

# Cruise report for 64PE488 onboard of R/V Pelagia Terceira Island 2021 - Towed camera video footage

(4<sup>th</sup> – 10<sup>th</sup> June 2021)

## CRUISE REPORT *Date: 18/06/2021*

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**Objectives:** To explore deep-sea areas of the Azores EEZ to better understand the distribution patterns of large VME species and commercial fishes. Specifically, the objectives of the cruise were to (i) continue the characterization of benthic communities inhabiting the slopes of Terceira and neighboring submarine ridges, (ii) identify new areas that may fit the FAO definition of what constitutes a Vulnerable Marine Ecosystem; and (iii) to contribute with additional data to address patterns and drivers of the distribution of deep-sea benthic biodiversity in the Azores region. It will also provide valuable information in the context of Good Environmental Status (GES), Marine Spatial Planning (MSP) and provide new insights on how to sustainably manage deep-sea ecosystems.

**Vessel:** R/V Pelagia

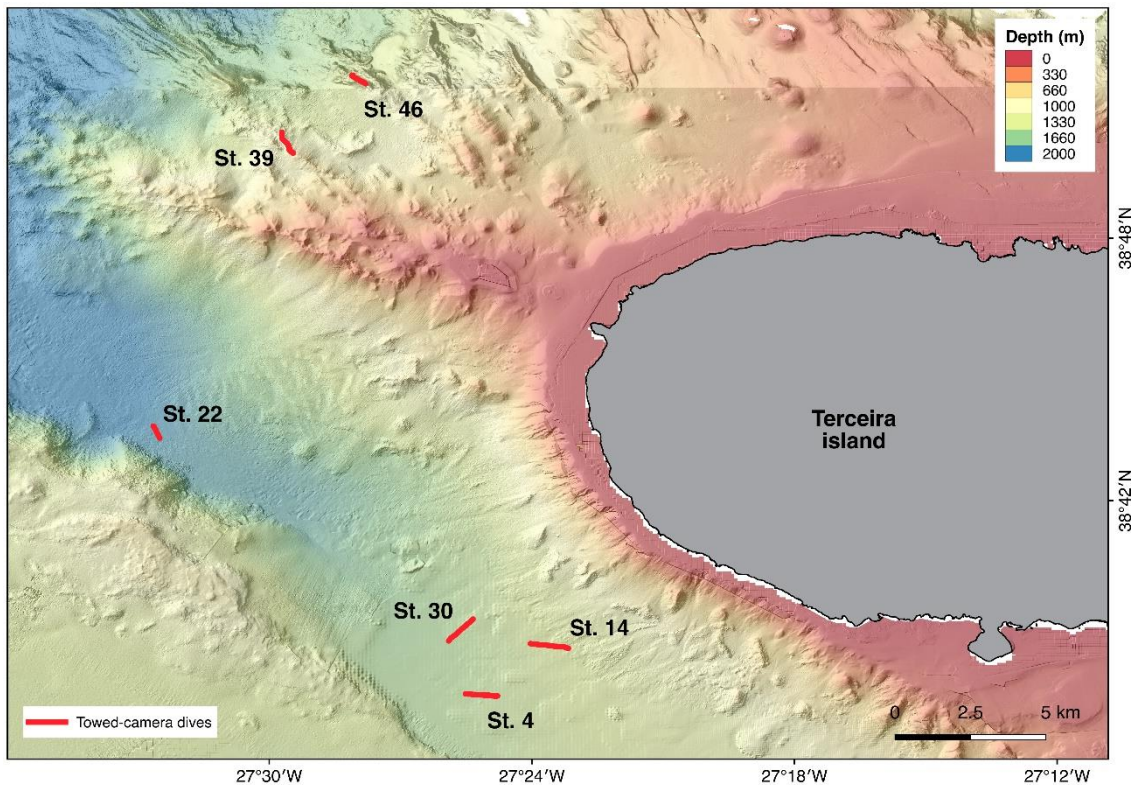
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**Scientific team:** Manuela Ramos (IMAR-UAç)

**Cruise summary:** Six new dives were performed by the towed camera system of R/V Pelagia during the cruise (Table 1, Fig. 1). Four dives were performed on the southern Terceira island depression, covering a depth range between 1300 and 1900 m. The remaining two dives were performed in the Serreta Ridge, WNW of Terceira, between 780 and 1100 m depth. Overall, we collected 6 h of new video footage.

**Table 1.** GPS positions of the deployments made with the towed camera system of R/V Pelagia carried out during the Terceira 2021 cruise to investigate deep-sea habitats south (muddy-flat area) and west (hard bottom area – Serreta Ridge) of Terceira island.

Station	Date	Location	Habitat type	Position		Bottom time (h:min)	Depth range (m)	
				start	end		start	end
St04	05/06/21	SW Terceira Depression	Soft bottom	38°37.54 N 27°24.78 W	38°38.63 N 27°26.95 W	01:00	1446	1497
St14	06/06/21	SW Terceira Depression	Soft bottom	38°64.40 N 27°38.57 W	38°64.54 N 27°39.92 W	01:00	1305	1370
St22	07/06/21	SW Terceira Depression	Soft bottom	38°43.71 N 27°32.65 W	38°43.43 N 27°32.50 W	00:30	1949	1920
St30	08/06/21	SW Terceira Depression	Soft bottom	38°65.49 N 27°42.24 W	38°38.79 N 27°25.91 W	01:30	1491	1545
St39	09/06/21	WNW Terceira Serreta Ridge	Hard bottom	38°50.41 N 27°29.71 W	38°49.91 N 27°29.47 W	01:30	1086	780
St46	10/06/21	WNW Terceira Serreta Ridge	Hard bottom	38°51.71 N 27°28.10 W	38°51.53 N 27°27.80 W	00:30	1153	1150



**Fig. 1.** Paths performed over the seabed by the towed camera system of R/V Pelagia to characterize the benthic communities inhabiting the southern and western slopes of Terceira island.

#### **St. 04, Dive 1, 05/06/21**

Performed at approx. 1400 m depth in a flat sedimentary area covered with mud and sand. The community observed (Fig. 2) was characterised by the presence of burrowing organisms (“Lebensspuren”) and sparse mobile and sessile deep-sea fauna typical of soft bottoms, such as the holothurian Cf. *Pseudostichopus* sp., the asterid cf. *Henricia* sp., several cerianthids, the xenophyophore *Syringamina fragilissima* and the hexactinellid *Pheronema carpenteri*.

#### **St. 14, Dive 2, 06/06/21**

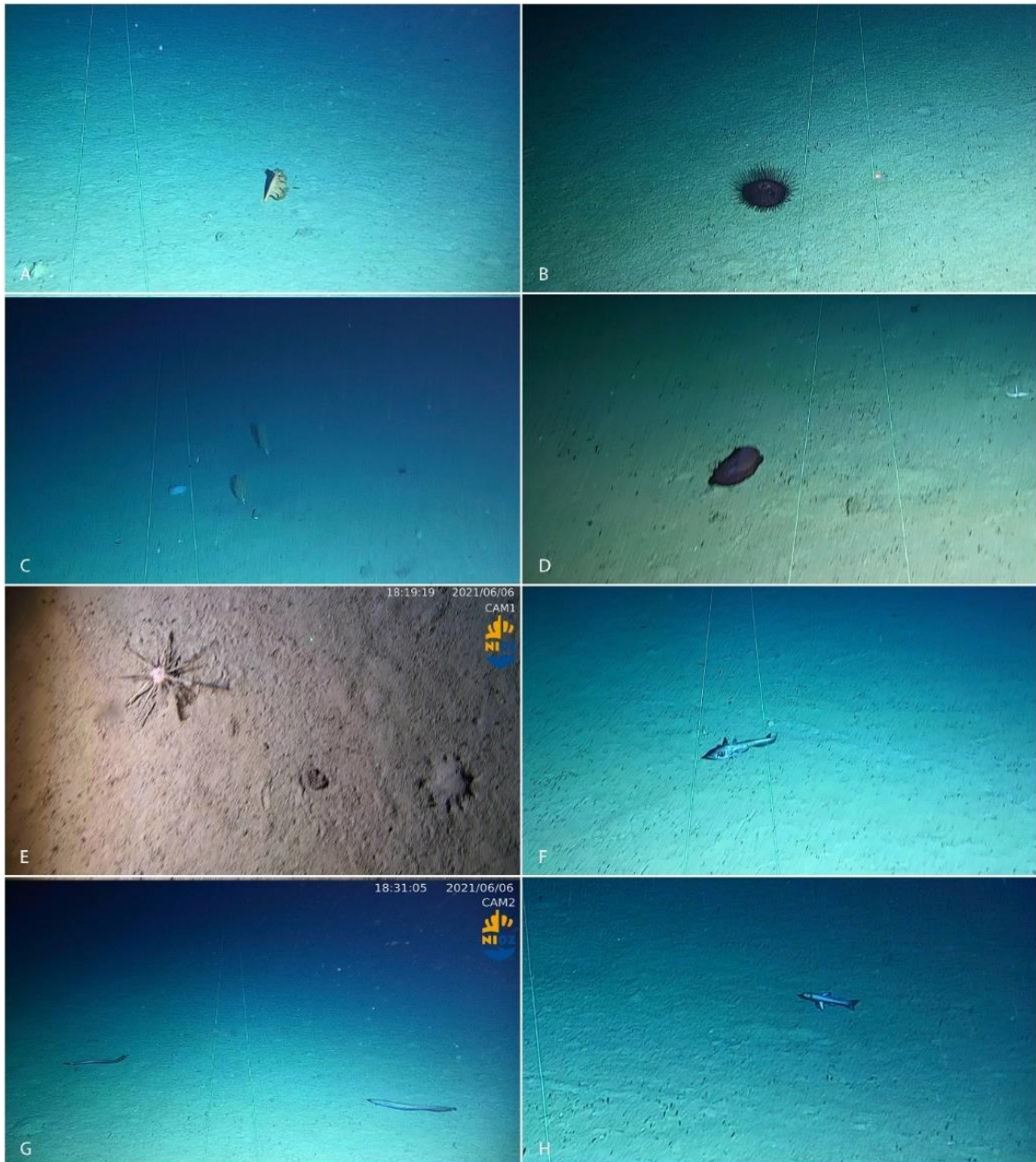
Performed at approx. 1300 m depth in a flat sedimentary area covered with mud and sand. The community observed (Fig. 3) was composed by “Lebensspuren”, with some sparse cnidarians observed, including the bamboo coral *Acanella arbuscula* and the pennatulacean *Gyrophyllum hirondellei*. Several echinoderms were also reported, such as cf. *Hygrosoma petersii*, *Cidaris cidaris* and cf. *Pseudostichopus* sp., which appeared sparsely distributed throughout the dive. Some fishes were also present, mainly anguiliformes such as cf. *Synphobranchus kaupii* and macrourids of the genus *Coelorinchus*.

#### **St. 22, Dive 3, 07/06/21**

Performed at a deeper location, at approx. 1900 m depth in a flat sedimentary area covered with mud and sand. The fauna appeared very sparse (Fig. 4), even though some hexactinellids (likely *Hylonema* sp.), actinarians and holothurians still to be determined were observed. Most of the highly-mobile fauna associated to this environment were fishes such as the chimaerid *Hydrolagus pallidus* and the anguiliforme *Synphobranchus kaupii*, but also the cephalopod cf. *Mastigotheutis* sp.



**Fig. 2.** Images obtained with the towed camera system of R/V Pelagia during St. 4. A) Foraminifera (Xenophyophorea) likely of the species *Syringamina fragilissima*; B) The glass sponge *Pheronema carpenteri*; C) Lebensspuren, possibly formed by the Arthropoda cf. Tanaidacea; D) Lebensspuren (unknown); E) Undetermined spp., possibly a Holothurian; F) Asteroidea, likely cf. *Henricia* sp.; G) Ceriantharia to be determined; H) Holothuroidea, likely cf. *Pseudostichopus* sp.



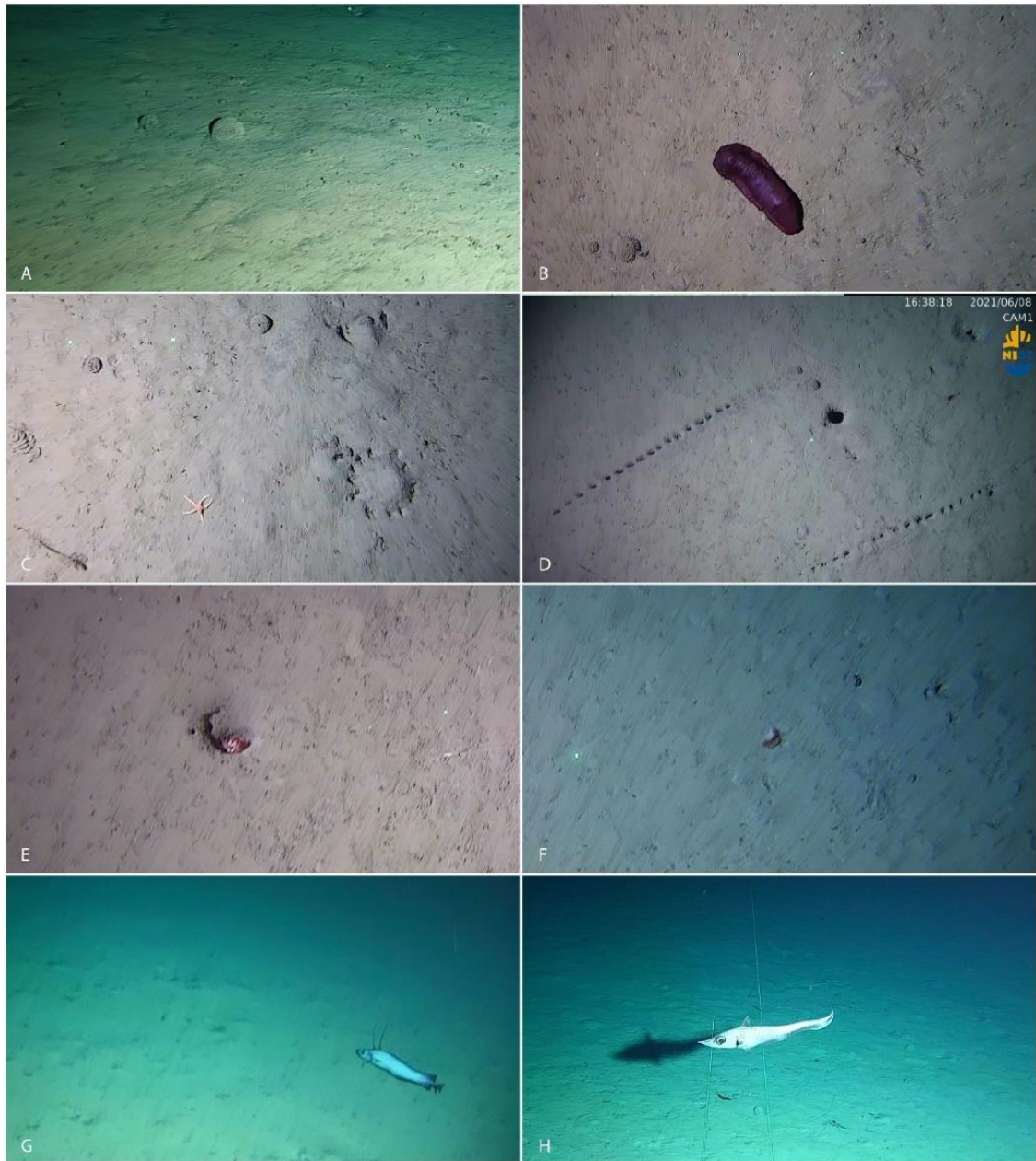
**Fig. 3.** Images obtained with the towed camera system of R/V Pelagia during St. 14. A) The pennatulacean *Gyrophyllum birondellei*; B) Echinodermata, likely *Hygrosoma petersii*; C) The bamboo coral *Acanella arbuscula*; D) Holothuroidea to be determined; E) The sea urchin *Cidaris cidaris* and Lebensspuren of unknown origin; F) The Macrouridae *Coelorinchus labiatus*; G) Anguilliformes, likely of the genus *Synaphobranchus*; H) Aulopiformes, *Bathypterois phenax*.



**Fig 4.** Images obtained with the towed camera system of R/V Pelagia during St. 22. A) A squid swimming fast in front of the camera, likely of the genus *Mastigotheutis*; B) The chimera *Hydrolagus pallidus*; C) Anguilliforme, likely of the genus *Synaphobranchus*; D) Hexactinellida, *Hyalonema* sp.; E) Undetermined actiniaria; F) Common holothruoidea species observed still to be determined.

#### St. 30, Dive 4, 08/06/21

Performed at approx. 1500 m depth in a flat sedimentary area covered with mud and sand. This dive shared many species of the previous dives, such as the xenophyophore *Syringamina fragilissima* and many burrowing organisms (Fig. 5). The seabed was characterized by the presence of “Lebensspuren” (German term meaning “life traces”), which relates to the imprints (tracks and burrows) left behind in sedimentary conditions by the deposit-feeding fauna (see Bell, et al. 2013). During this dive, it was possible to obtain an image of one of this “unknown” organisms inside their hole (Fig. 5 E). The image has allowed us to identify the organism to the taxonomic group it belongs: Polychaeta from the Onuphidae family. This observation is a rare finding, since it is generally difficult to detect these organisms outside their burrows. The scleractinian *Flabellum* sp. and asterids laying on the sediment were also observed. The most common fishes were the gadiform *Lepidion eques* and the macrourid *Coelorinchus labiatus*, always sparsely distributed.



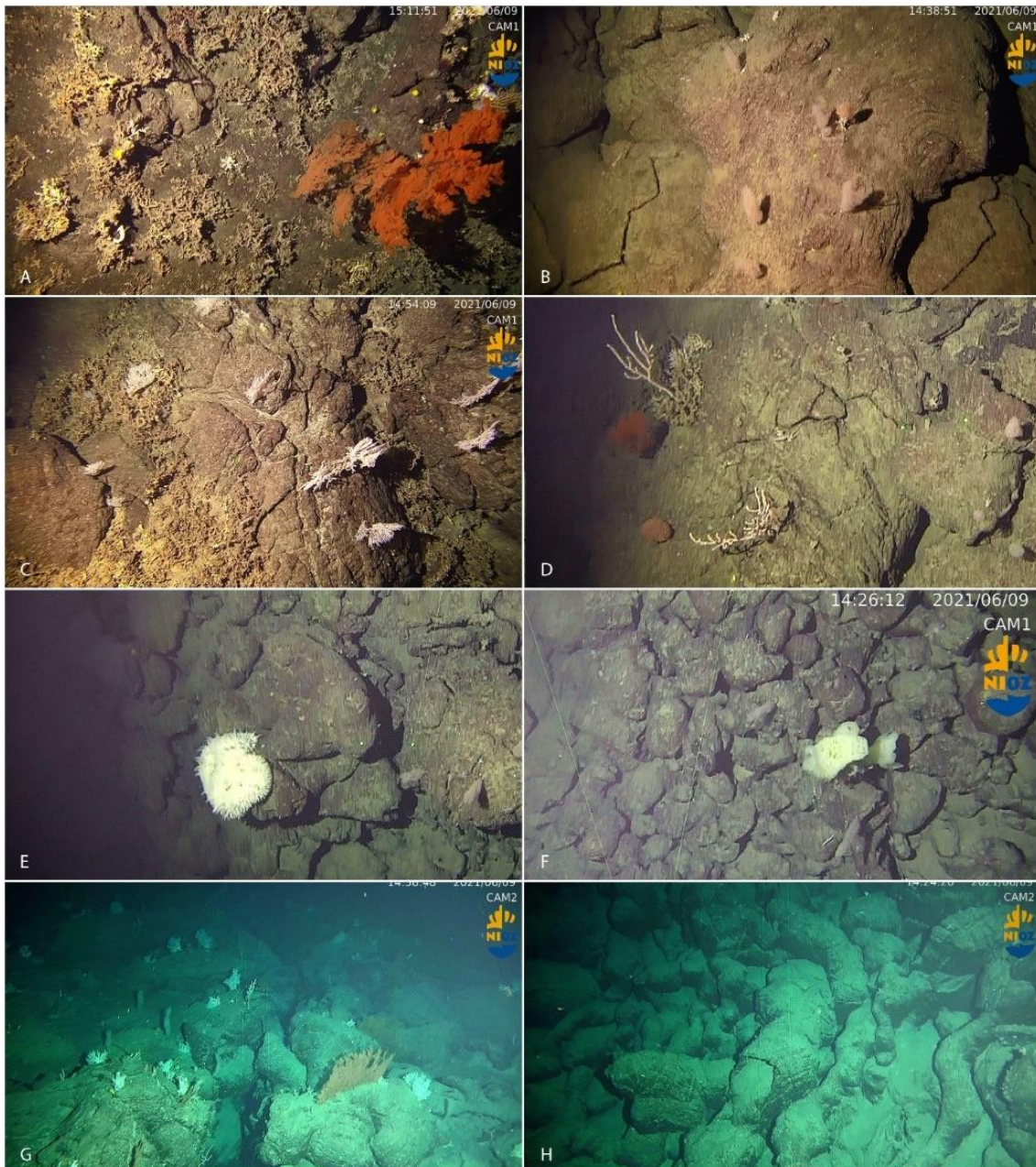
**Fig. 5.** Images obtained with the towed camera system of R/V Pelagia during St. 30. A) Foraminifera (Xenophyophorea) of the species *Syringammina fragilissima*; B) Holothruroidea still to be determined; C) Lebensspuren of unknown origin next to a Lebensspuren possibly formed by the Arthropoda cf. Tanaidacea; E) Polychaeta, likely Onuphidae; F) A scleractinian of the genus *Flabellum*; G) Gadiformes, *Lepidion eques*; H) Macrouridae, likely *Coelrorinchus labiatus*.

### St39, Dive 6, 09/06/21

This dive aimed to explore the deep-sea habitats of Serreta Ridge, starting on a crest at approx. 1086 m depth. Even if never found forming dense patches, poriferans started to appear at the beginning of the dive, specially glass sponges such as *Farrea occa* and *Hertwigia falcifera*, and large polymastids (cf. *Polymastia* sp.). In the depth range of 800-900 m, a highly diverse and dense coral garden started to be observed (Fig. 6), with the antipatharian *Leiopathes expansa* forming patches of high densities. Other antipatharian species were also detected, such as those from the genus *Antipathes* and *Bathypathes*. Moreover, the octocorals *Candidella imbricata* and *Chrysogorgia* sp. were found in some areas forming high-density patches, especially over pillow lavas. Many other species were observed as part of this coral assemblage, including the isidid *Acanella arbuscula*, the plexaurid *Muriceides* sp., and the scleractinians *Dendrophyllia cornigera* and *Caryophyllia* sp. One of the common features observed throughout the dive was the accumulation of old deposits of coral rubble, likely formed from dead colonies of *Lophelia pertusa*. It is interesting to point out that some alive *Lophelia pertusa* colonies were noticed too.

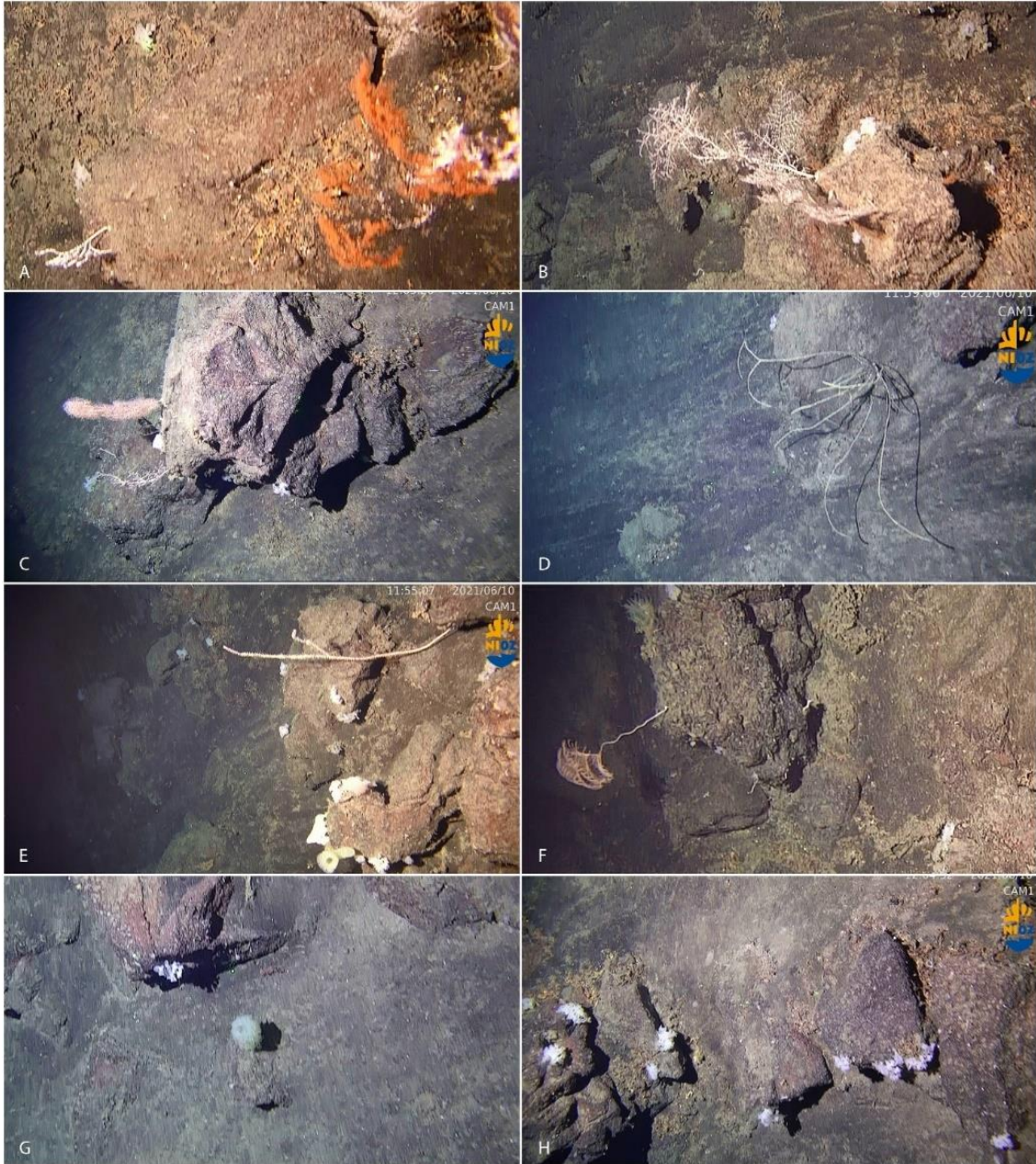
### St46, Dive 8, 10/06/21

The last dive of the cruise was also performed at the Serreta Ridge, at a close-by crest from the previous dive. The dive began at a depth of approx. 1150 m depth. Some problems with the sonar of the towed-camera system found during dive preparation on deck limited time at bottom available for this dive. In any case, a rich and abundant community was observed at this location (Fig. 7). The substrate was mainly formed by pillow lavas and volcanic rocky outcrops, exhibiting a rich coral diversity. In some areas, coral rubble was also present in high quantities, likely formed by dead colonies of the scleractinian coral *Lophelia pertusa*. Other areas presented rocks covered with sediments, but also hosting a diversified community. The antipatharian *Leiopathes expansa* and the chrysogorgid of the genus *Chrysogorgia* were also present. Some distinct species appeared throughout this dive, such as antipatharians of the genus *Antipathes*, isidids of the genus *Keiratoisis*, and alcyonaceans such as *Iridogorgia* sp. and an undetermined Plexauridae. Sponges also occurred in large abundances, specially the hexactinellids *Hertwigia falcifera* and *Farrea occa*.



**Fig. 6.** Images obtained with the towed camera system of R/V Pelagia during St. 39. Cnidarians: A) *Leiopathes expansa*, *Dendrophyllia cornigera*, *Lophelia pertusa* (alive) and coral rubble; B) *Chrysogorgia* cf. *agassizii* and *Acanella arbuscula*; C) *Candidella imbricata*; D) Undetermined Plexauridae, *Leiopathes expansa* and *Chrysogorgia* sp.; Porifera: E) *Polymastia* sp.; F) *Hertwigia falcifera*; G) Forward camera view of the community, showing high densities of corals; H) Forward camera view of the pillow lavas depleted of fauna.





**Fig. 7.** Images obtained with the towed camera system of R/V Pelagia during St. 46. Cnidarians; A) *Leiopathes expansa*; B) Plexauridae; C) *Chrysogorgia* sp.; D) *Antipathes* sp.; E) *Keratoisis* sp.; F) *Iridogorgia* sp.; Porifera (Hexactinellida): G) *Hertwigia falcifera*; H) *Farrea occa*.

References:

Bell, J.B., Jones, D.O.B., Alt, C.H.S., 2013. Lebensspuren of the Bathyal Mid-Atlantic Ridge. Deep-Sea Res. Pt II 98, 341–351. doi:10.1016/j.dsr2.2012.09.004.