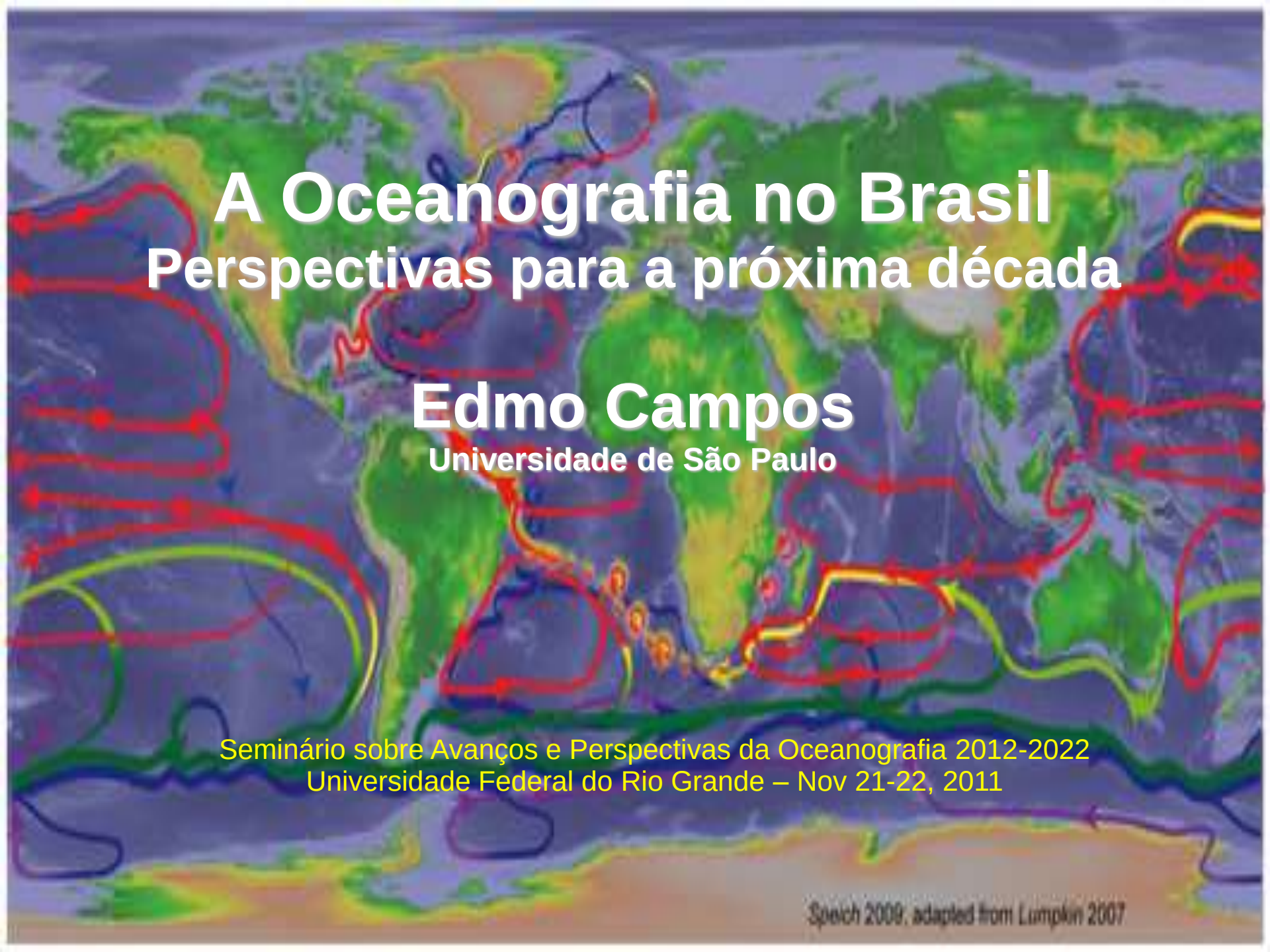



# A Oceanografia no Brasil
## Perspectivas para a próxima década

**Edmo Campos**
**Universidade de São Paulo**

Seminário sobre Avanços e Perspectivas da Oceanografia 2012-2022
Universidade Federal do Rio Grande – Nov 21-22, 2011

# PASSADO

# Um pouco de história

1994


1997

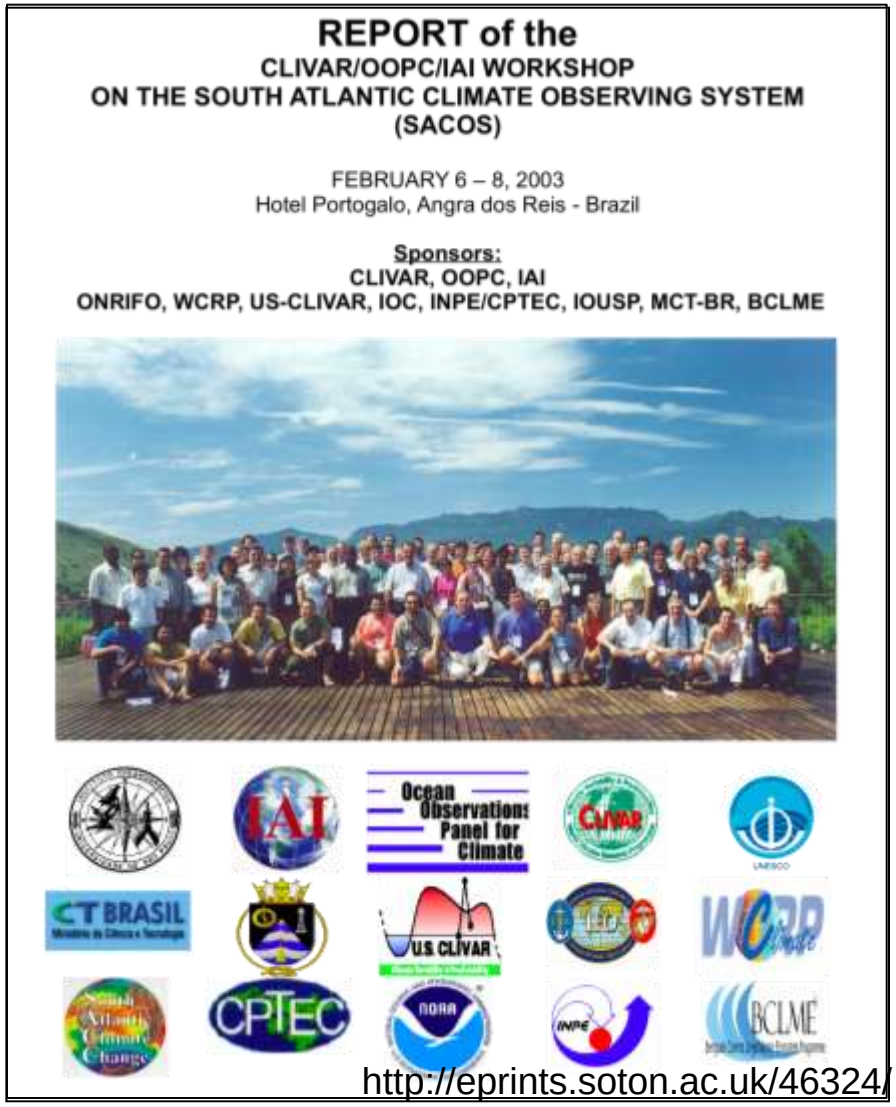

1993

1999

# Um pouco de história



# Um pouco de história




http://eprints.soton.ac.uk/46324/

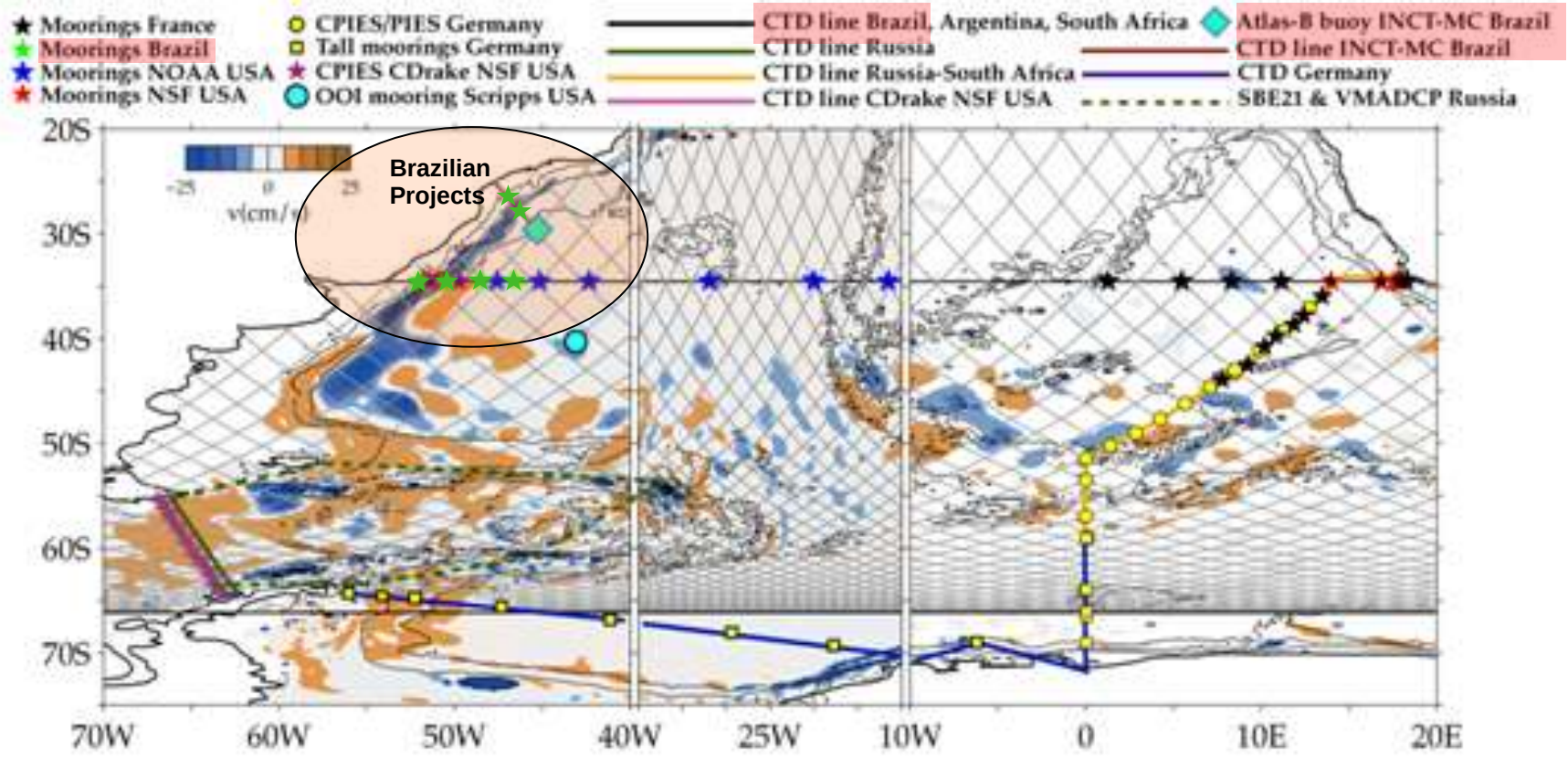
Até o final da década de 90, o Atlântico Sul era uma das regiões menos observadas do oceano global.

Em 1999, um grupo de cientistas apresentou no Oceanobs99 um trabalho mostrando a importância do AS para o clima.
*(Campos et al., 2002, in: Oceanobs99 C. Koblinski & N. Smith, eds.)*

Em Fevereiro de 2003, mais de 50 cientistas internacionais reunidos em Angras dos Reis estabeleceram as bases de um sistema de observações climáticas no Atlântico Sul.

PRESENTE

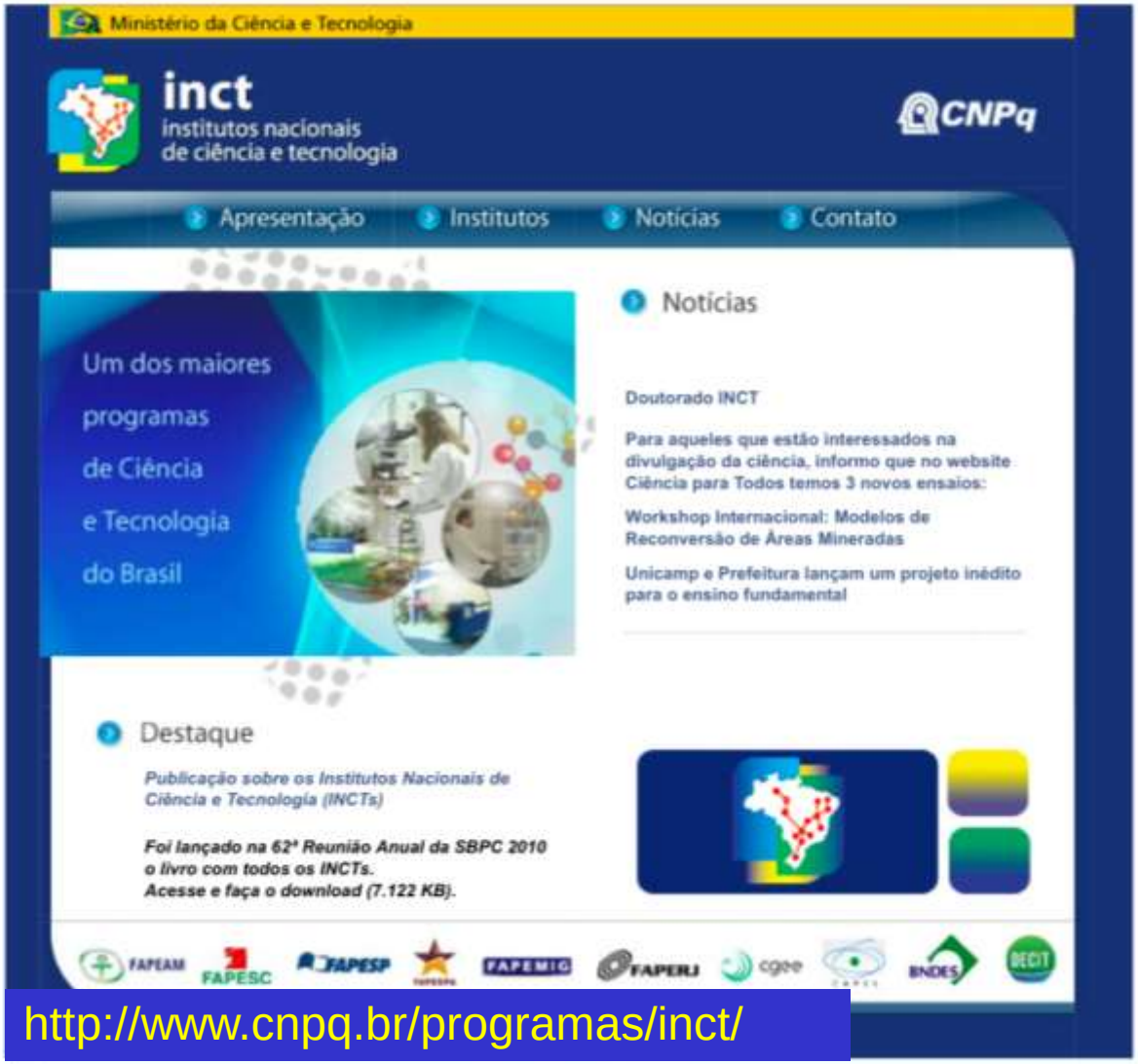
# Hoje: Projetos Brasileiros no Atlântico Sul




- INCT-MC-Ocean
- INCT-Mar-COI
- INCT-Mar-CARBOM
- FAPESP-MC

- ATLAS-B
- CALSA
- NAP-MC
- SAMOC

# The INCT Program



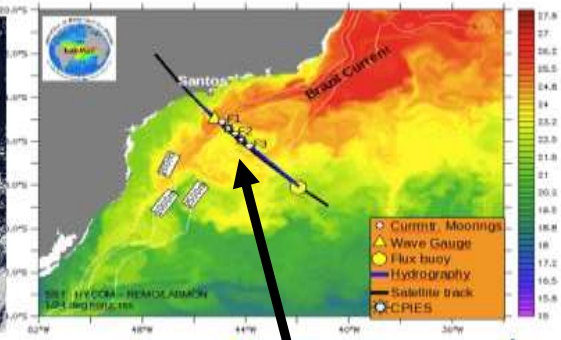

http://www.cnpq.br/programas/inct/

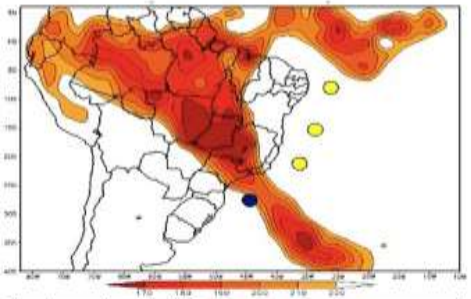
In 2007 Brazil launched the *Institutos Nacionais de Ciência e Tecnologia* (INCT), one of the largest programs of Science and Tecnology of Brazil.

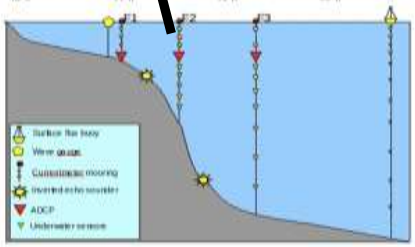
Among the multi-million projects funded by the INCT program, there are some with ocean activities closely related to SAMOC.

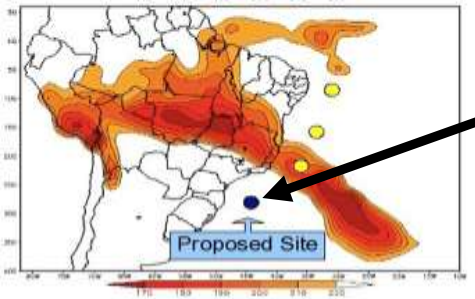
# The INCT Project for Climate Change (INCT-MC)

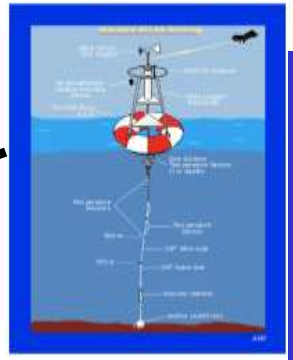
Funded!







Observational component of the INCT-MC-Ocean

Scientific Basis

A.1 - Detection, attribution and variability of natural climate
A.2 - Amazônia
A.3 - Changes in land use
A.4 - Global biogeochemical cycles
A.5 - Ocean
A.6 - Greenhouse gases
A.7 - Biosphere-Atmosphere interactions
A.8 - Reduction of uncertainties in models and climate scenarios

Impact, Adaptation and Vulnerability

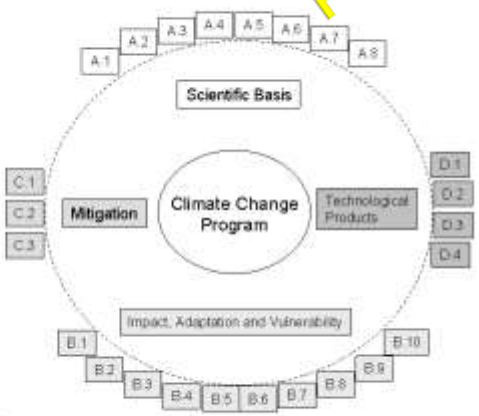
B.1 - Climate change scenarios
B.2 - Agriculture
B.3 - Water Resources
B.4 - Renewable Energy
B.5 - Biodiversity
B.6 - Health
B.7 - Coastal Zones
B.8 - Urbanization and Megacities
B.9 - Economy of Climate Change
B.10 - Science Technology and Policy Studies

Mitigation

C.1 - Emissions from lakes and reservoirs
C.2 - Combustion Processes and CCS
C.3 - Reducing Emissions from Deforestation and Forest Degradation

Technological Products

D.1 - Global Climate System Model
D.2 - Multi-scale modeling
D.3 - Observational Technologies
D.4 - Early Warning System in Support of Natural Disaster Risk Reduction

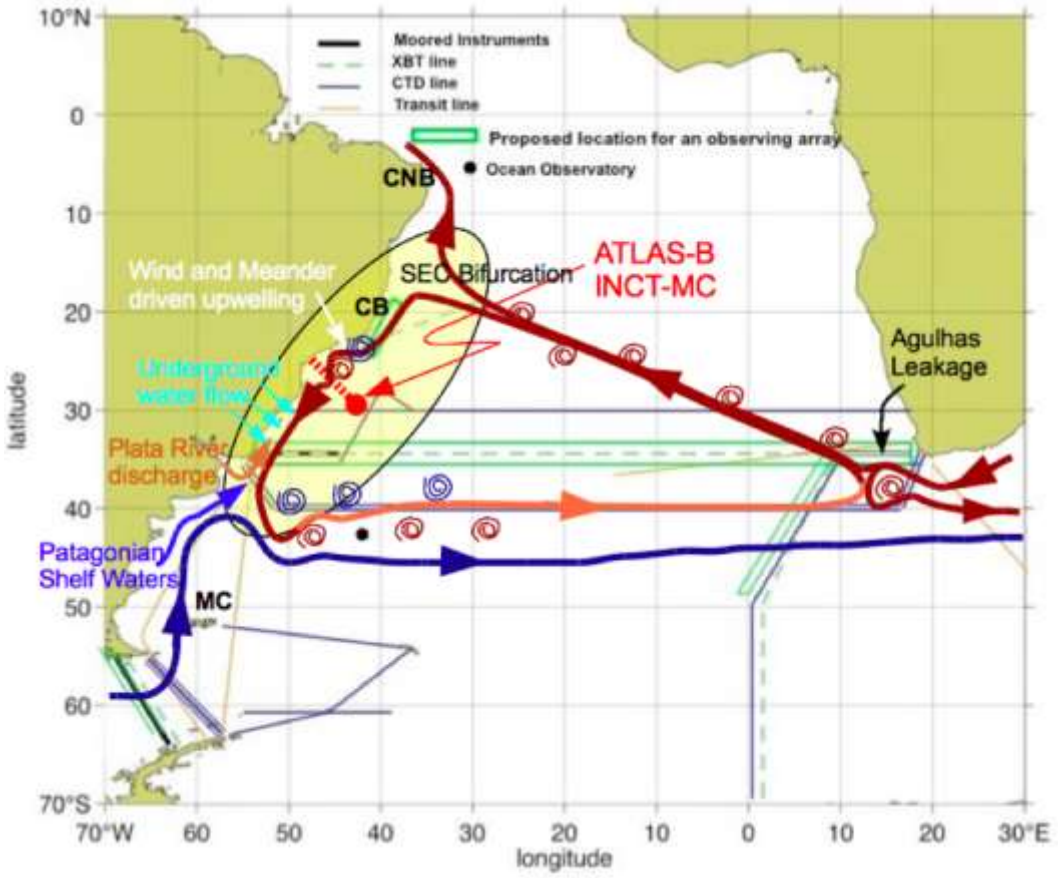



**The INCT-MC is a multidisciplinary project covering several aspects of the climate change science.**

**The ocean component (INCT-MC-Ocean) focuses on the understading of the impacts of Global Climate changes on the Southwest Atlantic and on South America**

# The INCT-Mar-CARBOM and INCT-Mar-COI Projects

Funded!




These are two recently funded projects with highly synergic components related to climate changes in the SW Atlantic and closely related to the INCT-MC-Ocean, Atlas-B, FAPESP-MC and SAMOC Projects.

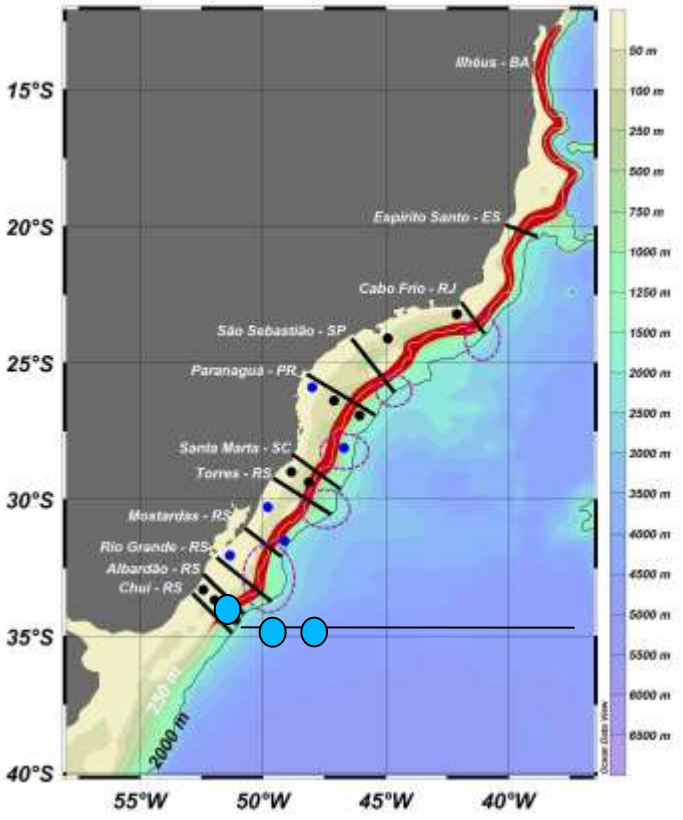
**Main Hypothesis:**

The Brazilian coastal regions from the Abrolhos Banks to the Uruguayan border are connected to the western boundary of the South Atlantic Subtropical Gyre and, therefore, impacted by the large-scale ocean circulation

# The INCT-Mar-COI Project

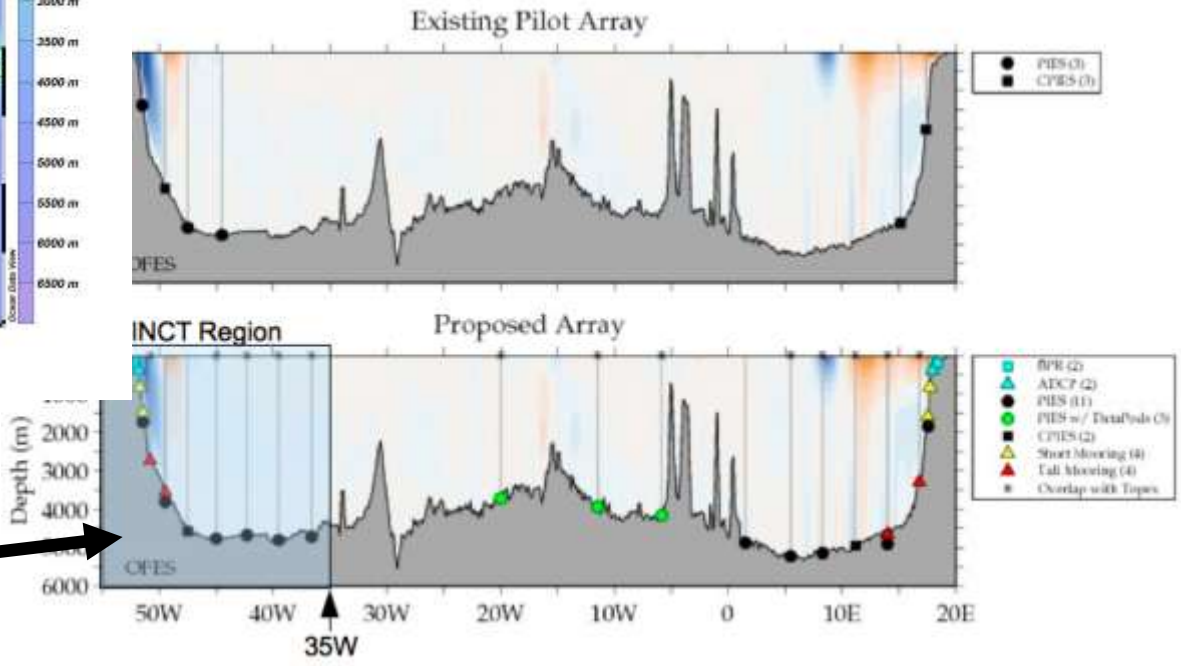
Contact: F. Niencheski <felipeniencheski@furg.br>

Funded!




## Meso and Large Scale components

An extensive program of repeat hydrography, moored buoys, Argo floats and langrangean drifters, and numerical modeling will be conducted on the shelf and along the 34ºS SAMOC transect.




The INCT-Mar-COI includes an explicit contribution to the SAMOC Array

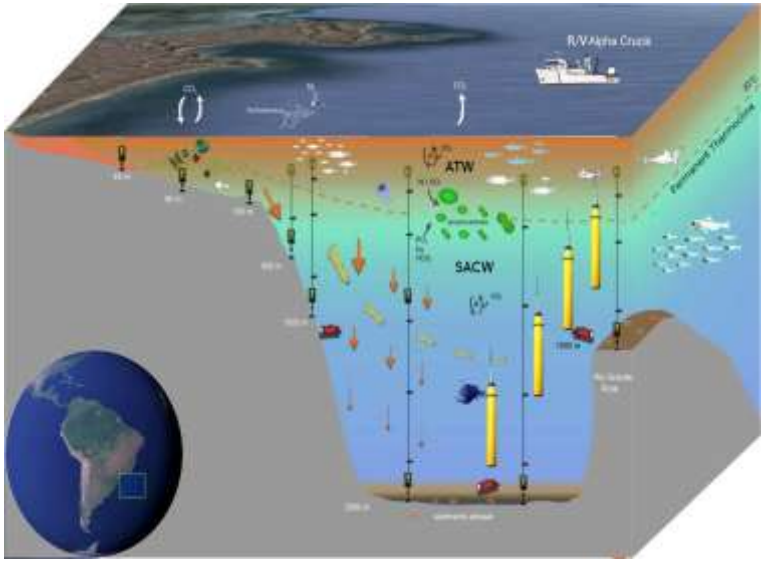
# The INCT-Mar-CARBOM

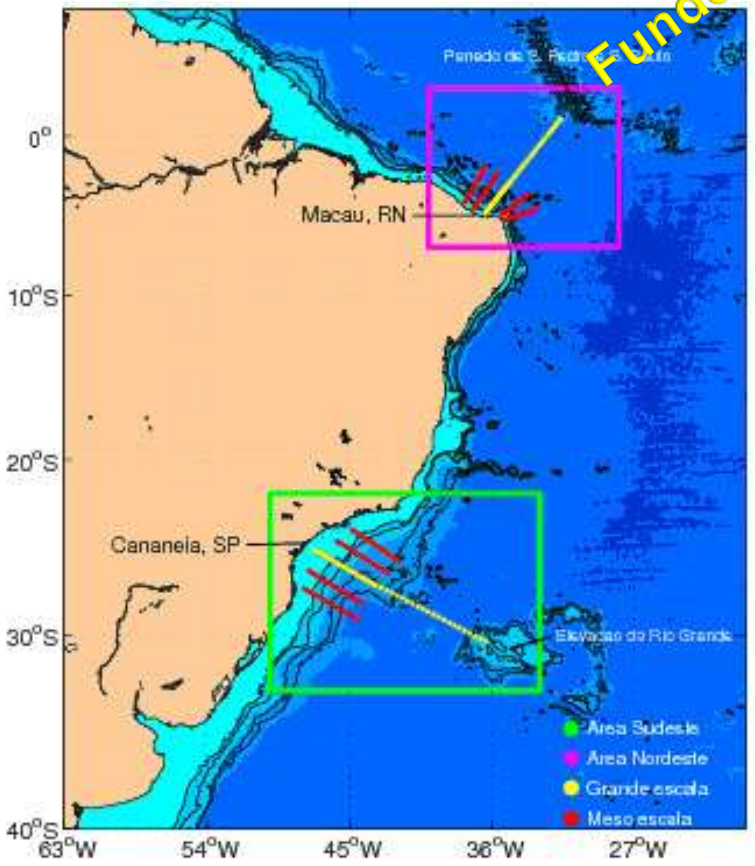
Contact: F. Brandini <brandini@usp.br>

Funded!

Inventory of carbon at the Brazilian NE and SE continental shelves and its adjacent oceanic regions.

Strategic interest for the marine conservation in the South Atlantic and Equatorial regions and for a sustainable exploitation of mineral and biotechnological resources.



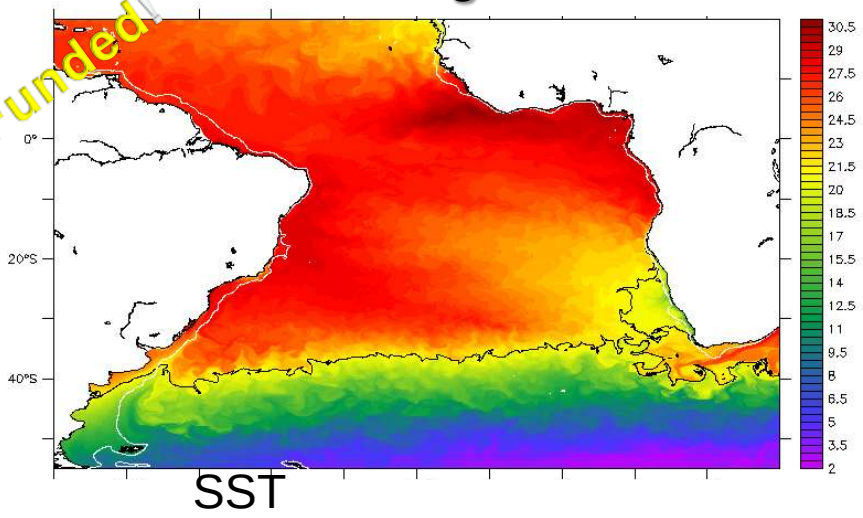




Closely related to the ATLAS-B, INCT-MC and FAPESP/MC, this project will deploy Argo floats and lagrangean drifters in the SBB.

# The CALSA Project

## Numerical Study of Impacts of Global Climate Changes on the South Atlantic

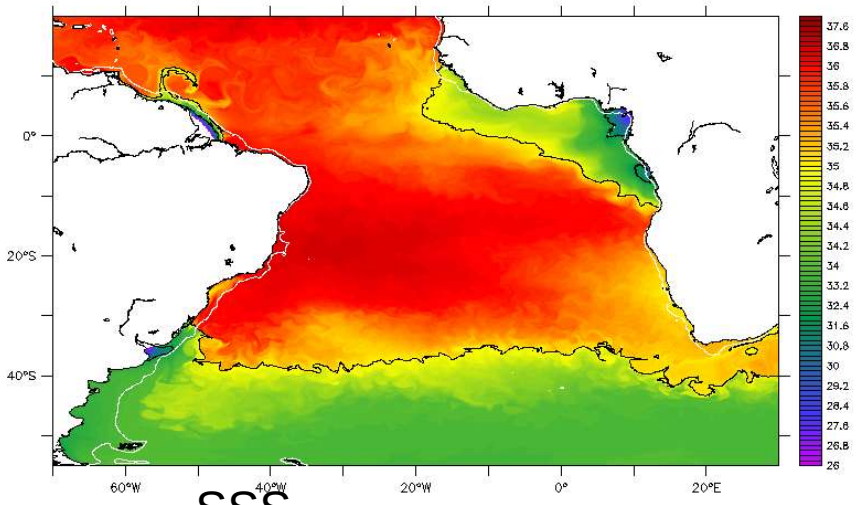
Funded!



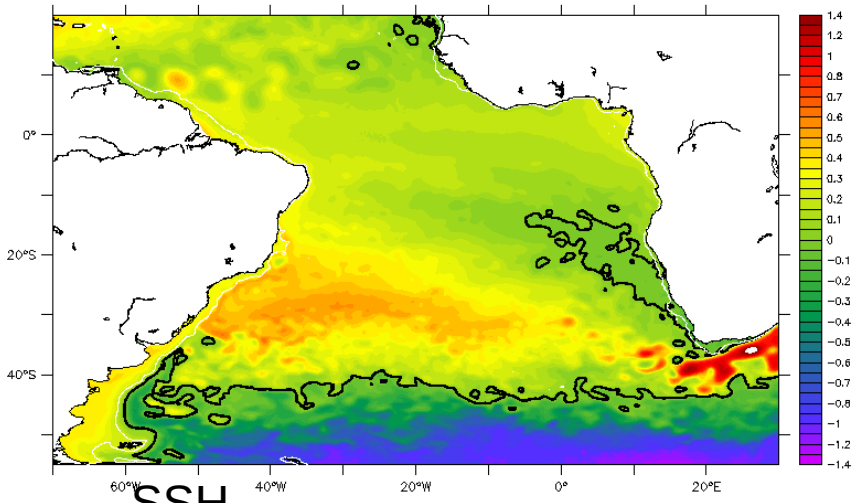

SST

As a complement of the INCT-MC-Ocean, the CALSA Project (funded by FAPESP), includes runs with HYCOM, forced with NCEP Products since 1948.

Currently a simulation for the Indian-Atlantic Basin is being conducted, with 1/12-deg resolution, 22 isopycnic layers, including Indonesian throughflow and major rivers discharges




SSS




SSH

# The CALSA Project

**Numerical Study of Impacts of Global Climate Changes on the South Atlantic**

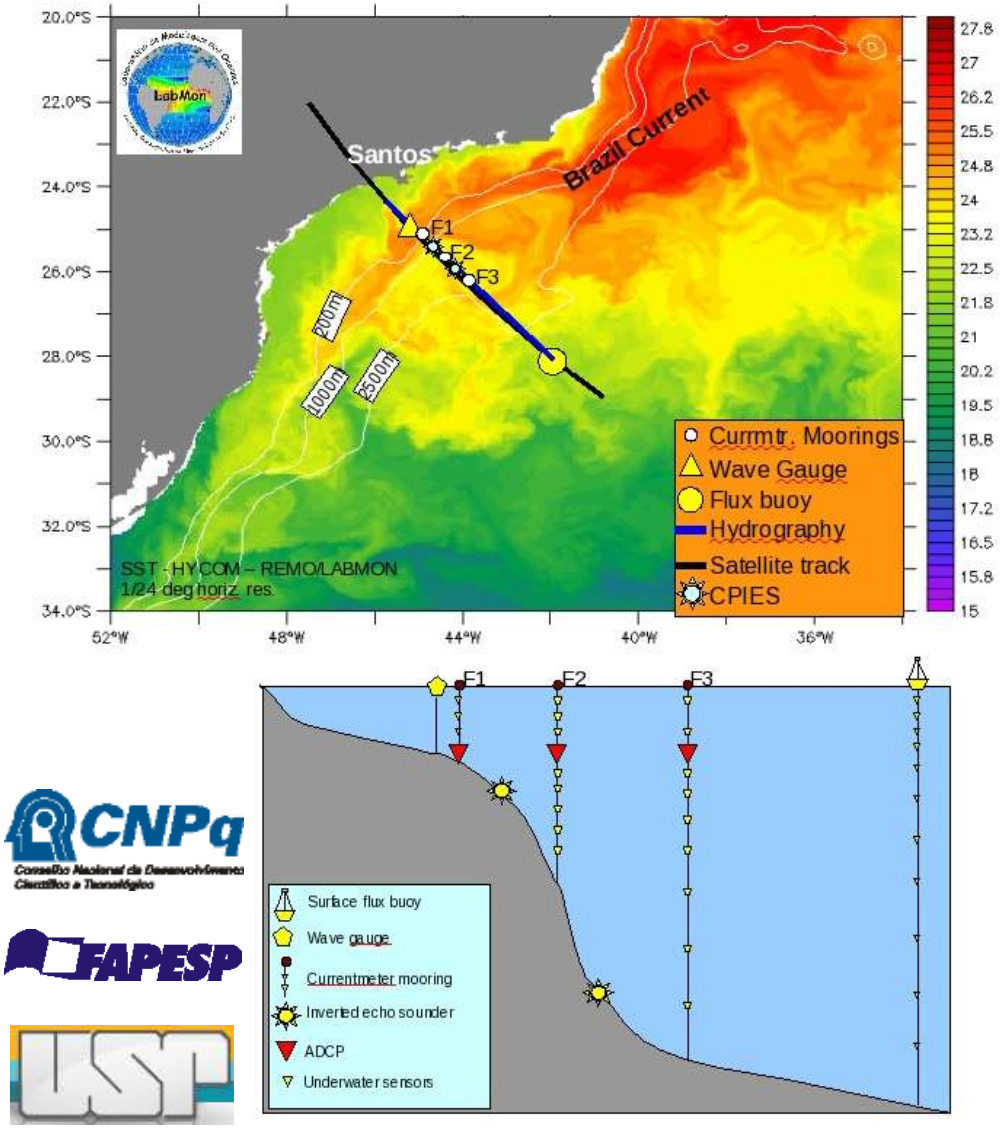
Funded!

## Computer Resources

**“Tupã Supercomputer**
Cray XT6, with a peak processing speed of more than 244 teraflops, ranking it among the top 25 most powerful computers in the world.


**SGI ICE Personal Cluster System (LABMON/IOUSP)**

# The ATLAS-B, the NAP-MC and FAPESP-MC Projects







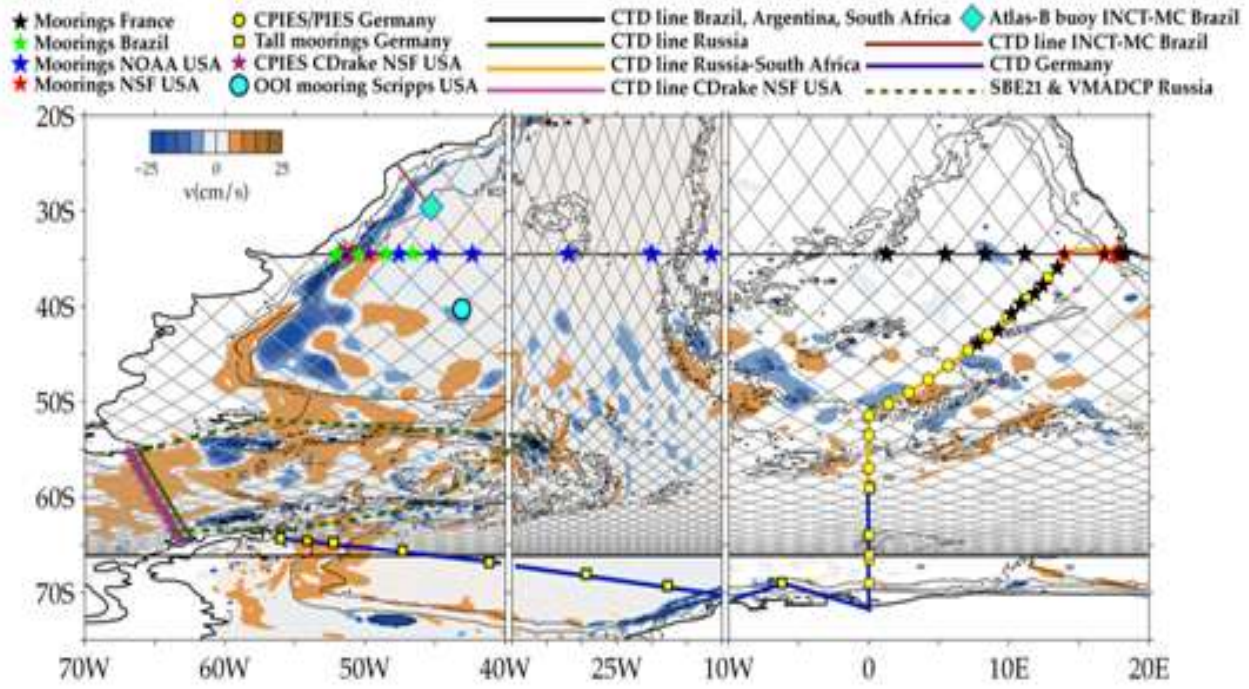
Funded!

Complementary to each other and to the INCT-MC, these three projects include monitoring the BC by seasonal repeat hydrography and currentmeter moorings.

Numerical experiments with high-resolution (1/24-deg) models.

Univ. of Sao Paulo's *RV Alpha Crucis*

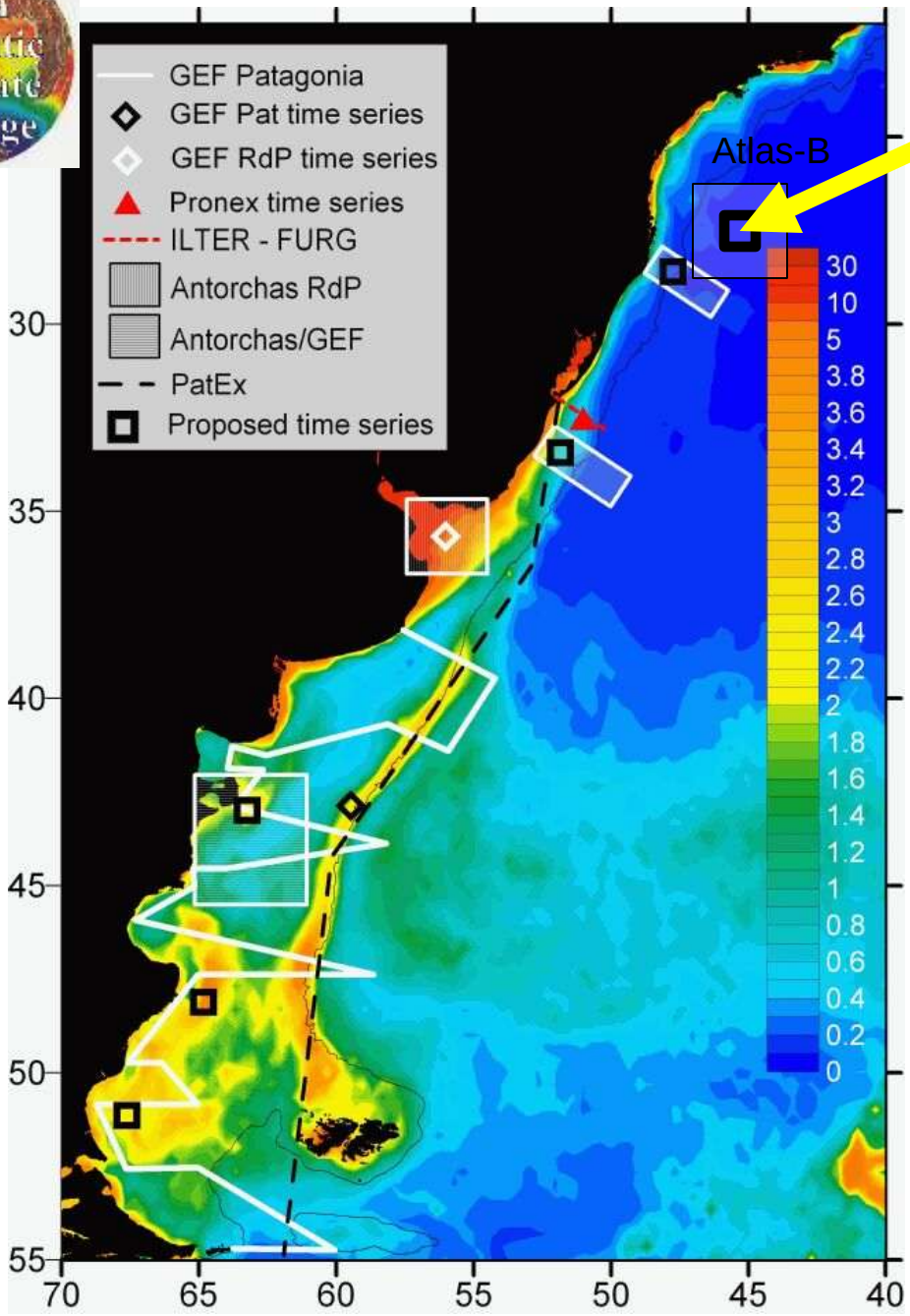
# The ANR, FAPESP/FACEP, NSF/NOAA SAMOC Project




Funded!

Schematic of the proposed trans-basin array along 34.5°S and the oblique Goodhope transect. Stars indicate the different components of the array that have been submitted to respective funding agencies:

✧Eastern boundary PIES/CPIES by France-ANR **(black stars),**
✧Western boundary bottom pressure gauges, CPIES and ADCP by Brazil-/ FAPESP/FACEPE **(green stars)**
✧Dynamic height moorings to USA-NSF **(red stars)**,
✧western boundary PIES/CPIES and interior PIES-DP to USA-NOAA **(blue stars)**




Funded!

Contact: A. Piola <apiola@hidro.gov.ar>

**The South Atlantic Climate Change Consortium (SACC)**

A multi-national, multi-institutional, multi-disciplinary Project funded continuously by the IAI since 1996.

**A three-year extension of the SACC CRN2 project has been approved to start in 2012**

The SACC CRN-3 will include activies closely related to SAMOC and all other projects discussed in this presentation

# FUTURO