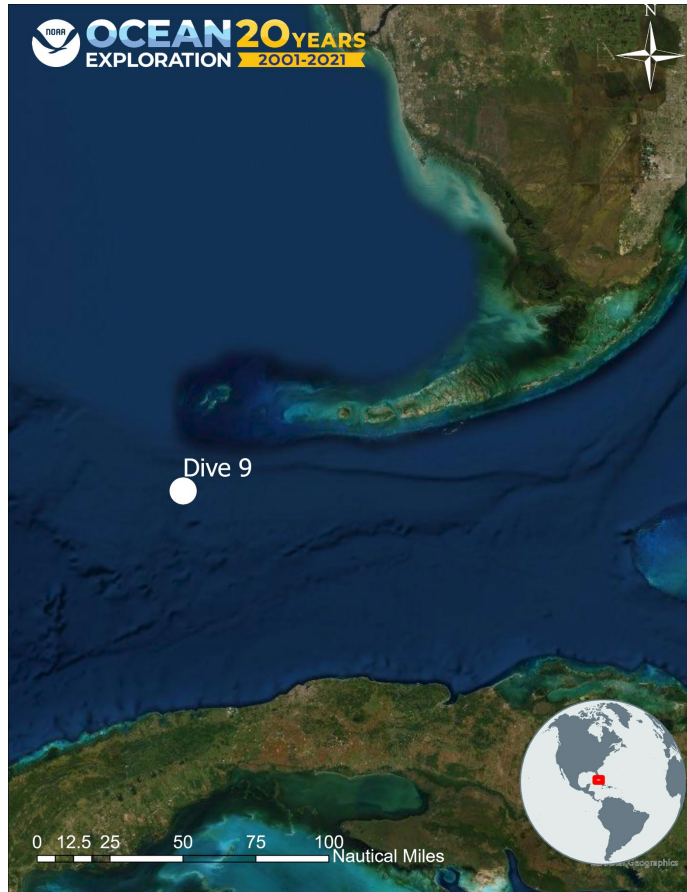


ROV Dive Summary, EX-21-07, Dive 09, November 08, 2021

General Location Map



Dive Information

Site Name	Tortugas Scarp
General Area Descriptor	Tortugas Valley - south of Dry Tortugas
Science Team Leads	Stephanie Farrington, Allen Collins
Expedition Coordinator	Matt Dornback
Sample Data Manager	Jonathan Jackson
ROV Dive Supervisor	Chris Ritter

Mapping Lead	Derek Sowers
Dive Purpose	Exploration and collections
Was the dive restricted for Underwater Cultural Heritage?	No
ROV Dive Summary Data	<p>Dive Summary: EX2107_DIVE09 ^^^</p> <p>Dive Type: Normal</p> <p>In Water: 2021-11-08T15:00:41.757966 24.15893777947066 ; -83.05356505929228</p> <p>On Bottom: 2021-11-08T16:19:29.406910 24.161392882833617 ; -83.04995836330588</p> <p>Off Bottom: 2021-11-08T20:46:59.196053 24.16269498760721 ; -83.05325039493387</p> <p>Out Water: 2021-11-08T21:44:25.804288 24.16793912226418 ; -83.05212681446835</p> <p>Dive Duration: 6:43:44 Bottom Time: 4:27:29 Max Vehicle Depth: 982.1 m Min Seafloor Depth: 915.5 m Distance Travelled: 399.3 m</p>
Dive Description	<p>During the dive, five water samples were taken for eDNA processing: EX2107_D09_01W at 500 m during descent; EX2107_D09_02W at 984 m after achieving bottom; EX2107_D09_04W at 973 about 3 hours into the transect at the base of the scarp wall; EX2107_D09_05W at 924 m after finally achieving a steep slope and making way up slope for roughly 50 m; and EX2107_D09_07W at 900 m at the end of our bottom time, prior to achieving the top of the scarp wall that we were ascending.</p> <p>At the bottom, we found it to be 100% silty sandy sediment, heavily bioturbated with abundant holes and mounds, with the occasional soft/clay-like white rock. The most abundant species encountered were <i>Illex</i> sp. squid, often sitting on the bottom or traveling in schools. Crinoids were also common.</p> <p>In the water column just above the bottom, there were a few red shrimps (sergestid and non-sergestid), <i>Argyropelecus</i> (hatchet fish), a “water walker” munnopsid isopod, <i>Poralia rufescens</i> - scyphozoan jellyfish with red bells, larvacean houses, the lobate ctenophore <i>Bathocyroe</i>, and a stunning physonect siphonophore (<i>Bargmannia?</i>).</p> <p>Three or so <i>Bathynomus giganteus</i> (giant isopods) were seen on the sandy bottom, as were many red crabs, <i>Chaceon quinquedens</i>, one of which was eating the head of an <i>Illex</i> squid. A couple of delicate thin sea pens (<i>Protoptilum?</i>) were imaged closely. A polynoid scale worm (not the same as EX2107_D09_03B (see below) was imaged closely on the sandy bottom. Also on the flat sandy bottom, we came upon the asteroids <i>Zoroaster fulgens</i> (some uncertainty in ID, but most likely) and the goniasterid <i>Nymphaster arenatus</i>. An unusual looking ophiuroid with a black cap-like central disc, <i>Ophiothola</i>, was seen. A few very colorful squat lobsters with prominent dorsal spines were imaged closely (M. Nizinski: likely <i>Galacantha rostrata</i>).</p>

Several tripod fish of the species *Bathypterois quadrifilis* were observed in their characteristic pose on the seafloor. Other fish encountered on the sandy bottoms were multiple species of rat tails including a fish of the genus *Ventrifossa*, Synphobranchidae (cutthroat eels), Ophidiidae (cusk-eels), *Polymixia lowei* with a prominent black spot on its dorsal fin, and *Halosaurus*, probably *H. guentheri*. Sponges and corals were largely absent from the sandy bottom, but we did encounter the stalked hexactinellid *Hyalonema*, whose stalk was providing substrate to anemones or more likely zoantharians and a squat lobster.

On the few rocks encountered on the flat bottom, as one would expect, we saw greater diversity of sponges and corals, including the hexactinellid *Farrea*, several demosponges (including a distinctive blue sponge, Hymedesmiidae, collected later in the dive), and the antipatharian *Bathypathes*. On these rocks, we found a polynoid annelid (sample **EX2107_D09_03B** ~10 cm), multiple pycnogonids (family Colossendeidae), and hydroids upon which they were apparently feeding, and blind lobster living in holes (*Acanthycaris*).

We had been traveling across the bottom expecting a quick rise and wall that never seemed to come. The Hi-Pac data showed that we should have been at 830 m on top of the wall when we were still maintaining a bottom depth closer to 970 m. It was proposed that the wall may have sloughed off between the time of the multibeam collection (~2014) and the current dive. Evidence of this possibility could be seen when we finally reached an area of slope that was more solidified. We could see the sediment was volatile and slowly moving down the slope in almost a stream. This slope eventually turned into a wall toward the end of the dive.

As the slope increased, we came upon a Flapjack Devilfish (*Opisthoteuthis*; likely *O. grimaldii*) and imaged it closely, making note of clear organs beneath the eyes of unknown function, but possibly serving as light concentrators). We continued to see *Illex* squid, and also encountered another *Halosaurus*, a myctophid that had been stunned by the lights and bumped into the sand, and a different species of tripod fish, *Bathypterois viridensis* (Darkheaded Tripodfish)

with amphipod parasites, one mistaken for an isopod during dive narration (from Tammy Horton "Looks like both amphipod to me...possibly *Trischizostoma* sp."). The bathygadid macrourid *Gadomus arcuatus* was observed a number of times. A different species of sea pen was seen in the soft sediment between harder layers on the wall, as was a benthic siphonophore (Rhodaliidae) that had apparently become dislodged from above and was actively swimming in an attempt to find better purchase upon more stable ground and wound entangling its anchoring tentacles. We encountered one individual of the sea cucumber *Oloughlinius* that had various shells of pteropods adhered to it.

The wall became steeper in places (up to 80-90° slope, no rugosity, with geological layering, with areas of a few thin (10-20 cm) layers of blackened layers between the white layers (1-3 m tall). There were a few species of branching gorgonians on the hardened parts of the wall, including: multiple species of bamboos (including a bamboo whip with short internodes, likely part of the S1 clade of *Cladarisis*-like taxa), Acnathogorgiidae (likely *Pacogorgia*), *Chrysogorgia*, *Aphanostichopathes*. We collected a blue encrusting Poecilosclerida sponge (**EX2107_D09_06B**) with large oscules that had thin membranes, additional demosponges, a white species of Stylasteridae, bryozoan lace corals, barnacles, solitary cup corals, a brachiopod, worm tubes, *Munidopsis* squat lobsters, and *Nematocarsinus* shrimp.

In the water column near the wall, we observed a 2-3 m physonect siphonophore that was very active in its retraction and extension and a few red cydippid ctenophores.

Water sample before leaving bottom **EX2107_D09_07W**.

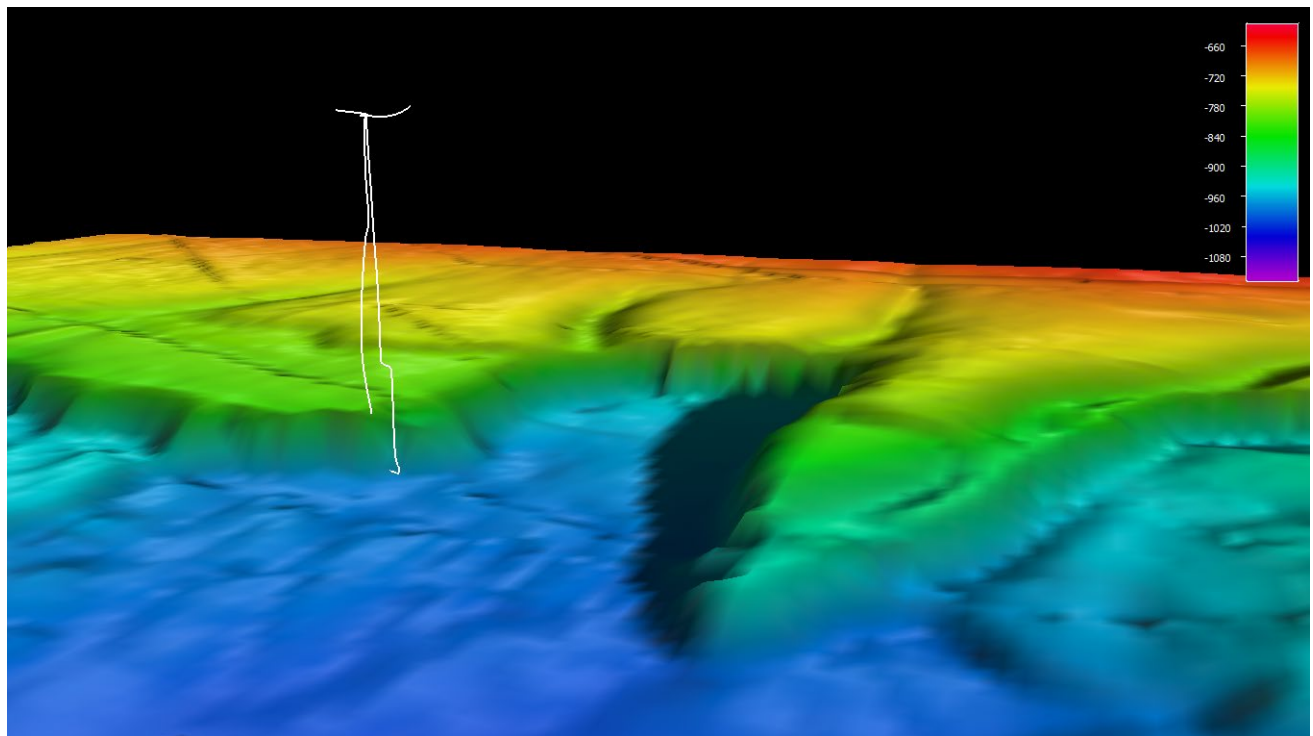
Notable Observations	<ul style="list-style-type: none"> This dive documented a fairly dramatic change in bathymetry since the area was mapped; we had expected to climb a scarp to 830 m but found the water to bottom to be at 970, suggesting that perhaps the wall had sloughed off more than 100 meters of sediment between the time of the multibeam survey (~2014) and our dive
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	<ul style="list-style-type: none"> We collected a strikingly blue encrusting Hymedesmiidae (Poecilosclerida) demosponge with large oscules that had thin membranes; the pigment proved to be ethanol soluble and stable and is therefore of biochemical importance
Community and habitat observations	Corals and Sponges - Present Chemosynthetic Community - Absent High biodiversity Community - Absent Active Seep or Vent - Absent Extinct Seep or Vent - Absent Hydrates - Absent
CMECS Feature Type(s)	Shelf Valley, Ledge
SeaTube Link (science annotation system)	https://data.oceannetworks.ca/SeaTubeV3?resourceTypeId=600&resourceId=2503

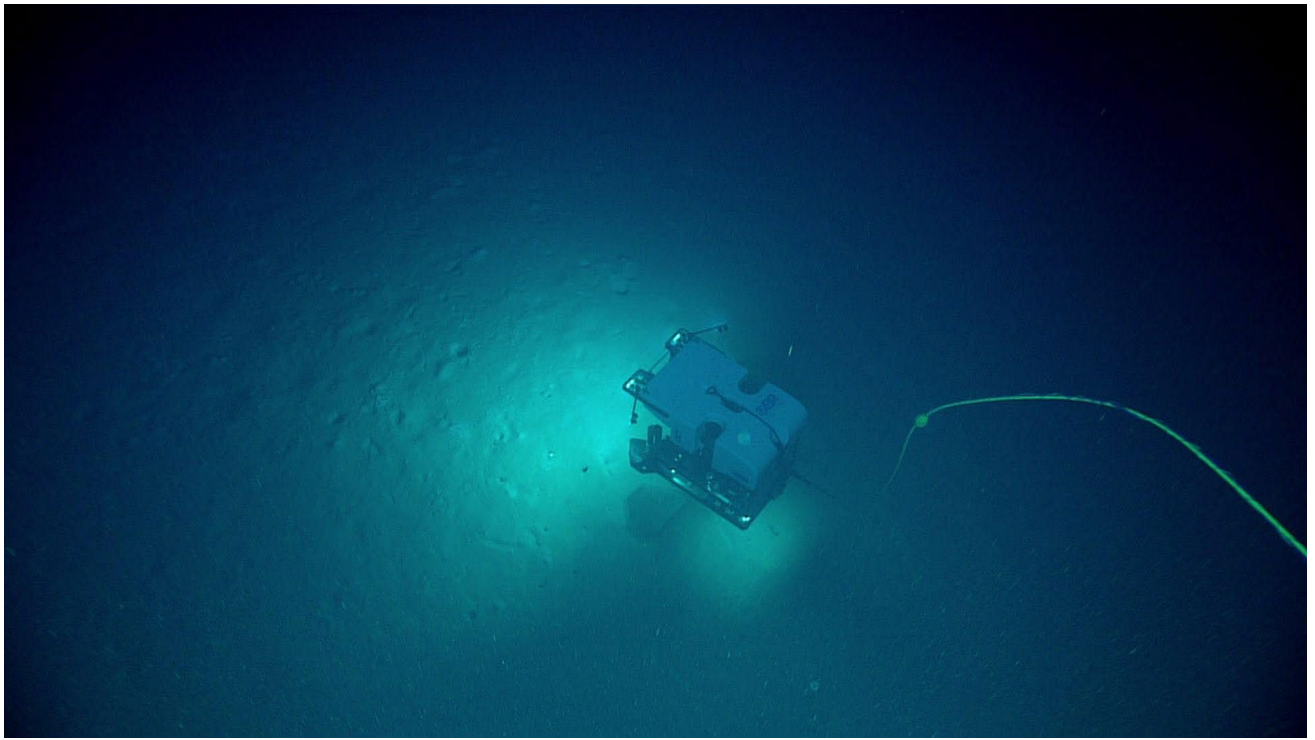
Equipment Deployed

ROV	<i>Deep Discoverer</i>
Camera Platform	<i>Seirios</i>
ROV Measurements	The following ROV measurements, data streams and equipment are used on each ROV deployment: CTD, depth, scanning sonar, USBL position, altitude, heading, attitude, high-resolution cameras, low resolution cameras, manipulator arms, suction sampler, sample drawers and thrusters. The section below notes if any of these sensors were malfunctioning or not operational
Equipment Malfunctions	

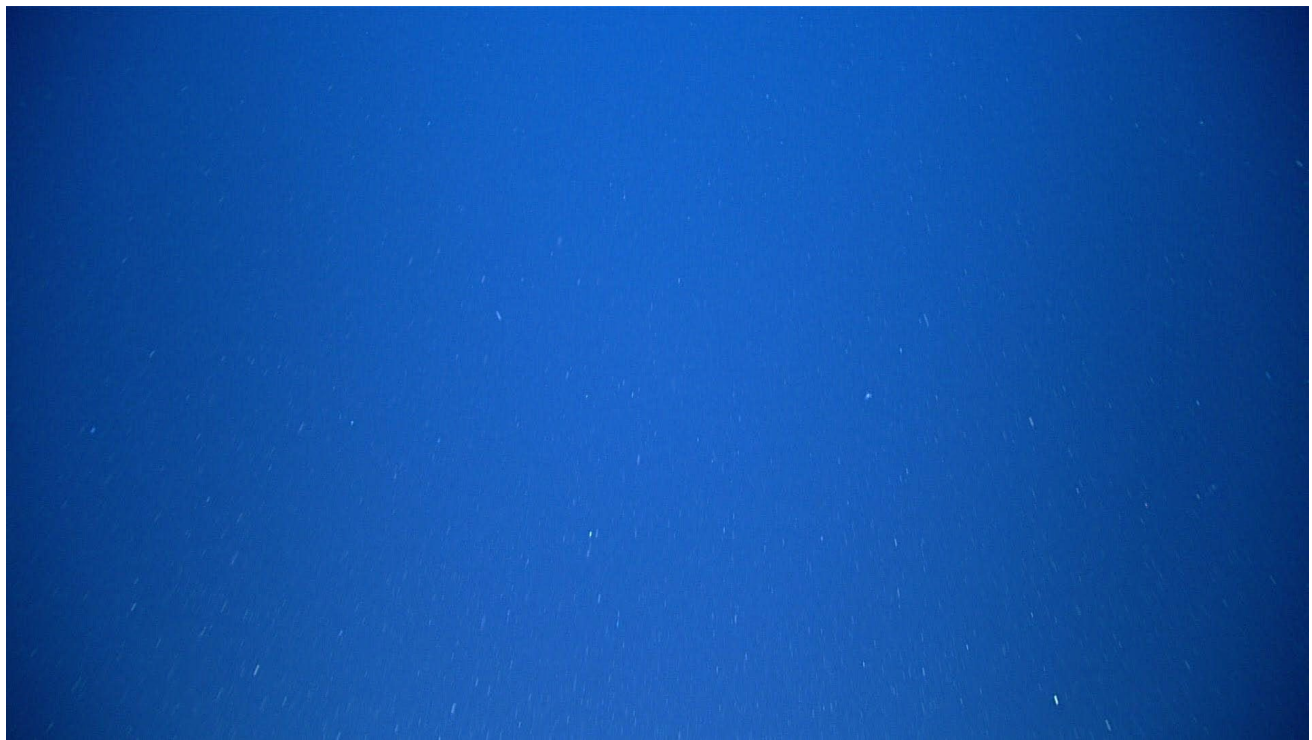
Close-up Map of Main Dive Site



Representative Photos of the Dive

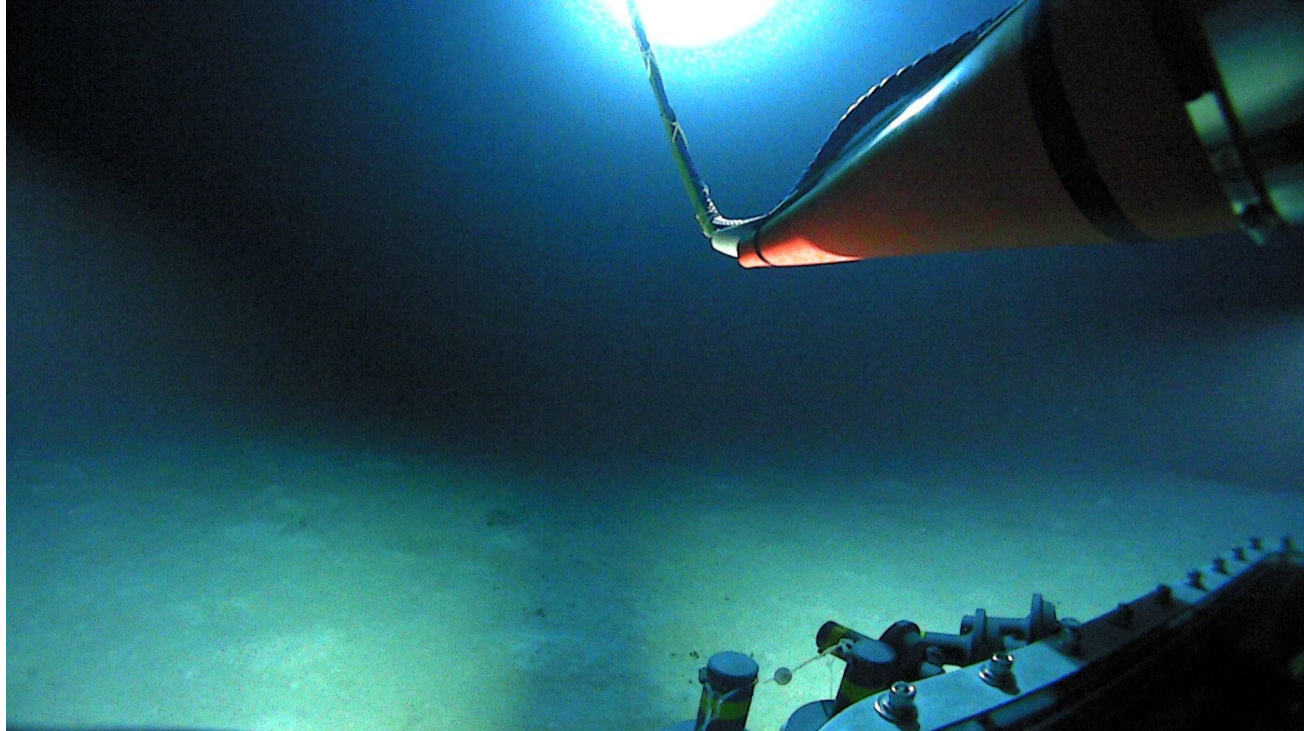


Samples Collected -



Sample ID	EX2107_D09_01W
Date (UTC)	20211108
Time (UTC)	153558
Depth (m)	503.29
Latitude (decimal degrees)	24.16361
Longitude (decimal degrees)	-83.052830
Temp. (°C)	9.041
Field ID(s)	Water Sample
Comments	eDNA

Associates Sample ID	Field Identification	Count
N/A	N/A	N/A



Sample ID	EX2107_D09_02W
Date (UTC)	20211108
Time (UTC)	162307
Depth (m)	984.266
Latitude (decimal degrees)	24.161370
Longitude (decimal degrees)	-83.049950
Temp. (°C)	5.821
Field ID(s)	Water Sample
Comments	eDNA

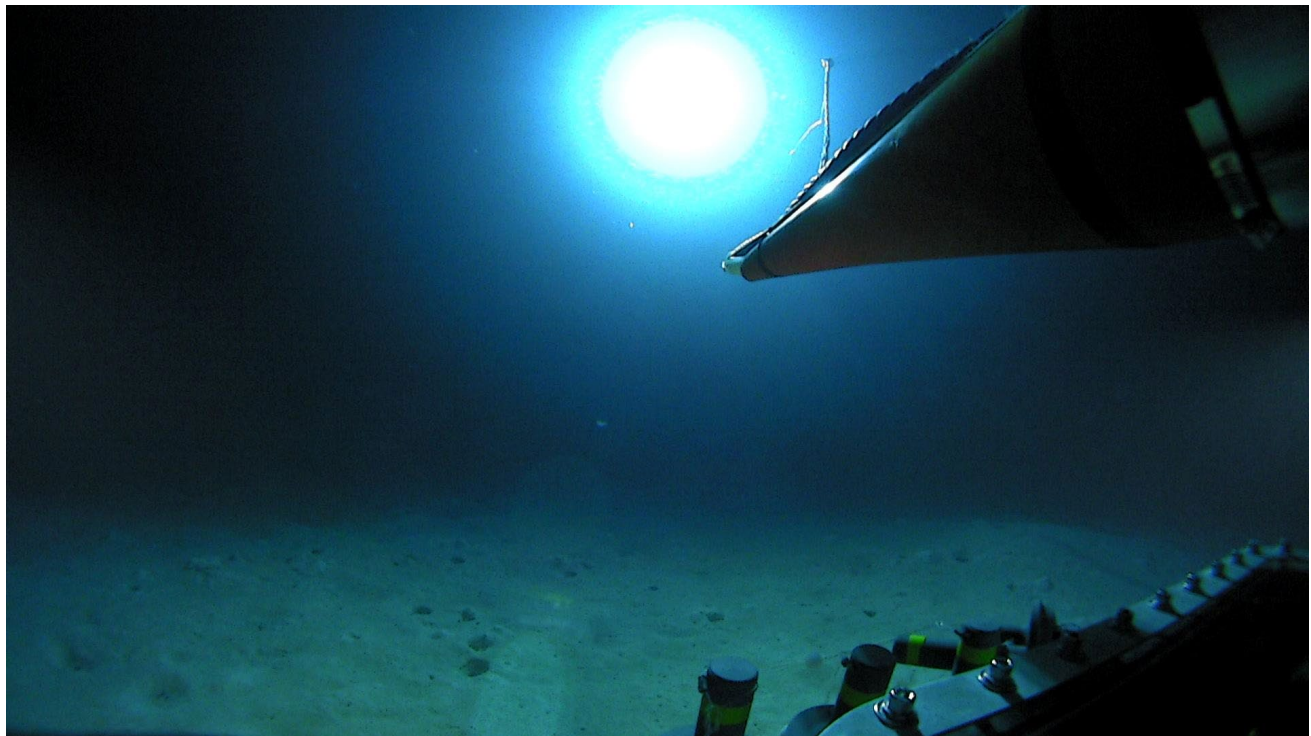
Associates Sample ID	Field Identification	Count
N/A	N/A	N/A



Sample ID	EX2107_D09_03B
Date (UTC)	20211108
Time (UTC)	171110
Depth (m)	985.7349854
Latitude (decimal degrees)	24.16158295

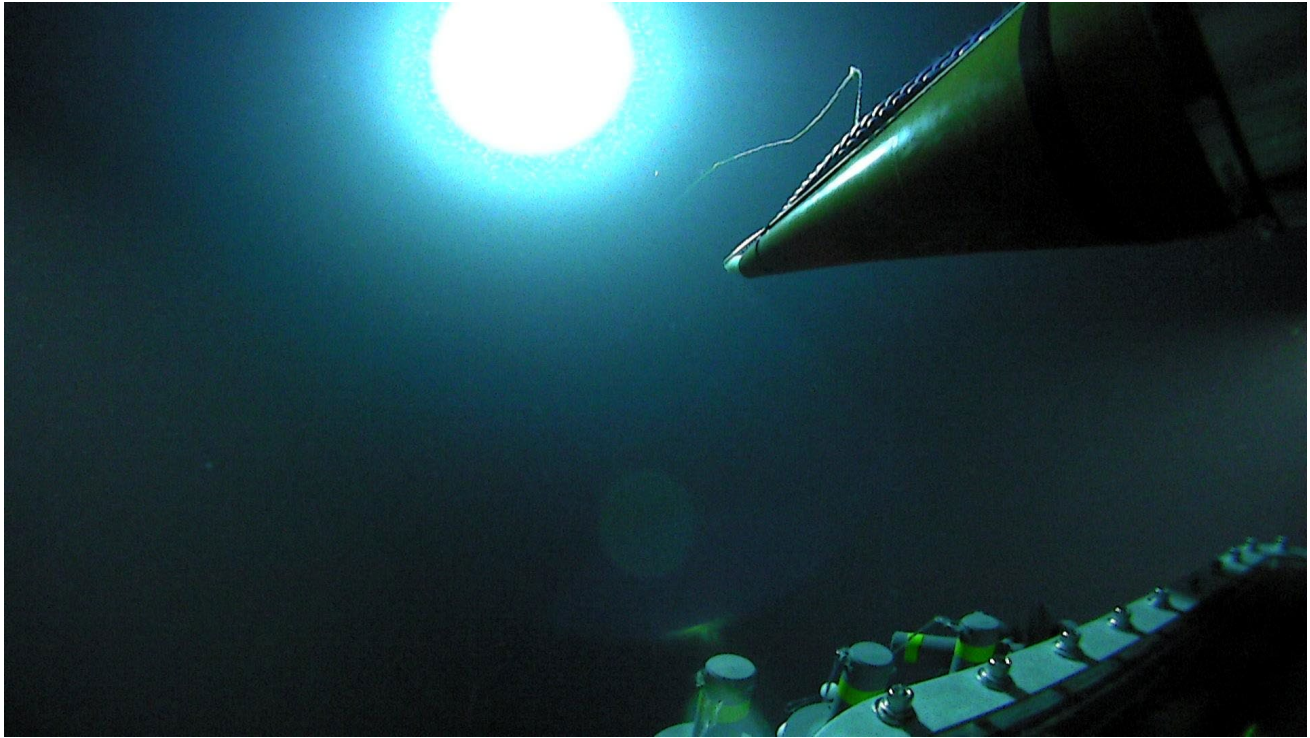
Longitude (decimal degrees)	-83.0508728
Temp. (°C)	5.795000076
Field ID(s)	Polynoidae
Comments	Proboscis was extruded when removed from ROV, Dead on arrival

Associates Sample ID	Field Identification	Count
N/A	N/A	N/A



Sample ID	EX2107_D09_04W
Date (UTC)	20211108
Time (UTC)	191442
Depth (m)	973.341
Latitude (decimal degrees)	24.16221
Longitude (decimal degrees)	-83.052830
Temp. (°C)	5.826
Field ID(s)	Water Sample
Comments	eDNA

Associates Sample ID	Field Identification	Count
N/A	N/A	N/A



Sample ID	EX2107_D09_05W
Date (UTC)	20211108
Time (UTC)	201816
Depth (m)	924.46
Latitude (decimal degrees)	24.16262
Longitude (decimal degrees)	-83.05315
Temp. (°C)	5.83
Field ID(s)	Water Sample
Comments	eDNA

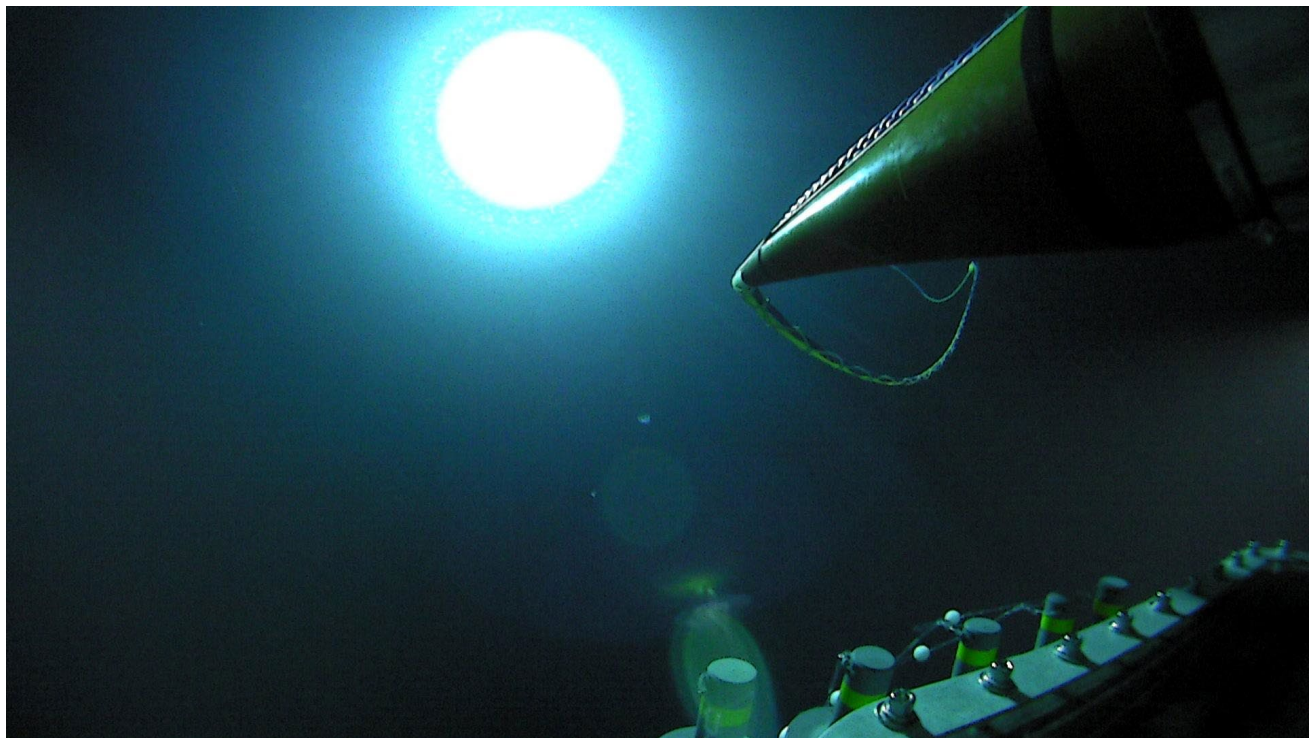
Associates Sample ID	Field Identification	Count
N/A	N/A	N/A



Sample ID	EX2107_D09_06B
Date (UTC)	20211108
Time (UTC)	202502
Depth (m)	923.702
Latitude (decimal degrees)	24.16265

Longitude (decimal degrees)	-83.0531
Temp. (°C)	5.841
Field ID(s)	Poecilosclerida
Comments	blue encrusting sponge, oscules have membranes in the water, no longer visible out of the water, bright blue out of water. Very thin, soft. Leaching blue in ethanol.

Associates Sample ID	Field Identification	Count
N/A	N/A	N/A



Sample ID	EX2107_D09_07W
Date (UTC)	20211108
Time (UTC)	204557
Depth (m)	899.789
Latitude (decimal degrees)	24.16268
Longitude (decimal degrees)	-83.053290
Temp. (°C)	6.022
Field ID(s)	Water Sample
Comments	eDNA

Associates Sample ID	Field Identification	Count
N/A	N/A	N/A

Scientists Involved (provide name, email, affiliation)

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