ALFRED-WEGENER-INSTITUT
HELMHOLTZ-ZENTRUM FÜR POLAR- UND MEERESFORSCHUNG

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Glass sponge environments in the Weddell Sea, Antarctica

Motivation & Objective

Glass sponges (Porifera, Hexactinellida), one of the oldest existing animal groups[1], play an important ecological role in Antarctic shelf regions. These marine sessile filter feeders can form vast sponge beds and dominate the benthic biomass in some areas[2]. They provide habitat for a diverse associated fauna[3,4] and play a significant role in silicon cycling[5] and bentho-pelagic coupling[6].

It is still unknown, however, which factors determine their distribution and, therefore, how environmental changes may affect glass sponge communities. The aim of our study was to characterize environments with and without glass sponges and to identify the determining parameters.

Methods

We conducted video transects with a remotely operated vehicle (ROV) and measured various environmental parameters at corresponding stations in the Weddell Sea during expedition PS82 with RV Polarstern in January/February 2014. To gain a first impression of glass sponge abundance, 20 images from the first hour of each of six transects were randomly extracted, measured and animals were counted.

Temperature was derived from CTD measurements and water samples were analyzed for dissolved silicate (dSi) concentration and bacteria abundance. All results shown here are preliminary.

Results

Station A (12.5 m²)
- Depth 410 m
- Gravel/mud/debris
- Strong current

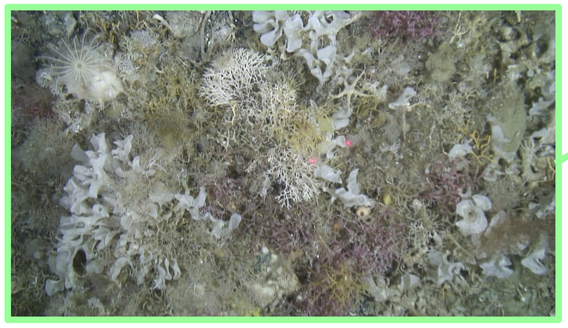
➢ **No sponges, few cnidarians and mobile benthos**

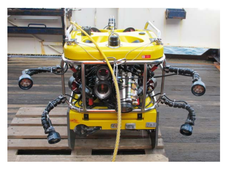
Station B (14.4 m²)
- Depth 220 m
- Spicule mats/debris

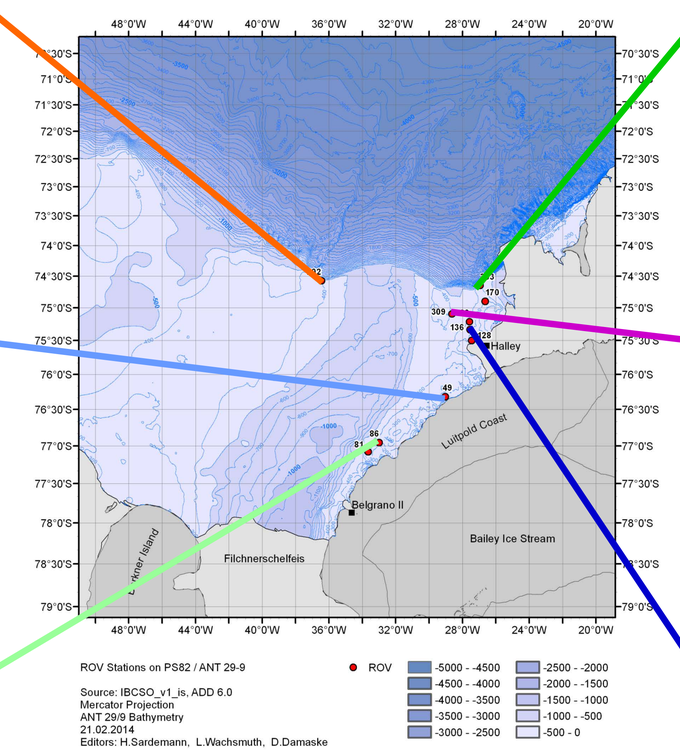
➢ **Many sponges, bryozoans, ascidians, octocorals and echinoids**

Station C (10.7 m²)
- Depth 280 m
- Gravel/stones

➢ **Extremely high bryozoan cover, many sponges with holothurians and crinoids**

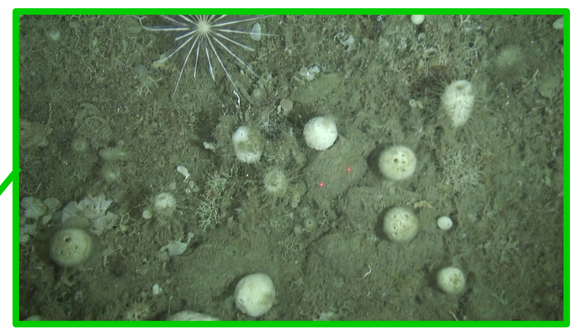






Station D (9.6 m²)
- Depth 410 m
- Sponge spicule mats

➢ **Large numbers of sponges, esp. tiny individuals, many asteroids, incl. sponge predators**



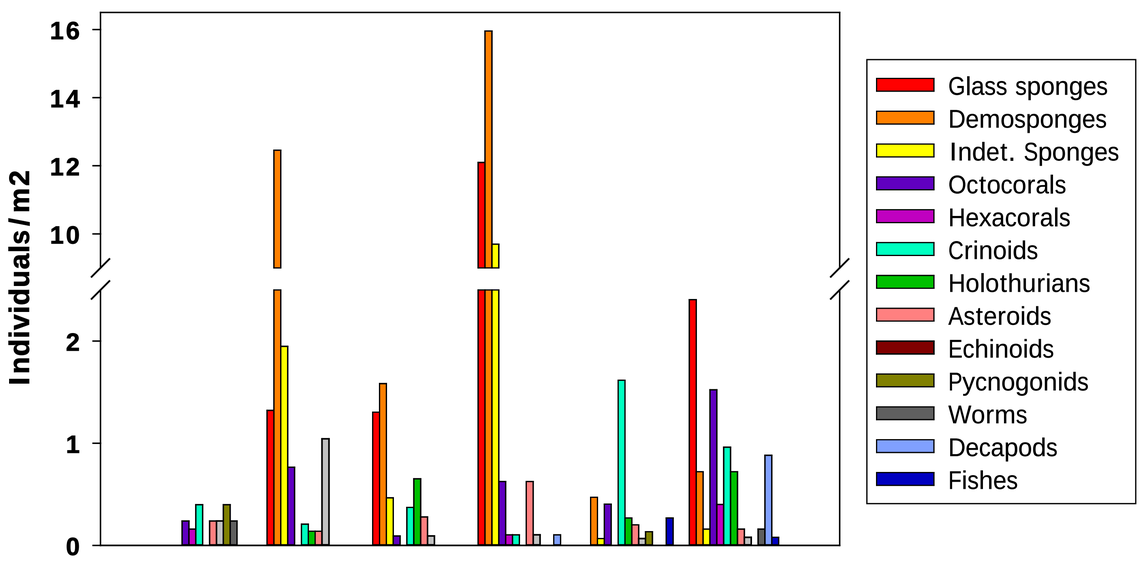
Station E (14.8 m²)
- Depth 440 m
- Mud

➢ **No glass sponges, few demosponges and octocorals, many crinoids and fishes**

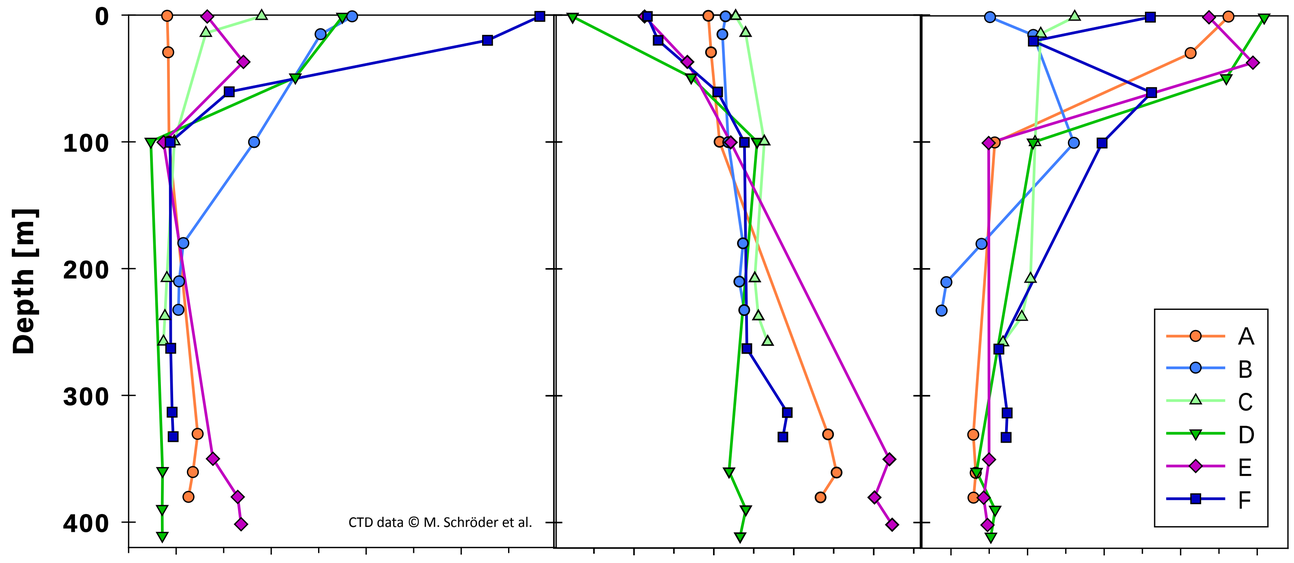
Station F (12.5 m²)
- Depth 330 m
- Mud/few stones

➢ **Many ind. of one glass sponge species, many cnidarians and mobile animals**

Community composition and abundances

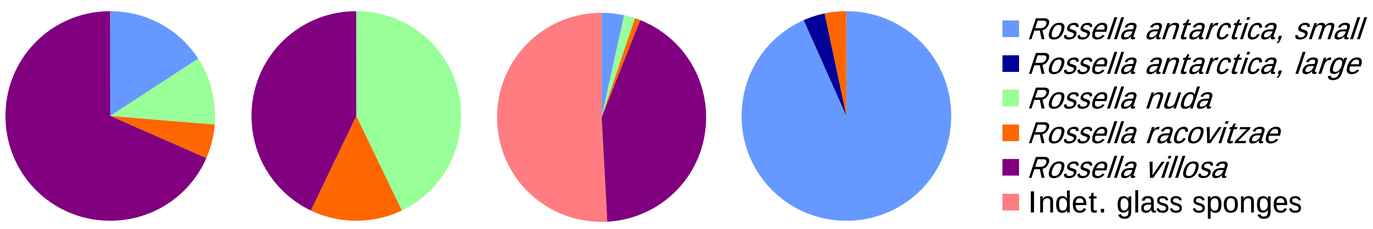


Environmental factors: Temperature, dissolved Silicate, Bacteria



Glass sponge diversity

B: 1.32 Ind/m² **C:** 1.30 Ind/m² **D:** 12.1 Ind/m² **F:** 2.41 Ind/m²



Conclusions

➢ Bottom water temperatures and dissolved silicate lower at stations with glass sponges than at stations without them

➢ No obvious differences in bottom water bacteria abundance between stations

➢ Highest sponge diversity at stations with hard substrate or sponge spicule mats

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