

A Pictorial Guide to the Epibenthic Megafauna of Orphan Knoll (northwest Atlantic) Identified from In Situ Benthic Video Footage

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ABSTRACT

Wudrick, A., Beazley, L., Culwick, T., Goodwin, C., Cárdenas, P., Xavier, J., and Kenchington, E. 2020. A Pictorial Guide to the Epibenthic Megafauna of Orphan Knoll (northwest Atlantic) Identified from In Situ Benthic Video Footage. Can. Tech. Rep. Fish. Aquat. Sci. 3375: v + 154 p.

In 2010, Fisheries and Oceans Canada led a multidisciplinary oceanographic research mission onboard the Canadian Coast Guard Ship *Hudson* to the Northwest Atlantic Fisheries Organization Regulatory Area to collect benthic imagery and geological data in support of the identification of vulnerable marine ecosystems. Using the remotely operated vehicle ROPOS, six benthic video transects were collected on Orphan Knoll, a submerged circular continental fragment located 550 km northeast of St. John's, Newfoundland. High-resolution video footage, digital still images, and specimen samples were collected between 1655 and 3004 m depth across the flanks and plateau of the knoll and Orphan Seamount. In 2007, the Northwest Atlantic Fisheries Organization implemented a ~15,800 km² closure over Orphan Knoll to restrict the use of bottom-tending fishing gear in accordance with United Nations General Assembly Resolution 61/105. However, at the time, its benthic communities and the presence of vulnerable marine ecosystems had not been fully assessed. Here we present a pictorial guide to the epibenthic megafauna enumerated and taxonomically identified from five ROPOS transects collected on Orphan Knoll and Orphan Seamount. The purpose of this report is to provide a visual representation and taxonomic nomenclature scheme of the epibenthic megafauna of Orphan Knoll for use in future monitoring of the benthic communities of this unique topographic feature.

RÉSUMÉ

Wudrick, A., Beazley, L., Culwick, T., Goodwin, C., Cárdenas, P., Xavier, J., and Kenchington, E. 2020. A Pictorial Guide to the Epibenthic Megafauna of Orphan Knoll (northwest Atlantic) Identified from In Situ Benthic Video Footage. Can. Tech. Rep. Fish. Aquat. Sci. 3375: v + 154 p.

En 2010, Pêches et Océans Canada a mené une mission de recherche océanographique multidisciplinaire à bord du navire de la Garde côtière canadienne Hudson dans la zone de réglementation de l'Organisation des pêches de l'Atlantique Nord-Ouest, afin de recueillir des données géologiques et d'imagerie benthique pour appuyer l'identification des écosystèmes marins vulnérables. À l'aide d'un véhicule télécommandé ROPOS, des images vidéo de six transects benthiques ont été recueillies sur le dôme Orphan, un fragment continental circulaire submergé situé à 550 km au nord-est de St. John's (Terre Neuve). Des séquences vidéo à haute résolution, des images fixes numériques et des échantillons ont été recueillis à des profondeurs de 1 655 m à 3 004 m sur les flancs et le plateau du dôme et du mont sous-marin Orphan. En 2007, l'Organisation des pêches de l'Atlantique Nord-Ouest a mis en place une fermeture d'approximativement 15 800 km² sur le dôme Orphan afin de restreindre l'utilisation des engins de pêche de fond conformément à la résolution 61/105 de l'Assemblée générale des Nations Unies. Toutefois, à cette époque, ses communautés benthiques ainsi que la présence d'écosystèmes marins vulnérables n'avaient pas encore été pleinement évaluées. Nous présentons ici un guide illustré de la mégafaune épibenthique recensée et identifiée sur le plan taxonomique d'après les données de cinq transects obtenues au moyen du véhicule ROPOS sur le dôme et le mont sous-marin Orphan. Le présent rapport vise à fournir une représentation visuelle et un schéma de la nomenclature taxonomique de la mégafaune épibenthique du dôme Orphan, qui pourront être utilisés ultérieurement pour le suivi des communautés benthiques qui peuplent cette entité topographique unique.

INTRODUCTION

Orphan Knoll is a pronounced topographic feature located beyond Canada's exclusive economic zone, 550 km northeast of St. John's, Newfoundland and 350 km north of the Flemish Cap. The main feature of the knoll is a submerged, circular plateau situated approximately 1800 m below sea level, that is marked by a series of protruding mounds and flanked on its north and southeast margins by deep spurs (Parson et al., 1984; van Hinte et al., 1995). Southeast of Orphan Knoll lies one named seamount (i.e., Orphan Seamount), with several un-named seamounts occurring to the east and northeast (Pe-Piper et al., 2013). In 1969, Orphan Knoll was nominated as a potential survey site under the Deep Sea Drilling Project (DSDP; Hay, 2009), and was subsequently sampled under this program in 1970. Initially proposed as a continental fragment that had become separated and left behind during the initial breakup of Europe (hence the name 'Orphan' Knoll; Ruffman, 2011), its continental origin was confirmed by the collection of anthracite-rich, non-marine sandstone from core samples (Ruffman and van Hinte, 1973).

The Northwest Atlantic Fisheries Organization (NAFO), the regional fisheries management organization responsible for fisheries management in the northwest Atlantic high seas, designated Orphan Knoll as a Physical Vulnerable Marine Ecosystem (VME) Indicator Element, for the potential of its hard substrates and complex topography to support benthic VMEs. In addition, Orphan Knoll is considered an Ecologically and Biologically Significant Area by the UN Convention on Biological Diversity (CBD, 2014). Although not technically a seamount, in 2007 NAFO implemented a 'seamount closure' (*sensu* NAFO, 2016) approximately 15,800 km² in size over most of Orphan Knoll to restrict the use of bottom-tending fishing gear in accordance with United Nations General Assembly Resolution 61/105. This closure will remain in effect until its review in 2020.

Orphan Knoll is relatively well described in terms of its topography, surficial geology, oceanographic setting (see Enachescu, 2004; Greenan et al., 2010; Edinger et al., 2011; Pe-Piper et al., 2013; Meredyk et al., 2020), and more recently, its benthic communities (Meredyk, 2017; Lecours et al., 2019). Observations from benthic video transects revealed a highly varied surficial geology, ranging from relatively flat surfaces draped with fine-grained sediments at non-mound locations, to highly sloped regions with bedrock outcroppings covered by talus and ice-drafted debris at mound locations (Meredyk et al., 2020). These diverse geomorphic features support its rich epibenthic megafaunal communities (Meredyk, 2017; Lecours et al., 2019). While a previous study on the oceanography and lower trophic level biology of Orphan Knoll (see Greenan et al., 2010) gave little evidence to support an enhanced lower trophic level biology in the water column above the knoll, near-bottom current measurements revealed a mean anti-cyclonic (clockwise) circulation at and above the knoll known as a Taylor column, which

may have important implications for the benthic community. Additional measurements from a Lowered Acoustic Doppler Current Profiler (LADCP) and Argo floats in the area further support the presence of a clockwise circulation, with stronger current flow on the eastern side of the knoll compared to its northern and western sides, and high variability in flow velocity and direction on the summit. Anti-cyclonic circulation and the presence of Taylor columns have been previously cited as a possible mechanism for seamount endemism via the retention of gametes and larvae (Mullineaux and Mills, 1997).

In 2010, the Department of Fisheries and Oceans Canada (DFO) in collaboration with academic participants conducted a multidisciplinary oceanographic expedition onboard the Canadian Coast Guard Ship (CCGS) *Hudson* to the NAFO Regulatory Area (NRA) to collect data in support of the identification and characterization of VMEs as part of Canada's contribution to the NEREIDA program (i.e., NAFO Potential Vulnerable Marine Ecosystems - Impacts of Deep-Sea Fisheries; <https://www.nafo.int/Portals/0/PDFs/NEREIDA/diptico-nereida.pdf?ver=2016-08-09-104633-013>). During this mission, the remotely operated vehicle (ROV) ROPOS was deployed to collect high-resolution benthic video and photographic data on both Flemish Cap and Orphan Knoll. A total of six ROPOS benthic imagery (continuous video and high-resolution digital still photographs) transects were collected on Orphan Knoll and Orphan Seamount, with the aim of describing the benthic biodiversity and geological landscape of the flanks and plateau of the knoll and its associated seamount. Although these transects have been the subject of subsequent analyses to describe the benthic communities of Orphan Knoll (see Meredyk, 2017; Lecours et al., 2019), a detailed inventory of the observed taxa has not yet been published.

Here we present a pictorial reference to the epibenthic megafauna enumerated and taxonomically identified from five ROPOS transects collected on Orphan Knoll and Orphan Seamount. Representative images, taxonomic descriptions and classification ranking according to the World Register of Marine Species (WoRMS) are provided for each observed taxon. The intent of this report is to provide a visual representation and taxonomic nomenclature scheme of the epibenthic megafauna of Orphan Knoll for use in future initiatives aimed at monitoring the benthic communities of this unique topographic feature.

MATERIALS AND METHODS

Data Collection

Between July 19 and July 25, 2010, high-resolution continuous video footage and digital still images (DSCs) were collected on Orphan Knoll and Orphan Seamount during six deployments of the tethered ROV ROPOS (Remotely Operated Platform for Ocean Science, www.ropos.com), deployed from the CCGS *Hudson*. ROPOS is a 40 hp Science/Work-Class ROV owned and operated by the non-profit Canadian Scientific Submersible Facility (CSSF) based in North Saanich, British Columbia, Canada. High-resolution continuous video footage was collected via forward- and downward-facing 1080p colour video cameras, and digital still images via a 5-megapixel camera. Two parallel laser beams set 10 cm apart were used for scale. Additionally, ROPOS was fitted with two hydraulically-operated manipulator arms used to collect biological and geological samples, and sediment push cores along its dive path.

Originally, 10 deployments of ROPOS were planned for Orphan Knoll and its associated seamount, but due to inclement weather, only six deployments were possible. Five transects were collected on the plateau and flanks of Orphan Knoll, and one on Orphan Seamount (Figure 1). Most transects were designed with a 1 x 1 km orthogonal grid pattern (see Appendix A), where the ROV traversed in one direction (normally along contours) for 1 km, and moved 90° to then traverse (normally) upslope. This transect design serves to optimize interpolation of biological distribution and its association with abiotic factors (e.g., depth, slope, elevation, substrate, etc.). On dives 1343, 1345, and 1346, ROPOS had two modes of operation while traversing along its planned route: 'Explorer Mode' and 'Transect Mode'. When in 'Transect Mode' the ROV was kept at a constant forward velocity and altitude as it travelled towards a predetermined waypoint without stopping. While in 'Explorer Mode', the ROV was biased towards interesting observations and was often stopped to collect photographs and specimens along its pre-determined route. On these four dives, Transect Mode was often conducted along contours, with Explorer Mode occurring upslope. Dives 1341 and 1342 were conducted solely in Explorer Mode, as their purpose was to survey three irregularly-distributed mound features and to retrieve a previously deployed benthic mooring, respectively. Dive 1340 was intended to be conducted in both Transect and Explorer modes as it traversed up the slope of Orphan Seamount. However, frequent specimen collection and exploration along its route rendered the dive as Explorer Mode only. Appendix A contains a spatial representation of each transect, and the portion of each transect spent in 'Explorer Mode' and 'Transect Mode'.

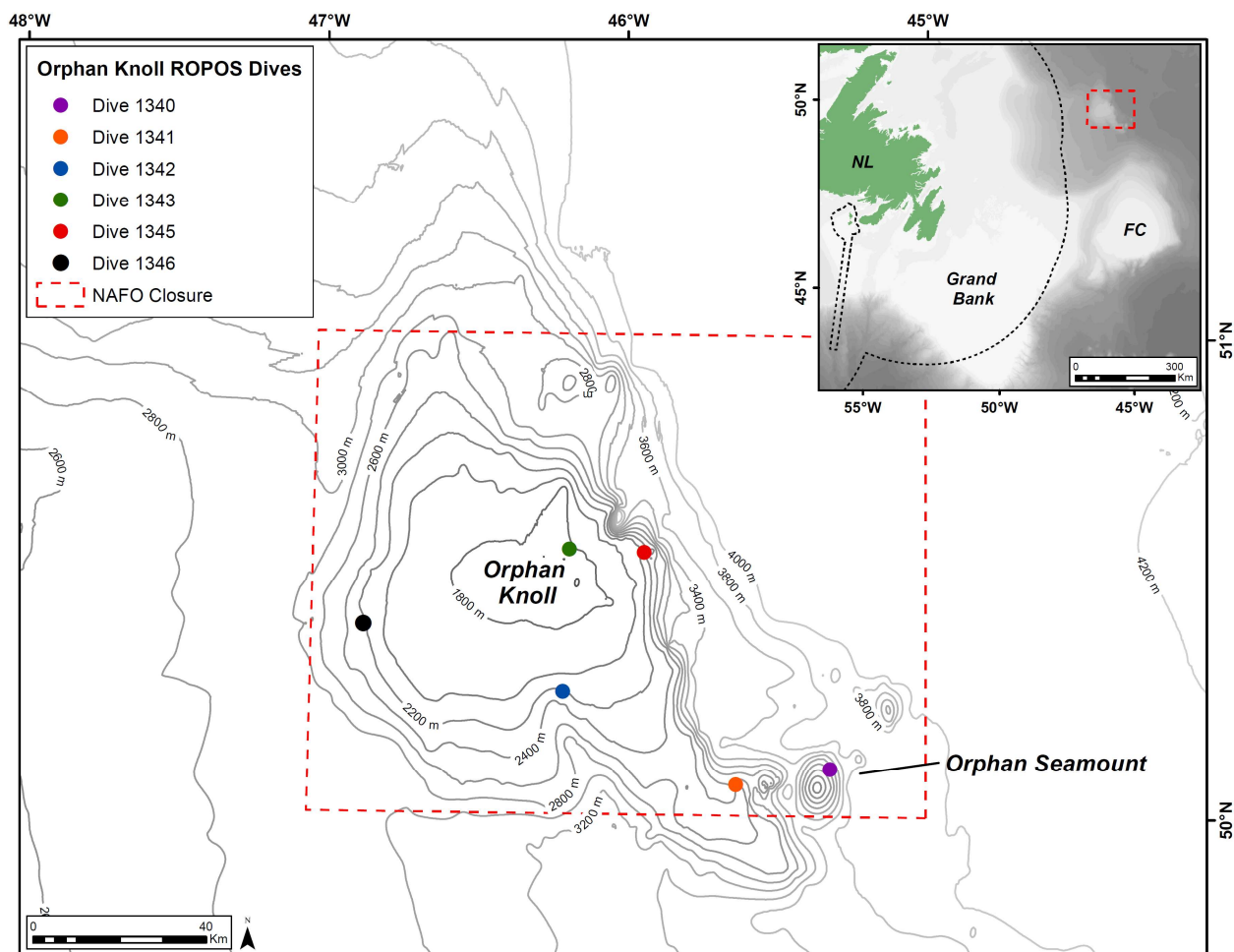


Figure 1. Location of the six ROPOS deployments on Orphan Knoll and Seamount made during the HUD2010-029 oceanographic mission onboard CCGS *Hudson*. Also shown is the NAFO bottom fishery closure (red dash). Labels in inset are as follows: NL = Newfoundland, FC = Flemish Cap. Logistical details associated with each dive are summarized in Table 1.

Video Transect Analysis

Of the six transects collected, only five were analyzed for inclusion in this report. Dive 1342 was excluded as its purpose was to recover a benthic oceanographic mooring where the ROV traversed over areas in a diagonal search pattern, which often resulted in the ROV covering the same area of seabed multiple times. The remaining five video transects were annotated using the in-house software ClassAct Mapper, version 3.24, (see Figure 2) designed by Robert Benjamin of the Bedford Institute of Oceanography in Dartmouth, NS. Using an acoustic modem (Geostamp© Audio, Intuitive Circuits, LLC, Troy, Michigan, USA), ClassAct Mapper decodes navigational data (Greenwich Mean Time, or GMT, and latitude and longitude) embedded in the audio track of the video files during data collection. Customized buttons (Figure 2) allow for entry of the taxonomic identity of different fauna as they are encountered, and the time and position (latitude and

Table 1. General location, depth (minimum (min), maximum (max), on bottom/off bottom), on bottom/off bottom latitude (Lat) and longitude (Long) (in decimal degrees, DD), and the total distance of seabed sampled of six ROPOS dives collected on Orphan Knoll and Orphan Seamount during the HUD2010-029 oceanographic mission. Note that Dive 1342 was not analyzed as part of this report. Additional information and maps of each dive can be found in Appendix A.

Dive ID	General Location	Min/Max Depth (m)	On/Off Bottom Depth (m)	Average Depth (m)	On Bottom Lat/Long (DD)	Off Bottom Lat/Long (DD)	Total Distance (m)
1340	Orphan Seamount	1862/ 3004	3000/ 1922	2455	50.10958/ -45.31734	50.08567/ -45.35960	11 515
1341	Orphan Knoll	2326/ 2897	2873/ 2390	2630	50.07617/ -45.62168	50.05918/ -45.60794	7387
1342	Orphan Knoll	2048/ 2196	2156/ 2095	2142	50.26622/ -46.18670	50.27021/ -46.17727	9867
1343	Orphan Knoll	1656/ 1853	1852/ 1727	1749	50.56306/ -46.17096	50.55197/ -46.19314	8232
1345	Orphan Knoll	2240/ 2371	2370/ 2241	2279	50.55827/ -45.92720	50.56272/ -45.94497	4522
1346	Orphan Knoll	2162/ 2272	2269/ 2162	2207	50.39852/ -46.83847	50.40612/ -46.82259	4663

longitude) of observed taxa are directly recorded into a Microsoft Access database linked to ClassAct Mapper. Drop-down menus allow for the per-second recording of categorical observations, such as substrate type, ROV behaviour, etc. A full description of the features of ClassAct Mapper can be found in Sameoto et al. (2008).

Although both forward and downward-facing video were collected by ROPOS, only the downward-facing video was chosen for quantitative analysis as its field of view was considered more consistent. The video footage was viewed in VLC Media Player (version 2.2.1) consecutively with ClassAct Mapper engaged, and all epibenthic megafauna, including both non-motile and motile taxa, were enumerated and identified to the lowest possible taxonomic level. The resolution of the video when ROPOS was landed allowed for the identification of fauna ≥ 2.5 cm. Care was taken to ensure that organisms were enumerated only once in adjacent frames.

For those taxa not recorded to genus or species, the taxonomic level was indicated in brackets after each taxon, where (P.) = Phylum, (C.) = Class, (Sub. C) = Subclass, (I. C.) = Infraclass, (O.) = Order, (Sub. O) = Suborder, (Sup. F) = Superfamily, (F.) = Family,

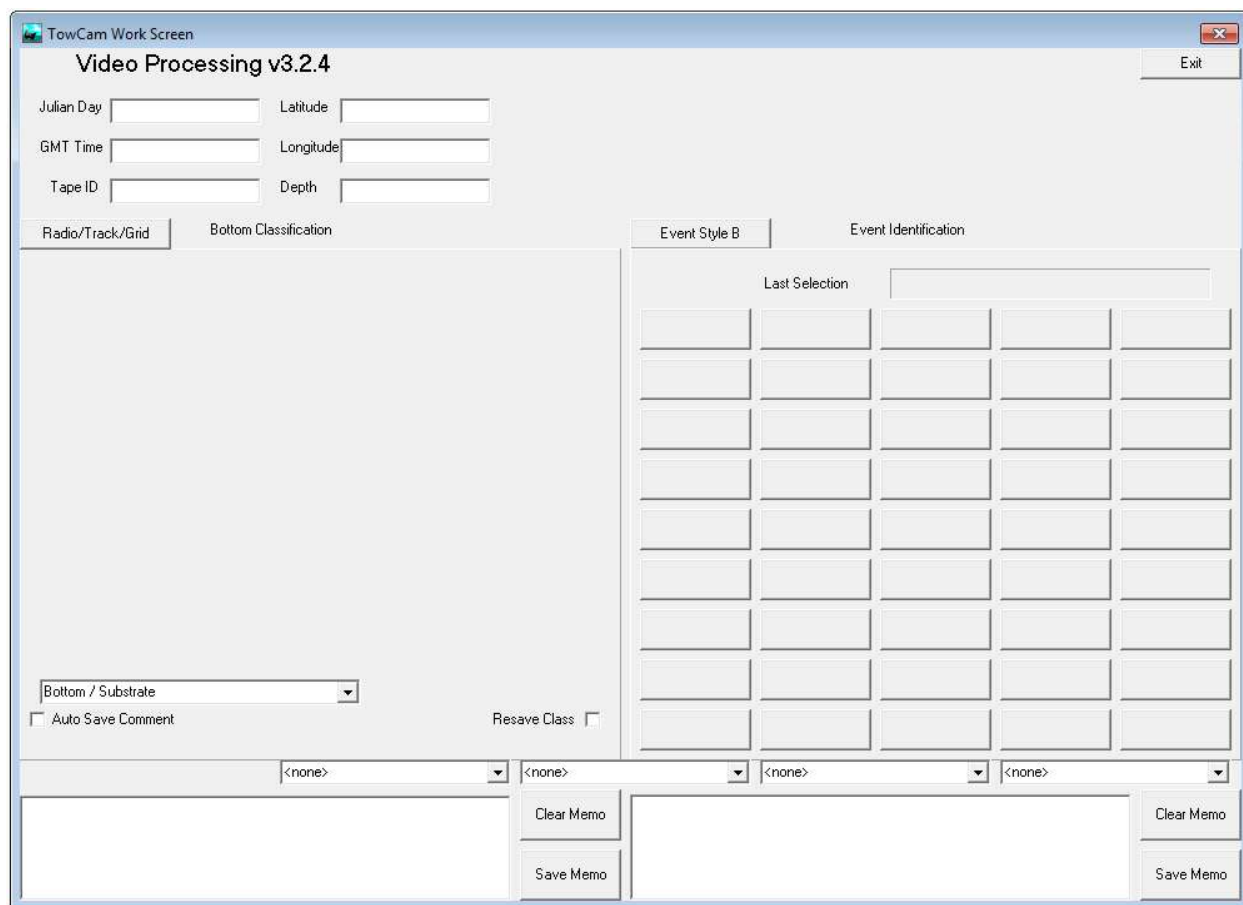


Figure 2. Depiction of the main graphical user interface of the video annotation software ClassAct Mapper. In the upper left corner the embedded location and time data is displayed as it is decoded by Geostamp. The right panel contains programmable buttons used for recording individual species/taxa. The bottom of the interface contains programmable drop-down menus to record per-second observations, and entry boxes where comments can be made.

and (Sub. F) = Subfamily. Fauna that could not be identified down to the species level were given mutually exclusive morphotype designations (e.g., *Pennatula* sp. 1), where the 'sp.' indicates the presence of a single species. Taxa that could not be consistently separated due to a high degree of similarity in their morphological features were grouped together into a single taxon and given an 'spp.' designation (e.g., Malacostraca (C.) spp.). In the event that multiple species from the same taxonomic level were suspected to be present but could not be consistently discerned, taxa were grouped into mutually exclusive 'types', where members followed a consistent theme (e.g., Keratoisnidae (Sub. F.) Type 1, consisting of more than one species of branching bamboo coral). Occasionally the applied nomenclature consisted of a combination of genera suspected to occur in the region (e.g., *Anthomastus/Heteropolypus/Pseudoanthomastus* spp.), but that could not be differentiated without physical examination of specimens. Any organism that could not be identified to the phylum level were recorded as 'Unidentified' and given a sequential

number (e.g., Unidentified 1). Unidentified taxa are not shown in this report, but will be kept for consideration in future analyses of the data.

Given the difficulty in identifying members of the phylum Porifera from video, different species with consistent superficial morphologies were occasionally grouped together and assigned a morphotype descriptor (e.g., Massive-Globose Porifera spp.), based generally on the morphotype classifications of Ackers et al. (2007). In some cases, collected specimens that were subsequently examined through morphological and/or molecular approaches aided in the identification of the taxa presented in this report.

Even as ROPOS operated in Transect Mode, its position in relation to the seabed and field of view of the video sometimes varied due to the presence of raised topographic features (e.g., bedrock outcrops), exploration of high-sloped areas, or other operational requirements, affecting the ability to detect and consistently differentiate organisms on the seabed. Categorical descriptors of the ROV's altitude above the seabed and field of view were recorded each second using the drop-down menu function of ClassAct Mapper. Examples of each category are provided in Appendix B, and could be used in future analyses to subset sections of the video and data by quality. As only counts of individuals are provided in this report, the removal of video sections not optimal for quantitative analysis was not done here. Such an exercise could be undertaken in the future for the calculation of area sampled and the standardization of the data to individuals per m⁻².

The optimal height above bottom and field of view is indicated by the 'Optimal Altitude' descriptor (Appendix B). Although epibenthic megafauna were visible in the 'Off Bottom Levels 1 and 2' categories, they often could not often be identified to a high taxonomic resolution or consistently differentiated from one another. In cases where overlap between different taxa were suspected to occur due to the variable altitude of the ROV when the taxa were observed, a comment is provided along with the taxon description in the catalogue below (see Scleractinia (O.) sp. 1 and Scleractinia (O.) spp.). While such taxa could be distinguished under optimal conditions, their potential overlap under sub-optimal conditions may require their combination for multivariate community analyses. Often when the ROV's altitude was high off the seabed, sponges could be detected but not identified with a high degree of accuracy. In these instances, sponges were recorded and assigned general taxonomic and/or morphological descriptors and assigned the suffix 'Off Bottom' (e.g., Cylindrical Hexactinella_Off Bottom; see catalogue section 'Porifera Off Bottom' below for more details). These morphotype groups likely overlap with identified taxa/morphotypes, and are therefore only useful to indicate presence or abundance at the phylum level. Fauna were not recorded in sections of video where the ROV was so high that the seabed could not be detected ('Seabed Undetected'; Appendix B). Similarly, in situations where there were many individuals in the frame and ROPOS was moving too quickly or too high off bottom to discern individual count, even with the video paused, the best conservative estimate of their abundance was made.

CATALOGUE OF EPIBENTHIC MEGAFUNA OF ORPHAN KNOLL

The following section is a photographic catalogue of the epibenthic megafauna enumerated from five ROPOS video transects collected on Orphan Knoll and Seamount. The catalogue is ordered alphabetically by phylum, and the taxa within organized into major taxonomic groups with individual taxa ordered from highest taxonomic resolution (genus or species level) to lowest (phylum). An exception to this is phylum Porifera, where demosponges, hexactinellids, and unknown sponges are organized by morphotype group. The nomenclature applied to each taxon follows the WoRMS classification system. However, both the WoRMS AphiaID and the Integrated Taxonomic Identification System (ITIS) Taxonomic Serial Number (TSN) are shown for each taxon, when applicable. A brief description of the gross morphological features used to identify and distinguish each taxon is also provided. Representative photos are a combination of both DSCs and video screen grabs captured using the graphical design software PicPick®, then cropped/edited in Adobe Photoshop version CS2®. Consequently, some of the resulting images, particularly the video frame grabs, are of poor quality. While some DSCs and frame grabs naturally included the 10-cm scaling lasers of ROPOS, most specimens were not oriented in such a way that the lasers could be included.

Table 2 shows the number of taxa/morphotypes and total number of individuals for each phylum observed across all five dives, while Table 3 shows the total number of individuals by transect, as well as the average depth and temperature of their observations. The Porifera was the most abundant and diverse phylum (abundance estimate includes those sponges in the 'Porifera Off Bottom' catalogue), followed by the Echinodermata and Cnidaria.

Table 2. Total number of taxa/morphotypes and number of individuals per phylum of epibenthic megafauna observed across all five ROPOS transects collected on Orphan Knoll and Seamount.

Phylum	Number of taxa/morphotypes	Total number of individuals
Annelida	5	393
Arthropoda	10	490
Bryozoa	1	384
Chordata	18	503
Cnidaria	50	11,651
Echinodermata	62	13,185
Hemichordata	2	1,852
Mollusca	4	16
Porifera	95	87,633

Table 3. Total number (N) of individuals of each taxon/morphotype, abundance by transect, and the mean depth (m) and temperature (°C) of their observations across all five ROPOS transects collected on Orphan Knoll and Orphan Seamount. Taxa are organized by phylum. Average depth and temperature are \pm standard deviation.

	N	1340	1341	1343	1345	1346	Mean depth (m)	Mean temperature (°C)
Annelida								
Aphroditidae (F.) sp. 1	353	51	3		151	148	2244 \pm 88	2.94 \pm 0.07
Polynoidae (F.) sp. 1	1					1	2231	3.01
Serpulidae (F.) sp. 1	1			1			1684	3.33
Serpulidae (F.) sp. 2	1			1			1804	3.33
Terebellida (C.) sp. 1	37			37			1807 \pm 0	3.34 \pm 0.01
Arthropoda								
<i>Colossendeis</i> sp. 1	8	1		3	1	3	2161 \pm 432	3.02 \pm 0.32
<i>Colossendeis</i> sp. 2	17	11	1	4	1		1974 \pm 195	3.16 \pm 0.16
Galatheaidea (Sup. F) sp. 1	60	25	6		17	12	2295 \pm 104	2.93 \pm 0.08
Galatheaidea (Sup. F) sp. 2	209	83	124	1	1		2627 \pm 206	2.68 \pm 0.17
Galatheaidea (Sup. F) sp. 3	1		1				2491	2.97
Pleocyemata (Sub. O.) sp. 1	2	1	1				2813 \pm 91	2.54 \pm 0.06
Pleocyemata (Sub. O.) sp. 2	19	14	5				2754 \pm 147	2.58 \pm 0.14
Cirripedia (I. C.) sp. 1	29	21	8				2468 \pm 264	2.85 \pm 0.24
Malacostraca (C.) sp. 7	13		9	1	1	2	2469 \pm 302	2.80 \pm 0.20
Malacostraca (C.) spp.	132	107	8	10	3	4	2130 \pm 309	3.07 \pm 0.23
Bryozoa								
Bryozoa (P.) sp. 1	384	38	345			1	2597 \pm 155	2.72 \pm 0.14

Chordata								
<i>Apristurus manis</i>	1			1			1808	3.34
Rajidae sp. 1	3	1	1		1		2639 ± 381	2.60 ± 0.25
<i>Hydrolagus affinis</i>	1				1		2277	2.92
<i>Antimora rostrata</i>	31	8	3	14	2	4	2033 ± 265	3.12 ± 0.20
<i>Bathysaurus ferox</i>	4	2	1			1	2507 ± 262	2.78 ± 0.21
<i>Lipogenys gillii</i>	12	6		3	2	1	2147 ± 293	3.04 ± 0.21
Alepocephalidae (F.) sp. 1	3	1		2			1798 ± 171	3.28 ± 0.12
Halosauridae (F.) sp. 1	15	3		8	2	2	2010 ± 214	3.14 ± 0.18
Halosauridae (F.) sp. 2	13	7	1	4	1		2244 ± 413	2.97 ± 0.31
Macrouridae (F.) sp. 1	368	108	82	112	15	51	2269 ± 390	2.96 ± 0.29
Anguilliformes (O.) sp. 1	13	9	1		1	2	2374 ± 362	2.86 ± 0.28
Scorpaeniformes (O.) sp. 1	6	2	4				2503 ± 275	2.79 ± 0.22
Gadiformes (O.) sp. 1	13	1	3	6	3		2077 ± 335	3.07 ± 0.26
Gadiformes (O.) sp. 3	2			2			1761 ± 25	3.32 ± 0.02
Actinopterygii (C.) sp. 1	10	7	3				2787 ± 108	2.56 ± 0.09
Actinopterygii (C.) sp. 3	1	1					2740	3.60
Actinopterygii (C.) sp. 4	2	2					2371 ± 174	2.90 ± 0.10
Actinopterygii (C.) sp. 5	5	5					2039 ± 114	3.12 ± 0.07
Cnidaria								
Ceriantharia (Sub. C.) sp. 1	539	29	18	308	44	140	1985 ± 288	3.14 ± 0.22
Ceriantharia (Sub. C.) sp. 2	16	5			3	8	2371 ± 269	2.86 ± 0.16
<i>Actinernus nobilis</i>	8	8					2009 ± 82	3.18 ± 0.03

<i>Actinoscyphia</i> sp. 1	5	3	2				2707 ± 68	2.61 ± 0.08
Hormathiidae (F.) sp. 1	2	2					2746 ± 0.01	2.62 ± 0.02
Hormathiidae (F.) sp. 2	1	1					1884	3.20
Hormathiidae (F.) sp. 3	1	1					2147	3.12
Actiniaria (O.) sp. 3	2		1	1			2193 ± 585	2.98 ± 0.43
Actiniaria (O.) sp. 8	55	15	35	1	3	1	2516 ± 212	2.79 ± 0.17
Actiniaria (O.) sp. 10	1			1			1718	3.34
Actiniaria (O.) sp. 11	24	4	20				2687 ± 99	2.66 ± 0.08
Actiniaria (O.) sp. 12	239	124	111	2		2	2395 ± 302	2.88 ± 0.23
Actiniaria (O.) sp. 17	215		2	208		5	1742 ± 147	3.32 ± 0.10
Actiniaria (O.) sp. 20	1		1				2165	2.94
Actiniaria (O.) spp.	2		1	1			2263 ± 594	2.97 ± 0.47
<i>Stauropathes arctica</i>	3	3					2441 ± 439	2.91 ± 0.24
<i>Telopathes magnus</i>	12		12				2678 ± 90	2.66 ± 0.08
<i>Bathypathes</i> sp. 1	42	8	7	12	6	9	2252 ± 375	2.96 ± 0.29
Antipatharia (O.) sp. 2	2		2				2673 ± 1.38	2.66 ± 0.02
Antipatharia (O.) sp. 6	1	1					2242	3.07
<i>Desmophyllum dianthus</i>	3	1		1	1		2195 ± 379	3.01 ± 0.26
<i>Flabellum alabastrum</i>	35			32	3		1768 ± 171	3.29 ± 0.13
Scleractinia (O.) sp. 1	310	208	2	39	28	33	2145 ± 210	3.05 ± 0.16
Scleractinia (O.) spp.	141	32	6	67	22	14	2002 ± 288	3.14 ± 0.22
Zoantharia (O.) sp. 1	46	42	4				2043 ± 211	3.14 ± 0.15
<i>Anthomastus/Pseudoanthomastus/Heteropolypus</i> spp.	199	101	39	22	26	11	2350 ± 322	2.89 ± 0.24

Nephtheidae (F.) sp. 1	1		1			2862	2.52
Clavulariidae (F.) sp. 1	6725	6725				1952 ± 19	3.18 ± 0.03
Clavulariidae (F.) sp. 2	1	1				2750	2.55
<i>Acanella arbuscula</i>	6	1		4	1	1924 ± 228	3.21 ± 0.16
<i>Acanthogorgia armata</i>	3	3				2021 ± 19	3.19 ± 0.08
<i>Hemicorallium bathyrubrum</i>	28		28			2627 ± 14	2.68 ± 0.03
<i>Isidella</i> sp. 1	15	10	5			2647 ± 313	2.68 ± 0.23
<i>Paragorgia</i> sp. 1	1	1				2314	2.98
<i>Paramuricea</i> sp. 1	2	2				1996 ± 5	3.15 ± 0.02
<i>Swiftia</i> sp. 1	2	1		1		1840 ± 221	3.24 ± 0.11
Keratoisidinae (Sub. F.) Type 1	565	523	42			2190 ± 322	3.02 ± 0.25
Keratoisidinae (Sub. F.) Type 2	58	23	34	1		2700 ± 257	2.63 ± 0.21
Keratoisidinae (Sub. F.) sp. 1	2		2			2672 ± 0.57	2.67 ± 0.03
Chrysogorgiidae (F.) Type 1	2237	729	1489		13 6	2694 ± 138	2.63 ± 0.11
Chrysogorgiidae (F.) Type 2	58	51	7			2722 ± 298	2.60 ± 0.24
Alcyonacea (O.) sp. 1	1	1				2750	2.54
Alcyonacea (O.) sp. 2	2	2				2282 ± 57	2.93 ± 0.04
<i>Anthoptilum grandiflorum</i>	17	17				2001 ± 128	3.16 ± 0.09
<i>Pennatula</i> sp. 1	1	1				2133	3.02
<i>Umbellula</i> sp. 1	3	1	1	1		2428 ± 578	2.83 ± 0.41
Pennatulacea (O.) sp. 1	6	5	1			2309 ± 172	2.93 ± 0.16
Anthoathecata (O.) sp. 1	1				1	2164	3.02
Hydrozoa (C.) sp. 1	6	6				2576 ± 135	2.73 ± 0.14

Hydrozoa (C.) sp. 2	5	2	3				2687 ± 59	2.66 ± 0.07
<i>Echinodermata</i>								
Freyellidae (F.) spp.	356	152	187	5	7	5	2398 ± 205	2.87 ± 0.16
cf. <i>Zoraster</i> sp. 1	1			1			1741	3.40
Goniasteridae (F.) sp. 1	31	4			17	10	2252 ± 59	2.93 ± 0.05
Solasteridae (F.) sp. 1	9	6	1	2			2300 ± 502	2.92 ± 0.37
Pterasteridae (F.) sp. 1	184	1	5	29	34	115	2159 ± 203	3.00 ± 0.16
Pterasteridae (F.) sp. 2	37	13	14				2644 ± 299	2.66 ± 0.21
Pterasteridae (F.) sp. 3	22	7	1	6	7	1	2194 ± 294	3.00 ± 0.22
Asteroidea (C.) sp. 5	271	88	2	75	68	38	2143 ± 224	3.04 ± 0.18
Asteroidea (C.) sp. 7	70	27	3	24	10	6	2107 ± 304	3.08 ± 0.22
Asteroidea (C.) sp. 9	8	5		3			1871 ± 184	3.25 ± 0.14
Asteroidea (C.) sp. 14	90	50	7	2	16	15	2292 ± 258	2.94 ± 0.19
Asteroidea (C.) sp. 15	89	32	4	7	21	25	2262 ± 235	2.95 ± 0.17
Asteroidea (C.) sp. 21	104	52	4	4	22	22	2229 ± 197	2.97 ± 0.16
Asteroidea (C.) sp. 28	63	32	3	3	8	17	2232 ± 246	2.97 ± 0.19
Asteroidea (C.) sp. 29	22	11	4		6	1	2425 ± 190	2.85 ± 0.10
Asteroidea (C.) sp. 33	71	3			15	53	2227 ± 34	2.95 ± 0.05
Asteroidea (C.) sp. 56	3	2	1				2609 ± 590	2.68 ± 0.44
Asteroidea (C.) sp. 60	1	1					2355	2.95
Asteroidea (C.) sp. 65	1	1					1879	3.20
Asteroidea (C.) sp. 66	2	2					0.21	0.02
Bourgueticrinina (Sub. O.) sp. 1	189	1		64		124	2076 ± 192	3.07 ± 0.17

Bourgueticrinina (Sub. O.) sp. 2	1927	1	1	1788	7	130	1787 ± 159	3.29 ± 0.12
Bourgueticrinina (Sub. O.) sp. 6	19	4	5	10			2106 ± 454	3.07 ± 0.34
Bourgueticrinina (Sub. O.) sp. 7	6		5		1		2582 ± 204	2.71 ± 0.14
Bourgueticrinina (Sub. O.) sp. 9	1				1		2243	2.91
Bourgueticrinina (Sub. O.) sp. 10	121			6	1	114	2197 ± 91	2.97 ± 0.09
Bourgueticrinina (Sub. O.) sp. 13	2	2					2185 ± 133	3.06 ± 0.07
Bourgueticrinina (Sub. O.) sp. 14	26	26					2172 ± 108	3.05 ± 0.09
Bourgueticrinina (Sub. O.) sp. 15	3	3					2051 ± 59	3.14 ± 0.04
Bourgueticrinina (Sub. O.) Type 1	157	107	25	7	18		2451 ± 341	2.82 ± 0.27
Comatulida (O.) sp. 4	2	1		1			1945 ± 195	3.24 ± 0.15
Comatulida (O.) sp. 8	6		2	2	2		2425 ± 499	2.78 ± 0.36
Comatulida (O.) sp. 11	44	6			5	33	2191 ± 85	3.00 ± 0.09
Comatulida (O.) sp. 14	12	12					2757 ± 167	3.00 ± 0.09
Comatulida (O.) spp.	767	72	33	651		11	2026 ± 399	3.13 ± 0.09
<i>Araeosoma fenestratum</i>	71	1		68	2		1742 ± 128	3.32 ± 0.09
<i>Phormosoma placenta</i>	1			1			1685	3.34
<i>Hygrosoma</i> (C.) sp. 1	23	2		20	1		1855 ± 352	3.24 ± 0.26
Echinidae (F.) sp. 1	58	41	3	8	5	1	1971 ± 188	3.17 ± 0.14
Echinoidea (C.) sp. 1	5			5			1785 ± 37	3.31 ± 0.02
Echinoidea (C.) sp. 7	2			2			1717 ± 16	3.31 ± 0.01
Echinoidea (C.) sp. 9	28	4	20	1	1	2	2523 ± 246	2.77 ± 0.19
<i>Penilpidia midatlantica</i>	109	105	4				2435 ± 215	2.86 ± 0.16
<i>Psolus</i> sp. 1	41	1		39	1		1762 ± 117	3.31 ± 0.10

Holothuroidea (C.) sp. 2	44	2	20	22			2192 ± 406	3.01 ± 0.31
Holothuroidea (C.) sp. 3	180	3		16	55	106	2187 ± 141	2.97 ± 0.12
Holothuroidea (C.) sp. 4	173	18	1	6	93	55	2251 ± 125	2.93 ± 0.10
Holothuroidea (C.) sp. 5	22			2	9	11	2187 ± 134	2.97 ± 0.11
Holothuroidea (C.) sp. 6	286	116	51	1	105	13	2459 ± 219	2.81 ± 0.15
Holothuroidea (C.) sp. 7	171	73	98				2596 ± 226	2.72 ± 0.19
Holothuroidea (C.) sp. 8	1		1				2650	2.72
Ophiuroidea (C.) sp. 1	5	1		3		1	2123 ± 528	3.07 ± 0.39
Ophiuroidea (C.) sp. 2	428	3		196	20	209	1993 ± 247	3.13 ± 0.20
Ophiuroidea (C.) sp. 3	1634	244	67	66	611	646	2287 ± 213	2.91 ± 0.16
Ophiuroidea (C.) sp. 5	178	80	6	27	30	38	2179 ± 198	3.02 ± 0.16
Ophiuroidea (C.) sp. 9	239	1		1	200	37	2265 ± 49	2.91 ± 0.05
Ophiuroidea (C.) sp. 12	4539	4264	68		128	79	2214 ± 226	3.01 ± 0.18
Ophiuroidea (C.) sp. 22	99	95		4			2021 ± 95	3.20 ± 0.08
Ophiuroidea (C.) sp. 26	11		11				2676 ± 99	2.69 ± 0.05
Ophiuroidea (C.) sp. 29	78	20	1	8	23	26	2137 ± 179	3.03 ± 0.16
Ophiuroidea (C.) spp. (obstructed)	41	26	15				2659 ± 263	2.67 ± 0.20
Asteroidea/Ophiuroidea sp. 1	1	1					2248	2.96
<i>Hemichordata</i>								
Enteropneusta (C.) sp. 1	1851	62	102	163	670	854	2222 ± 171	2.95 ± 0.14
Enteropneusta (C.) sp. 2	1				1		2264	2.90
<i>Mollusca</i>								
<i>Graneledone verrucosa</i>	3			3			1717 ± 30	3.33 ± 0.03

<i>Grimpoteuthis</i> sp. 1	2			2			1752 ± 75	3.33 ± 0.04
<i>Muusoctopus</i> sp. 1	1					1	2177	2.92
Scaphopoda (C.) sp. 1	10	6	1		3		2370 ± 141	2.92 ± 0.09
Porifera								
Demospongiae ~Astrophorina								
<i>Geodia atlantica</i>	69	63	2	4			1967 ± 259	3.18 ± 0.19
<i>Geodia barretti</i>	469	421	7	30	4	7	2041 ± 254	3.13 ± 0.18
<i>Geodia macandrewii</i>	158	114	44				2352 ± 366	2.91 ± 0.29
<i>Geodia megastrella</i>	620	584	25	11			2013 ± 156	3.15 ± 0.12
<i>Geodia phlegraei</i>	23176	10182	12954	20	20		2672 ± 199	2.66 ± 0.17
<i>Stryphnus fortis</i>	281	119	148	10	3	1	2401 ± 198	2.88 ± 0.15
<i>Geodia atlantica</i> / <i>Geodia macandrewii</i> sp. 1	312	294	9	6	2	1	1997 ± 281	3.15 ± 0.21
<i>Geodia barretti</i> / <i>Geodia hentscheli</i> sp. 1	183	183	58	123	1	1	2542 ± 272	2.77 ± 0.21
<i>Geodia barretti</i> / <i>Geodia megastrella</i> sp. 1	5	5	3	1	1		2001 ± 235	3.15 ± 0.20
<i>Geodia</i> sp. 1	82	45	37				2455 ± 182	2.86 ± 0.13
<i>Geodia</i> sp. 2	2059	1387	672				2452 ± 178	2.85 ± 0.14
<i>Geodia</i> sp. 3	5	5					1946 ± 68	3.22 ± 0.08
<i>Geodia</i> spp. Type 1	414	192	85	17	117	2	2451 ± 285	2.82 ± 0.22
<i>Geodia</i> spp. Type 2	235	134	92	7	2		2474 ± 320	2.82 ± 0.25
Astrophorina (Sub. O) sp. 1	1			1			1711	3.29
Astrophorina (Sub. O) sp. 4	11	11					1962 ± 114	3.20 ± 0.09
Astrophorina (Sub. O) sp. 5	10		10				2767 ± 107	2.58 ± 0.09

Astrophorina (Sub. O) sp. 6	1700	795	905				2665 ± 132	2.66 ± 0.12
Astrophorina (Sub. O) sp. 7	5	4	1				2290 ± 322	2.96 ± 0.26
Astrophorina (Sub. O) sp. 8	2	2					1876 ± 0	3.28 ± 0.00
Astrophorina Massive-Globose Type 1	123	72		51			1914 ± 155	3.21 ± 0.11
Astrophorina Massive-Lobose Type 1	76	37	31	4	4		2382 ± 336	2.87 ± 0.26
Demospongiae ~ Branching-Erect								
<i>Lissodendoryx complicata</i>	537	534	3				2602 ± 77	2.75
<i>Tedania</i> sp. 1	39	39					3002 ± 1	2.39 ± 0.03
Demospongiae ~ Cushion								
Crellidae/Myxillidae (F.) sp. 1	55		3	52			1763 ± 184	3.32 ± 0.14
<i>Hexadella dedritifera</i>	25768	12212	13511	23	21	1	2667 ± 196	2.66 ± 0.17
Hymedesmiidae (F.) sp. 1	58	13	45				2685 ± 156	2.66 ± 0.14
Demospongiae (C.) sp. 23	186	15	169		2		2704 ± 129	2.63 ± 0.11
Demospongiae ~ Massive-Globose Papillate								
cf. <i>Polymastia corticata</i>	161	154	1	4		2	1990 ± 116	3.17 ± 0.08
Demospongiae (C.) sp. 42	1			1			1735	3.33
Demospongiae ~ Massive-Lobose/Globose								
Demospongiae (C.) sp. 43	9		7		2		2456 ± 112	2.86 ± 0.09
Demospongiae (C.) sp. 44	3752	2149	1603				2658 ± 182	2.67 ± 0.16
Demospongiae ~ Spherical								
Demospongiae (C.) sp. 45	8		8				2607 ± 21	2.78 ± 0.09
Hexactinellida ~ Branching-Erect								

<i>Farrea herdendorfi</i>	448	430	13	4	1		2007 ± 153	3.16 ± 0.12
<i>Hexactinellida ~ Cup-like</i>								
<i>Asconema fristedti</i>	104	81	14	2	7		2185 ± 260	3.02 ± 0.19
<i>Chonelasma</i> sp. 1	749	53	694	2			2659 ± 142	2.66 ± 0.12
Hexactinellida (C.) sp. 76	216	27	189				2599 ± 152	2.71 ± 0.13
Hexactinellida (C.) sp. 65	82	7	75				2592 ± 130	2.72 ± 0.11
<i>Hexactinellida ~ Cylindrical</i>								
<i>Dictyaulus romani</i>	59	24	21	13	1		2355 ± 360	2.89 ± 0.26
Euplectellidae (F.) sp. 1	19	12	7				2581 ± 116	2.77 ± 0.10
Hexactinellida (C.) sp. 1	1447	796	420	6	209	16	2440 ± 186	2.84 ± 0.15
Hexactinellida (C.) sp. 10	17	15	1	1			2490 ± 220	2.84 ± 0.16
Hexactinellida (C.) sp. 47	6	1	5				2545 ± 301	2.74 ± 0.24
Hexactinellida (C.) sp. 49	3		3				2750 ± 120	2.57 ± 0.06
Hexactinellida (C.) sp. 41	145	51	89	3	2		2680 ± 242	2.65 ± 0.19
<i>Hexactinellida ~ Massive-Globose</i>								
Rossellidae (F.) spp.	83	15	62	4		2	2537 ± 278	2.77 ± 0.21
Hexactinellida (C.) sp. 23	1			1			1848	3.32
Hexactinellida (C.) sp. 46	28	2	26				2409 ± 237	2.84 ± 0.18
Hexactinellida (C.) sp. 61	287	69	218				2610 ± 100	2.71 ± 0.10
<i>Hexactinellida ~ Massive-Lobose</i>								
Hexactinellida (C.) sp. 64	20	4	16				2490 ± 271	2.82 ± 0.23
Hexactinellida (C.) sp. 67	9	1	8				2628 ± 48	2.69 ± 0.04
Hexactinellida (C.) sp. 68	33	2	31				2669 ± 196	2.65 ± 0.16

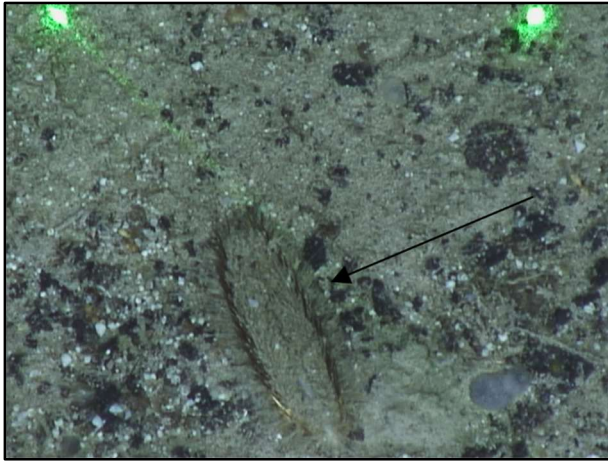
<i>Hexactinellida ~ Massive-Lobose Foliose</i>								
<i>Asconema foliatum</i>	31	21	9	1		2341 ± 305	2.93 ± 0.21	
Hexactinellida (C.) sp. 11	3		1	2		2075 ± 541	3.08 ± 0.40	
Hexactinellida (C.) sp. 44	795	535	260			2771 ± 193	2.57 ± 0.16	
Hexactinellida (C.) sp. 84	98	98				2249 ± 97	2.99 ± 0.08	
<i>Hexactinellida ~ Massive-Lobose Matrix</i>								
Hexactinellida (C.) sp. 97	135	107	28			2465 ± 281	2.82 ± 0.21	
<i>Hexactinellida ~ Massive-Lobose Lattice/Tubular</i>								
Hexactinellida (C.) sp. 26	314	31	269	11	3	2576 ± 218	2.73 ± 0.17	
Hexactinellida (C.) sp. 28	104	9	88	7		2586 ± 332	2.72 ± 0.26	
Hexactinellida (C.) sp. 57	679		679			2667 ± 73	2.66 ± 0.08	
Hexactinellida (C.) Lattice Type 1	299	180	89	20	9	1	2290 ± 335	2.94 ± 0.26
<i>Hexactinellida ~ Massive-Lobose Tubular</i>								
<i>Hertwigia</i> sp. 1	298	182		116		1919 ± 136	3.22 ± 0.09	
<i>Hertwigia</i> sp. 2	1		1			2757	2.57	
Hexactinellida (C.) sp. 59	15	3	12			2618 ± 245	2.70 ± 0.17	
Hexactinellida (C.) sp. 77	23	19	4			2430 ± 281	2.85 ± 0.21	
Hexactinellida (C.) sp. 86	597	19	578			2426 ± 128	2.84 ± 0.10	
<i>Hexactinellida ~ Stalked</i>								
<i>Amphidiscella</i> sp. 1	1		1			2586	2.73	
<i>Caulophacus</i> sp. 1	122	8	114			2737 ± 131	2.60 ± 0.12	
<i>Farrea</i> sp. 1	11	7	1	3		2347 ± 275	2.90 ± 0.19	
<i>Saccocalyx</i> sp. 1	1369	318	1051			2697 ± 101	2.63 ± 0.09	

Hexactinellida (C.) sp. 24	760	532	228				2718 ± 74	2.61 ± 0.08
Hexactinellida (C.) sp. 43	323	50	273				2659 ± 119	2.67 ± 0.10
<i>Porifera ~ Branching-Repent</i>								
Porifera (P.) sp. 251	52	52					2749 ± 1	2.60 ± 0.03
<i>Porifera ~ Cushion</i>								
Porifera (P.) sp. 151	169	38	42	89			2173 ± 444	3.03 ± 0.32
Porifera (P.) sp. 178	6	2	4				2576 ± 245	2.71 ± 0.22
Porifera (P.) sp. 183	71	19	52				2678 ± 119	2.66 ± 0.11
Porifera (P.) Cushion spp.	149	18	14	97	6	14	2162 ± 337	3.06 ± 0.27
<i>Porifera ~ Cylindrical</i>								
Porifera (P.) Vase-Cylindrical Type 1	41	14	11	26			2245 ± 442	2.98 ± 0.31
<i>Porifera ~ Disc-like</i>								
Porifera (P.) sp. 256	1			1			1807	3.30
<i>Porifera ~ Encrusting</i>								
Porifera (P.) sp. 1	172	12	2	63	82	13	2098 ± 245	3.05 ± 0.20
Porifera (P.) sp. 50	9978	6417	2884	184	292	201	2500 ± 300	2.80 ± 0.23
<i>Porifera ~ Massive-Globose</i>								
Porifera (P.) sp. 59	2		1	1			2192 ± 587	2.98 ± 0.39
Porifera (P.) sp. 155	2		1	1			2082 ± 493	3.11 ± 0.34
Porifera (P.) sp. 164	3195	2004	1190	1			2643 ± 177	2.70 ± 0.16
Porifera (P.) sp. 192	8	2	6				2476 ± 172	2.81 ± 0.15
Porifera (P.) sp. 254	85	15	69	1			2485 ± 181	2.83 ± 0.15

Porifera (P.) sp. 253	544	223	142	20	73	86	2334 ± 258	2.91 ± 0.20
<i>Porifera ~ Massive-Lobose</i>								
Porifera (P.) sp. 247	5	4	1				2596 ± 180	2.78 ± 0.12
Porifera (P.) sp. 255	2	2					2120 ± 181	3.09 ± 0.17
Porifera (P.) Massive-Lobose Type 1	113	40	58	2	9	4	2398 ± 275	2.87 ± 0.20
<i>Porifera ~ Lamellate</i>								
Porifera (P.) sp. 98	2			2			1733 ± 3	3.34 ± 0.03
Porifera (P.) sp. 126	2				2		2307 ± 31	2.90 ± 0.03
Porifera (P.) sp. 226	1	1					1993	3.14
Porifera (P.) Lamellate spp.	542	55	443		33	11	2602 ± 197	2.69 ± 0.16
<i>Porifera ~ Stalked</i>								
Porifera (P.) sp. 257	58		58				2621 ± 141	2.72 ± 0.15
<i>Porifera ~ Off Bottom</i>								
Cylindrical Hexactinellida_Off Bottom	160	88	61	11			2534 ± 310	2.75 ± 0.23
Massive-Lobose Foliose Hexactinellida_Off Bottom	4	1	3				2773 ± 124	2.56 ± 0.11
Cushion-Massive Porifera_Off Bottom	1047	14		1033			1759 ± 158	3.32 ± 0.11
Massive-Globose Porifera_Off Bottom	817	788		11		18	2152 ± 363	3.03 ± 0.27
Erect Porifera_Off Bottom	101	97			4		1989 ± 218	3.16 ± 0.20

Family Aphroditidae

WORMS AphalID 938



Aphroditidae (F.) sp. 1

Depth: 1933 - 2678 m

Oblong worm identified as a 'sea mouse' due to its distinctive chaetae and bristles, which shimmer once illuminated. Possibly the species *Laetmonice filicornis*. Length is ~ 5 cm. Green dots represent 10-cm scaling lasers.

Family Polynoidae

WORMS AphiaID 939



Polynoidae (F.) sp. 1

Depth: 2231 m

Scale worm. Mostly pink in colour with purple posterior end. Chaetae visible. Observed traversing over rock.

Family Serpulidae

WORMS AphiaID 988



Serpulidae (F.) sp. 1

Depth: 1684 m

Erect, tube-dwelling polychaete with transparent plume at distal end of calcareous tube. Found attached to branching coral *Swiftia*. Green dots represent 10-cm scaling lasers.



Serpulidae (F.) sp. 2

Depth: 1804 m

Tube-dwelling polychaete. Tube is white, indicating its calcareous composition (and assignment to the family Serpulidae). Green dots represent 10-cm scaling lasers.

Order Terebellida

WORMS AphiaID 900



Terebellida (O.) sp. 1

Depth: 1807 m

Tube-dwelling polychaete. White plume at distal end of sediment coloured/textured tube that appears adhered to hard substrate. Green dots represent 10-cm scaling lasers.

Class Pycnogonida

WORMS AphiaID 1302



Colossendeis sp. 1 (Jarzynsky, 1870)

Depth: 1658 - 3000 m

AphiaID: 134586 / TSN: N/A

Large pycnogonid sea spider. Yellow in color. Identified as a member of the genus *Colossendeis* due to its size (>10 cm) and long proboscis. Green dots represent 10-cm scaling lasers.



Colossendeis sp. 2 (Jarzynsky, 1870)

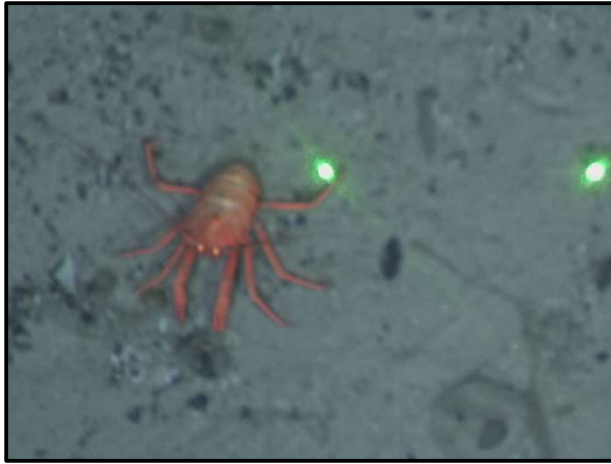
Depth: 1684 - 2346 m

AphiaID: 134586 / TSN: N/A

Large pycnogonid sea spider. Red in color, with long abdomen. Identified as a member of the genus *Colossendeis* due to its size (>10 cm) and long proboscis.

Order Decapoda

WORMS AphiaID 1130



Galatheaidea (Sup. F.) sp. 1

Depth: 2136 - 2565 m

AphiaID: 106685 / TSN: 206948

Orange 'squat lobster'. Six pereopods and two claws visible. Occasionally observed swimming over soft substrate. Green dots represent 10-cm scaling lasers.



Galatheaidea (Sup. F.) sp. 2

Depth: 1770 - 3000 m

AphiaID: 106685 / TSN: 206948

White 'squat lobster'. Six pereopods and two claws visible. Commonly found on hard substrate.



Galatheaidea (Sup. F.) sp. 3

Depth: 2491 m

AphiaID: 106685 / TSN: 206948

Purple 'squat lobster'. Small (~2.5 cm) and partially obscured. Two long claws clearly visible.

Order Decapoda

WORMS AphialD 1130



Pleocyemata (Sub. O.) sp. 1

Depth: 2749 - 2878 m

AphialD: 106670 / TSN: 96105

White, robust decapod crustacean with rounded carapace, and rostrum that tapers to a point at its distal end.



Pleocyemata (Sub. O.) sp. 2

Depth: 2342 - 2969 m

AphialD: 106670 / TSN: 96105

Hermit crab. Observed traversing over the seabed. Number of legs unknown but appear red in colour.

Infraclass Cirripedia

WORMS AphiaID 1082



Cirripedia (I. C.) sp. 1

Depth: 1973 - 2830 m

Large white barnacle attached to stalked organism. Blurry image negated further identification.

Class Malacostraca

WORMS AphiaID 1071



Malacostraca (C.) sp. 7

Depth: 1777 - 2888 m

Large (~10 cm), shrimp-like crustacean. Large eyes and a long, cylindrical carapace ending in a small triangular-shaped tail. Usually found on the seabed.

Class Malacostraca

WORMS AphiaID 1071



Malacostraca (C.) spp.

Depth: 1690 - 2886 m

Red shrimp-like crustaceans. Several species suspected to be present, but poor quality of imagery when observed negated their identification. Orders Mysida and Lophogastrida may be present. Observed in a variety of locations, including on sponges.

Phylum Bryozoa

WORMS AphiaID 146142



Bryozoa (P.) sp. 1

Depth: 1973 - 3003 m

Yellow, filamentous bryozoan. Found commonly on hard substrate. Difficult to detect when the ROV was high off the seabed, and so abundance is likely underestimated.

Subclass Elasmobranchii

WORMS AphiaID 10193



Aristurus manis
(Springer, 1979)

Depth: 1808 m

AphiaID: 105808 / TSN: 160014

Ghost catshark. Blunt rostrum and two dorsal fins set far back on body.



Rajidae (F.) sp. 1

Depth: 2242 - 3002 m

AphiaID: 105711 / TSN: 160845

Large grey skate. Possibly the species *Rajella bathyphila*.

Subclass Holocephali

WORMS AphiaID 10196



Hydrolagus affinis

(de Brito Capello, 1868)

Depth: 2277 m

AphiaID: 105808 / TSN: 161019

Deep sea chimaera. Large eyes with grooved and branched lateral lines running from the snout to the caudal fin. Broad triangular pectoral fins.

Class Actinopterygii

WORMS AphiaID 10194



Antimora rostrata

(Günther, 1878)

Depth: 1682 - 2633 m

AphiaID: 126486 / TSN: 164672

Also known as 'Blue Hake' or 'Blue Antimora'. Large eyes and laterally compressed body. Dorsal and pelvic fins with several rays; the first one being elongated.



Bathysaurus ferox

(Günther, 1878)

Depth: 2240 - 2866 m

AphiaID: 126369 / TSN: 162782

Deep-sea lizardfish. Dorso-ventrally flattened, silver fish with a very large, superiorly oriented mouth. Pelvic fins anteriorly oriented below the pelvic fins.



Lipogenys gillii

(Goode & Bean, 1895)

Depth: 1656 - 2658 m

AphiaID: 158559 / TSN: 635796

White 'spiny eel'. Slender and elongated body shape; dark lining visible around the operculum. Green dots represent 10-cm scaling lasers.

Class Actinopterygii

WORMS AphiaID 10194



Alepocephalidae (F.) sp. 1

Depth: 1687 - 1994 m

AphiaID: 125507 / TSN: 162303

Dark grey fish with large eyes and a rounded, smooth blunt head. Single dorsal fin and scales visible.



Halosauridae (F.) sp. 1

Depth: 1791 - 2277 m

AphiaID: 125500 / TSN: 161657

Slender grey fish with ribbon-like caudal fin. Head a lighter grey than rest of body.



Halosauridae (F.) sp. 2

Depth: 1665-2885 m

AphiaID: 125500 / TSN: 161657

Black and slender with ribbon like caudal fin. Smoother head with distinct scales on body. Green dots represent 10-cm scaling lasers.

Class Actinopterygii

WORMS AphialD 10194



Macrouridae (F.) sp. 1

Depth: 1656 - 3002 m

AphialD: 125471 / TSN: 165332

Medium-sized 'rat tail' fish with caudal fin rays that run along its ventral side to the pectoral fins. Wedge-shaped head, single dorsal fin and large black eyes.



Anguilliformes (O.) sp. 1

Depth: 1989 - 3000 m

AphialD: 10295 / TSN: 161123

Long silver body with two small pectoral fins visible, and a slightly pointed snout. Possibly the species *Synphobranchus kaupii*.



Scorpaeniformes (O.) sp. 1

Depth: 2006 - 2825 m

AphialD: 10329 / TSN: 166702

An oblong shaped, stout, red fish with two rounded pelvic fins visible at the posterior end. Green dots represent 10-cm scaling lasers.

Class Actinopterygii

WORMS AphialD 10194



Gadiformes (O.) sp. 1

Depth: 1673 - 2619 m

AphialD: 10313 / TSN: 164665

Large fish with mottled, dark body. Pectoral fins are triangular in shape.



Gadiformes (O.) sp. 3

Depth: 1743 - 1778 m

AphialD: 10313 / TSN: 164665

Large dark grey/black fish with white fringe around caudal fin. Two long and thin pelvic fins are visible under the pectoral fins.



Actinopterygii (C.) sp. 1

Depth: 2594 - 3000 m

Large brown fish, rounded head tapering to a narrower caudal fin. Dorsal and pelvic fins are long and run the length of the dorsal and ventral surface. Possibly a cusk eel.

Class Actinopterygii

WORMS AphiaID 10194



Actinopterygii (C.) sp. 3

Depth: 2740 m

Large, striped fish with rounded head and long, tapering tail. Two pectoral fins visible.



Actinopterygii (C.) sp. 4

Depth: 2248 - 2494 m

Long, slender, dark-coloured fish. Camera altitude high, impeding further identification. Ribbon-like tail could indicate membership in the family Halosauridae.



Actinopterygii (C.) sp. 5

Depth: 1980 - 2243 m

Long, slender fish with ribbon-like tail. Head is narrow with a pointed snout.

Subclass Ceriantharia

WORMS AphiaID 1361



Ceriantharia (Sub. C.) sp. 1

Depth: 1657 - 2811 m

Tube-dwelling anemone with long, thin tentacles. Green dots represent 10-cm scaling lasers.



Ceriantharia (Sub. C.) sp. 2

Depth: 2162 - 2974 m

Tube-dwelling anemone with long tube extending above seabed. Crown of tentacles dark red in centre and lighter in colour near the tips.

Order Actiniaria

WORMS AphialD 1360



Actinernus nobilis

(Verrill, 1879)

Depth: 1910 - 2197 m

AphialD: 158217 / TSN: 611480

Large anemone with purple tentacles and white column. Note that due to poor image quality, this representative image was taken from a specimen observed on the Flemish Cap.



Actinoscyphia sp. 1

(Stephenson 1920)

Depth: 2601 - 2757 m

AphialD: 100707 / TSN: 52814

Fuchsia-coloured anemone resembling a 'venus fly trap'. Specimen casts a shadow, suggesting it is raised from the seabed and attached to a stalk.



Hormathiidae (F.) sp. 1

Depth: 2746 m

AphialD: 100672 / TSN: 52651

Light-pink anemone; possibly attached to a stalk. Square-shaped/folded column with long, thin tentacles.

Order Actiniaria

WORMS AphiaID 1360



Hormathiidae (F.) sp. 2

Depth: 1884 m

AphiaID: 100672 / TSN: 52651

Large anemone with beige-coloured column with a 'bumpy' appearance. Several rows of pink tentacles visible. Possibly the species *Hormathia nodosa*. Poor image quality prevented further identification.



Hormathiidae (F.) sp. 3

Depth: 2147 m

AphiaID: 100672 / TSN: 52651

Large anemone similar to Hormathiidae (F.) sp. 2, except this specimen has a smooth column and darker-coloured tentacles. Attached to a large branching coral.



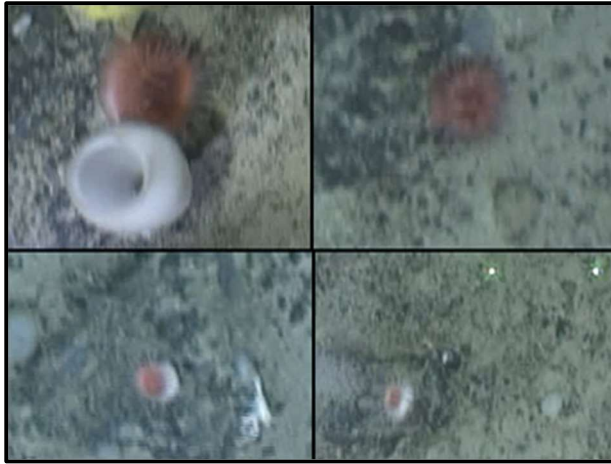
Actiniaria (O.) sp. 3

Depth: 1780 - 2607 m

Large rose-coloured anemone with thick tentacles that taper into thin wisps. Column not visible. Attached to hard substrate. Tentacles are approximately 60 cm in length.

Order Actiniaria

WORMS AphiaID 1360



Actiniaria (O.) sp. 8

Depth: 1741 - 2902 m

Large red-pink anemone on hard substrate. Column is a lighter colour in smaller/younger specimens, turning to a darker pink in larger/older specimens. Green dots represent 10-cm scaling lasers.



Actiniaria (O.) sp. 10

Depth: 1718 m

Large pink anemone attached to hard substrate. Tentacles are thick and numerous, circling a wide oral disc and column. Green dots represent 10-cm scaling lasers.



Actiniaria (O.) sp. 11

Depth: 2597 - 2998 m

Small anemone settled on a dead glass sponge. Purple in colour. Imagery blurry negating further identification. Green dots represent 10-cm scaling lasers.

Order Actiniaria

WORMS AphiaID 1360



Actiniaria (O.) sp. 12

Depth: 1735 - 2965 m

Common orange anemone with long, thin tentacles. Often observed on hard substrate. Approximately 5 cm in diameter.



Actiniaria (O.) sp. 17

Depth: 1678 - 2873 m

Light purple anemone. Can be small in size (~2.5 cm) and often observed partially obscured by nearby rocks.



Actiniaria (O.) sp. 20

Depth: 2165 m

Small anemone. Light pink tentacles and darker column with pink and purple striation. Column flush with seabed. Green dots represent 10-cm scaling lasers.

Order Actiniaria

WORMS AphiaID 1360



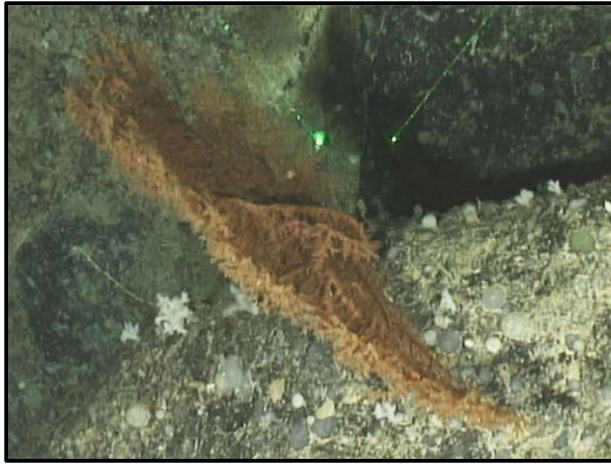
Actiniaria (O.) spp.

Depth: 1843 - 2684 m

Grouping for several species of anemone that are difficult to identify due to poor image quality. Possibly members of the family Hormathiidae.

Order Antipatharia

WORMS AphiaID 22549



Stauropathes arctica (Lütken 1871)

Depth: 1935 - 2711 m

AphiaID: 291111 / TSN: N/A

Large black coral with a fan-shaped morphology. Green dots represent 10-cm scaling lasers.



Telopathes magnus (MacIsaac & Best, 2013)

Depth: 2597 - 2848 m

AphiaID: 740051 / TSN: N/A

Black coral with wide basal plate and a highly pinnulated stem. Branched to the second order off main stem. Green dots represent 10-cm scaling lasers.



Bathypathes sp. 1 (Brook, 1889)

Depth: 1733 - 3000 m

AphiaID: 103304 / TSN: 51978

Large black coral with pinnate branching pattern. Long, thin polyps visible. Possibly the species *Bathypathes patula*. Green dots represent 10-cm scaling lasers.

Order Antipatharia

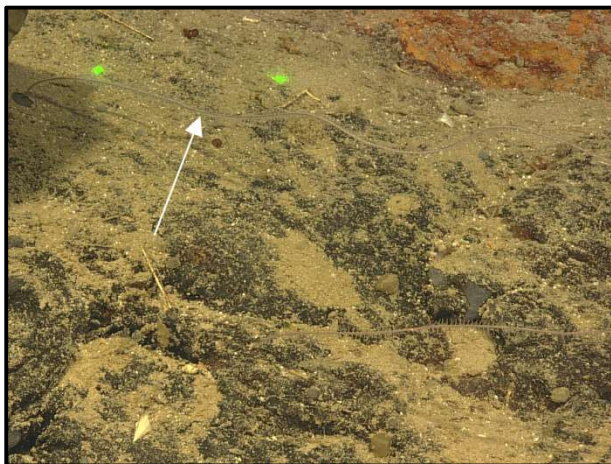
WORMS AphiaID 22549



Antipatharia (O.) sp. 2

Depth: 2673 - 2674 m

Large black coral with irregular branching. Green dots represent 10-cm scaling lasers.



Antipatharia (O.) sp. 6

Depth: 2242 m

Long and thin, whip-like black coral attached to rocky substrate. Black skeleton visible under white polyps. Green dots represent 10-cm scaling lasers.

Order Scleractinia

WORMS AphiaID 1363



Desmophyllum dianthus (Esper, 1794)

Depth: 1777 - 2517 m

AphiaID: 135159 / TSN: 572071

Solitary cup coral with an elongated epitheca and large septa visible. Morphological examination of collected specimen confirmed taxonomic ID.



Flabellum alabastrum (Moseley, 1876)

Depth: 1682 - 2316 m

AphiaID: 1383416 / TSN: 572140

Cup coral on soft substrate. Identified as *F. alabastrum* due to the 'pinched' appearance of its cup.



Scleractinia (O.) sp. 1

Depth: 1683 - 2758 m

Oblong-shaped orange cup coral. Septa clearly visible. Possible overlap with *Scleractinia (O.)* spp. when observed far from the seabed, and should therefore be grouped with this taxon for multivariate community analyses.

Order Scleractinia

WORMS AphiaID 1363



Scleractinia (O.) spp.

Depth: 1658 - 2834 m

Group encompasses possibly several species of red cup corals. Attachment point not always visible. Septa occasionally visible in clear images.

Order Zoantharia

WORMS AphiaID 607338



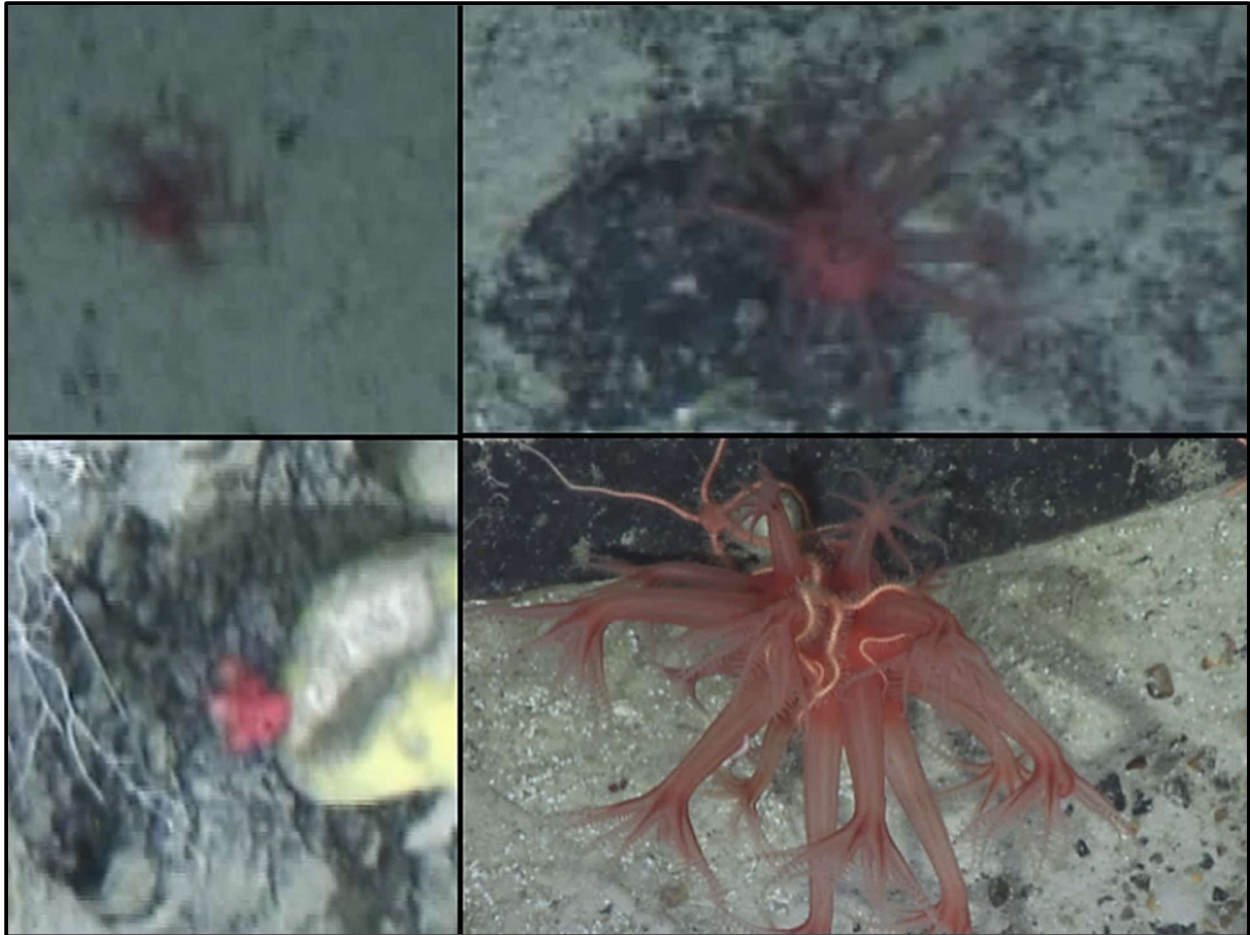
Zoantharia (O.) sp. 1

Depth: 1871 - 2667 m

Colonial beige-coloured polyps. Very numerous, found on rocky substrate and occasionally on other organisms.

Order Alcyonacea

WORMS AphiaID 1365



Anthomastus/Pseudoanthomastus/Heteropolypus spp.

Depth: 1682 - 3000 m

AphiaID: 125285, 267770, 345446 / TSN: 52030, N/A, N/A

Includes possibly several 'mushroom corals' from the genera *Anthomastus*, *Pseudoanthomastus* and/or *Heteropolypus*. Observed mostly on hard substrate, but some are on soft substrate, possibly with a small pebble underneath.

Order Alcyonacea

WORMS AphialD 1365

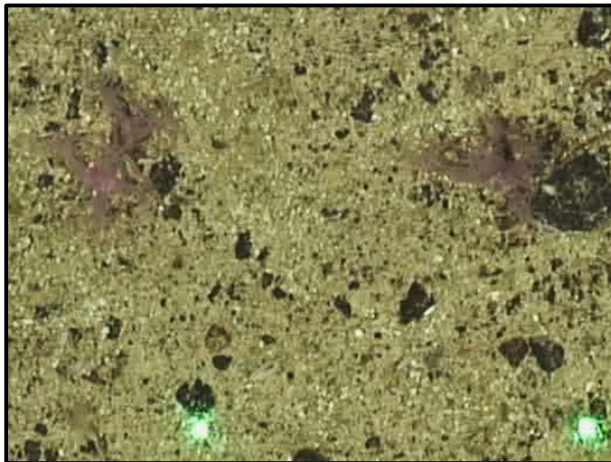


Nephtheidae (F.) sp. 1

Depth: 2862 m

AphialD: 146762 / TSN: 52034

Translucent 'cauliflower-like' soft coral, possibly of the genera *Duva* or *Drifa*. Imagery blurry negating further identification. Only 1 specimen observed.



Clavulariidae (F.) sp. 1

Depth: 1934 - 2043 m

AphialD: 125270 / TSN: 52057

Purple soft coral. Tubular polyps connected via stolon. Very numerous. Found on hard and soft substrate, with a small pebble attachment point in the latter. Green dots represent 10-cm scaling lasers.



Clavulariidae (F.) sp. 2

Depth: 2750 m

AphialD: 125270 / TSN: 52057

White soft coral with long tubular polyps with basal attachment at the stolon. Observed when ROV was very close to the seabed.

Order Alcyonacea

WORMS AphiaID 1365



Acanella arbuscula

(Johnson, 1862)

Depth: 1724 - 2241 m

AphiaID: 125371 / TSN: 52338

Orange bushy coral with large polyps visible. Note that due to poor imagery, this representative image was taken from a specimen observed on the Flemish Cap in the same survey.



Acanthogorgia armata

(Verrill, 1878)

Depth: 1999 - 2032 m

AphiaID: 125348 / TSN: 52119

Large (>30 cm), yellow bushy coral. Spindly appearance; slightly flattened and growing parallel to the sea floor.



Hemicorallium bathyrubrum

(Simpson & Watling, 2011)

Depth: 2619 - 2675 m

AphiaID: 1311242 / TSN: N/A

Branching pink coral with polyps growing laterally off first and second order branches.

Order Alcyonacea

WORMS AphiaID 1365



Isidella sp. 1
(Gray, 1857)

Depth: 2009 - 3000 m

AphiaID: 125305 / TSN: 719033

Large branching bamboo coral. Dark brown, proteinaceous banding visible. Identified tentatively as *Isidella* sp.



Paragorgia sp. 1
(Milne Edwards, 1857)

Depth: 2314 m

AphiaID: 125326 / TSN: 52107

Large 'gorgonian-type' coral. Pink in colour, lighter-coloured main trunk. Possibly *Paragorgia arborea* or *P. johnsoni*.



Paramuricea sp. 1
(Kölliker, 1865)

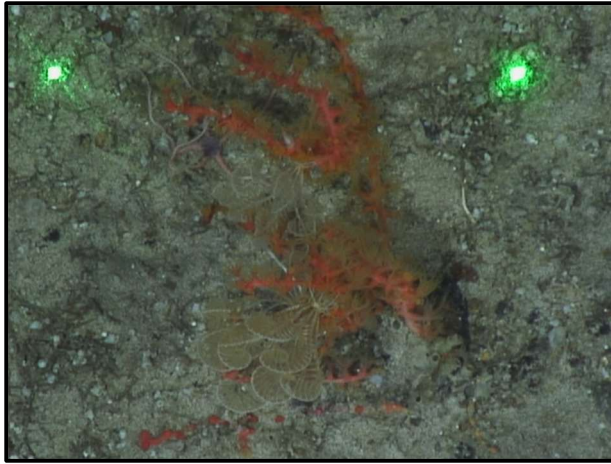
Depth: 1993 - 2000 m

AphiaID: 125311 / TSN: 52124

Large fan-shaped branching coral. Yellow to gold in colour.

Order Alcyonacea

WORMS AphiaID 1365



Swiftia sp. 1

(Duchassaing & Michelotti, 1864)

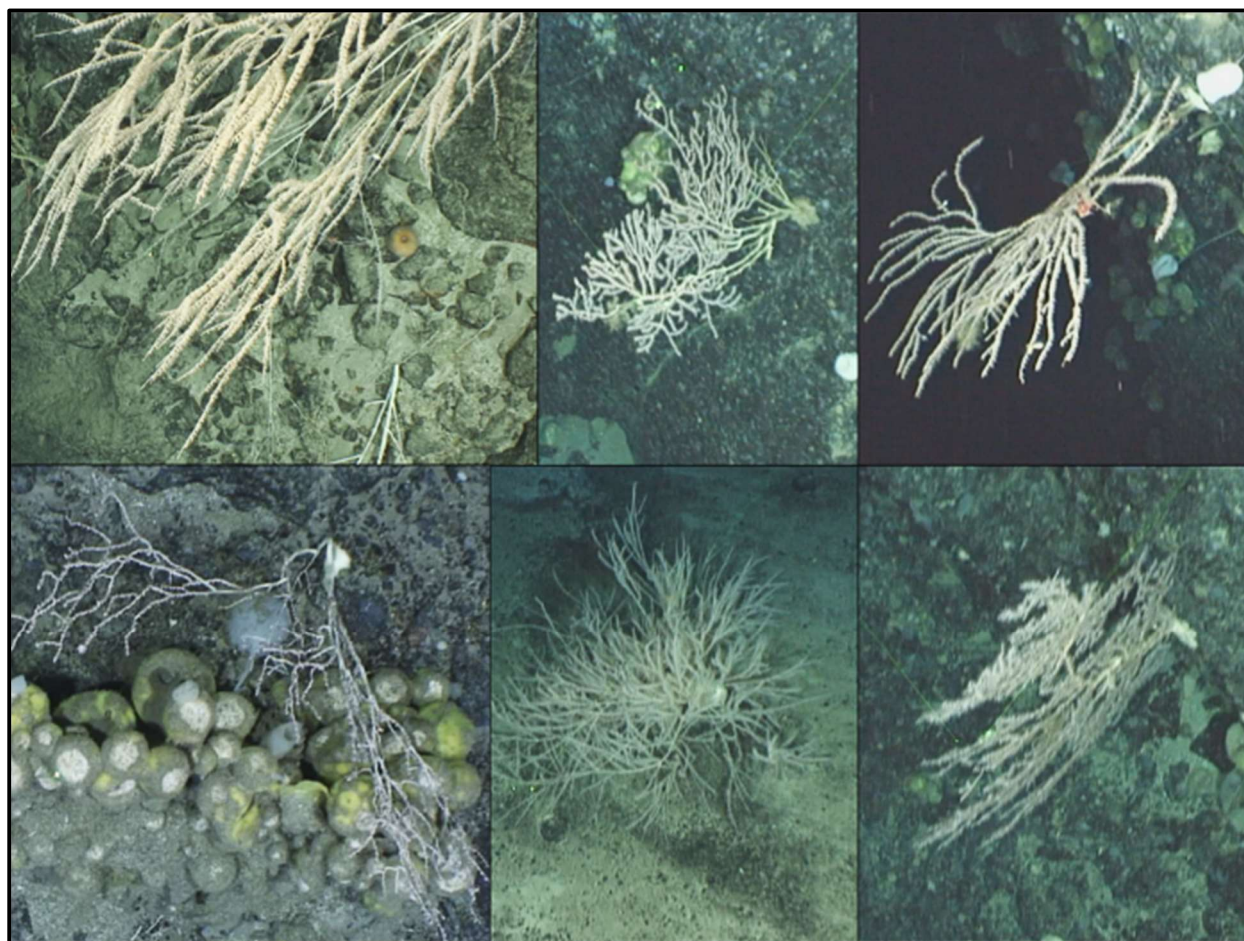
Depth: 1684 - 1997 m

AphiaID: 125314 / TSN: 52148

Small orange branching coral found on sandy sediment. Identified as *Swiftia* from collections made on the Flemish Cap. Green dots represent 10-cm scaling lasers.

Order Alcyonacea

WORMS AphiaID 1365



Keratoisidinae (Sub. F) Type 1

Depth: 1972 - 3003 m

AphiaID: 1419319 / TSN: N/A

Large, branching bamboo corals. Likely multiple species present, but too difficult to consistently discern due to poor image quality.

Order Alcyonacea

WORMS AphiaID 1365

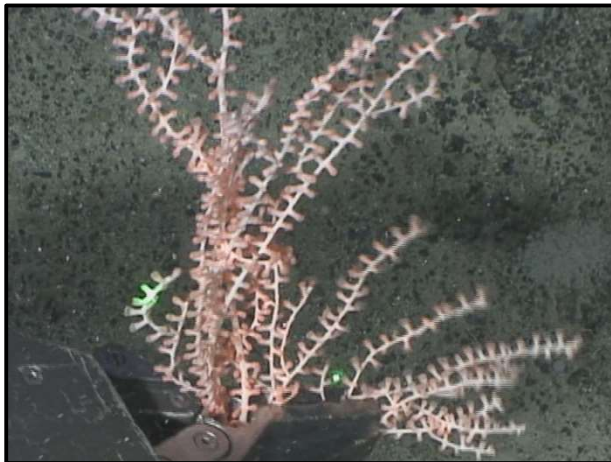


Keratoisidinae (Sub. F) Type 2

Depth: 1719 - 3002 m

AphiaID: 1419319 / TSN: N/A

Long, single-stem whip-like corals. Two species are suspected to be present. Observed frequently on high-sloped regions. Polyps open or retracted.



Keratoisidinae (Sub. F) sp. 1

Depth: 2671 - 2672 m

AphiaID: 1419319 / TSN: N/A

Bamboo coral with pink polyps and a lighter-coloured skeleton. Polyps exhibit an alternating branch pattern along each branch of the main coral.



Chrysogorgiidae (F.) Type 1

Depth: 1991 - 3003 m

AphiaID: 125273 / TSN: 52298

Bottlebrush coral attached to hard substrate.

Order Alcyonacea

WORMS AphialD 1365



Chrysogorgiidae (F.) Type 2

Depth: 1973 - 3000 m

AphialD: 125273 / TSN: 52298

Large bushy branching coral with dichotomous branching and numerous small polyps. 'Wispy' appearance. Multiple species suspected to be present.



Alcyonacea (O.) sp. 1

Depth: 2750 m

Branching coral observed on cliff face. Possibly growing on the skeleton of a different branching coral species.



Alcyonacea (O.) sp. 2

Depth: 2242 - 2322 m

Branching coral. Observed when ROV was high off bottom, negating further identification. Possibly *Paramuricea* sp. 1, and should be combined with this taxon for multivariate community analyses.

Order Pennatulacea

WORMS AphiaID 1367

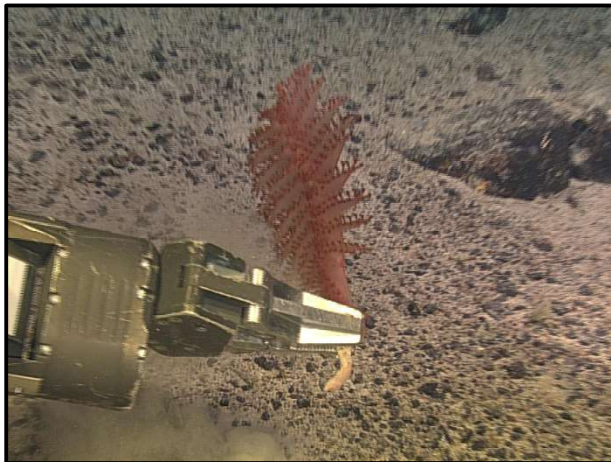


Anthoptilum grandiflorum (Verrill, 1879)

Depth: 1933 - 2435 m

AphiaID: 128504 / TSN: 52365

Elongated sea pen, with a “Y” shape.
Two rows of polyps running the length
of the stalk.



Pennatula sp. 1 (Linnaeus, 1758)

Depth: 2133 m

AphiaID: 128495 / TSN: 52417

Small, robust sea pen. Red in colour.
Numerous ‘leaves’ off main axial
skeleton.



Umbellula sp. 1 (Gray, 1870)

Depth: 1780 - 2887 m

AphiaID: 128499 / TSN: 52384

Long, stalked sea pen with a distal
crown of polyps. Dark red in colour.
Anchored in soft sediment.

Order Pennatulacea

WORMS AphiaID 1367



Pennatulacea (O.) sp. 1

Depth: 2168 - 2606 m

Erect, whip-like sea pen anchored in soft sediment. Two rows of dark polyps can be seen along the axial skeleton. Resembles *Halipteris finmarchica*.

Class Hydrozoa

WORMS AphialD 1337



Anthoathecata (O.) sp. 1

Depth: 2164 m

AphialD: 13551 / TSN: 718925

Stalked, semi-translucent hydroid on soft substrate. Pink hypostome visible.



Hydrozoa (C.) sp. 1

Depth: 2469 - 2750 m

Long stock with lateral projections. Occasionally observed with the barnacle Cirripedia (I. C.) sp. 1 attached.



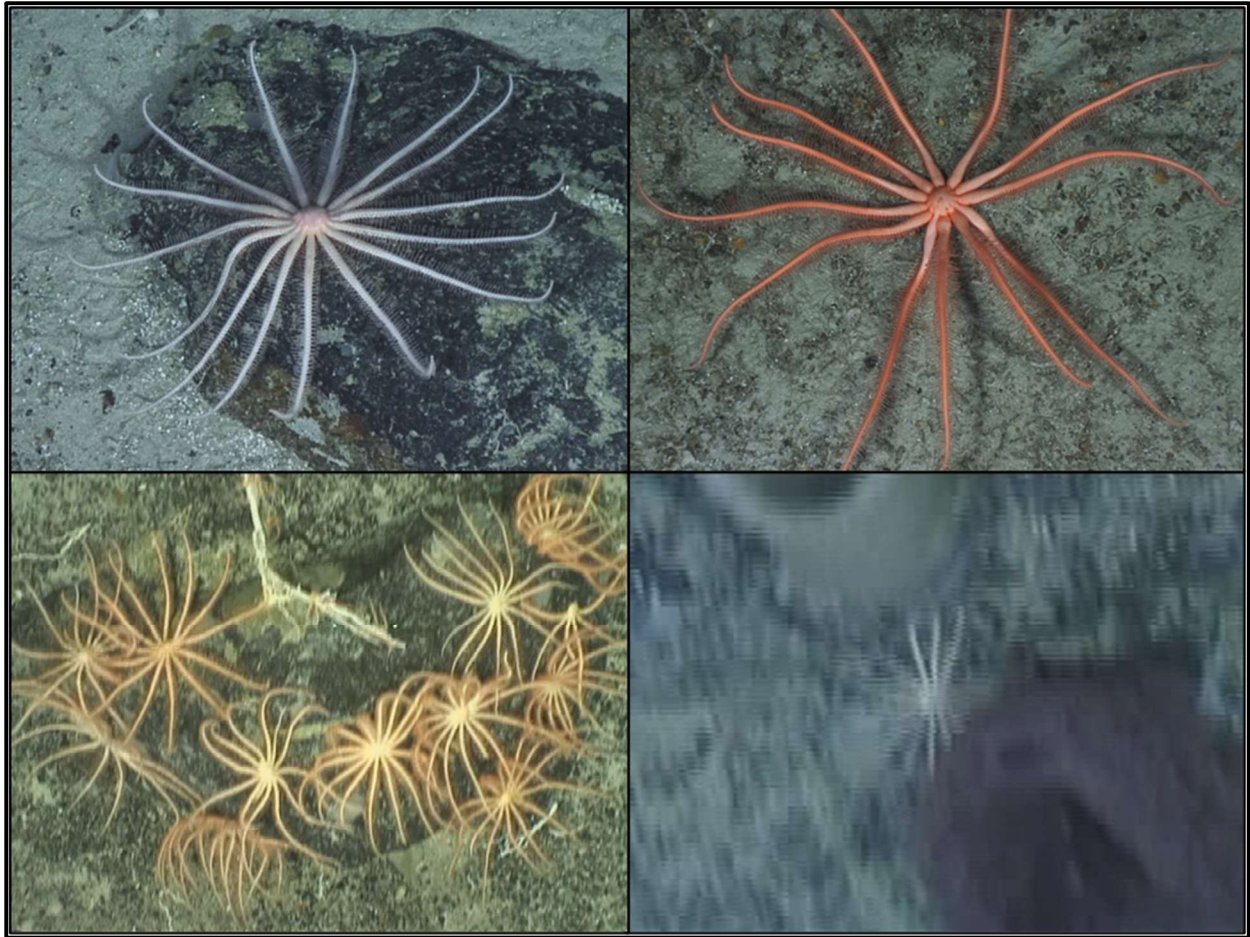
Hydrozoa (C.) sp. 2

Depth: 2618 - 2749 m

Thin branching hydroid. Possibly of the order Leptothecata.

Class Asteroidea

WORMS AphiaID 123080



Freyellidae (F.) spp.

Depth: 1734 - 2875 m

AphiaID: 123120 / TSN: 988851

Multi-armed (~12 arms on average) sea star of the family Freyellidae. The lack of rib-like abactinal plates generally distinguishes members of this group from brisingids. Commonly found in clusters on hard substrate. Possibly multiple species present, hence the 'spp.' categorization.

Class Asteroidea

WORMS AphialID 123080



cf. *Zoroaster* sp. 1
(Thomson, 1873)

Depth: 1741 m

AphialID: 123237 / TSN: 157205

Pale orange sea star with very long (>10 cm) arms relative to central disc. Some arms were broken in observed individual.



Goniasteridae (F.) sp. 1

Depth: 2111 - 2445 m

AphialID: 123135 / TSN: 156987

White sea star with 5 long arms (~5 cm) and madreporite visible.



Solasteridae (F.) sp. 1

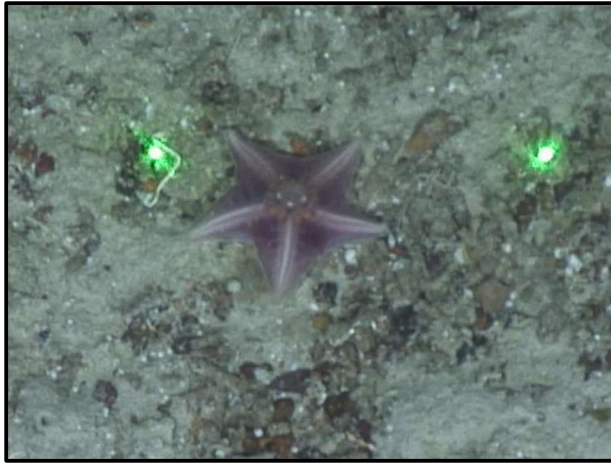
Depth: 1683 - 3002 m

AphialID: 123142 / TSN: 157062

Robust 8-armed sea star, with white-orange colouration.

Class Asteroidea

WORMS AphialD 123080

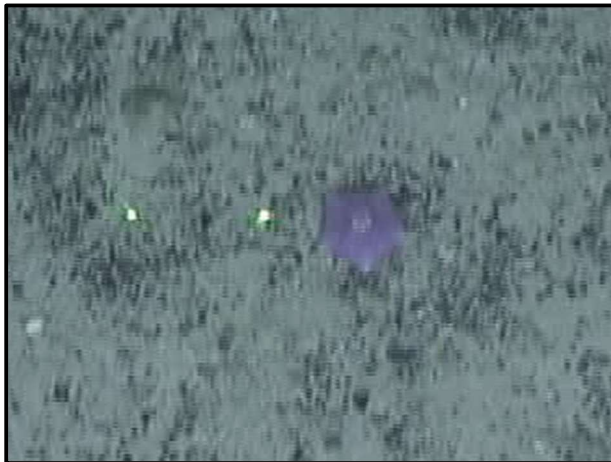


Pterasteridae (F.) sp. 1

Depth: 1678 - 2788 m

AphialD: 123142 / TSN: 157092

Small purple sea star with five arms and translucent/gelatinous body. Arms have a white line to the tips. Short arms relative to central disc. Green dots represent 10-cm scaling lasers.



Pterasteridae (F.) sp. 2

Depth: 2179 - 3003 m

AphialD: 123142 / TSN: 157092

Cushion-like sea star. Purple in colour, with five short arms that are lighter colour at the tips. Green dots represent 10-cm scaling lasers.



Pterasteridae (F.) sp. 3

Depth: 1684 - 2687 m

AphialD: 123142 / TSN: 157092

Pink cushion-like sea star with five short arms relative to the central disc. An x-like mark is occasionally visible on the central disc.

Class Asteroidea

WORMS AphiaID 123080



Asteroidea (C.) sp. 5

Depth: 1678 - 2758 m

White or off-white sea star with six arms. Very common.



Asteroidea (C.) sp. 7

Depth: 1681 - 3002 m

Sea star with five, thin white arms that are long relative to the small central disc.



Asteroidea (C.) sp. 9

Depth: 1657 - 2237 m

Yellow sea star often found on or wedged between rocky substrate. Five arms. Possibly a species of *Henricia*.

Class Asteroidea

WORMS AphiaID 123080



Asteroidea (C.) sp. 14

Depth: 1684 - 3000 m

Pale-orange sea star with large central disc relative to arm length. Five arms. Possibly a member of the family Gonasteridae.



Asteroidea (C.) sp. 15

Depth: 1722 - 2999 m

Light-coloured sea star with five thin arms tapering from a robust central disc. Size under 10 cm.



Asteroidea (C.) sp. 21

Depth: 1804 - 3003 m

Robust sea star with five short arms relative to the large central disc. Sometimes seen engorged. Range in colour from orange to off-white; tips are a lighter colour than main body. Green dots represent 10-cm scaling lasers.

Class Asteroidea

WORMS AphiaID 123080



Asteroidea (C.) sp. 28

Depth: 1777 - 3000 m

Medium-sized white sea star with five arms. Poor quality of imagery when observed negated further identification.



Asteroidea (C.) sp. 29

Depth: 2113 - 2977 m

Small (~5 cm) red/beige sea star with five thin arms. Possibly an ophiuroid.



Asteroidea (C.) sp. 33

Depth: 2163 - 2318 m

Six-armed sea star. Pink to purple in colour. Green dots represent 10-cm scaling lasers.

Class Asteroidea

WORMS AphiaID 123080



Asteroidea (C.) sp. 56

Depth: 1932 - 3002 m

White, medium-sized sea star with five short arms relative to central disc. Arms slightly shorter than Asteroidea (C.) sp. 28.



Asteroidea (C.) sp. 60

Depth: 2355 m

Cluster of sea stars with numerous thick arms; number unknown. Dark orange/brown colour. Possibly a species from the family Solasteridae.



Asteroidea (C.) sp. 65

Depth: 1879 m

Robust sea star observed under poor conditions. Colour appears light orange. Number of arms unknown. Green dots represent 10-cm scaling lasers.

Class Asteroidea

WORMS AphiaID 123080



Asteroidea (C.) sp. 66

Depth: 1876 m

Large, robust sea star with five thick arms. Appears cushion-like.

Class Crinoidea

WORMS AphiaID 123081



Bourgueticrinina (Sub. O.) sp. 1

Depth: 1666 - 2323 m

AphiaID: 123092 / TSN: 158608

Red/brown coloured stalked crinoid,
often found anchored in soft substrate.

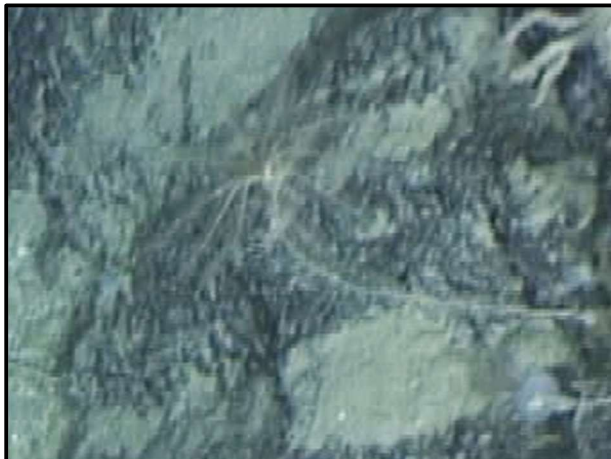


Bourgueticrinina (Sub. O.) sp. 2

Depth: 1671 - 2633 m

AphiaID: 123092 / TSN: 158608

White/beige stalked crinoid attached to
sediment or hard substrate. Number of
arms unknown but likely 5-7.



Bourgueticrinina (Sub. O.) sp. 6

Depth: 1719 - 2884 m

AphiaID: 123092 / TSN: 158608

Light-brown/yellow stalked crinoid.
Number of arms likely close to 10.
Found on rocky surface.

Class Crinoidea

WORMS AphialD 123081



Bourgueticrinina (Sub. O.) sp. 7

Depth: 2284 - 2765 m

AphialD: 123092 / TSN: 158608

White feathery stalked crinoid. Stalk long relative to crown. Arms are feathery in appearance; number unknown but likely more than five.

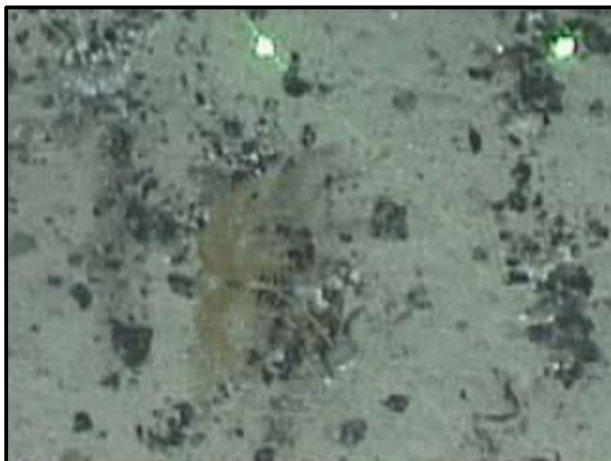


Bourgueticrinina (Sub. O.) sp. 9

Depth: 2243 m

AphialD: 123092 / TSN: 158608

Small yellow stalked crinoid. Five arms with alternate branching pinnulae on each.



Bourgueticrinina (Sub. O.) sp. 10

Depth: 1701 - 2272 m

AphialD: 123092 / TSN: 158608

Stalked crinoid. Stalk short, with crown of feathery arms; number unknown. Green dots represent 10-cm scaling lasers.

Class Crinoidea

WORMS AphiaID 123081



Bourgueticrinina (Sub. O.) sp. 13

Depth: 2091 - 2280 m

AphiaID: 123092 / TSN: 158608

Stalked crinoid with approximately 9 arms. Light yellow in colour with feathery appearance.



Bourgueticrinina (Sub. O.) sp. 14

Depth: 1973 - 2264 m

AphiaID: 123092 / TSN: 158608

Stalked crinoid with red crown of approximately 10 arms with small pinnate projections. Stalk thick and beige-coloured; attached to hard substrate.



Bourgueticrinina (Sub. O.) sp. 15

Depth: 1984 - 2088 m

AphiaID: 123092 / TSN: 158608

Stalked crinoid with five arms. Yellow in colour. Appears less 'feathery' than Bourgueticrinina (Sub. O.) Type 1.

Class Crinoidea

WORMS AphiaID 123081



Bourgueticrinina (Sub. O.) Type 1

Depth: 1709 - 3002 m

AphiaID: 123092 / TSN: 158608

Large yellow stalked crinoid. Several species suspected to be present. Some specimens have dark stalk and long thick pinnulae, while others have thinner pinnulae and a lighter stalk. Green dots, when present, represent 10-cm scaling lasers.

Class Crinoidea

WORMS AphiaID 123081



Comatulida (O.) sp. 4

Depth: 1807 - 2083 m

AphiaID: 123093 / TSN: 158545

Unstalked crinoid with dark-coloured, feathery arms. Number of arms unknown. Often attached to other organisms.



Comatulida (O.) sp. 8

Depth: 1684 - 2887 m

AphiaID: 123093 / TSN: 158545

Unstalked crinoid found attached to branching corals. Long curled arms with long pinnulae. Number of arms possibly 8.



Comatulida (O.) sp. 11

Depth: 1979 - 2284 m

AphiaID: 123093 / TSN: 158545

Dark red crinoid often found on sponges and or stalks of various organisms. Number of arms unknown. Green dots represent 10-cm scaling lasers.

Class Crinoidea

WORMS AphiaID 123081



Comatulida (O.) sp. 14

Depth: 2549 - 3002 m

AphiaID: 123093 / TSN: 158545

Bright yellow unstalked crinoid.
Attached to Chrysogorgiidae (F.) sp. 2.



Comatulida (O.) sp. 15

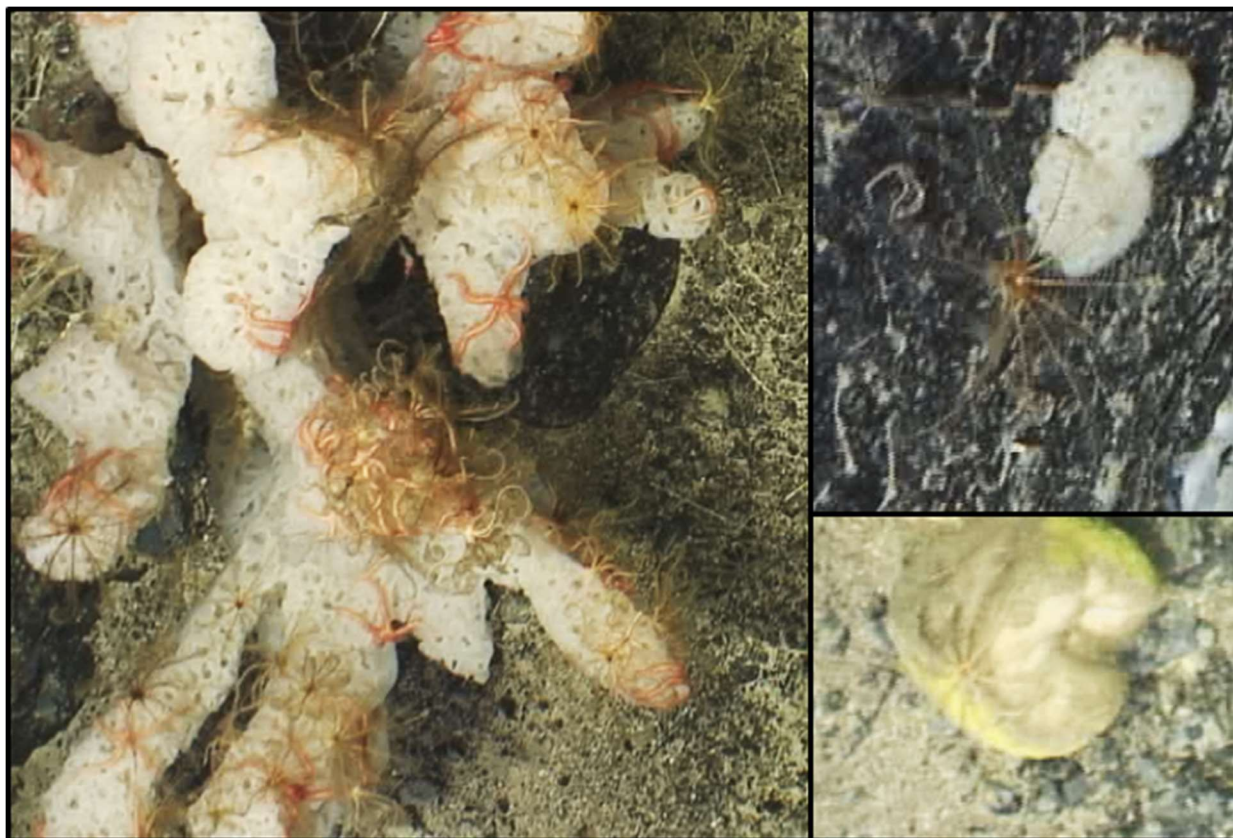
Depth: 2549 - 3002 m

AphiaID: 123093 / TSN: 158545

Large (~10 cm) unstalked crinoid
observed on rocks and sponges.

Class Crinoidea

WORMS AphiaID 123081



Comatulida (O.) spp.

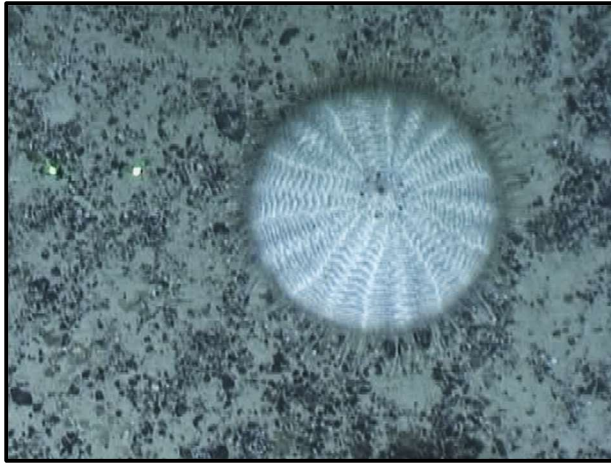
Depth: 1656 - 3000 m

AphiaID: 123093 / TSN: 158545

Orange to beige-coloured unstalked crinoids. Several species suspected to be present, but poor image quality negated further identification.

Class Echinoidea

WORMS AphiaID 123082



Araeosoma fenestratum

(Thomson, 1872)

Depth: 1656 - 2382 m

AphiaID: 149880 / TSN: 157855

Large white sea urchin with numerous ambulacral grooves. Green dots represent 10-cm scaling lasers.



Phormosoma placenta

(Thomson, 1872)

Depth: 1685 m

AphiaID: 124343 / TSN: 157859

Large, purple/red sea urchin with distinctive fleshy sacs surrounded by large aboral spines. Observed when the ROV was in motion, resulting in poor image quality. Presence of sacs confirmed taxonomic ID.



Hygrosoma sp. 1

(Mortensen, 1903)

Depth: 1682 - 2930 m

AphiaID: 123400 / TSN: 157856

Large purple sea urchin with long spines. No sacs observed.

Class Echinoidea

WORMS AphiaID 123082



Echinidae (F.) sp. 1 (Linnaeus, 1758)

Depth: 1657 - 2426 m

AphiaID: 123160 / TSN: 157940

Pink sea urchin. Approximately 5 cm in diameter with a very spherical test and thick spines.



Echinoidea (C.) sp. 1

Depth: 1745 - 1845 m

White disc-like echinoderm. Possibly same as *Araesoma fenestratum*, but ambulacral grooves not as prominent.



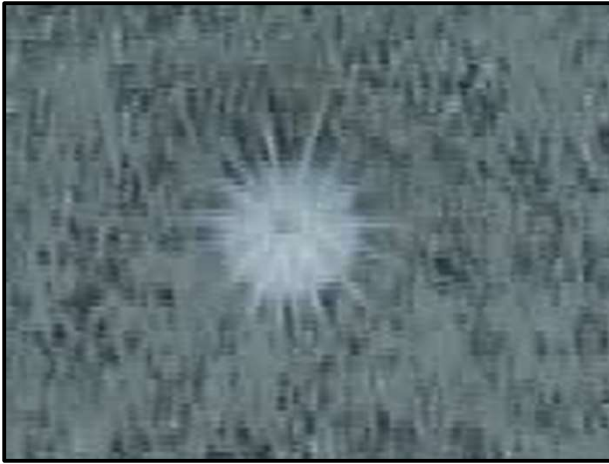
Echinoidea (C.) sp. 7

Depth: 1706 - 1729 m

Large disc-like echinoderm. Purple in colour.

Class Echinoidea

WORMS AphiaID 123082



Echinoidea (C.) sp. 9

Depth: 1718 - 2828 m

White sea urchin. Some spines are longer and thicker than others.

Class Holothuroidea

WORMS AphiaID 123083



Penilpidia midatlantica

(Gebruk, 2008)

Depth: 2235 - 3001 m

AphiaID: 345443 / TSN: 1079433

Transparent ovoid sea cucumber with a velum on the dorsal surface. Tube feet visible as well as two pairs of papillae posterior to the velum.



Psolus sp. 1

(Oken, 1815)

Depth: 1719 - 2308 m

AphiaID: 146121 / TSN: 1077949

Small, bright pink sea cucumber attached to rock. Tentacles are a lighter pink in colour. Apparent adherence to rock places this specimen in the genus *Psolus*.



Holothuroidea (C.) sp. 2

Depth: 1699 - 2866 m

Purple sea cucumber. Semi-translucent. Approximately 10 cm in length. Green dots represent 10-cm scaling lasers.

Class Holothuroidea

WORMS AphiaID 123083



Holothuroidea (C.) sp. 3

Depth: 1698 - 2680 m

Sea cucumber covered in sediment granules. Individual in this image is showing its (presumed) ventral surface after being overturned by the current created from the ROV landing.



Holothuroidea (C.) sp. 4

Depth: 1743 - 2872 m

Translucent sea cucumber with barbells at anterior end. Internal viscera not visible.



Holothuroidea (C.) sp. 5

Depth: 1741 - 2287 m

Green sea cucumber with internal digestive track visible. Green dots represent 10-cm scaling lasers.

Class Holothuroidea

WORMS AphiaID 123083



Holothuroidea (C.) sp. 6

Depth: 1777 - 3000 m

Large (≥ 10 cm), semi-translucent purple sea cucumber, with one end a darker purple than the rest of the body. Digestive tract visible. Possibly *Psychropotes depressa*.



Holothuroidea (C.) sp. 7

Depth: 2200 - 3002 m

Bright pink-red sea cucumber observed on rocky substrate.



Holothuroidea (C.) sp. 8

Depth: 2650 m

Large purple and white sea cucumber with two rows of small papillae. Possibly *Paleopatides* sp. Green dots represent 10-cm scaling lasers.

Class Ophiuroidea

WORMS AphialD 123084



Ophiuroidea (C.) sp. 1

Depth: 1688 - 2999 m

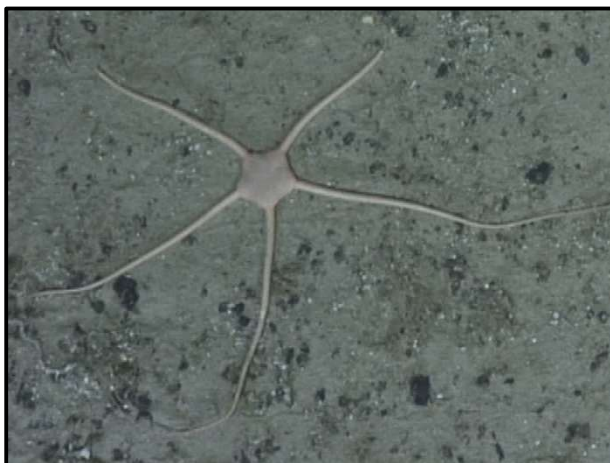
Ophiuroid with long, slender white arms and purple central disc. Often observed in motion over sandy sediment.



Ophiuroidea (C.) sp. 2

Depth: 1678 - 2315 m

Dark pink ophiuroid with red central disc and five long, light-pink arms. Often observed in motion over sandy sediment.



Ophiuroidea (C.) sp. 3

Depth: 1658 - 3003 m

Five-armed ophiuroid with pentagonal central disc. Observed on both rocks and soft sediment. Common. Possibly *Ophiomusium lymani*.

Class Ophiuroidea

WORMS AphiaID 123084



Ophiuroidea (C.) sp. 5

Depth: 1741 - 2750 m

Ophiuroid with orange-red central disc and five slender arms that are a lighter orange colour. Often found on a rocky substrate.



Ophiuroidea (C.) sp. 9

Depth: 1738 - 2351 m

Large ophiuroid with large, round central disc and five long, thin arms. Often partially buried in sediment.



Ophiuroidea (C.) sp. 12

Depth: 1876 - 3003 m

Pink/orange ophiuroid found on or near sponges or rocks. Red-purple central disc and five orange arms. Green dots represent 10-cm scaling lasers.

Class Ophiuroidea

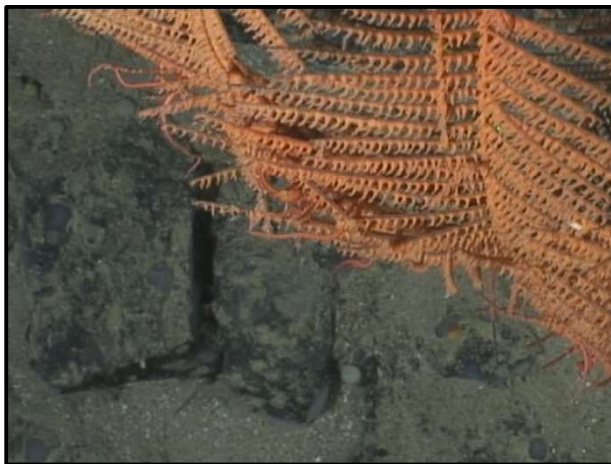
WORMS AphiaID 123084



Ophiuroidea (C.) sp. 22

Depth: 1734 - 2133 m

Six-armed ophiuroid with red central disc and six white arms. Found on rocky substrate.



Ophiuroidea (C.) sp. 26

Depth: 2613 - 2848 m

Red/orange ophiuroid observed on the branches of black coral.



Ophiuroidea (C.) sp. 29

Depth: 1687 - 2410 m

Red/orange sea star with a circular central disc. Robust. Five arms. Green dots represent 10-cm scaling lasers.

Class Ophiuroidea

WORMS AphiaID 12308



Ophiuroidea (C.) spp. (obstructed)

Depth: 2250 - 3002 m

Beige coloured ophiuroids found in/on stalkeds, coral or sponge. View of central disc is always partially impeded, giving rise to their 'obstructed' and 'spp.' designation.



Asteroidea/Ophiuroidea (C.) sp. 1

Depth: 2248 m

Thick-armed echinoderm that belongs to either the Asteroidea or Ophiuroidea. Observed on a branching coral.

Class Enteropneusta

WORMS AphiaID 1820



Enteropneusta (C.) sp. 1

Depth: 1659 - 2700 m

Acorn worm with a spade-shaped purple proboscis and collar. Tapers into a long yellow trunk. Likely a member of the family Torquaratoridae. Green dots represent 10-cm scaling lasers.



Enteropneusta (C.) sp. 2

Depth: 2264 m

Acorn worm with same morphology as Enteropneusta (C.) sp. 1 but with a golden/yellow proboscis and collar. Green dots represent 10-cm scaling lasers.

Class Cephalopoda

WORMS AphiaID 11709



Graneledone verrucosa
(A. E. Verrill, 1881)

Depth: 1685 - 1744 m

AphiaID: 157019 / TSN: 82648

Octopus with small “wart-like” tubercles covering the outer surface of the mantle, head and web. One row of suckers on each arm. Green dots represent 10-cm scaling lasers.



Grimpoteuthis sp. 1
(Robson, 1932)

Depth: 1699 - 1805 m

AphiaID: 138293 / TSN: 555807

White cirrina octopus with a reddish colouration on the arms and fins. Two fins are present on mantle above the eyes.



Muusoctopus sp. 1
(Hoyle, 1885)

Depth: 2177 m

AphiaID: 527126 / TSN: N/A

Octopus with white mantle and red arms. Two rows of suckers on each arm.

Class Scaphopoda

WORMS AphiaID 104



Scaphopoda (C.) sp. 1

Depth: 2133 - 2513 m

A white, long tapered 'tusk shell' found on the sediment. As members of this group are normally buried, the specimen visible here may be dead and record should only be used to indicate potential presence in a region.

Astrophorina: Class Demospongiae

WORMS AphiaID 131602



Geodia atlantica

(Stephens, 1915)

Depth: 1660 - 3000 m

AphiaID: 134022 / TSN: 204081

Massive, white lobose sponge; almost lamellate in form.



Geodia barretti

(Bowerbank, 1858)

Depth: 1686 - 2895 m

AphiaID: 134023 / TSN: N/A

Massive-globular sponge, often with several, highly visible oscula. Green dots represent 10-cm scaling lasers.



Geodia macandrewii

(Bowerbank, 1858)

Depth: 1872 - 3002 m

AphiaID: 134033 / TSN: N/A

Large globular sponge with a covering that possibly represents spicule 'fur'.

Astrophorina: Class Demospongiae



Geodia megastrella
(Carter, 1876)

Depth: 1661 - 3002 m

AphialD: 134034 / TSN : N/A

Large oblong-shaped sponge; dark brown in colour. Occasionally observed with possible buds projecting from the dermal surface.



Geodia phlegraei
(Sollas, 1880)

Depth: 1699 - 3003 m

AphialD: 254643 / TSN: N/A

Spherical globose sponge with what is likely *Hexadella dedritifera* covering approximately $\frac{3}{4}$ of its surface area. The uncovered area is white with numerous ostia visible.



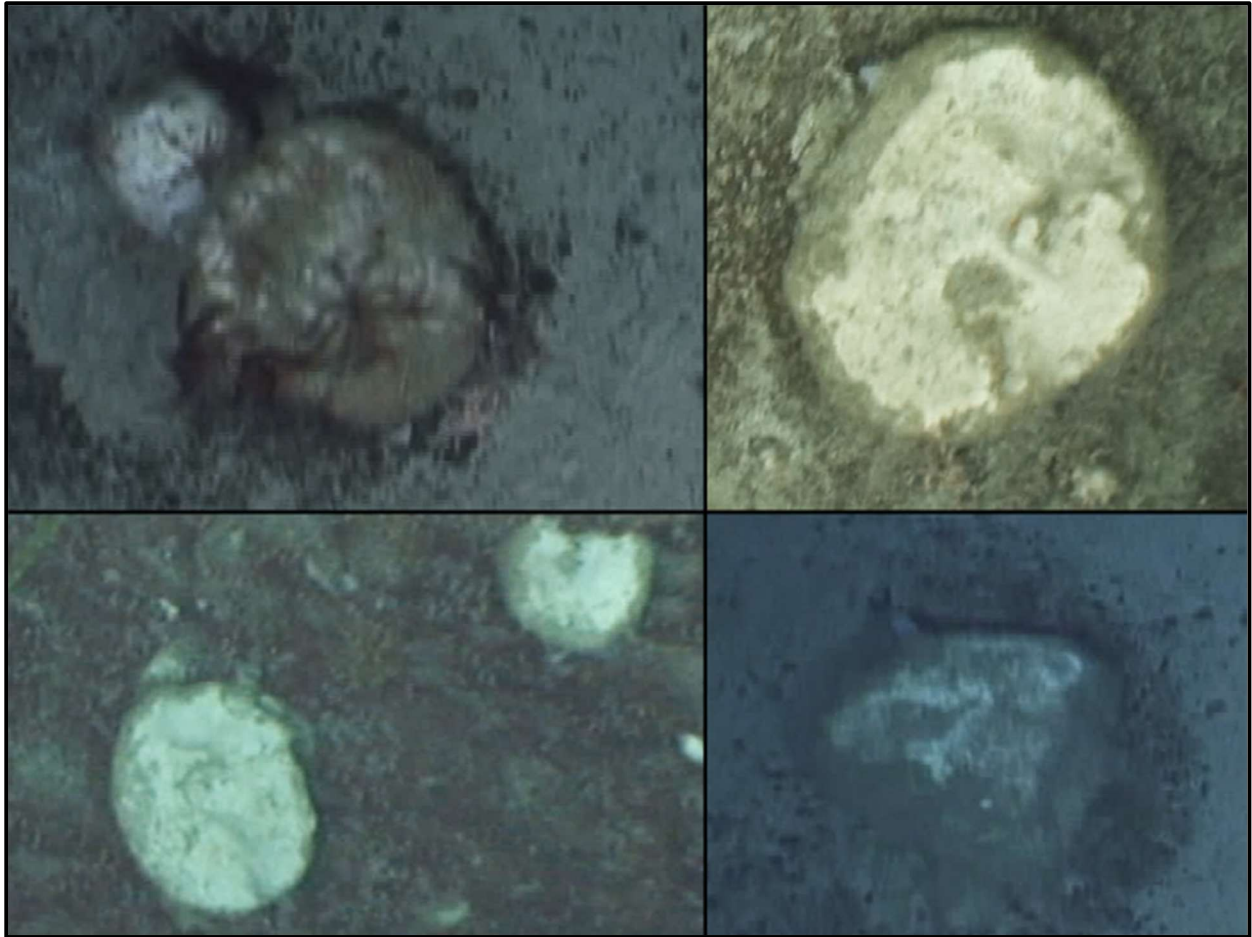
Stryphnus fortis
(Vosmaer, 1885)

Depth: 1704 - 2867 m

AphialD: 133988 / TSN: N/A

Large lobose sponge encrusted with what is likely *Hexadella dedritifera*. Green dots represent 10-cm scaling lasers.

Astrophorina: Class Demospongiae



Geodia atlantica/*Geodia macandrewii* sp. 1

(Stephens, 1915; Bowerbank, 1858)

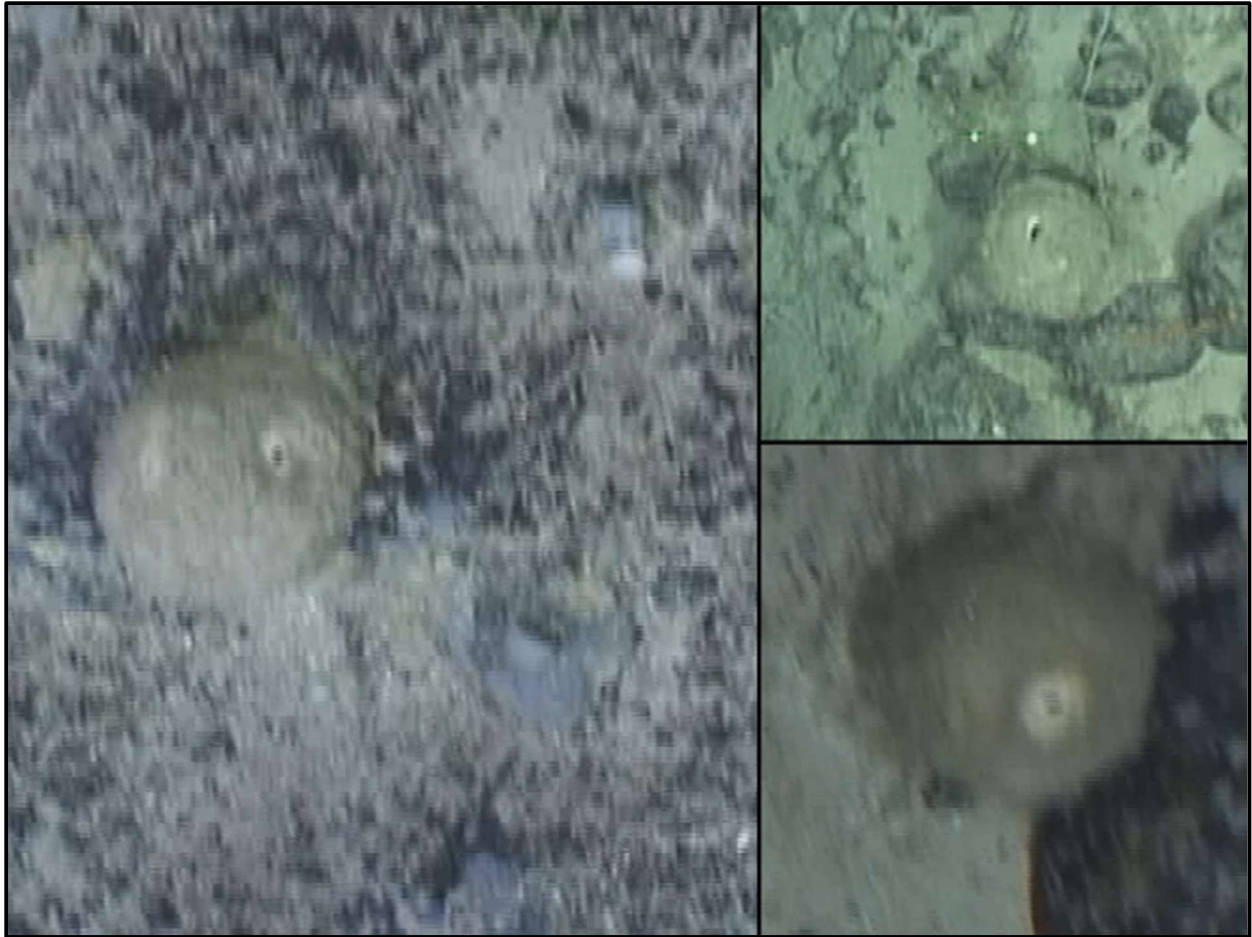
Depth: 1690 - 2887 m

AphiaID: 134022, 134033 / TSN: 204081, N/A

Either *G. atlantica* and/or *G. macandrewii*. Large, almost bowl-like in shape; either mostly or partially covered in sediment. Often observed when the ROV was high off bottom, negating further identification.

Astrophorina: Class Demospongiae

WORMS AphiaID 131602



Geodia barretti/Geodia hentscheli sp. 1

(Bowerbank, 1858; Cárdenas, Rapp, Schander & Tendal, 2010)

Depth: 1717 - 3000 m

AphiaID: 134023, 449128 / TSN:

Geodia barretti and/or *G. hentscheli*. Large, round morphology with dense cover by organic matter/sediment. A single, clear osculum visible always visible. Green dots, when present, represent 10-cm scaling lasers.

Astrophorina: Class Demospongiae



Geodia barretti/*Geodia megastrella* sp. 1
(Bowerbank, 1858; Carter, 1876)

Depth: 1678 - 2344 m

AphiaID: 134023, 134034 / TSN: N/A

Geodia barretti and/or *G. megastrella*. Large, smooth body with 2-3 oscula often visible. Colour is a light brown/tan. Green dots, when present, represent 10-cm scaling lasers.

Astrophorina: Class Demospongiae

WORMS AphiaID 131602



Geodia sp. 1
(Lamarck, 1815)

Depth: 1876 - 3000 m

AphiaID: 132005 / TSN: 48612

Globular sponge; dermal surface hispid with organic matter covering. Oscula not visible, which could be due to the angle at which they were observed.



Geodia sp. 2
(Lamarck, 1815)

Depth: 1875 - 3004 m

AphiaID: 132005 / TSN: 48612

Massive beige sponge attached to rock, various sizes. Slightly irregularly shaped, but often globular. Multiple oscula can be seen.



Geodia sp. 3
(Lamarck, 1815)

Depth: 1870 - 2008 m

AphiaID: 132005 / TSN: 48612

Large irregularly shaped sponge, brown/white mottled surface with an uneven texture.

Astrophorina: Class Demospongiae



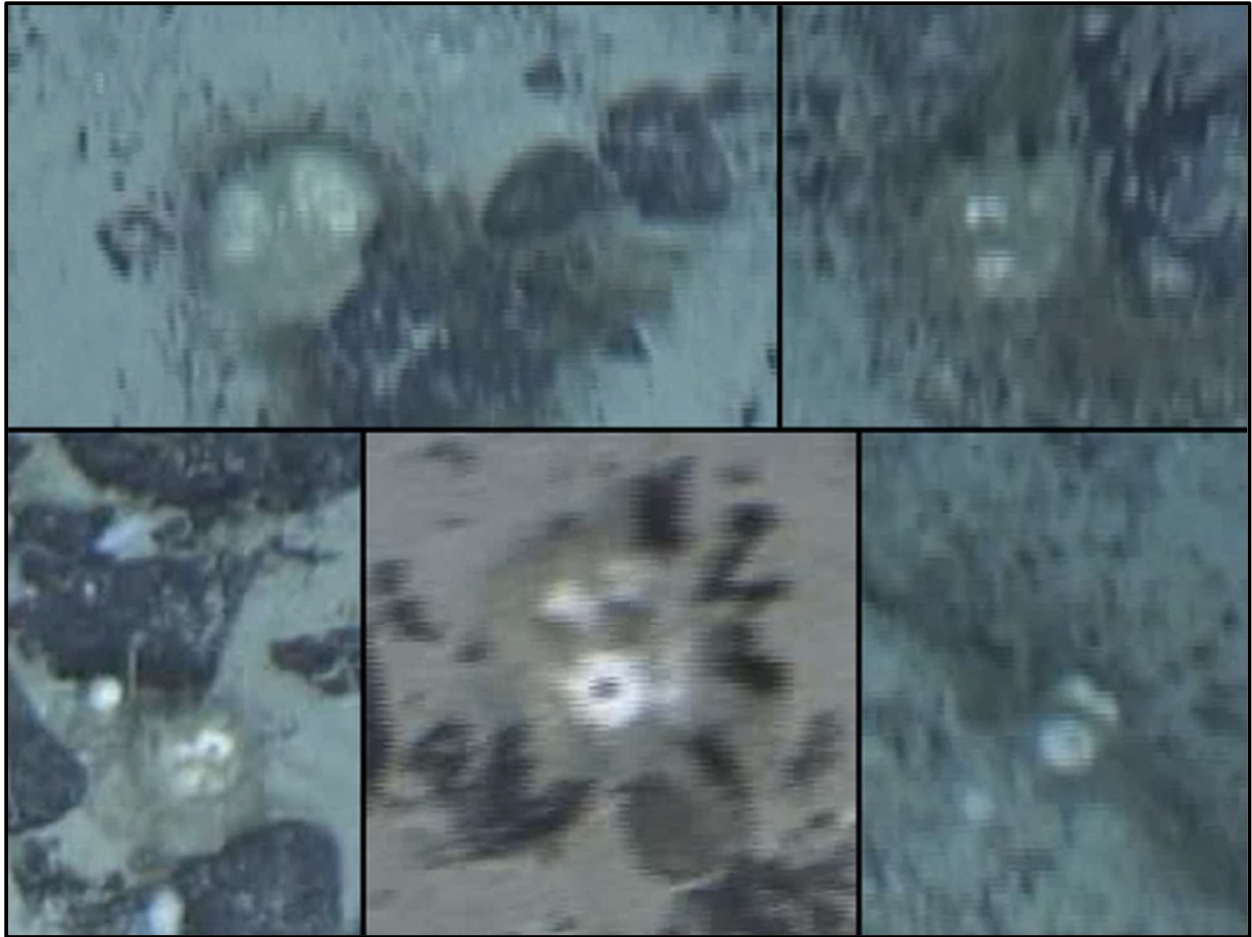
Geodia spp. Type 1
(Lamarck, 1815)

Depth: 1725 - 3001 m

AphiaID: 132005 / TSN: 48612

Medium-sized (~10 cm) globular sponge. Possibly multiple species present. No osculum visible. Surface appears hispid. Often observed when the ROV was in motion, negating further identification.

Astrophorina: Class Demospongiae



Geodia spp. Type 2
(Lamarck, 1815)

Depth: 1727 - 3003 m

AphiaID: 132005 / TSN: 48612

Globular to lobose sponge, ~10 cm in size. Body covered in organic matter, but white sponge surface and several oscula often visible. Often observed when the ROV was in motion, negating further identification.

Astrophorina: Class Demospongiae

WORMS AphiaID 131602



Astrophorina (Sub. O) sp. 1

Depth: 1711 m

Massive white sponge (>50 cm); globular to lobose in morphology. White with patches of organic matter visible on dermal surface. Resembles *Geodia atlantica*.



Astrophorina (Sub. O) sp. 4

Depth: 1871 - 2242 m

Massive-globular sponge with white sponge encrusting one side. from high up. Observed on a high-sloped environment.



Astrophorina (Sub. O) sp. 5

Depth: 2607 - 2873 m

Massive-globular sponge encrusted with *Hexadella dedritifera*. Dermal surface mostly covered in organic matter/sediment.

Astrophorina: Class Demospongiae

WORMS AphiaID 131602



Astrophorina (Sub. O) sp. 6

Depth: 1974 - 3003 m

Massive-globular sponge. Basal attachment area smaller than maximum body width of sponge. Off-white in colour; relatively clear of sediment.



Astrophorina (Sub. O) sp. 7

Depth: 1980 - 2667 m

Massive-lobose sponge. White with partial coverage by organic matter/sediment. Numerous small oscula visible.



Astrophorina (Sub. O) sp. 8

Depth: 1876 m

Massive, globular to lobose sponge. Observed when the ROV was high off bottom; negating further observation and identification. Green dots represent 10-cm scaling lasers.

Astrophorina: Class Demospongiae

WORMS AphiaID 131602



Astrophorina Massive-Globose Type 1

Depth: 1682 - 3000 m

Massive, white globose sponges often with several oscula visible. Sometimes observed with patches of detritus on dermal surfaces. Several species possibly present. Green dots, when present, represent 10-cm scaling lasers.

Astrophorina: Class Demospongiae

WORMS AphiaID 131602



Astrophorina Massive-Lobose Type 1

Depth: 1685 - 3002 m

Massive-lobose sponge. Often covered in detrital matter. Oscula possibly visible. Observed on rocky substrate. Wide range of possible species; poor image quality negated further identification.

Branching-Erect Demospongiae

WORMS AphiaID 164811

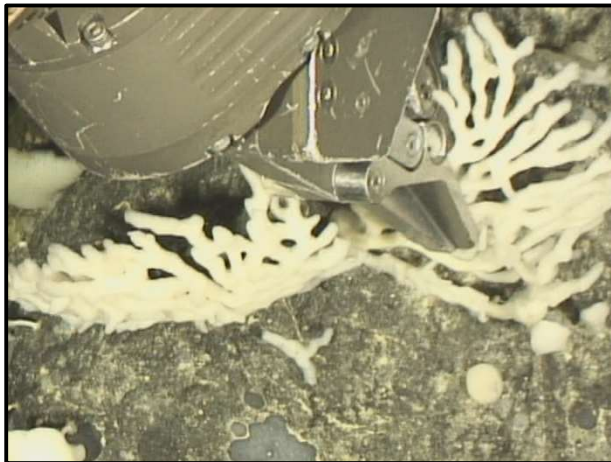


Lissodendoryx complicata (Hansen, 1885)

Depth: 1994 - 2750 m

AphiaID: 168950 / TSN: NA

Bush-like flattened sponge found on rocky substrate. Green dots represent 10-cm scaling lasers.



Tedania sp. 1 (Gray, 1867)

Depth: 2999 - 3003 m

AphiaID: 131974 / TSN: 48110

Erect, fan-shaped branching sponge. Recent morphological and genomic work (Ríos et al., 2018) placed this specimen in the genus *Tedania*.

Cushion Demospongiae

WORMS AphiaID 164811

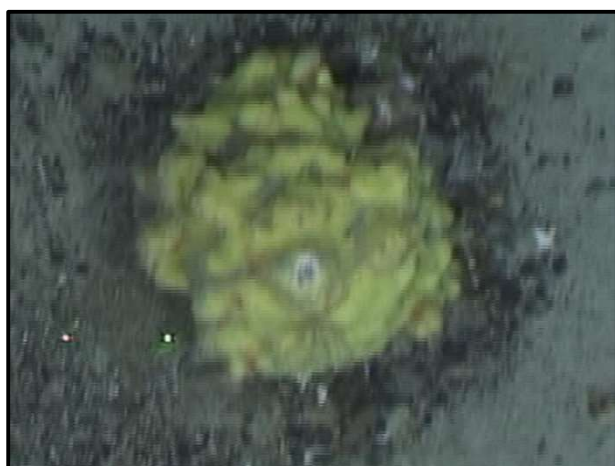


Crellidae/Myxillidae (F.) sp. 1

Depth: 1718 - 2880 m

AphiaID: 131652/131658 / TSN:
659176/48040

Yellow cushion-encrusting sponge that is either a member of the family Crellidae or Myxillidae. Always observed on hard substrate, a characteristic used to separate this species from *Hexadella dedritifera*.



Hexadella dedritifera (Topsent, 1913)

Depth: 1704 - 3004 m

AphiaID: 169682 / TSN: N/A

Yellow encrusting sponge. Always observed encrusting other sponge species, including *Stryphnus fortis* and *Geodia phlegraei*. Green dots represent 10-cm scaling lasers.



Hymedesmiidae (F.) sp. 1

Depth: 2322 - 2999 m

AphiaID: 131655 / TSN: 48301

Grey encrusting sponge with numerous pore sieves visible. Observed on rocky substrate.

Cushion Demospongiae

WORMS AphiaID 164811



Demospongiae (C.) sp. 23

Depth: 2280 - 3001 m

Cushion sponge with possible pore sieves, suggesting it is a member of the family Hymedesmiidae. Sediment-coloured.

Massive-Globose Papillate Demospongiae

WORMS AphiaID 164811



cf. *Polymastia corticata*
(Ridley & Dendy, 1886)

Depth: 1749 - 2346 m

AphiaID: 134197 / TSN: N/A

Globular white sponge, with numerous papillae. Usually observed on hard substrate.



Demospongiae (C.) sp. 42

Depth: 1735 m

Small globular sponge with possible papilla and crown.

Massive-Lobose/Globose Demospongiae

WORMS AphiaID 164811



Demospongiae (C.) sp. 43

Depth: 2276 - 2579 m

White/translucent globular to lobose sponge. Large pores visible. Poor image quality negated further identification.



Demospongiae (C.) sp. 44

Depth: 1877 - 3003 m

Small hemispherical sponge with a single osculum visible. Tan in colour.

Spherical Demospongiae

WORMS AphiaID 164811



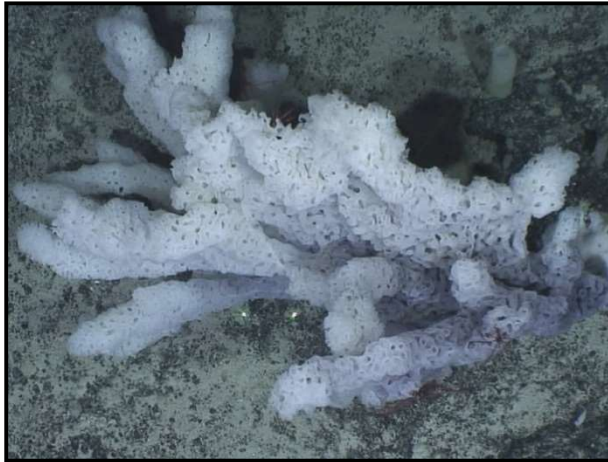
Demospongiae (C.) sp. 45

Depth: 2597 - 2638 m

Small, spherical sponge. Yellow in colour and slightly transparent. Several oscular 'chimneys' visible.

Branching-Erect Hexactinellida

WORMS AphiaID 22612



Farrea herdendorfi
(Duplessis & Reiswig, 2004)

Depth: 1741 - 3002 m

AphiaID: 171744 / TSN: NA

Large, branching glass sponge with anastomosing tubes. Green dots represent 10-cm scaling lasers.

Cup-like Hexactinellida

WORMS AphiaID 22612



Asconema fristedti

(Tabachnick & Menshenina
2007)

Depth: 1793 - 3002 m

AphiaID: 255144 / TSN: NA

Large funnel-shaped body with flared edges and a top wider than the basal attachment site.



Chonelasma sp. 1

(Schulze & Kirkpatrick, 1910)

Depth: 1702 - 3000 m

AphiaID: 171662 / TSN: NA

Large, funnel-shaped glass sponge with wide flat top. Tightly-knit, mesh-like pattern spicule pattern observed when up close. Green dots represent 10-cm scaling lasers.



Hexactinellida (C.) sp. 76

Depth: 2234 - 3001 m

Cup-like sponge. Basal attachment area not visible. Possibly a juvenile of *Chonelasma* sp. 1

Cup-like Hexactinellida

WORMS AphiaID 22612



Hexactinellida (C.) sp. 65

Depth: 1993 - 2810 m

Large, funnel-shaped sponge with netted appearance and large tube-like projections covering dermal surface. Green dots, when present, represent 10-cm scaling lasers.

Cylindrical Hexactinellida

WORMS AphiaID 22612



Dictyaulus romani
(Murillo, Tabachnick &
Menshenina, 2013)

Depth: 1690 - 2750 m

AphiaID: 742695 / TSN: N/A

Long, cylindrical body with a sieve plate observed at its distal end. Green dots represent 10-cm scaling lasers.



Euplectellidae (F.) sp. 1

Depth: 2422 - 2754 m

AphiaID: 131692 / TSN: 47463

Large, rotund body that tapers to a sieve plate observed at its distal end.



Hexactinellida (C.) sp. 1

Depth: 1719 - 3000 m

Large, cylindrical sponge often observed in clusters on hard substrate. Rim around the distal end of large specimens.

Cylindrical Hexactinellida

WORMS AphiaID 22612



Hexactinellida (C.) sp. 10

Depth: 1777 - 2886 m

Cylindrical sponge with irregular shape. Often parallel to the seabed, with a bend in the body.



Hexactinellida (C.) sp. 47

Depth: 1994 - 2866 m

Tubular glass sponge observed on its side. Thick body wall. Does not appear to be stalked. Similar to Hexactinellida (C.) sp. 41 but without the long spicules protruding from its dermal surface.



Hexactinellida (C.) sp. 49

Depth: 2675 - 2889 m

Robust, tubular glass sponge. Height is not apparent due to poor image quality.

Cylindrical Hexactinellida

WORMS AphiaID 22612



Hexactinellida (C.) sp. 41

Depth: 1685 - 3000 m

Robust cylindrical glass sponge with 'hispid' surface. Spicules covered in organic matter. Wide osculum at the top. Shape often irregular. Green dots, when present, represent 10-cm scaling lasers.

Massive-Globose Hexactinellida

WORMS AphiaID 22612



Rosellidae (F.) spp.

Depth: 1721 - 3003 m

AphiaID: 131694 / TSN: 47504

Small, globular to tube-shaped sponge with long spicules protruding from dermal surface. Single osculum visible. Similar in appearance to the barrel-shaped rosellid *Vazella pourtalesii*. Green dots, when present, represent 10-cm scaling lasers.

Massive-Globose Hexactinellida

WORMS AphiaID 22612



Hexactinellida (C.) sp. 23

Depth: 1848 m

A group of translucent tubes clustered on sea floor. Single osculum visible in terminal end of each tube. Green dots represent 10-cm scaling lasers.



Hexactinellida (C.) sp. 46

Depth: 1990 - 2867 m

Medium-sized, globular glass sponge, often found settled on other sponges. Shape is irregular.



Hexactinellida (C.) sp. 61

Depth: 2322 - 2813 m

Small (< 5 cm) globular to tube-shaped sponge observed on hard substrate. Similar to Hexactinellida (C.) sp. 23 except tubes do not appear connected. Poor image quality.

Massive-Lobose Hexactinellida

WORMS AphiaID 22612



Hexactinellida (C.) sp. 64

Depth: 1992 - 2765 m

White, possibly fan-shaped sponge with numerous ostia visible across the dermal surface. Often found on/around other sponges.



Hexactinellida (C.) sp. 67

Depth: 2595 - 2750 m

Large, massive sponge with an irregular, lobose shape.



Hexactinellida (C.) sp. 68

Depth: 1992 - 2894 m

Large white lobose sponge; almost foliose in morphology. Green dots represent 10-cm scaling lasers.

Massive-Lobose Foliose Hexactinellida

WORMS AphiaID 22612



Asconema foliatum

Depth: 1875 - 2764 m

AphiaID: 172017 / TSN: NA

White, foliose sponge observed on rocky substrate.

Massive-Lobose Foliose Hexactinellida

WORMS AphiaID 22612



Hexactinellida (C.) sp. 11

Depth: 1748 - 2700 m

White lattice-like sponge with sediment accumulating around the edges.



Hexactinellida (C.) sp. 44

Depth: 2049 - 3003 m

Large white sponge with a thin sheet-like morphology irregular slightly folded structure/shape. Green dots represent 10-cm scaling lasers.



Hexactinellida (C.) sp. 84

Depth: 1978 - 2351 m

Glass sponge with multiple sheaths of folded lobes. May have both dead and living tissue. More sheet-like in body type as opposed to tube-like.

Massive-Lobose Matrix Hexactinellida

WORMS AphiaID 22612



Hexactinellida (C.) sp. 97

Depth: 1876 - 3000 m

Irregularly shaped, white sponge. Often observed with large holes and arches within its structure; matrix-like. Images on the bottom left and bottom centre are of the same individual.

Massive-Lobose Lattice/Tubular Hexactinellida

WORMS AphiaID 22612



Hexactinellida (C.) sp. 26

Depth: 1717 - 3000 m

Small, tubular sponge with thin body walls. Tubes branching but have terminal ends.

Massive-Lobose Lattice/Tubular Hexactinellida

WORMS AphiaID 22612



Hexactinellida (C.) sp. 28

Depth: 1720 - 2896 m

Tubular glass sponge. Tubes interconnecting. Observed on cliff faces.

Massive-Lobose Lattice/Tubular Hexactinellida

WORMS AphiaID 22612



Hexactinellida (C.) sp. 57

Depth: 2434 - 2880 m

Tubular glass sponge with numerous long tube-like projections from its outer surface. Often multi-lobed. Green dots, when present, represent 10-cm scaling lasers.

Massive-Lobose Lattice/Tubular Hexactinellida

WORMS AphiaID 22612



Hexactinellida (C.) Lattice Type 1

Depth: 1718 - 3002 m

Category reserved for large lattice-like sponges. Multiple species likely present. Very common, but poor image quality negated further identification.

Massive-Lobose Tubular Hexactinellida

WORMS AphiaID 22612



Hertwigia sp. 1
(Schmidt, 1880)

Depth: 1718 - 2242 m

AphiaID: 132115 / TSN: 659643

Yellow, lobose, matrix-like sponge.
Occasionally vase-shaped.



Hertwigia sp. 2
(Schmidt, 1880)

Depth: 2757 m

AphiaID: 132115 / TSN: 659643

White, translucent matrix-like glass
sponge. Single specimen observed in a
crevice.



Hexactinellida (C.) sp. 59

Depth: 1990 - 2838 m

Translucent, cylindrical sponge with
multiple raised oscula.

Massive-Lobose Tubular Hexactinellida

WORMS AphiaID 22612



Hexactinellida (C.) sp. 77

Depth: 1973 - 2750 m

Globular white sponge consisting of many interconnected tubes with oscula at terminal ends. Often observed in crevices.



Hexactinellida (C.) sp. 86

Depth: 1900 - 2848 m

Globular purple sponge consisting of many interconnected tubes with oscula at terminal ends. Green dots represent 10-cm scaling lasers.

Stalked Hexactinellida

WORMS AphialD 22612



Amphidiscella sp. 1
(Tabachnick & Lévi, 1997)

Depth: 2586 m

AphialD: 171849 / TSN: 659631

Stalked white sponge with bulbous terminal end. Single raised osculum.



Caulophacus sp. 1
(Schulze, 1886)

Depth: 2430 - 2875 m

AphialD: 132112 / TSN: 47490

Stalked glass sponge with a mushroom-like, domed top when small, and a larger, flat, flower-like top when large.



Farrea sp. 1
(Bowerbank, 1862)

Depth: 1907 - 2750 m

AphialD: 132107 / TSN: 47350

Translucent stalked sponge found on cliff face.

Stalked Hexactinellida

WORMS AphiaID 22612



Saccocalyx sp. 1
(Schulze, 1896)

Depth: 2343 - 3002 m

AphiaID: 171844 / TSN: 659636

Stalked white sponge with bulbous, matrix-like head.



Hexactinellida (C.) sp. 24

Depth: 2374 - 2897 m

Stalked white sponge with tulip-shaped head. Possibly a species from the genus *Crateromorpha*.



Hexactinellida (C.) sp. 43

Depth: 2343 - 3000 m

Stalked sponge with a small, round, bulbous head.

Branching-Repent Porifera

WORMS AphiaID 558



Porifera (P.) sp. 251

Depth: 2747 - 2750 m

Massive white sponge with a creeping morphology. Observed when ROV was relatively high off bottom, negating further identification.

Cushion Porifera

WORMS AphiaID 558



Porifera (P.) sp. 151

Depth: 1719 - 3002 m

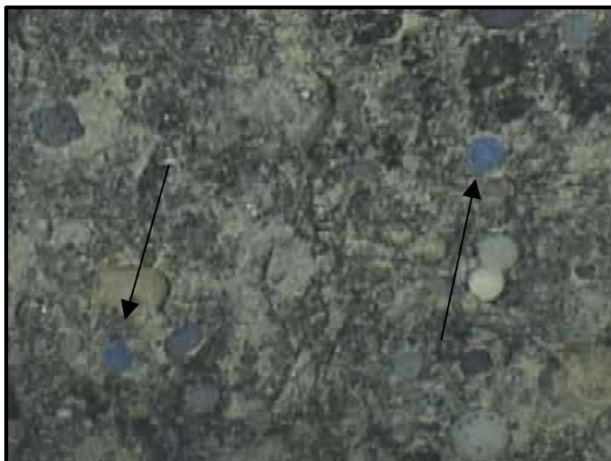
White cushion sponge always observed on rocky substrate. Occasionally observed with 'dimples' on its surface.



Porifera (P.) sp. 178

Depth: 2219 - 2853 m

Thin white sponge with a creeping, matrix-like morphology. Similar to Hexactinellida (C.) sp. 97 but with a thinner body wall. Green dots represent 10-cm scaling lasers.



Porifera (P.) sp. 183

Depth: 2389 - 2998 m

Small blue cushion sponge observed on cliff faces. Possibly a member of the genus *Hymedesmia*.

Cushion Porifera

WORMS AphiaID 558



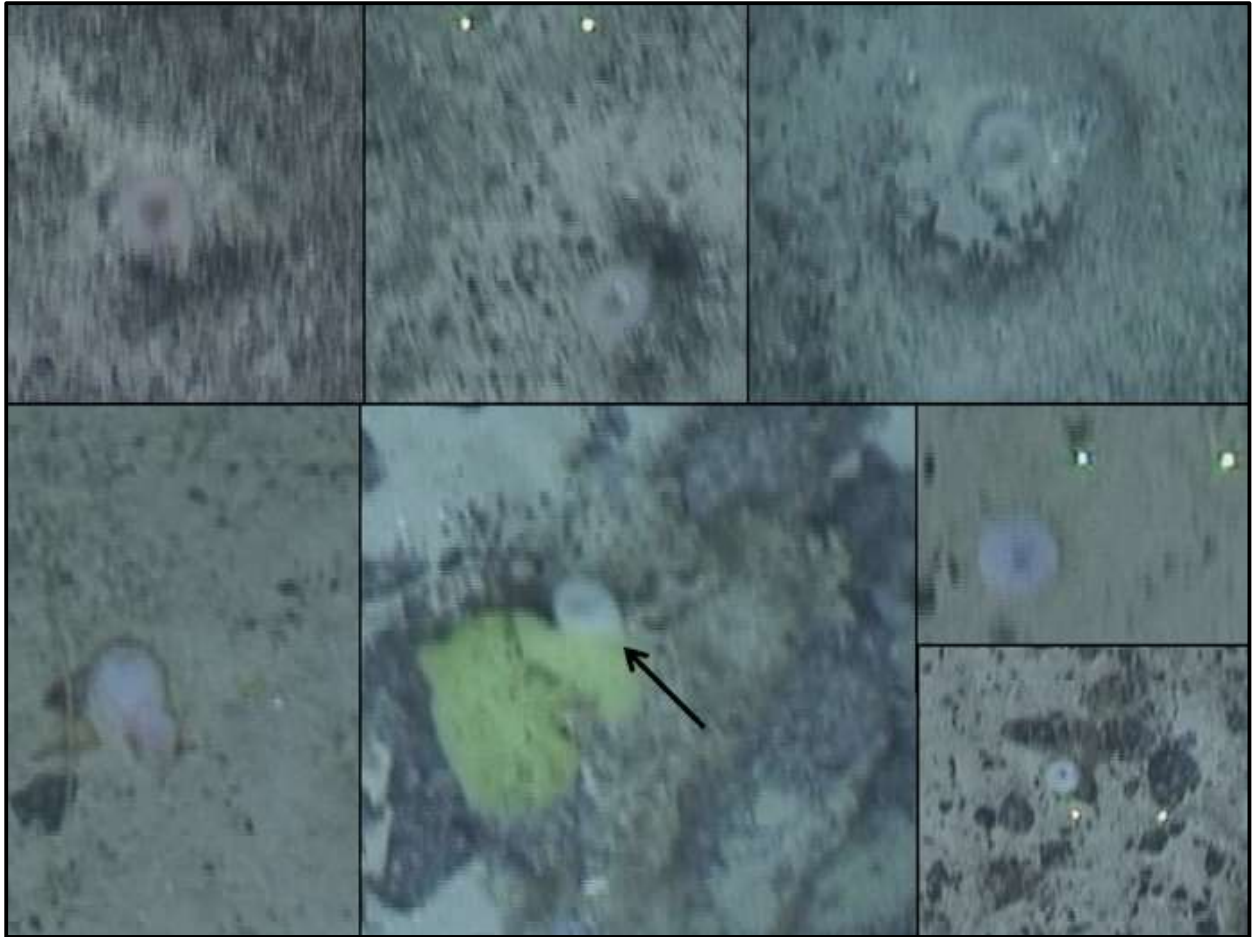
Porifera Cushion spp.

Depth: 1685 - 3000 m

White cushion-encrusting sponge on rocky substrate. Likely several species present, but poor image quality negated further identification.

Cylindrical Porifera

WORMS AphiaID 558



Porifera Vase-Cylindrical Type 1

Depth: 1678 - 3002 m

White, translucent, globular to vase-shaped sponge. Single osculum visible at terminal end and occasionally projections can be seen. Poor image quality negated further identification. Green dots, when present, represent 10-cm scaling lasers.

Disc-like Porifera

WORMS AphiaID 558



Porifera (P.) sp. 256

Depth: 1807 m

Small white, disc-like (flat) sponge attached to rock. Spicules are visible. Green dots represent 10-cm scaling lasers.

Encrusting Porifera

WORMS AphiaID 558



Porifera (P.) sp. 1

Depth: 1686 - 2518 m

Yellow sponge that encrusts hard substrate and possibly soft sediments and other sponges. Likely includes *Hexadella dedritifera*, and should be grouped with this taxon for diversity analyses.



Porifera (P.) sp. 50

Depth: 1658 - 3004 m

Thin, semi-translucent grey encrusting sponge. Always found on rocks. Very common.

Massive-Globose Porifera

WORMS AphiaID 558



Porifera (P.) sp. 59

Depth: 1777 - 2607 m

Hemispherical-shaped globular sponge on rocky substrate. Three oscula visible. Possibly a demosponge. Green dots represent 10-cm scaling lasers.



Porifera (P.) sp. 155

Depth: 1733 - 2430 m

Hemispherical-shaped globular sponge on rocky substrate. Many oscula visible. Green dots represent 10-cm scaling lasers.



Porifera (P.) sp. 164

Depth: 1788 - 3002 m

White globular sponge with single osculum often visible. Found on rocky substrate. Possibly a demosponge. Green dots represent 10-cm scaling lasers.

Massive-Globose Porifera

WORMS AphiaID 558



Porifera (P.) sp. 192

Depth: 2244 - 2746 m

Flat white sponge. Poor image quality negated further identification. Possibly a demosponge. Green dots represent 10-cm scaling lasers.



Porifera (P.) sp. 254

Depth: 1716 - 3000 m

Grey massive-globose to hemispherical sponge found on rocky substrate. Oscula visible.

Massive-Globose Porifera

WORMS AphiaID 558



Porifera (P.) sp. 253

Depth: 1687 - 3003 m

Small (~5-10 cm) hemispherical sponge with oscula sometimes visible. Usually observed on soft substrate; never in good focus. Green dots, when present, represent 10-cm scaling lasers.

Massive-Lobose Porifera

WORMS AphiaID 558



Porifera (P.) sp. 247

Depth: 2322 - 2748

Thin and flat sponge with undulating appearance. Surface dotted with well-defined ostia. Green dots, when present, represent 10-cm scaling lasers.



Porifera (P.) sp. 255

Depth: 1993 - 2248 m

White massive-lobose to lamellate sponge.

Massive-Lobose Porifera

WORMS AphiaID 558



Porifera Massive-Lobose Type 1

Depth: 1704 - 3001 m

Massive-lobose sponges. Several species suspected to be present. Green dots, when present, represent 10-cm scaling lasers.

Lamellate Porifera

WORMS AphiaID 558



Porifera (P.) sp. 98

Depth: 1731 - 1736 m

White, cup-shaped sponge. Width of attachment point uncertain. Crinoids often attached.



Porifera (P.) sp. 126

Depth: 2285 - 2329 m

Large, white fan-shaped sponge. Appears to have venation. Green dots represent 10-cm scaling lasers.



Porifera (P.) sp. 226

Depth: 1993 m

Large sponge with folded-like appearance. Attached to hard substrate. May be a member of the class Hexactinellida.

Lamellate Porifera

WORMS AphiaID 558



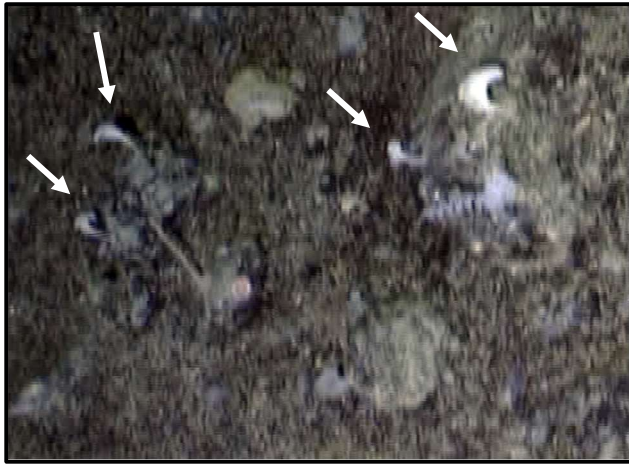
Porifera Lamellate spp.

Depth: 1876 - 3002 m

White fan-shaped sponges. Several species suspected to be present. Occasionally observed growing on other sponges. Green dots, when present, represent 10-cm scaling lasers.

Stalked Porifera

WORMS AphiaID 558



Porifera (P.) sp. 257

Depth: 2431 - 2848 m

Small, stalked sponge with narrow base, which spreads into an irregular fan at the distal end. Possibly a glass sponge.

Porifera Off Bottom

WORMS AphiaID 558



Cylindrical Hexactinellida_Off Bottom

Depth: 1718 - 2863 m

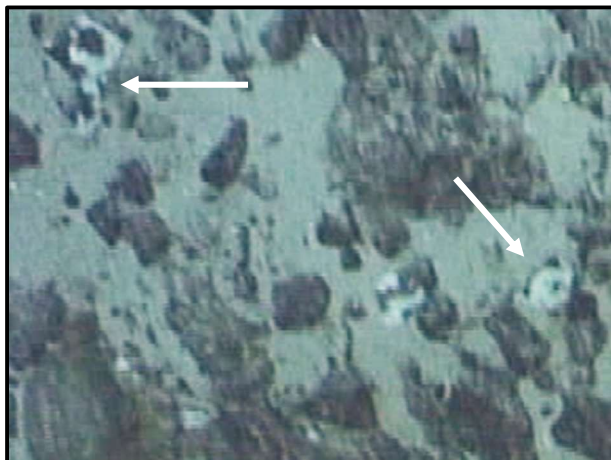
Identifier given to any tube-like or cylindrical hexactinellid consistently observed when the ROV was high off the seabed, preventing their identification. Likely overlaps with sponge morphotypes listed above.



Massive-Lobose Foliose Hexactinellida_Off Bottom

Depth: 2749 m

Identifier given to any matrix or foliose hexactinellid consistently observed when the ROV was high off the seabed, preventing their identification. Likely overlaps with sponge morphotypes listed above.



Cushion-Massive Porifera_Off Bottom

Depth: 1718 - 2746 m

Identifier given to any cushion and/or massive-lobose sponge that was consistently observed when the ROV was high off the seabed, preventing their identification. Likely overlaps with sponge morphotypes listed above.

Porifera Off Bottom

WORMS AphiaID 558



Massive-Globose Porifera_Off Bottom

Depth: 1743 - 3000 m

Identifier given to any massive-globose sponge (likely demosponge) consistently observed when the ROV was high off the seabed, preventing their identification. Likely overlaps with sponge morphotypes listed above.



Erect Porifera_Off Bottom

Depth: 1874 - 2749 m

Identifier given to any erect, 'bushy' (likely) hexactinellid consistently observed when the ROV was high off the seabed or traversing up/over slope or outcrops, preventing their identification. Likely overlaps with sponge morphotypes listed above.

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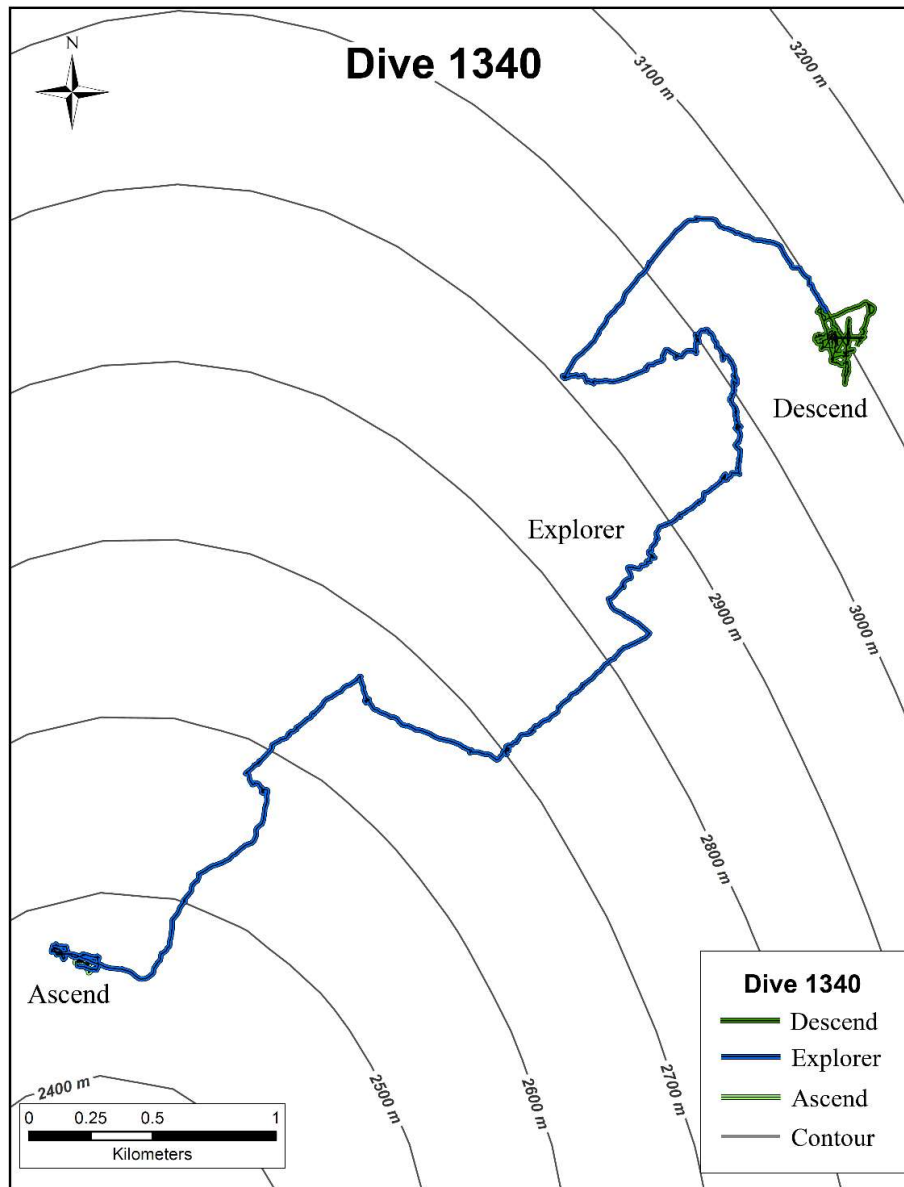
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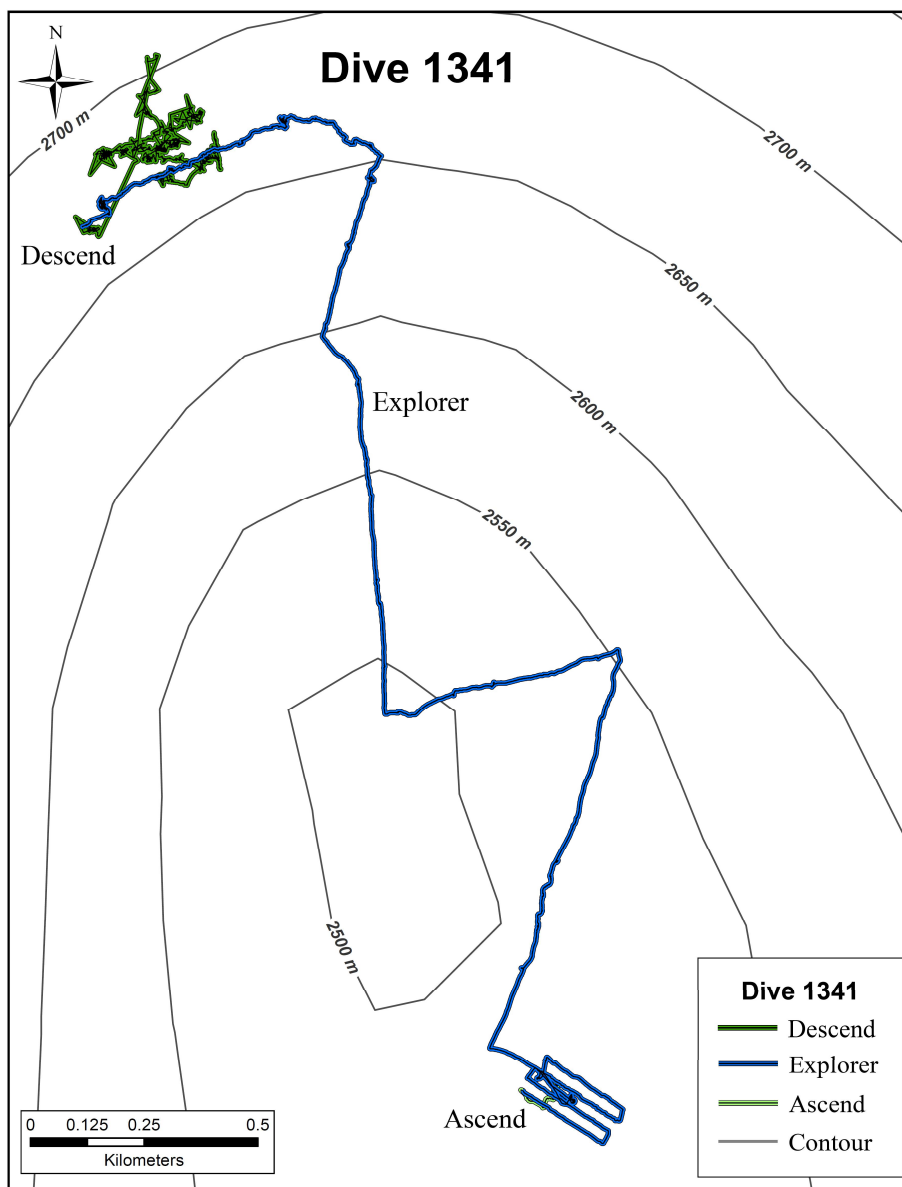
APPENDIX A



Location	Latitude (DD)	Longitude (DD)	Time (JDayGMT)
Start:	50.10843	-45.31649	200054400
On Bottom:	50.10958	-45.31734	200094400
Off Bottom:	50.08567	-45.35960	201010000
End:	50.08603	-45.35871	201022100

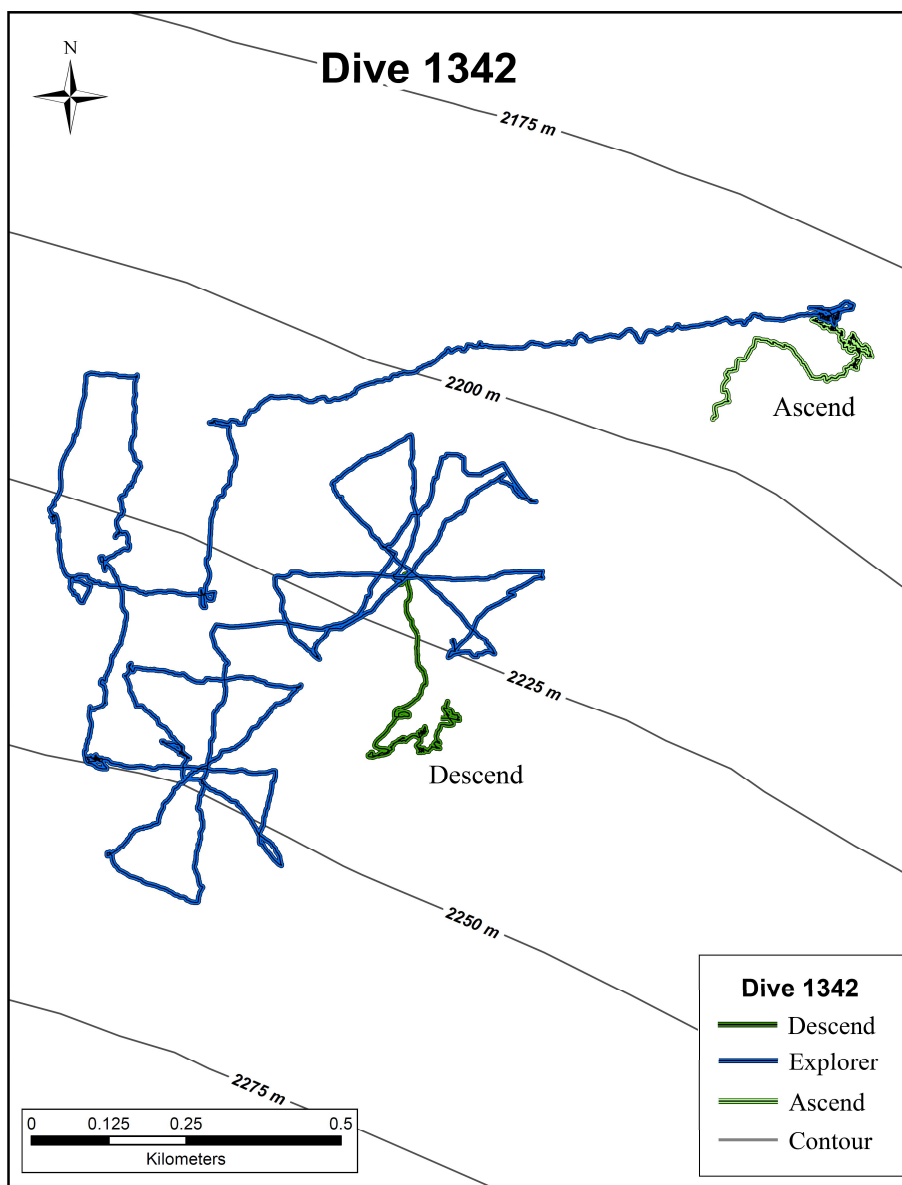
Dive Length (m)	ROV Depth (m)
Descend: 3720	On Bottom: 3000
On Bottom: 11515	Off Bottom: 1922
Ascend: 1082	Average: 2455
	Min: 1862
	Max: 3004

*Note that the depth contours presented in the maps of this appendix are based on the Canadian Hydrographic Service - Atlantic Bathymetry Compilation (CHS-ABC). ROV depth should be consulted for actual depth.



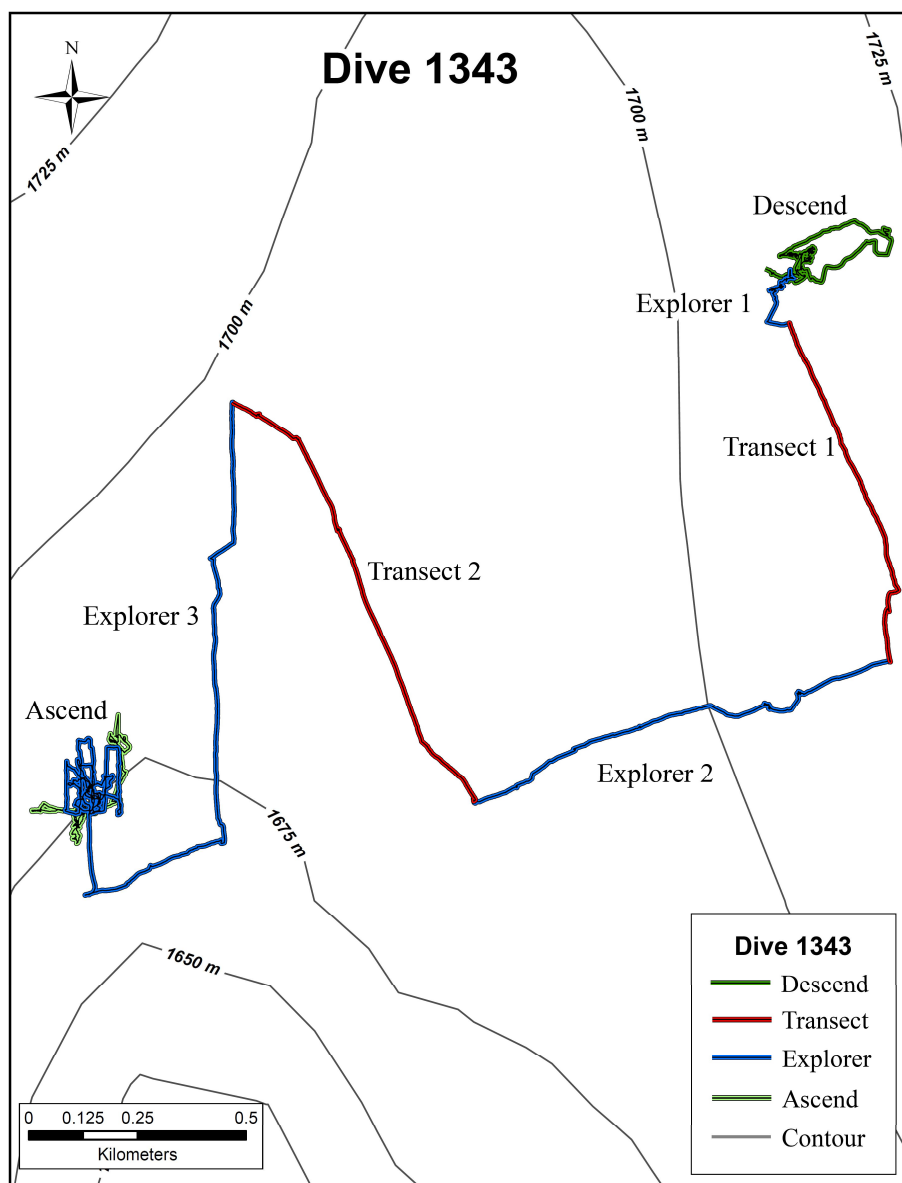
Location	Latitude (DD)	Longitude (DD)	Time (JDayGMT)
Start:	50.07726	-45.61884	201131100
On Bottom:	50.07617	-45.62168	201164600
Off Bottom:	50.05918	-45.60794	202013700
End:	50.05919	-45.60682	202032200

Dive Length (m)	ROV Depth (m)
Descend: 6844	On Bottom: 2873
On Bottom: 7387	Off Bottom: 2390
Ascend: 1283	Average: 2630
	Min: 2326
	Max: 2897



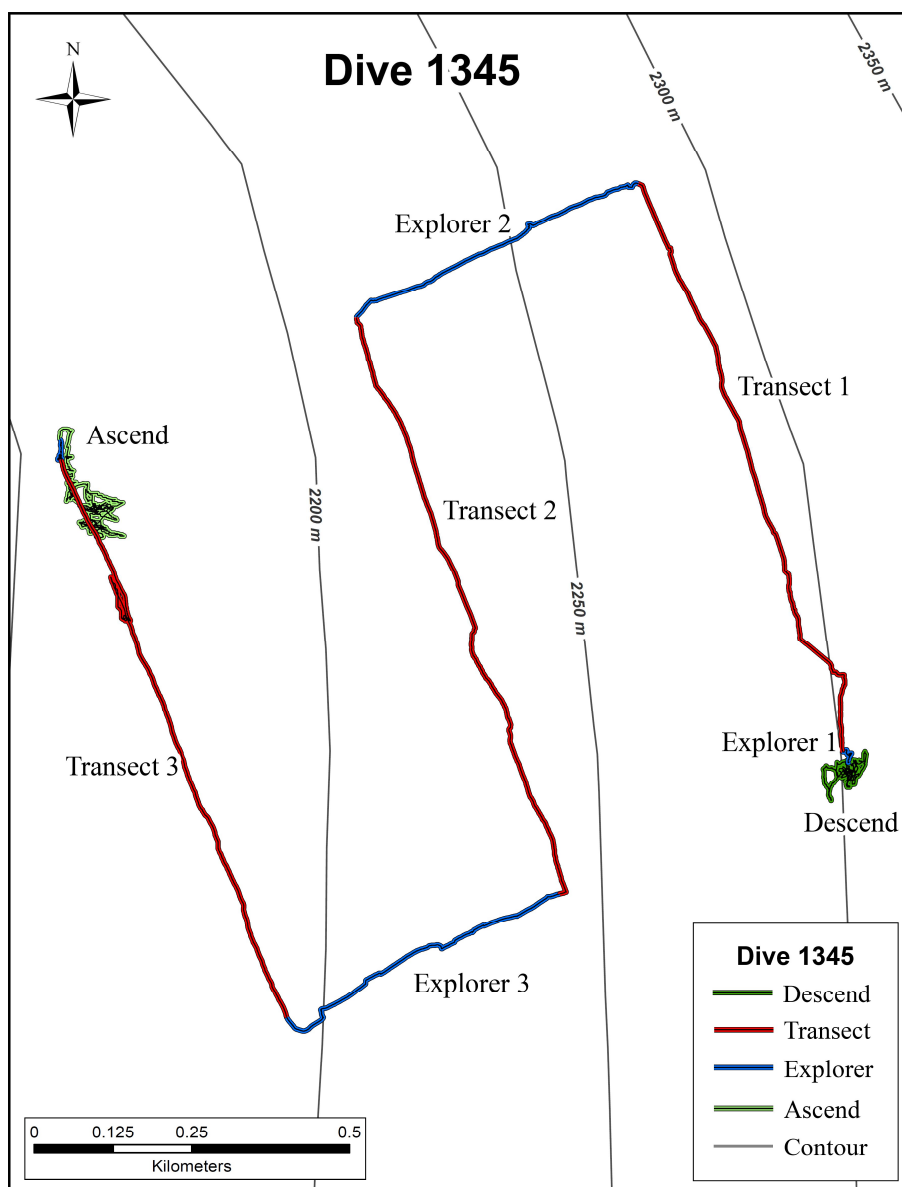
Location	Latitude (DD)	Longitude (DD)	Time (JDayGMT)
Start:	50.26442	-46.18533	202123000
On Bottom:	50.26622	-46.18670	202142500
Off Bottom:	50.27021	-46.17727	202212900
End:	50.26759	-46.18053	202231000

Dive Length (m)	ROV Depth (m)
Descend: 1192	On Bottom: 2156
On Bottom: 9867	Off Bottom: 2095
Ascend: 1251	Average: 2142
	Min: 2048
	Max: 2196



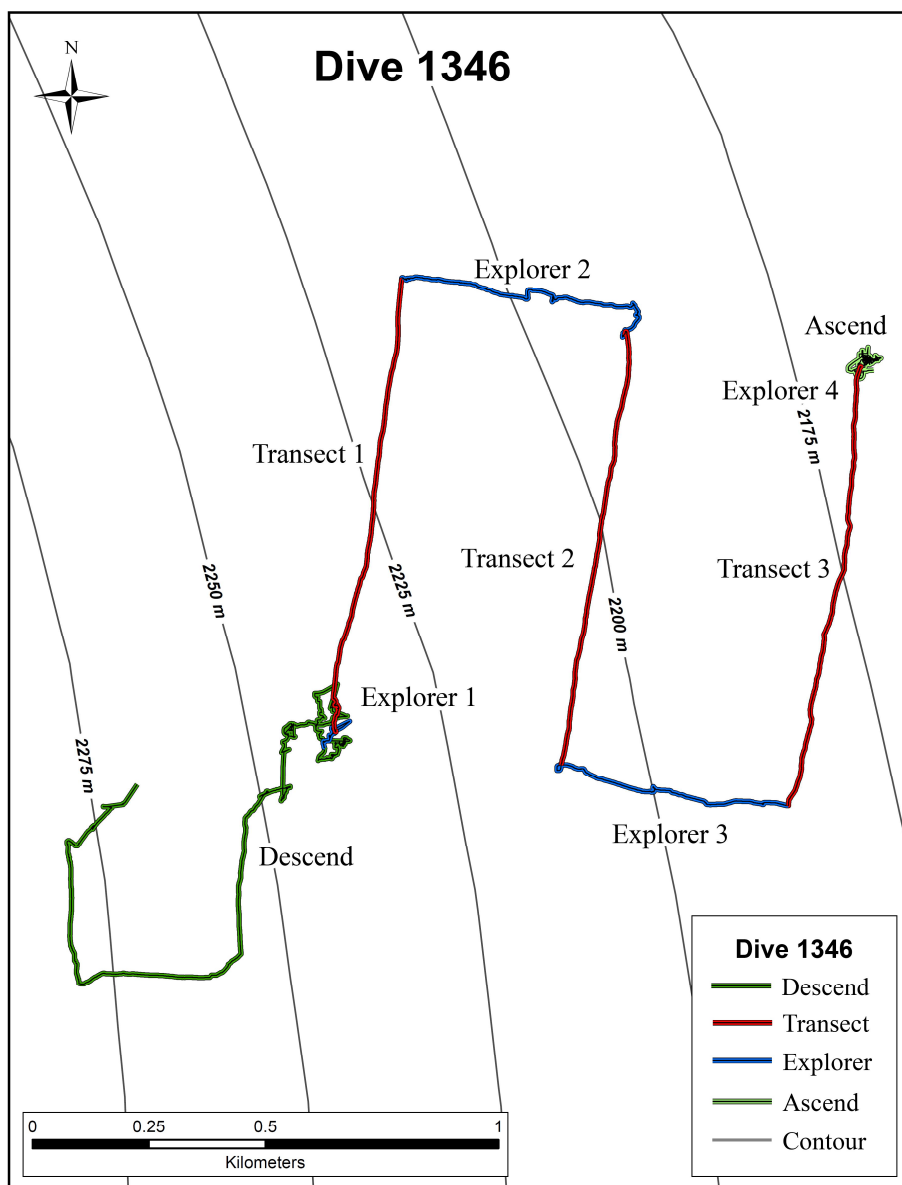
Location	Latitude (DD)	Longitude (DD)	Time (JDayGMT)
Start:	50.56315	-46.17114	203140100
On Bottom:	50.56306	-46.17096	203153500
Off Bottom:	50.55197	-46.19314	204045100
End:	50.55341	-46.19239	204062200

Dive Length (m)	ROV Depth (m)
Descend: 1849	On Bottom: 1852
On Bottom: 8232	Off Bottom: 1727
Ascend: 1849	Average: 1749
	Min: 1656
	Max: 1853



Location	Latitude (DD)	Longitude (DD)	Time (JDayGMT)
Start:	50.55815	-45.92732	204200900
On Bottom:	50.55827	-45.92720	204220000
Off Bottom:	50.56272	-45.94497	205034500
End:	50.56186	-45.94543	205053500

Dive Length (m)	ROV Depth (m)
Descend: 1014	On Bottom: 2370
On Bottom: 4522	Off Bottom: 2241
Ascend: 1713	Average: 2279
	Min: 2240
	Max: 2371







Location	Latitude (DD)	Longitude (DD)	Time (JDayGMT)
Start:	50.39730	-46.84324	205095800
On Bottom:	50.39852	-46.83847	205120300
Off Bottom:	50.40612	-46.82259	205180800
End:	50.40630	-46.82141	205193900

Dive Length (m)	ROV Depth (m)
Descend: 2834	On Bottom: 2269
On Bottom: 4663	Off Bottom: 2162
Ascend: 1211	Average: 2207
	Min: 2162
	Max: 2272

APPENDIX B

Table 1. Depicting of each height classification assigned in ClassAct Mapper during transect analysis.

Height Classification	Description	Example
Seabed Undetected	Seabed is not visible	
Off Bottom Level 2	ROV high off bottom and its shadow is visible in the video. The seabed is visible but difficult to discern organisms	
Off Bottom Level 1	Slight shadow at edges, large organisms can be seen	
Optimal Altitude	ROV is at a suitable, consistent altitude above the seabed	

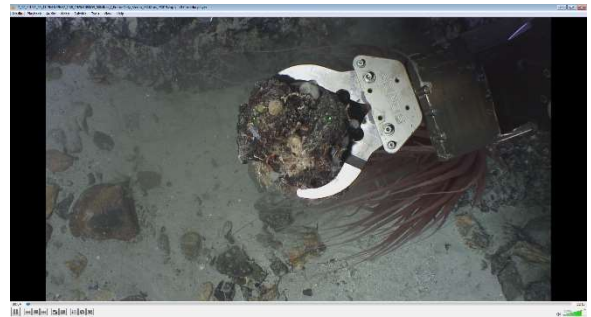
Stationary

ROV is stationary
on seafloor



Sample Collection

ROV is collecting a
biological/geological
sample or sediment
core



Slope/Outcrop

ROV height and
speed variable due
to exploration of
steep slopes,
outcrops

