

# ROV Dive Summary, EX-22-05, Dive 04, July 23, 2022

## General Location Map



## Dive Information

Site Name	Axial Volcanic Ridge (AVR) 1
General Area Descriptor	Mid-Atlantic Ridge; elongate composite volcano forming part of the axial volcanic ridge.
Science Team Leads	Dr. Scott France (Biology), Dr. Ashton Flinders (Geology)
Expedition Coordinator	Dr. Derek Sowers

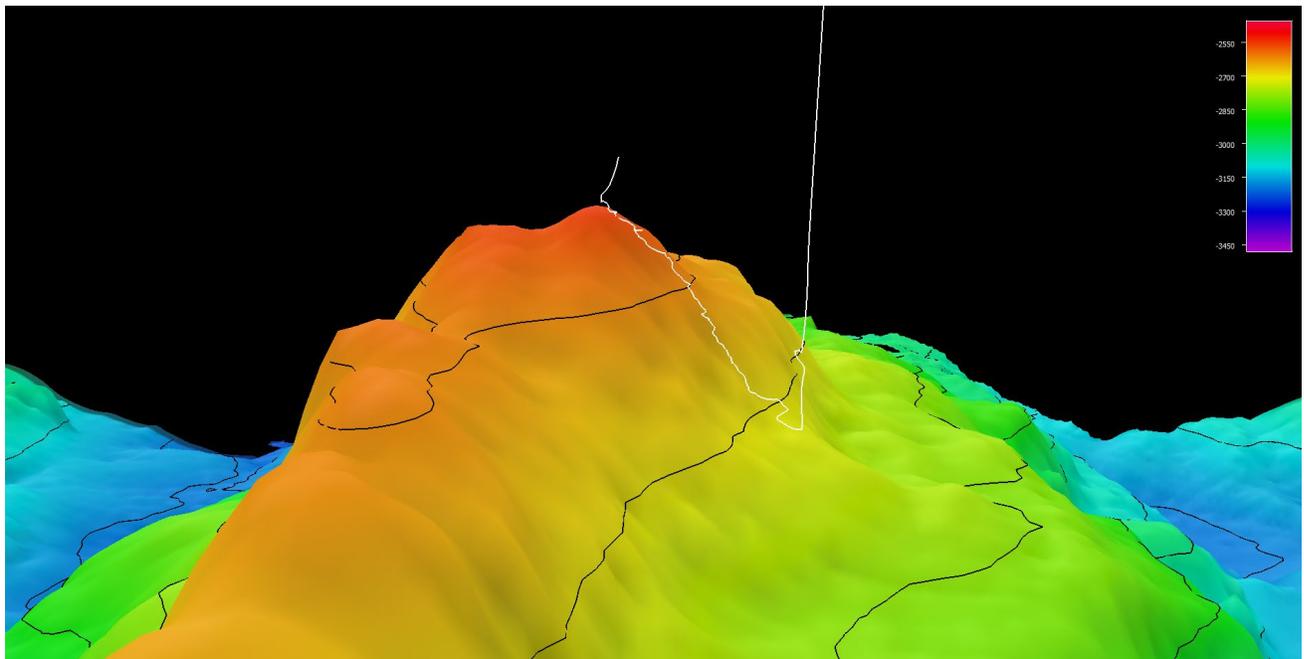


Dive Description	<p><b>Biology</b></p> <p>The seafloor had an unexpectedly high amount of pelagic sediments blanketing the slope based on our prediction of the age of the ridge feature, suggesting very high productivity in the overlying water column. We observed a number of basalt outcroppings that supported a good diversity of sponges and corals (in relatively low abundance), particularly nearest the upper slope and crest of the ridge. A variety of sediment-fauna were observed, including 4 (or more) species of sea cucumber, the acorn worm <i>Yoda purpurata</i>, sea pens (<i>Umbellula</i> and <i>Protoptilum</i>), and heart urchins. Fish abundance was low, and included Blue hake (<i>Antimora rostrata</i>), spiny eel (Notacanthidae) and cusk eel (<i>Bathrites</i>). Other notable observations included a rock pen (the easternmost recorded), a large burrowed anemone, and a stalked crinoid with a [presumed] coprophagous snail laying eggs. The latter has been recorded <i>in situ</i> only once before to our knowledge, during CAPSTONE. At the end of the dive track we observed sublinear sets of holes in the sediment previously reported from the region by Vecchione &amp; Bergstad, and that still have no explained origin.</p> <p><b>Geology</b></p> <p>Extensive white sediment, likely biogenic (marine snow), with current-driven patches of black sediment (shells) mixed in the white shells. Basalt talus, possibly with some light manganese crust (could not tell, visually). Occasional outcrops of highly fragmented pillows, no visible fresh surfaces, interrupted with long stretches of sediment (20-40m distance over ground). Near the summit observed several possible old and inactive hydrothermal vents, very prone above the surrounding seafloor. We did a push test with the ROV manipulator and the outside of these vents were friable but the interior seemed consolidated.</p>
Notable Observations	<p>Several extinct hydrothermal vents near the summit.</p> <p>Rarely observed interaction of a presumed coprophagous snail laying eggs on a stalked crinoid.</p> <p>Easternmost observation of a Rockpen (<i>Anthoptilum</i> sp.) in the Atlantic.</p> <p>Sublinear sets of holes in the sediment of unknown origin.</p>
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 - Present</p> <p>Hydrates - Absent</p>
CMECS Feature Type(s)	Slope / Ridge
SeaTube Link (science annotation system)	<a href="https://data.oceannetworks.ca/SeaTubeV3?resourceTypeId=600&amp;resourceId=2593">https://data.oceannetworks.ca/SeaTubeV3?resourceTypeId=600&amp;resourceId=2593</a>

## Equipment Deployed

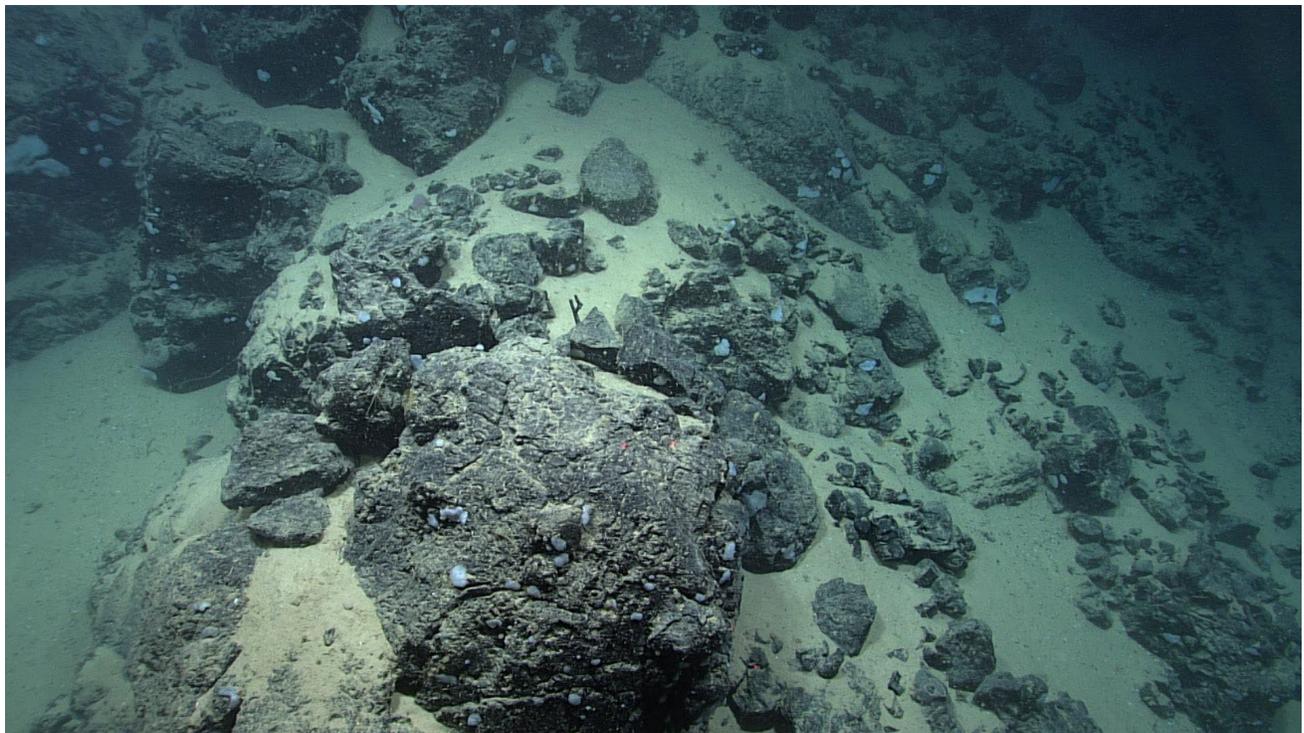
ROV	<i>Deep Discoverer</i>
Camera Platform	<i>Seirios</i>
ROV Measurements	The following ROV measurements, data streams and equipment are used on each ROV deployment: CTD, depth, scanning sonar, USBL position, altitude, heading, attitude, high-resolution cameras, low resolution cameras, manipulator arms, 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

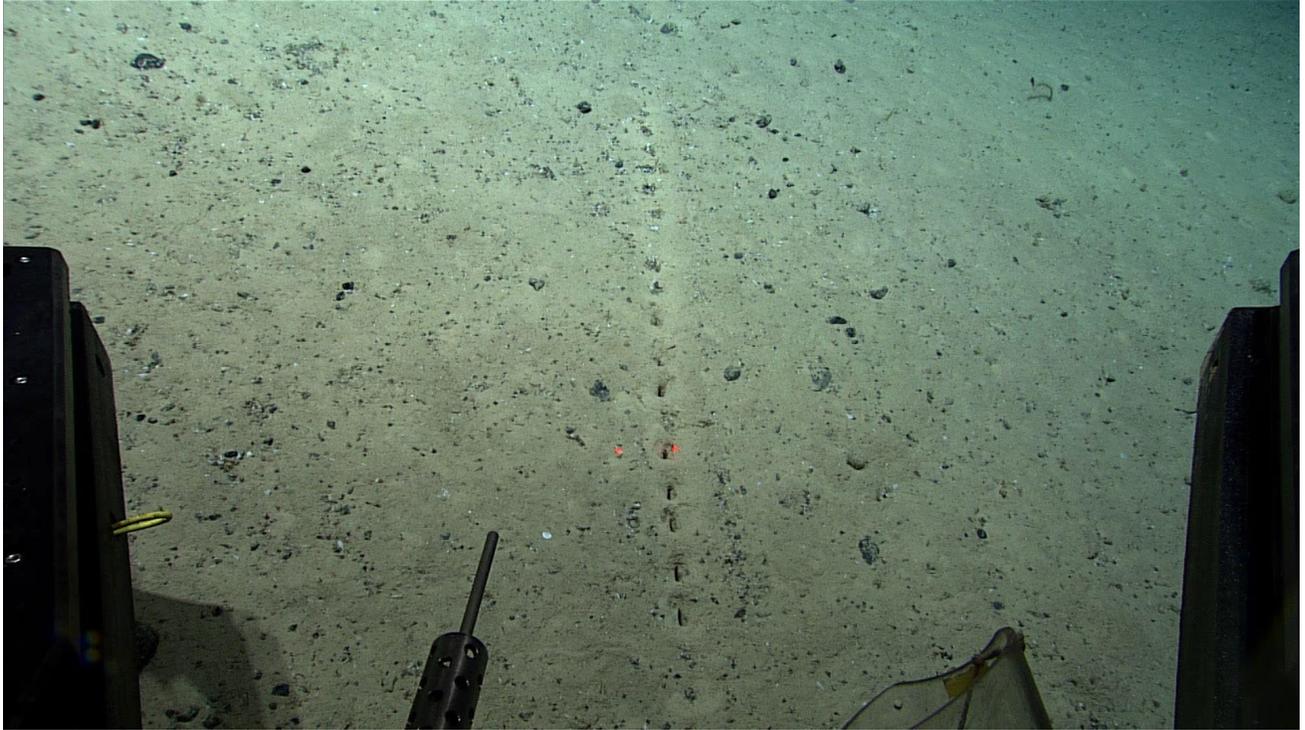


Smoothed ROV dive track in white on 25x25 cell size bathymetry, 3x vertical exaggeration, depth in meters, 10 meter contours.

## Representative Photos of the Dive



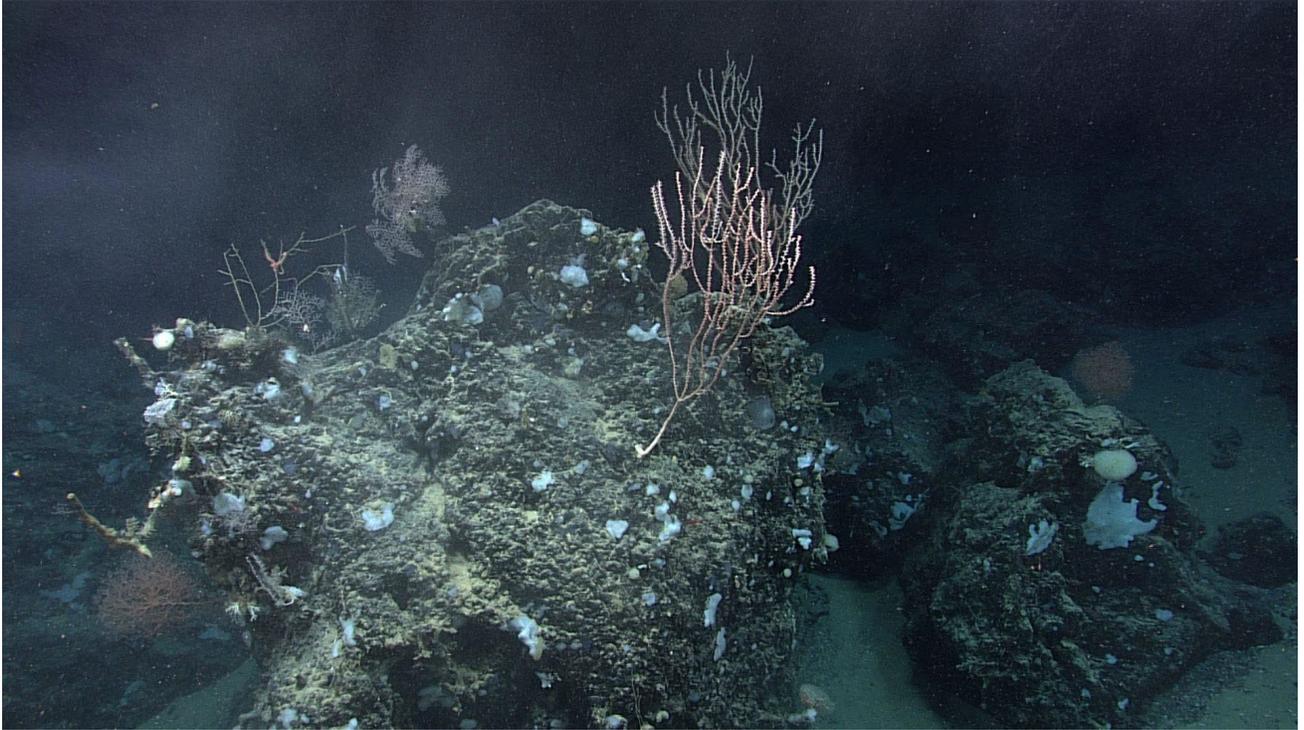
Fragmented pillow basalts overlain with calcareous sediment and basalt rubble.



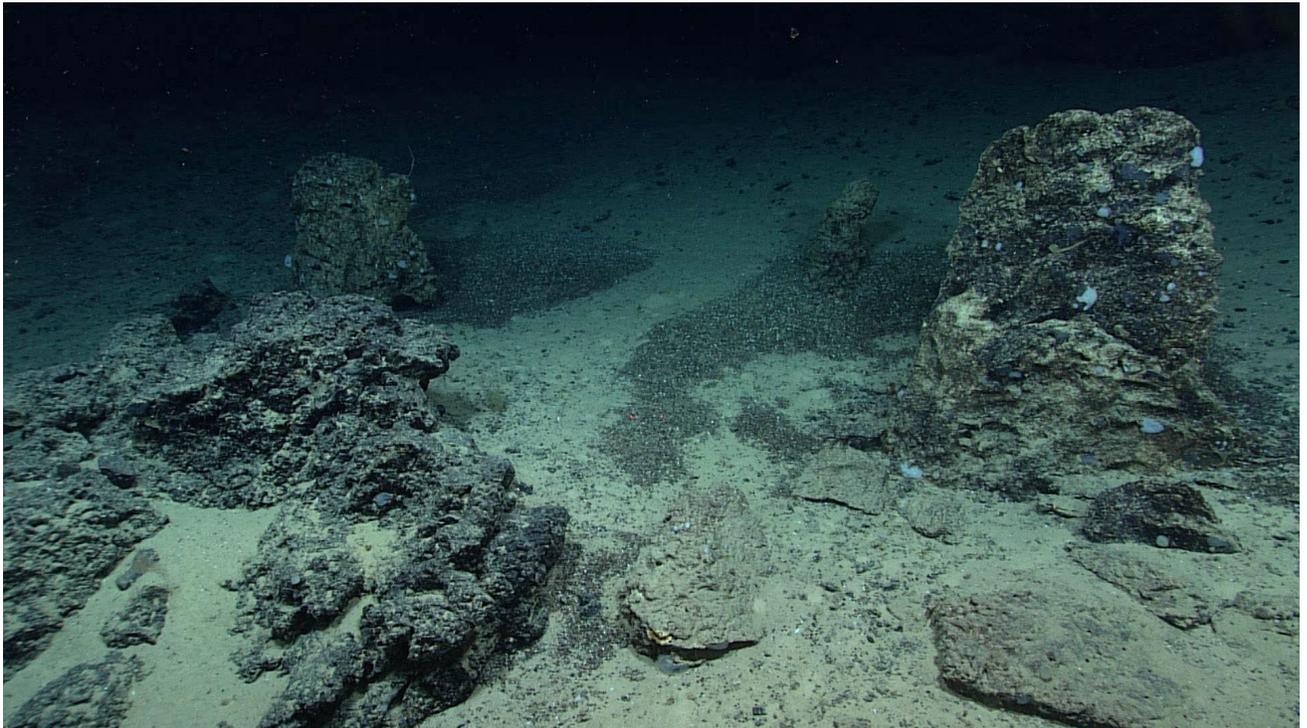
Linearly-aligned holes of unknown origin.



Pervasive calcareous sediment with likely ocean-bottom current-driven fields of pteropod shells. A few angular basalt clasts.



Rock outcrops at 2577 m support an abundance of octocorals and sponges.



Old, inactive, heavily degraded hydrothermal vents located near the summit of the AVR.

a



A rarely observed interaction of a presumed coprophagous snail laying eggs on a stalked crinoid (2555 m).



Acorn worm, *Yoda purpurata* (2706 m).



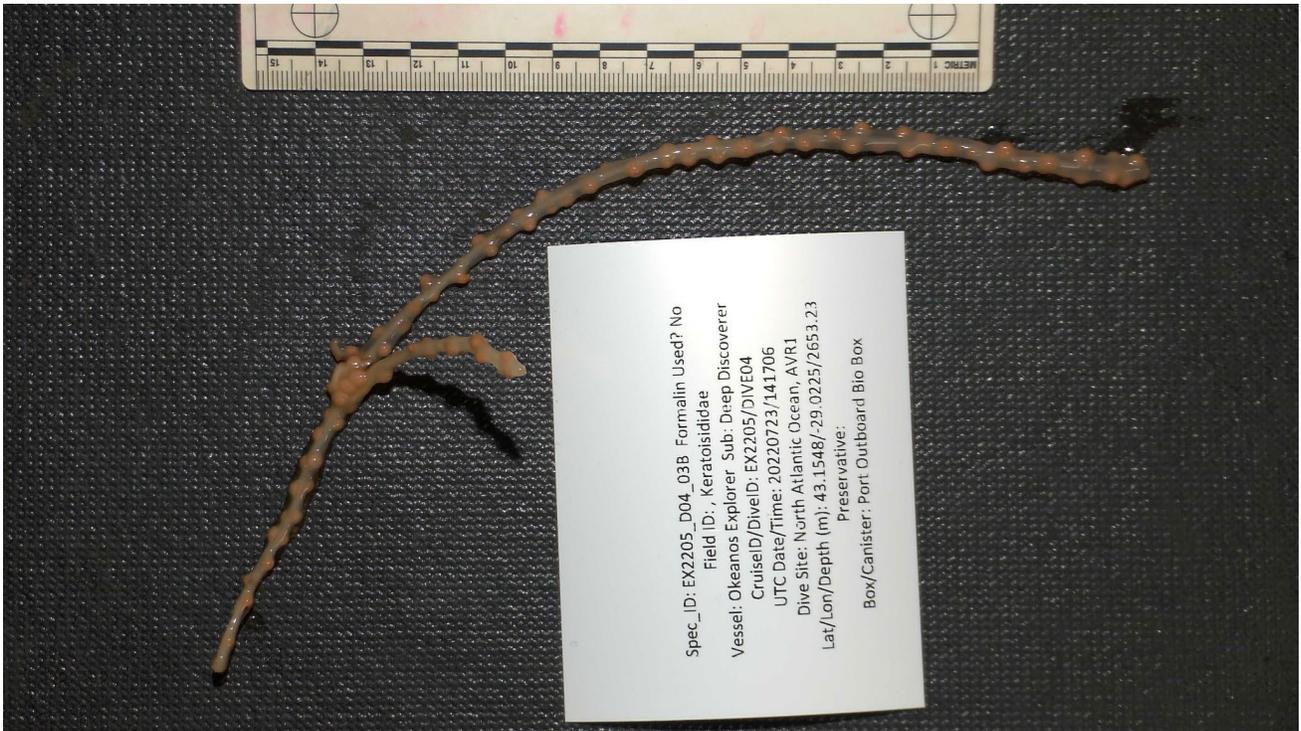
The easternmost observation of a Rockpen (*Anthoptilum* sp.) in the Atlantic (2614 m).

**Samples Collected -**



Sample ID	EX2205_D04_05G
Date (UTC)	20220723
Time (UTC)	16:24:25
Depth (m)	2550.2
Latitude (decimal degrees)	43.1555
Longitude (decimal degrees)	-29.0246
Temp. (°C)	3.56
Field ID(s)	Basalt
Comments	2 Rocks collected from the exact same locale. Rock1: weight: 1.7 kg size: 4-50 cm; 4-50 cm; basalt talus, dense, no vesicularity, light manganese coating. Rock 2: weight 1.8 kg, size: 11-50 cm; comment: basalt talus, <3% vesicularity on one surface, shear surface on one end looks like planed off

Associates Sample ID	Field Identification	Count
EX2205_D04_05G_A01	Unknown; potential poriferan	1
EX2205_D04_05G_A02	Unknown	
EX2205_D04_05G_A03	Unknown	1
EX2205_D04_05G_A04	Unknown	
EX2205_D04_05G_A05	Bryozoa	1



Sample ID	EX2205_D04_03B
Date (UTC)	20220723
Time (UTC)	14:17:06
Depth (m)	2653
Latitude (decimal degrees)	43.154831
Longitude (decimal degrees)	-29.022501

Temp. (°C)	3.58053
Field ID(s)	Keratoisididae
Comments	

## Niskin Sampling Summary

Sample ID	EEX2205_D04_01W
Date (UTC)	20220723
Time (UTC)	11:02:37
Depth (m)	573.5
Latitude (decimal degrees)	43.1536
Longitude (decimal degrees)	-29.0198
Bottle number	NISKIN 1
Temperature (°C)	10.6
Dissolved Oxygen (ml/L)	6.21
Treatment	eDNA

Sample ID	EX2205_D04_02W
Date (UTC)	20220723
Time (UTC)	12:37:51
Depth (m)	2711.0
Latitude (decimal degrees)	43.1545
Longitude (decimal degrees)	-29.0209
Bottle number	NISKIN 2
Temperature (°C)	3.6
Dissolved Oxygen (ml/L)	8.17
Treatment	eDNA

Sample ID	EX2205_D04_04W
Date (UTC)	20220723

Time (UTC)	15:41:34
Depth (m)	2574.6
Latitude (decimal degrees)	43.1554
Longitude (decimal degrees)	-29.0238
Bottle number	NISKIN 3
Temperature (°C)	3.6
Dissolved Oxygen (ml/L)	8.10
Treatment	eDNA

Sample ID	EX2205_D04_06W
Date (UTC)	20220723
Time (UTC)	17:03:21
Depth (m)	2527.6
Latitude (decimal degrees)	43.1555
Longitude (decimal degrees)	-29.0253
Bottle number	NISKIN 4
Temperature (°C)	3.6
Dissolved Oxygen (ml/L)	8.10
Treatment	eDNA

Sample ID	EX2205_D04_07W
Date (UTC)	20220723
Time (UTC)	18:14:33
Depth (m)	525.5
Latitude (decimal degrees)	43.1550
Longitude (decimal degrees)	-29.0301
Bottle number	NISKIN 5
Temperature (°C)	11.0
Dissolved Oxygen (ml/L)	6.23
Treatment	eDNA

## Scientists Involved (provide name, email, affiliation)

Name	Email	Affiliation
Joana Xavier	joanarxavier@gmail.com	CIIMAR - Interdisciplinary Centre of Marine and Environmental Research
Les Watling	watling@hawaii.edu	University of Hawaii at Manoa
Michael Vecchione	vecchiom@si.edu	NOAA and Smithsonian NMNH
Cindy Van Dover	clv3@duke.edu	Duke University
Ken Sulak	Jumpingsturgeon@yahoo.com	USGS
Arvind Shantharam	arvind.shantharam@noaa.gov	NGI/NCEI
Tim Shank	tshank@whoi.edu	Woods Hole Oceanographic Institution
Manuela Ramos	manuramo@gmail.com	OKEANOS/IMAR
Elisabetta Menini	elisabetta.menini@duke.edu	Duke University
Asako Matsumoto	amatsu@gorgonian.jp	Chiba Institute of Technology
Ashley Marranzino	ashley.marranzino@noaa.gov	NOAA (UCAR)
Christopher Mah	brisinga@gmail.com	National Museum of Natural History-Smithsonian
Alaina Hebert	c00241285@louisiana.edu	University of Louisiana at Lafayette
Tara Harmer Luke	tara.luke@stockton.edu	Stockton University
Upasana Ganguly	upasana.ganguly1@louisiana.edu	University of Louisiana at Lafayette
Scott France	scott.france@louisiana.edu	University of Louisiana at Lafayette
Ashton Flinders	aflinders@usgs.gov	USGS
Carlos Dominguez-Carrió	carlosdominguezcarrio@gmail.com	University of the Azores
Mary Deere	mary.deere1@louisiana.edu	University Louisiana at Lafayette
Jaymes Awbrey	C00227433@louisiana.edu	University of Louisiana at Lafayette
Monika Neufeld	Monika.Neufeld@dal.ca	Dalhousie University
Deidric Davis	dbdavis@eckerd.edu	DUML
Meri Bilan	meri.bilan@unisalento.it	University of Salento
Neus Campanyà-Llovet	neus.ci.llovet@uac.pt	IICM - OKEANOS

### Please direct inquiries to:

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

