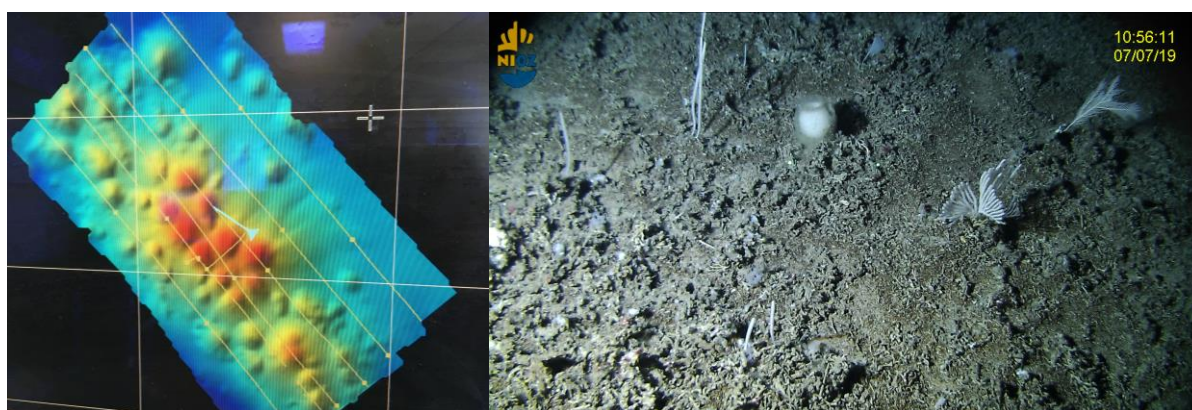


# Cruise report for 64PE456 onboard of R/V Pelagia Terceira Island 2019 - Hopper tow-cam video footage -

(4<sup>th</sup> to 7<sup>th</sup> of July 2019)

## CRUISE REPORT *Date: 07/07/2019*



*Exploration of the deep-sea benthic communities inhabiting important foraging areas for marine mammals and inhabiting São Jorge de Fora seamount (left), a poorly known seamount south of Terceira Island (right). In São Jorge de Fora (right) we found some aggregation of Narella bellissima and Narella versluysi mixed with the sponge cf. Pheronema carpenteri at ca. 700 m.*

# 64PE456 Cruise, Hopper dives

(4<sup>th</sup> to 7<sup>th</sup> of July 2019)

## CRUISE REPORT *Date: 16/07/2019*

**Authors:** Telmo Morato, Gerald H. Taranto

**Objectives:** to explore deep-sea areas of the Azores EEZ to better understand the distribution patterns of large VME species and commercial fishes. Specifically, OKEANOS/IMAR/ATLAS/MapGES/iAtlantic objectives in the cruise were to (i) characterize benthic communities inhabiting seamounts in the Azores, such as São Jorge de Fora seamount, (ii) identify new areas that fit the FAO vulnerable marine ecosystems criteria; 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. The information gathered in this cruise was obtained by means of the Hopper tow-cam system, an HD video platform specially designed to be operated on board of the R/V Pelagia.

**Vessel:** NIOZ R/V Pelagia

### Main achievements:

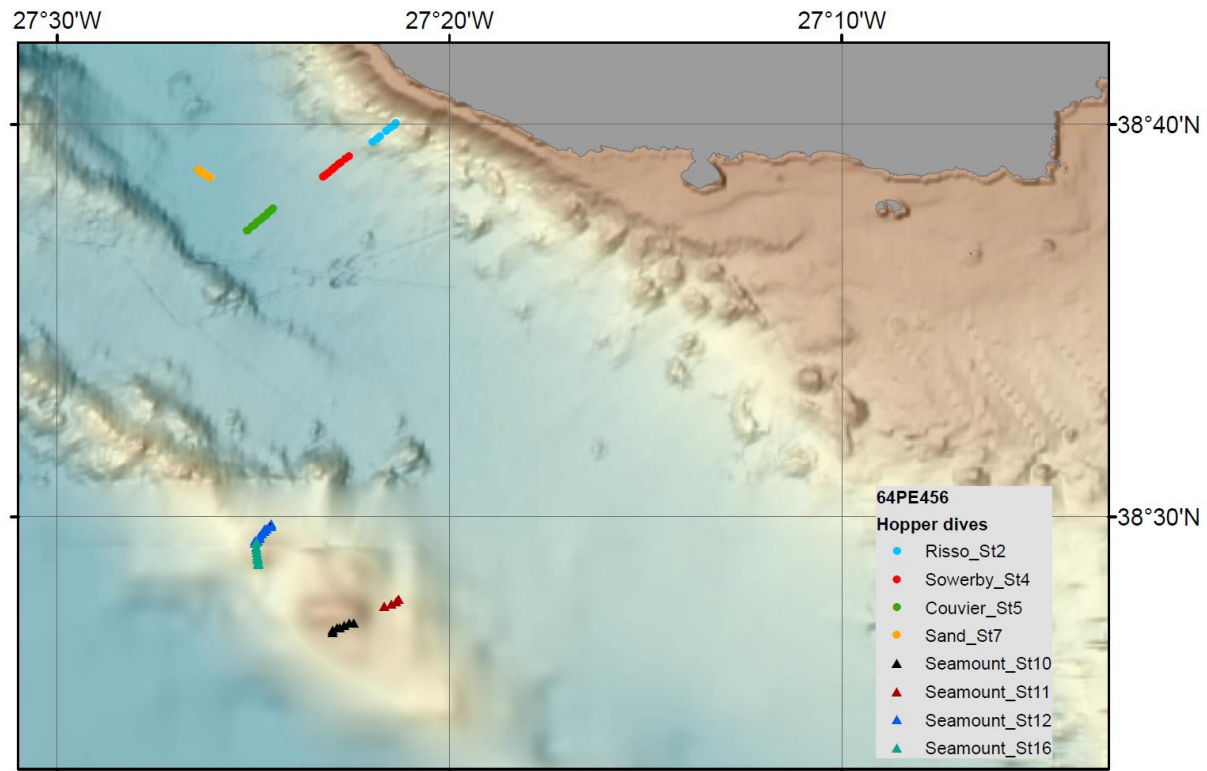
1. Exploration of the deep-sea benthic communities inhabiting important foraging areas for marine mammals and inhabiting São Jorge de Fora seamount, a poorly known seamount south of Terceira Island.
2. 13 hours of HD video footage recorded in unexplored areas of the Azores.

### Summary

During the 64PE456 cruise, we performed 8 hopper dives in total (Table 1), 4 in deep sandy bottom areas known to be important foraging grounds for marine mammals and 4 in the São Jorge de Fora seamount, a poorly known seamount south of Terceira Island (Fig. 1). In total we collected 7:40 hours of video covering 4.5km of mostly sandy bottom in the abyssal plain and about 5:20 hours, covering 3.6km of the seamount seafloor.

**Table 1.** Hopper transects performed during 64PE456 cruise. Start and end depths are in meters; length is in kilometers. \*Vessel positions when the Hopper reached or left the bottom.

St	Date	St Depth	End Depth	St Lat*	St Lon*	End Lat*	End Lon*	Bottom time	Length
02	04/07/19	-670	-960	38.668	-27.355	38.659	-27.366	01h24m	1.43
04	05/07/19	-1160	-1310	38.653	-27.376	38.645	-27.387	01h38m	1.35
05	05/07/19	-1410	-1470	38.621	-27.419	38.631	-27.408	01h31m	1.41
07	05/07/19	-1544	-1576	38.642	-27.431	38.648	-27.440	01h26m	0.56
10	06/07/19	-672		38.451	-27.383	38.455	-27.374	01h02m	0.98
11	06/07/19	-588	-327	38.465	-27.355	38.462	-27.361	00h54m	0.62
12	06/07/19	-790	-750	38.467	-27.409	38.488	-27.416	01h29m	1.10
16	07/07/19	-660	-870	38.489	-27.416	38.480	-27.415	01h24m	1.02

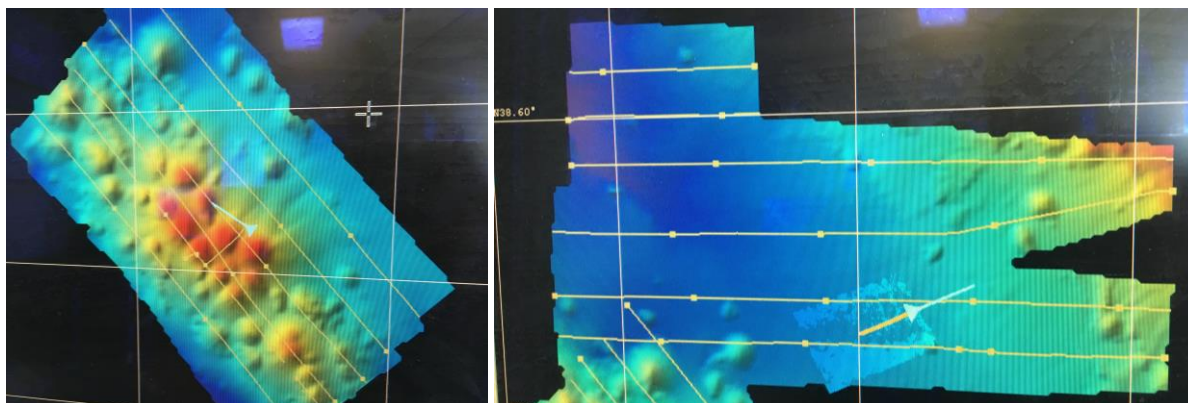


**Figure. 1.** Location of all Hopper dives conducted during the research cruise 64PE456 aimed to explore the benthic communities inhabiting marine mammals feeding grounds and inhabiting São Jorge de Fora seamount.

#### **64PE656. Stations 8 and 14: Bathymetry Surveys**

During the cruise 64PE456 in the South Terceira island area, two multibeam bathymetry surveys were conducted during the nights. In the first survey (St8) we finalised the bathymetry of the São Jorge de Fora seamount; which were started in 2018. Here, 6 transect lines totalising 51nm produce new multibeam data covering an area of 120km<sup>2</sup>. This seamount was revealed to be a linear feature with 20+ peaks of different sizes, heights and shapes (Fig. 2). In the second night, we surveyed (St14) an area between the south shores of Terceira island and the São Jorge de Fora seamount. Here, 6 transect lines totalising 64nm covered 160km<sup>2</sup> of the seafloor. This area revealed to be a flat abyssal plain at around 1,200m depth (Fig. 2).

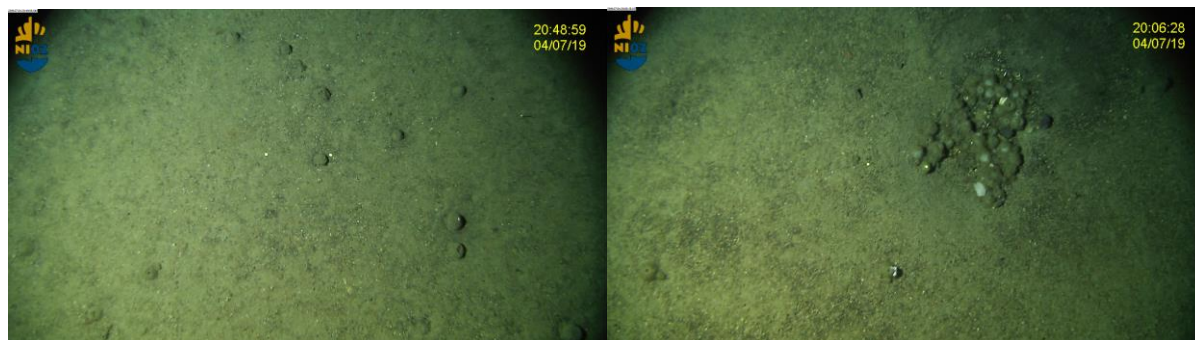




**Figure 2:** Maps of the two multibeam bathymetry surveys; São Jorge de Fora (left) and south of Terceira island (right).

**64PE656, Station 2:** 4<sup>th</sup> July 2019. *South of Terceira slopes; Risso station*

The Hopper tow cam system was deployed in the slopes south of Terceira island, in a Risso's dolphin foraging area, at a depth of about 730 m. The dive covered a distance of 1.4 km along the seabed, on a perfect linear track (Fig. 1). Soft sediment dominated station 2. Benthic communities were characterized by sparse aggregations of Xenophyophores (cf. *Syringamina fragilissima*) and an unidentified reddish sea urchin. The sponge cf. *Pheronema carpenteri* also aggregated in patches (Fig. 3). Solitary corals of the genus *Flabellum* were scattered around the seafloor. The sea urchin *Cidaris cidaris* was found in the deeper portion of the transect. Unidentified small Macroruridae were the most common fish together with an eel like fish (cf. *Synaphobranchus kaupii*). This area looked interesting for sharks with several individuals sighted (mostly from the front camera) apparently belonging to two species (cf. *Daenia* and cf. *Centroscymnus coelolepis*).



**Figure 3.** Examples of some of the benthic communities in Station 2. Sparse aggregations of Xenophyophores (cf. *Syringamina fragilissima*) (left) and the sponge cf. *Pheronema carpenteri* (right).

**64PE656, Station 4:** 5<sup>th</sup> July 2019. *South of Terceira slopes; Sowerby station*

The Hopper tow cam system was deployed in the slopes south of Terceira island, in a Soweby beaked whale foraging area, at a depth of about 1160 m. The dive covered a distance of 1.3 km along the seabed (Fig. 1). The maximum depth reached during the dive was about 1310 m. Soft sediment dominated the whole station 4. Apparently, benthic invertebrates and fish reached lower densities than those in the previous station. The foraminifera cf. *Syringamina fragilissima* was the most abundant organism. The seafloor was characterized by several lebensspuren of unknown origin (Fig. 4). Occasional sightings of *Cidaris cidaris*, reddish sea urchin, Macrouridae and of an eel-like fish (cf.

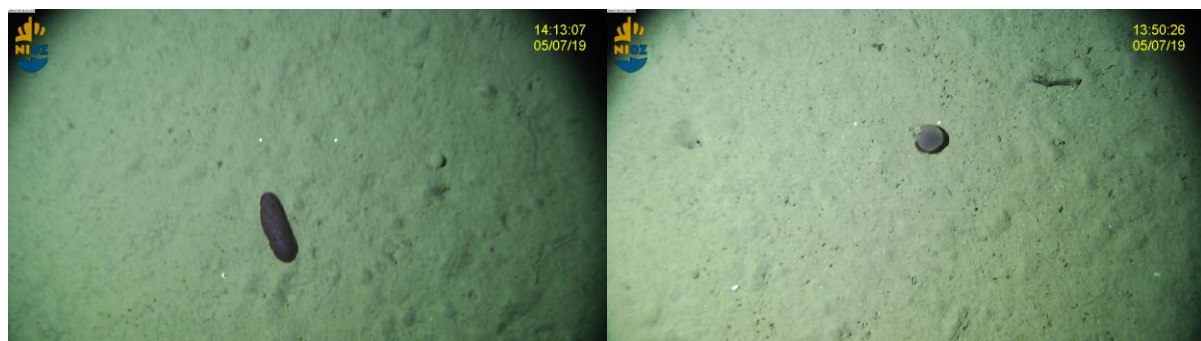
*Synaphobranchus kaupii*). The water column right above the sediment presented high concentrations of Pteropods like organisms (visible from the frontal camera).



**Figura 4.** Examples of some of the benthic communities found in Station 4. The foraminifera cf. *Syringammina fragilissima* with sediment bioturbation (aka lebensspuren) of unknown origin (left), the shrimp *Plesionika edwardsii* and a reddish sea urchin (middle), and the Macrouridae eel-like fish cf. *Synaphobranchus kaupii* (right).

#### **64PE656, Station 5:** 5<sup>th</sup> July 2019. *South of Terceira slopes; Cuvier station*

The Hopper tow cam system was deployed in the slopes south of Terceira island, in a Cuvier's beaked whale foraging area, at a depth of about 1,410 m. The dive covered a distance of 1.4 km along the seabed (Fig. 1) and the maximum depth reached was about 1470 m. Soft sediment dominated the whole station 5. Different species of Echinodermata were quite abundant throughout the dive, in particular two holothurian species (white and purple) together with less common species of Asteroidea and Ophiuroidea (Fig. 5). The soft sediment presented several marks probably produced by small crustaceans. Cf. *Syringammina fragilissima* was less abundant than previous dives as well as fish abundance. The most common fish species were unidentified Macrouridae and cf. *Synaphobranchus kaupii*. A chimera and a shark species were sighted from the front camera.



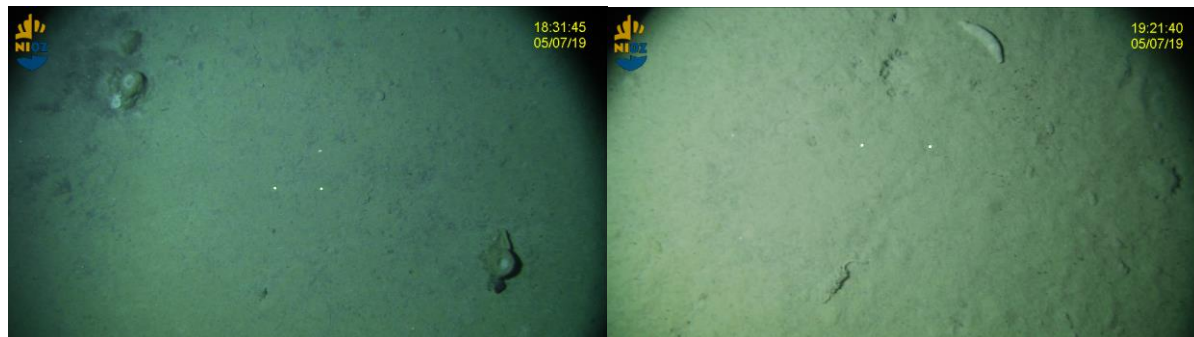
**Figure 5.** Examples of some of the benthic communities found in Station 5. An unknown holothurian (left) and an unknown animal covered by another unknown animal (right)... This is deep-sea science in practice!

#### **64PE656, Station 7:** 5<sup>th</sup> July 2019. *South of Terceira slopes; Sand station*

The Hopper tow cam system was deployed in the slopes south of Terceira island, in a flat area at a depth of about 1540 m. The dive covered a distance of 0.6 km along the seabed (Fig. 1) and was dominated by soft sediment bottom. Different kinds of lebensspuren, probably produced by echinoids, were seen. White and purple holothurians, as well as cf. *Syringammina fragilissima* continued to be quite common. Cf. *Synaphobranchus kaupii*



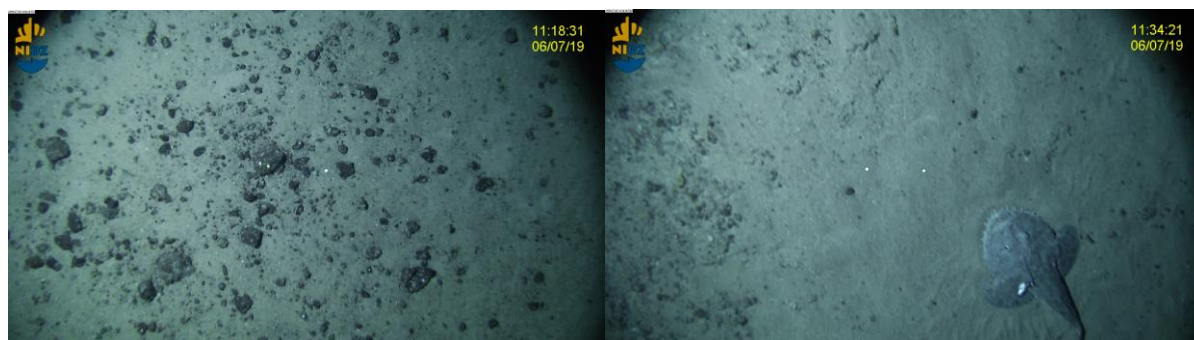
was the most abundant fish. Few patches of lollipop sponges and cf. *Pheronema carpinteri* appeared during the dive (Fig. 6). Few Pennatulacea and Crinoid species were sighted. Aggregations of an identified white and tubular organism were also characteristic of this dive.



**Figure 6.** Examples of some of the benthic communities found on the sandy bottoms of Station 7. The sponge *Pheronema carpinteri* (left) and an unknown white holothurian (right).

**64PE656, Station 10:** 6<sup>th</sup> July 2019. *São Jorge de Fora seamount; SW station*

The Hopper tow cam system was deployed in the slopes of the São Jorge de Fora seamount, at a depth of about 670 m. The dive covered a distance of 1.0 km along the seabed (Fig. 1). The Hopper landed on an area of sand and gravel, with scarce epifauna (Fig. 7) mostly composed of Hexactinellid and other smaller sponges, bryozoans, sparse Xenophyophores (cf. *Syringammina fragilissima*) and few colonies of octocorals, soft and black corals (*Acanthogorgia cf. armata*, *Anthomastus* and *Parantipathes hirondele*). In the second half of the dive, as the Hopper rose toward shallower depths, boulders became more frequent and aggregations of large tubular (cf. *Phakelia robusta*) and globular sponges (*Craniella longipilis*) and *Viminella flagellum* colonies started to be quite common. The most abundant fish species were *Helicolenus dactylopterus*, *Hoplostethus mediterraneus*, *Chaunax pictus* and unidentified Macrouridae, but one monkfish (*Lophius piscatorius*) was also spotted (Fig. 7). Given the high density of lost fishing lines it was decided to abort the transect before the planned end.

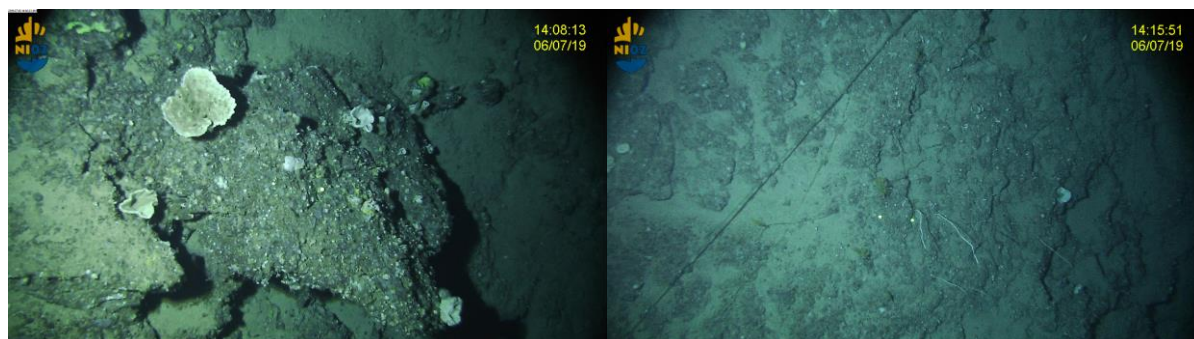


**Figure 7.** Example of the bottom type found in station 10 (left) and one monkfish *Lophius piscatorius* sitting on sand (right).

**64PE656, Station 11:** 6<sup>th</sup> July 2019. *São Jorge de Fora seamount; SE station*

The Hopper tow cam system was deployed in the slopes of the São Jorge de Fora seamount, at a depth of about 590 m. The dive covered a distance of 0.6 km along the

seabed (Fig. 1). Station 11 started on the planned end point of station 10. The first portion of the transect was on sandy areas and presented little benthic epifauna: small sponges, Macrouridae, Crinoids and one black coral species (*Parantipathes hirondele*). The few larger rocks mostly hosted small globular and encrusting sponges, and, only occasionally, larger tubular (cf. *Phakelia robusta*) and flabellate (cf. *Leiodermatium pfeifferae*) sponges and soft corals (*Anthomastus* sp.). The dive profile became gradually steeper and, concurrently, pebbles turned into the main substrate component. However, benthic macrofauna remained scarce until 400m deep, where larger sponges (including cf. *Leiodermatium pfeifferae*, cf. *Phakelia robusta*, *Neophrissospongia* sp. and cf. *Macandrewia azorica*) were more common (Fig. 8). Overall, coral cover was scarce, excluding the presence of *Viminella flagellum* (very common in the Azores) and few colonies of *Acanthogorgia* cf. *armata* on the shallowest areas of the dive. As in the previous station, the elevate number of lost fishing lines put at risk the towed camera system. It was therefore decided to abort the dive before reaching the seamount top.



**Figure 8.** Examples of some of the benthic communities found in Station 11. The sponges *Neophrissospongia* sp. and cf. *Phakelia robusta* (left) and some *Viminella flagellum* in between lost fishing lines (right).

#### **64PE656. Station 12:** 6<sup>th</sup> July 2019. São Jorge de Fora seamount; Central E station

The Hopper tow cam system was deployed in the slopes of the São Jorge de Fora seamount, at a depth of about 790 m. The dive covered a distance of 1.1 km along the seabed (Fig. 1) and reaching close to the summit at around 320m depth. Station 12 started at about 790m on hard bedrock covered by biogenic sediment. Flabellate white sponges (cf. *Pachastrella monilifera*) that became rarer as depth decreased), *Cidaris cidaris*, glass sponges, white stylasterids, probably of the genus cf. *Lepidopora*, cf. *Leptopsammia Formosa* and *Acanella arbuscula* formed a distinctive assemblage. The fish *Hoplostethus mediterraneus* was quite common at this depth. On a vertical apparently a community of the “fossil” Echinodermata *Cyathidium foresti* was sighted, but it needs to be confirmed with a more careful analysis. Above 700m appeared aggregations of *Narella versluysi* and *Narella bellissima* (with cf. *Leptopsammia Formosa* and *Acanella arbuscula*) while cf. *Lepidopora* started to disappear (Fig. 9). Besides *Hoplostethus mediterraneus* other relevant fish species were *Chaunax pictus*, Cf. *Synaphobranchus kaupii* and *Helicolenus dactylopterus*. Two shark species were sighted (cf. *Daenia* sp. and *Dalathias* sp.).





**Figure 9.** Examples of some of the benthic communities found in Station 12. White stylasterids, probably of the genus *cf. Lepidopora* and *Acanella arbuscula* (left), and *cf. Narella versluysi* and *cf. Narella bellissima* (right).

**64PE656, Station 16:** 7<sup>th</sup> July 2019. *São Jorge de Fora seamount; Central W station*

The Hopper tow cam system was deployed at the end of station 12, in the slopes of the *São Jorge de Fora* seamount. It covered a distance of 1.0 km along the seabed (Fig. 1). Station 16 continued from the end point of station 15, reaching the local peak before starting descending toward the seamount base. The dive begun on hard rock at about 660m. There lived a rich community of gorgonians, dominated by *Narella versluysi* and *Narella bellissima*, with occasional large patches of *Pheronema carpinteri*, and other more disperse species including (Fig. 10): *Callogorgia verticillata*, *Pleurocorallium johnsoni*, *Anthomastus* and *Elatopathes abietina*. Above 600m the two *Narella* species started to fade away, while *Anthomastus* and *Callogorgia verticillata* e become more common, together with larger tubular sponges. Reached 600m, the hopper started descending the southern flank of the local peak. While the area right below the shallowest point presented scarcer fauna, as the hopper moved deeper communities of *Narella*, *Pheronema* and *Rossallidae* become common again. Below 800m the community changed again, *Narella* colonies gradually became of smaller sizes, leaving space to *Rossellidae*, other ear-like sponges, *cf. Leptopsammia Formosa* and, less frequently, the stylasterid *Errina cf. dabneyi*. Fish fauna was mostly composed of *Hoplostethus mediterraneus*, *Helicolenus dactylopterus* and *Chaunax pictus*, and another species of shark was sighted (*Hexanchus griseus*).



**Figure 10.** Examples of some of the benthic communities found in Station 16. Communities of *Narella* spp. and *Pheronema* (left) and *Rossallidae* sponges (right).