



Deep-sea benthic megafaunal communities at the Great Meteor seamount complex

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Direção Regional dos Assuntos do Mar

U.PORTO

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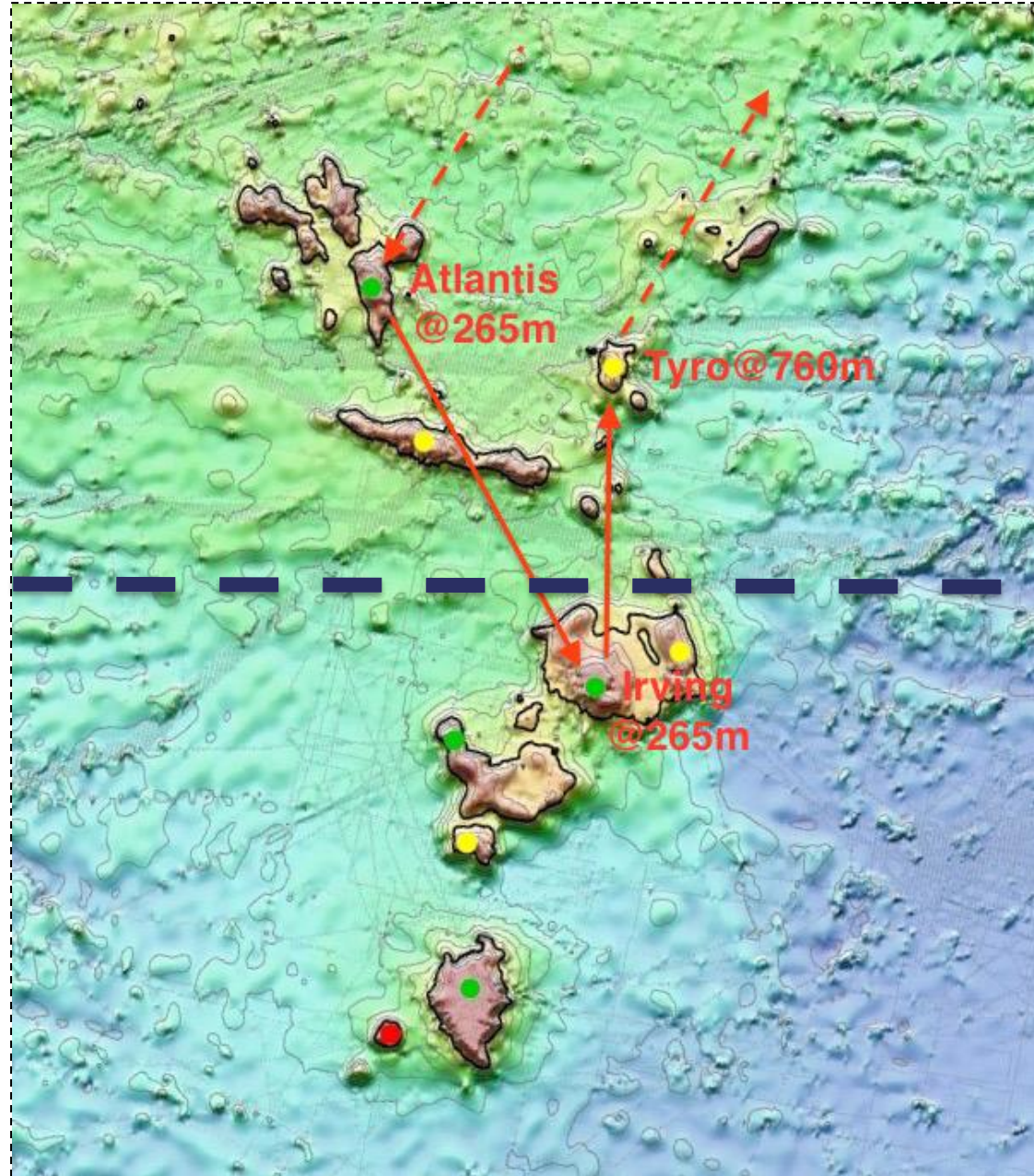


Objectives

- (i) to map benthic communities (e.g. corals, sponges, fish) on seamounts within the proposed Great Meteor oceanic MPA;
- (ii) To improve the understanding of the influence of substrate type and geomorphological features as well as oceanographic conditions on the distribution of these communities;
- (iii) identify new vulnerable marine ecosystems;

Targeted seamounts

Atlantis & Tyro under different clim. regimes
relative to Irving & Great Meteor



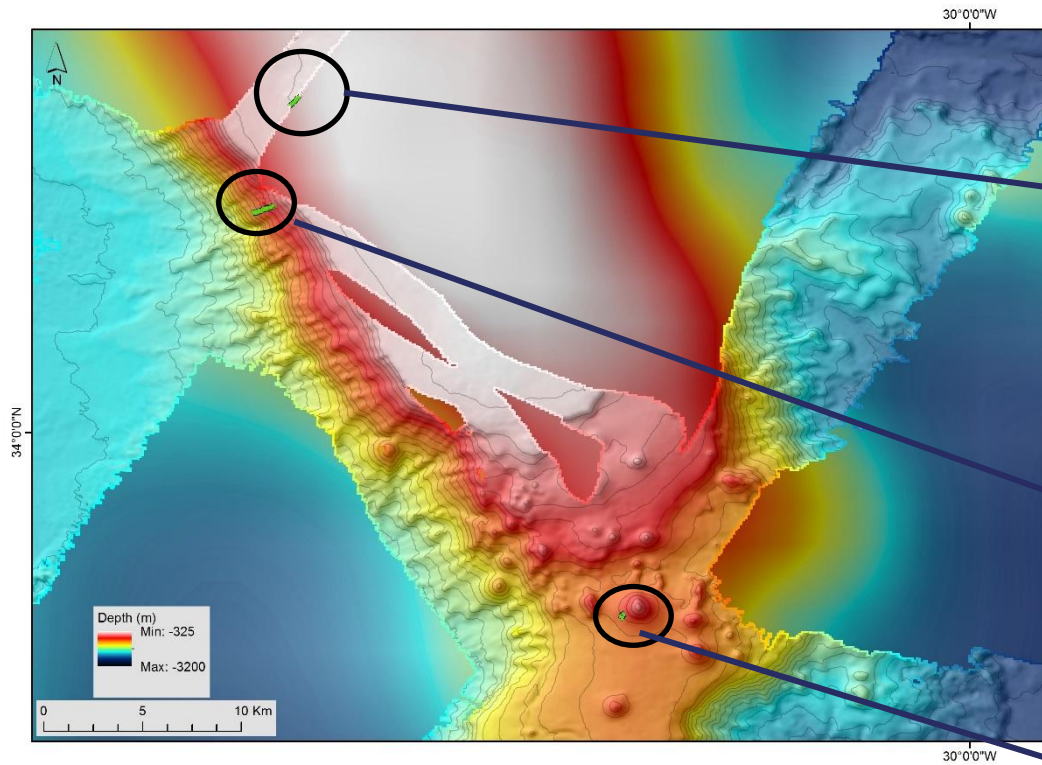
Methods / ROV Surveys

DATA used in the study collected with ROV Luso during 3 cruises:
1 cruise within the NRP Gago Coutinho in 2015
2 cruises led by EMEPC in 2008/09

Transect	Seamount	Obs. Time	Min. Depth (m)	Max. Depth (m)	Distance (m)
DOP 2	ATLANTIS	02:35:22	885	1328	1149
DOP 3	ATLANTIS	03:26:14	262	408	559
EMEPC 13	ATLANTIS	00:59:35	1136	1150	860
DOP 4	IRVING	05:25:26	577	1091	1879
DOP 5	IRVING	03:14:19	334	574	1500
EMEPC 16	IRVING	01:15:58	280	287	220
EMEPC 19	IRVING	01:50:13	828	1003	1081
EMEPC 20	IRVING	02:39:14	2490	2582	821
8 dives		21:30	262	2582	8069

Methods / ROV Surveys

ATLANTIS



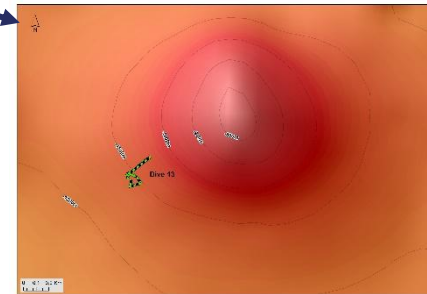
DOP15D03



DOP15D02



EMEPC 13

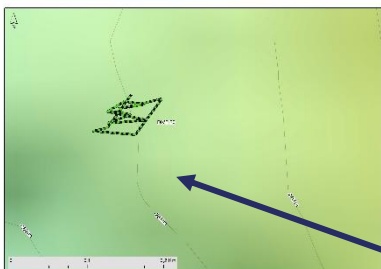


Seamount		Obs. Time	Min. Depth (m)	Max. Depth (m)	Distance (m)
Transect	t				
DOP 2	ATLANTIS	02:35:22	885	1328	1149
DOP 3	ATLANTIS	03:26:14	262	408	559
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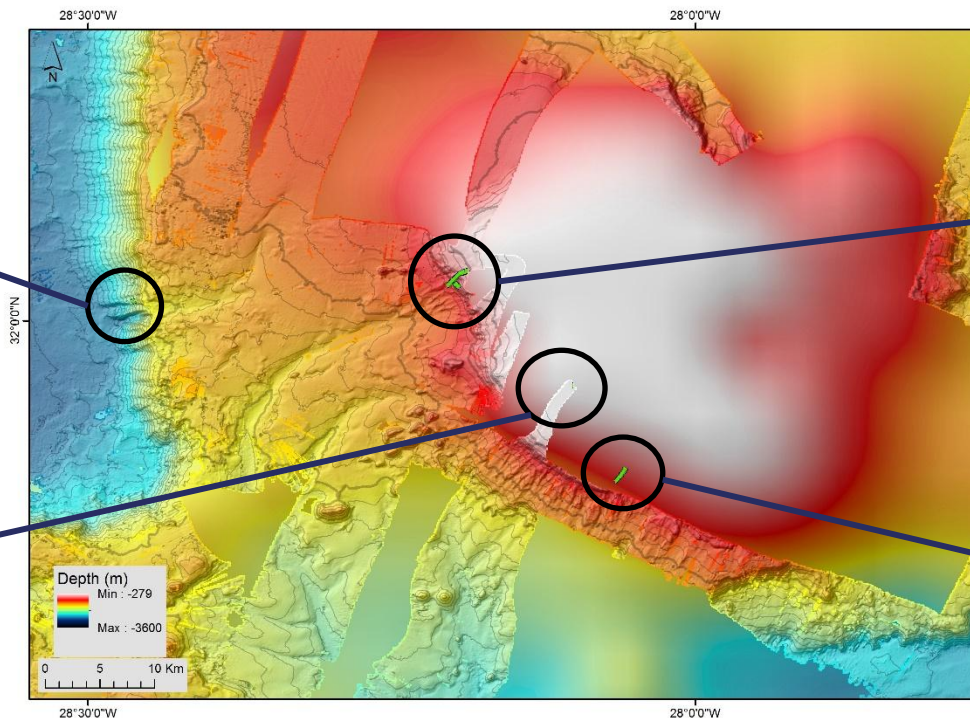
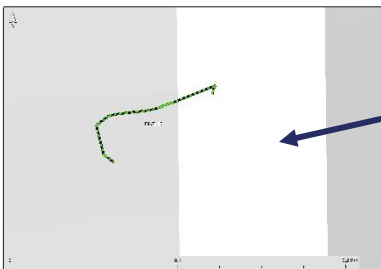
Methods / ROV Surveys

IRVING

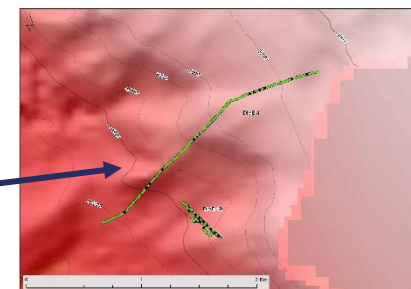
EMEPC 20



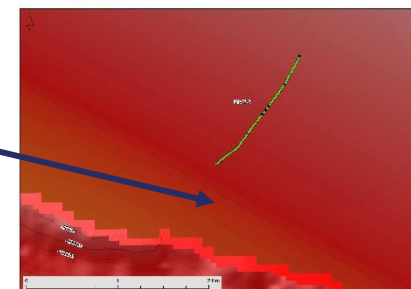
EMEPC 16



DOP15D04/EMEPC 19



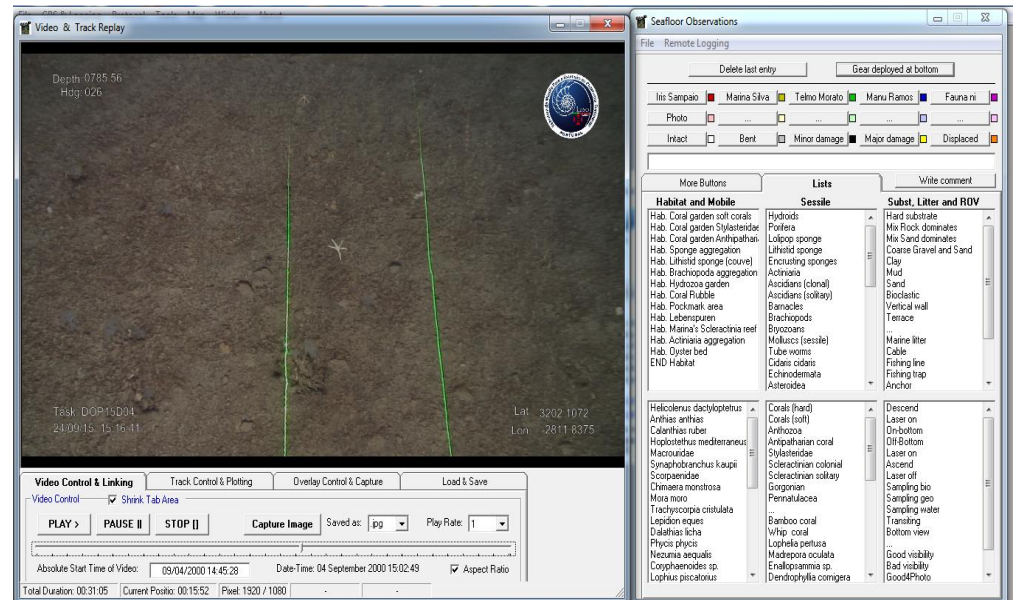
DOP15D05



Transect	Seamount	Obs. Time	Min. Depth (m)	Max. Depth (m)	Distance (m)
DOP 4	IRVING	05:25:26	577	1091	1879
DOP 5	IRVING	03:14:19	334	574	1500
EMEPC 16	IRVING	01:15:58	280	287	220
EMEPC 19	IRVING	01:50:13	828	1003	1081
EMEPC 20	IRVING	02:39:14	2490	2582	821

Methods /Video Analysis data

- ROV transects annotation using **OFOP** to link the video footage to the track positioning
- Identifications to **lowest possible taxon**, recorded along entire transect
- Record every **30 s to 1 min intervals** (events)
- Habitat type (**EUNIS habitats, OSPAR/FAO VMEs**)
- Substrate type (**Hard, Mix Rock, Mix Sediment, Coarse/Gravel, Sand, Mud, Biogenic**)
- Semi-quantitative analysis: **presence data** was used to estimate frequency for major taxa from 50 m video segments

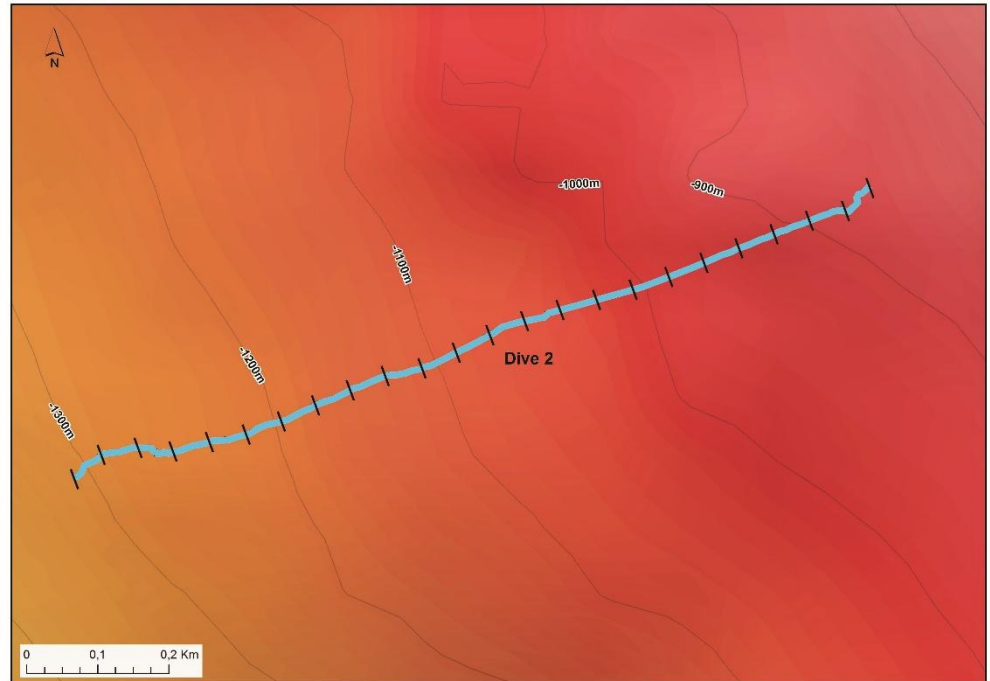


Methods / Data Analysis

In order to obtain “samples” of equal length, transect distances were subdivided in segments of **50 meters sequences**.

Depth ranges subdivisions followed the structure of the “deep sea hierarchical classification system” proposed by Howell (2010) for the NE Atlantic:

- 1.upper slope** (200-750 m) – D1
- 2.upper bathyal** (750-1100 m) – D2
- 3.mid bathyal** (1100-1800 m) – D3
- 4.lower bathyal** (1800-2700 m) –D4

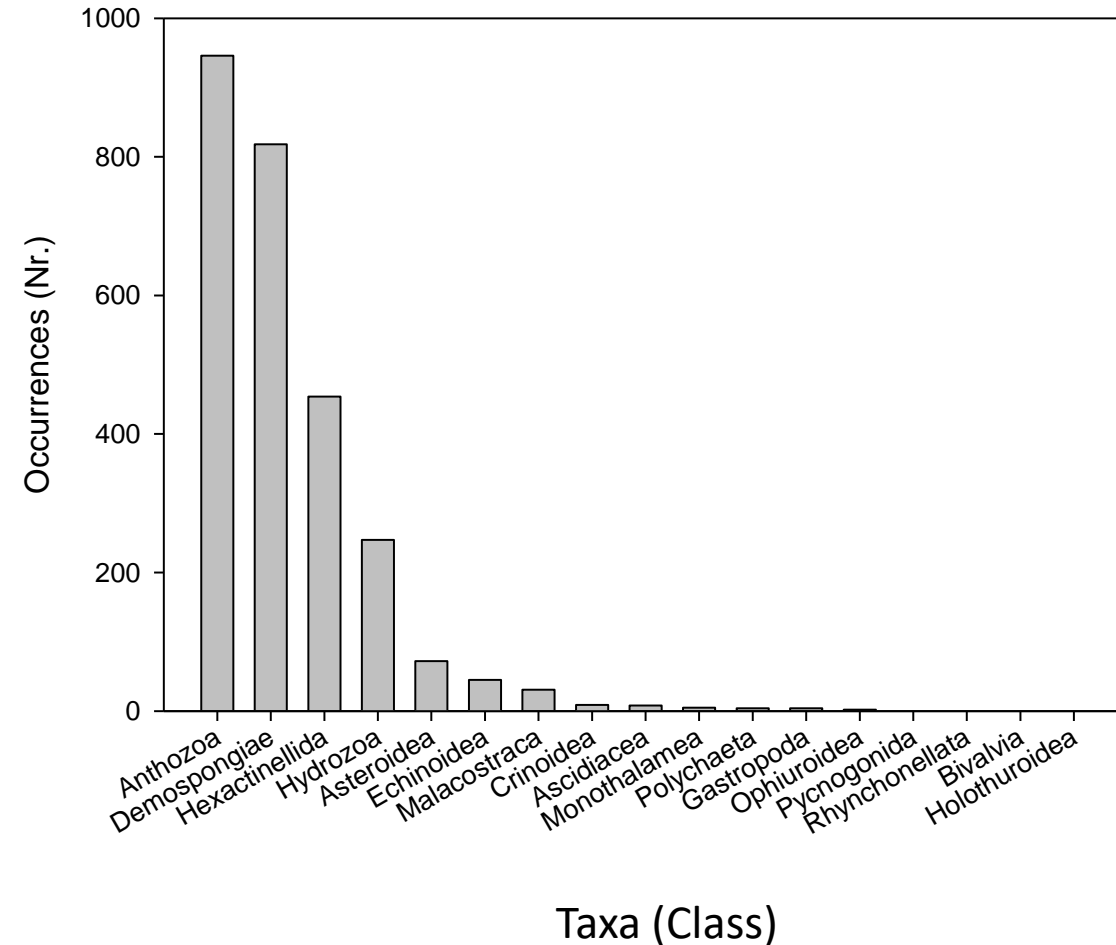


Methods / Data Analysis

Statistical analyses were computed in PRIMER v.6 (Clarke and Warwick, 2001):

- Species occurrence data for each transect were **presence/absence transformed**,
- **Community similarity** was first analysed with group average **CLUSTER with SIMPROF test**,
- Variables (**depth/substrate**) were analysed by **Principle Components Analysis (PCA)** to develop additional hypotheses,
- A one-way **SIMPER routine** was analysed using the depths as units to find the organisms that best defined depth intervals and best differentiated between depths.

Results / Benthic Morphospecies Occurrences

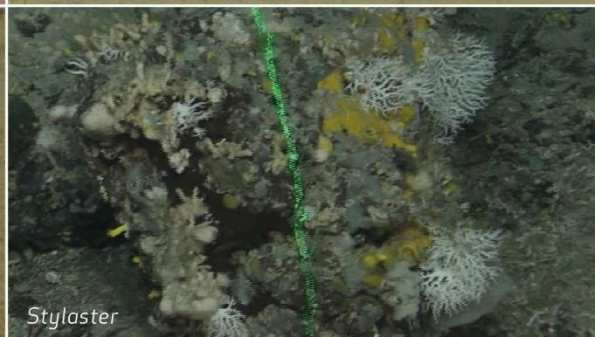


Cnidarians - 40 morphospecies: Alcyonacea (19); Scleractinia (9); Antipatharia (5); Stylasterida, Actiniaria, Ceriantharia and Pennatulacea were here poorly represented,

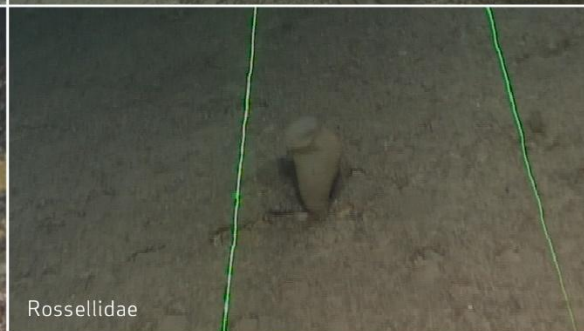
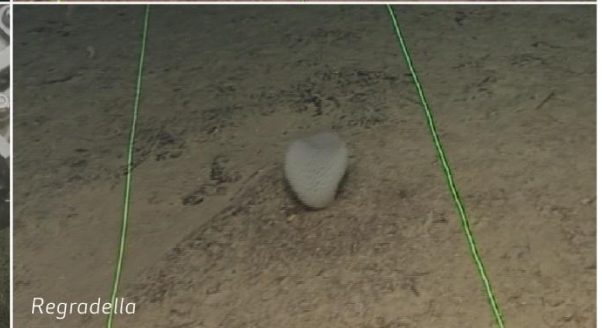
Porifera - 50 morphospecies: Hexactinellida (10), Demospongiae (14): 'Lithistida' (5), Polymatidae (2), Axinellidae (2), Suberitidae (1), Tetillidae (2), Geodiidae (2). Unidentified morphospecies (25) were distinguished by shapes and colors,

Numerous **other invertebrate taxa** were annotated, such as: Ascidacea, Asterozoa, Echinozoa, Crinozoa, Bivalvia, Gastropoda, Decapoda, Polychaeta, Pycnogonida and Xenophyophoroidea.

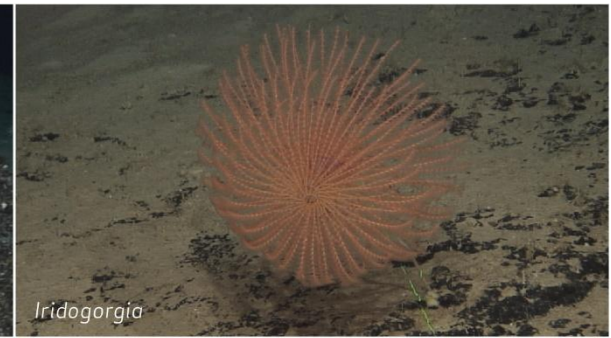
Results: Catalogue - Upper Slope Corals composition



Results: Catalogue - Upper Bathyal Sponges composition



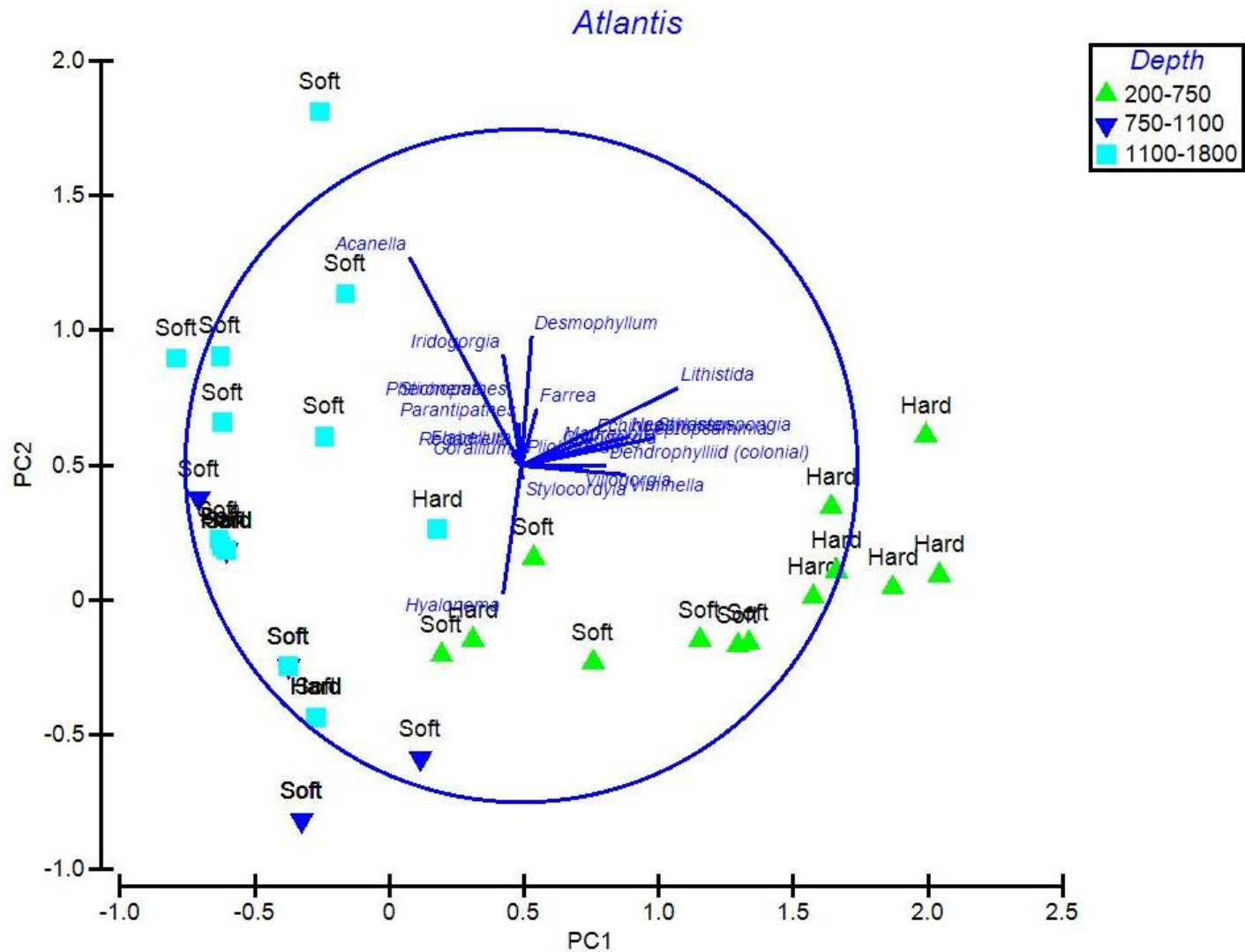
Results: Catalogue - Upper and Lower Bathyal Corals composition



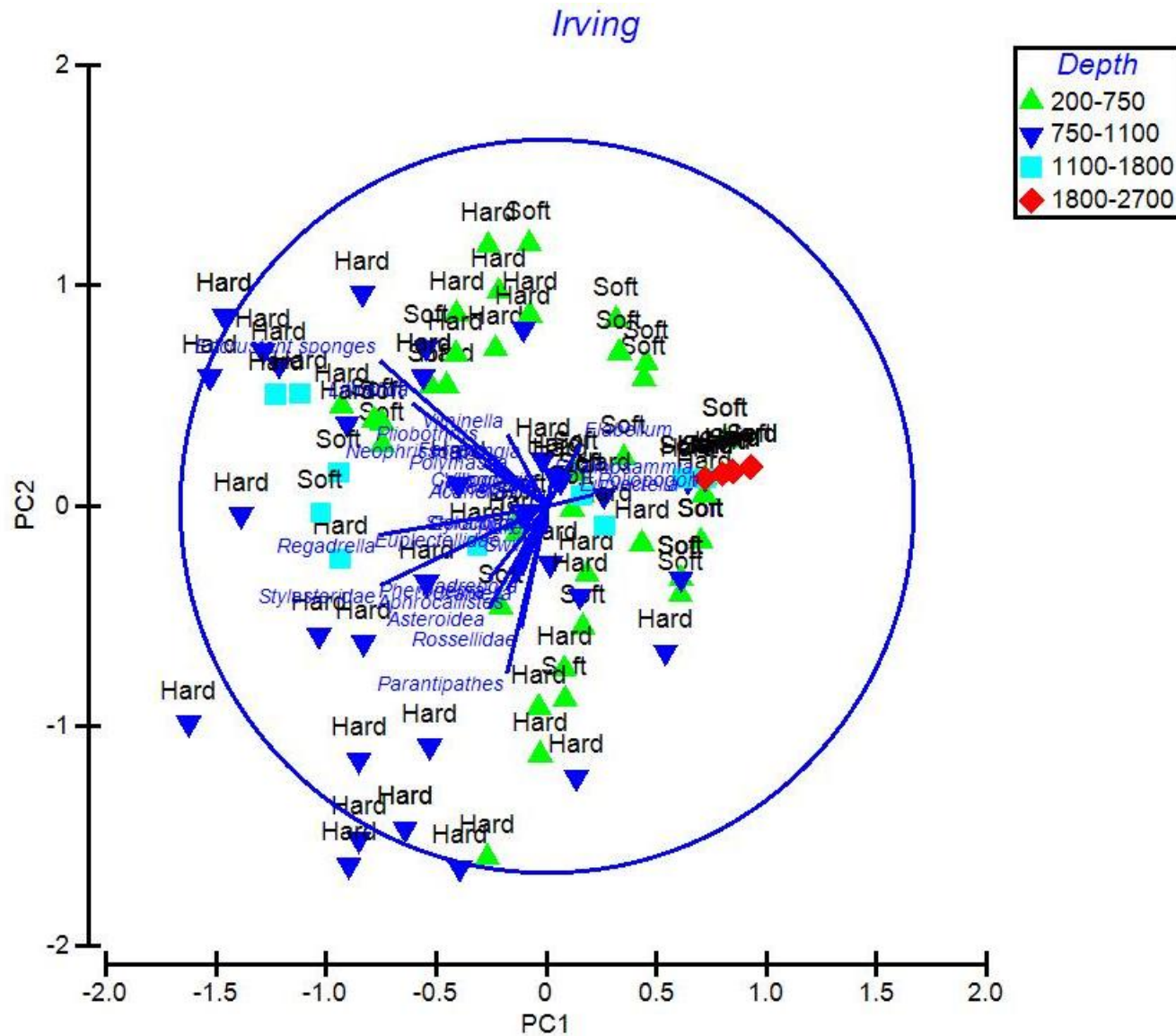
Results: Catalogue - Deep Bathyal Sponges



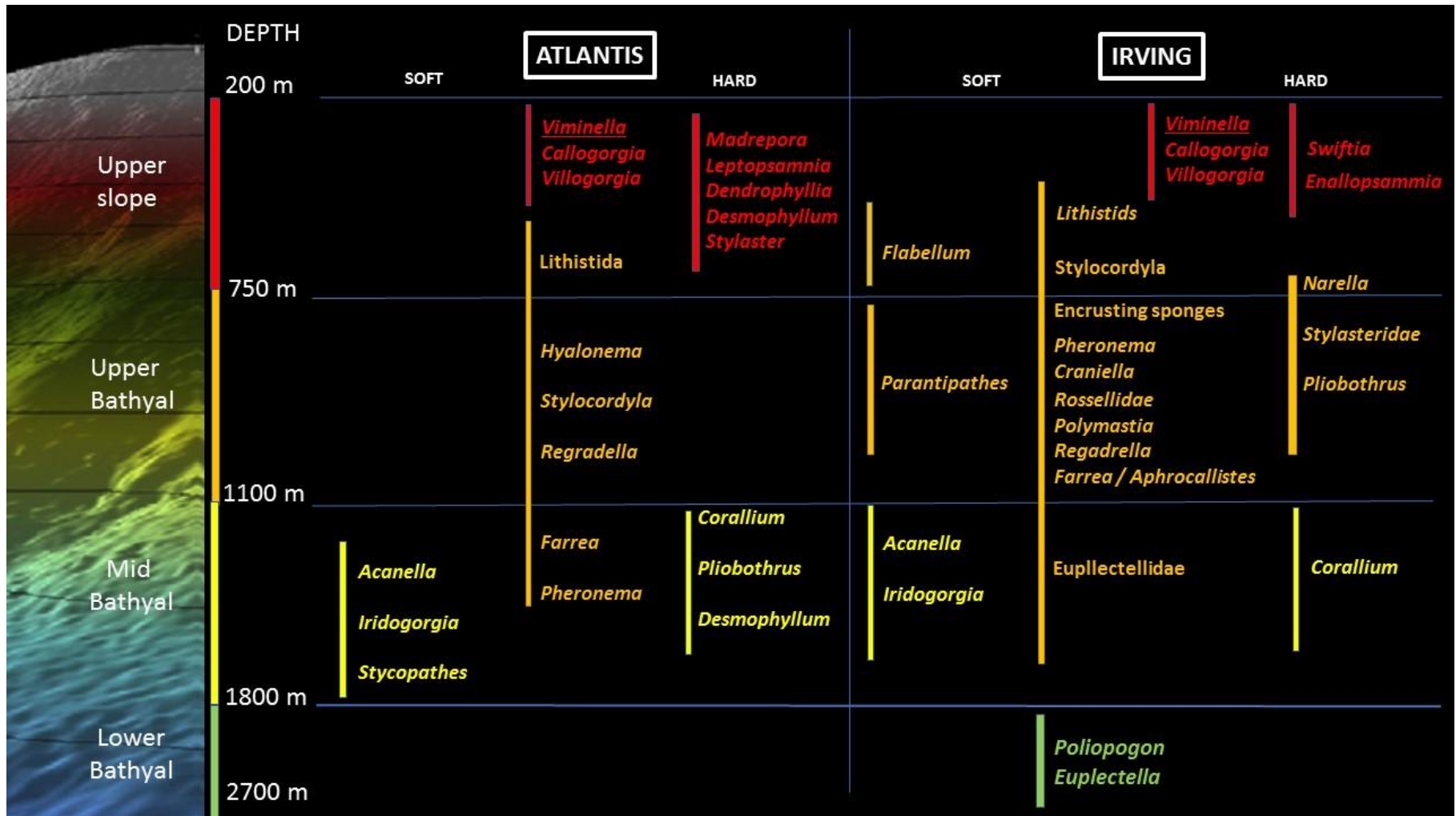
Results / PCA



Results / PCA



Discussion: Species distribution



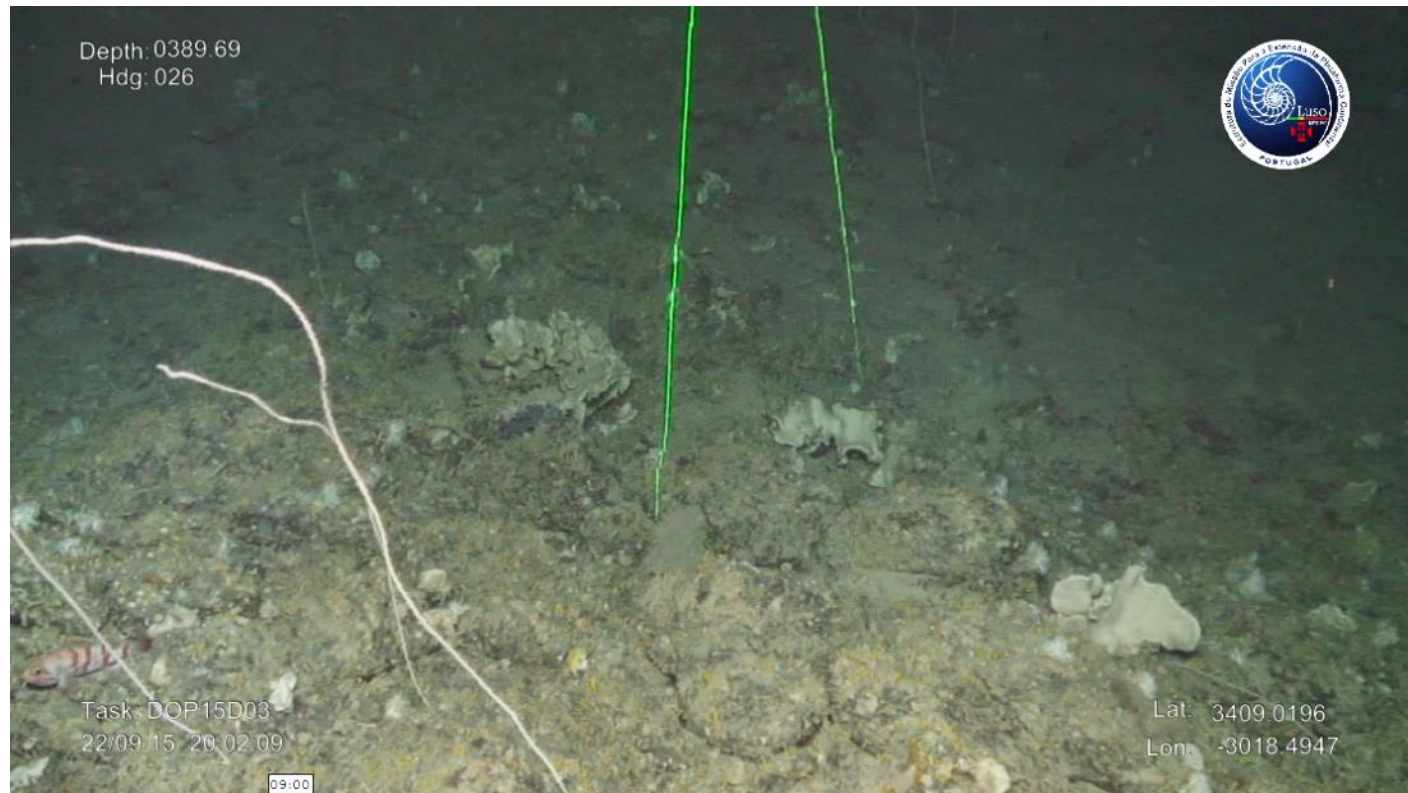
Identified habitat types

Sponge aggregation on hard substrate

Species composition: Lithistid sponges

Depth: 400-800 m upper slope

Location: Atlantis and Irving seamounts



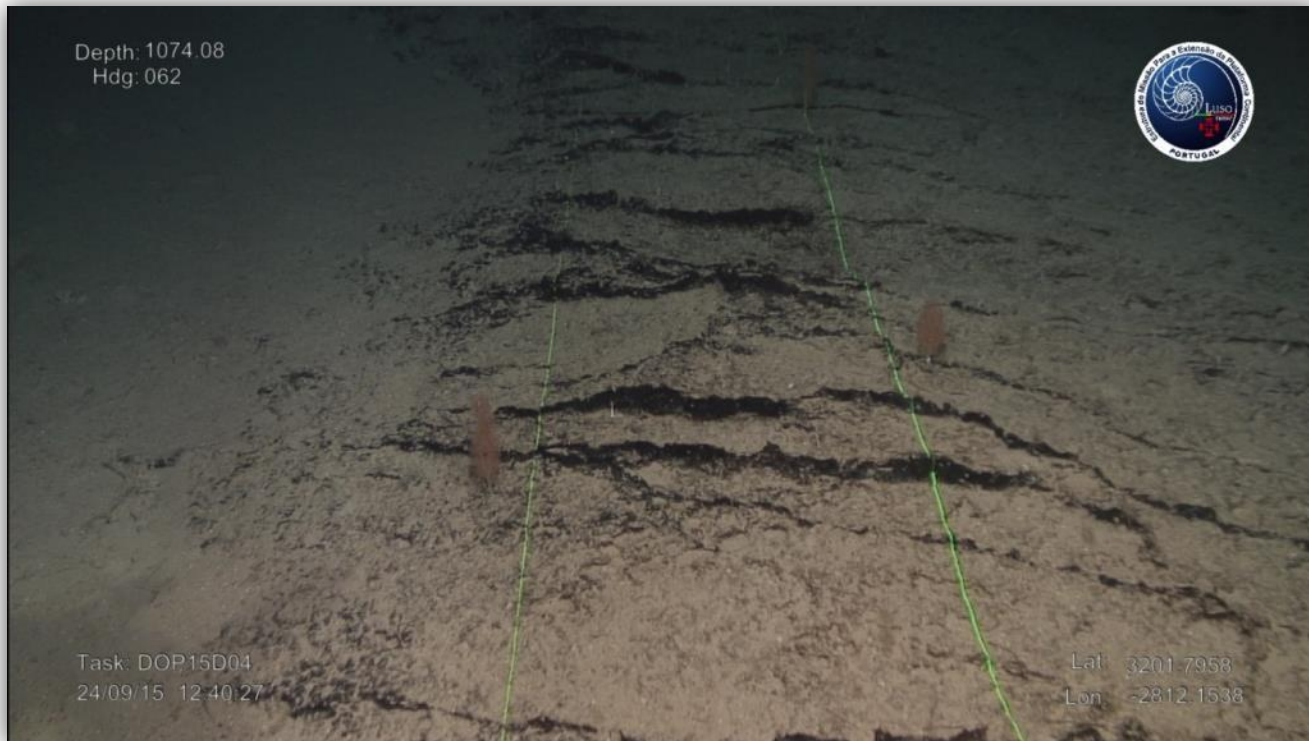
Identified habitat types

Mixed coral garden on hard substrate

Species composition: *Acanella arbuscula*, *Corallium tricolor*, *Iridogorgia* sp. (Alcyonacea), *Parantipathes* sp. (Antipatharia)

Depth: 800-1100 m upper bathyal

Location: Atlantis and Irving seamount



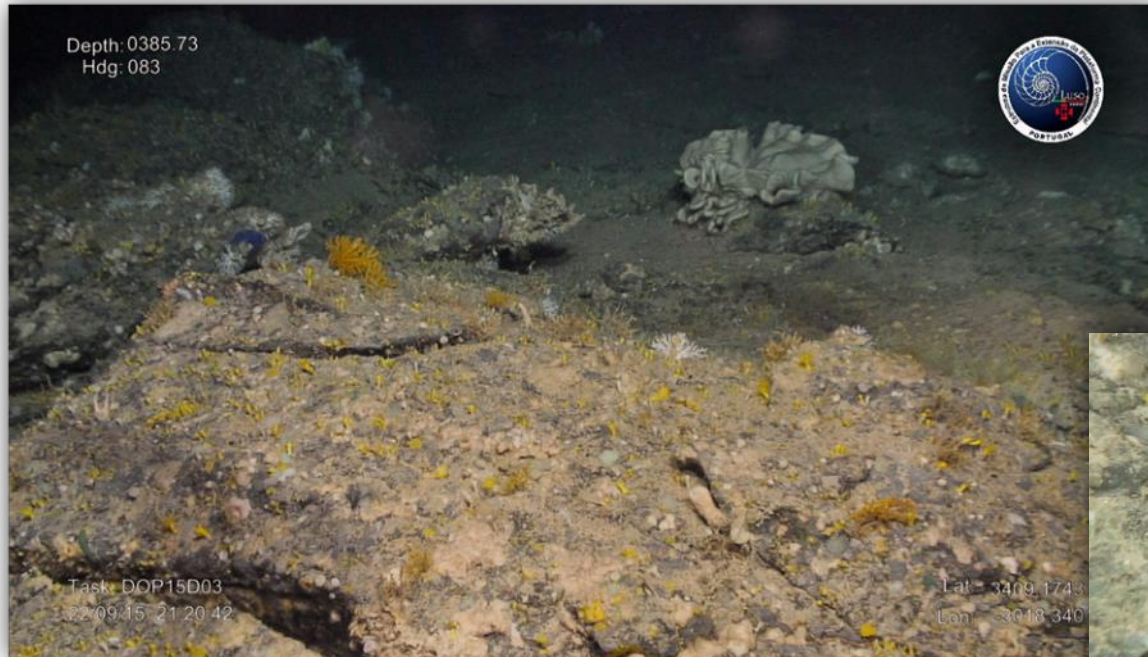
Identified habitat types

Mixed coral garden on hard substrate

Species composition: *Leptopsammia* cf. *formosa* (Scleractinea), *Villogorgia* cf. *bebrycoides* (Alcyonacea), Stylaster (Stylasteridae), digitiform and encrusting sponges

Depth: 380-400 m upper slope

Location: Atlantis seamount



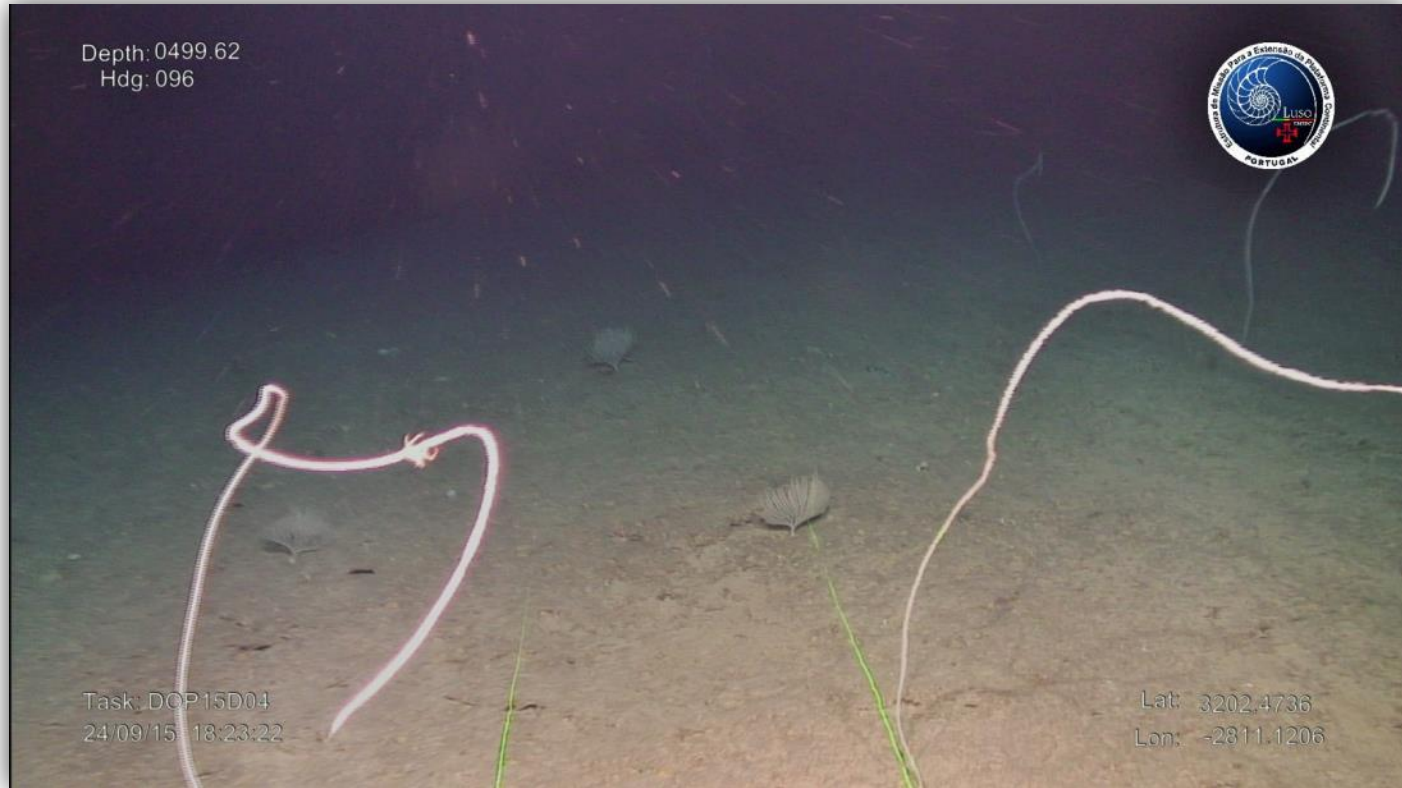
Identified habitat types

Gorgonian garden on mixed substrate

Species composition: *Viminella flagellum* and *Narella* sp (Alcyonacea)

Depth: 500-600 m upper slope

Location: Irving seamount



Identified habitat types

Lace coral garden on hard substrate

Species composition: *Pliobothrus* sp (Stylasteridae)

Depth: 800-1000 m upper bathyal

Location: Irving seamount



Identified habitat types

Scleractinian Garden on Soft Substrate

Species composition: *Flabellum* sp (Scleractinea)

Depth: 380-450 m upper slope

Location: Irving seamount



Conclusions

- Diverse communities of sedentary suspension-feeding organisms were observed, with more than 40 cold-water morphospecies (mainly octocorals) and 50 sponge morphotypes;
- Dense coral garden habitats and sponge grounds were identified on several occasions, confirming the presence of *vulnerable marine ecosystems* (VMEs) and pointing out potential *ecologically or biologically significant areas* (EBSAs);
- The new knowledge on deep-sea megafaunal communities provides evidence of the **importance of the Great Meteor seamount complex as an area of high conservation interest and the creation of an oceanic Marine Protected Area in the framework of the MSFD implementation in Portuguese marine waters.**



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Thank You