

Ocean, climate and fisheries: the Patagonia Shelf case

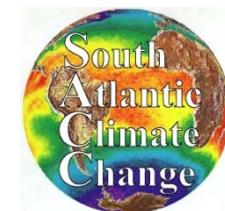
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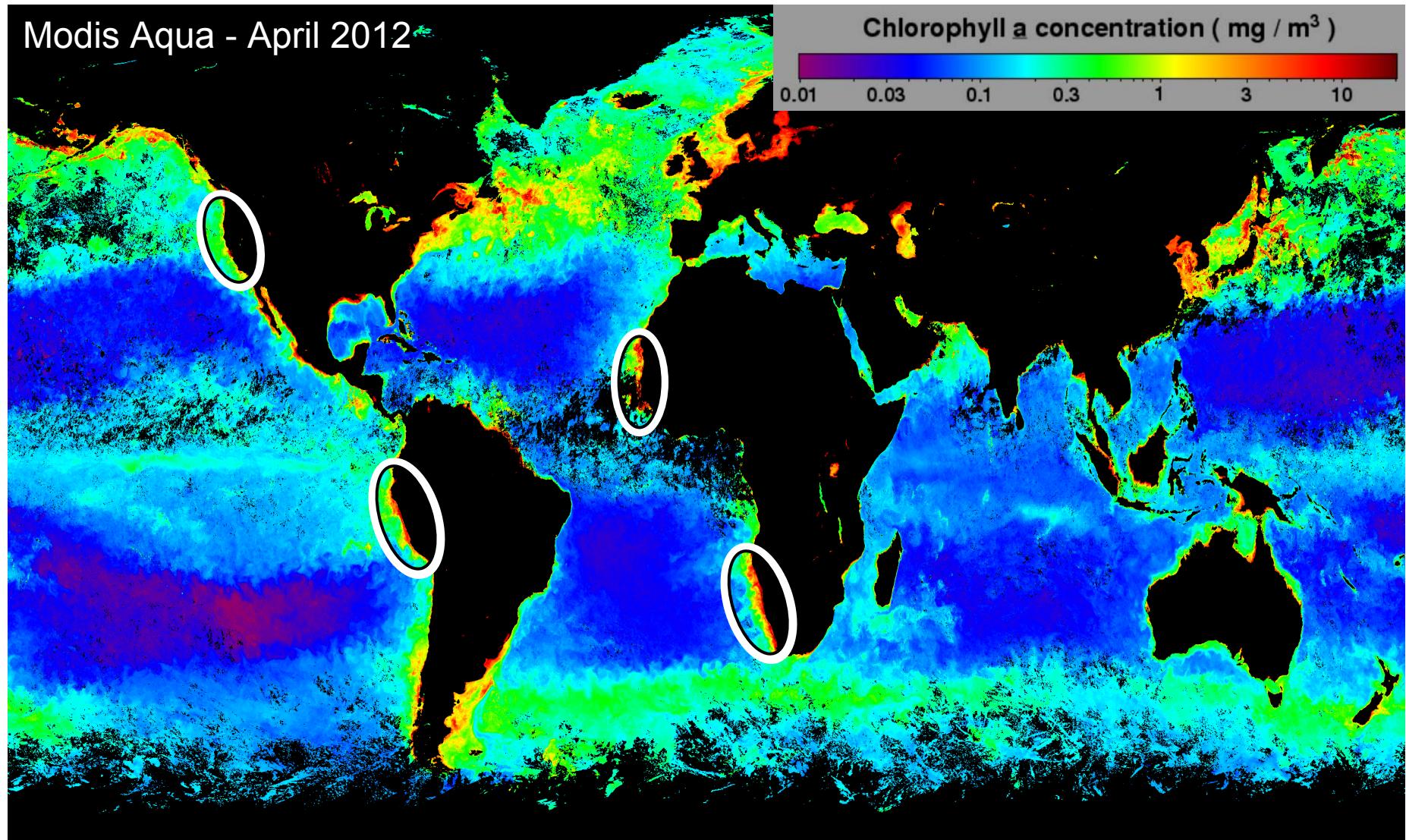


<http://sacc.coas.oregonstate.edu>





Global Ocean Chlorophyll



The SACC Consortium



Goal

To determine the physical mechanisms that control biological processes in highly productive regions of the SW Atlantic.

Who we are: the SACC Team

- 9 Principal Investigators + 31 collaborating investigators
- 12 Research institutions
- 5 Countries



SHN



UBA



INIDEP



USP



FURG



UDEC



Urep



OSU



WHOI

Capacity Building



39 Research Fellows

Postdoctoral, PhD, MSc and Undergraduate

22 Theses completed + 8 ongoing



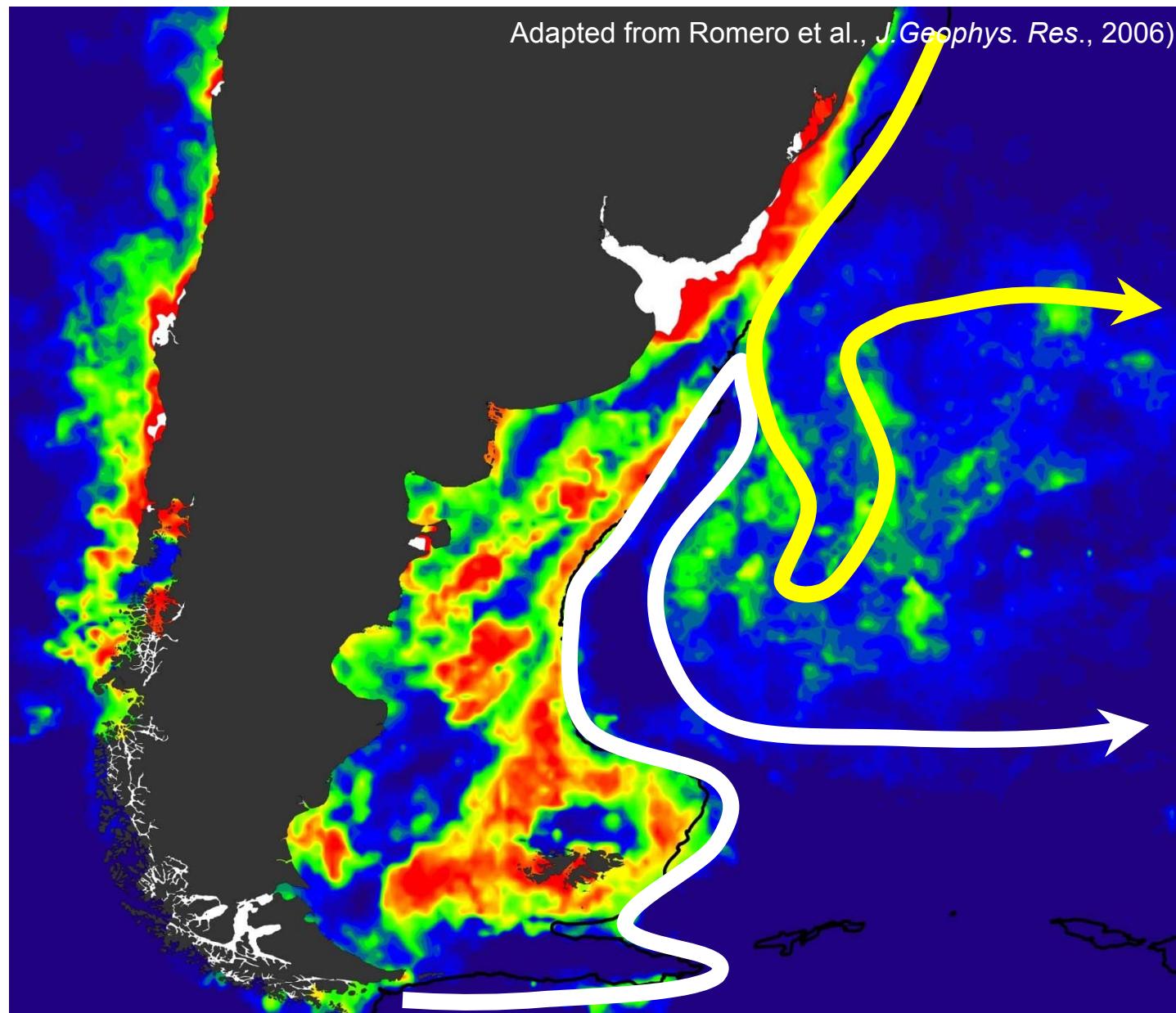
6 International Training Courses

87 students from 38 institutions located in 12 countries of the Americas

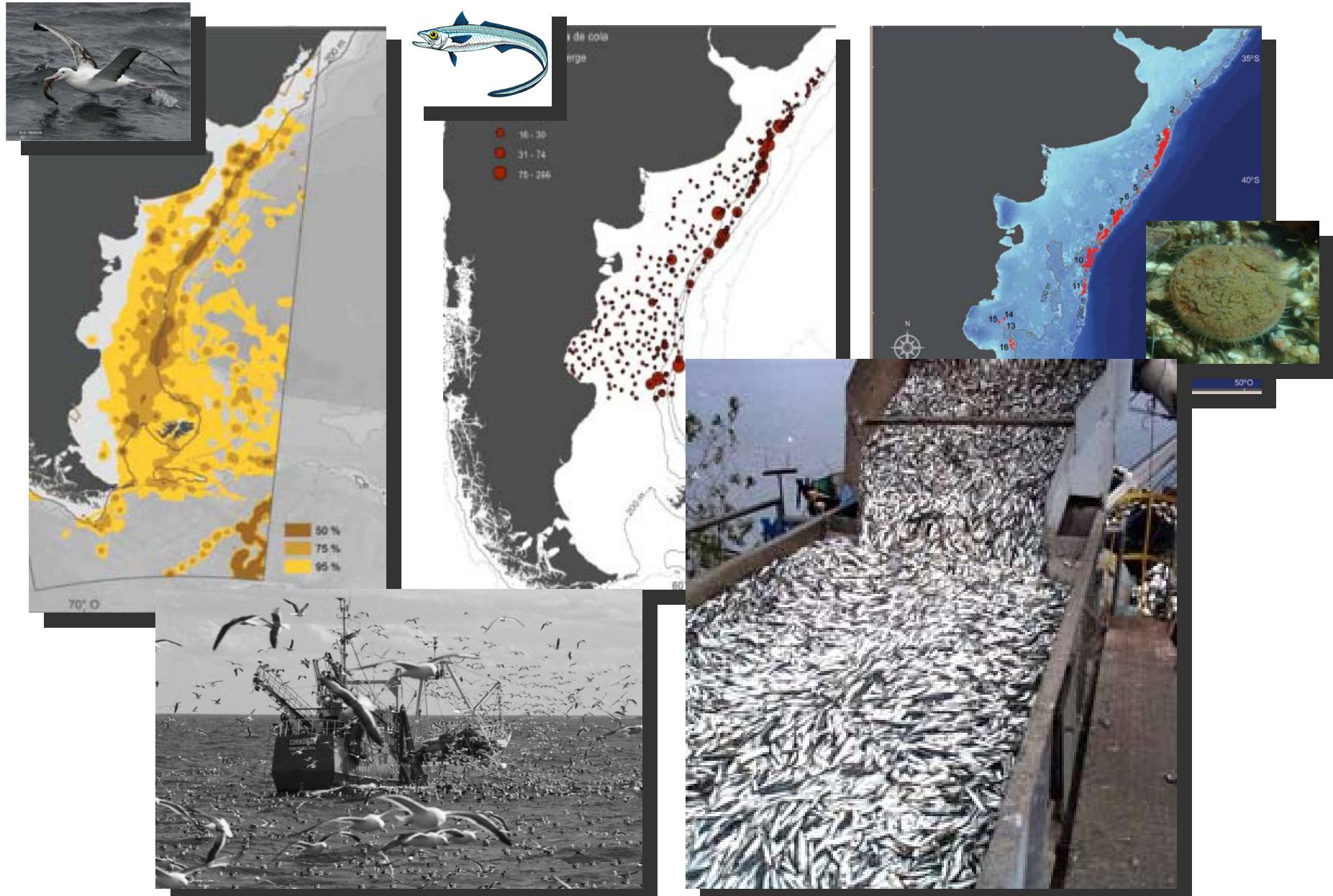




Ocean Productivity in the SW Atlantic



This energy cascades up reaching top predators

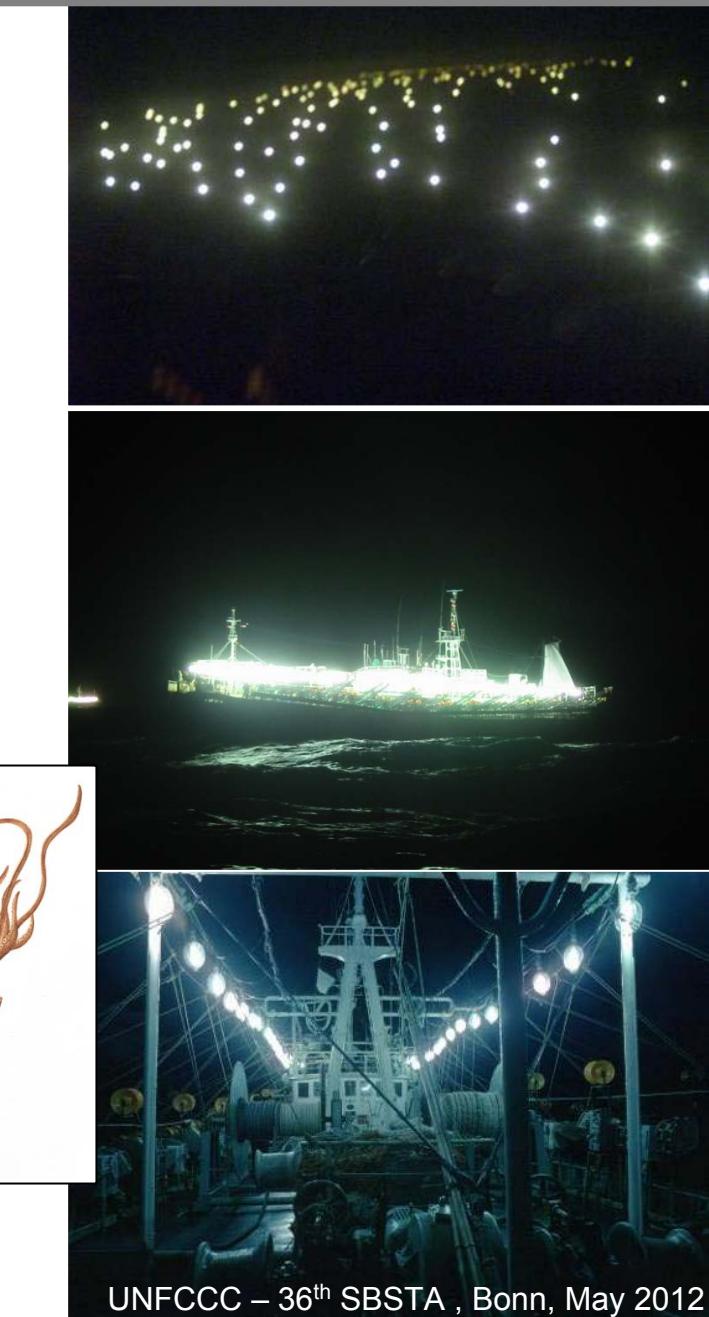
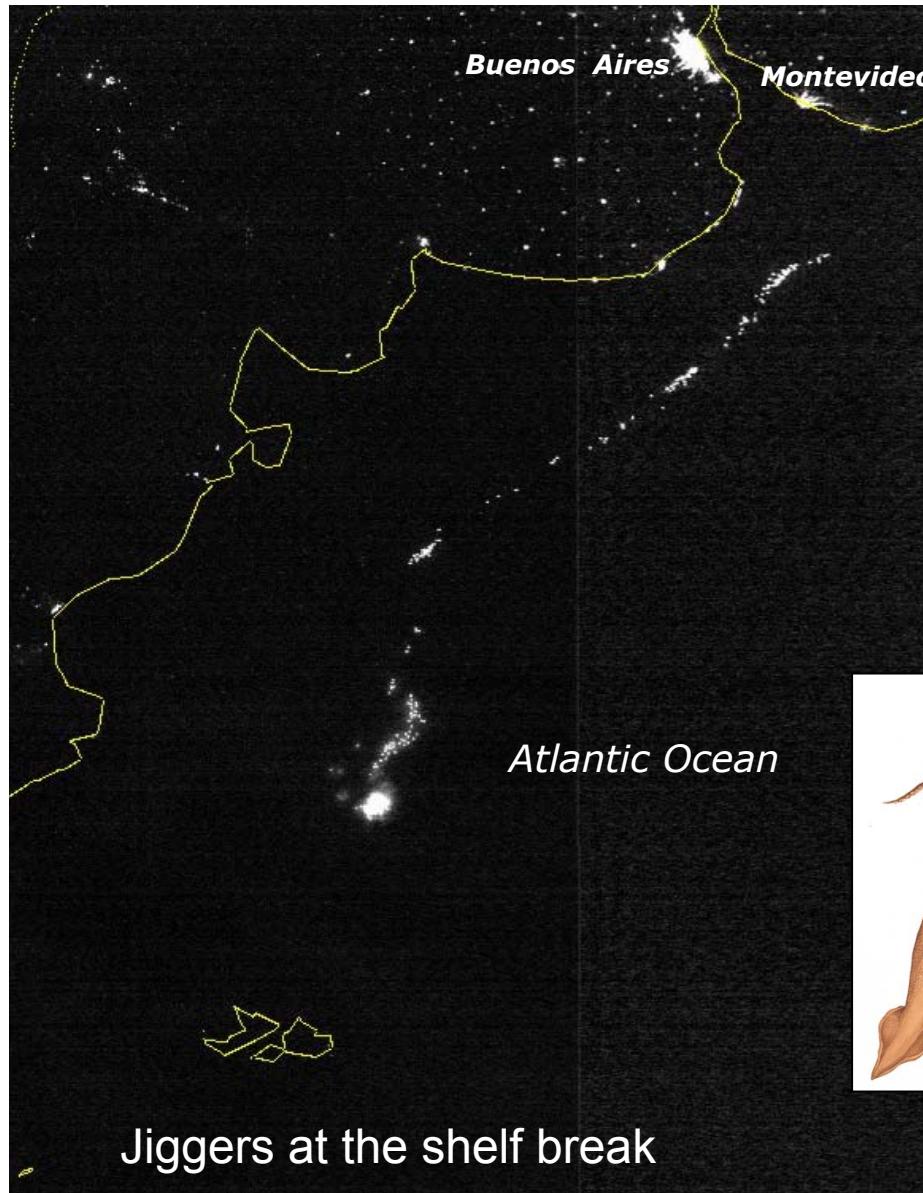


from Campagna et al., *Atlas Mar Patagónico.*, 2010

UNFCCC – 36th SBSTA , Bonn, May 2012

No night at the shelf break

Rodhouse, pers. comm., 2001



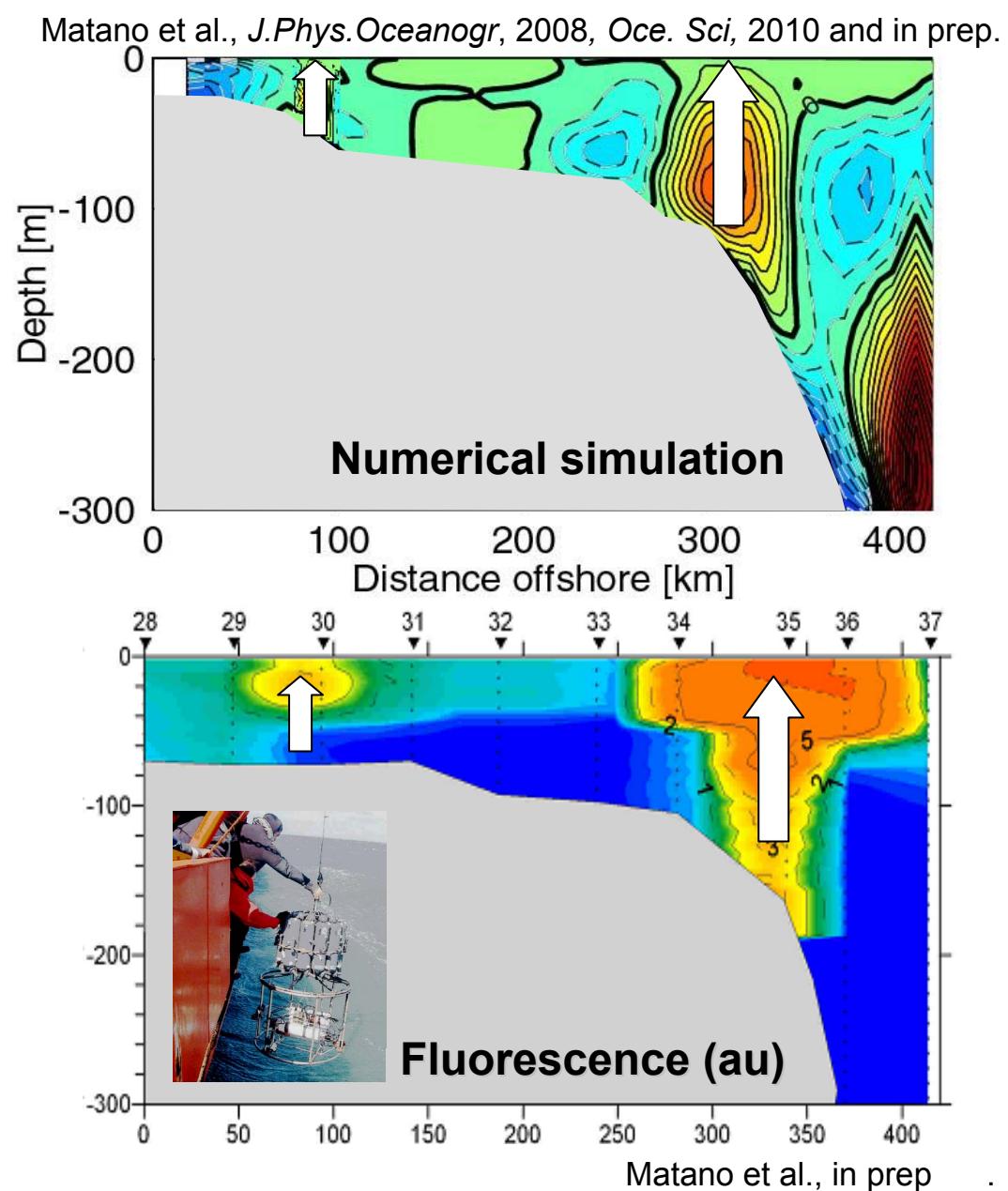
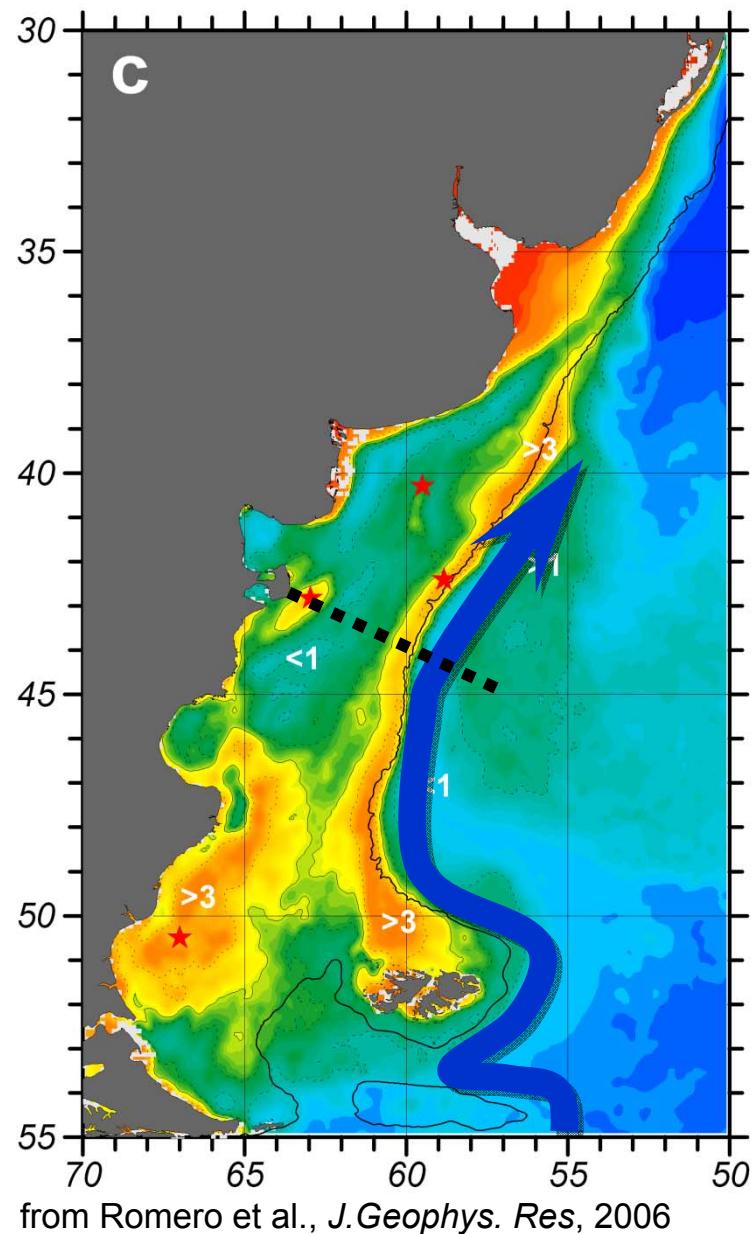


Why is the Patagonia shelf so productive?

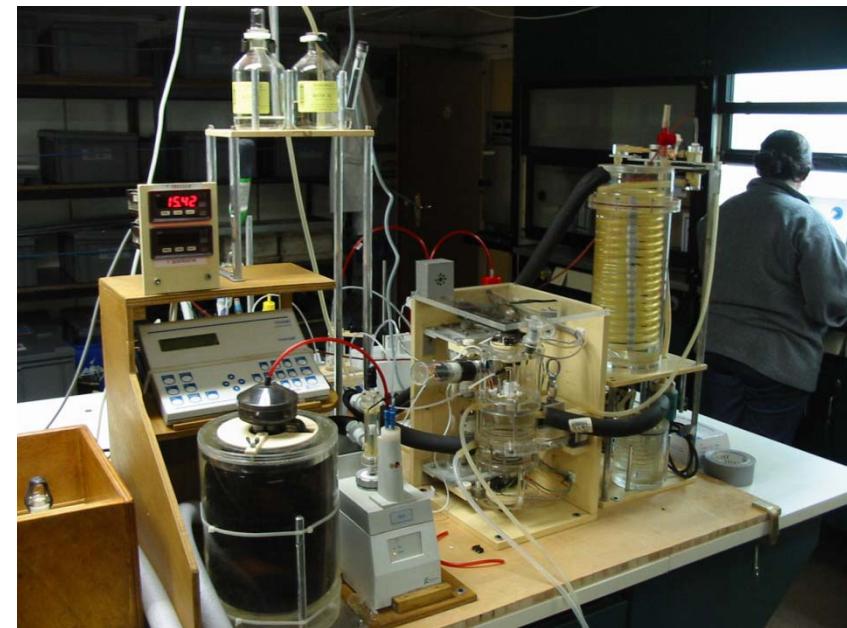
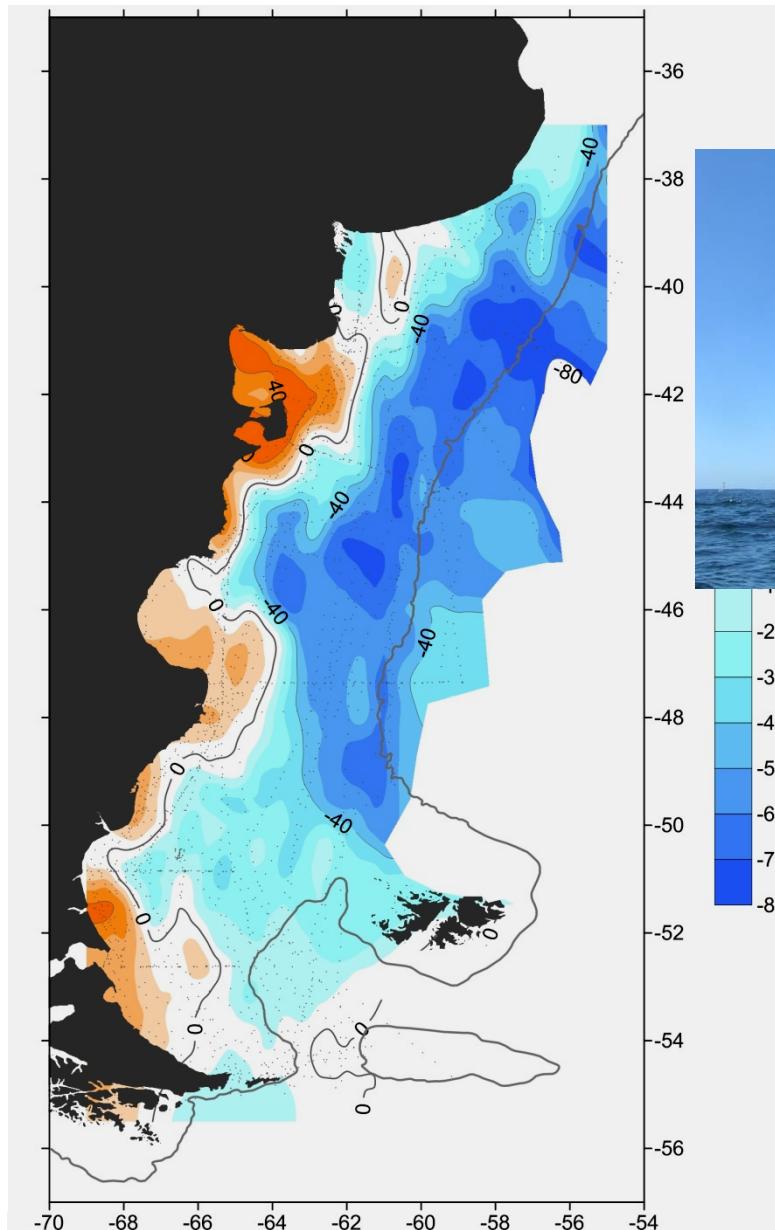
**What mechanisms control the nutrient fluxes
required to sustain the growth of
phytoplankton?**

**How may this marine ecosystem respond to
changes in the forcing factors?**

Processes: providing fertilizers for plant growth



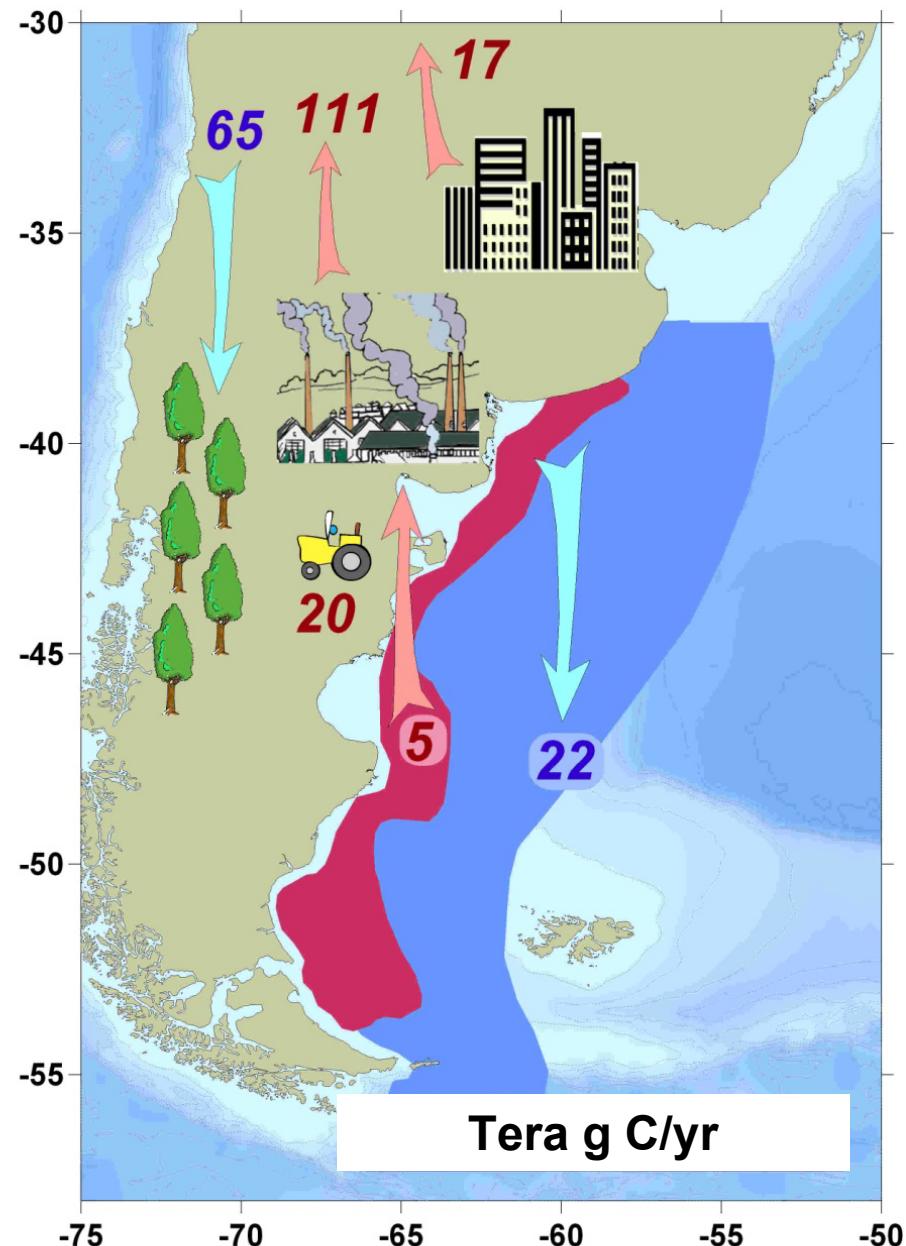
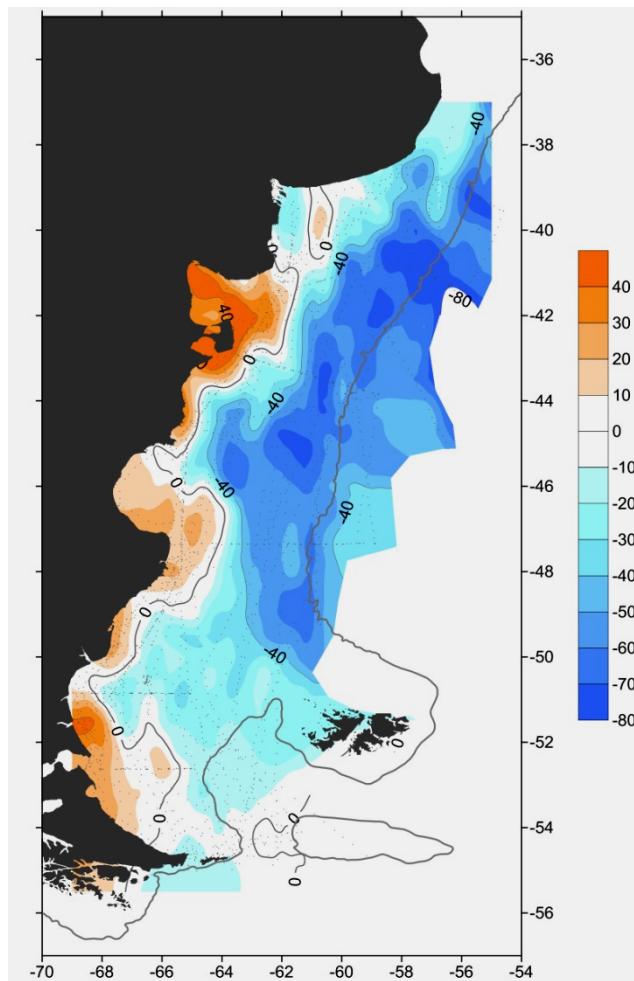
Ocean CO₂ observations



from Bianchi et al., *J.Geophys. Res.*, 2009, and in prep..

UNFCCC – 36th SBSTA , Bonn, May 2012

Ocean CO₂ uptake vs. land exchanges



A scanning electron micrograph showing a close-up view of a biological surface. The surface is covered with numerous small, hair-like cilia. There are also larger, irregular clusters of white, granular material scattered across the surface, possibly representing cellular debris or mucus. The overall texture is somewhat rough and organic.

Danke

Thank you

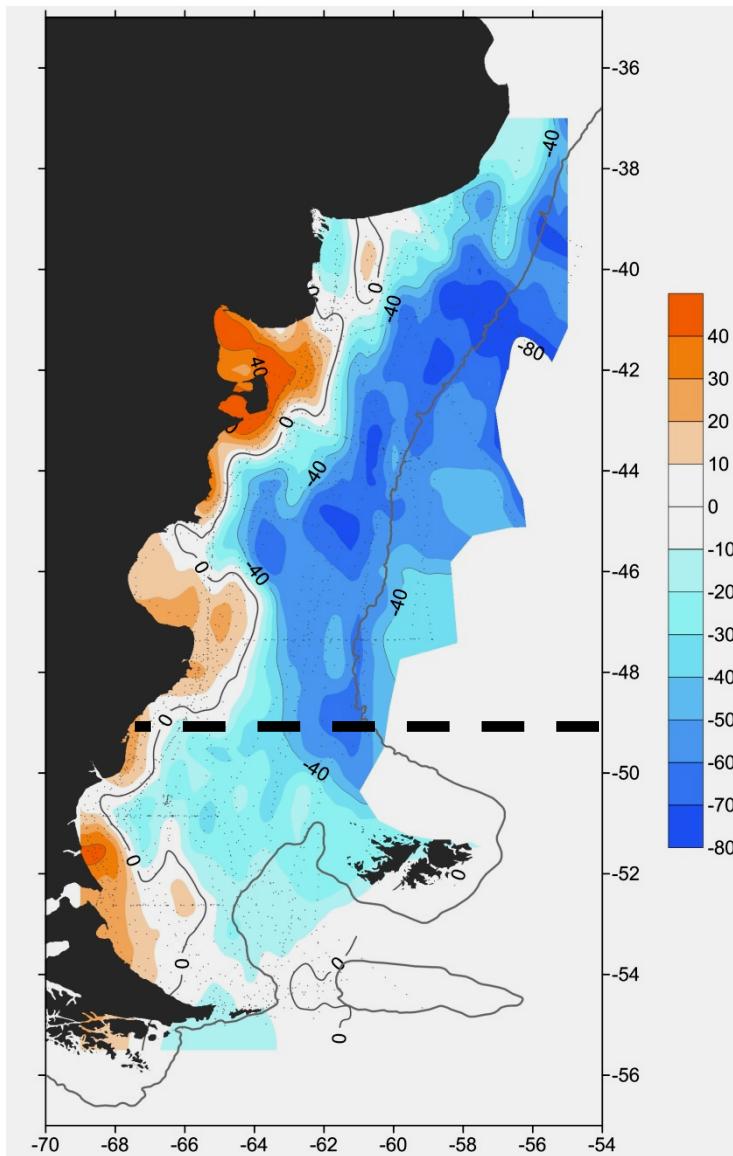
Obrigado

Gracias

10kV X2, 200 10 μm

10kV X100 1μm

Impacts in nutrient and CO₂ fluxes



Weaker winds

Reduced vertical mixing

Warmer surface ocean, less nutrients

Decreased CO₂ solubility

Reduced CO₂ uptake

Stronger winds

Stronger vertical mixing

Cooler surface ocean, more nutrients

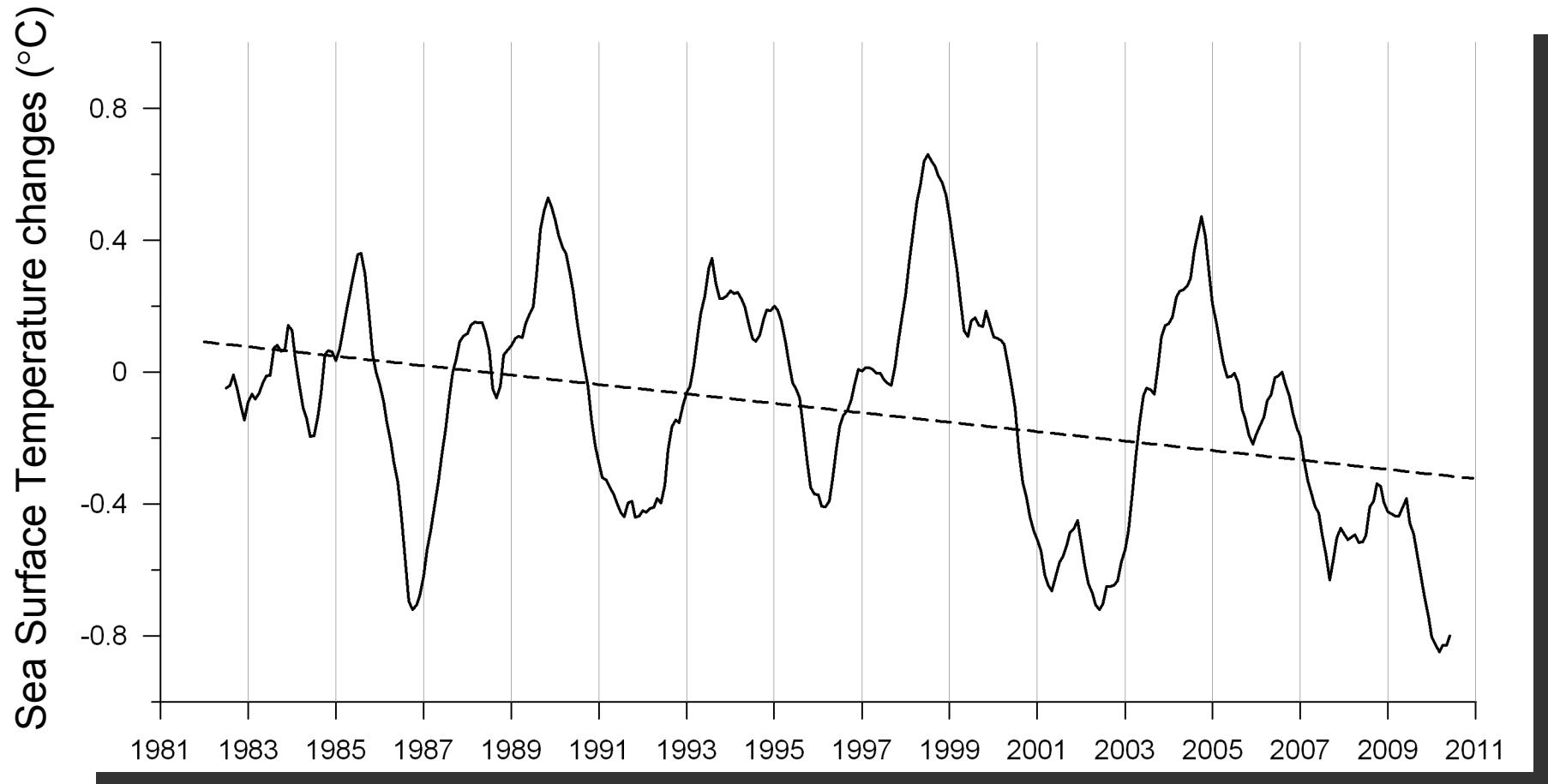
Increased CO₂ solubility

Stronger CO₂ uptake

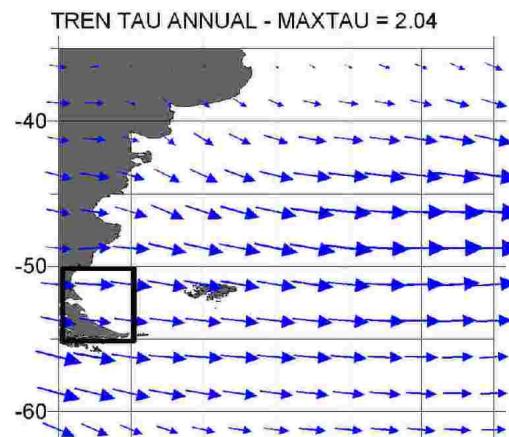
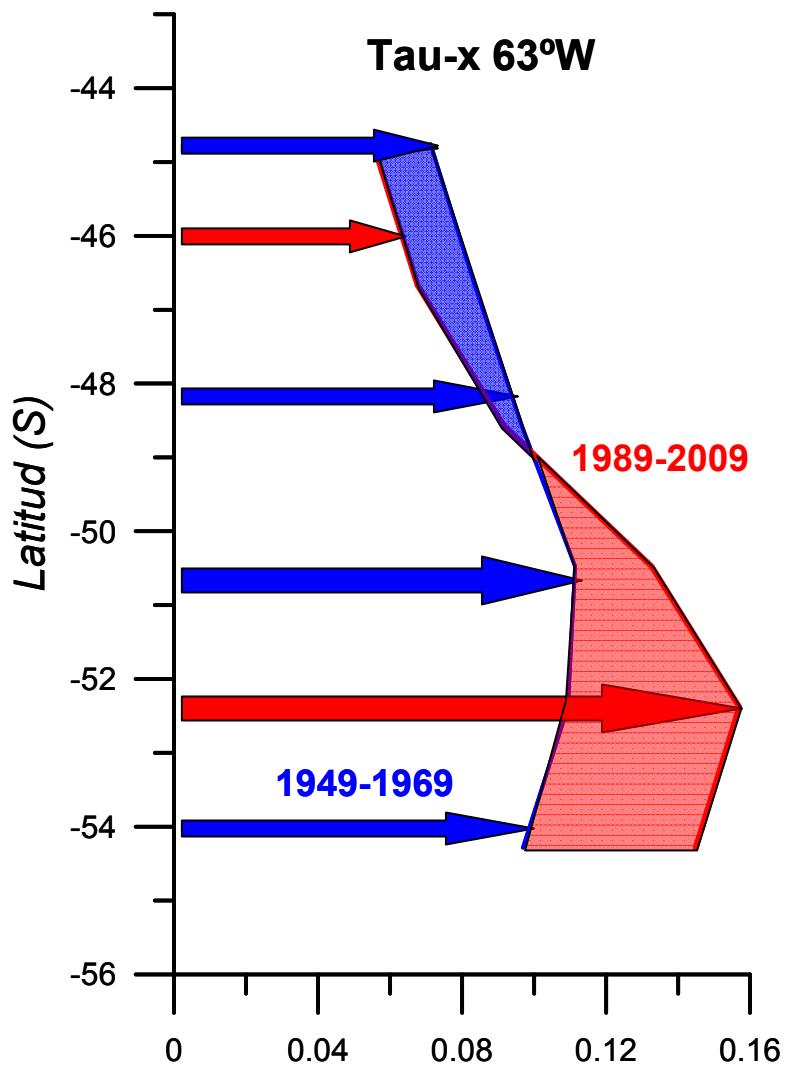
Changes in the forcing factors?



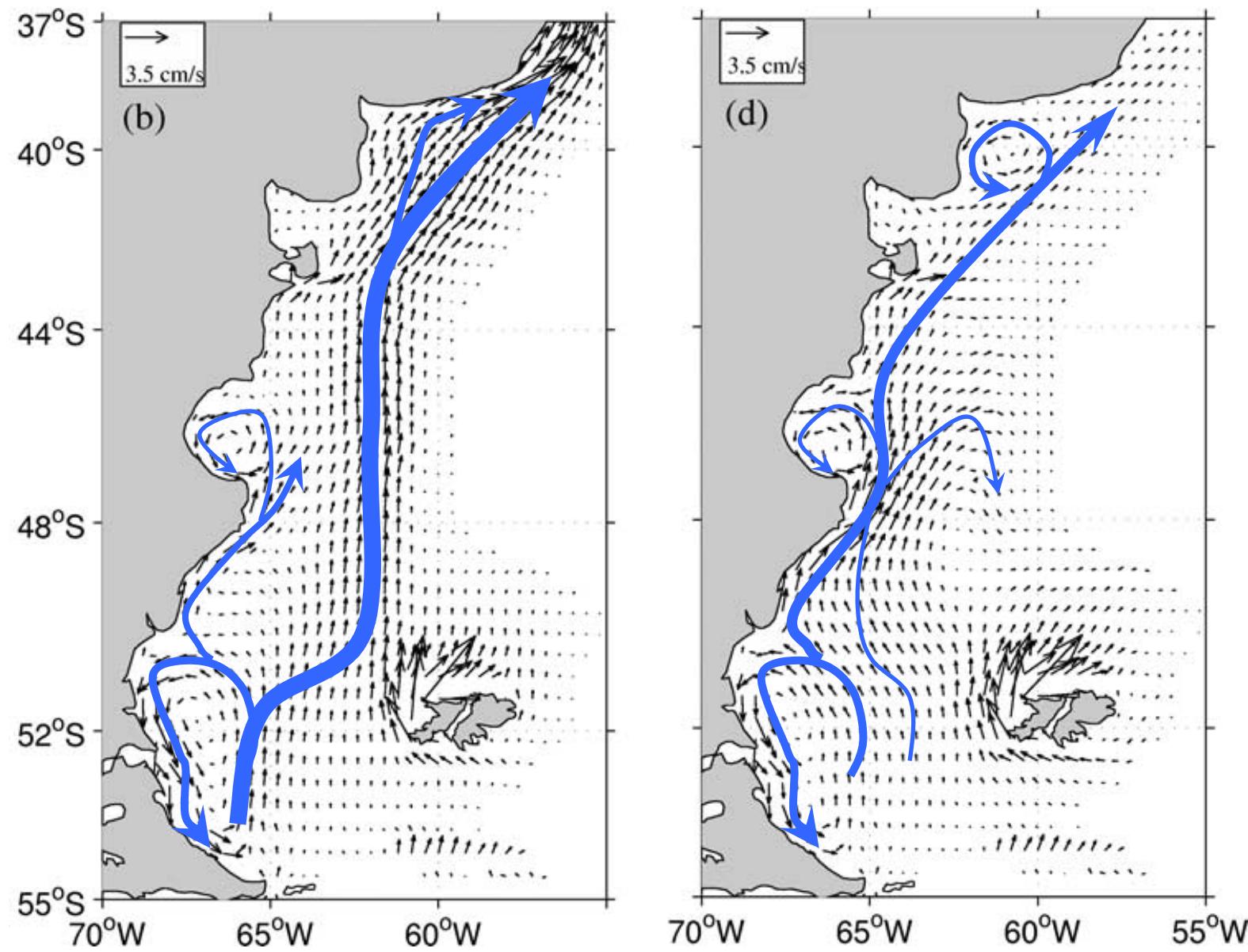
Unexpected changes in southern Patagonia



Changes in wind pattern



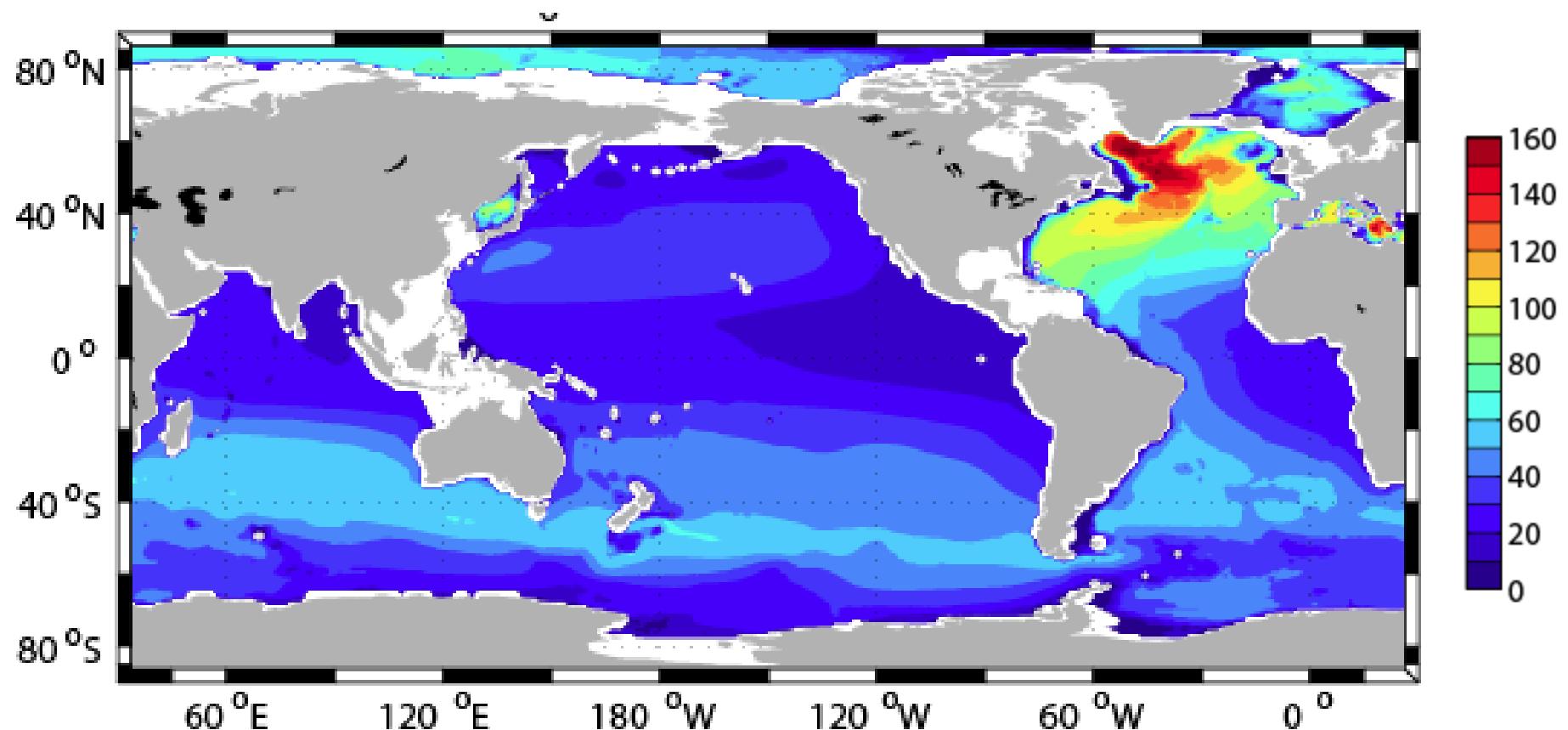
Impacts II – changes in the ocean circulation



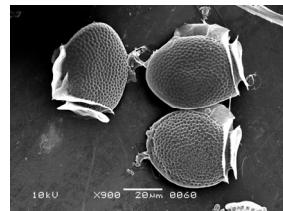
Water column inventories



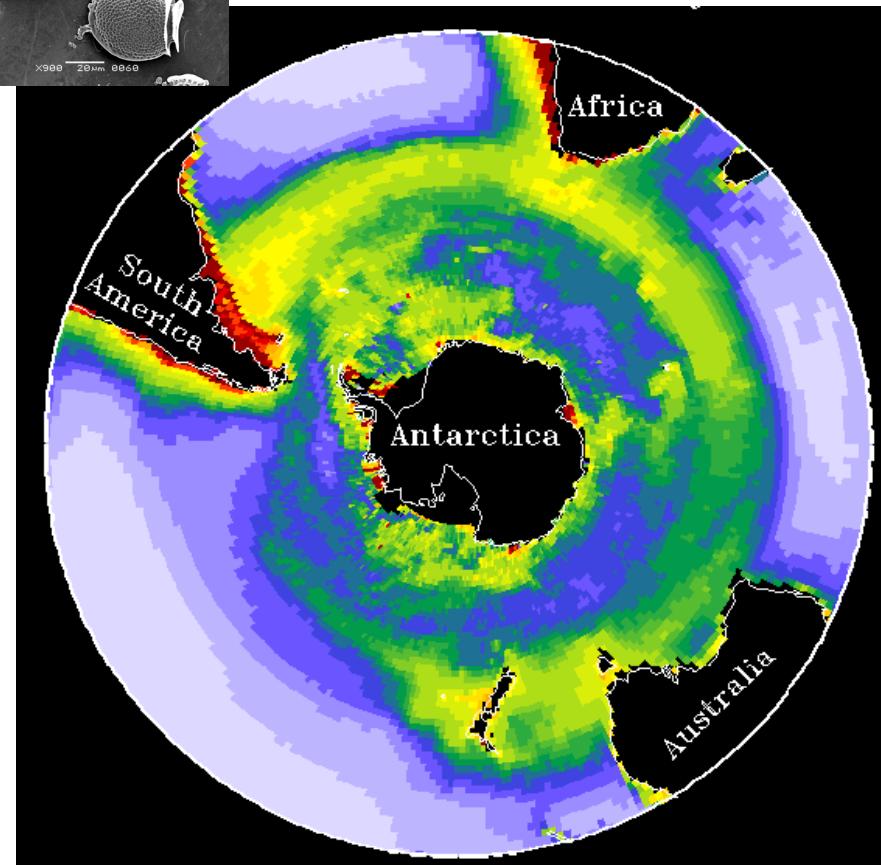
Anthropogenic CO₂



Ocean Productivity in the Southern Hemisphere



Biological Productivity



Surface Circulation

