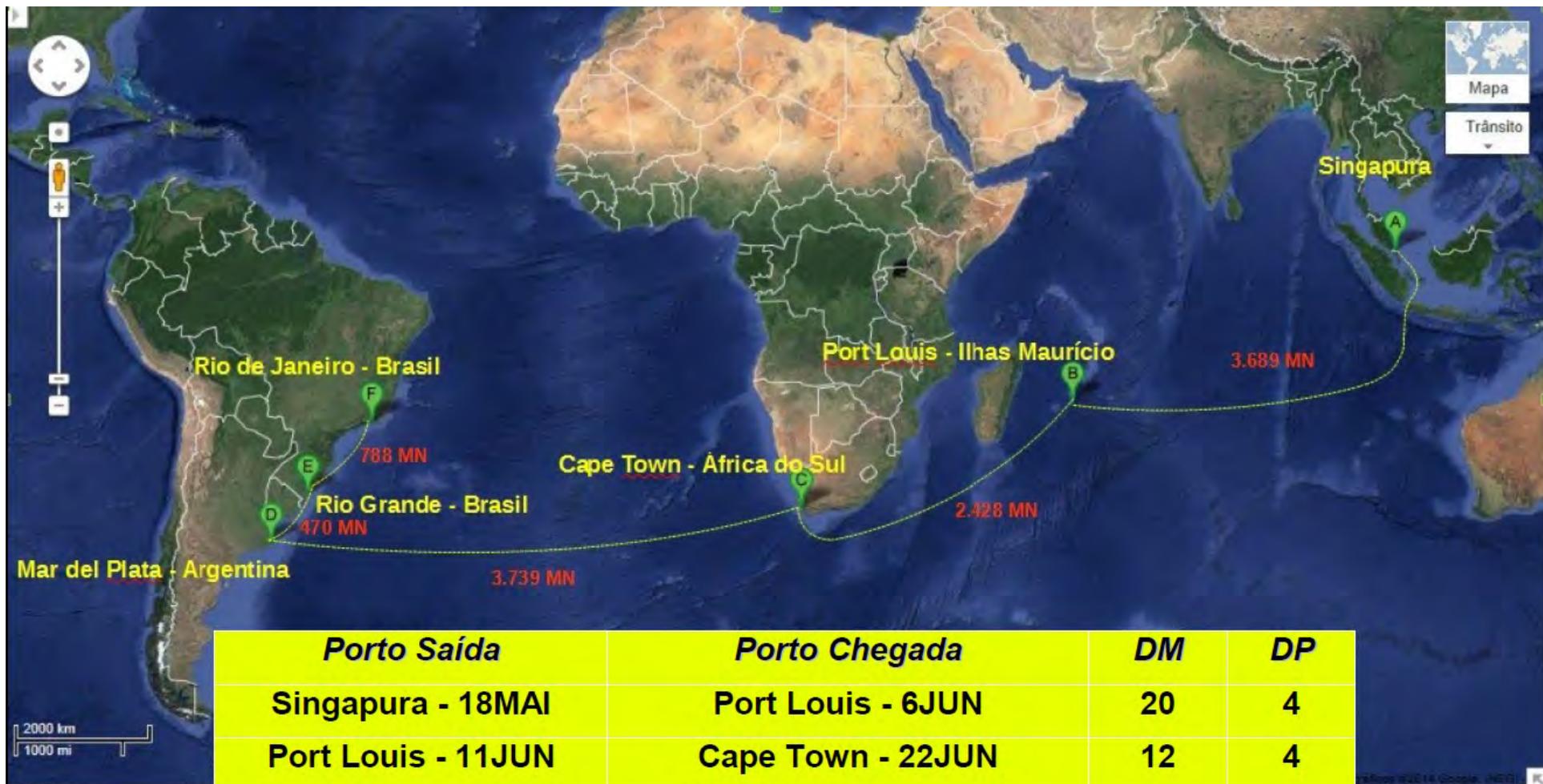
- Total length: 78 meters;
- Beam: 20 meters;
- Accommodation: up to 146 people;
- Researchers onboard: 40 to 60 scientists, technicians and students;
- Laboratories: 05 (03 dry labs and 02 wet labs);
- Scientific System "state of the art" of oceanographic instrumentation, and
- Autonomy: 60 days;



VITAL DE OLIVEIRA

SWL 20 TON

RV Vital de Oliveira Maiden Voyage Cruise Track



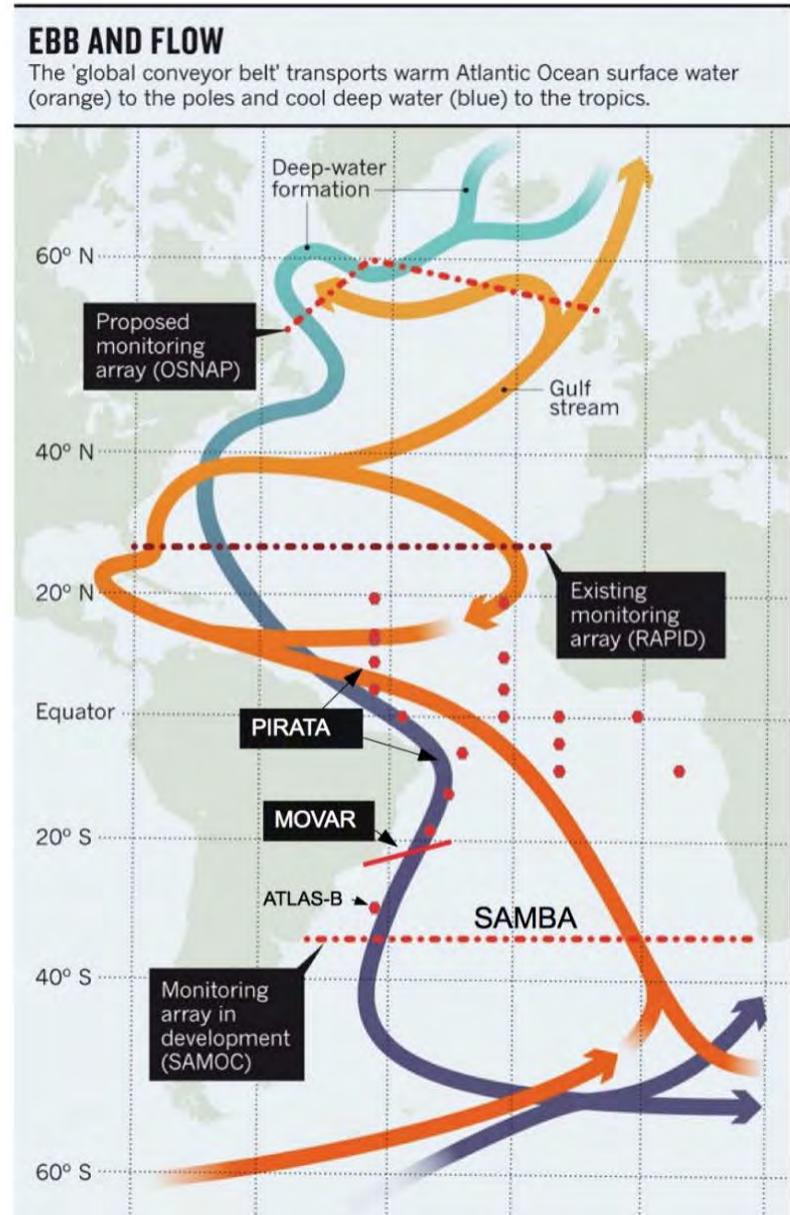
<i>Porto Saída</i>	<i>Porto Chegada</i>	<i>DM</i>	<i>DP</i>
Singapura - 18MAI	Port Louis - 6JUN	20	4
Port Louis - 11JUN	Cape Town - 22JUN	12	4
Cape Town - 27JUN	Mar del Plata - 14JUL	18	4
Mar del Plata - 19JUL	Rio Grande - 21JUL	3	3
Rio Grande - 25JUL	Rio de Janeiro - 29JUL	5	-

The Central and South Atlantic

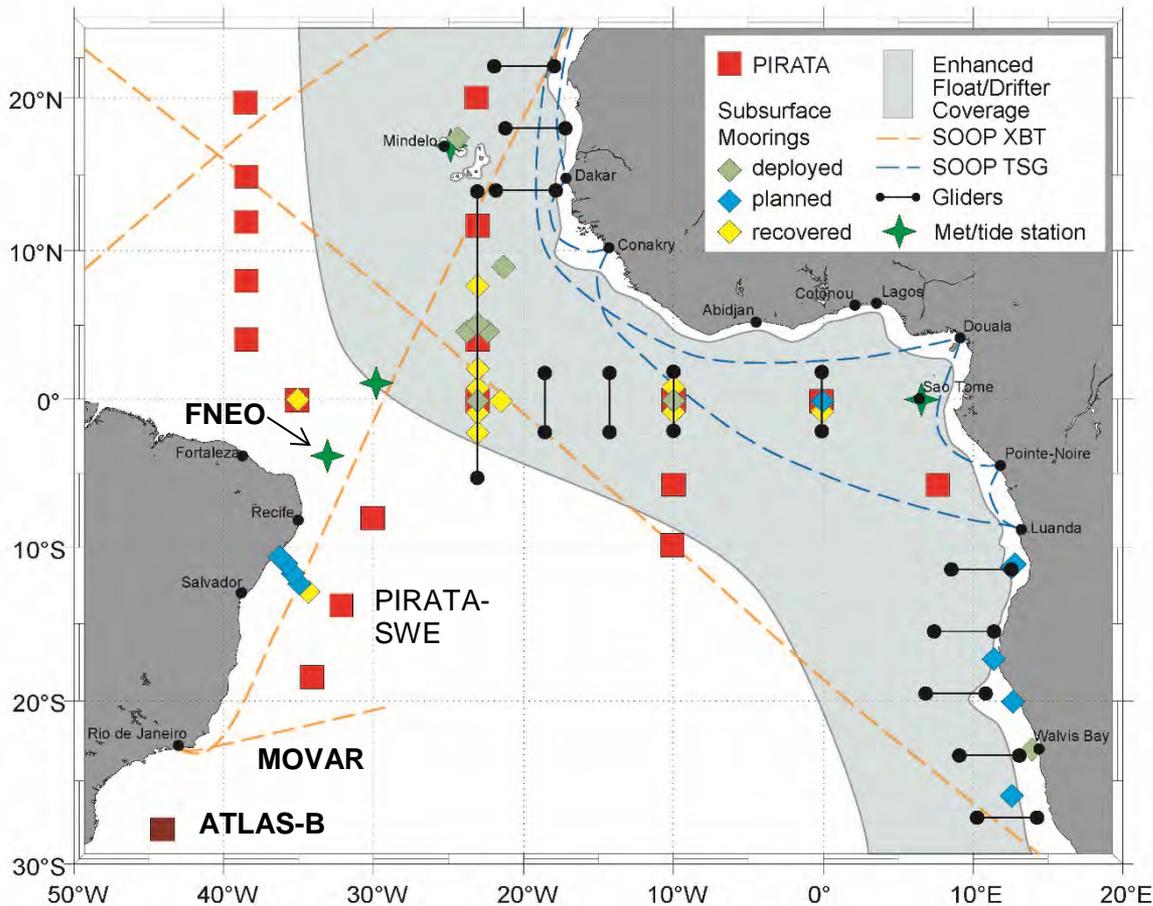
Ongoing Programs

The Brazilian activities in the Central and South Atlantic are being conducted in coordination with international Programs.

- PIRATA: Prediction and Research moored Array in the Tropical Atlantic
- MOVAR: Monitoring the upper ocean thermal variability between Rio de Janeiro and Trindade island
- ATLAS-B: Development and mooring of a Brazilian prototype of TAO Atlas buoy
- SAMOC: South Atlantic Meridional Overturning Circulation



PIRATA/TACE



PIRATA is an important element of a Tropical Atlantic Climate Experiment.

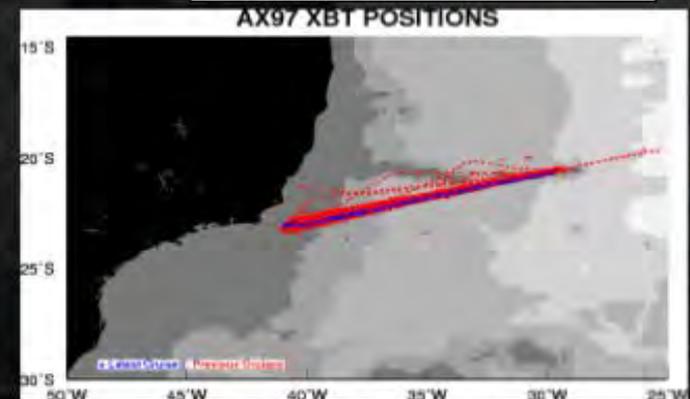
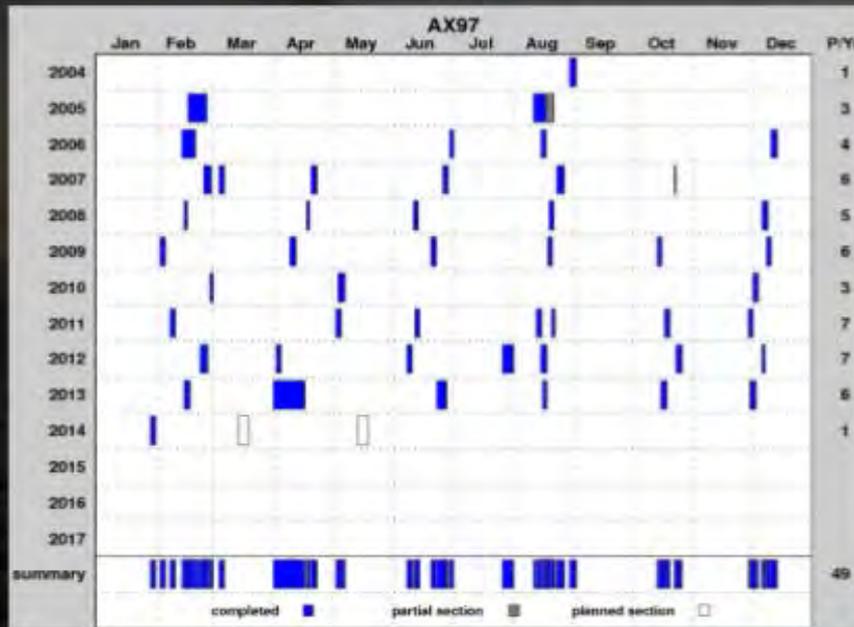
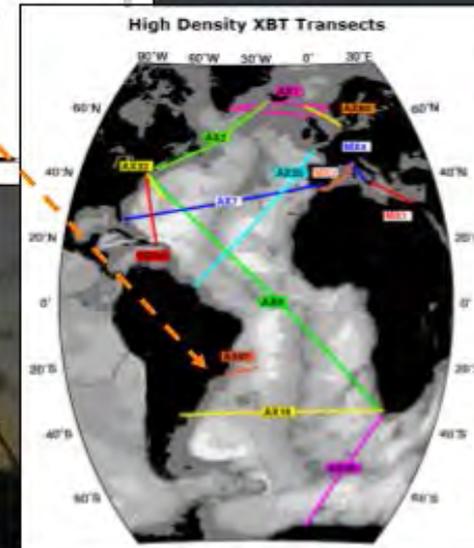
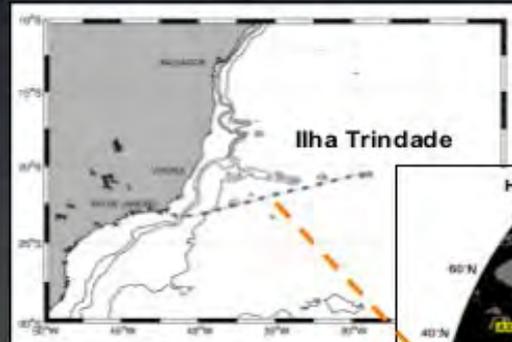
The PIRATA-SWE, MOVAR and ATLAS-B extend the Tropical array into the western subtropical Atlantic.

The Fernando de Noronha Experimental Observatory (FNEO) has been proposed to be a counterpart of the Cape Verde Ocean Observatory (CVOO)

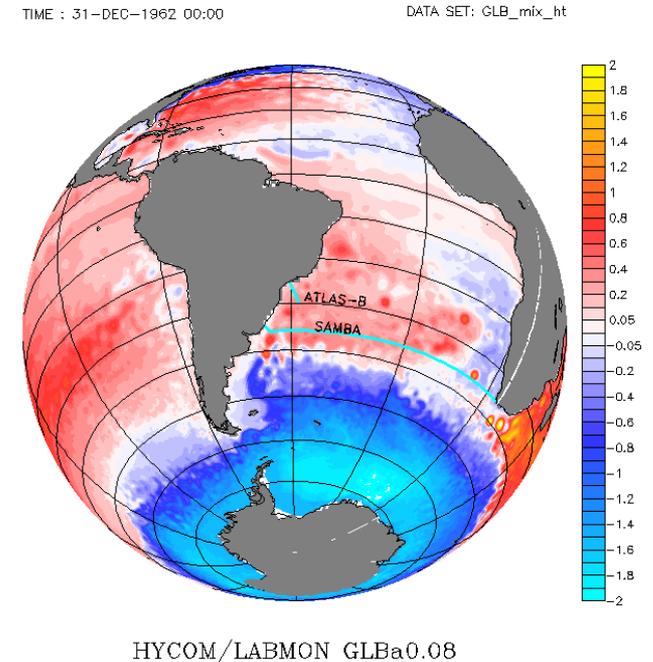
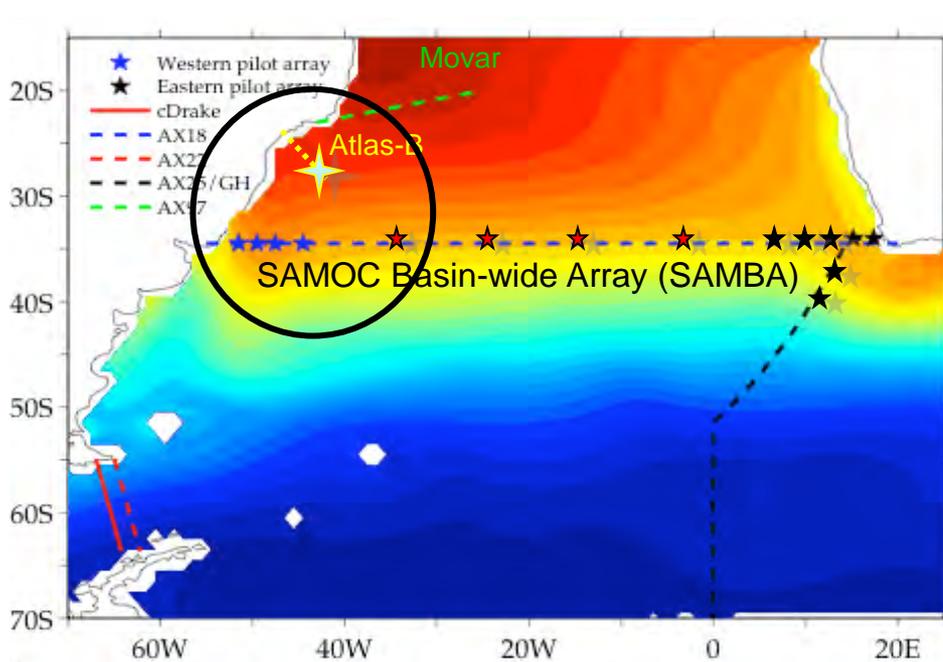
MOVAR: Monitoring the Upper Ocean Thermal Variability between Rio de Janeiro and Trindade Island

LINHA DE REPETIÇÃO AX97

- Agosto/2004 - presente
- 44 cruzeiros
- ~1680 XBTs lançados



SAMOC Initiatives in Brazil: Observations and Numerical Modeling

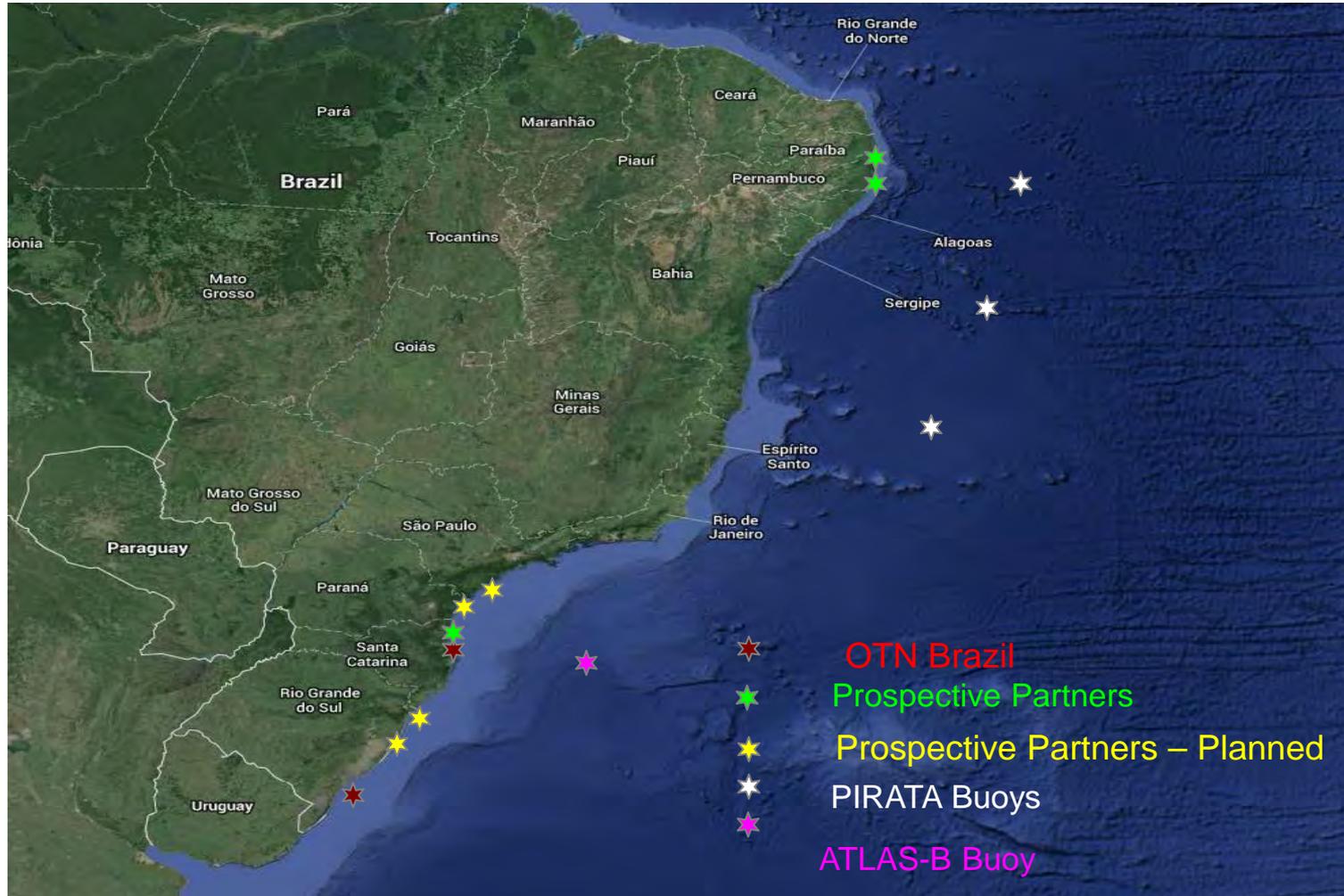


The Brazilian contribution to SAMOC includes observation on the western end of the SAMBA Array and numerical experiments with a global, 1/12-degree implementation of HYCOM, forced with reanalysis products.

The numerical model effort include the development of the Brazilian Earth System Model - BESM



Implementing a Brazilian Node of the Ocean Tracking Network - OTN-Brazil



SiMCosta

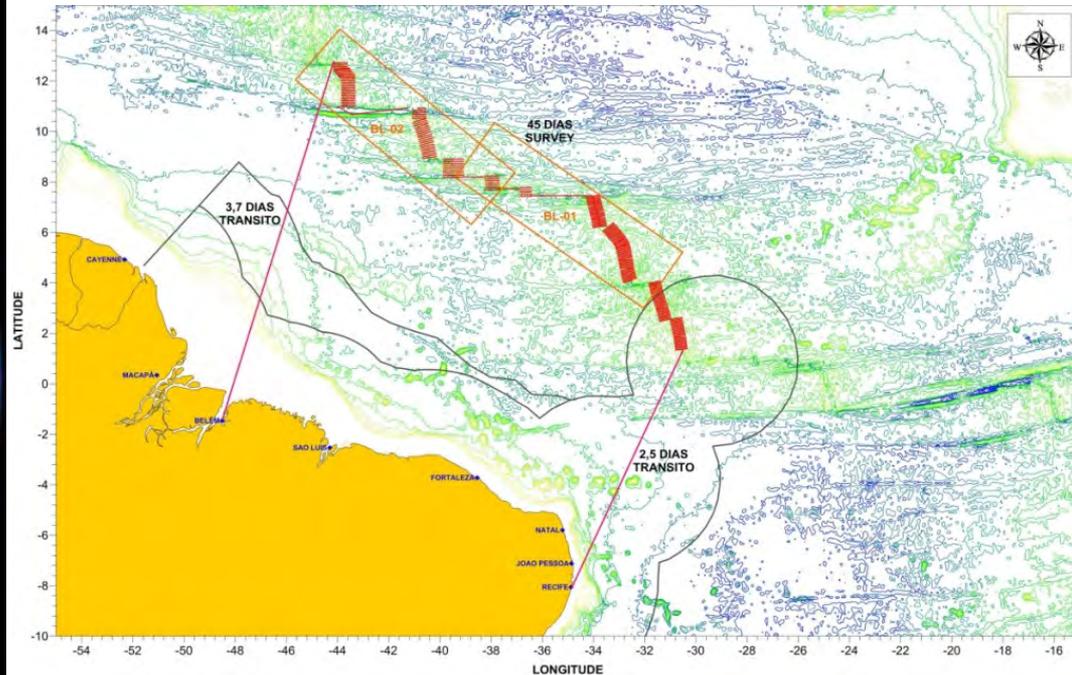
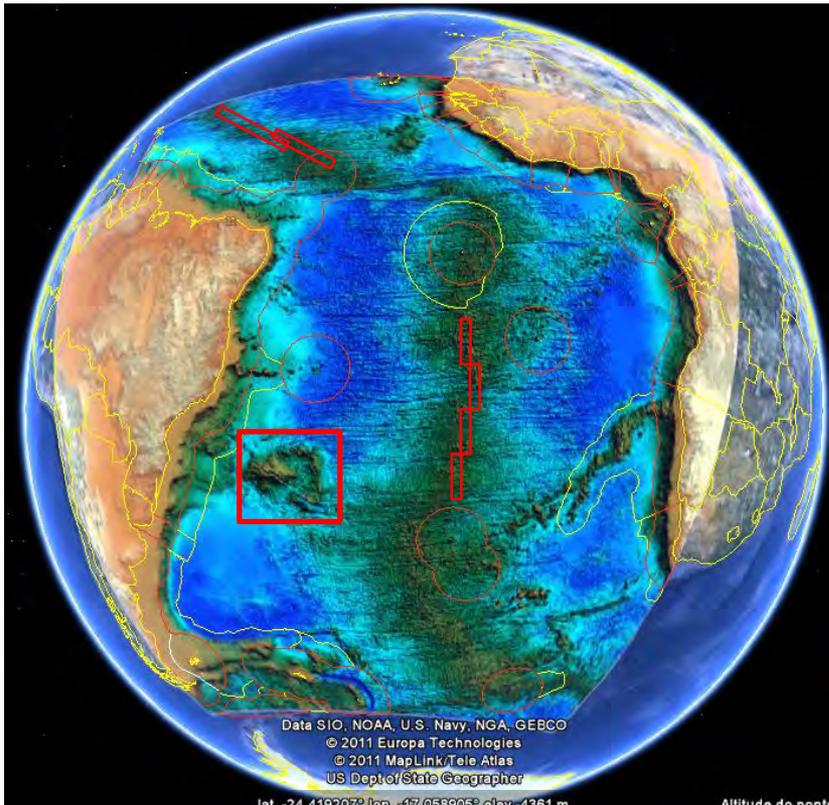
Brazilian Coastal Monitoring System



- Initial Phase:
 - south-southeast - states of RS, SC, PR and SP
- In Medium Term:
 - entire coastal region along the Brazilian territory

SOUTH AND TROPICAL ATLANTIC DEEP SEA INTEGRATED RESEARCH PROGRAMME

- Mid-Atlantic Ridge -

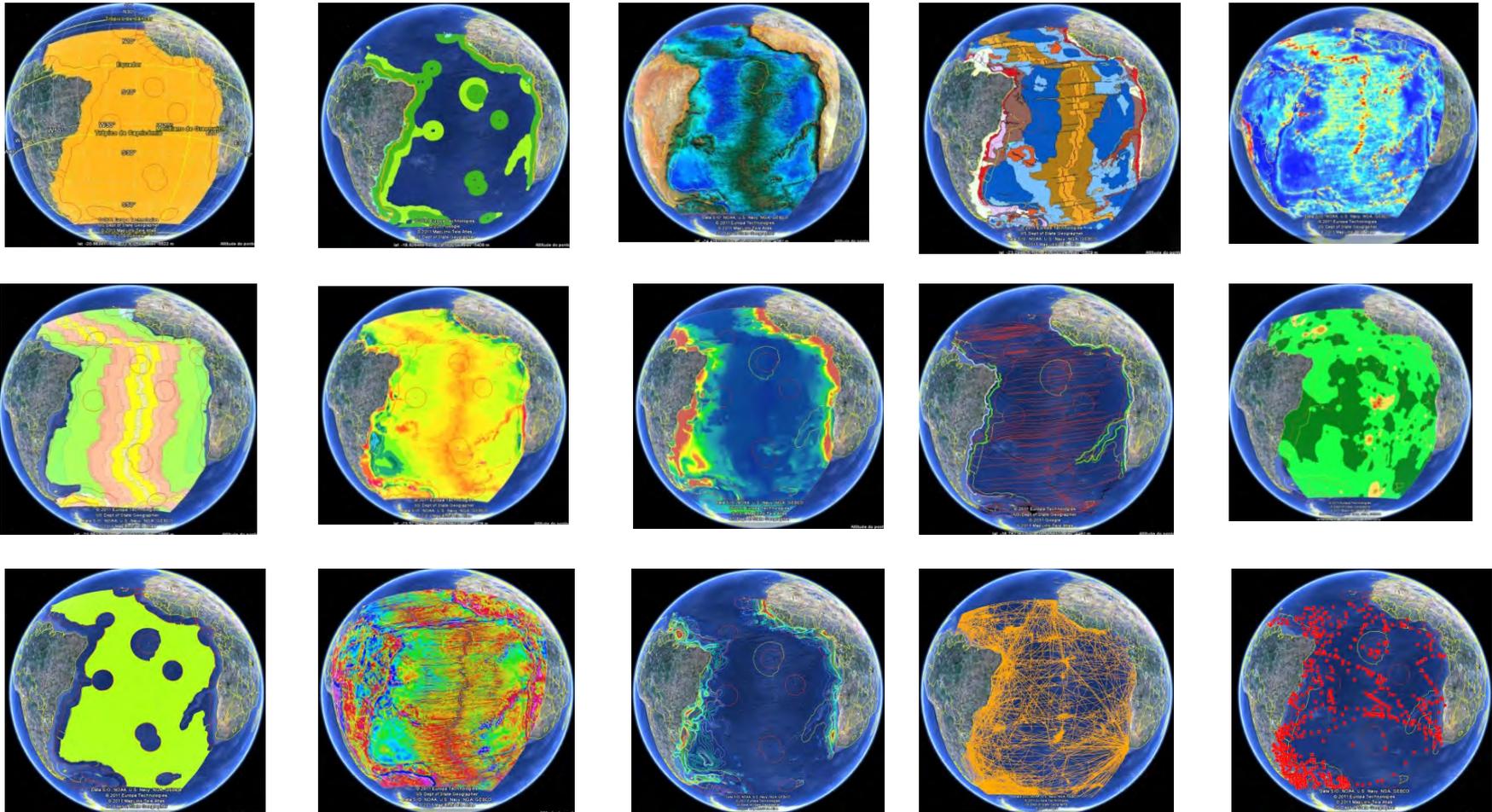


- Encompass public and private partnerships

- Regional geology: Mapping
- Mineral resources
- Biodiversity
- Bioprospecting
- Environment: Ecosystems
- Capacity building

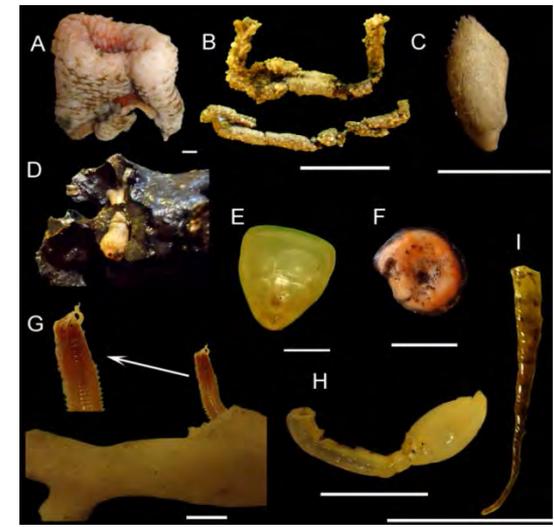
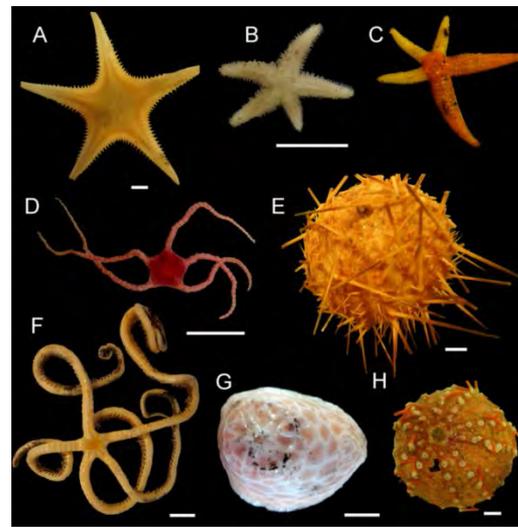
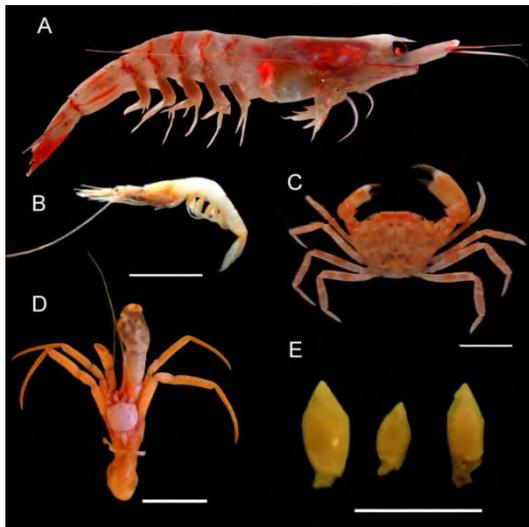
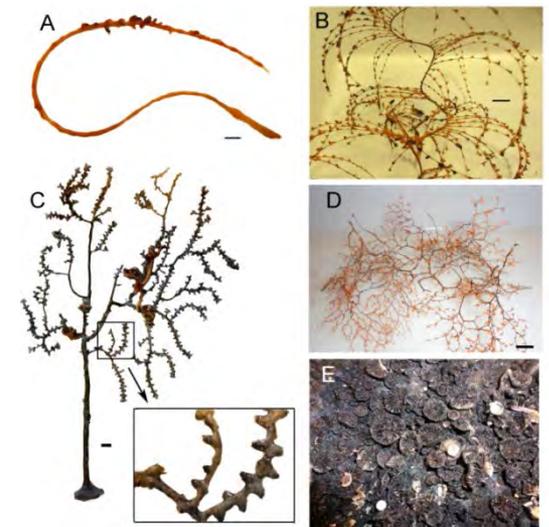
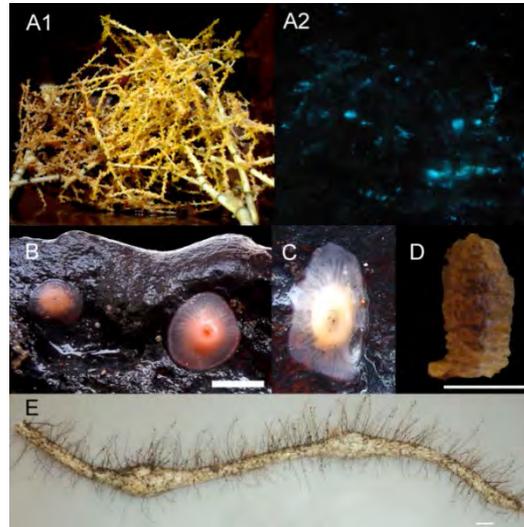
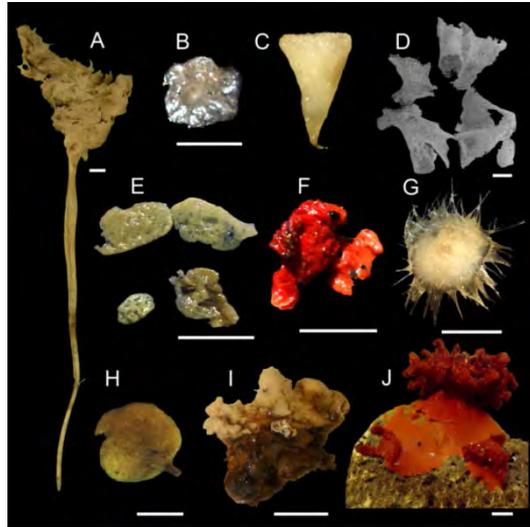
SOUTH AND TROPICAL ATLANTIC DEEP SEA INTEGRATED RESEARCH PROGRAMME

- Data and information -



- Project supported by the International Seabed Authority (ISA)

SOUTH AND TROPICAL ATLANTIC DEEP SEA INTEGRATED RESEARCH PROGRAMME



Fisheries and Aquaculture

Ministry of Fisheries and Aquaculture

Ecosystem approach applied to fisheries Management

- Moving from single species to ecosystem fisheries based management
- Marine spatial management, including the design and monitoring of marine protected area

Stock Assessment

- Traditional methods
- Data poor methods (ex: ERA)
- Focus on by-catch species

on going examples (IRD x ICCAT x Brazil)

- Life history traits and fishery patterns of teleosts caught by the tuna longline fishery in the South Atlantic and Indian Oceans
- Estimating vulnerability of teleosts caught by the tuna longline fleet in South Atlantic and Indian Oceans

Oceanic fisheries, ecology and conservation of large pelagic predators (pelagic longline and purse seine)

- Catch and effort data
- Spatial and temporal trends
- Fisheries observer programs (100 observers)
- Tagging (pop-up tags) and biotelemetry to spatial modeling

e.g. ICCAT Tagging Program for tropical tunas
(US\$ 500.000,00 from Brazil)

- Use of FAD (ecology and management)
- Seamounts (aggregation, biology and behavior)
- Bycatch (biology and ecology of sharks, turtles, seabirds...)

Brazil South-South Cooperation + FAO: US\$ 6 million

Potential countries: Cape Vert, Guine-Bissau, Ivory Coast

Fisheries and Aquaculture

Ministry of Fisheries and Aquaculture

- **Themes related to fishery in H2020:**
 - Food Security, Sustainable Agriculture and Forestry, Marine, Maritime and Inland Water Research and the Bioeconomy
 - Aquatic living resources and marine research
- **Sub-calls Blue Growth**
 - Examples:
 - BG-01-2015: Improving the preservation and sustainable exploitation of Atlantic marine ecosystems
 - BG-02-2015: Forecasting and anticipating effects of climate change on fisheries and aquaculture
 - BG-16-2015: Coordination action in support of the implementation of the Joint Programming Initiative on 'Healthy and Productive Seas and Oceans

Example of a potential participation of Brazil in H2020 initiatives

Sustainable Ecosystem Services from the open ocean of the Atlantic SESA

- EUROPEAN COMMISSION - Horizon 2020 - Research and Innovation Framework Programme
(H2020-BG-2015-2_FirstStage)
- 60 months - Total requested: € 9 000 000
- Keywords: Common fisheries policy (CFP), Fisheries management and management tools, Environment, resources and sustainability, Ecosystem management, Marine ecosystems and processes, Pelagic ecosystems
- Consortium: composed of European, North and South America (Brazil), and African countries

Structure and seasonal variability of food webs in an estuarine tropical marine ecosystem: Evidence from stable isotope analyses and trophic modelling approach (2014/2016)

- Investigate the **complex interactions between resources and exploitation** and to delineate the processes that sustain productivity in coastal and estuarine ecosystems.
- By promoting the **use of efficient and complementary tools** (stable isotope analyses, mercury concentrations and trophic modeling) to **investigate the food web structure** and functioning of coastal and estuarine ecosystems.



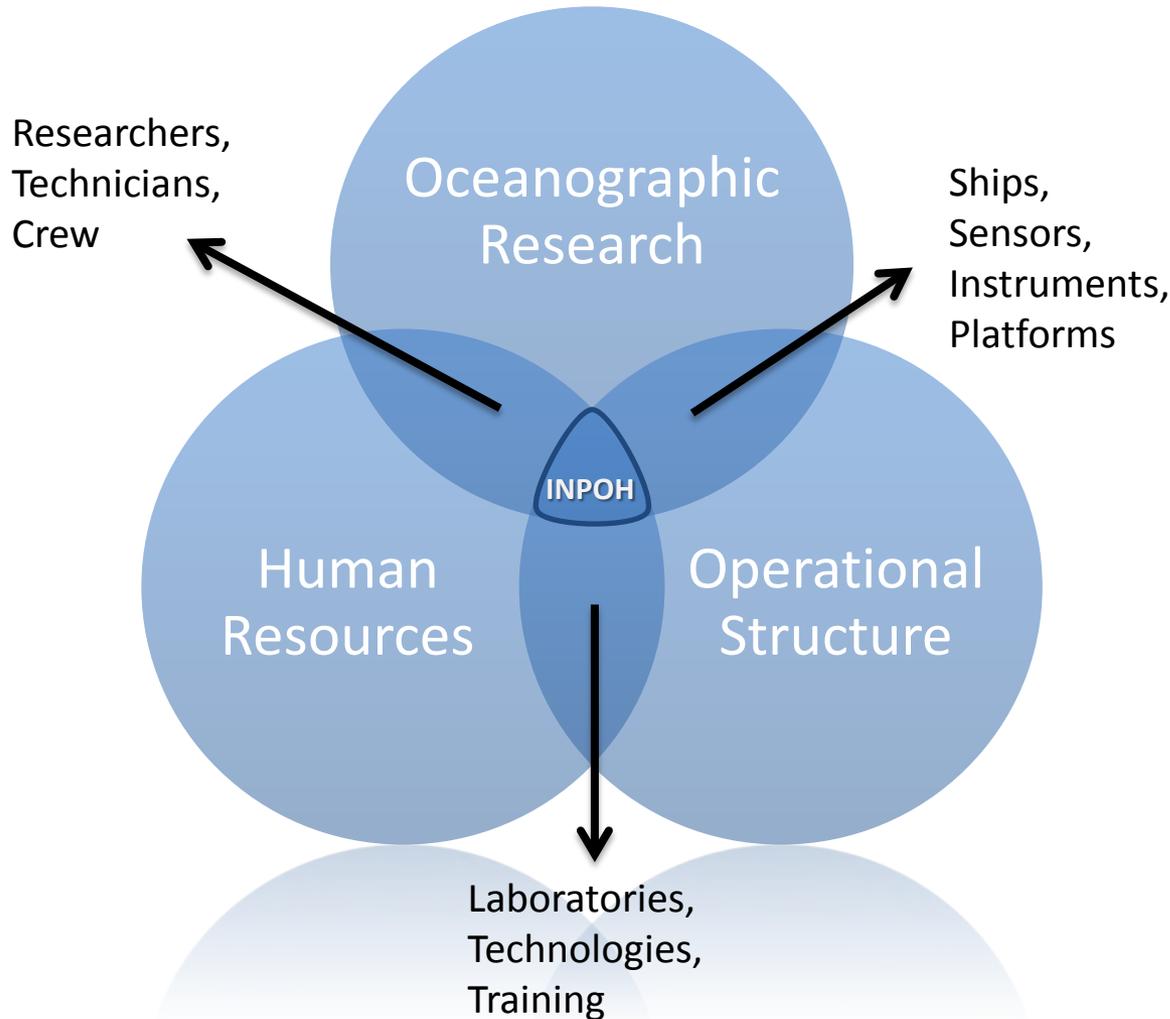


Thank You

Fabio Hazin

National Secretary on Fisheries
Ministry of Fisheries and Aquaculture
Fabio.hazin@mpa.gov.br

National Institute for Ocean Research and Waterways - INPOH



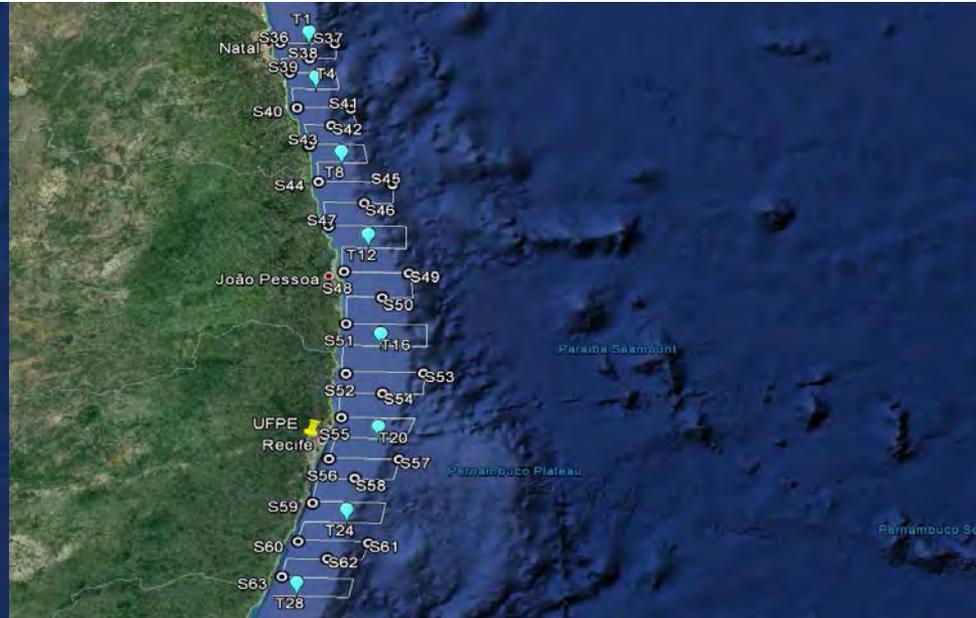
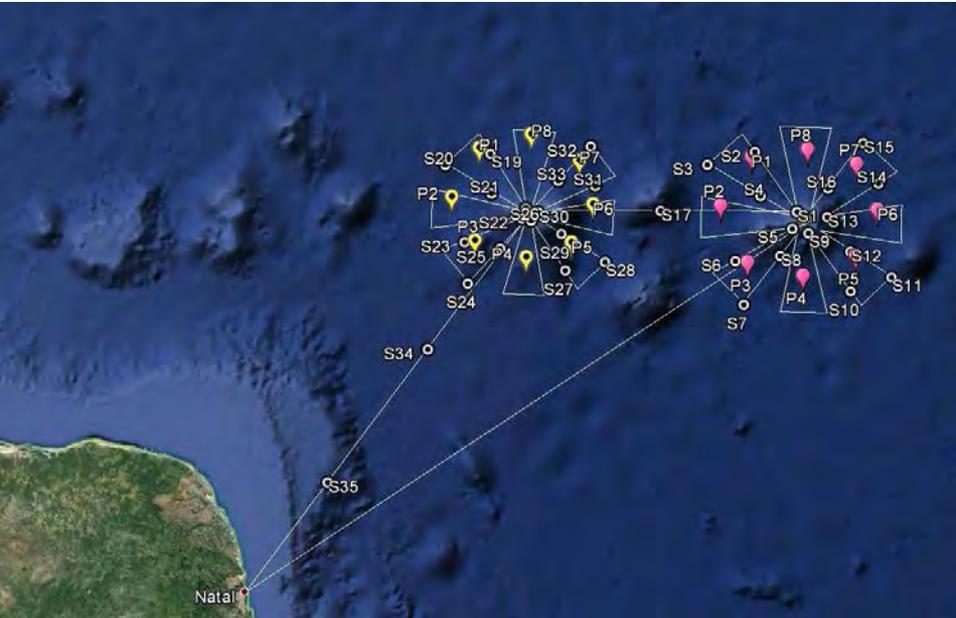
- Based on the model of a Federally Funded Research Centers.

- Will act in cooperation with other institutions through decentralized centers.

- Will gather R&D with operational structure and human resources.

Acoustics along the BRAzilian COaSt (ABRACOS)

Flávia Lucena (UFRPE) & Arnaud Bertrand(IRD)



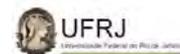
Objectif 1 - Caractérisation des dynamiques insulaires et côtières

Objectif 2 - Acoustique écosystémique

Objectif 3 - Biodiversité et structure trophique

Objectif 4 - Un océan changeant (Modélisation)

Funding - Flotte Océanographique Française



Towards the Sustainability of **MARine**Tropical ecosystems: an integrative monitoring, modelling and management approach



Key question: what are the development options in tropical coastal zones conciliating uses and conservation?



International and pluridisciplinary project

(Following the Voluntary Guidelines on Securing Sustainable Small-Scale Fisheries [SSF Guidelines])



UNIVERSITÉ DE NANTES

WP1 - Characterizing the 3D structure of the mosaic of coastal systems

- Task 1. Characterizing the coastal dynamics
- Task 2. Listening to the ecosystems
- Task 3. Characterizing the biodiversity and the small scale fisheries

Ecosystem maps (2D-3D)

WP2 - Dynamics among connected coastal systems

- Task 4. Oceanographic dynamics and impacts
- Task 5. Characterize the trophic food web
- Task 6. Spatial dynamics of marine organisms
- Task 7. Valuing the 'deluge of data'

Ecosystem dynamics (2D-3D)

WP3 - Spatially explicit management plans

- Task 8. Dynamic of social-ecological systems
- Task 9. Integration and dissemination

Spatially explicit socio-systems



Flávia Lucena (UFRPE) & Arnaud Bertrand(IRD)
To be submitted ANR - FACEPE

Aquaculture

Ronaldo O. Cavalli – ronaldocavalli@gmail.com



Aquaculture of cobia (*Rachycentron canadum*)

- Reproduction and larviculture
- Nutrition/Feeding
- Offshore culture: environmental impact, economic feasibility, etc.





Common snook (*Centropomus undecimalis*) and Brazilian mojarra (*Eugerres brasiliensis*)

→ Reproduction and larval development

→ Nutrition (Digestibility & nutritional requirements) and feeding

→ Grow-out in estuarine ponds as an alternative to the monoculture of shrimp (*Litopenaeus vannamei*)

Biodiversity → Management

- Hotspots
- Essential Habitats
- Habitat models

Examples

1. Research project: Biodiversity pattern highlighted by tuna longline fisheries data in the tropical Atlantic Ocean
 - Aim: To investigate diversity patterns of pelagic oceanic species assemblages through species richness
2. Identification of areas for priority management using the definition of critical habitat for species caught by tuna fleets in the Atlantic
 - Use of multi-criteria analysis as method to synthesize different levels of information

IRD & Brazil