



## Okeanos Explorer ROV Dive Summary

Dive Information	
General Location	
General Area Descriptor	Southeast U.S. Continental Margin - North Carolina Canyons
Site Name	Keller Canyon
Science Team Leads	Leslie Sautter / Cheryl Morrison
Expedition Coordinator	Kasey Cantwell
ROV Dive Supervisor	Bobby Mohr
Mapping Lead	Derek Sowers
ROV Dive Name	
Cruise	EX1806
Leg	-
Dive Number	DIVE15
Equipment Deployed	
ROV	Deep Discoverer
Camera Platform	Seirios
ROV Measurements	<input checked="" type="checkbox"/> CTD <input checked="" type="checkbox"/> Depth <input checked="" type="checkbox"/> Altitude



Bruce Mundy	NOAA PIFSC	
Carolyn Marshall	Conchologists Society of America	
Carolyn Ruppel	US Geological Survey	cruppel@usgs.gov
Cheryl Morrison	USGS Leetown Science Center	cmorrison@usgs.gov
Chloe Brown	Boston University	rrlab@bu.edu
Derek Sowers	OER	derek.sowers@noaa.gov
Dhugal Lindsay	JAMSTEC	dhugal@jamstec.go.jp
Elizabeth Gugliotti	College of Charleston	gugliottief@gmail.com
Elizabeth Gugliotti	College of Charleston	gugliottief@g.cofc.edu
Enrique Salgado	NCCOS	enrique.salgado@noaa.gov
Erik Cordes	Temple University	ecordes@temple.edu
Ervan Garrison	University of Georgia	egarriso@uga.edu
George Matsumoto	MBARI	mage@mbari.org
Gina Selig	NOAA EPP/MSI Undergraduate Scholar	gina.selig@NOAA.gov
Heather Judkins	University of South Florida St. Petersburg	Judkins@mail.usf.edu
Isabela Trumble	Boston University	rrlab@bu.edu
Jason Chaytor	USGS	jchaytor@usgs.gov
Jenna Hill	U.S. Geological Survey	jhill@usgs.gov
Jill Bourque	US Geological Survey	jbourque@usgs.gov
John Reed	Harbor Branch Oceanographic Institute	jreed12@fau.edu
Jon Norenberg	Smithsonian	norenburgj@si.edu
Kate Rose	NOAA NCEI	kate.rose@noaa.gov
Keith Bayha	Smithsonian	
Kenneth Sulak	USGS (ret.)	ksulak@usgs.gov
Kevin Jerram	UNH	kjerram@ccom.unh.edu
Lauren Walling	University of Louisiana, Lafayette	c00305146@louisiana.edu
Les Watling	University of Hawaii at Manoa	watling@hawaii.edu
Leslie Sautter	College of Charleston	Sautterl@cofc.edu



	Madalyn Newman	NGI/MSU-NOAA/NCEI	madalyn.newman@noaa.gov
	Matt Dornback	NOAA-NCEI	matt.dornback@noaa.gov
	Megan McCuller	North Carolina Museum of Natural Sciences	mccullermi@gmail.com
	Michael Vecchione	NOAA/NMFS National Systematics Lab	vecchiom@si.edu
	Mike Ford	NOAA Fisheries	michael.ford@noaa.gov
	Nolan Barrett	South Carolina University	barrettnh@g.cofc.edu
	Robert Carney	Louisiana State Univ	rcarne1@lsu.edu
	Santiago Herrera	Lehigh University	sherrera@alum.mit.edu, sah516@lehigh.edu
	Scott Allen	NOAA Ship Okeanos Explorer	
	Scott France	University of Louisiana at Lafayette	france@louisiana.edu
	Scott Harris	College of Charleston	harriss@cofc.edu
	Stephanie Bush	Smithsonian	stephalopod@gmail.com
	Steve Auscavitch	Temple University	steven.auscavitch@temple.edu
	Tamara Frank	Nova Southeastern University	tfrank1@nova.edu
	Tara Harmer Luke	Stockton University	luket@stockton.edu
	Timothy Shank	Wood Hole Oceanographic Institution	tshank@whoi.edu
	Tina Molodtsova	Shirshov Institute of Oceanology RAS	tina@ocean.ru; tina.molodtsova@gmail.com
	Tracey Sutton	Nova Southeastern University	tsutton1@nova.edu
	Treyson Gillespie	College of Charleston	gillespieta@g.cofc.edu
	Victoria Gitto	College of Charleston	geogittotm@gmail.com
Zach Proux	College of Charleston	prouxzs@g.cofc.edu	

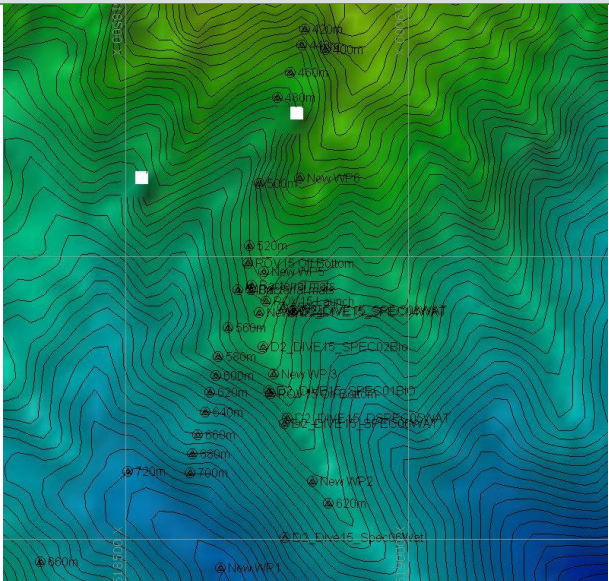
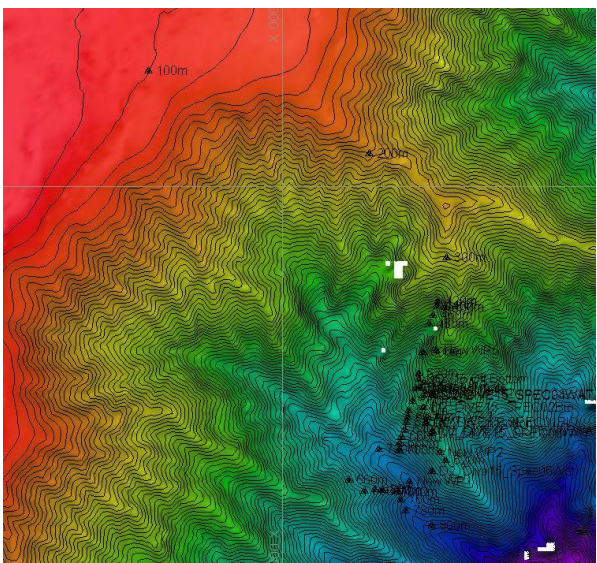
Purpose of the Dive	<p>This dive was part of a series that will investigate the similarities and differences in community composition between deepwater habitats of the SE US continental margin. Submarine canyon sites in the past have been shown to be deep sea coral habitats, particularly in areas of rock/hard-bottom exposure. This site was proposed by Deep Search to represent canyon features that have yet to be explored in detail. The autonomous vehicle <i>Sentry</i> has surveyed a handful of</p>
---------------------	---

	<p>locations in the canyons off North Carolina, however visual information about the presence and ID of corals and other benthic fauna have not been possible. An ROV/HOV is required to visually examine these rugged, high profile features.</p>
<p>Description of the Dive</p>	<p>This dive explored the south-facing slope of an intra-canyon ridge. The planned start was at a depth of 722 m, however low/no visibility due to abundant organisms in the water column and high turbidity from suspended sediments caused a delay and the dive began at a depth of 578 m, just above the turbid layer. Immediately, the ROV was welcomed by 3 octopuses (<i>Bathypolypus bairdi</i>) that lived on a small mud ledge. Several other <i>B. bairdi</i> individuals were observed on the dive, along with swimming squid (<i>Illex</i>, possibly <i>illecebrosus</i> or <i>oxygonius</i> sp.). Other organisms were encountered on the soft sediment substrate, including: orange and green nemertean ribbon worms; sabellid polychaetes; the long proboscis of a spoon worm; gastropod snails (Family Buccinidae, possibly <i>Colus</i> sp.); nudibranchs; many pycnogonids; white nephtheid soft corals; large, feathery hydroids; burrowing anemones (Family Edwardsiidae); a small carnivorous sponge; galatheoid squat lobsters (possibly <i>Munida</i> sp.); hagfish (<i>Eptatretus lopheliae</i>); and wolf eelpouts (<i>Lycenchelys verrilli</i>). Small rattails (<i>Nezumia</i> sp.) were seen close to muddy ledges. Countless brittlestars were buried in the sediments, with only the tips of their arms showing at the surface. The ROV ascended the ridge's backbone, which sloped at angles &gt;50° in areas. Bacterial mats were seen at a depths between of 520 and 510 m, but no active bubbles were observed. The seabed was mostly mud with large burrows, some of which had its midshipman (<i>Porichthys plectrodon</i>) as the resident. Several crabs (<i>Cancer</i> sp.) were observed criss-crossing the ridge crest. Jellyfish (Order Semaestomataeae, <i>Cyanea</i> possibly <i>lamarckii</i> sp., the lion's mane jellyfish) were swimming close to the ROV.</p> <p>The seabed portion of the dive ended at a depth of 505 m, and three midwater transects were conducted: at 500, 400 and 300 m. The high productivity in the water column led to a very interesting start to the water column survey, with a great density of organisms at the 500-meter depth. Decreasing numbers of organisms were found at the 400- and 300-meter depth transects. Some of the species seen throughout the water column transects included lobed ctenophores, siphonophores, jellies including comb jellies, amphipods, shrimps, copepods, and chaetognaths (arrow worms).</p>

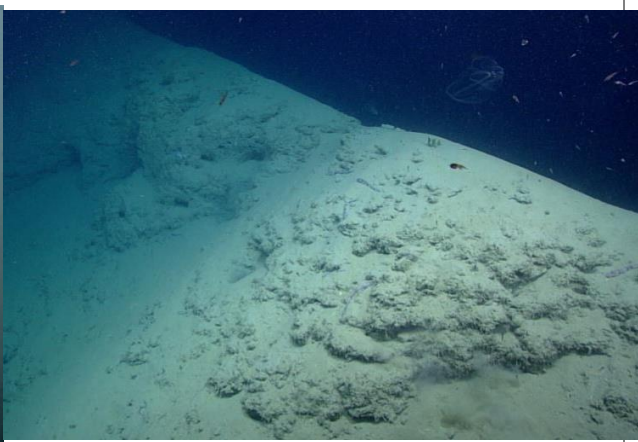
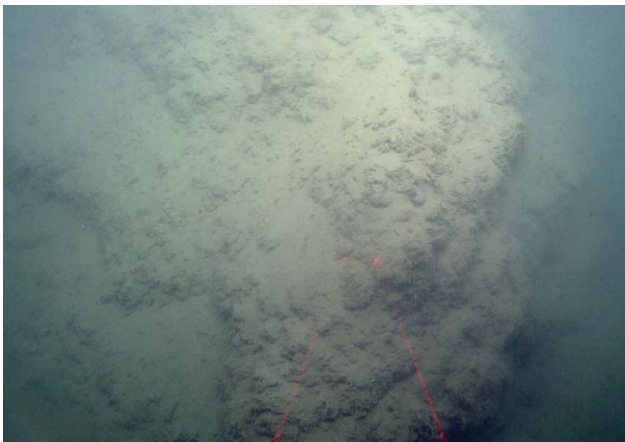
Notable Observations	<p><i>This south-facing canyon wall and ridge were composed of compacted muds.</i></p> <p><i>Although some fauna was typical of sedimented habitats (such as hagfish and eelpouts), the abundance of taxa such as pycnogonid sea spiders, the octopus <i>Bathypolypus bairdi</i>, and white nephtheid soft corals made this site unique relative to other canyon habitats visited on the expedition.</i></p>	
----------------------	--	--

Community Presence/ Absence ( <i>community is defined as more than two species</i> )	<input checked="" type="checkbox"/> Corals and Sponges Present	<input type="checkbox"/> Active Seep or Vent
	<input type="checkbox"/> Chemosynthetic Community Present	<input type="checkbox"/> Extinct Seep or Vent
	<input type="checkbox"/> High biodiversity Community Present	<input type="checkbox"/> Hydrates Present

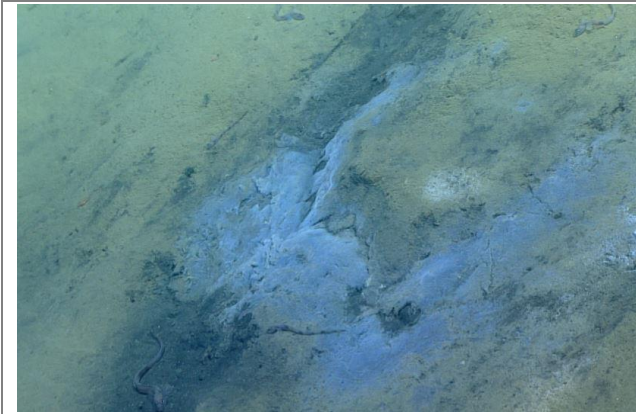
Overall Map of the ROV Dive Area	Close-up Map of Main Dive Site
----------------------------------	--------------------------------



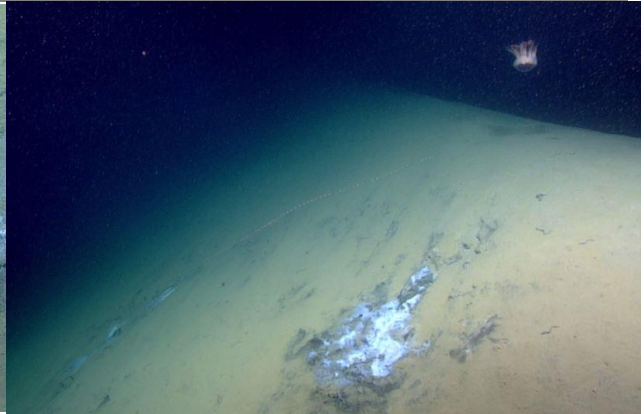
Representative Photos of the Dive
-----------------------------------



<p>Small mud ledges characterized the deeper portion of the dive.</p>	<p>The intra-canyon ridge was steeply sloped on each side, draped with stiff mud, creating the irregularity shown here.</p>
---	---



Several small, active seeps were encountered.



Several inactive seep areas with bacterial mats and reduced sediments were observed at ~520 m.



At least 6 small octopuses (*Bathypolypus bairdi*) were seen on the muddy, irregular topography.



Small gastropods (Family Buccinidae, possibly *Colus* sp.) were very common on the muddy substrate.



Several nephtheid soft corals were observed, and one was collected.

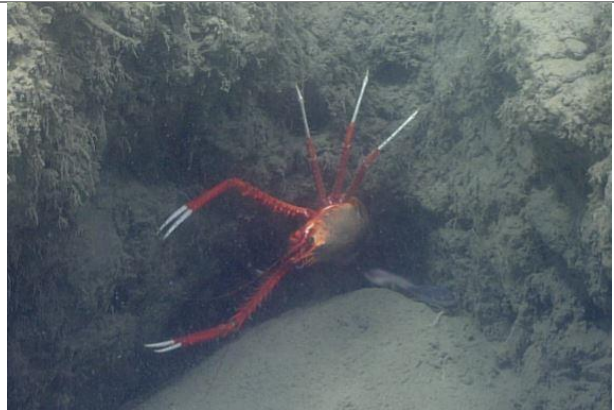


Burrowing anemones (Family Edwardsiidae) were common.



Only one brittle star (*Ophiomusia limini*) was observed on the sediment surface, however hundreds of brittle star arms poked out of the muds in many areas.

Many pycnogonids were seen on the muddy ledges.



Crabs (*Cancer* sp.) were very common, particularly at the canyon ridge crests.

*Eumunida picta* squat lobsters were common, though not seen in previous canyon dives.



A juvenile snailfish (Family Liparidae, *Paraliparis* sp.) was observed.

The wolf eelpout (Family Zoarcidae, *Lycenchelys verrilli*) was common.





The midshipman (*Porichthys plectrodon*) was observed in several burrows.

An armored sea robin (*Peristedion* sp.).



Two nemertean ribbon worms were observed on a muddy ledge and one was collected.

Several hagfish (*Eptatretus lopheliae*) were seen, some of which were peeking out of their burrows.


Samples Collected

Sample

Sample ID	SPEC01BIO	
Date (UTC)	2018 06 29	
Time (UTC)	16:04:29	
Depth (m)	581.89	
Temperature (°C)	5.32	
Field ID(s)	Heteronemertea; Family Lineidae	
Reason for Collection	Lab Assessment Required for ID	
Notes	When tissue subsamples were taken, the remains of a Themisto-like amphipod were removed from the stomach. Swarms of these amphipods were observed in the water column and near the bottom throughout much of the dive. Interesting that this nemertean can capture them	
Associates	[Notes section here can include number of organisms, condition of organism(s) upon retrieval or photos as needed]	

Associate ID	Field Identification	Notes
A01	Sediment	Sediment comprised of terrigenous clays and pelagic calcareous microfossils. Label says mud, but verified to be sediment, 2 samples in separate containers with same sample number
A02	Polychaeta	

### Sample

Sample ID	SPEC02BIO	
Date (UTC)	2018 06 29	
Time (UTC)	18:31:54	
Depth (m)	540.51	
Temperature (°C)	5.82	
Field ID(s)	Alcyonacea	


Reason for Collection	Lab Assessment Required for ID
-----------------------	--------------------------------

Notes	
-------	--

[Notes section here can include number of organisms, condition of organism(s) upon retrieval or photos as needed]

Associate ID	Field Identification	Notes
N/A		

### Sample

Sample ID	SPEC08BIO	
Date (UTC)	2018 06 29	
Time (UTC)	99:99:99	
Depth (m)	N/A	
Temperature (°C)		



Field ID(s)	Nemichthys curvirostris		
Reason for Collection	Opportunistic collection		
Notes	Was attached to D2's foam block upon recovery		
Associates	<i>[Notes section here can include number of organisms, condition of organism(s) upon retrieval or photos as needed]</i>		
	Associate ID	Field Identification	Notes
<b>Water Samples Collected</b>			
<p>Though water samples were collected on this dive, there were issues with sample storage and preservation, therefore no water samples were retained nor archived. Sample numbering and data remains the same, as if water sampling did occur. EX1806_DIVE15_SPEC03WAT, EX1806_DIVE15_SPEC04WAT, EX1806_DIVE15_SPEC05WAT, EX1806_DIVE15_SPEC06WAT, and EX1806_DIVE15_SPEC07WAT have no physical specimen associated with them.</p>			

**Please direct inquiries to:**

NOAA Office of Ocean Exploration & Research  
 1315 East-West Highway (SSMC3 10th Floor)  
 Silver Spring, MD 20910  
 (301) 734-1014