

Cruise report for 64PE479 onboard of R/V Pelagia Terceira Island 2020 - Hopper tow-cam video footage - (28th October to 1st November 2020)

CRUISE REPORT *Date: 16/02/2021*

Authors: Carlos Dominguez-Carrió, Sérgio Gomes, Telmo Morato

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 deep seamounts, (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

Chief scientist: Fleur Visser (NIOZ)

Scientific team: Carlos Dominguez-Carrió (IMAR-UAç), Sérgio Gomes (IMAR-UAç)

Main achievements:

1. Exploration of deep-sea habitats located in important foraging areas for marine mammals off Terceira Island, covering a depth range between 150 and 1500 m.
2. Filming of 8.75 km of seabed, equivalent to 7 hours of HD video footage, in unexplored areas of the Azores.

Cruise summary:

Three new hopper dives were performed during the cruise. One dive was performed on the southern slopes of Terceira island, covering a depth range between 150 and 750 m. The remaining two dives were performed in a deep seamount located south-west of Terceira Island, in two locations at 1000 and 1500 m depth. Overall, we collected 7 h of new video footage, covering 8.75 km of seabed. More than 6 km corresponded to the deep seamount, from which no information was available until now.

Table 1. GPS positions of the deployments made with the Hopper tow-cam system carried out during the Terceira 2020 cruise to investigate deep-sea habitats south of Terceira island.

| St. | Date | Start-end bottom time | Start latitude | Start longitude | End latitude | End longitude | Length (m) | Bottom time (hh:mm) | Start-end depth (m) |
|------|----------|-----------------------|----------------|-----------------|--------------|---------------|------------|---------------------|---------------------|
| 1_1 | 29/10/20 | 12:45-14:35 | 38°37.81'N | 27°15.32'W | 38°36.65'N | 27°16.03'W | 2430 | 01:49 | 150-755 |
| 7_1 | 31/10/20 | 12:13-14:03 | 38°41.61'N | 27°33.18'W | 38°40.83'N | 27° 32.54'W | 1868 | 01:49 | 967-847 |
| 11_1 | 01/11/20 | 12:47-16:04 | 38°38.65'N | 27°27.02'W | 38°35.67'N | 27°24.82'N | 4471 | 03:16 | 1512-1498 |

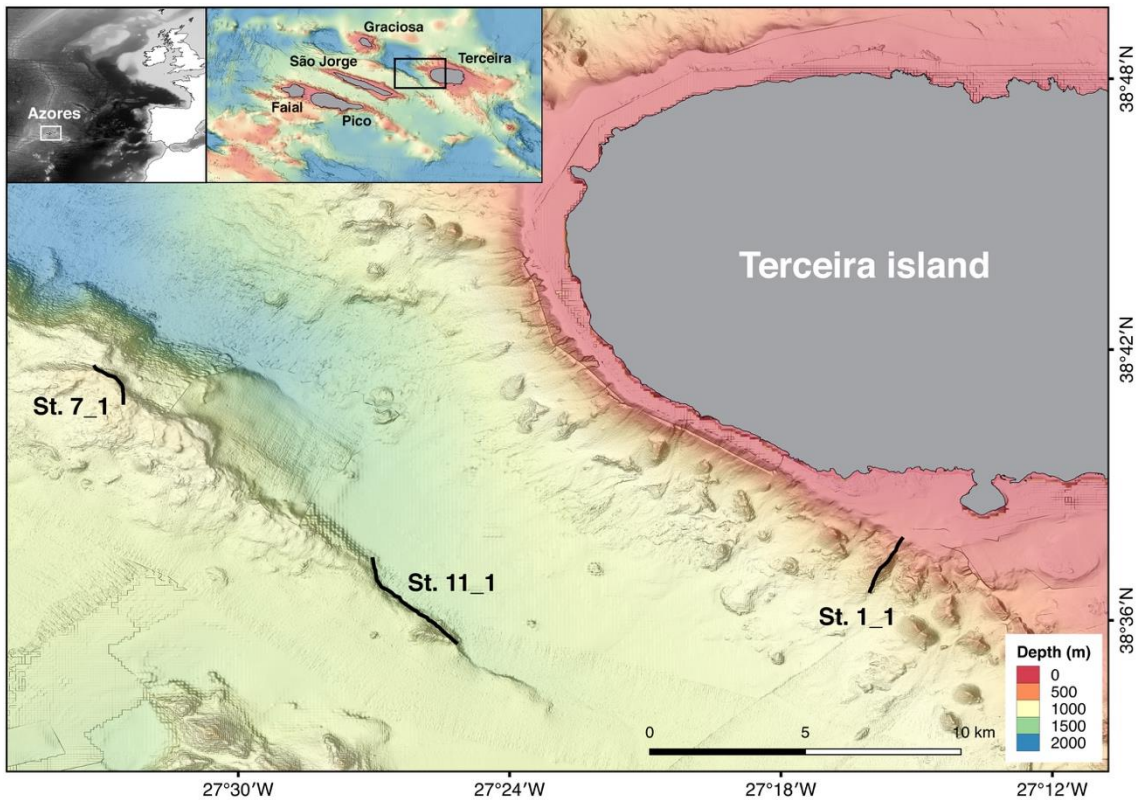


Fig. 1. Paths performed over the seabed by the Hopper tow-cam system to characterize the benthic communities inhabiting the southern slopes of Terceira island and the deep seamount located around 6 nautical miles southwest of the island.

Station 1_1, 29th October 2020

The first dive with the Hopper video system to explore the seabed habitats around Terceira island was carried out on the first day of the cruise, just at 1.3 miles from land (Fig. 1). Due to the strong winds that blew during that day, the dive had to be performed following a southwestern path along the slope, from the shelf (150 m depth) towards the bottom of the slope, with the dive ending at 755 m depth (Table 1). The dive started on the flat areas of the shelf, characterized by a mixture of sediments with a large quantity of gravels and barely any fauna observed. The slope appeared rapidly, with a large proportion of hard substrates colonized by a wide variety of encrusting and erect sponges (Fig. 2a), which will require a detailed evaluation to determine the species they belong to. With increasing depths, several species of octocorals started to appear, generating small patches with high densities in several areas. The main species observed correspond to the sea fan *Acanthogorgia* sp. and the whip coral *Viminella flagellum*, and with a lesser extent *Dentomuricea* aff. *meteor* (Fig. 2b). Along the slope, some large colonies of the primnoid coral *Callogorgia verticillata* were observed, always as isolated colonies (Fig. 2c). On the soft bottom areas in between the rocky outcrops, several aggregations of the hydroid *Lytocarpia myriophyllum* were observed. Towards the end of the dive, the soft-bottom areas became more common, even covering most of the area observed. In those areas, several xenophyophores appeared for quite a few meters (Fig. 2d). Overall, almost 2 hours of video footage was recorded, covering almost 2.5 km of seabed in an area where only a relatively small number of dives has been performed until now.

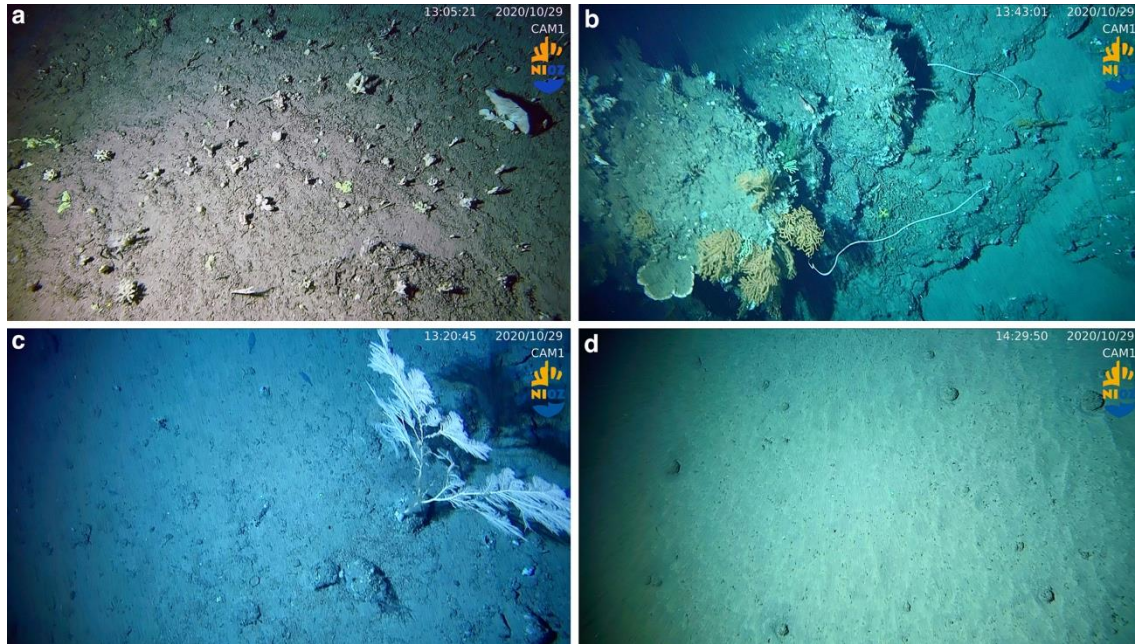


Fig. 2. Screen captures obtained from the video footage recorded by the Hopper tow-cam system during dive 1_1. (a) Aggregation of sponges on the first part of the dive. (b) Rocky outcrops with several colonies of the octocorals *Acanthogorgia* sp. and *Viminella flagellum*. (c) Large colony of the primnoid *Callogorgia verticillata*. (d) Aggregation of xenophyophores on the lowest part of the dive, on soft sediments.

Station 7_1, 31st October 2020

The second dive of the cruise to explore deep-sea habitats south of Terceira was performed on a deep seamount located around 6 nm southwest of the island (Fig. 1). This seamount has its summit at around 850 m depth, and St. 7_7 aimed to identify the potential benthic communities dwelling on its shallowest areas. For this reason, the dive started at around 1000 m depth and move towards its summit, reaching a depth of 847 towards the end of the dive. Due to the difficult weather conditions and the complexity of the terrain explored, the Hopper system had some difficulties moving close to the seabed at all times. During more than half of the dive, the areas explored corresponded to large rocky outcrops and vertical overhangs, which are not easy to survey when sea conditions are not at its best. In any case, thanks to the work done by the winch operators, the images allowed for a complete characterization of the benthic communities dwelling in this area. One of the common features observed throughout the dive was the accumulation of what seemed to be old deposits of coral rubble, which in several locations covered the whole surface available (Fig. 3a). The origin of this coral rubble has not yet been determined, but it is likely that relates to old communities of scleractinian corals, which were likely more common in the Azores than nowadays. Several isolated glass sponges could be identified on areas characterized by the presence of coral rubble (see Fig. 3a). Throughout the whole dive, mostly on hard substrate areas, several species of corals were seldomly observed, such as *Acanella arbuscula* (Fig. 3b) and *Chrysogorgia* sp., as well as some sea urchins, such as *Cidaris cidaris*, all of them always in low densities. In some of the vertical overhangs encountered, the diversity of coral and sponge species increased, and two relevant communities could be observed: one formed by black corals, some small plexauridae and glass sponges (Fig. 3c), and also a community dominated by stylasterid corals (Fig. 3d). Overall, almost 2 km of seabed were explored, providing new insights on the diversity of benthic fauna that dwells on deep seamounts of the Azores.

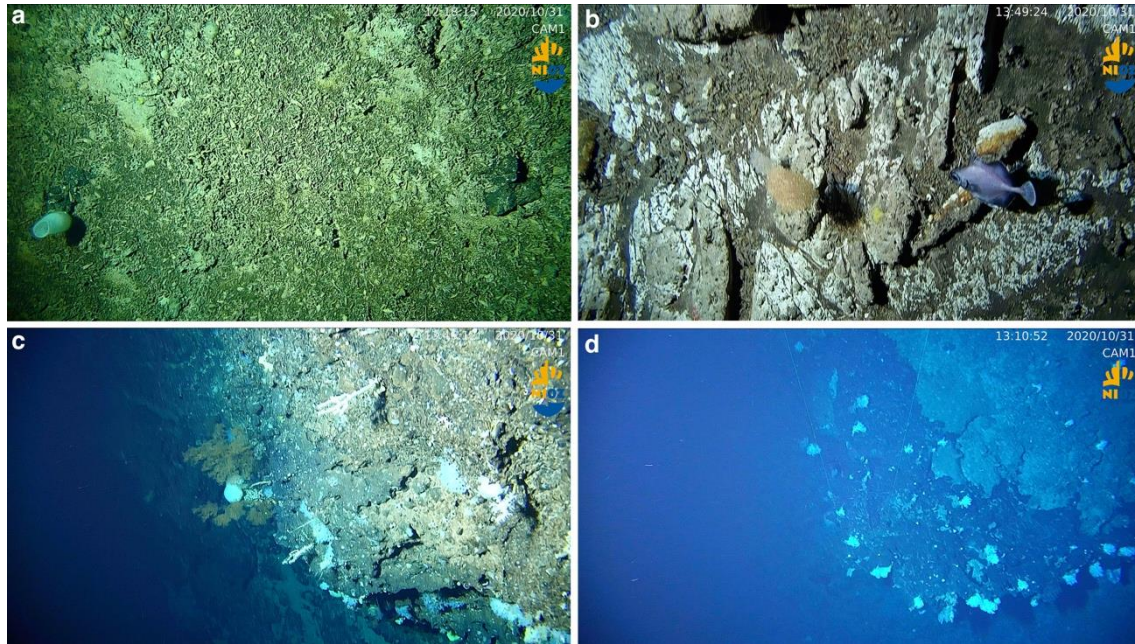


Fig. 3. Screen captures obtained from the video footage recorded by the Hopper tow-cam system during dive 7_1. (a) Accumulations of coral rubble on the slopes of the seamount. (b) One of the several octocorals of the species *Acanella arbuscula* observed scatters along the dive. (c) Large rocky outcrops with several colonies of black corals and octocorals. (d) Aggregation of stylasterids on a large rocky outcrop.

Station 11_1, 1st November 2020

The last dive of the cruise to explore the deep-sea habitats off Terceira took place 10 km southeast of the seamount previously explored in dive 7_1, on a much deeper section. This time, the starting point was located around 500 m deeper, aiming to identify differences in species composition and abundance with respect to the shallowest areas of the seamount. Overall, the transect lasted for around 4.5 km following the top of the ridge, on a south-eastern direction and keeping a similar depth. The seabed was mainly composed of hard substrates for most of the dive, with some areas characterized by the presence of large pebbles and boulders (Fig. 4a). In some rocky outcrops, the diversity of black corals and bamboo corals increase, generating small but diverse patches (Fig. 4b). Differences in species composition with the previous dive were clear, especially with respect of the coral fauna. Several coral species not previously observed appeared throughout the dive, generally in low numbers, such as octocorals (e.g. *Metallogorgia melanotrichos*; Fig. 4c), black corals (e.g. *Bathypathes patula*) and bamboo corals (from the Isididae family, still to be identified). Several glass sponge species were also observed throughout the dive, never generating high-density patches. From the mid-section of the dive onwards, several aggregations of laminate sponges were observed, likely of the genus *Phakellia* (Fig. 4d). Some of the sponges observed attained large sizes, in excess of 60-70 cm in width.

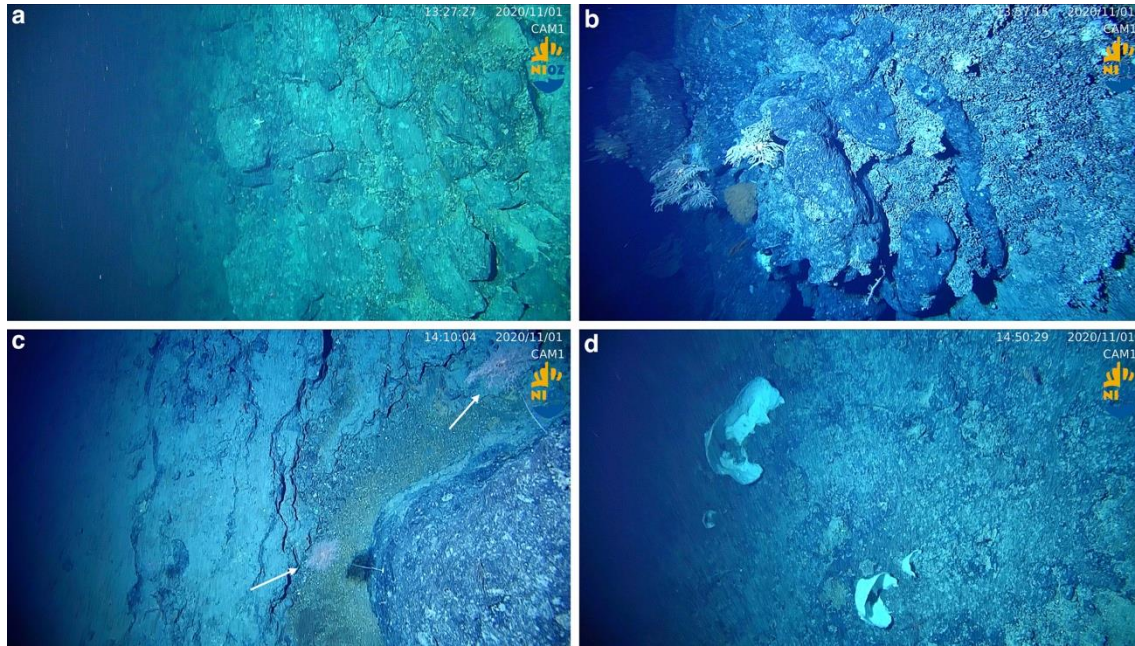


Fig. 4. Screen captures obtained from the video footage recorded by the Hopper tow-cam system during dive 11_1. (a) Accumulation of boulders of different sizes on the slopes of the seamount. (b) Some of the black corals and bamboo corals observed on the rocky outcrops. (c) Two specimens of the octocoral *Metallogorgia melanotrichos* (white arrows), a species seldomly observed in different areas along the dive. (d) One of the several aggregations of laminar sponges of a large size observed towards the mid-end part of the dive.