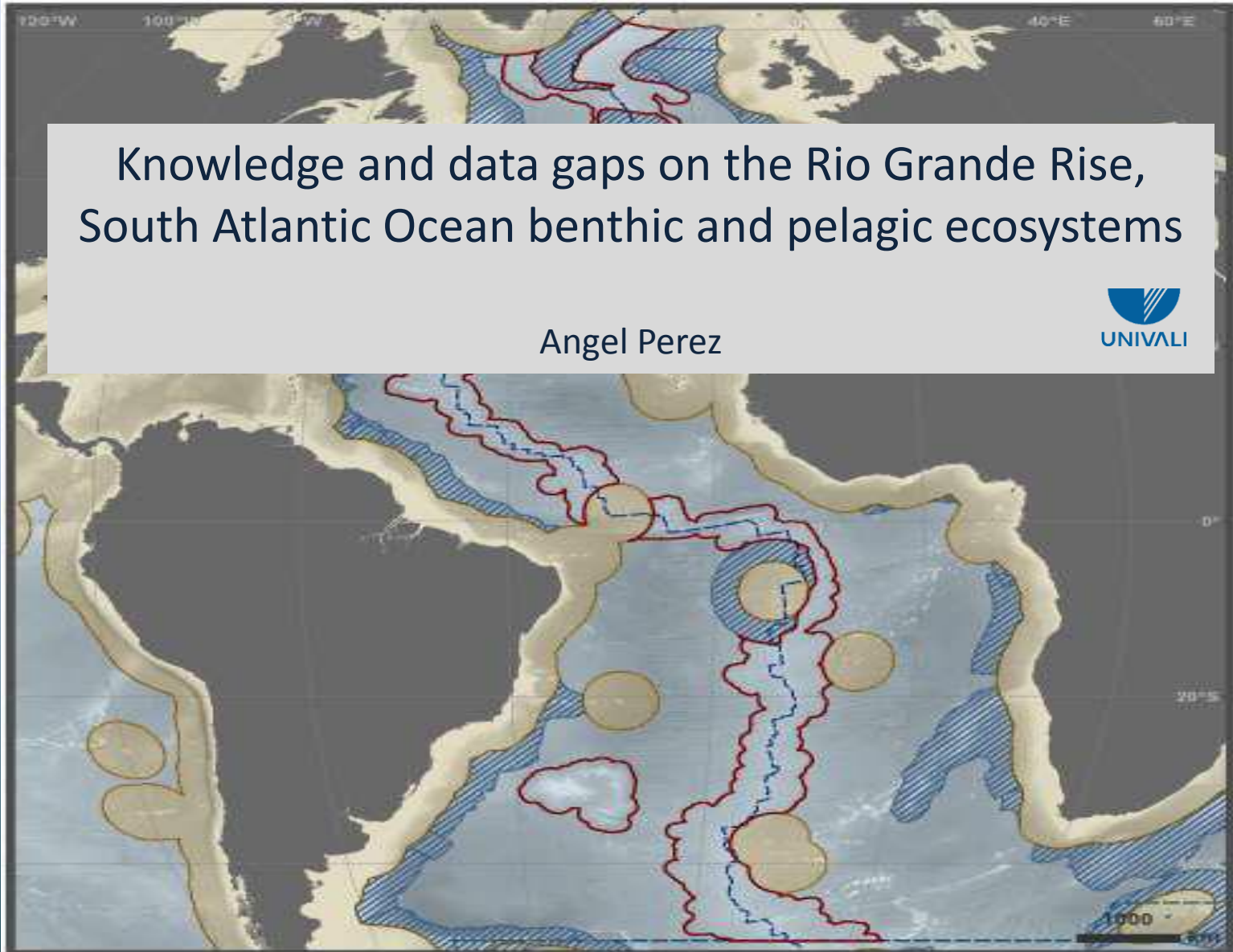


Workshop Towards the development of a strategic Environmental Management Plan for
deep seabed mineral exploration and exploitation in the Atlantic basin (SEMPIA)
1-3 June 2015, Horta, Azores, Portugal

Knowledge and data gaps on the Rio Grande Rise, South Atlantic Ocean benthic and pelagic ecosystems

Angel Perez



Origin

Origin of the Rio Grande Rise–Walvis Ridge reviewed integrating palaeogeographic reconstruction, isotope geochemistry and flexural modelling

NAOMI USSAMI, CARLOS ALBERTO MORENO CHAVES, LEILA SOARES MARQUES & MARCIA ERNESTO

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**Corresponding author (e-mail: nussami@usp.br)*

89 – 78 Ma - On-ridge intense basaltic volcanism



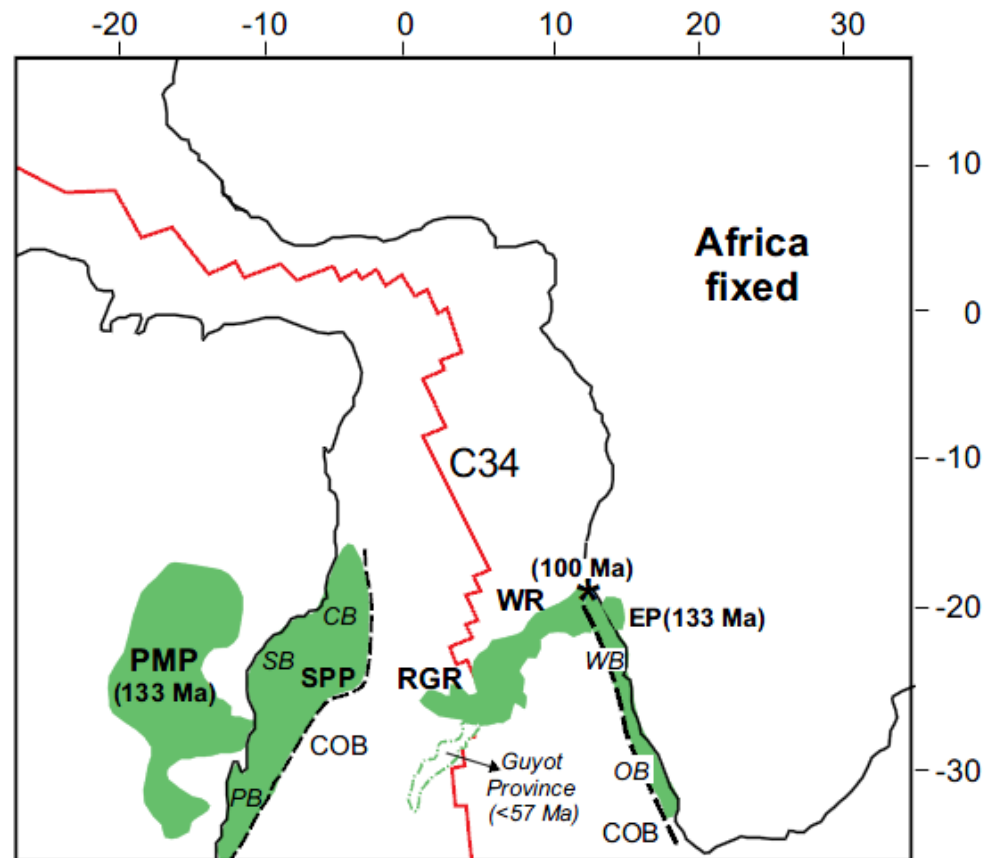
Atlantic expansion - Separation from Walvis Ridge - Thermal subsidence,



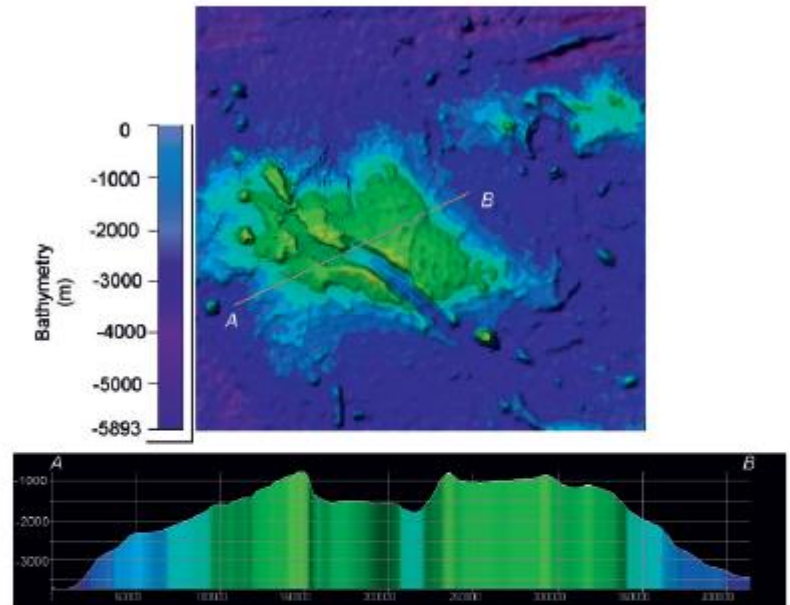
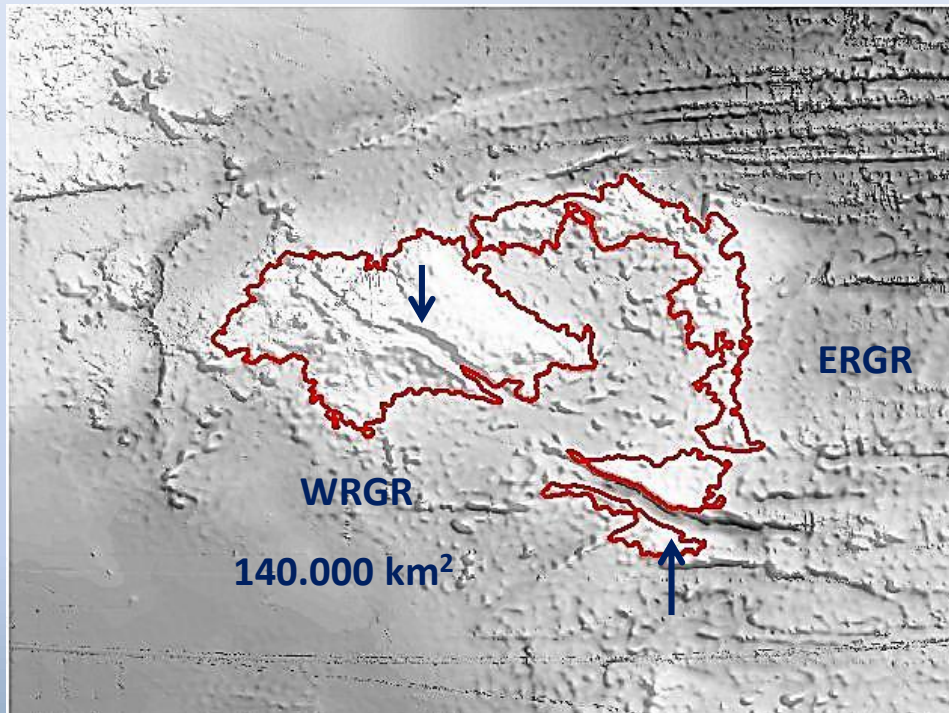
Eocene (30-50 ma) - RGR underwent alkaline vulcanism - Formation of seamounts and guyots - uplifted above the sea level



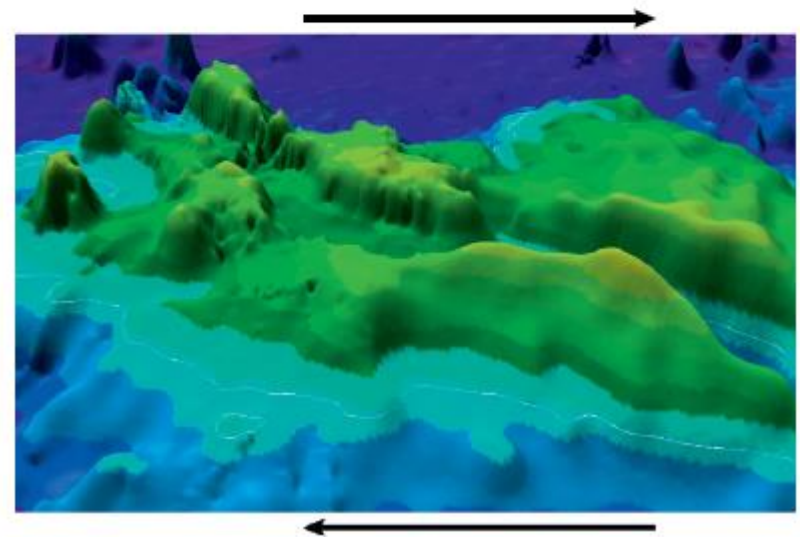
Erosion - shallow water sedimentation - subsidence



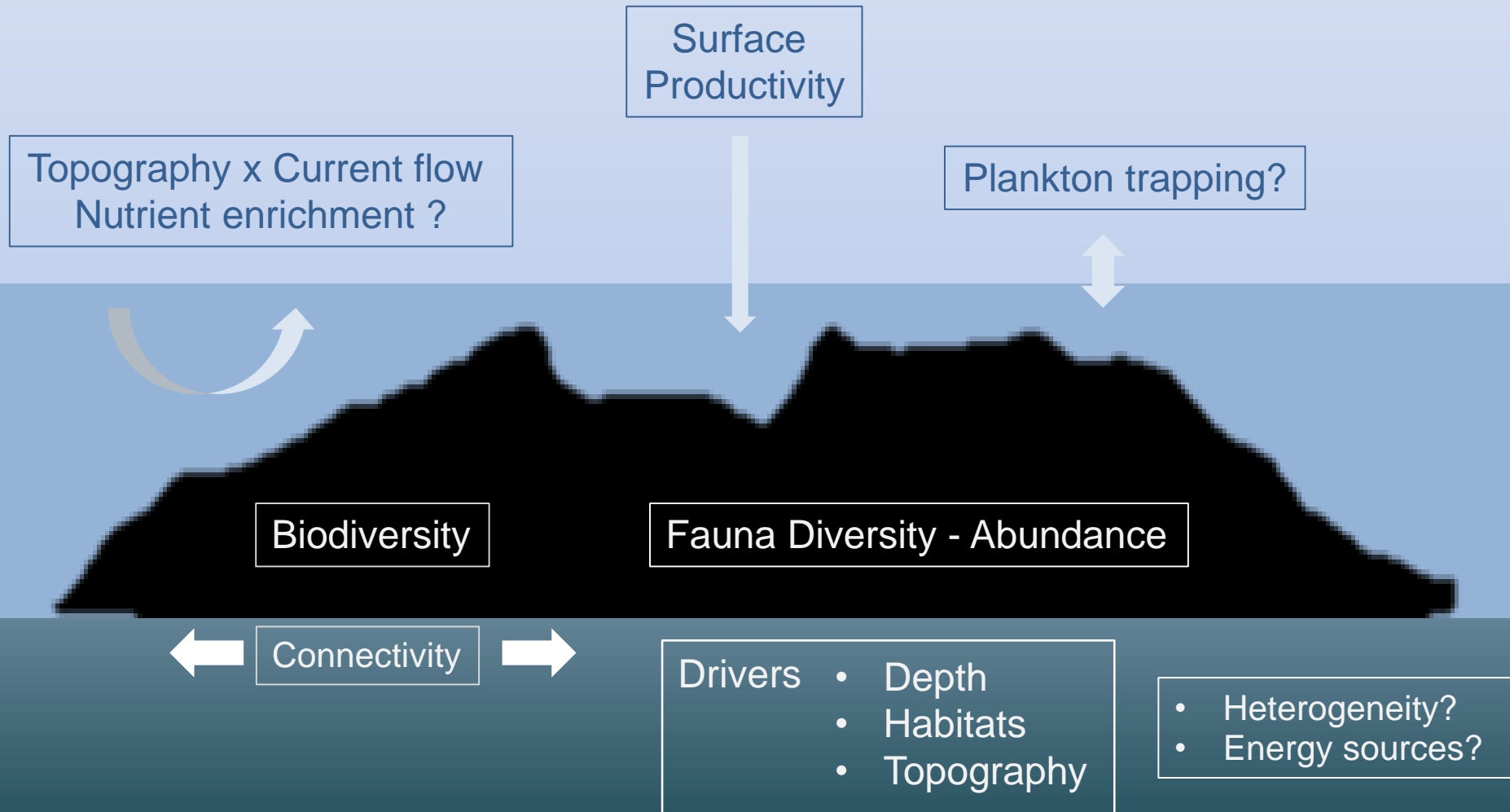
W. U. Möbiak et al.



- Complex topography: Western – Eastern components
- **Western** – Large Elyptic Bulge (1.5 the area of Portugal!)
- 5km above ocean basin – plateau 600 m deep
- On plateau: NW – SE troughs: “*grabben*” over plateau



Questions



Studies in the RGR



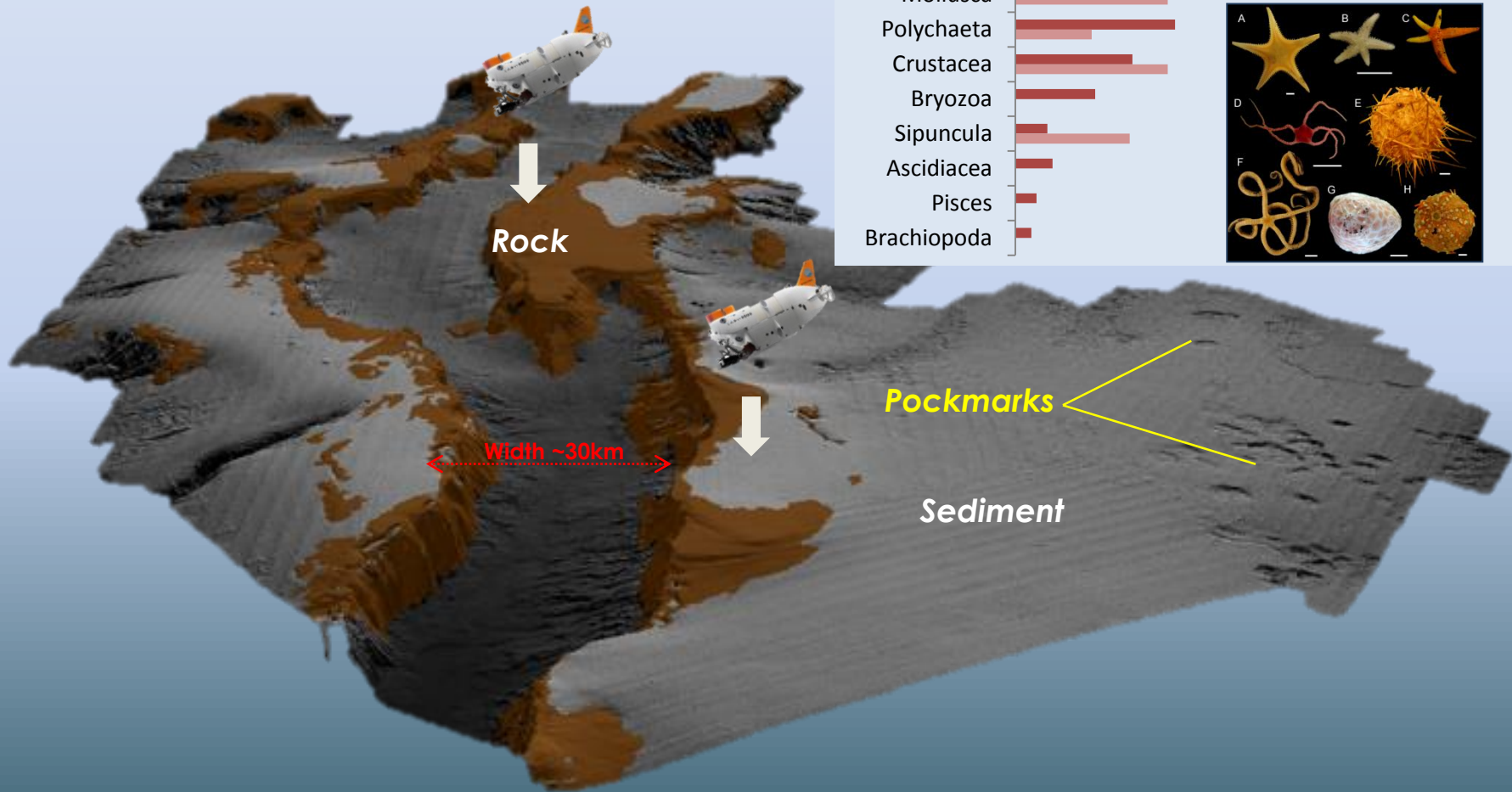
2011-12



2011



Benthic & Benthopelagic Fauna

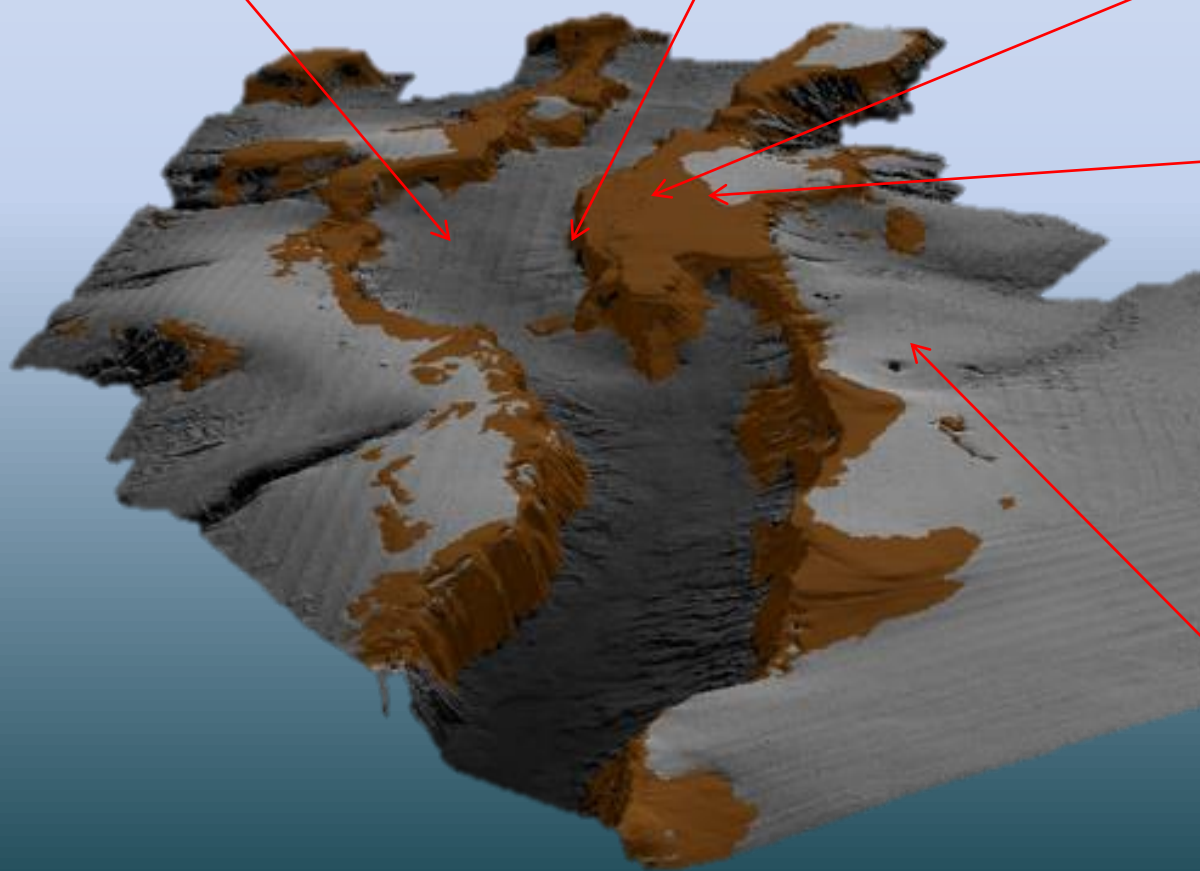




Grabben Bottom 1200m

Grabben Wall 1000-800m

Summit - Crust 800-600m



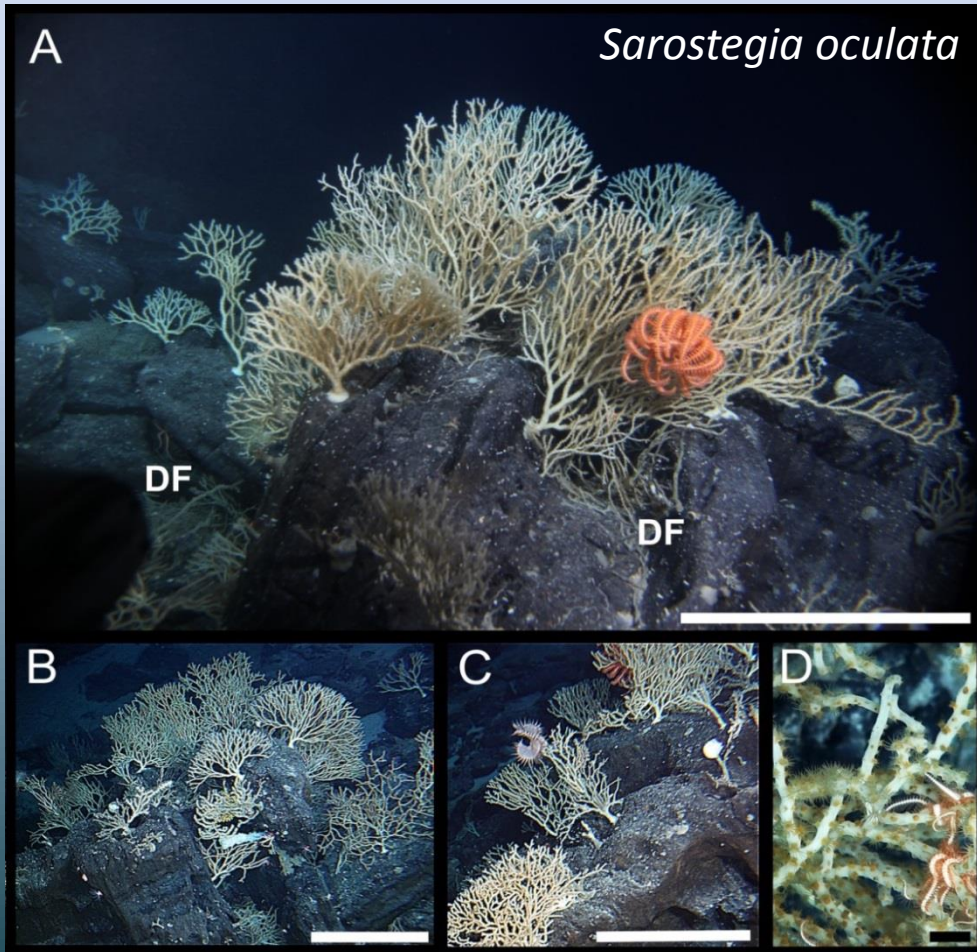
Summit - Carbonate Rock 600m



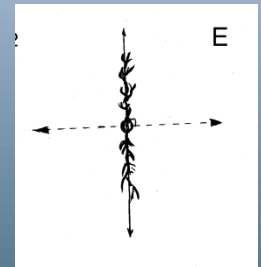
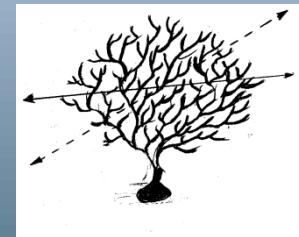
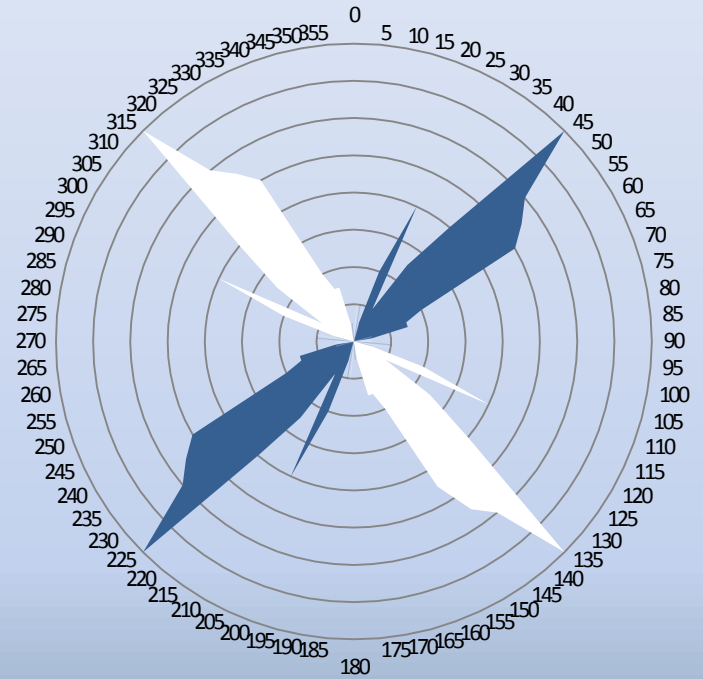
Summit - Sediment 1000m



Hajdu et al. (submitted)

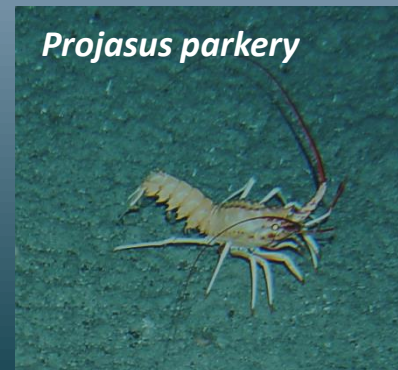
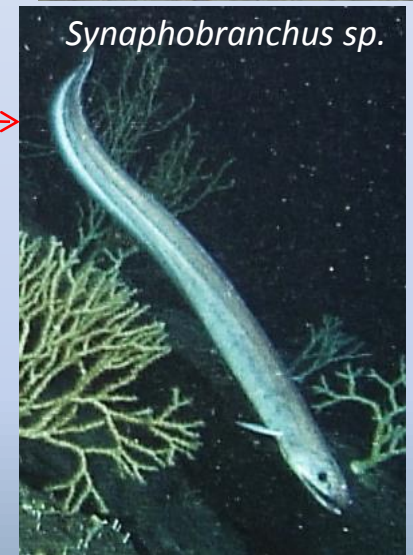
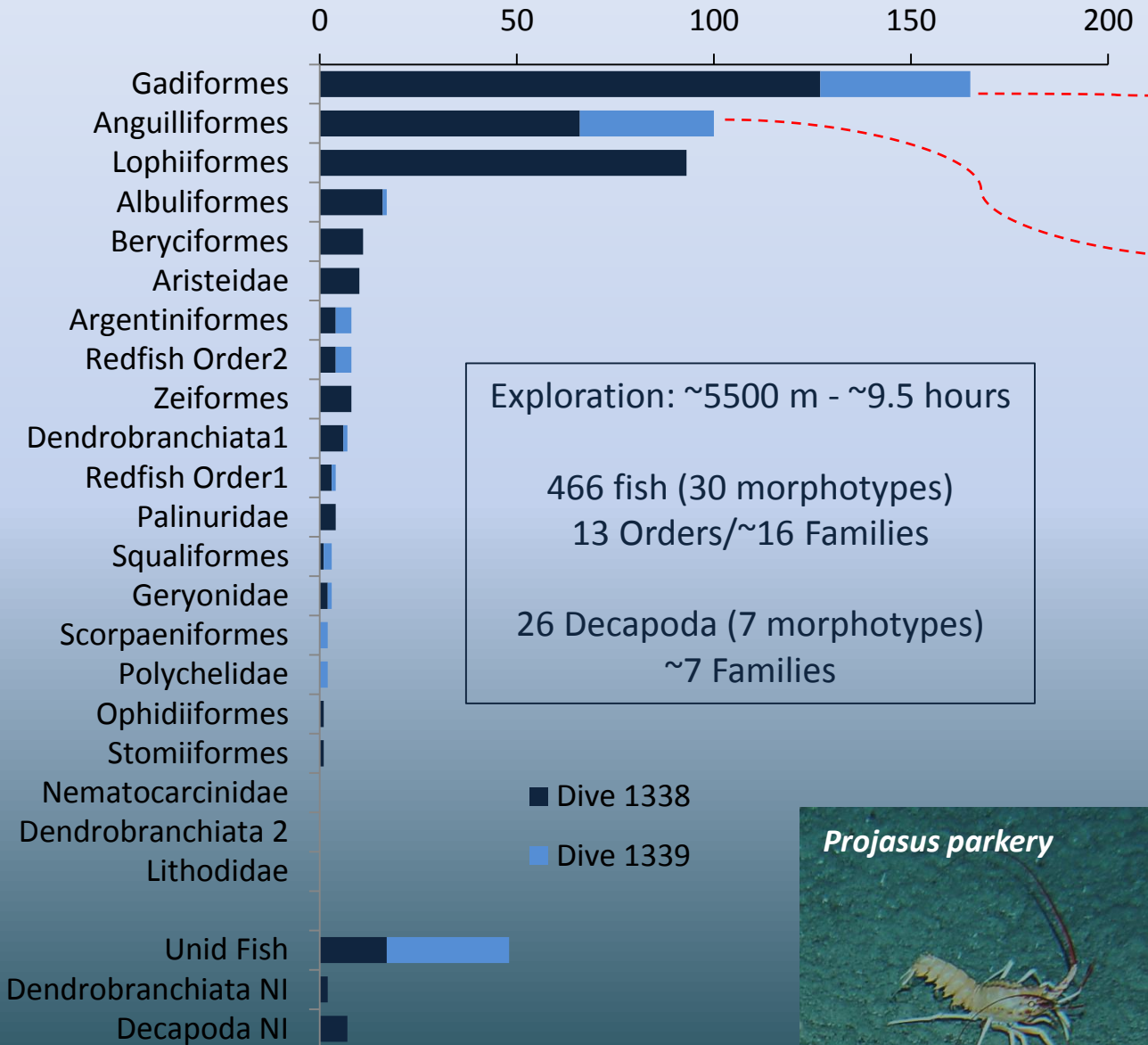


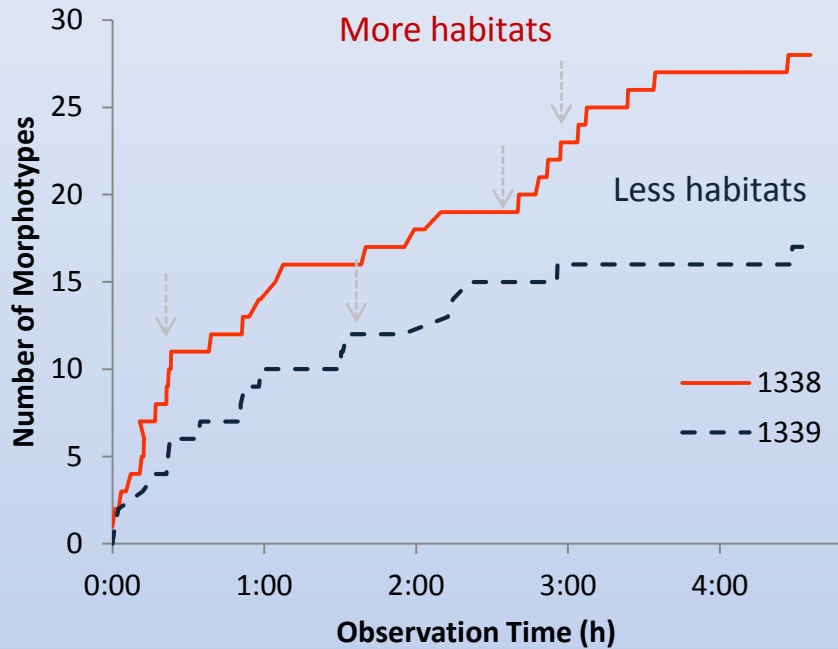
Perez et al. (submitted)



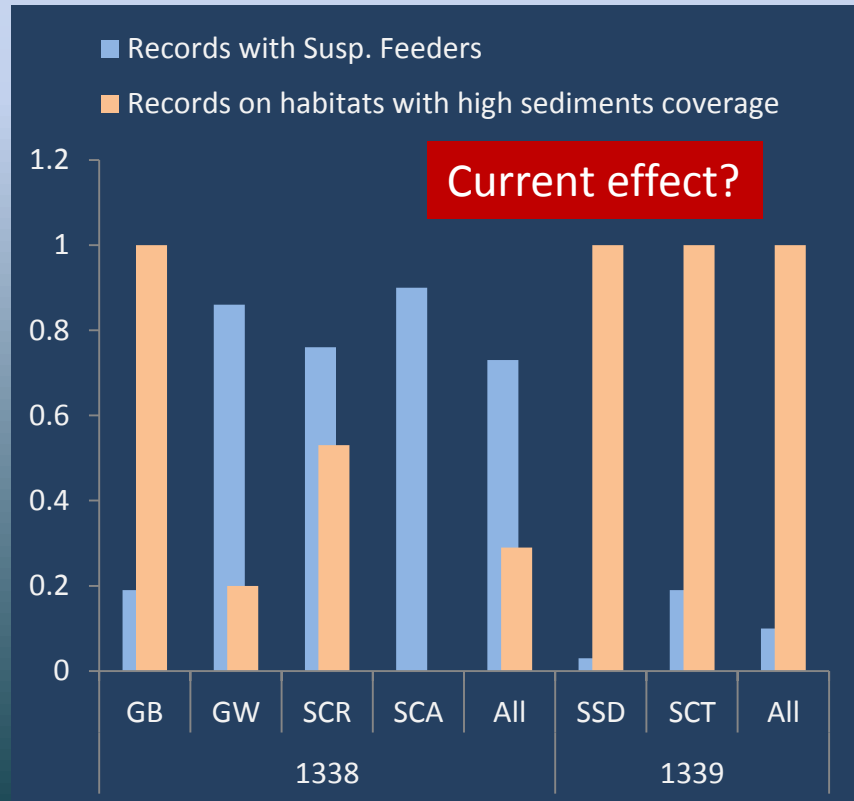
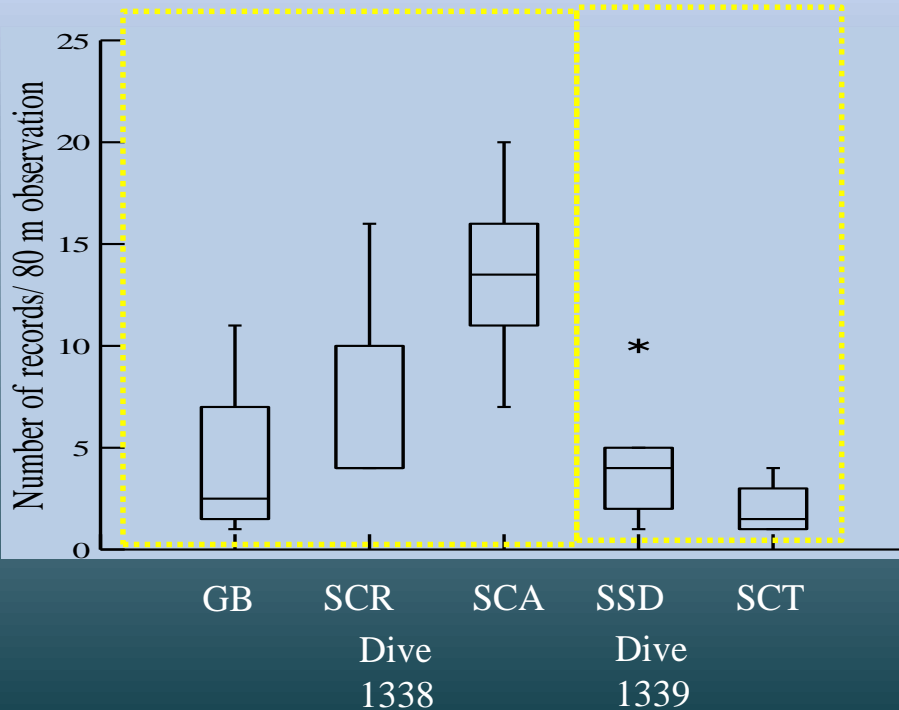
Regular plane of growth ($n=85$, $r = 0.97$)
Regular current direction (313°)

Megafauna: Fish & Crustacean (video analysis)



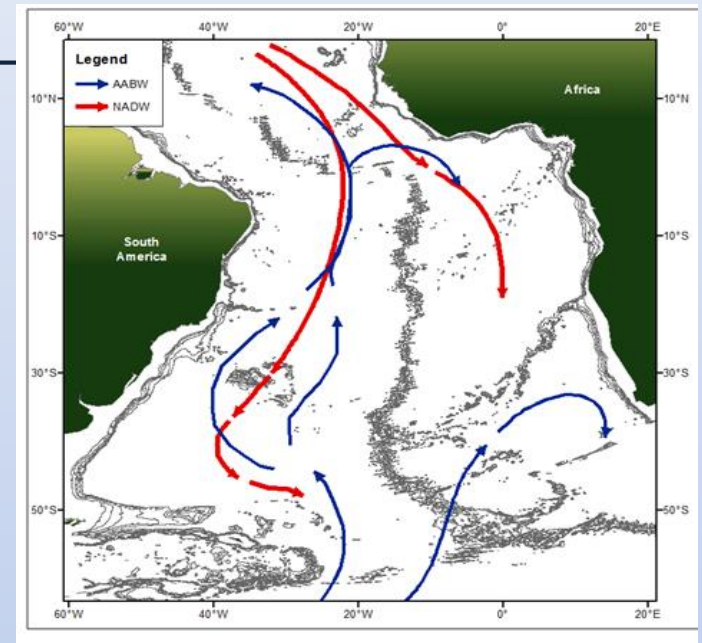


- Fish and crustacean community composition vary significantly among habitats (ANOSIM $p = 0.001$)
- 40 – 60% “species turnover” between adjacent habitats
- Two diving sites differed in abundance (<0.001)

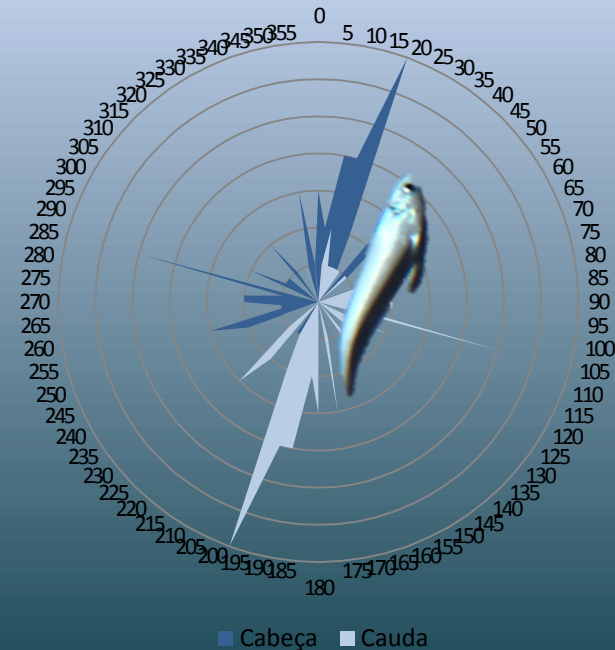
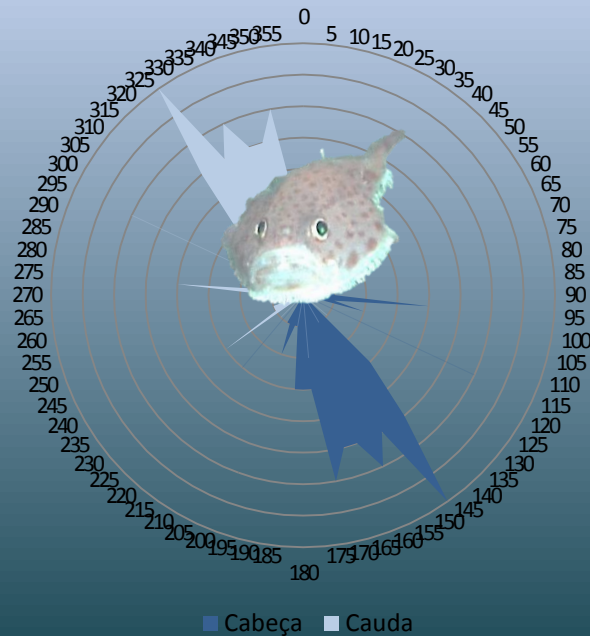


Megafauna: Hypothesis

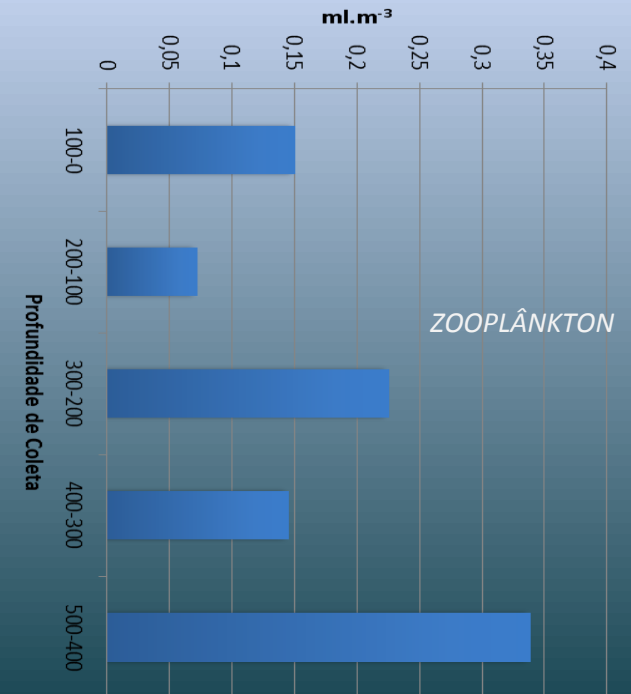
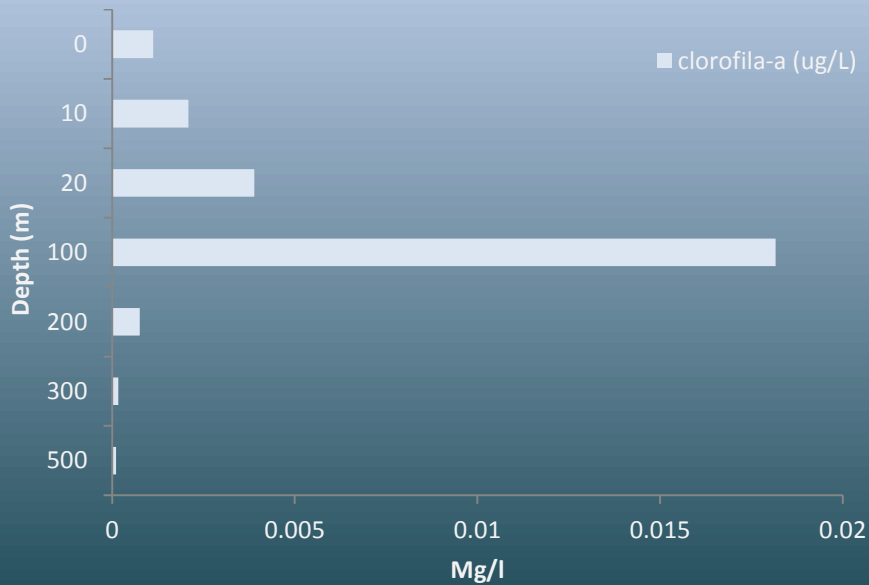
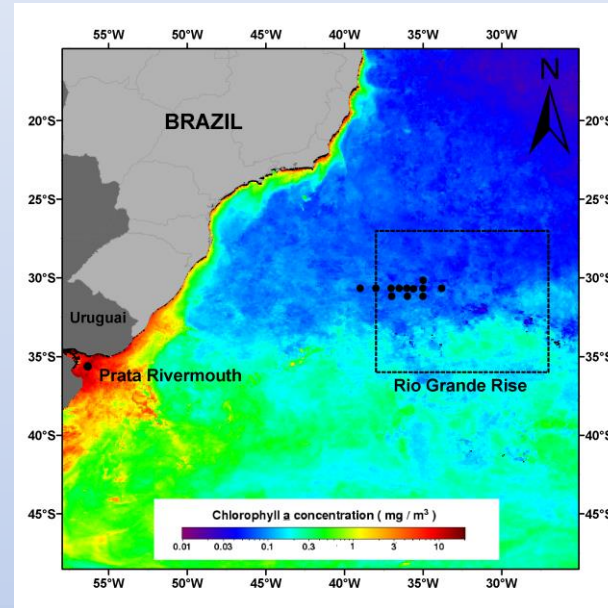
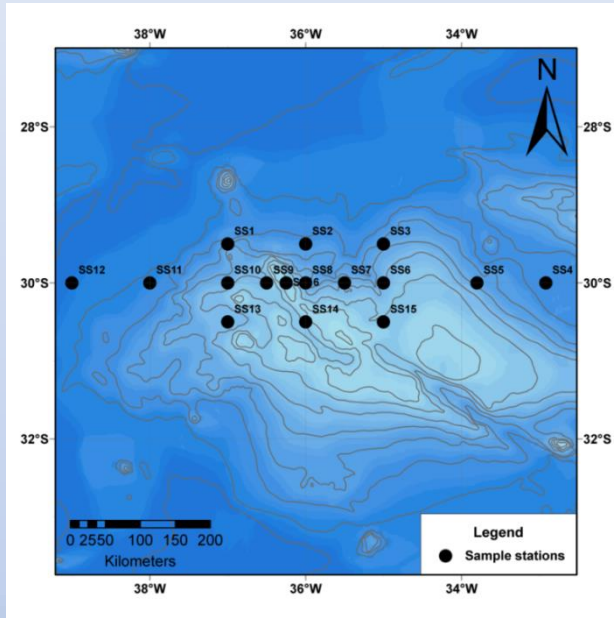
- RGR sectors exposed to intense/ regular current regime – many suspension feeders concentrate OM (Sponges) - increased fauna abundance
- RGR sectors where current regime is less intense/regular – more sediments – less suspension feeders – less fish/crustacean abundance
- Fish react to current regime in different ways.



Current direction
(as derived from sponge
growth plane)

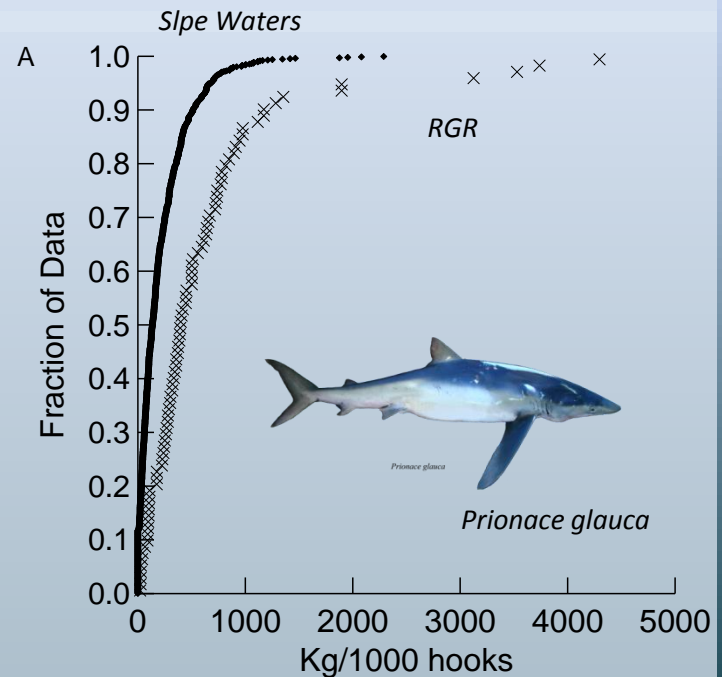
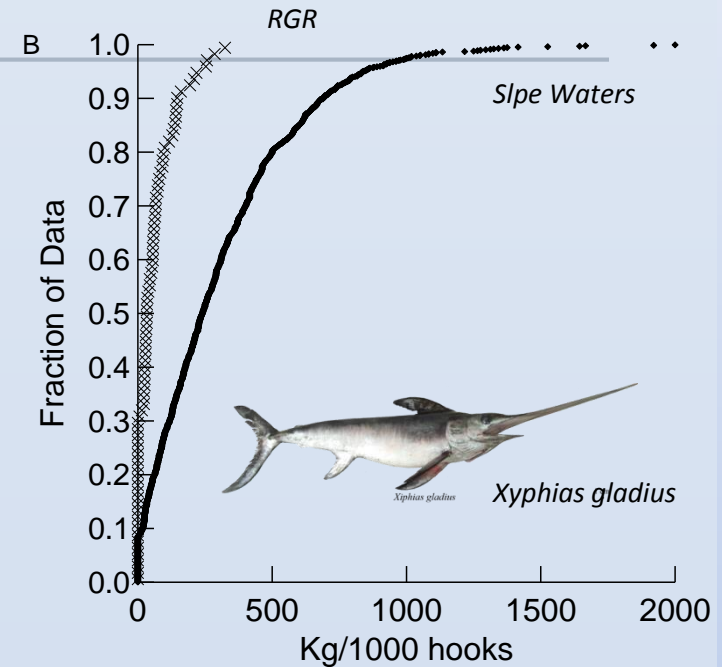
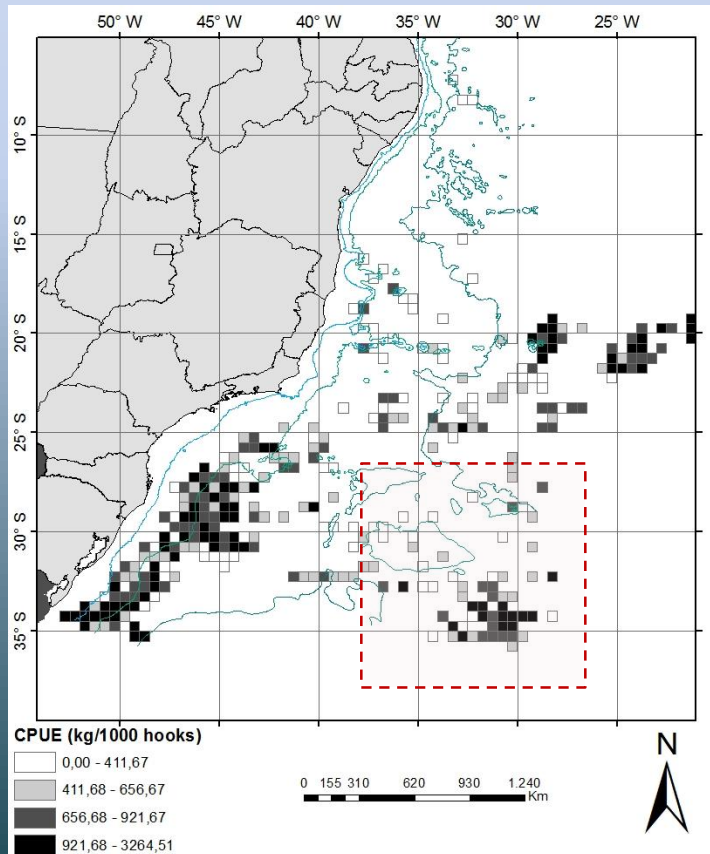


Pelagic Ecosystem



Top Predators

- Brazilian longliners concentrate on slope waters aiming at Swordfish
- Long Distance operations on SE RGR - targeting at large concentrations of blue shark
- Food concentration does not seem to be the driver of those concentrations – life cycle?



Final Remarks

- Understanding biological community structure in RGR is becoming critical as Brazil has applied for exploration of Cobalt-rich Ferromanganese Crusts – 2015 onwards
- Plan of Work – First Phase (5 years) – Series of Oceanographic Cruises planned to build Environmentl Baselines
- Ecological Questions will be addressed in a specific sampling program

International Seabed Authority

ISBA/20/LTC/2



Legal and Technical Commission

Distr.: Limited
8 January 2014

Original: English

Twentieth session
Kingston, Jamaica
14-25 July 2014

Application for approval of a plan of work for exploration for cobalt-rich ferromanganese crusts by the Companhia de Pesquisa de Recursos Minerais S.A.

6. Brazil proposes that the exploration be conducted over a period of 15 years, covering a total area of 3,000 km², divided into 150 blocks of 20 km² each. Besides the activities of collecting mineral data, it will include the development of oceanographic and environmental studies and assessments. The Brazilian plan of work is divided into three phases of five years each, as follows:

(a) Phase I (years 1-5): prospecting on a regional scale with a view to defining the target areas and collection of environmental parameters;

(b) Phase II (years 6-10): evaluation of the mineralogical, structural and geomorphological and environmental characteristics of the areas of interest, as well as the necessary geological and geophysical surveys for detailing the mineral resource;

(c) Phase III (years 11-15): selection of areas for economic, environmental and technical viability of mineral deposits, as well as evaluation of ore recovery systems, with a view to possible adaptation of the plan of work and the development of exploitation activities, in accordance with specific regulations to be approved by the Authority in the future.