

UNIVERSIDADE DE SÃO PAULO



# The ATLAS-B Project

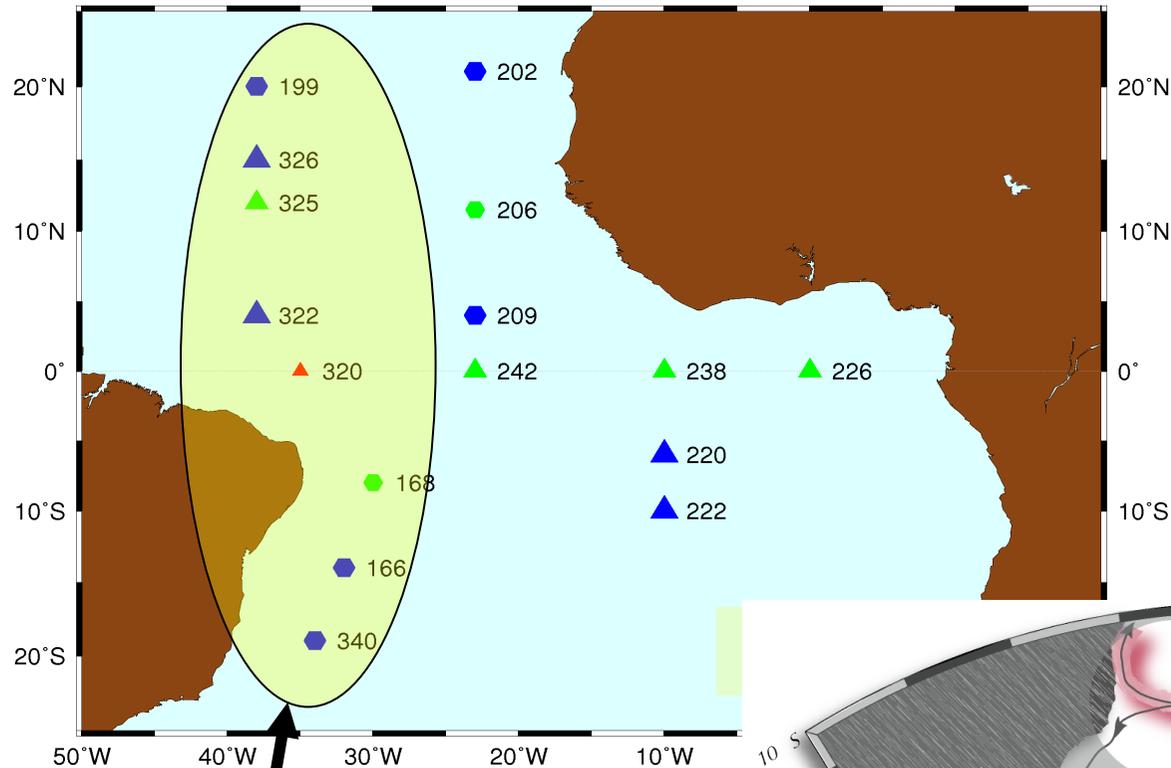
## Construction and Mooring of an Atlas-like Buoy in Brazil

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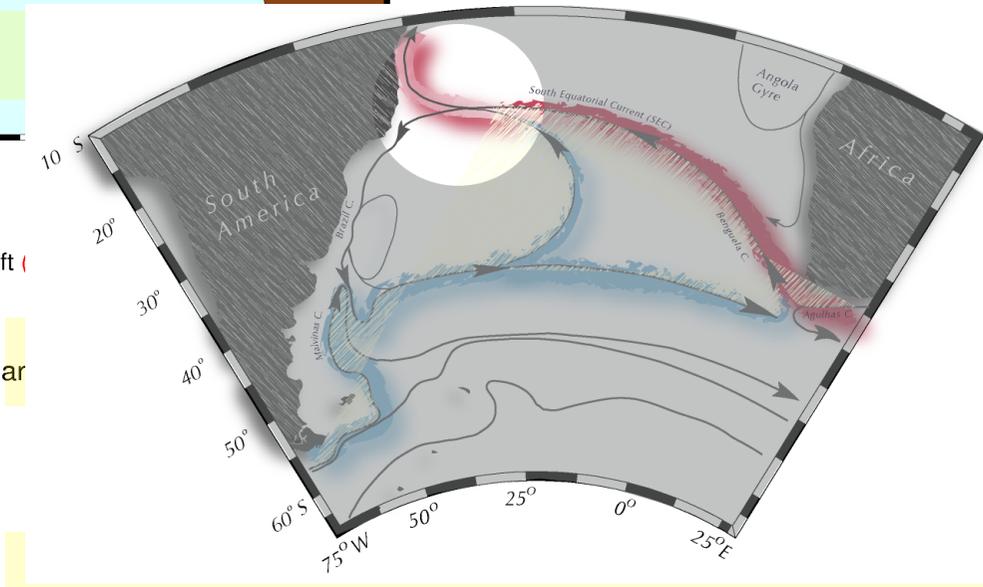
# The PIRATA original Array and its extensions



▲ PIRATA Core      ### Days Deployed  
✗ Buoy Not Transmitting      ○ Buoy Moved or Adrift  
 Deployment Data Return:    0% - 50%    50% - 75%  
 (Click Symbol for Summary)

GMD 15 Feb 2010 09:10:32 PST

The SEC bifurcation and the variability of the SACZ were the main rationales for the PIRATA Western Extension



## The "Brazilian" buoys

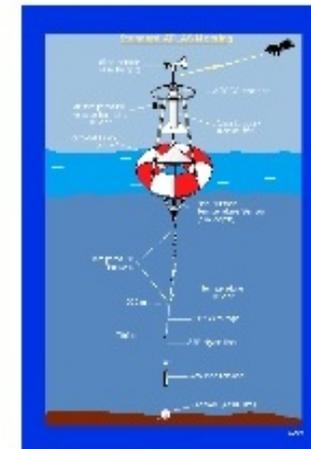
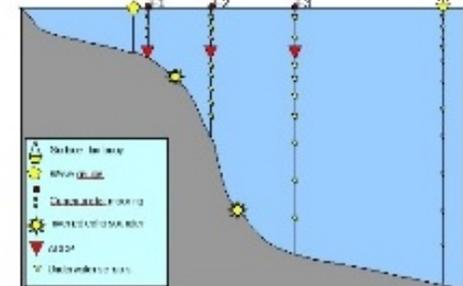
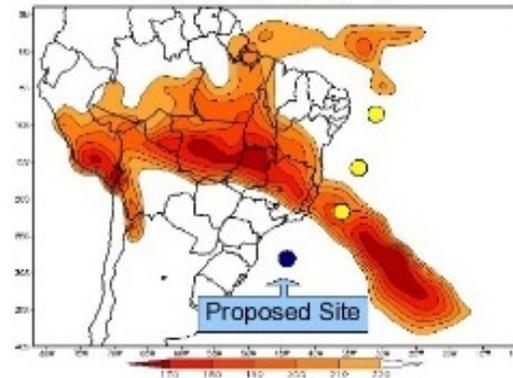
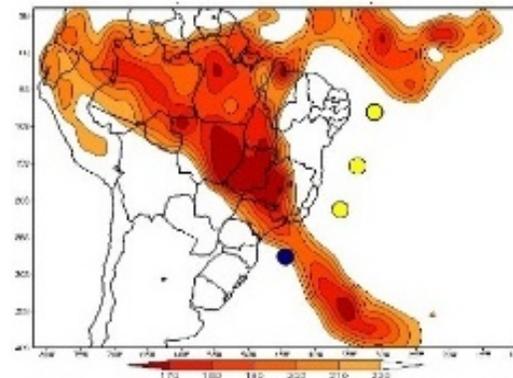
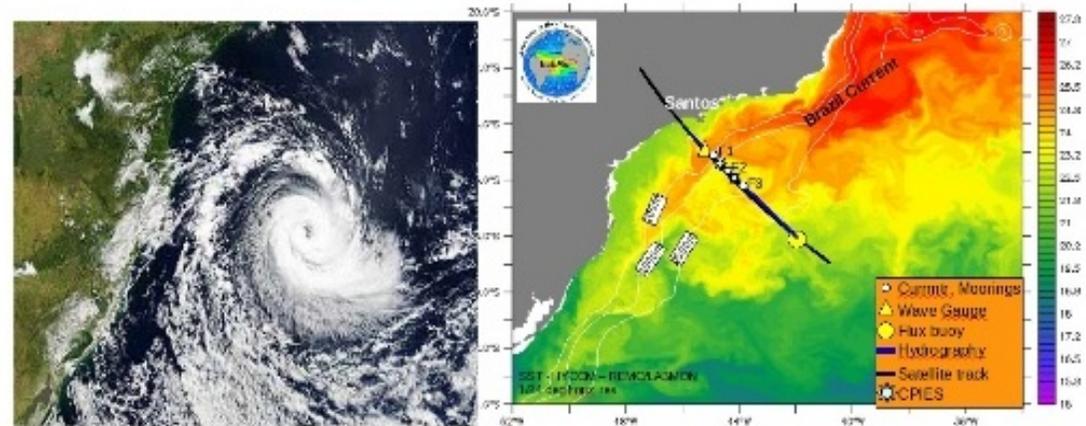
To fully enable the PIRATA WE for understanding the SACZ, a fourth buoy is needed

We are constructing a Brazilian Prototype of the Atlas Buoy (ATLAS-B) for monitoring the SACZ and the mixed layer in a regional with intense cyclogenetic activity.

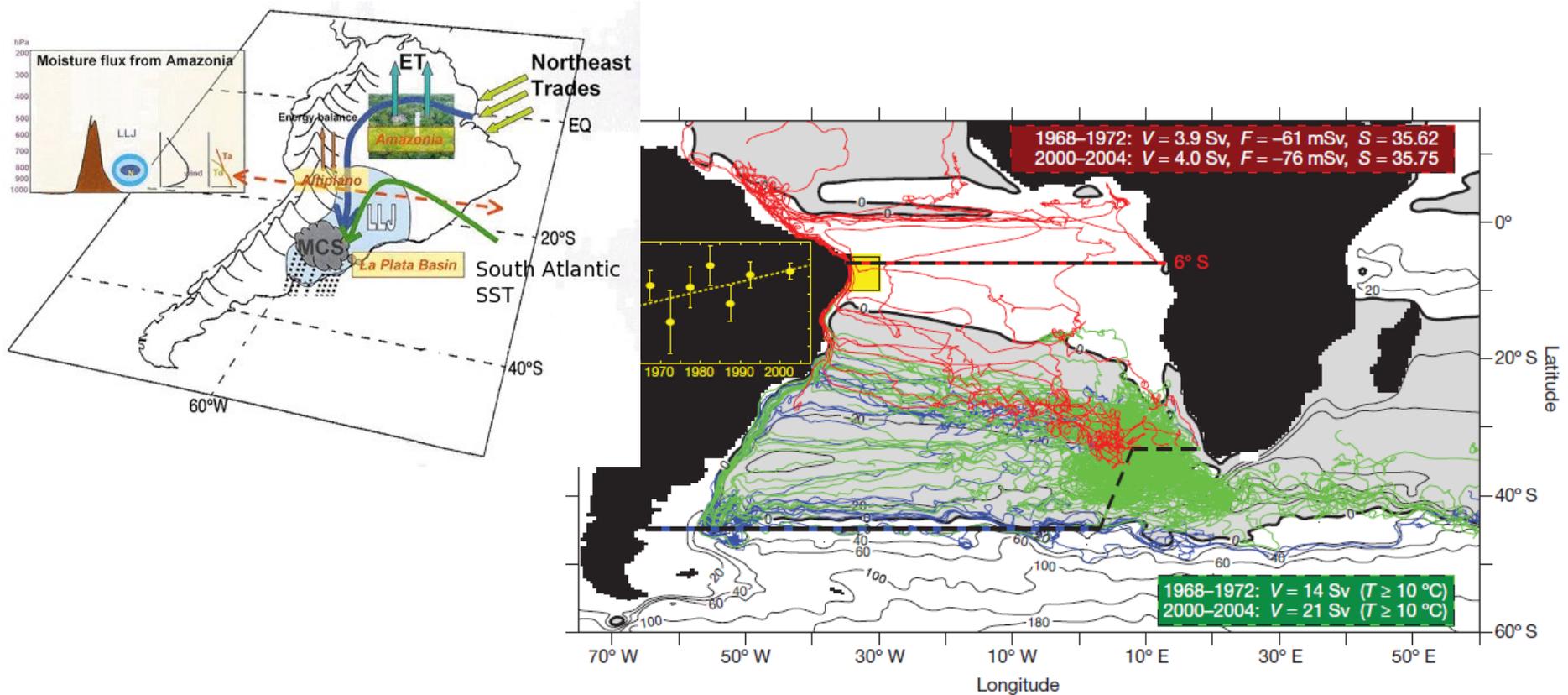
This work is being carried out in close cooperation with PMEL.

The buoy is planned to be moored at  $28^{\circ}\text{S}$ ,  $42^{\circ}\text{W}$ .

Repeat hydrographic section, together with current-meter mooring, will be carried across the Brazil Current.

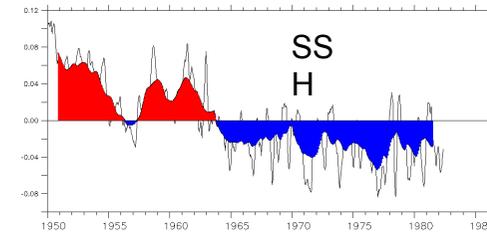
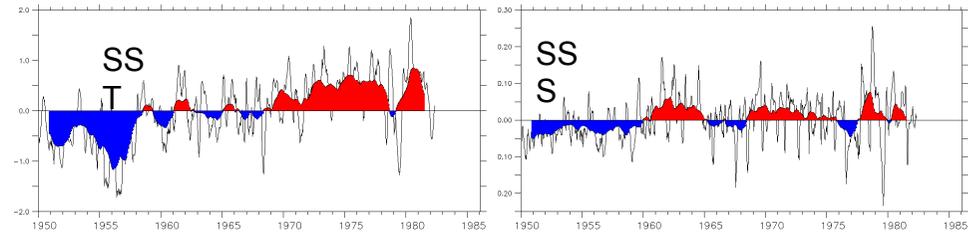
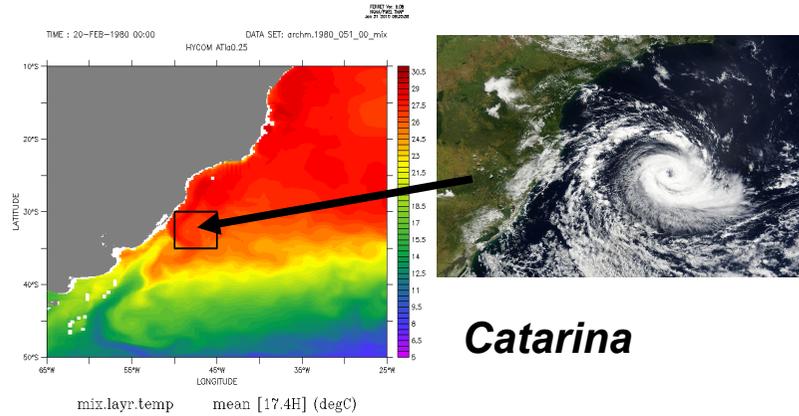


# Importance for the regional climate



Biastoch, A., C.W. Böning, F.U. Schwarzcopf and J.R.E. Lutjeharms  
 (*Nature* 462, 495-498, Nov/2009).

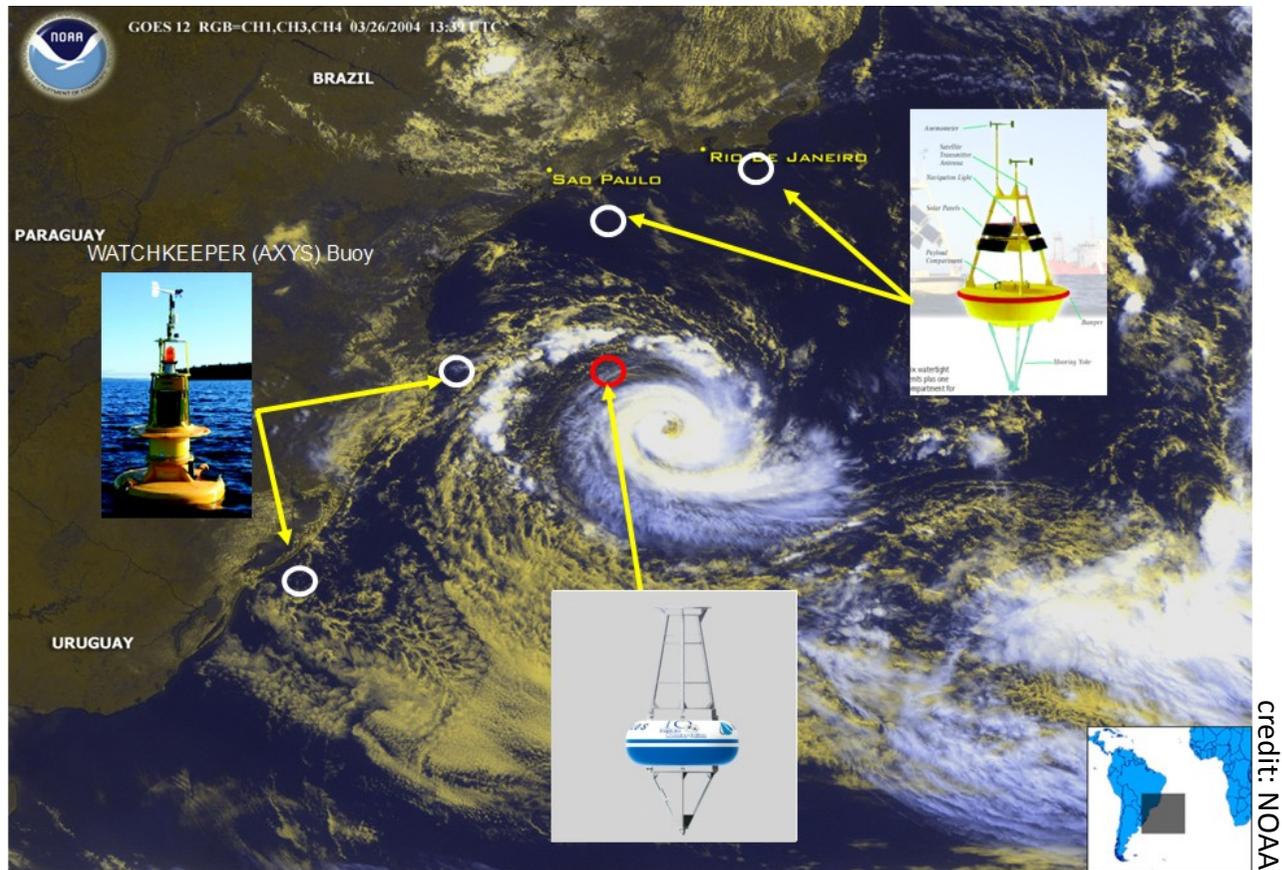
# Increase in intensity and frequency of extreme events?



**FATORES CLIMÁTICOS**

- 1 A temperatura do Oceano Atlântico estava 1,5 grau acima da média desta época do ano, o que favoreceu a formação de nuvens
- 2 Ventos de até 60 quilômetros por hora vindos do Sudeste empurraram as nuvens, elevando sua umidade – que no Rio é de 80% em abril – para 100%
- 3 Essa gigantesca massa de ar quente e úmido esbarrou com uma frente fria que havia chegado do sul (a mais forte do ano no país), o que provocou as chuvas
- 4 Os ventos formaram uma espécie de barreira de ar, impedindo que a frente fria seguisse rumo ao norte. A chuva, que duraria seis horas sem tais ventos, estendeu-se por 14 horas ininterruptas

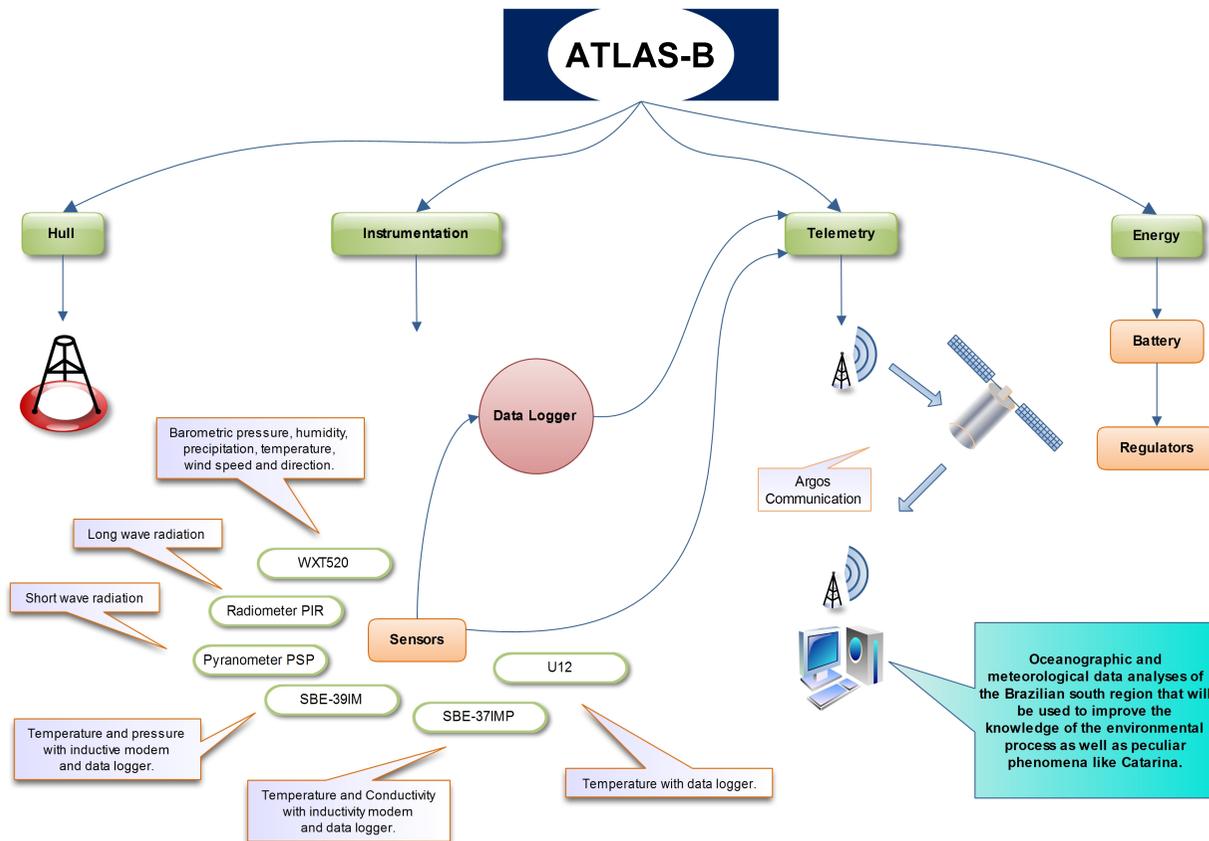
Veja, 14/04/2010



Proposed ATLAS-B buoy installation site superimposed to a satellite image. The image, obtained in March 2004, shows a fully developed tropical storm off the Brazilian south coast, the Catarina storm.

Catarina was a particularly destructive extreme phenomenon, which caused heavy losses to South Brazil agriculture, industry and housing, including loss of lives. Offshore sea surface temperature and air humidity at the region were abnormally high for that time of the year (SST was 1.5 oC higher than average). If real time offshore meteorological and oceanographic measurements were available at the time of the storm, early warning procedures could have been adopted, which might have minimized the losses.

( ATLAS-B drawing: Holos Brasil )

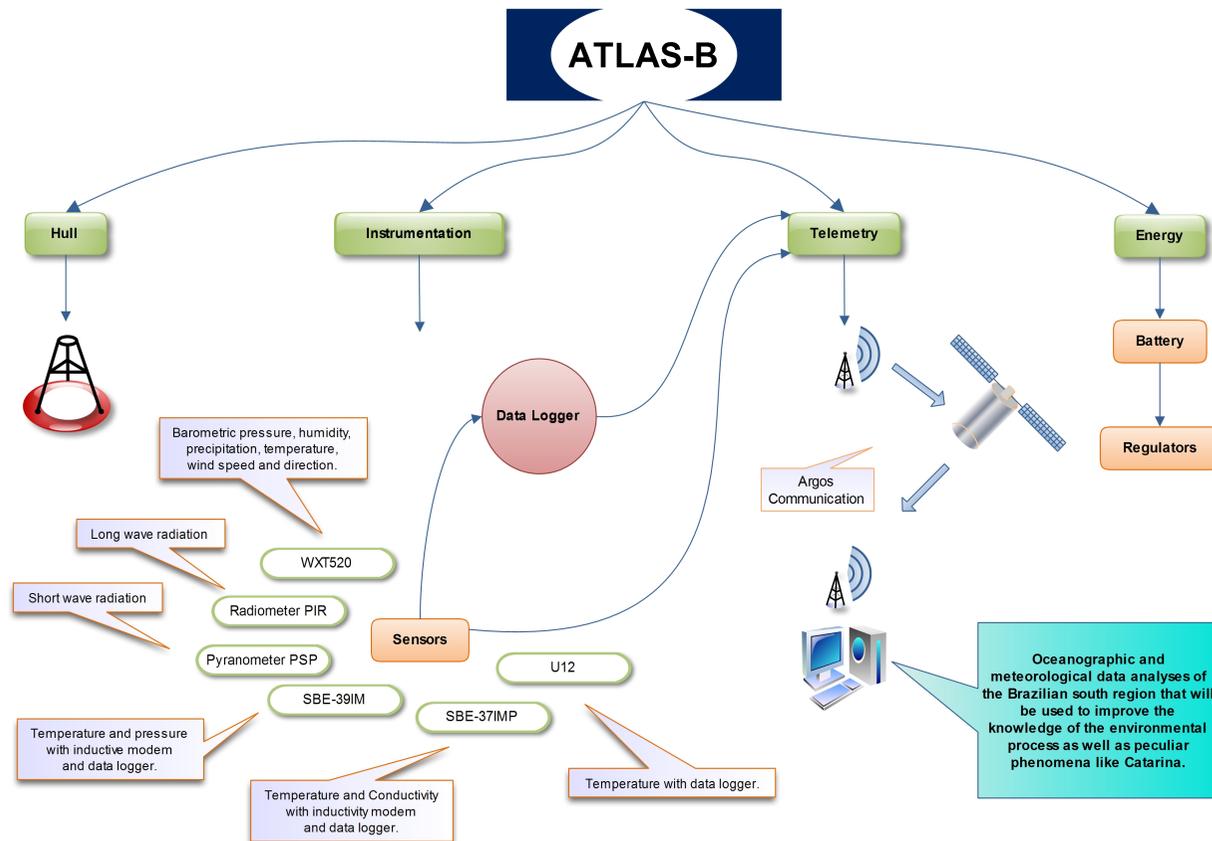


One of the project's main goals is to build a prototype as compatible as possible to the original NOAA first-generation ATLAS buoy.

Meteorological (air temperature, humidity, barometric pressure, rain and wind) and oceanographic parameters (water temperature, salinity and pressure) will be sampled at the same levels as in the PIRATA buoys.

Some alterations, however, will be implemented. Instead of custom meteorological sensors, a commercially available weather module (Vaisala WXT-520) will be employed.

A standard commercial ARGOS PTT should also be adopted. Mooring hardware, whenever available, will be purchased locally.



At present, detailed specification process for the buoy is in its final stage.

Construction of the buoy hull has been initiated.

It is expected that the buoy first sea test will be carried on at the second quarter of 2011. Buoy should be deployed till the end of 2011.

If this prototype fulfill the project's expectations, additional buoys will be built, including enhancements such as additional sensors (current meters and CO2 flux sensors), as well as an improved data acquisition and transmission systems (IRIDIUM, probably).