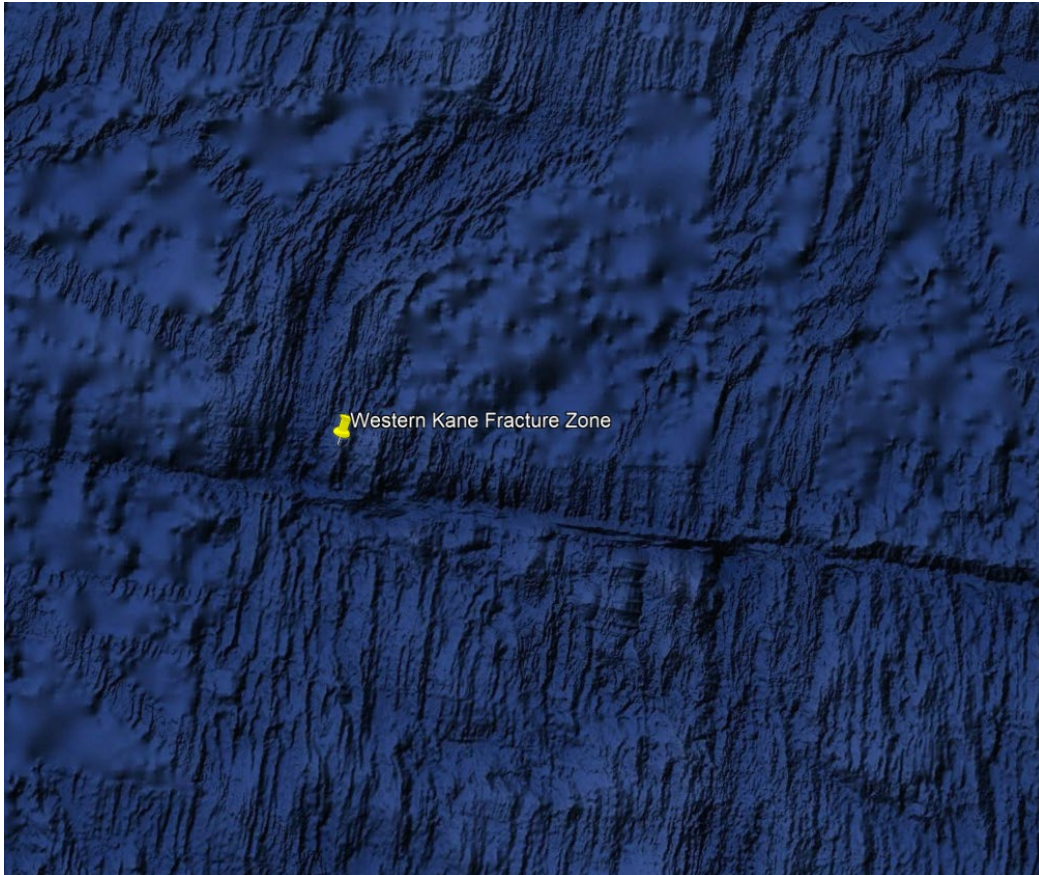


ROV Dive Summary, EX-22-06, Dive 04 August 18 2022

General Location Map



Dive Information

Site Name	Dive 04 - Western Kane Transform Fault
General Area Descriptor	Mid-Atlantic Ridge
Science Team Leads	Joana Xavier (Biology), Deb Glickson (Geology)
Expedition Coordinator	Kasey Cantwell
ROV Dive Supervisor	Levi Unema

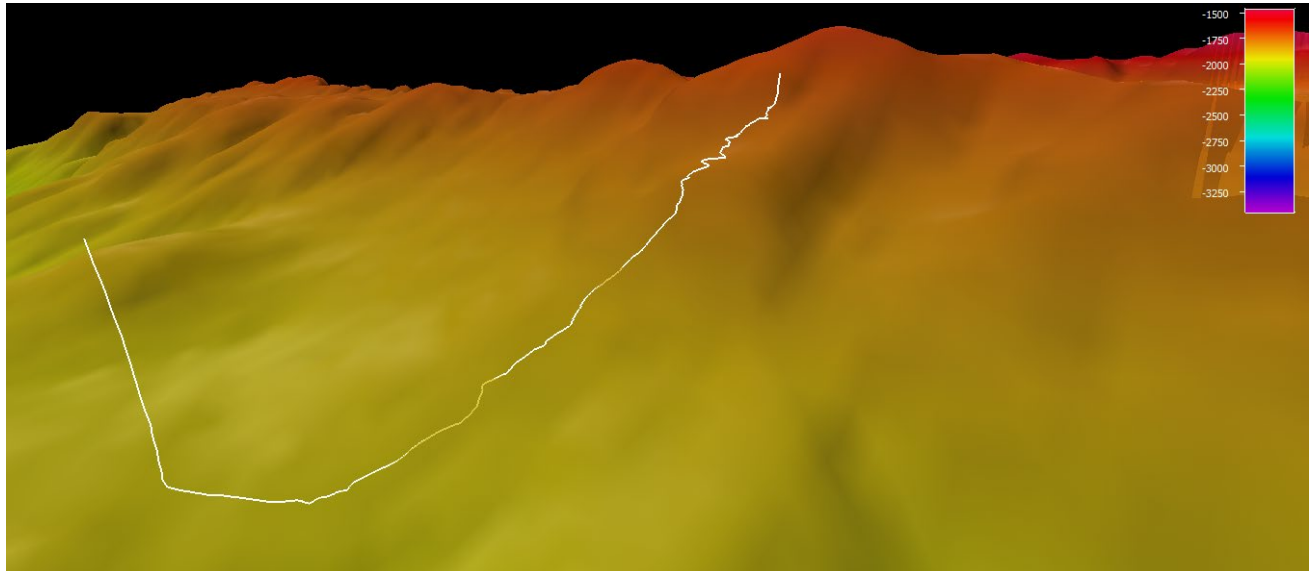
Dive Description	<p>We landed on a flat plain of biogenic sediment with ripple marks, composed almost entirely of pteropod shells. We took a water sample at that point. The ripples were well sorted, creating a pattern of tan and white ripples on the seafloor. We saw sparse evidence of biology, with isolated sponges, a seapen, and a shrimp. At 1208 UTC, we encountered the <i>Paleodictyon formosum</i> trace. We began to see a few small manganese (Mn) crusted rocks on the seafloor, all of which hosted sparse biota (sponges, hydrocorals, anemones, whip corals).</p> <p>After slowly moving upslope through the pteropod sediment ripples, we found the first real outcrop of rocks (1223 UTC) - many were Mn coated, while a few others were more angular. Isolated fauna continued to be found, including a sponge we sampled, black corals, squat lobsters, and <i>Paragorgia</i>. At 1865m (1240 UTC), we sampled a rock. We thought the rocks would all be loose, as they appeared to be talus, but the first attempt was very much in place. The rock was Mn crusted. While we initially thought this to be mafic, additional sampling may prove this to be sediment covered in an Mn crust. After this outcrop, the occurrence of rocks increased, as did the steepness of the topography. We also observed a crab (<i>Paromola?</i>) that was heavily sedimented, perhaps serving as camouflage.</p> <p>At 1829m, we finally encountered the steep outcrop we had expected from the bathymetry. As we moved up this steep face, we began to see evidence of radial cooling and pillow textures, indicating that we were looking at extrusive volcanism rather than the lower crustal rocks/plutonic rocks we had hoped to encounter on the inside corner high. We also found some conical features composed of fragmented pillow basalts. These rocks all had variable crusts of Mn, with many exhibiting the typical “bumpy” texture of a thicker Mn crust. At 1430 UTC (1726m), we collected a Mn encrusted angular basalt and a water sample. While biota still appeared to be sparse, we came across several <i>Iridogorgia</i>, an encrusting demosponge on which carnivorous sponges resided (these were collected), and a <i>Plinthaster</i> goniasterid (cookie) seastar eating a sponge. As we continued to move upslope, more fragmented and a few intact pillow basalts were seen. The dive ended about 1.5 hours before its planned end, as the ship lost power to the dynamic positioning system, which caused D2 to pull off the steep outcrop face we were at. The ship drifted away from our dive site, and by the time the power problem was fixed, we were too far away to reacquire the wall and continue the dive. We were about 200 m from the top of the local high when this occurred.</p>
Notable Observations	Sediment-covered <i>Paromola</i> crabs (as camouflage), fragmented pillow basalts but no evidence of plutonic or metamorphosed rocks.
Community and habitat observations	<p>Corals and Sponges - Present</p> <p>Chemosynthetic Community - Absent</p> <p>High biodiversity Community - Absent</p> <p>Active Seep or Vent - Absent</p> <p>Extinct Seep or Vent - Absent</p> <p>Hydrates - Absent</p>
CMECS Feature Type(s)	<p>Fracture Zone</p> <p>Mid-Ocean Ridge</p> <p>Ripples</p> <p>Rock Outcrop</p>
SeaTube Link (science annotation system)	https://data.oceannetworks.ca/SeaTubeV3?resourceTypeId=600&resourceId=2683

Equipment Deployed

ROV	<i>Deep Discoverer</i>
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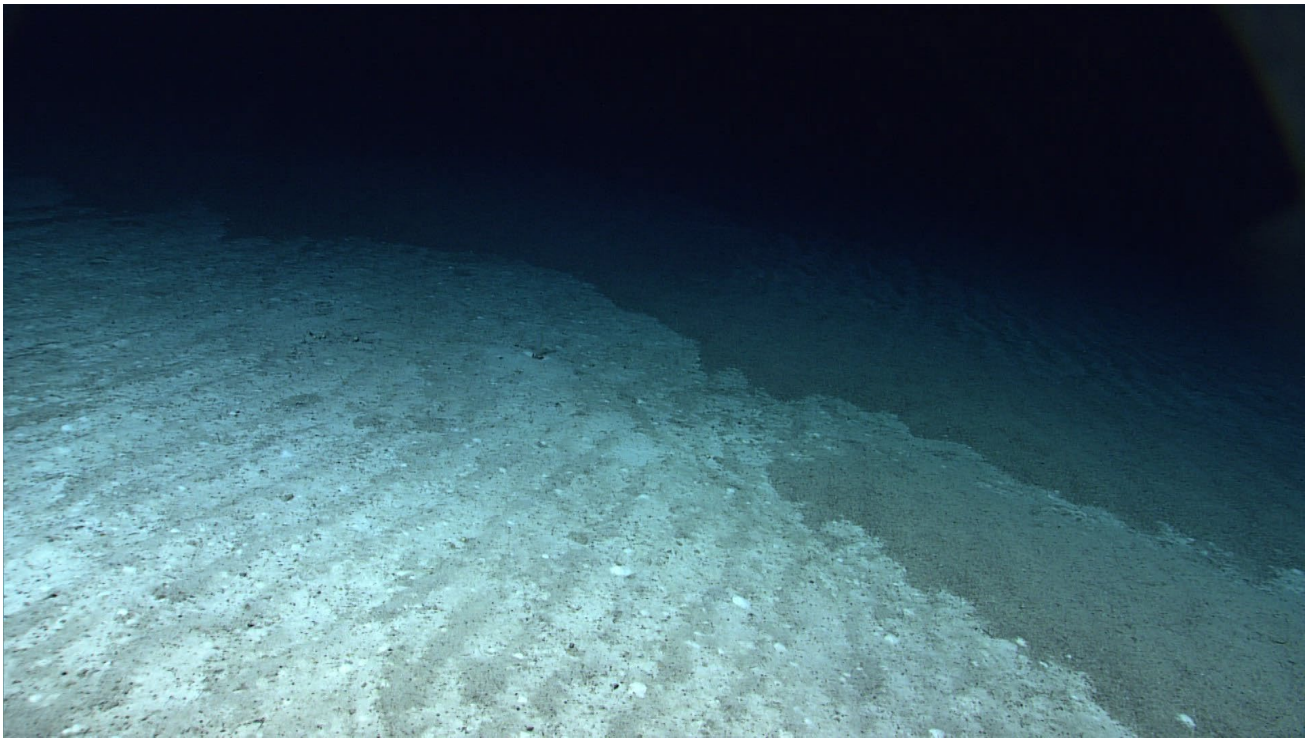
Camera Platform	<i>Seirios</i>
ROV Measurements	The following ROV measurements, data streams and equipment are used on each ROV deployment: CTD, depth, scanning sonar, USBL position, altitude, heading, attitude, high-resolution cameras, low resolution cameras, manipulator arms, suction sampler, sample drawers and thrusters. The section below notes if any of these sensors were malfunctioning or not operational
Equipment Malfunctions	The ship lost power to the dynamic positioning system (DP power supply failure on the Bridge) about 1.5 hours before the end of the planned dive, which meant that D2 had to pull away from the steep outcrop wall. While the issue was being troubleshot, the ship's drift pulled D2 too far away from the dive site to resume.

Close-up Map of Main Dive Site



Smoothed ROV dive track in white on a 20 m resolution bathymetric grid, 1x vertical exaggeration, depth in meters.

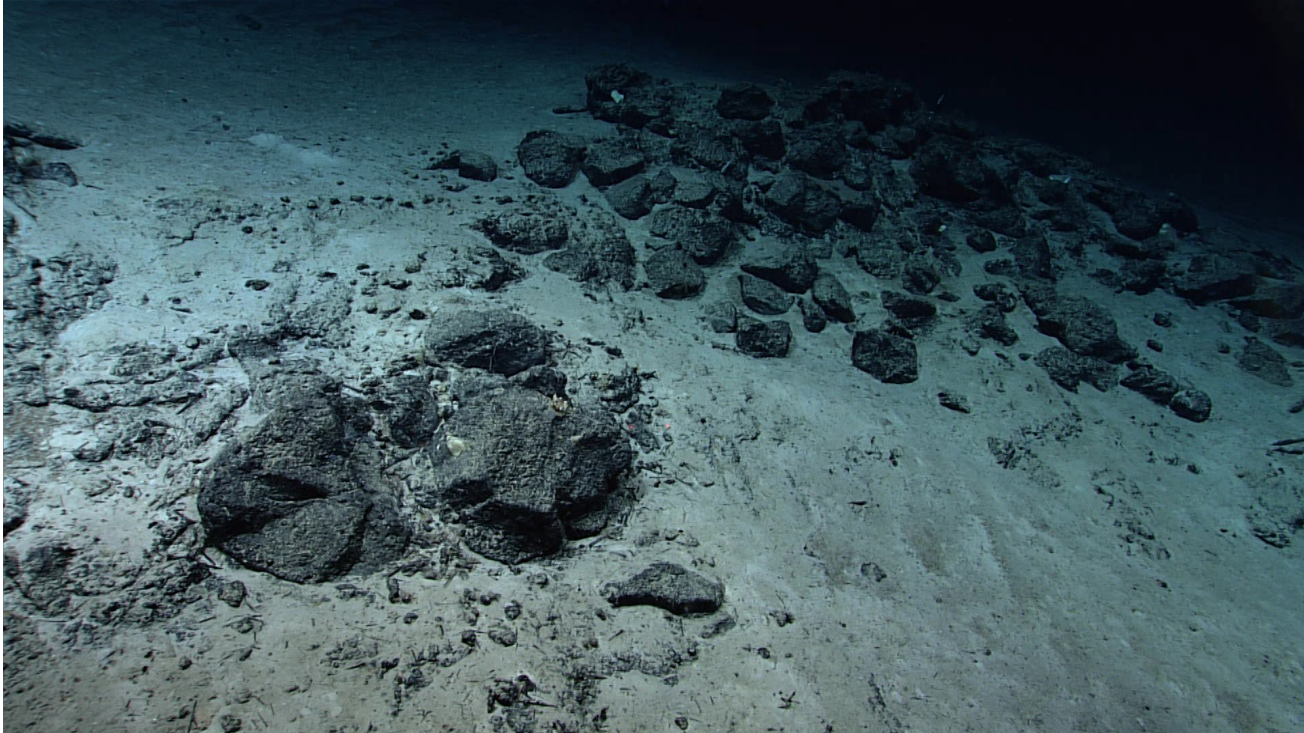
Representative Photos of the Dive



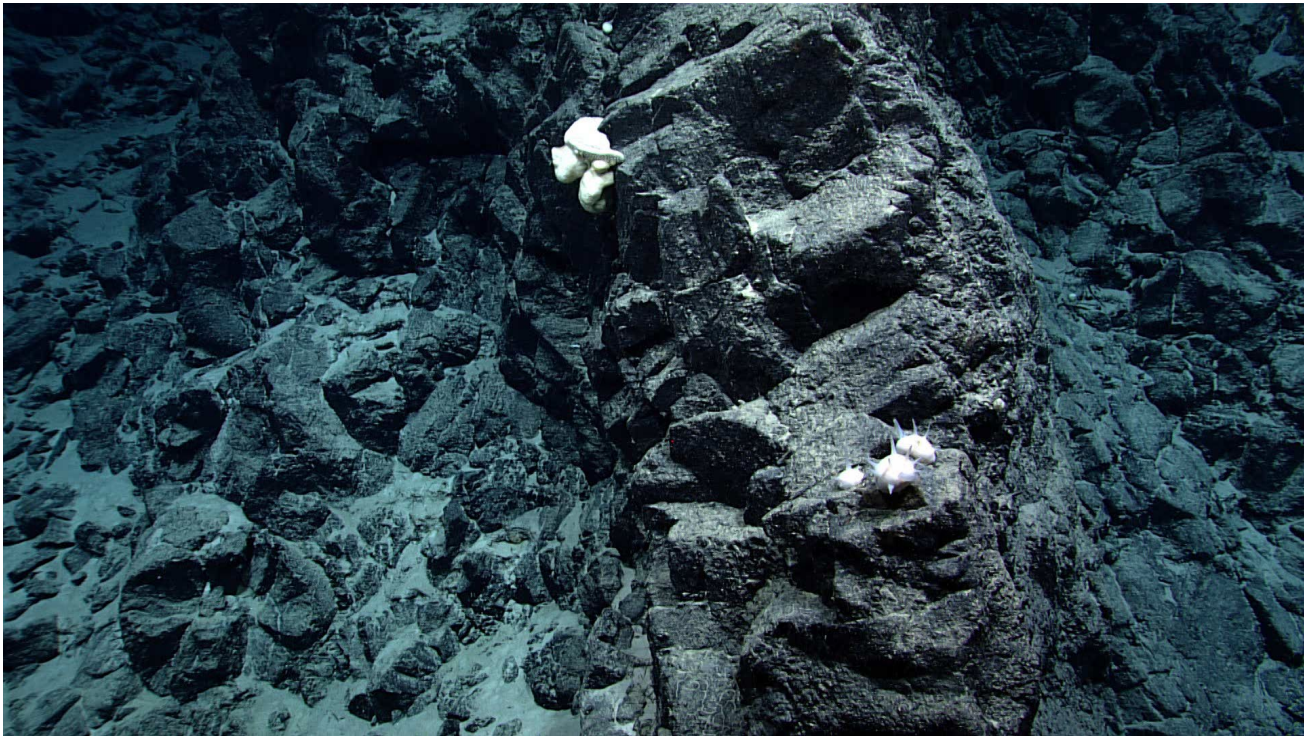
Sediment ripples on the seafloor. Much of it was biogenic, composed almost entirely of pteropod shells.



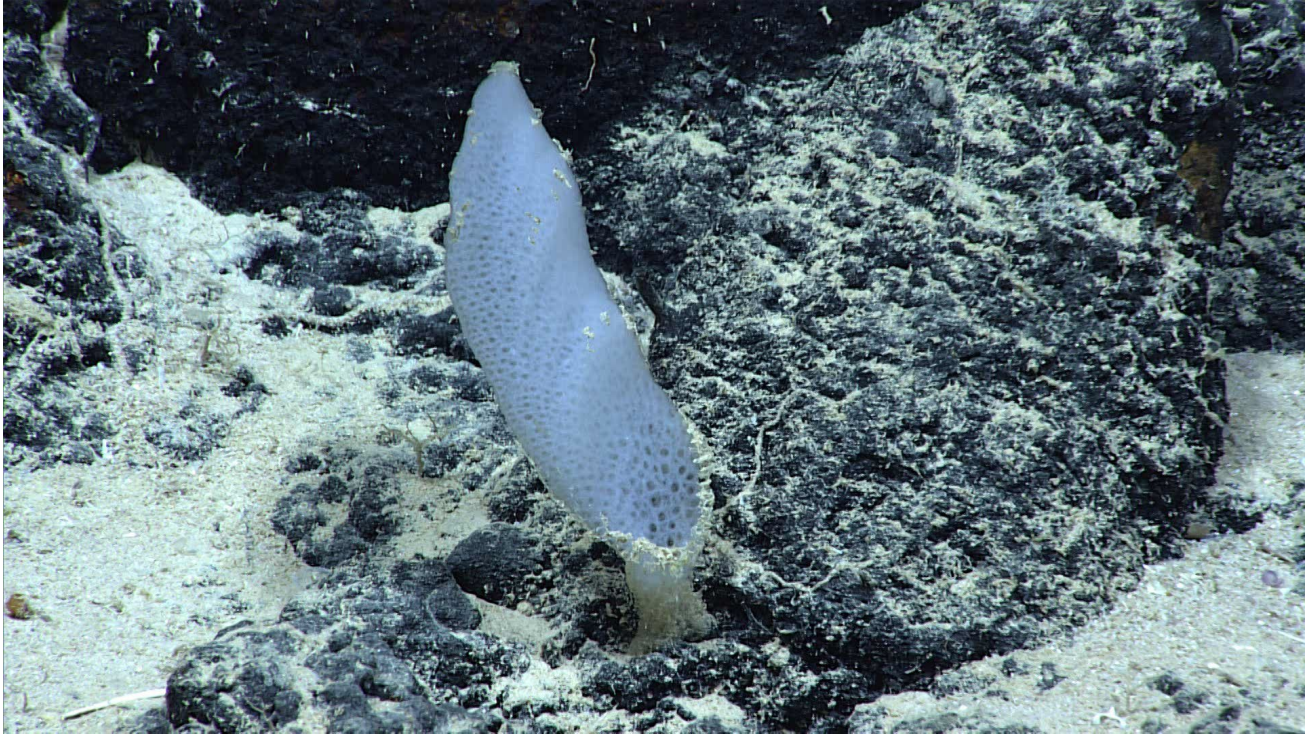
Close-up of the biogenic sediment showing many pteropod shells as well as two *Paleodictyon* (possibly *P. nodosum*) traces, of unknown biological origin.



Talus, some of it angular, all Mn crusted, on the heavily sedimented seafloor.



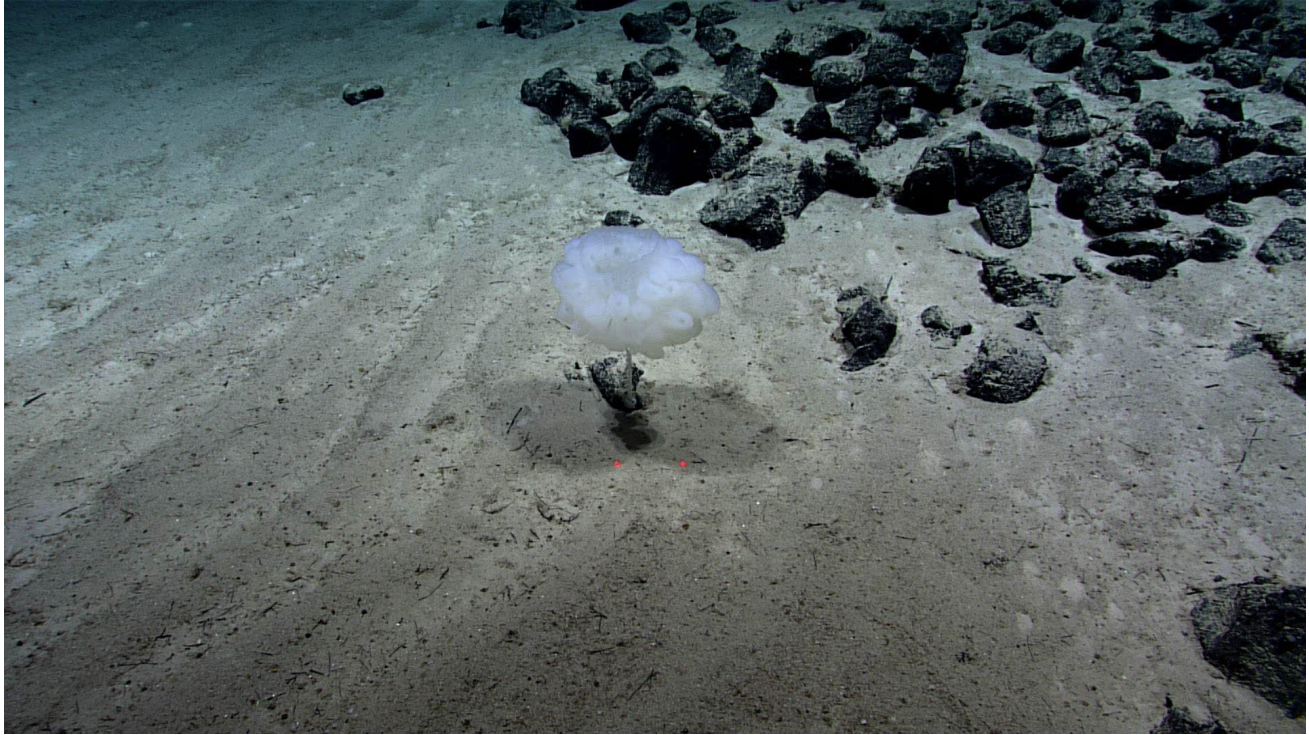
Fragmented massive and pillow flow structures at the base of the outcrop.



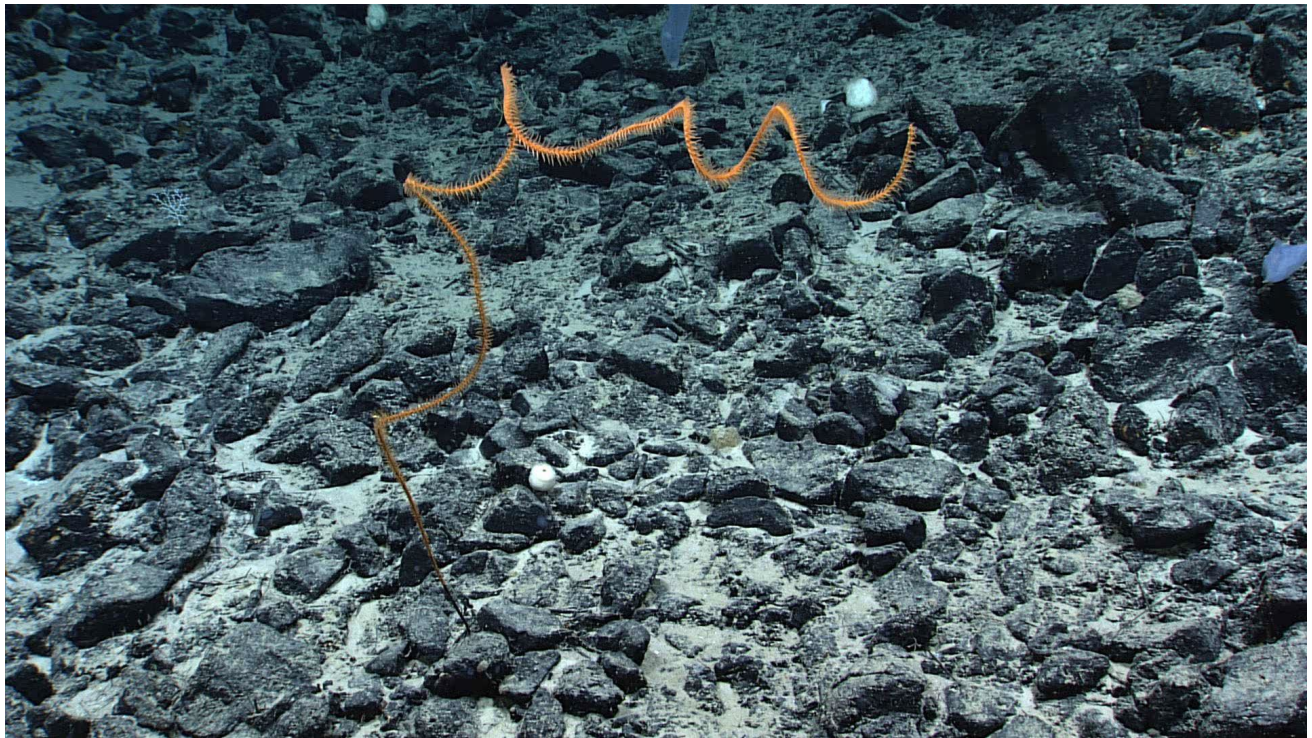
Unidentified glass sponge (class hexactinellida) on a heavily Mn crusted rock.



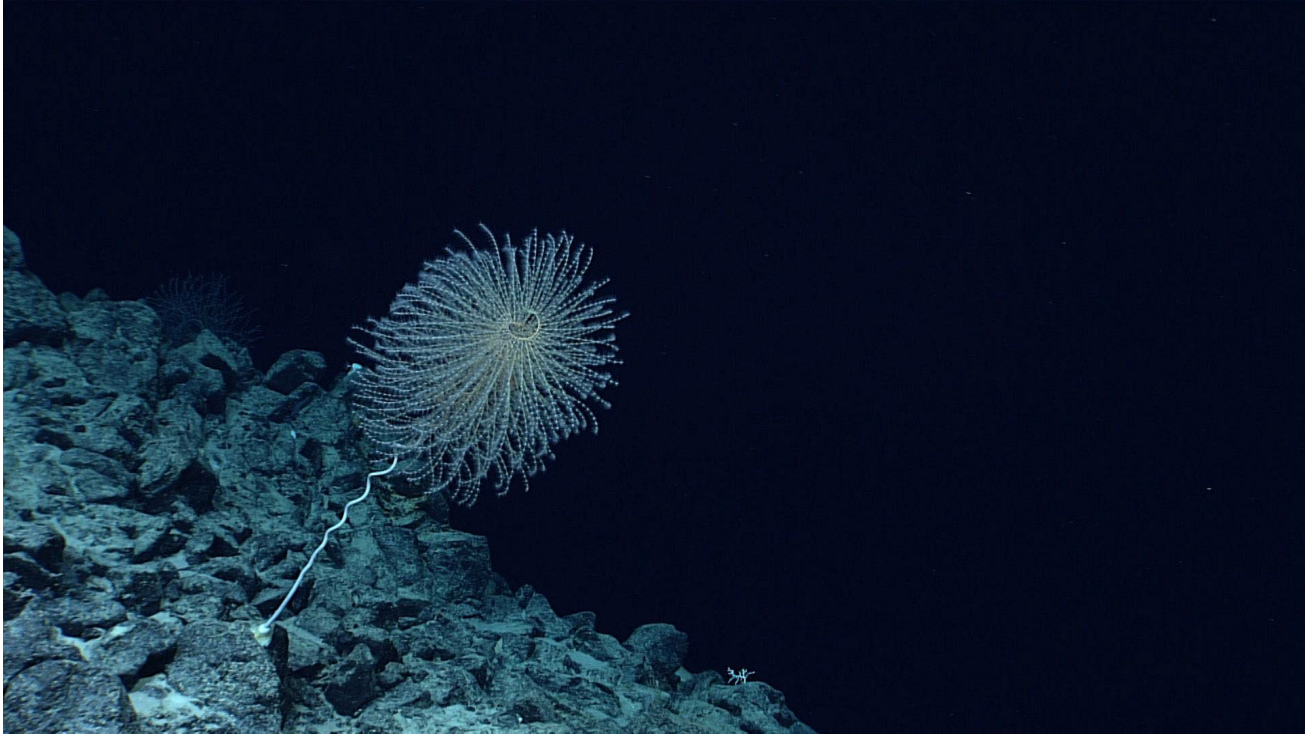
The tetractinellid demosponge *Geodia pachydermata*, with inhalant (lower) and exhalant (upper) surfaces clearly visible (specimen collected).



The stalked glass sponge *Sacocalyx pedunculatus*.



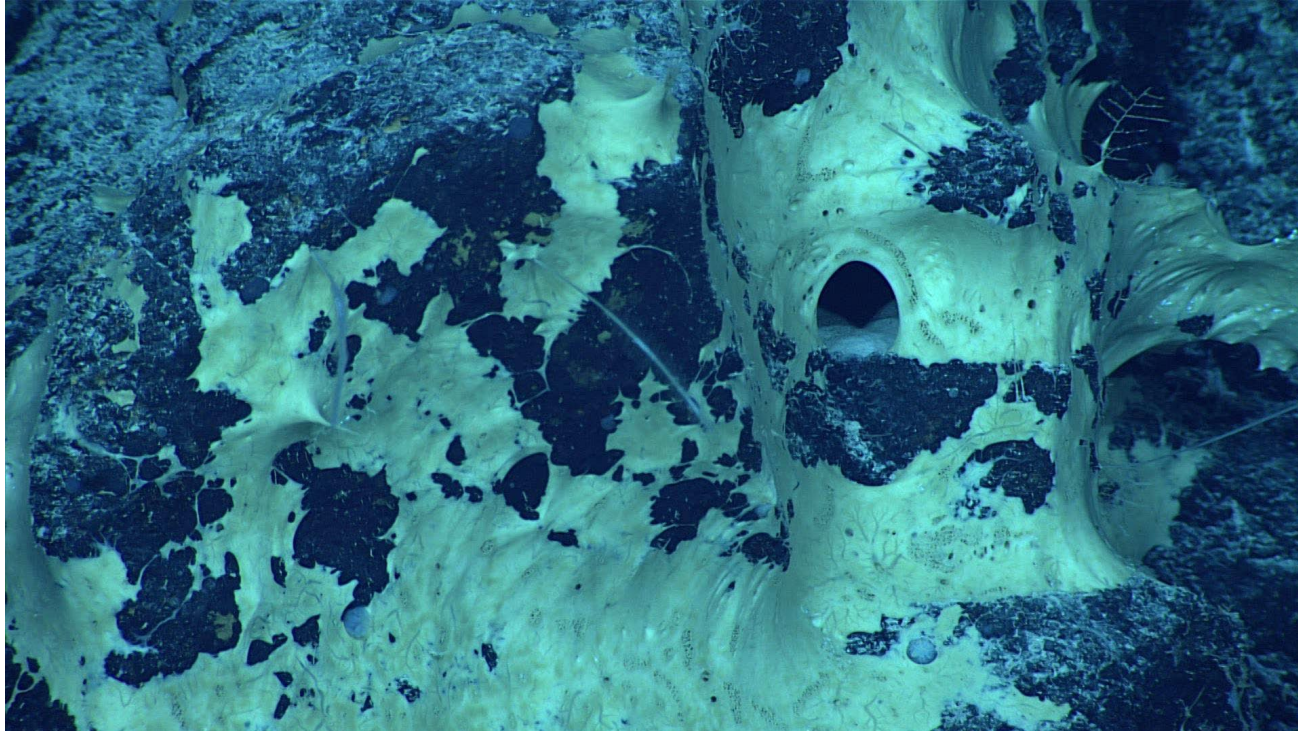
Black coral, possibly in the genus *Stycopathes*.



The spiral Alcyonacean coral *Iridogorgia* sp.



A live colony of the scleractinian coral *Enallopsammia* (possibly *E. rostrata*).

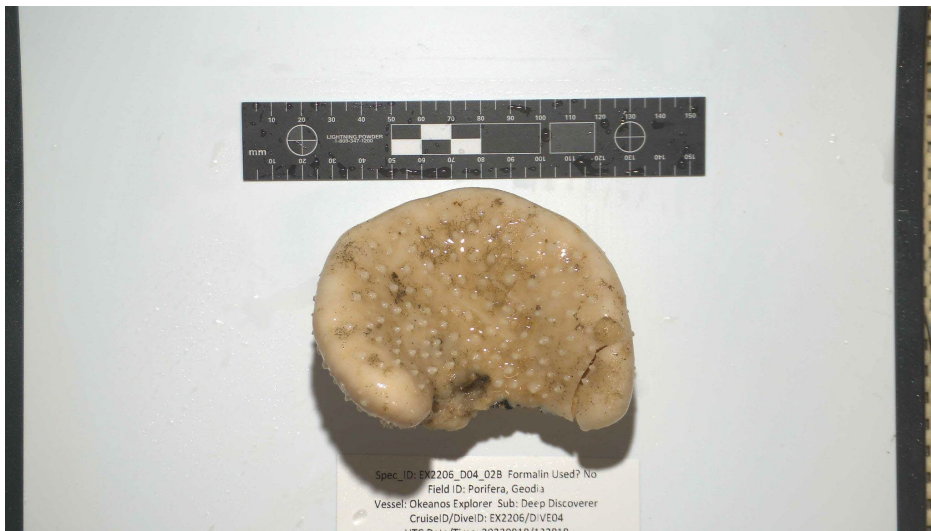


An unidentified encrusting demersal sponge and carnivorous sponges in the genus *Asbestopluma* or *Euchelipluma* (two specimens collected).



A cookie sea star, in the genus *Plinthaster*, feeding on a demersal sponge.

Samples Collected



Sample ID	EX2206_D04_02B
Date (UTC)	20220818
Time (UTC)	122818
Depth (m)	1880.211
Latitude (decimal degrees)	23.946680
Longitude (decimal degrees)	-46.076980
Temp. (°C)	4.021
Field ID(s)	Geodia

Comments

Plate like sponge, 1cm thick, round edges, white/off white with elevated pore areas on both surfaces. Distinct cortex, possibly *Geodia* cf. *pachydermata*.

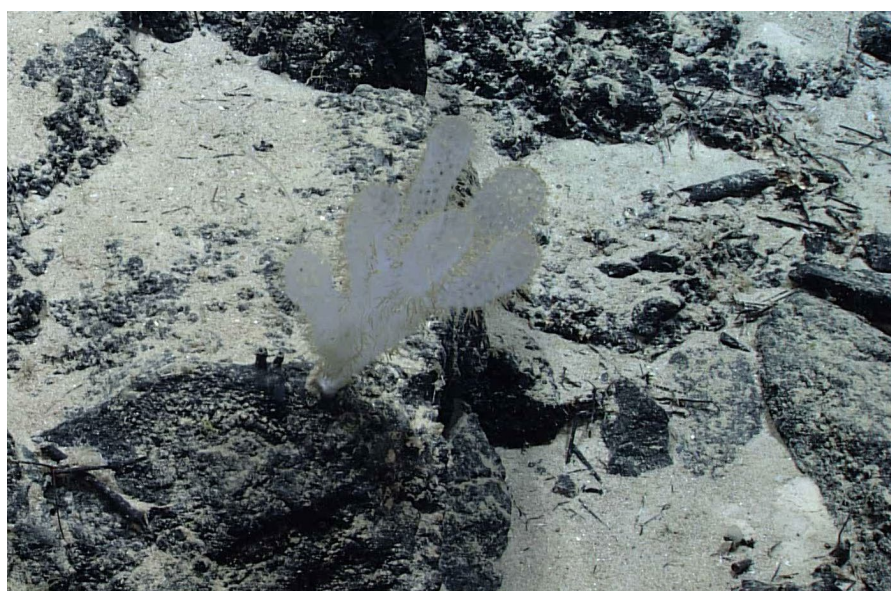


Associates Sample ID	Field Identification	Count
EX2206_D04_02B_A01	Tetractinellida	2





Sample ID	EX2206_D04_03G
Date (UTC)	20220818
Time (UTC)	124532
Depth (m)	1867.097
Latitude (decimal degrees)	23.94667
Longitude (decimal degrees)	-46.076630
Temp. (°C)	4.016
Field ID(s)	Manganese encrusted rock
Comments	Initially thought to be basalt. Lab examination identified sediment under the manganese coating indicating either a sediment layer or sedimentary rock.





Sample ID	EX2206_D04_04B
Date (UTC)	20220818
Time (UTC)	135310
Depth (m)	1751.992
Latitude (decimal degrees)	23.94642
Longitude (decimal degrees)	-46.07513
Temp. (°C)	4.297
Field ID(s)	Hexactinellid
Comments	Tubular, silicious plate at osteole



Associates Sample ID	Field Identification	Count
EX2206_D04_04B_A01	Scale Worms	2



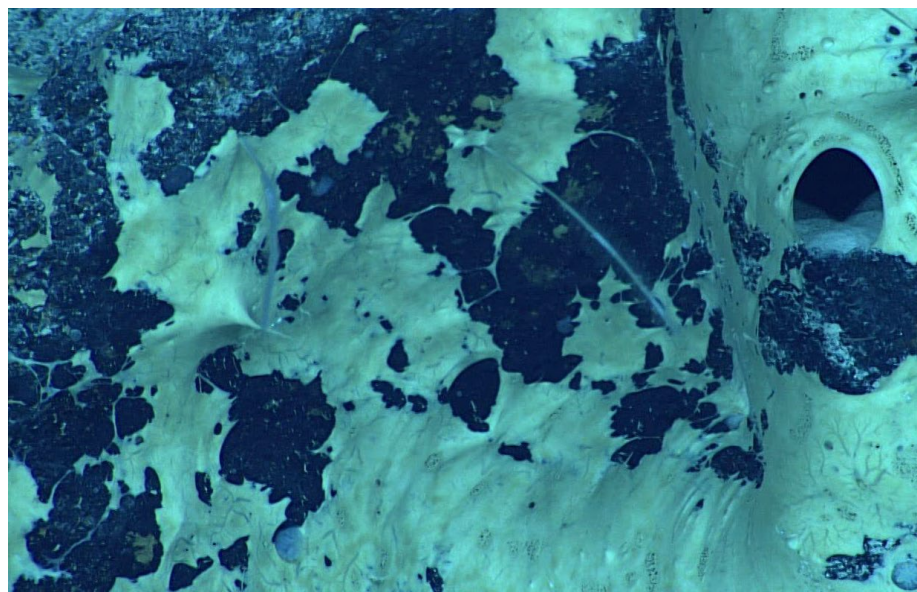


Sample ID	EX2206_D04_05G
Date (UTC)	20220818
Time (UTC)	143155
Depth (m)	1726.314
Latitude (decimal degrees)	23.94614
Longitude (decimal degrees)	-46.07467

Temp. (°C)	4.278
Field ID(s)	Manganese coated rock
Comments	Possibly basalt. Angular fracture pattern. Lab examination identified sediment under the manganese coating, indicating it might actually be a sedimentary rock.



Associates Sample ID	Field Identification	Count
EX2206_D04_05G_A01	Haplosclerid (Petrosia sp.?)	1



Sample ID	EX2206_D04_07B
Date (UTC)	20220818
Time (UTC)	151143
Depth (m)	1706.003
Latitude (decimal degrees)	23.946170
Longitude (decimal degrees)	-46.07419

Temp. (°C)	4.334
Field ID(s)	Cladorhizidae
Comments	Sample degraded rapidly.

Niskin Sampling Summary

Sample ID	EX2206_D04_01W
Date (UTC)	20220818
Time (UTC)	114200
Depth (m)	1914.189
Latitude (decimal degrees)	23.946770
Longitude (decimal degrees)	23.946770
Bottle number	NISKIN 1
Temperature (°C)	3.924
Dissolved Oxygen (ml/L)	3.924
Treatment	eDNA

Sample ID	EX2206_D04_06W
Date (UTC)	20220818
Time (UTC)	143453
Depth (m)	1724.979
Latitude (decimal degrees)	23.94636
Longitude (decimal degrees)	-46.07454
Bottle number	NISKIN 2
Temperature (°C)	4.283
Dissolved Oxygen (ml/L)	7.359
Treatment	eDNA

Sample ID	EX2206_D04_08W
Date (UTC)	20220818
Time (UTC)	161009
Depth (m)	523.277
Latitude (decimal degrees)	23.95084
Longitude (decimal degrees)	-46.084770
Bottle number	NISKIN 3
Temperature (°C)	13.168
Dissolved Oxygen (ml/L)	5.094
Treatment	Sample lost

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