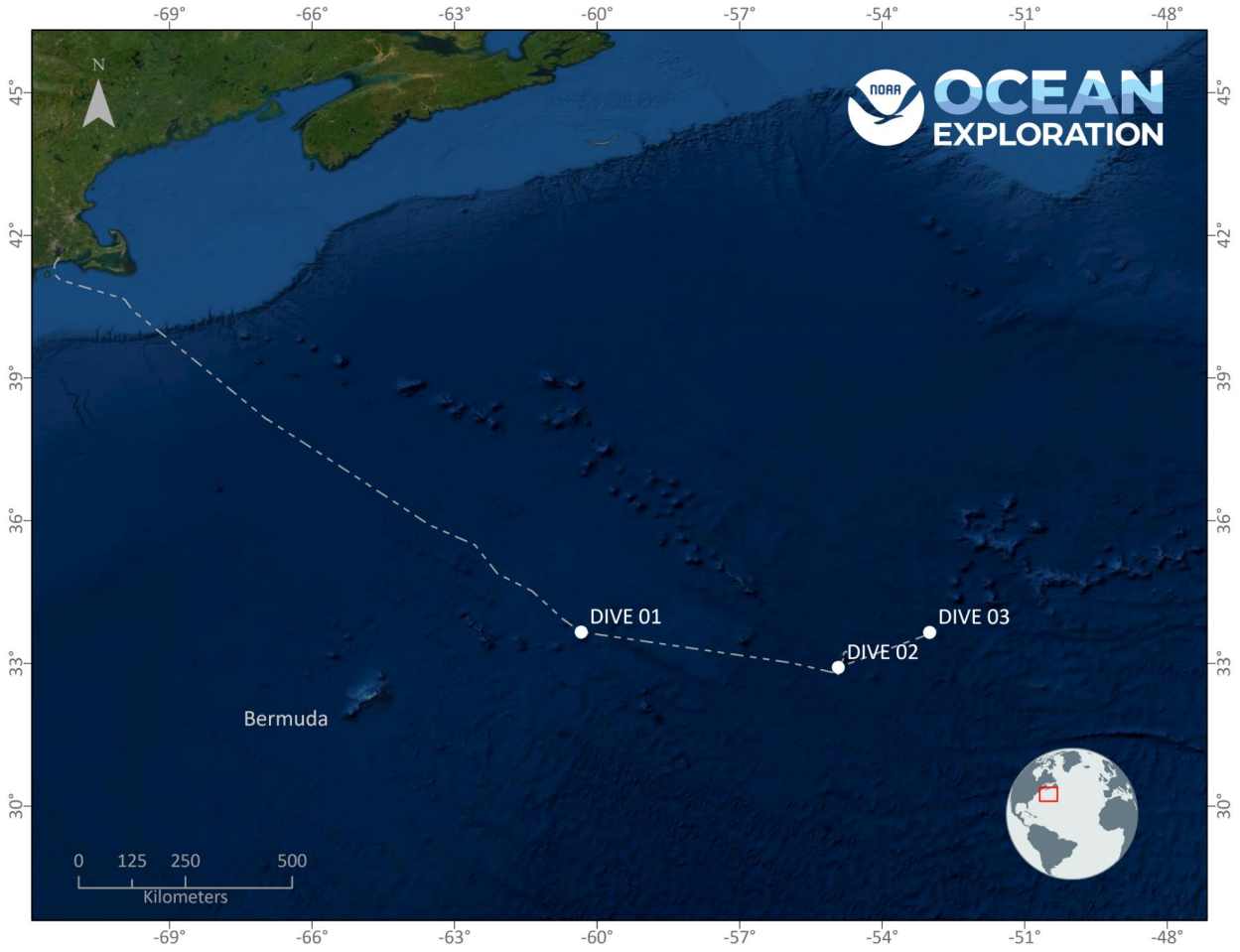
ROV Dive Summary, EX-21-04, Dive 03, July 06, 2021

General Location Map



Dive Information

Site Name	"Hopscotch" Seamount
General Area Descriptor	South of Corner Rise Seamounts
Science Team Leads	Rhian Waller, Jason Chaytor
Expedition Coordinator	Kasey Cantwell, Kimberly Galvez (Expedition Coordinator in Training)

ROV Dive Supervisor	Chris Ritter
Mapping Lead	Shannon Hoy
Dive Purpose	First exploration of an unexplored and largely unmapped seamount to characterize the biological and geological habitats. This dive was primarily chosen for logistical purposes, but samples and data from here can help inform how the Corner Rise Seamounts, New England Seamounts, and other surrounding seamounts are connected.
Was the dive restricted for Underwater Cultural Heritage?	No
ROV Dive Summary Data	Dive Summary: EX2104_DIVE03 ^^ Dive Type: Normal In Water: 2021-07-06T12:40:34.474285 33.67813696847926 ; -52.99322511388295 On Bottom: 2021-07-06T14:19:55.126488 33.67633918204695 ; -52.99504275128046 Off Bottom: 2021-07-06T19:09:31.657540 33.67638587198938 ; -52.991485487957526 Out Water: 2021-07-06T20:37:25.846182 33.671989648691024 ; -52.99818754059595 Dive Duration: 7:56:51 Bottom Time: 4:49:36 Max Vehicle Depth: 2639.8 m Min Seafloor Depth: 2382.1 m Distance Travelled: 329.5 m

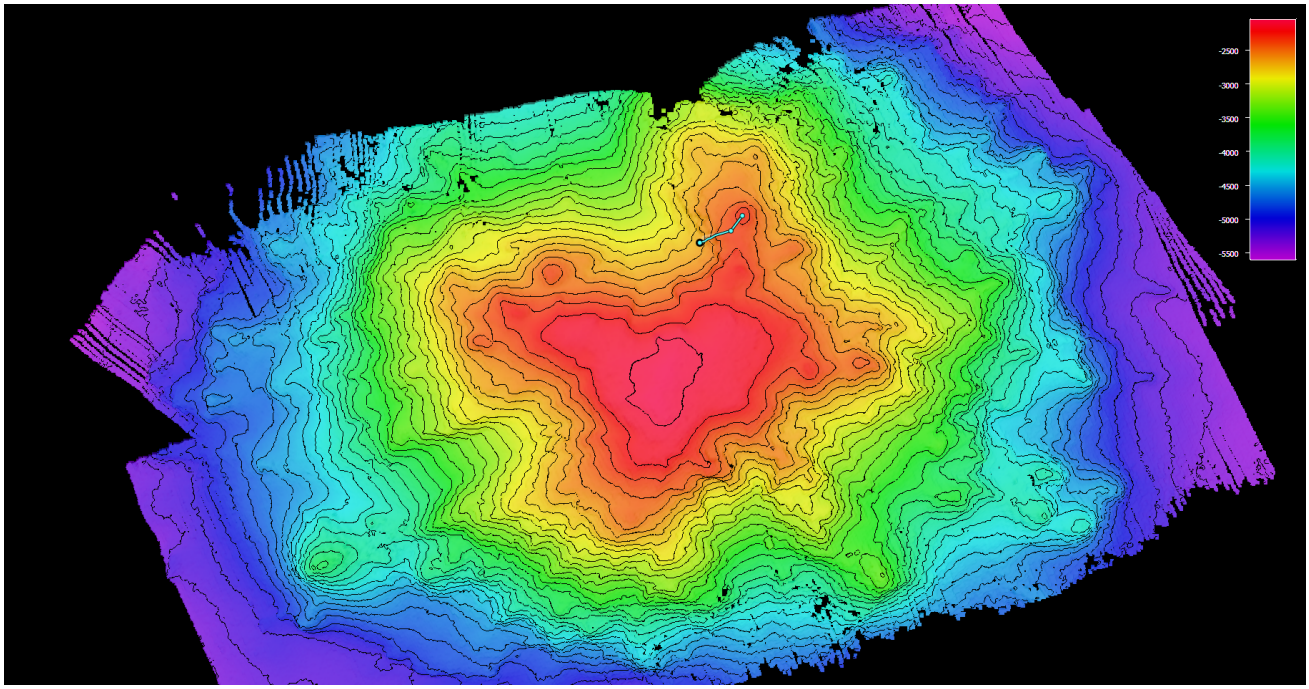
Dive Description	The ROV touched down in a heavily sedimented (primarily biogenic and dominated by pteropod tests with a variable volcanoclastic component) slope mantled by sediment ripples and animal tracks. As the ROV moved upslope, the number and size of FeMn-coated pebbles on the sediment increased and became large enough to support hosting of sponges and coral colonies. The sedimented slope transitioned to a mixed sediment/volcanic (FeMn-encrusted) pavement and then quickly on to 100-200 meters (vertical) of mostly unsedimented volcanic flow morphologies, dominated by pillow lavas with extensively developed botryoidal FeMn crust textures. A vertical exposure cutting through the slope revealed spectacular examples of different flow types overlying each other in a layered sequence. Toward the end of the dive, the mostly rounded pillows become elongated suggesting eruption on to the steep flanks of the seamount. Prior to departing the seafloor, the morphology of the substrate changed again to more angular outcrops, hypothesized by scientists onshore to be representative of morphologies encountered at the flow-fronts of erupted lava. Two samples were collected during the dive, the first at approximately 2619 m at the transition from sedimented slope to initial rock pavement exposure, and a second toward the end of the dive. Both samples are FeMn encrusted (with botryoidal surface textures) that may have primary volcanic rock inside. Biologically this area was much more diverse than the previous two dives. In the initial sediments we observed multiple Umbellula sp. sea pens, as well as feeding/movement trails. As we reached the hard bottom areas we initially saw multiple Lepidisis bamboo corals (possibly two species) on larger boulders, before reaching pavement where initially diverse walls of sponges were observed. There were <6 species of sponges observed during this dive, including those from the Farrea, Euplectellidae, and Euretid with two collections being made of unknown species from this region. Bamboo corals (~4 species), as in the previous two dives, were abundant throughout the dive where hard bottom was encountered, but we also saw representatives of Bathypathes, Corallium, Anthomastus, Primnoidea, Chrysogorgia, and scleractinian cup coral (possibly Caryophyllidae). Zooanthids were also observed, though not in high abundance as in Dive 2, and we observed a different species of cerianthid than Dive 2. Echinus, Henricia sp. and an unknown species of seastar and sea cucumber were observed, alongside other associated fauna such as snails, hermit crabs (with anemone attached), and amphipods. A swimming scale worm (swimma sp.) was also observed as well as an unknown jellyfish.
Notable Observations	High diversity of sponges and deep sea corals
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=2263

Equipment Deployed

ROV	*Deep Discoverer*
Camera Platform	*Seirios*

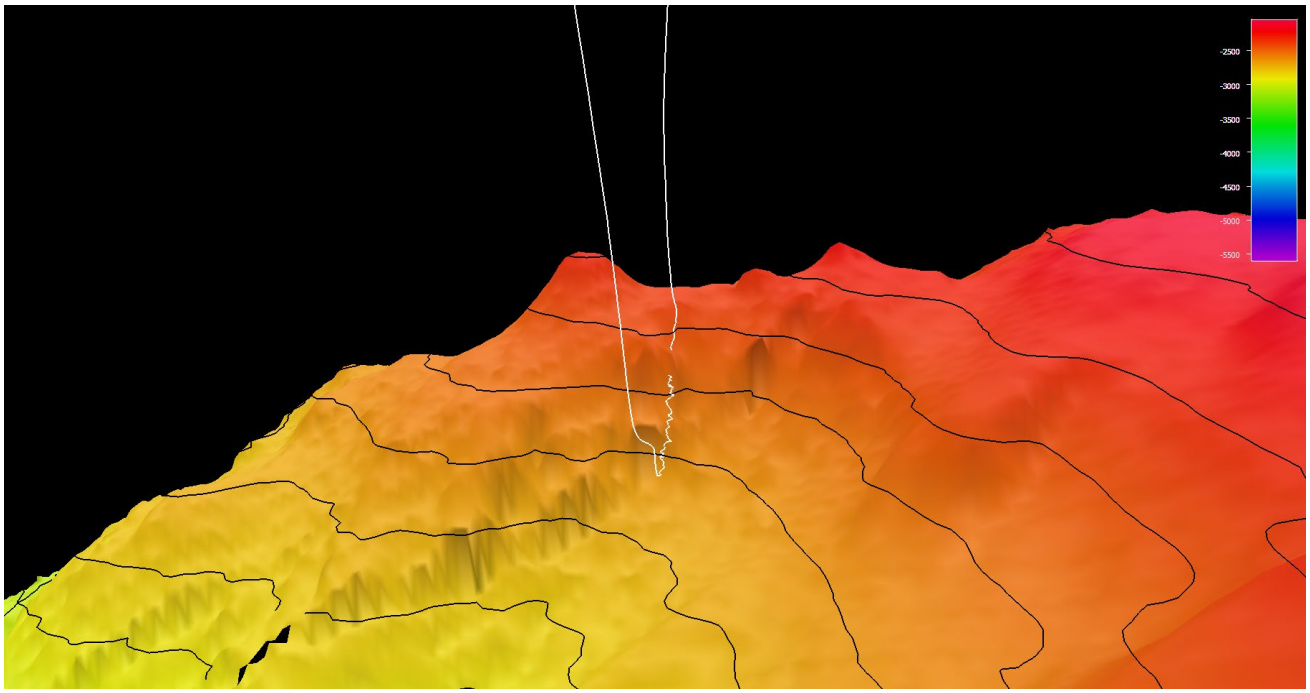
ROV Measurements	The following ROV measurements, data streams and equipment are used on each ROV deployment: CTD, depth, scanning sonar, USBL position, altitude, heading, attitude, high-resolution cameras, low resolution cameras, manipulator arms, suction sampler, sample drawers and thrusters. The section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

Overview of Dive Site



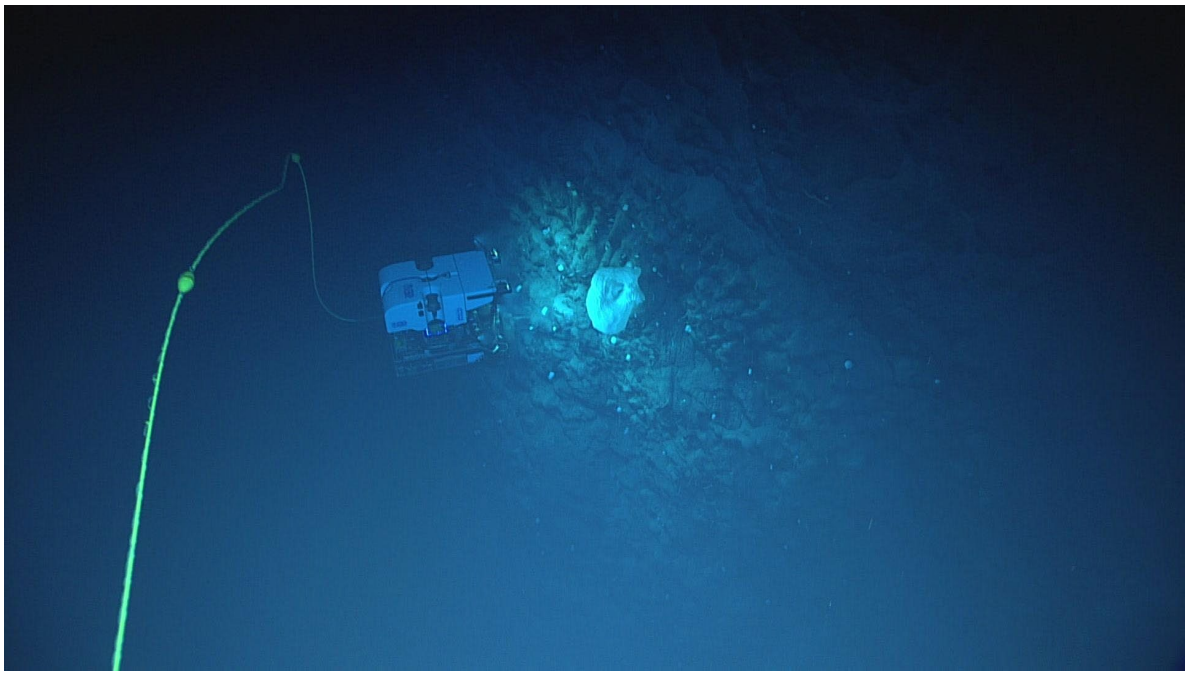
Smoothed ROV dive track (blue) on an overview bathymetry of the seamount, 3x vertical exaggeration.

Close-up Map of Main Dive Site

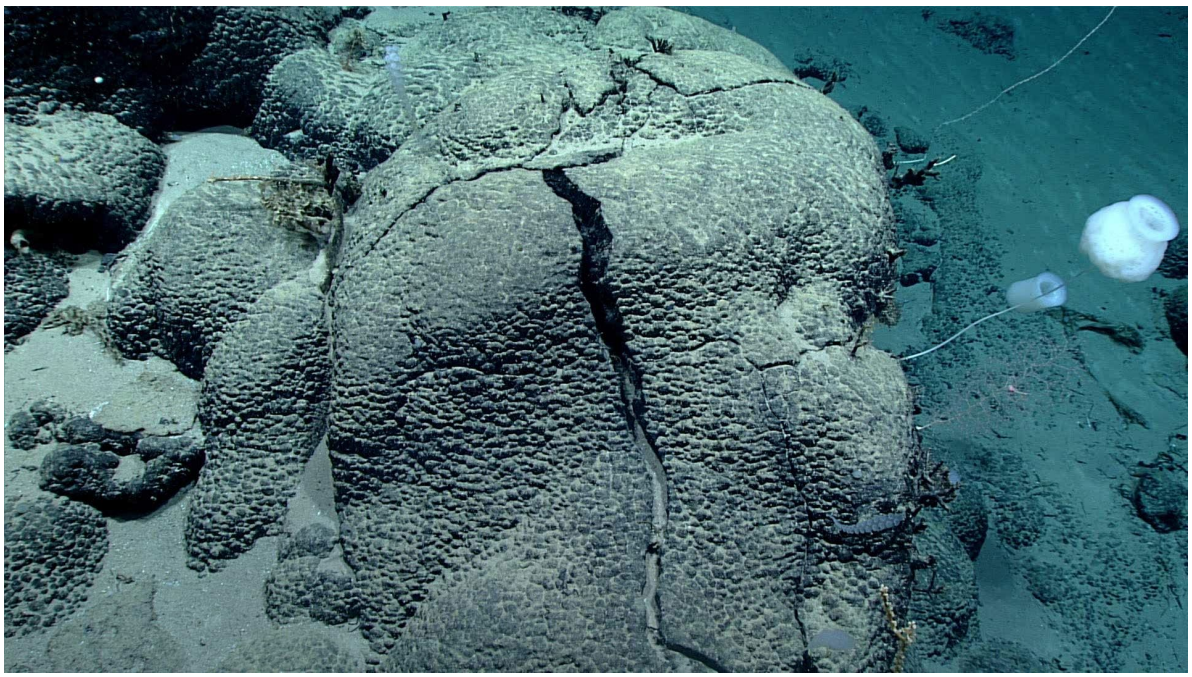


Smoothed ROV dive track (white) bathymetry, 3x vertical exaggeration, depth in meters, 100 meter contours

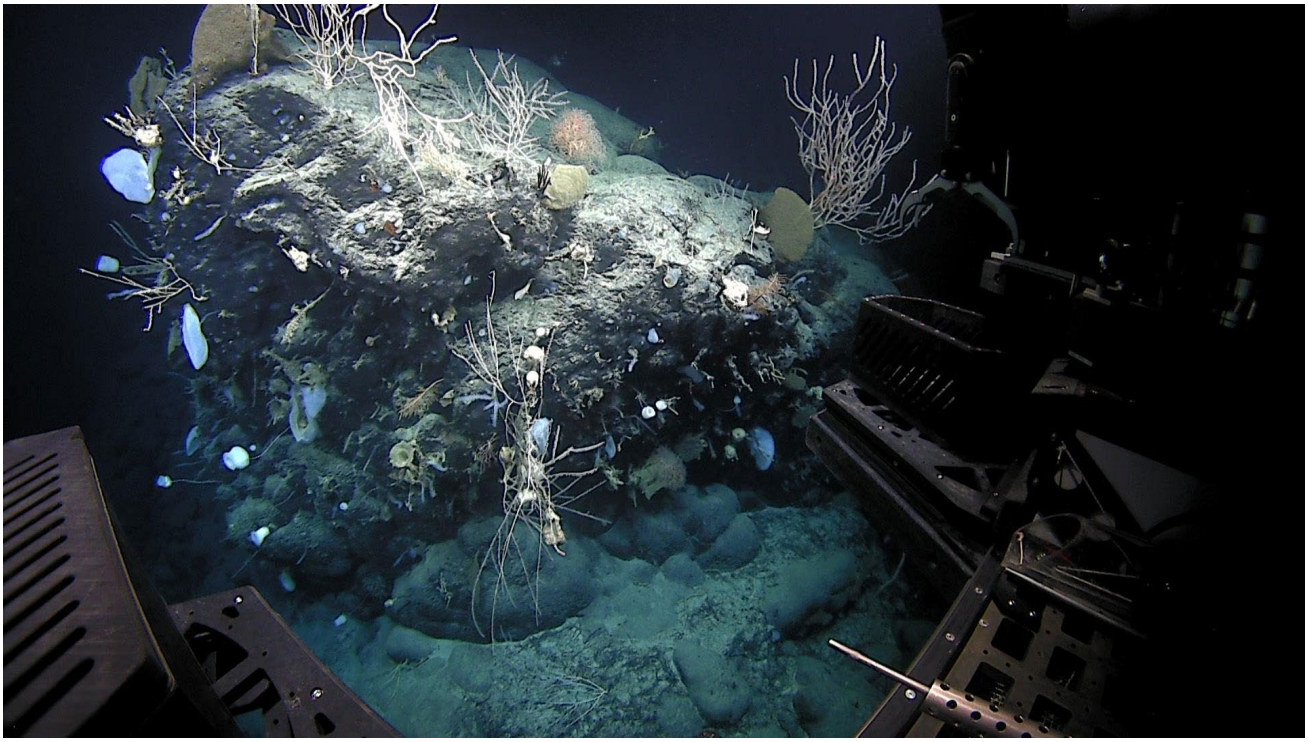
Representative Photos of the Dive



[D2 imaging an exceptionally large sponge during the mid portion of the dive. A number of these unknown types of sponge were observed on steep sloped rocky pavement]

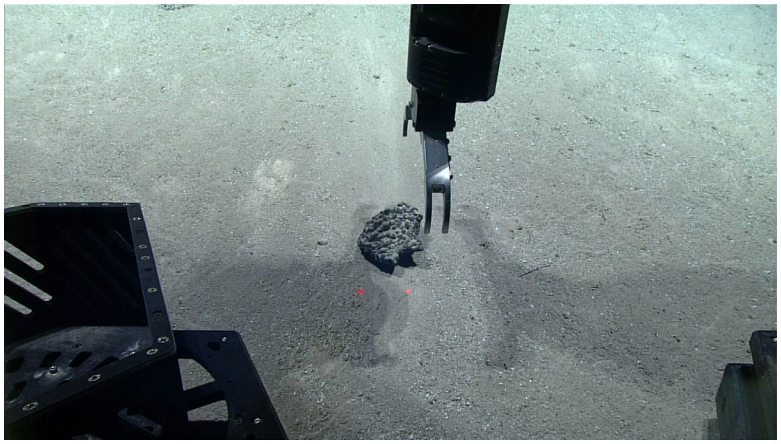


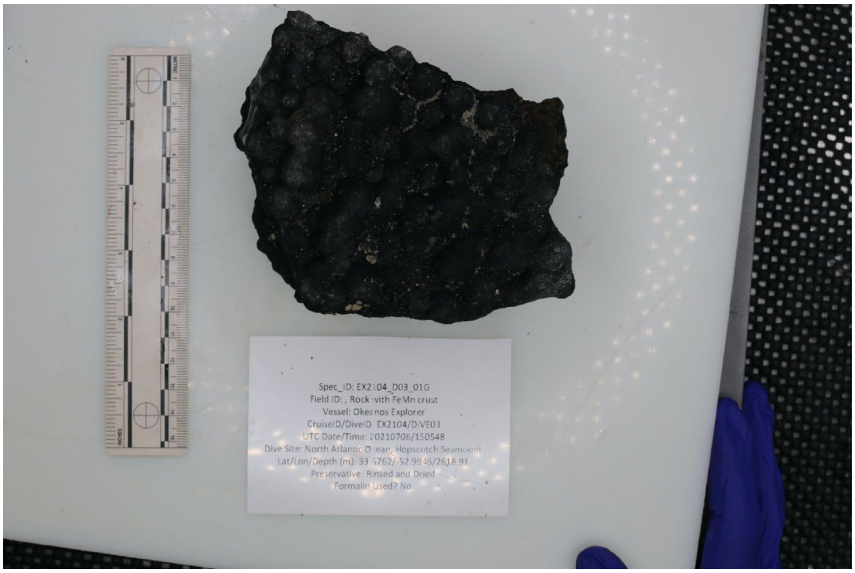
[A large fractured pillow basalt observed towards the end of the dive, with “tulip” sponges similar to that collected during this dive]



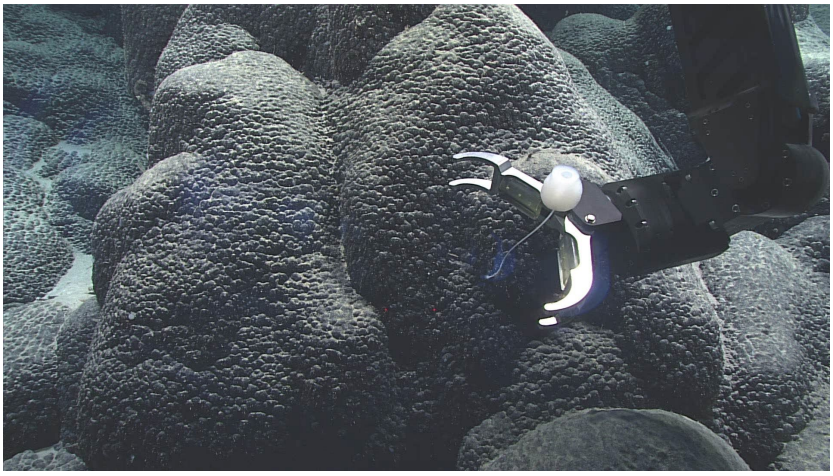
[Large boulders covered in biota were seen throughout the dive once out of the sediment zone during the initial landing. This rock has multiple species of coral and sponges associated with it.]

Samples Collected -



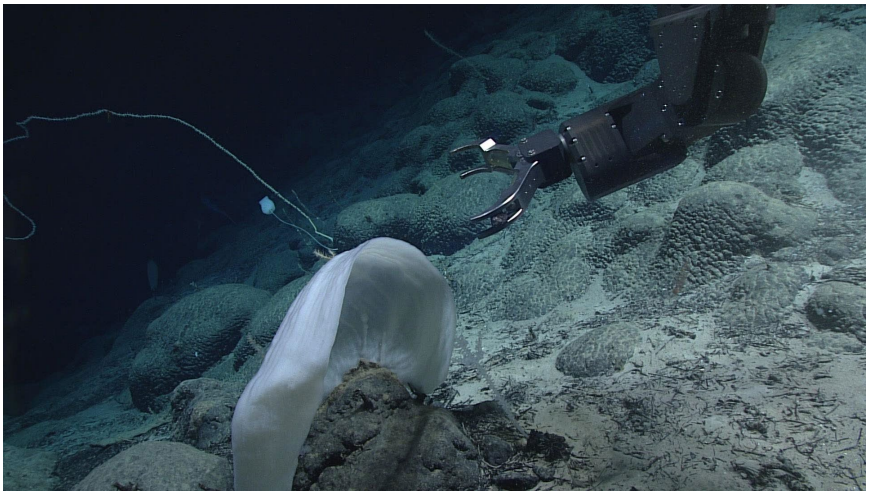


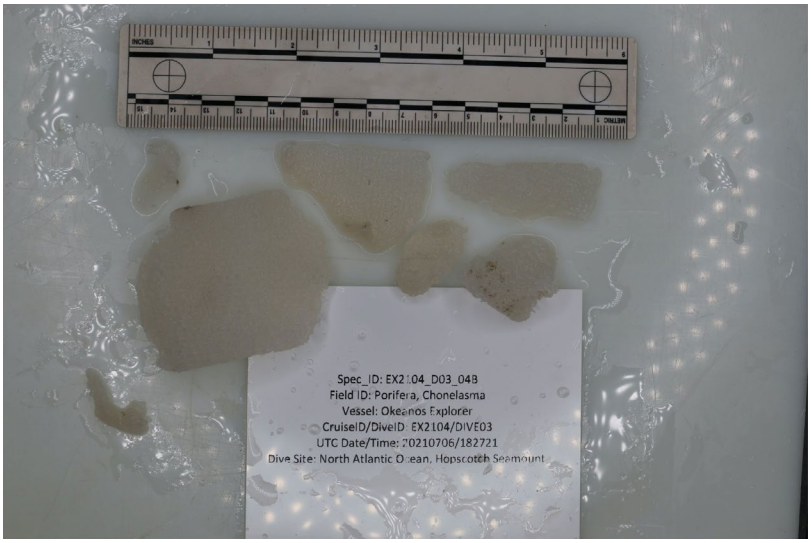
Sample ID	EX2104_D03_01G
Date (UTC)	20210706
Time (UTC)	150548
Depth (m)	2618.909
Latitude (decimal degrees)	33.676204
Longitude (decimal degrees)	-52.994556
Temp. (°C)	
Field ID(s)	Rock with FeMn crust
Comments	13 cm long x 11 cm wide x 5.5 cm tall; you can see Rust so Iron Oxides present; worm tubes - some are encrusted by FeMn, some are not; entire top is botryoidal; broke apart from a larger area during collection.



Sample ID	EX2104_D03_02B
Date (UTC)	20210706
Time (UTC)	173553
Depth (m)	2494.330
Latitude (decimal degrees)	33.676304
Longitude (decimal degrees)	-52.993153
Temp. (°C)	3.276
Field ID(s)	Bolosominae
Comments	13 cm; tulip sponge;

Sample ID	EX2104_D03_03G
Date (UTC)	20210706
Time (UTC)	180821
Depth (m)	2485.613
Latitude (decimal degrees)	33.676407
Longitude (decimal degrees)	-52.992885
Temp. (°C)	
Field ID(s)	Basalt Sample
Comments	top is botryoidal; entirely FeMn coated; unsure of the inside composition ; 26 cm long x 18 cm wide x 8.5 cm tall; has worm tubes coated in FeMn crust





Sample ID	EX2104_D03_04B
Date (UTC)	20210706
Time (UTC)	182721
Depth (m)	2474.989
Latitude (decimal degrees)	33.676380
Longitude (decimal degrees)	-52.992595
Temp. (°C)	3.291
Field ID(s)	Chonelasma
Comments	collected in a few pieces; 10 cm is one; plate sponge;

Scientists Involved (provide name, email, affiliation)

First Name	Last Name	Email	Affiliation
Christa	Rabenold	christa.rabenold@noaa.gov	NOAA/OER
Christopher	Kelley	ckelley@hawaii.edu	University of Hawaii
Christopher	Mah	brisinga@gmail.com	Dept. Invertebrate Zoology, National Museum of Natural History
Cindy	Van Dover	clv3@duke.edu	Duke University
David	Vousden	davidvousden@oceangov.org	United Nations and Global Environment Facility
Dhugal	Lindsay	dhugal@jamstec.go.jp	JAMSTEC
Emily	Crum	emily.crum@noaa.gov	NOAA Ocean Exploration
George	Matsumoto	mage@mbari.org	MBARI
Harold	Carlson	harold.carlson@noaa.gov	NOAA, USC
Jason	Chaytor	jchaytor@usgs.gov	USGS
Jaymes	Awbrey	C00227433@louisiana.edu	University of Louisiana at Lafayette
Jocelyn	Cooper	jocelyn.cooper@maine.edu	University of Maine
John	Deitz	johncdeitz@comcast.net	Long Island University
Kasey	Cantwell	kasey.cantwell@noaa.gov	NOAA Ocean Exploration
Kelsey	Viator	ksviator2000@gmail.com	University of Louisiana at Lafayette
Kenneth	Sulak	jumpingsturgeon@yahoo.com	USGS
Kevin	Konrad	Kevin.Konrad@unlv.edu	University of Nevada, Las Vegas
Kimberly	Galvez	kimberly.galvez@noaa.gov	OER
Kira	Mizell	kmizell@usgs.gov	USGS
Les	Watling	watling@hawaii.edu	University of Hawaii at Manoa
Meagan	Putts	meagan.putts@noaa.gov	University of Hawaii
Megan	McCuller	megan.mcculler@naturalsciences.org	North Carolina Museum of Natural Sciences
Michael	Vecchione	vecchiom@si.edu	NOAA & NMNH
Noelle	Helder	noelle.helder@noaa.gov	NOAA OER
Peter	Auster	peter.auster@uconn.edu	UConn & Mystic Aquarium
Bramley	Murton	bramley.murton@noc.ac.uk	National Oceanography Centre, UK
Rhian	Waller	rhian.waller@maine.edu	University of Maine
Scott	France	france@louisiana.edu	University of Louisiana at Lafayette
Thomas	Morrow	thomas.morrow@bc.edu	Boston College

Tina	Molodtsova	tina@ocean.ru	P.P.Shirshov Institute of Oceanology RAS
Upasana	Ganguly	upasana.ganguly1@louisiana.edu	University of Louisiana at lafayette
Pierre	Josso	piesso@bgs.ac.uk	British Geological Survey

Please direct inquiries to:

NOAA Office of Ocean Exploration & Research
1315 East-West Highway, SSMC3 RM 10210
Silver Spring, MD 20910
oceanexplorer@noaa.gov