

# Papel da zona costeira brasileira nos fluxos de CO<sub>2</sub> mar-atmosfera e possíveis efeitos da acidificação

**Leticia COTRIM DA CUNHA**

**Faculty of Oceanography, Rio de Janeiro State University (UERJ), Rio de Janeiro, Brazil**

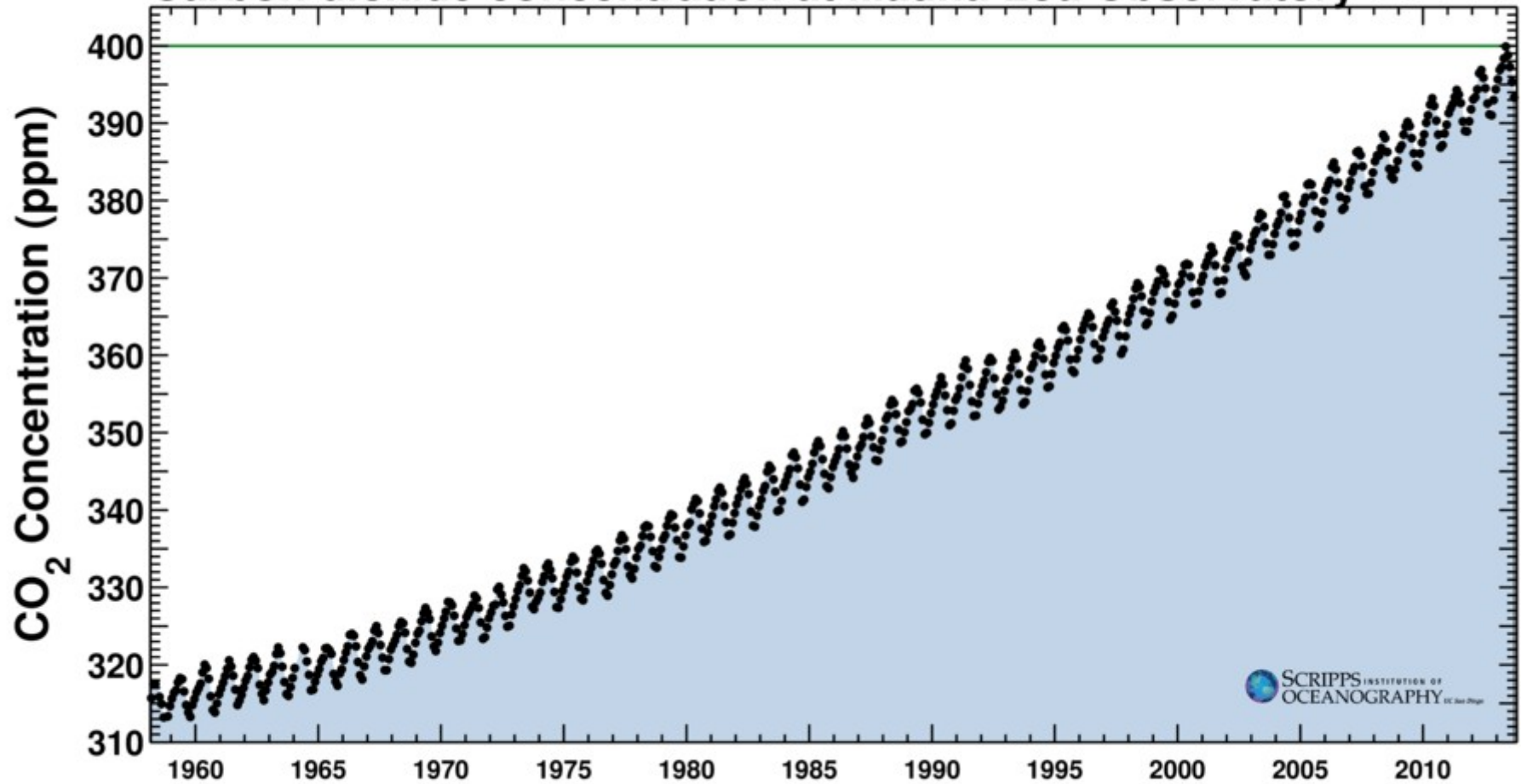
**Florianópolis, 11 dezembro 2013**

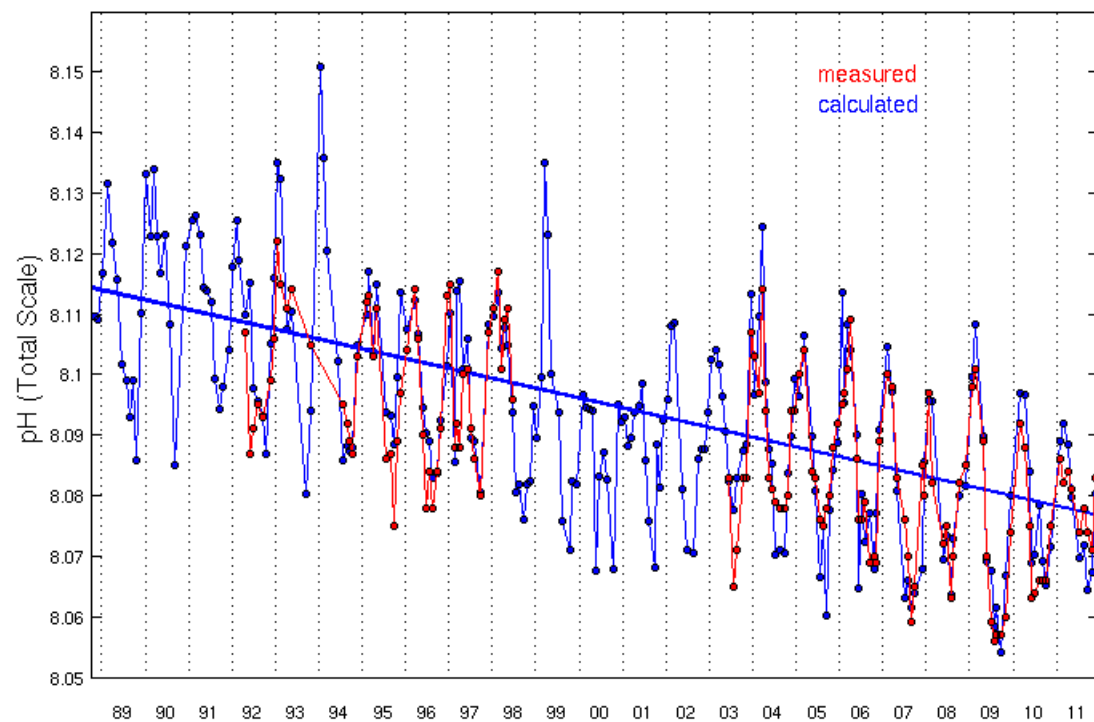
**III Workshop Brasileiro de Mudanças Climáticas em Zonas Costeiras**

**Thanks to the whole BrOA group**



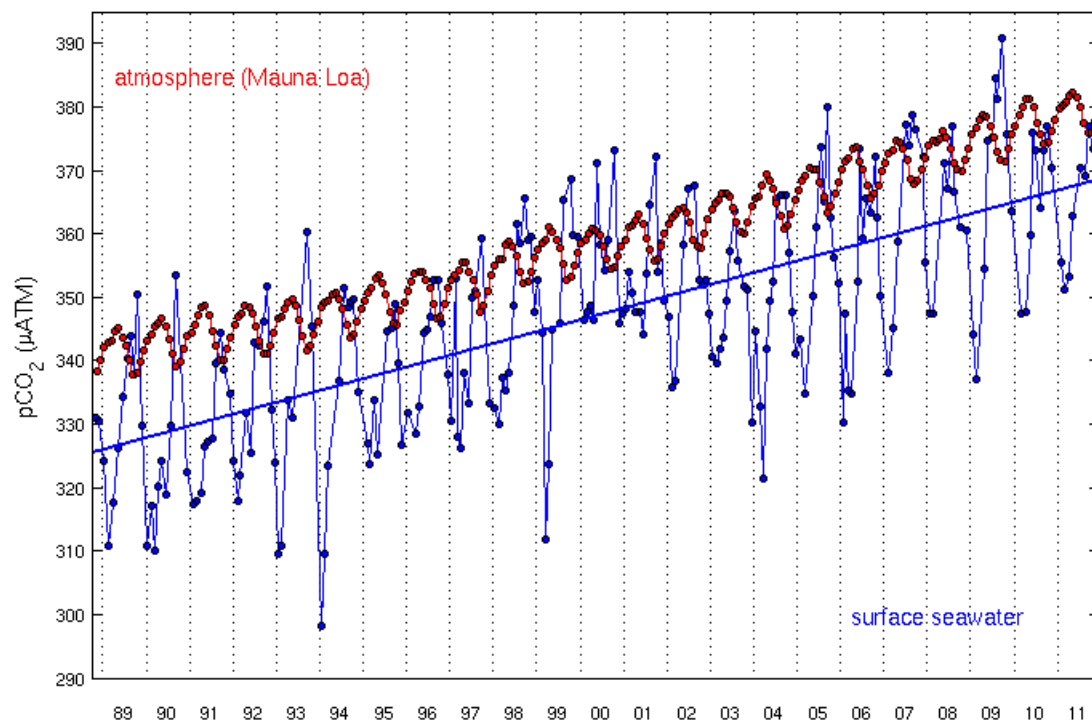
## Carbon dioxide concentration at Mauna Loa Observatory





## Data from Station HOT (Pacific Ocean)

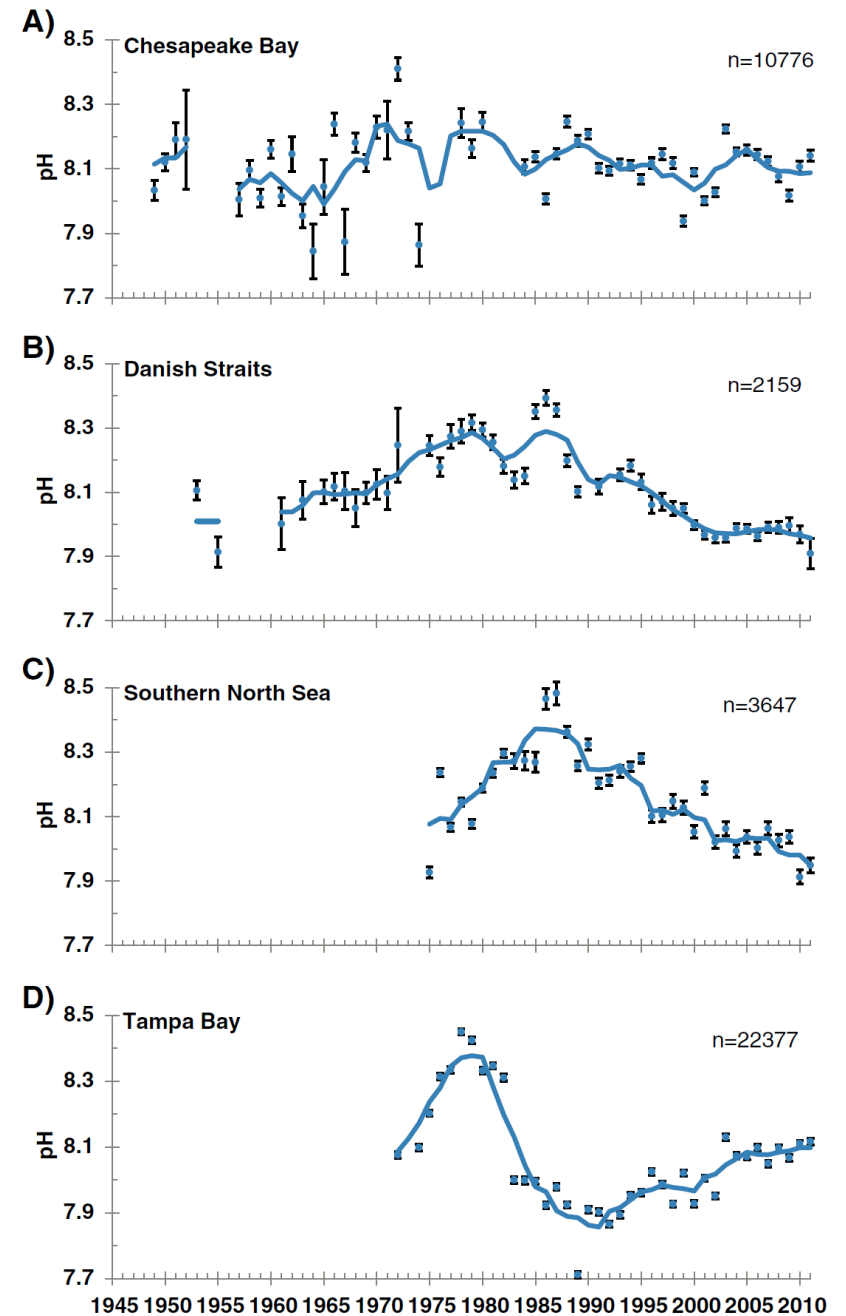
Partial Pressure of CO<sub>2</sub>



# What about the coastal ocean? And coastal ecosystems?

## Long-term data for some N-hemisphere coastal areas

(from Duarte et al 2013 doi 10.1007/s12237-013-9594-3)

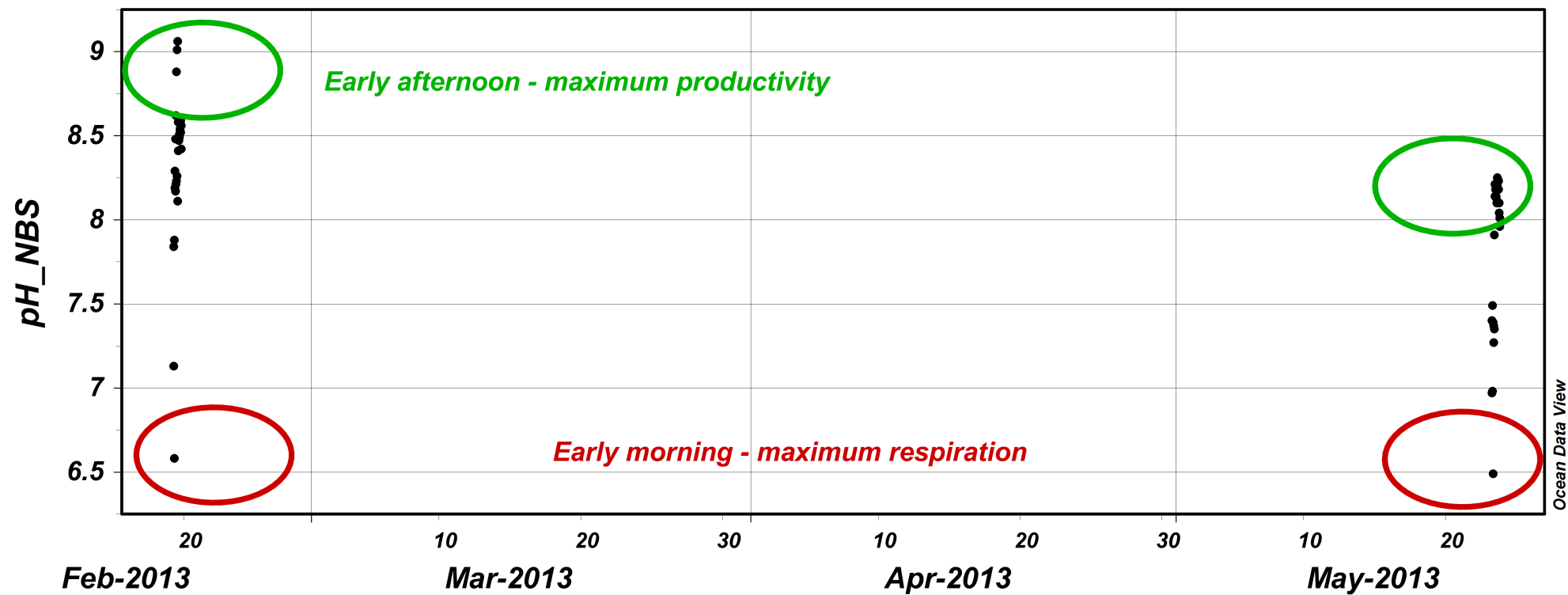


# Continental margins and coastal ecosystems

- ✓ **Extreme heterogeneity**
- ✓ **CO<sub>2</sub> system regulated by nutrients + biological processes in these areas**
- ✓ **CO<sub>2</sub> system parameters vary at daily AND seasonal time scales**
- ✓ **Lack of long term observations + inadequacy of global biogeochemistry models resolving these areas**
- ✓ **How would anthropogenic CO<sub>2</sub> influence these areas?**



**Estuário Barra Grande, SE Brazil (Ilha Grande)**



**(Soares, Farias, Hamacher, Araújo & Da Cunha, unpublished data)**

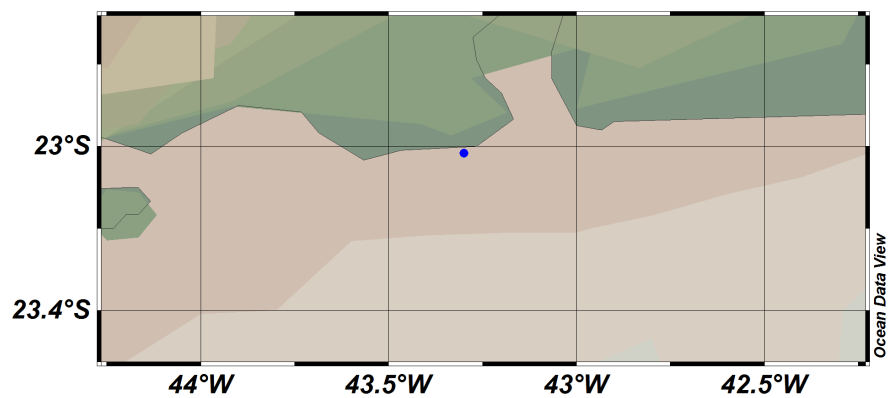




**Flood tide**

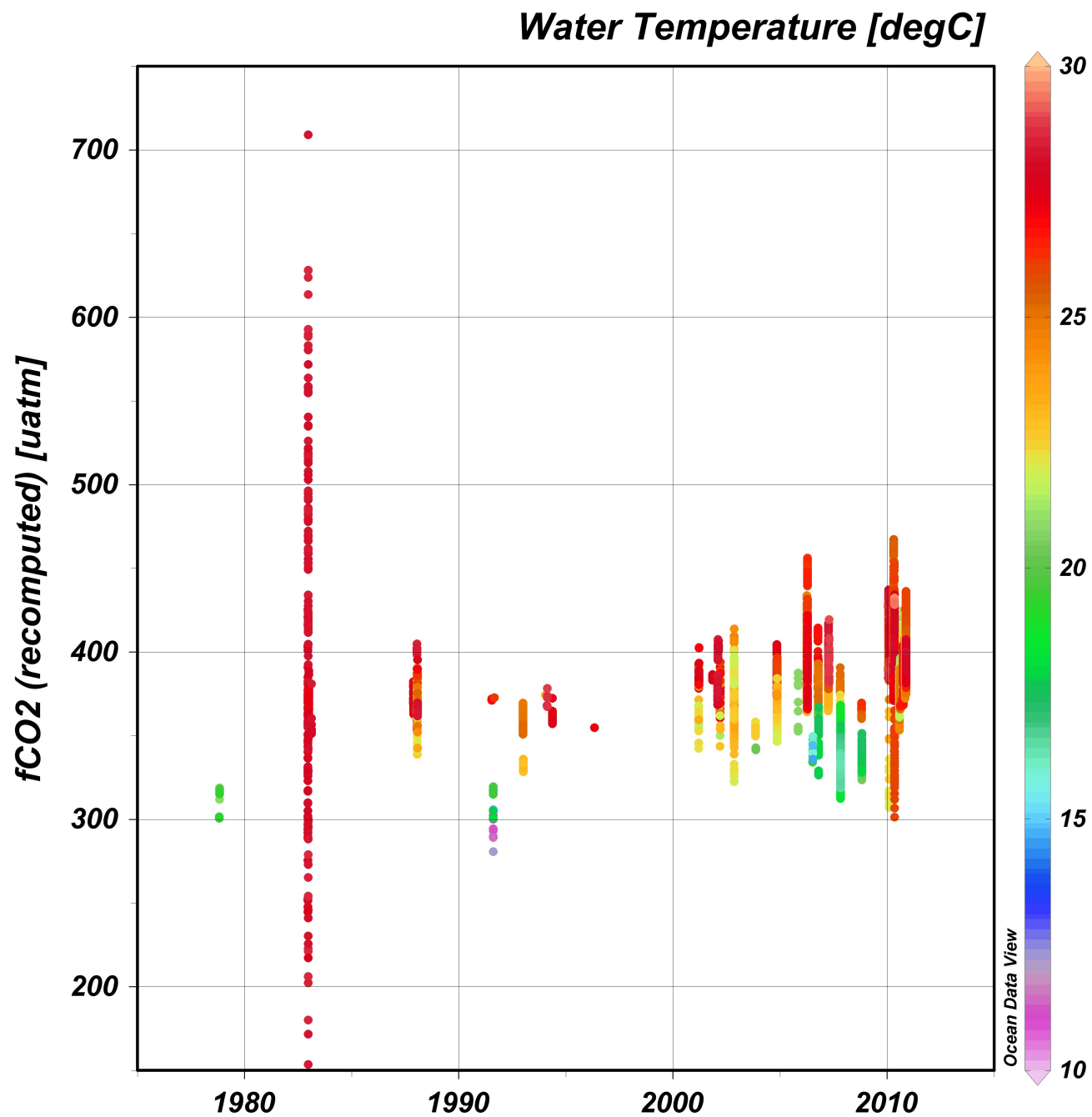
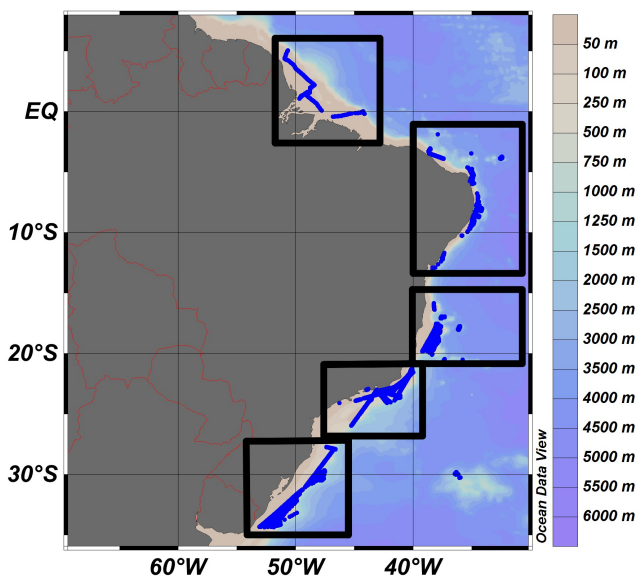


**Low tide**



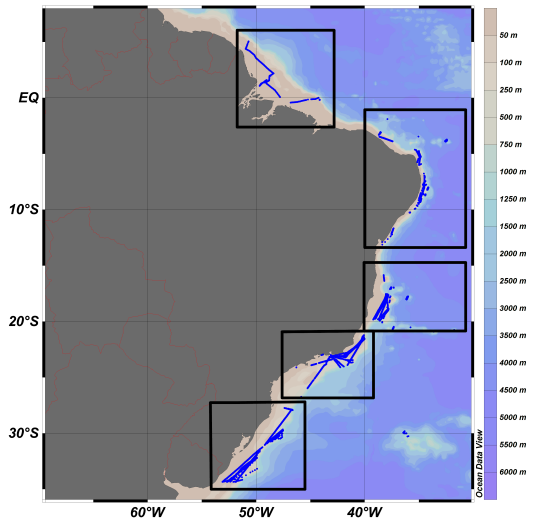
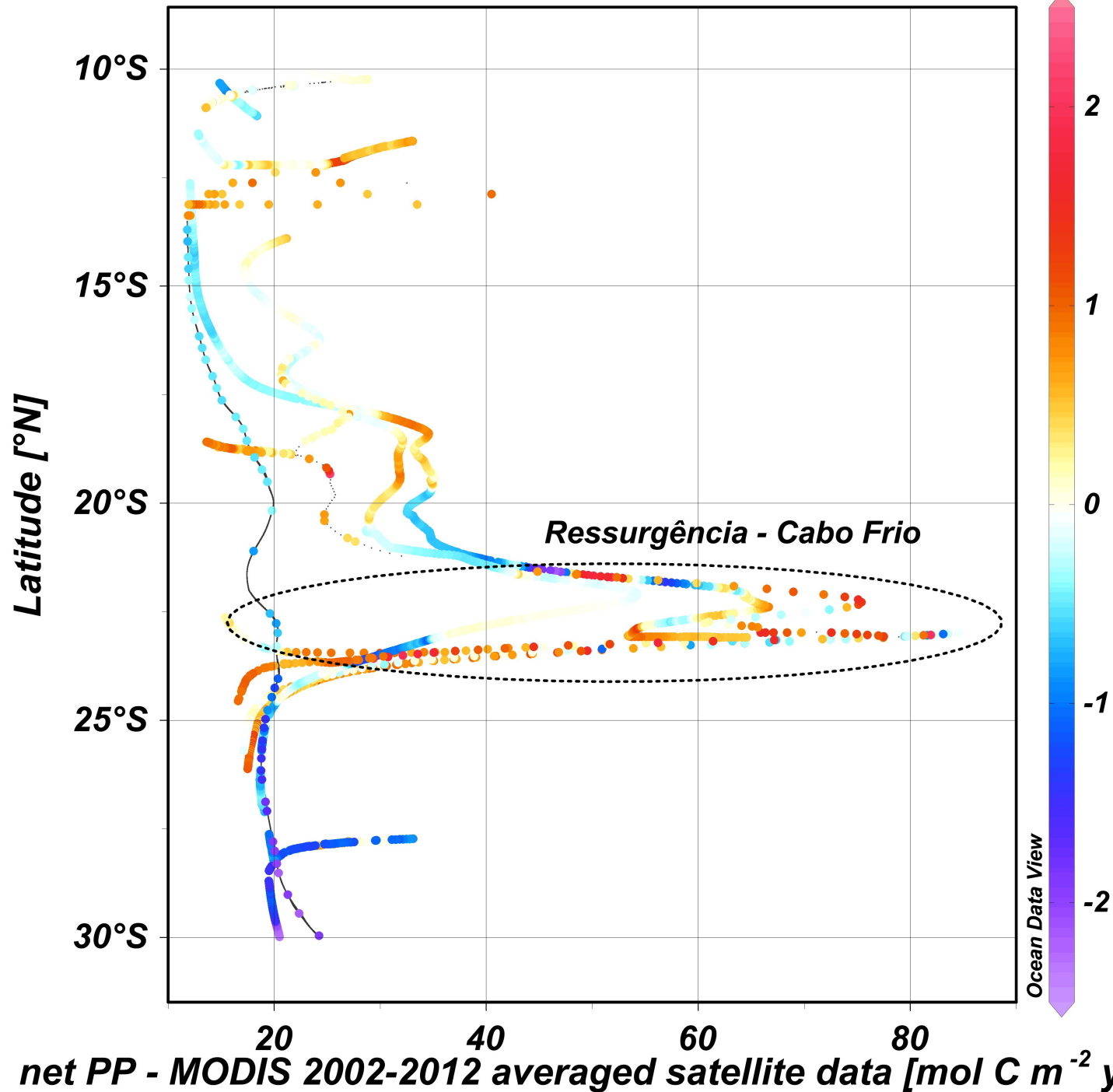
# Brazilian continental shelf

## SOCAT data





**Flux sea-air CO<sub>2</sub> [mol C m<sup>-2</sup> yr<sup>-1</sup>]**



**“tipping” point  
(from atmospheric  
CO<sub>2</sub> sink to source)  
below 25°S**

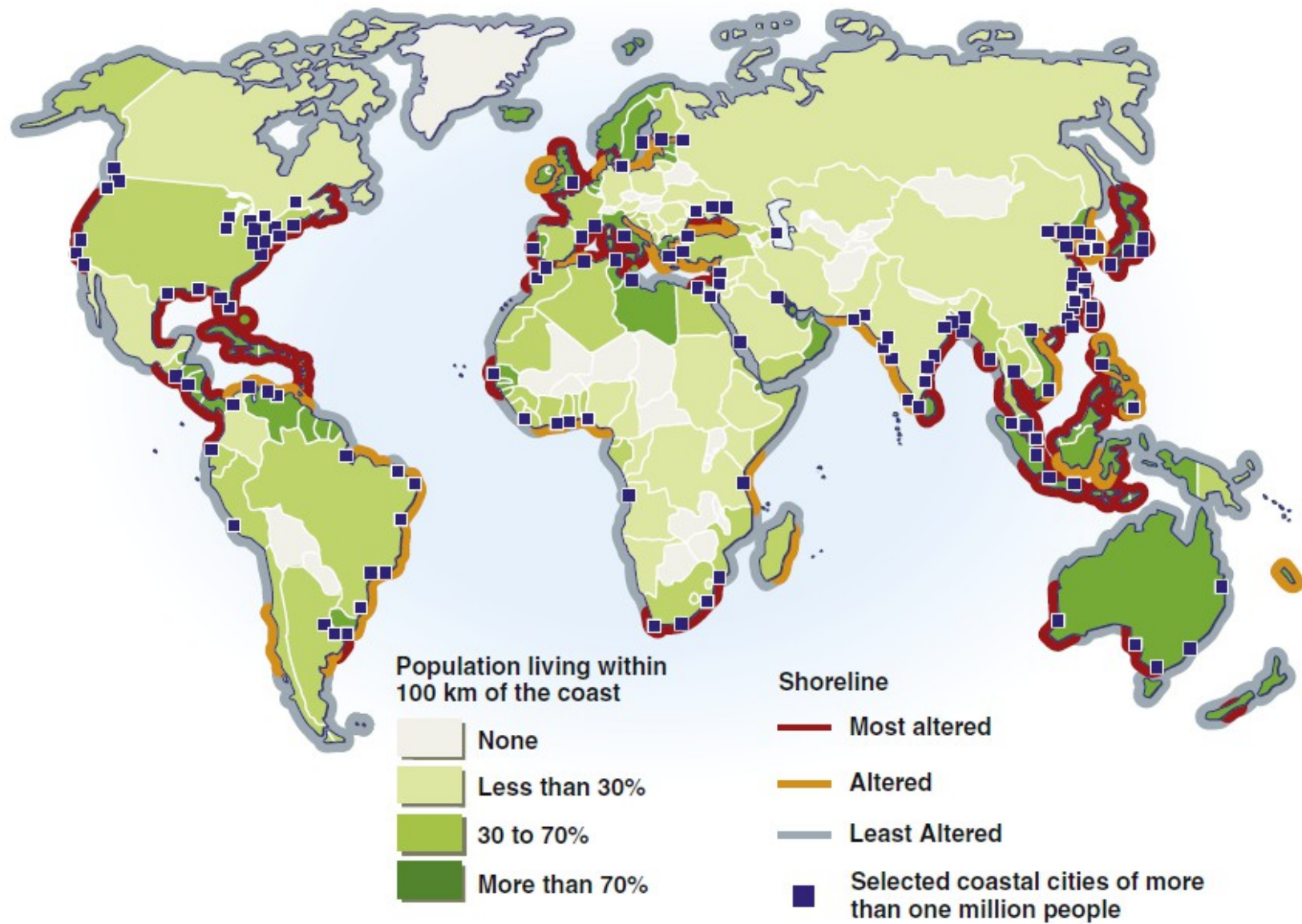
**da Cunha (in prep.) →  
Brazilian continental shelf  
data from SOCAT v. 1.5**

# Continental margins and coastal ecosystems

- ✓ Extreme heterogeneity
- ✓ CO<sub>2</sub> system regulated by nutrients + biological processes in these areas
- ✓ CO<sub>2</sub> system parameters vary at daily AND seasonal time scales
- ✓ **Adopt a “typology” of coastal areas**
- ✓ **Lack of long term observations**
- ✓ **Inadequacy of most global biogeochemistry models resolving these areas**
- ✓ **How would anthropogenic CO<sub>2</sub> influence these areas?**



**Estuário Barra Grande, SE Brazil (Ilha Grande)**



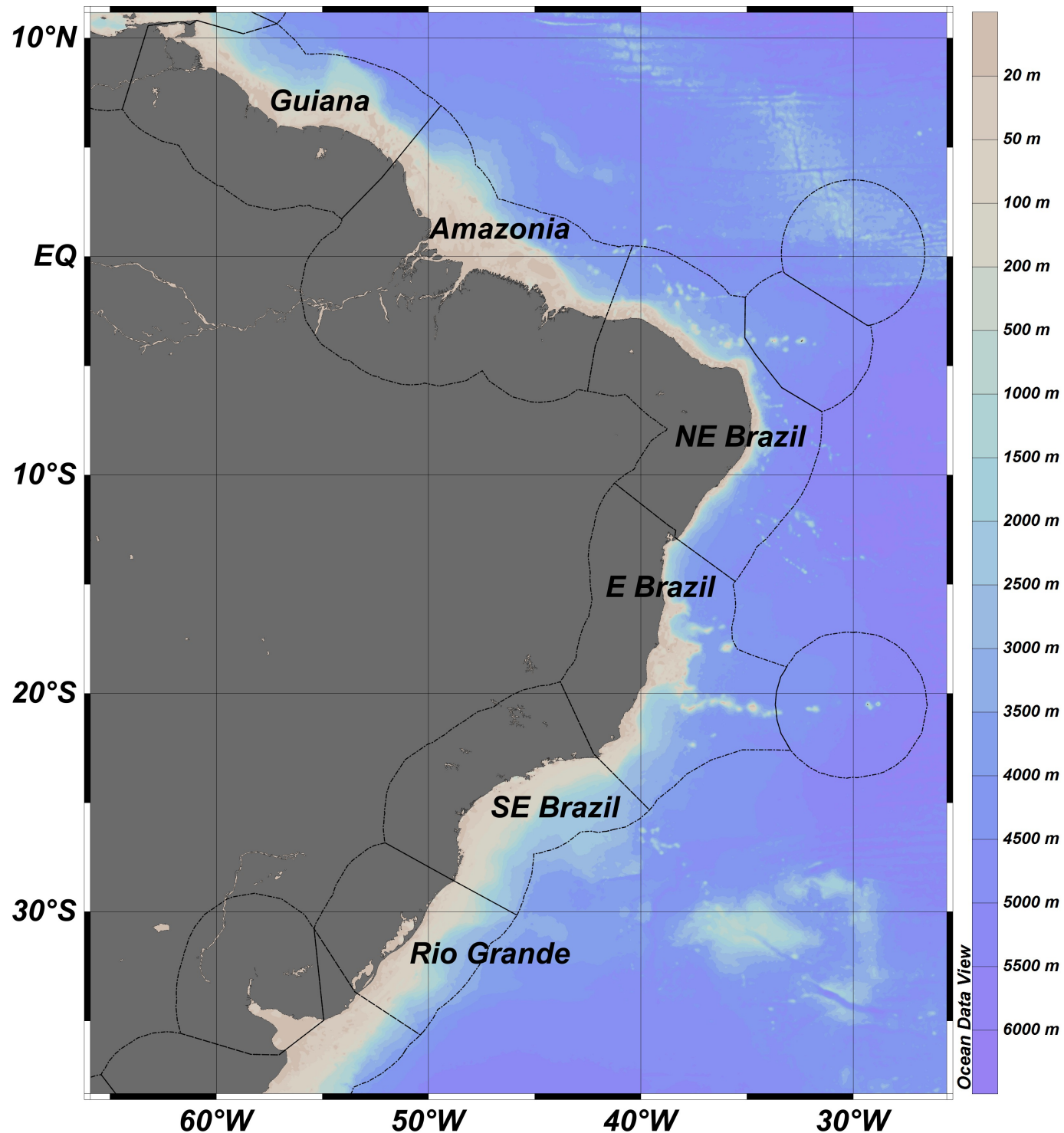
**Fig. 1.** Global distribution of population living within 100 km of the coast and degree of shoreline degradation. Sources: Burke et al. (2001) and Harrison and Pearce (2001).



**Tackling the  
“heterogeneity issue” for  
coastal ecosystems:**

**Adopt a coastal typology  
classification (LMEs,  
MEOWs)**

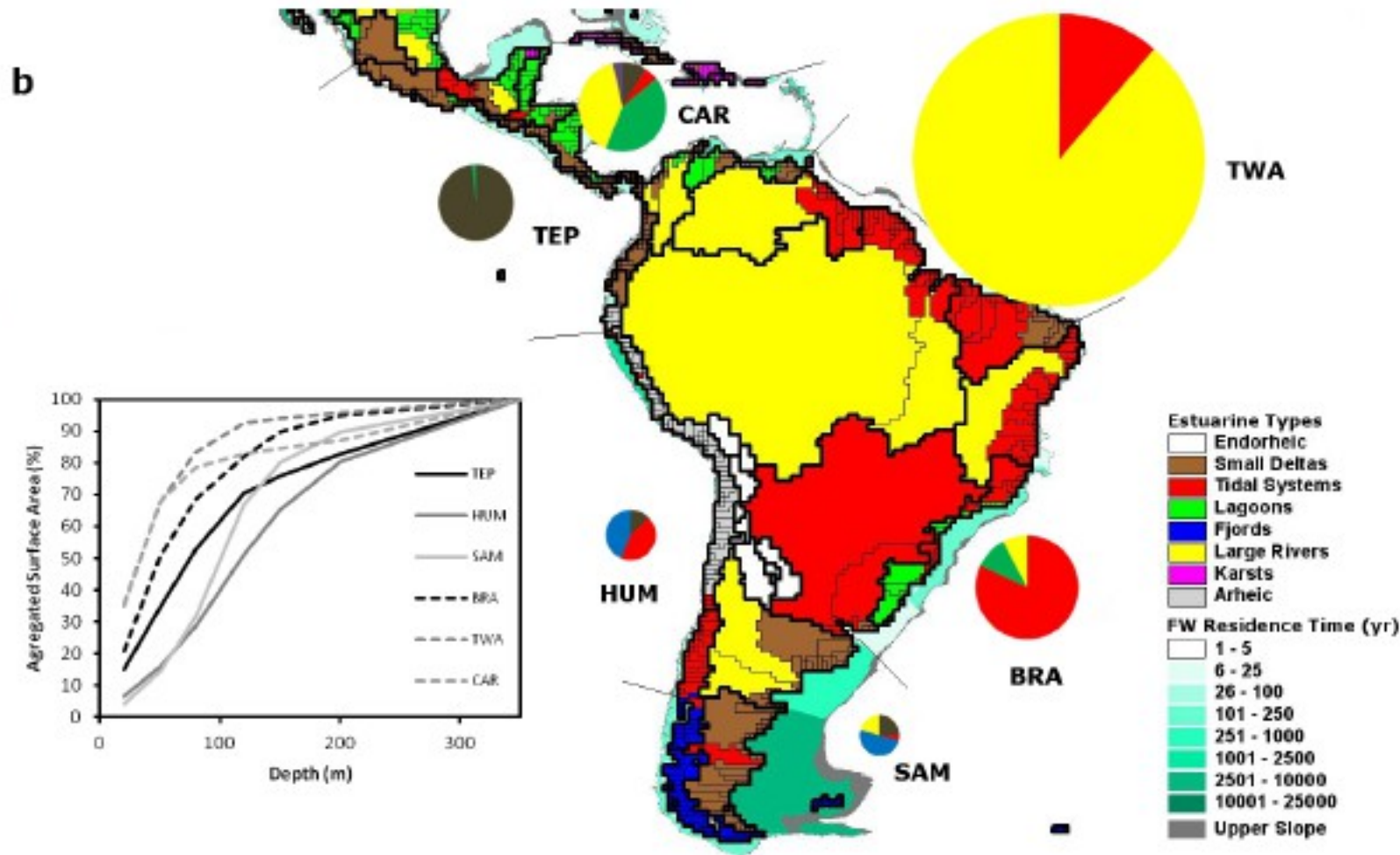
**Split “coastal” and  
“continental shelf”**



# Typology of coastal ecosystems

## Global multi-scale segmentation of continental and coastal waters from the watersheds to the continental margins

G. G. Laruelle<sup>1</sup>, H. H. Dürr<sup>2,4</sup>, R. Lauerwald<sup>1,3</sup>, J. Hartmann<sup>3</sup>, C. P. Slomp<sup>2</sup>, N. Goossens<sup>1</sup>, and P. A. G. Regnier<sup>1</sup>





# **What do we really need at present in Brazil?**

**Long-term coastal monitoring programmes (define key parameters, automated AND integrated regional observatories)**

**Accessible data, preferably at electronic format**



**“feed” models, at both diagnostic and prognostic levels (sorry, but the current BNDO is not ideal)**

**Identify the most sensitive coastal ecosystems (biodiversity, fisheries, aquaculture, tourism)**

**Capacity building (all levels, including technicians)**

**OA is a multidisciplinary issue!!**