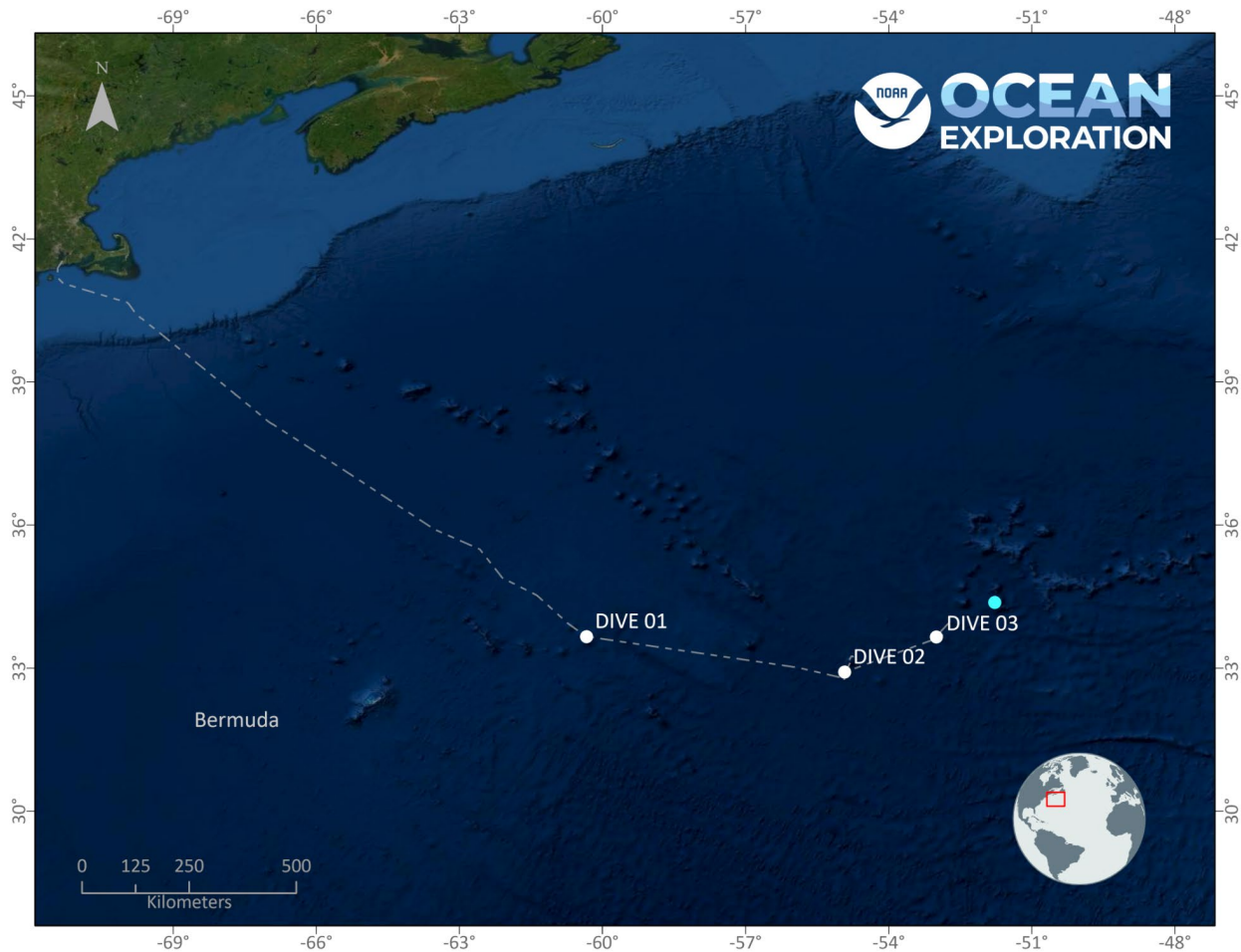


ROV Dive Summary, EX-21-04, Dive 04, July 07, 2021

General Location Map



Dive location noted in blue above.

Dive Information

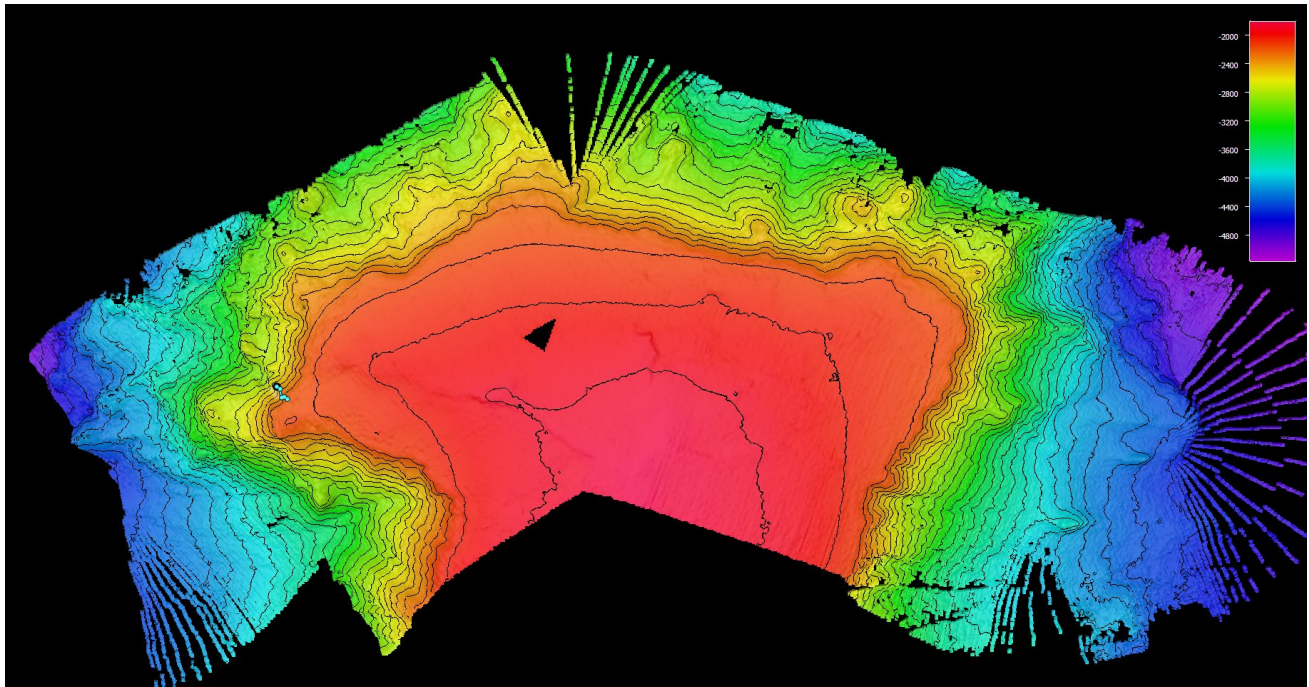
Site Name	"Dumbbell" Seamount
General Area Descriptor	Seamount within the Corner Rise Seamount Chain area
Science Team Leads	Rhian Waller, Jason Chaytor
Expedition Coordinator	Kasey Cantwell, Kimberly Galvez (Expedition Coordinator in Training)

Dive Description	<p>The geology and geomorphology observed during this dive shared many of the characteristics of the seamounts visited during so far during the EX2104 expedition, specifically, steep FeMn-encrusted rocky escarpments, low-relief rock pavements, and sediment-draped slopes with variable thickness of biogenic/volcanoclastic sediments. The dive began on a steep mixed sediment/FeMn encrusted pillow-lava (some of which appeared to be broken open with crust and other layers displayed) slope that quickly transitioned to a series of rock escarpments (perhaps where parts of the substrate failed). Botryoidal FeMn textures dominated the crusts seen throughout this segment to the end of the dive, with many areas observed where the crust had broken off. Several through-going cracks were seen in the outcrops. Approximately halfway through the dive, the slope gradient appeared too shallow just enough for sediment to begin accumulating on the slope. An attempt (failed) was made to collect a rock sample that broke on collection - the broken material was noted to be chalk-like, suggestive of a carbonate lithology. Sediment cover increased as the dive continued, with a thin draping blanket of sediment covering rock pavement in places. A rock sample was collected from the wall of a suspected lava tube/deflation feature, and shortly there-after another sample was collected from a sediment/rock pavement that may be ice-rafted debris or volcanic rock from further upslope. At the end of the dive, the ROV traversed mixed lava morphologies (sheet and pillow) with mixed sediment cover.</p> <p>This was a biologically diverse dive with walls covered in both a high abundance and high diversity of sponges. Corals were primarily Chrysogorgia (with squat lobster associates and potentially dumbo octopus egg cases), “bramble” bamboo corals and Lepidisis, though a few small solitary cup corals (likely Caryophyllia) were observed. Zooanthids were also observed and Asteronyx brittle stars, as well as a Cushion Star on a flow edge. There were areas of abundant fossil corals (likely <i>Desmophyllum dianthus</i>) on walls early in the dive, though tapered off as we moved beyond the midpoint of the dive. Several Evoplosome predatory sea stars were observed, and the final sample of the dive was a dark red stalked crinoid that is an unknown species and observed rarely. Two cusk eels were observed, one unknown and one a bony eared assfish and two lobate ctenophores were observed, one a yellow blood belly comb jelly.</p>
Notable Observations	High density sponge communities
Community and habitat observations	Corals and Sponges - (Present) Chemosynthetic Community - (Absent) High biodiversity Community - (Present) Active Seep or Vent - (Absent) Extinct Seep or Vent - (Absent) Hydrates - (Absent)
CMECS Feature Type(s)	Rock, Sediment (Fine & coarse unconsolidated)
SeaTube Link (science annotation system)	https://data.oceannetworks.ca/SeaTubeV3?resourceTypeId=600&resourceId=2273

Equipment Deployed

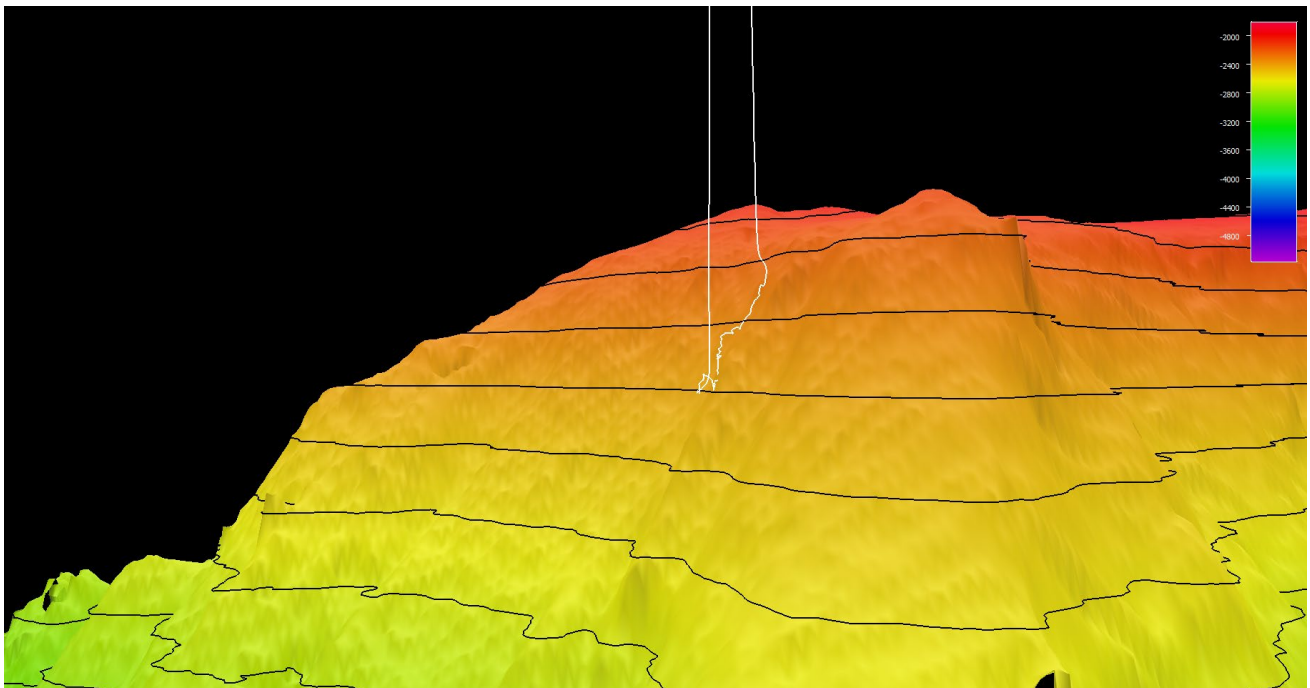
ROV	<i>Deep Discoverer</i>
Camera Platform	<i>Seirios</i>
ROV Measurements	The following ROV measurements, data streams and equipment are used on each ROV deployment: CTD, depth, scanning sonar, USBL position, altitude, heading, attitude, high-resolution cameras, low resolution cameras, manipulator arms, suction sampler, sample drawers and thrusters. The section below notes if any of these sensors were malfunctioning or not operational.
Equipment Malfunctions	None

Overview of Dive Site



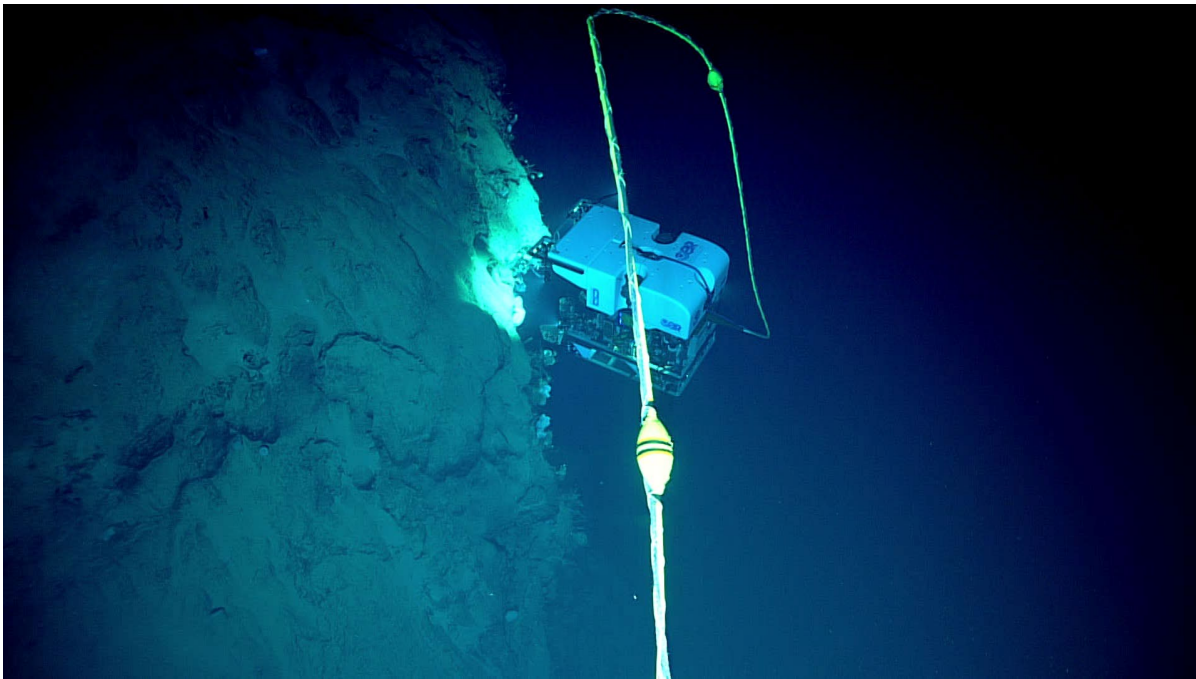
Smoothed ROV dive track (blue) on an overview bathymetry of the seamount, 3x vertical exaggeration.

Close-up Map of Main Dive Site

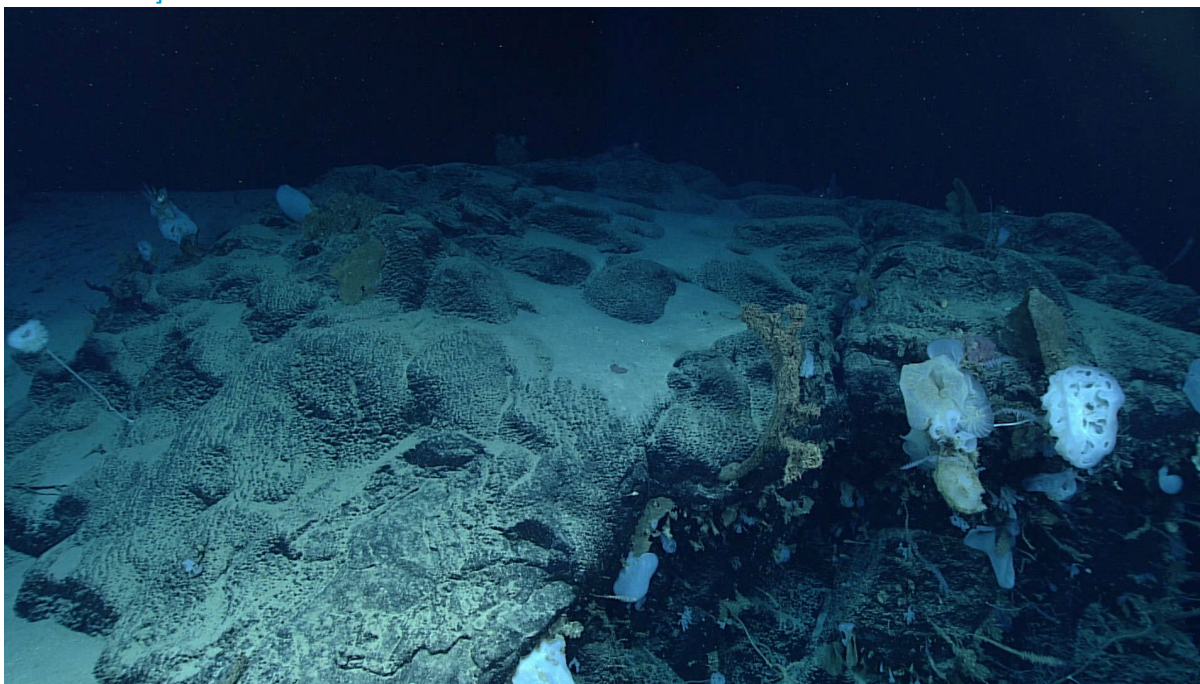


Smoothed ROV dive track in white on 25x25 cell size bathymetry, 3x vertical exaggeration, depth in meters, 100 meter contours

Representative Photos of the Dive



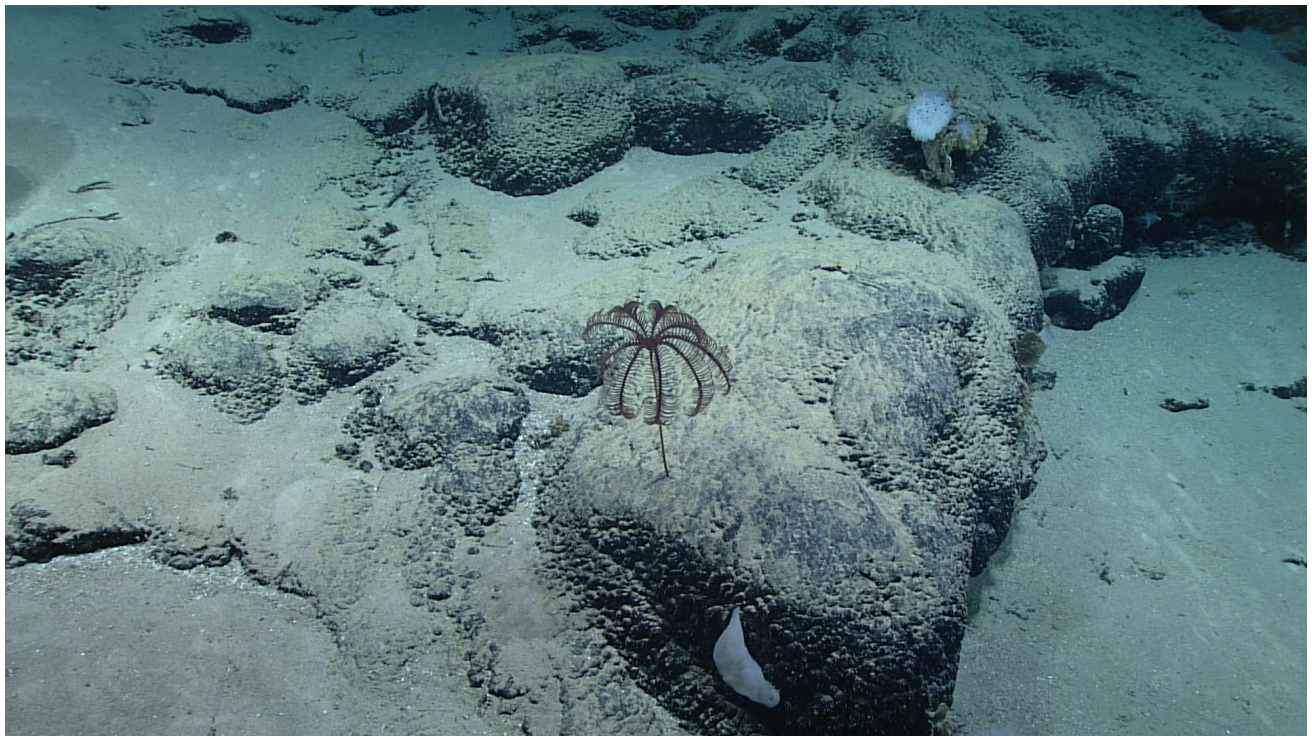
[Seirios image of D2 working on a cliff face covered with sponges. This scene was typical throughout the first $\frac{2}{3}$ of the dive.]



[At the top of a steep cliff covered with sponges and corals. Flow morphology changes from pillow to sheet flow on the far left of the image]

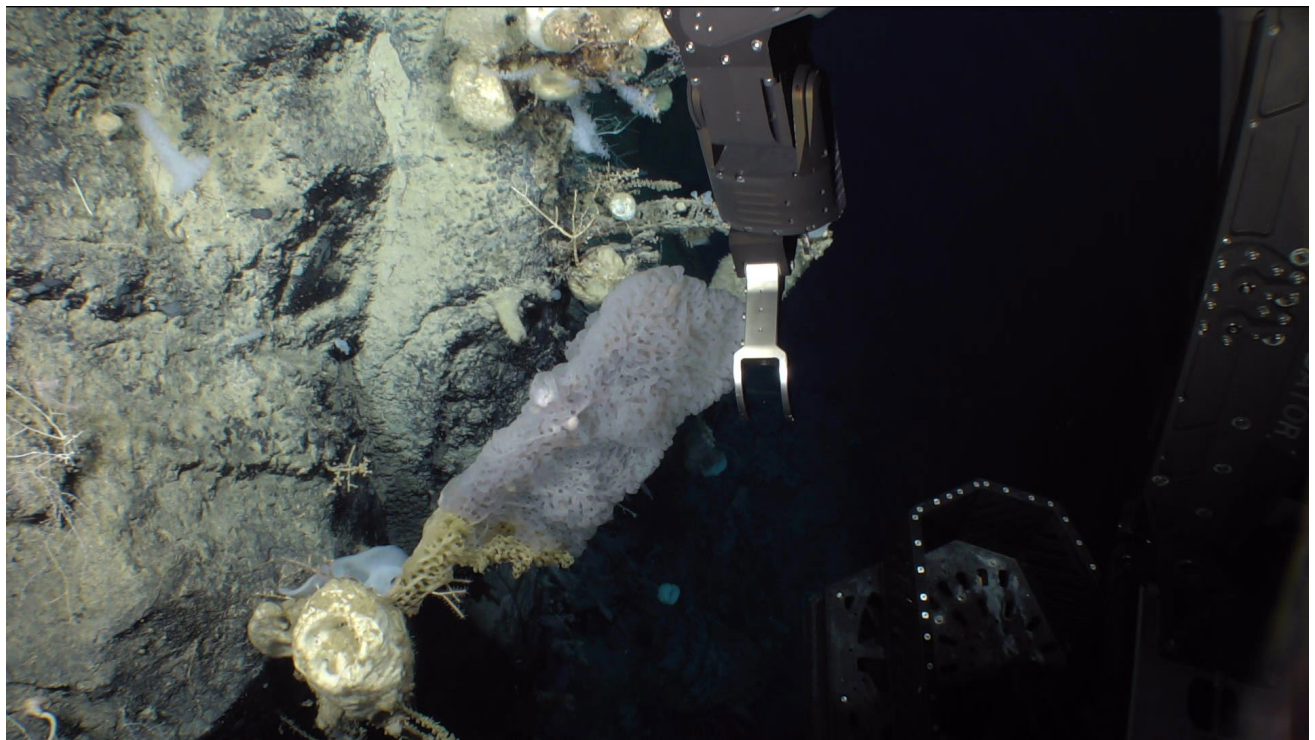


[End cap of a pillow lava with a hexactinellid sponge growing out of the face.]



[At the very end of the dive this pillow flow was observed in surrounding sediment with a few sponges and a rare, unidentified, stalked crinoid on top that was collected for identification]

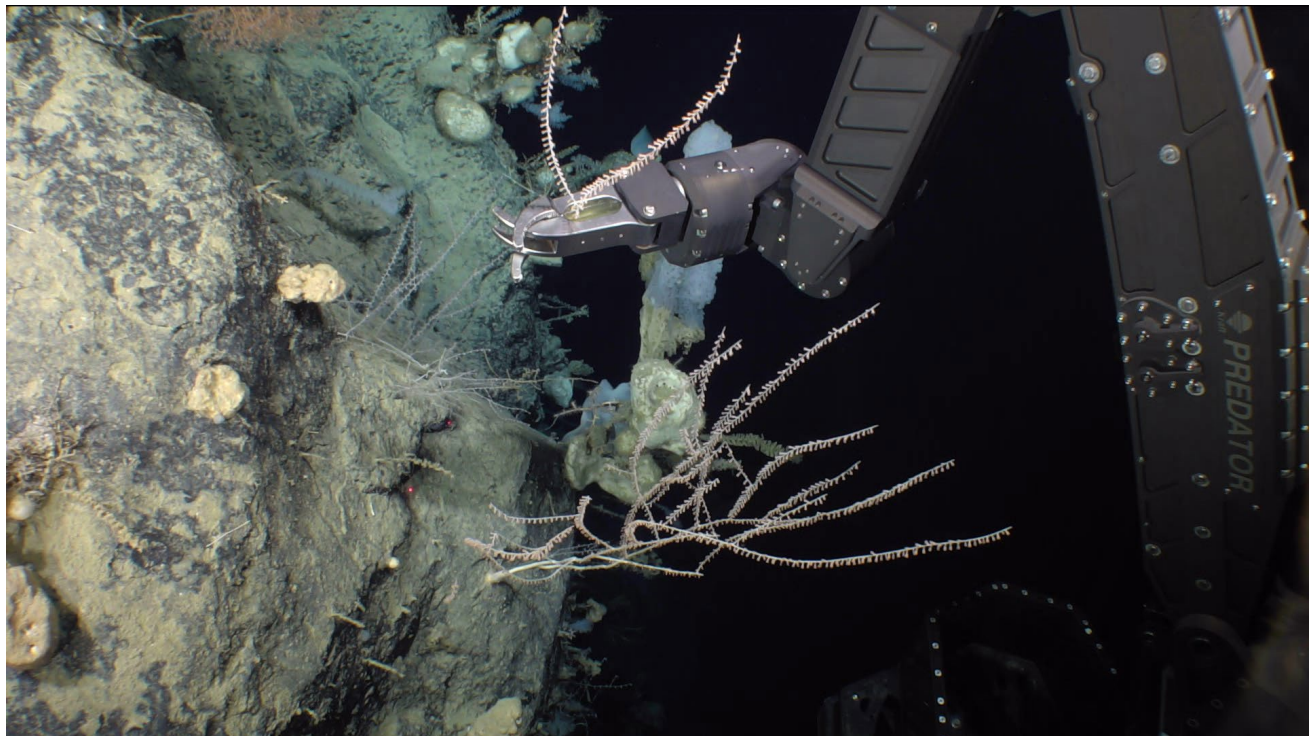
Samples Collected -

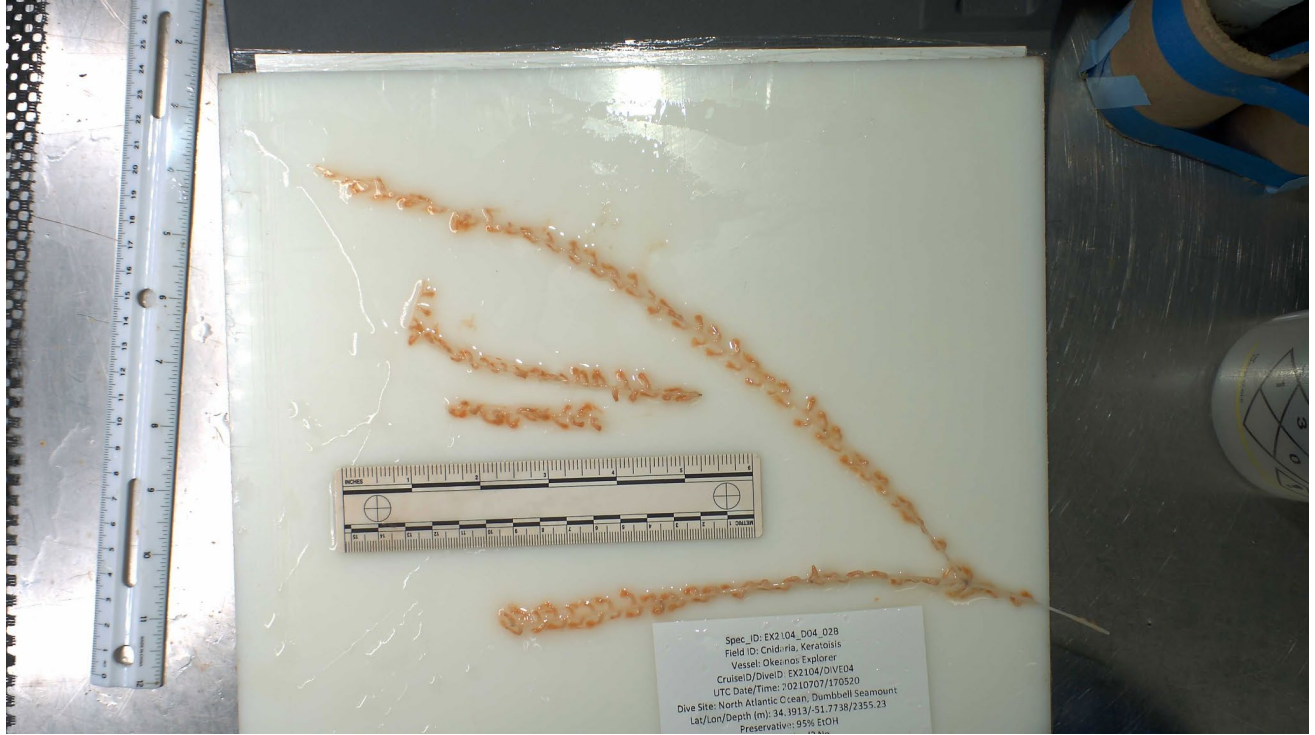


Sample ID	EX2104_D04_01B
Date (UTC)	20210707
Time (UTC)	164802
Depth (m)	2356.563965
Latitude (decimal degrees)	34.39134979

Longitude (decimal degrees)	-51.77375031
Temp. (°C)	3.38499999
Field ID(s)	Euplectellidae
Comments	Sample has broken apart, translucent glass sponge, 13cm long, part of a larger specimen about 60-70 cm total length

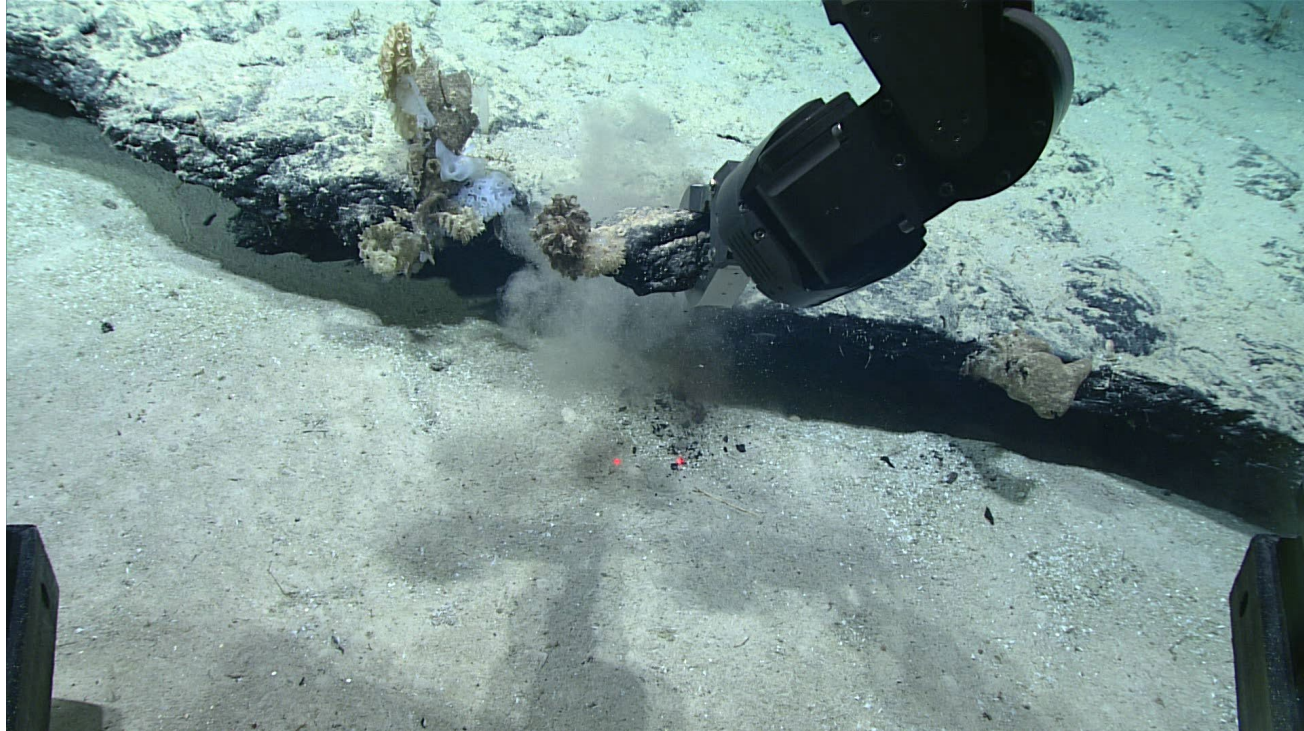
Associates Sample ID	Field Identification	Count
N/A	N/A	N/A





Sample ID	EX2104_D04_02B
Date (UTC)	20210707
Time (UTC)	170520
Depth (m)	2355.230957
Latitude (decimal degrees)	34.3913002
Longitude (decimal degrees)	-51.77379227
Temp. (°C)	3.371000051
Field ID(s)	Keratoisis
Comments	Very mucousy, 40cm, started with 95% ethanol, switched to 19% formalin for 24 hrs, then to 70% ethanol

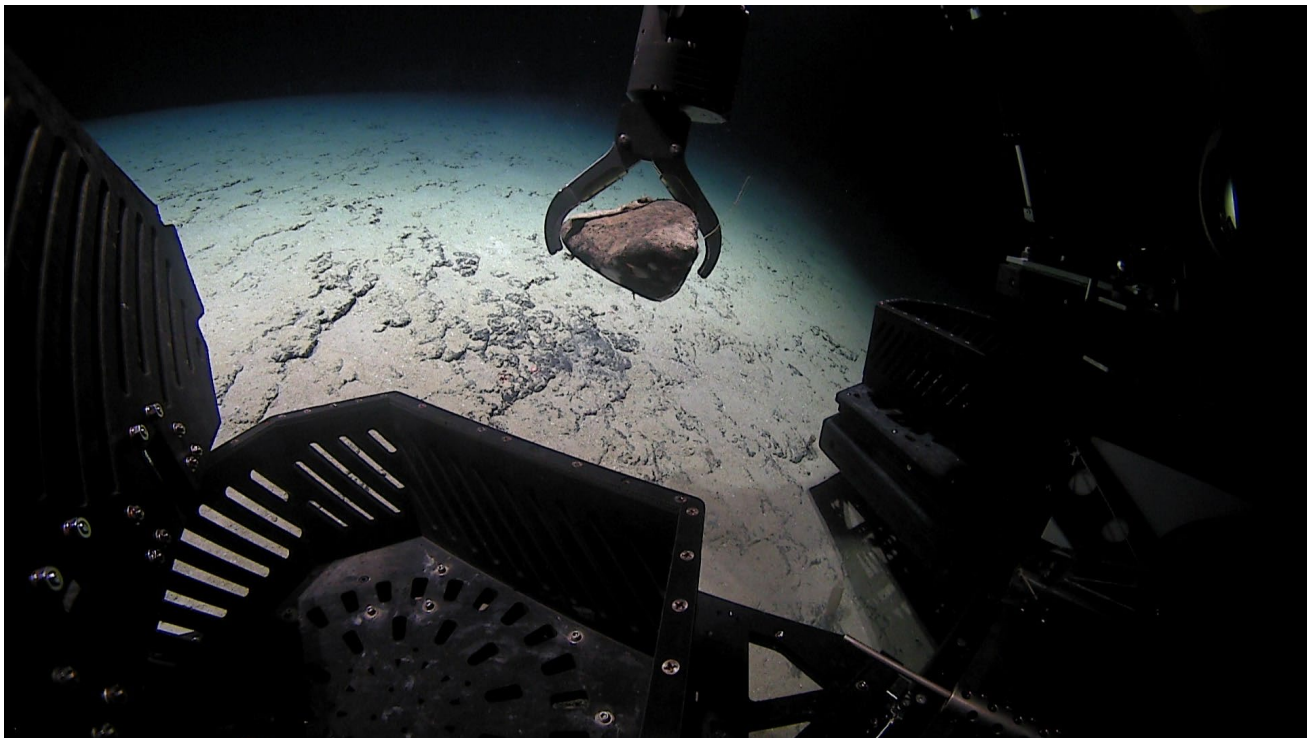
Associates Sample ID	Field Identification	Count
N/A	N/A	N/A



Sample ID	EX2104_D04_03G
Date (UTC)	20210707
Time (UTC)	175205
Depth (m)	2330.281982

Latitude (decimal degrees)	34.39126587
Longitude (decimal degrees)	-51.77323151
Temp. (°C)	3.406
Field ID(s)	rock encrusted in FeMn
Comments	16cm total, 9.5cm tall and 5.5cm wide, encrusted with FeMn, rusty striping, visible layering within FeMn crust, botryoidal texture, signs of oxidation

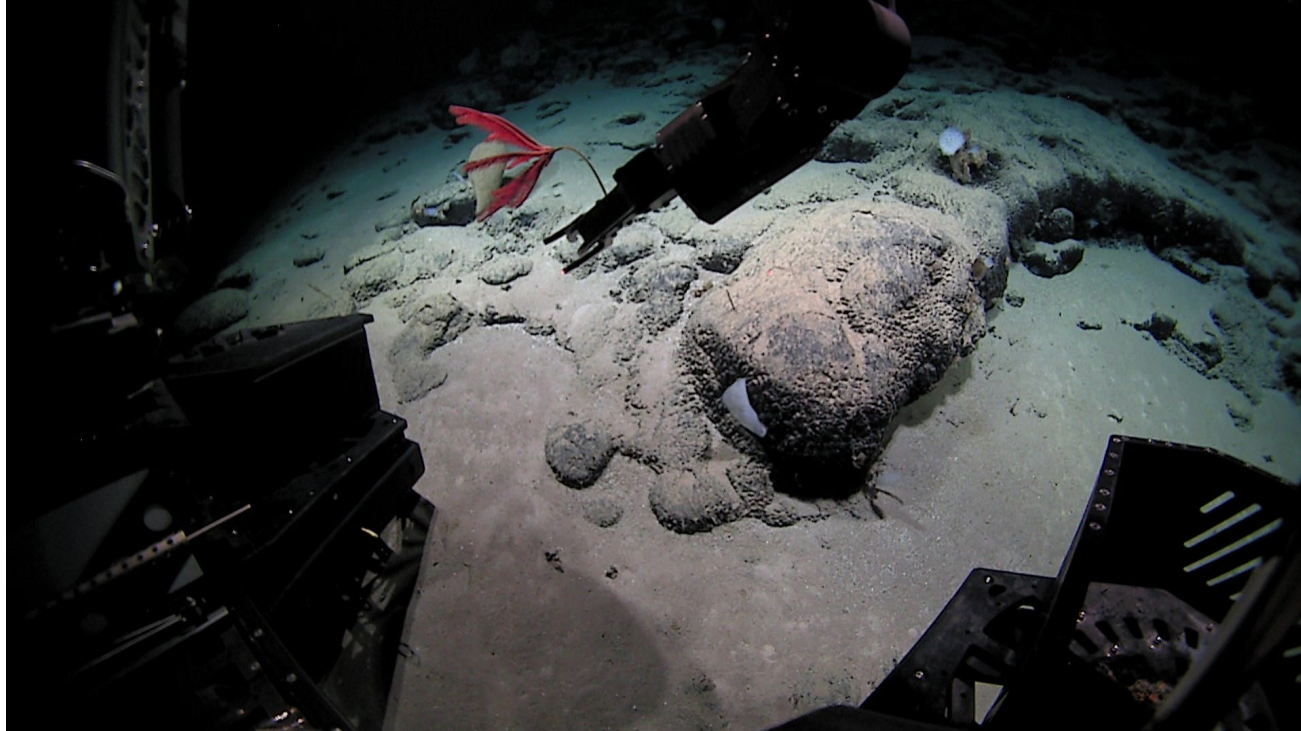
Associates Sample ID	Field Identification	Count
N/A	N/A	N/A





Sample ID	EX2104_D04_04G
Date (UTC)	20210707
Time (UTC)	180242
Depth (m)	2326.285889
Latitude (decimal degrees)	34.39129257
Longitude (decimal degrees)	-51.77285767
Temp. (°C)	3.395
Field ID(s)	Loose rock: Potential Ice Raft Debris
Comments	31cm long, 13cm wide, 15cm tall, dead sponge attached and various dead encrusted sponges, smooth texture

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



Sample ID	EX2104_D04_05B
Date (UTC)	20210707
Time (UTC)	190358
Depth (m)	2259.553955
Latitude (decimal degrees)	34.39042282
Longitude (decimal degrees)	-51.77141953

Temp. (°C)	3.578
Field ID(s)	Bathycrinidae
Comments	sample breaking apart, 25cm long including stem, 5 bifurcated arms, 10 arms total, and red in color

Scientists Involved (provide name, email, affiliation)

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