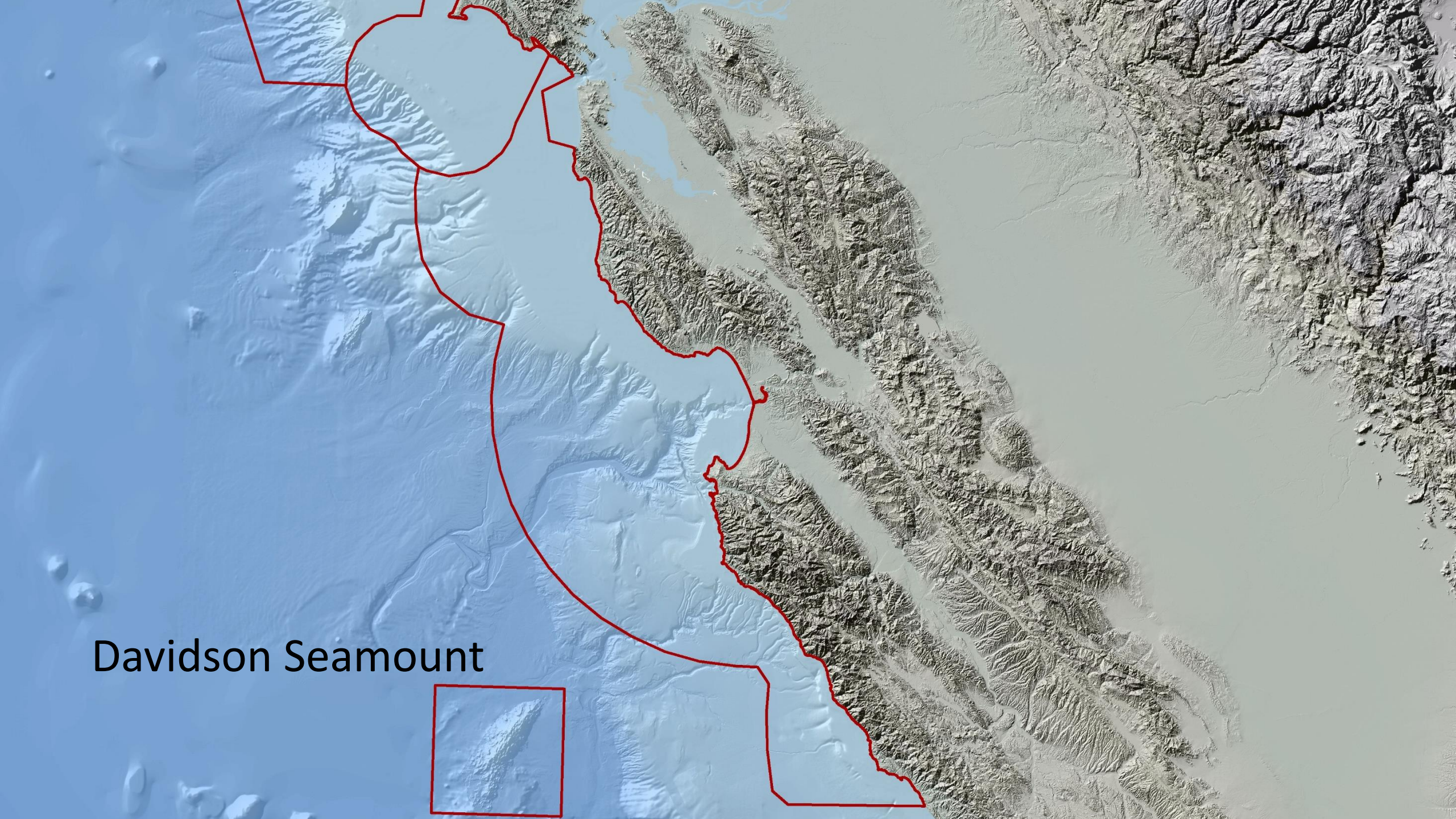


NA117: Monterey Bay National Marine Sanctuary

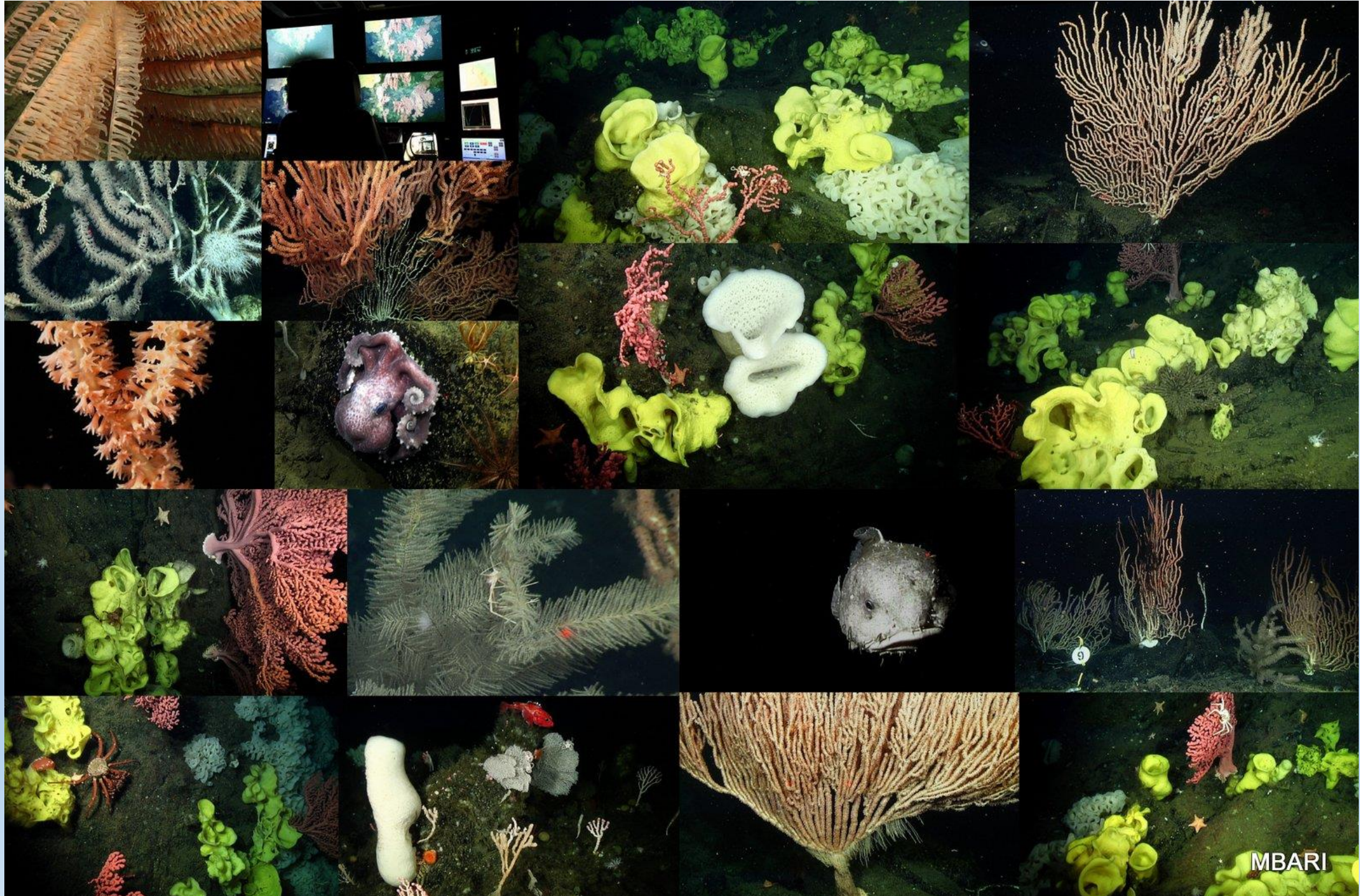
Expedition Review
Oct 12 – 18, 2019

Monterey Bay National Marine Sanctuary
Ocean Exploration Trust
Chad King





Davidson Seamount

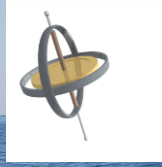


MBARI

Nautilus uses GPS to ascertain location



Gyroscope in ship measures its Heading, pitch and roll



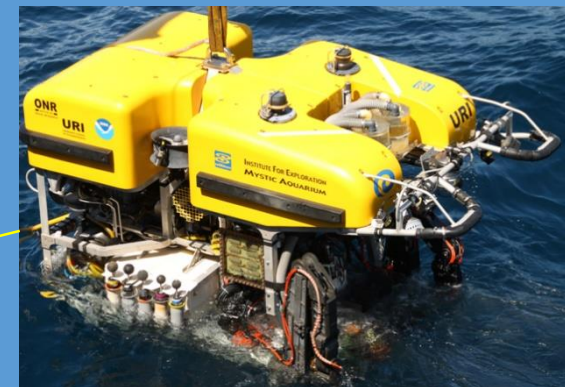
transceiver mounted below ship

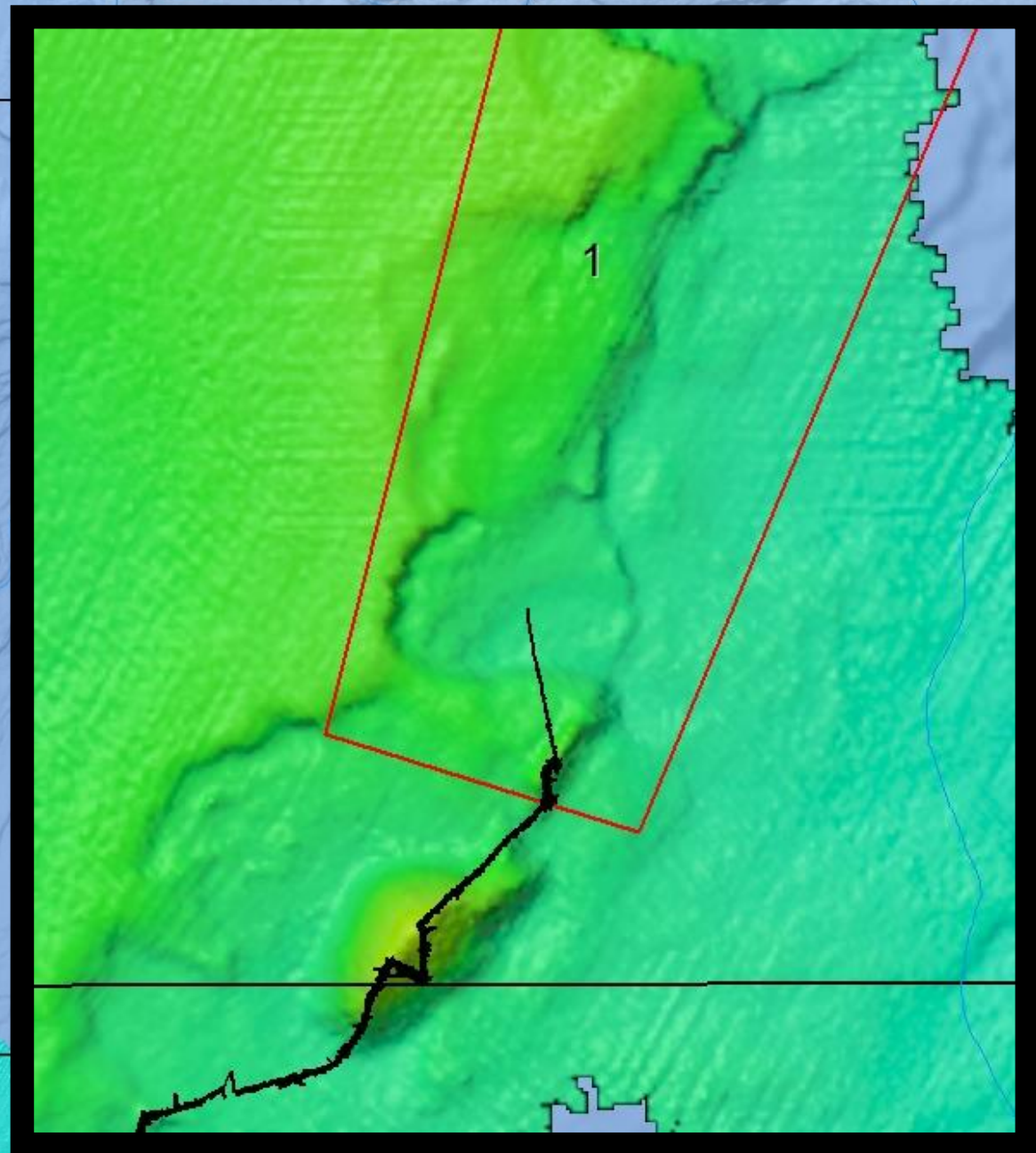
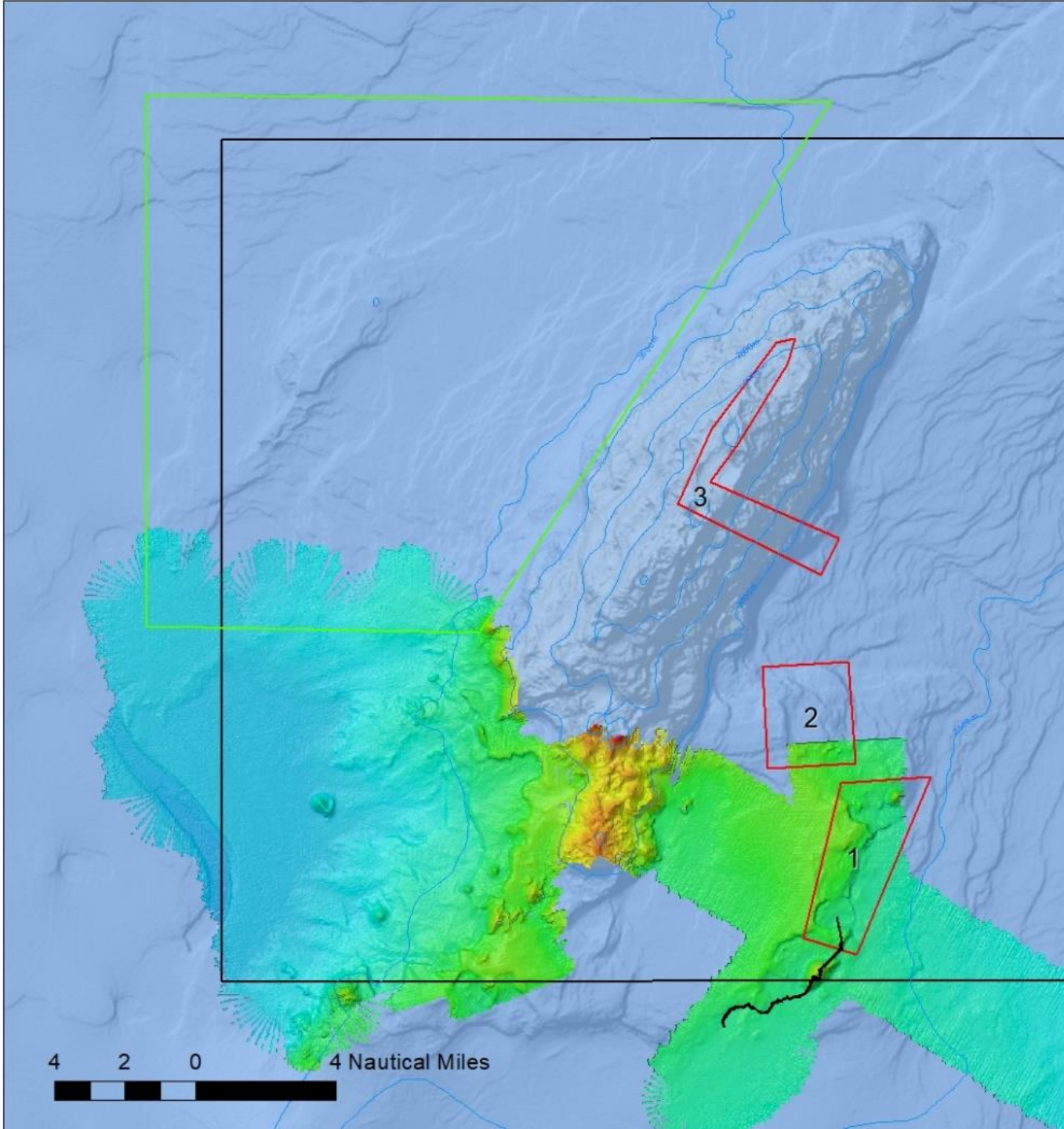


Software combines the data from GPS, gyroscope and Ultra-Short Baseline (USBL) transceiver to give lat and long of ROVs



Transponder mounted to each ROV







Video: Ocean Exploration Trust



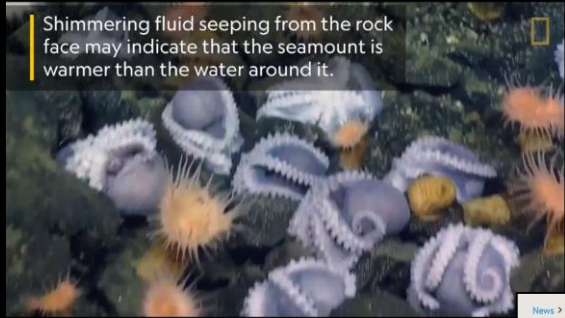
Nautilus Interviews – Dumbo Octopus and Octopus Gardens

- National Geographic (2)
- Associated Press
- SF Gate
- LA Times
- San Jose Mercury News
- Gizmodo
- KQED (2)
- Atlas Obscura
- Fox News
- KPIX (CBS SF)

ANIMALS | WEIRD & WILD

World's largest deep-sea octopus nursery discovered

Scientists discovered over 1,000 females, many brooding eggs, in a shimmering "octopus garden" that may be seeping natural gas or hot water.



Shimmering fluid seeping from the rock face may indicate that the seamount is warmer than the water around it.

BY JASON BITTEL

PUBLISHED OCTOBER 29, 2018

OFF THE COAST of Monterey, California, and some two miles below the surface of the Pacific Ocean, scientists piloting a remotely-operated submersible saw something no one has ever seen before.


Octopuses. Hundreds of them. Huddled on a rocky outcrop at the base of an underwater mountain.

"We went down the eastern flank of this small hill, and that's when—boom—we just started seeing pockets of dozens here, dozens there, dozens everywhere," says Chad King, chief scientist on the [Exploration Vessel Nautilus](#).

Found: The Largest Cluster of Deep-Sea Octopuses Ever Recorded

More than 1,000 were spotted off the coast of Monterey, California.

BY ANNA KUSMER | OCTOBER 30, 2018




So many cephalopods. OCEAN EXPLORATION TRUST/NOAA

IT IS SAID THAT AS far as humans are concerned, the deep sea might as well be another planet considering its vast unexplored corners and mysteries.

That sense of mystery was certainly present last week when marine scientists witnessed a sight never before seen by humans: a deep-sea vista of over a thousand

News > Environment & Science > News

Rare Dumbo octopus filmed in deep sea off Monterey Bay



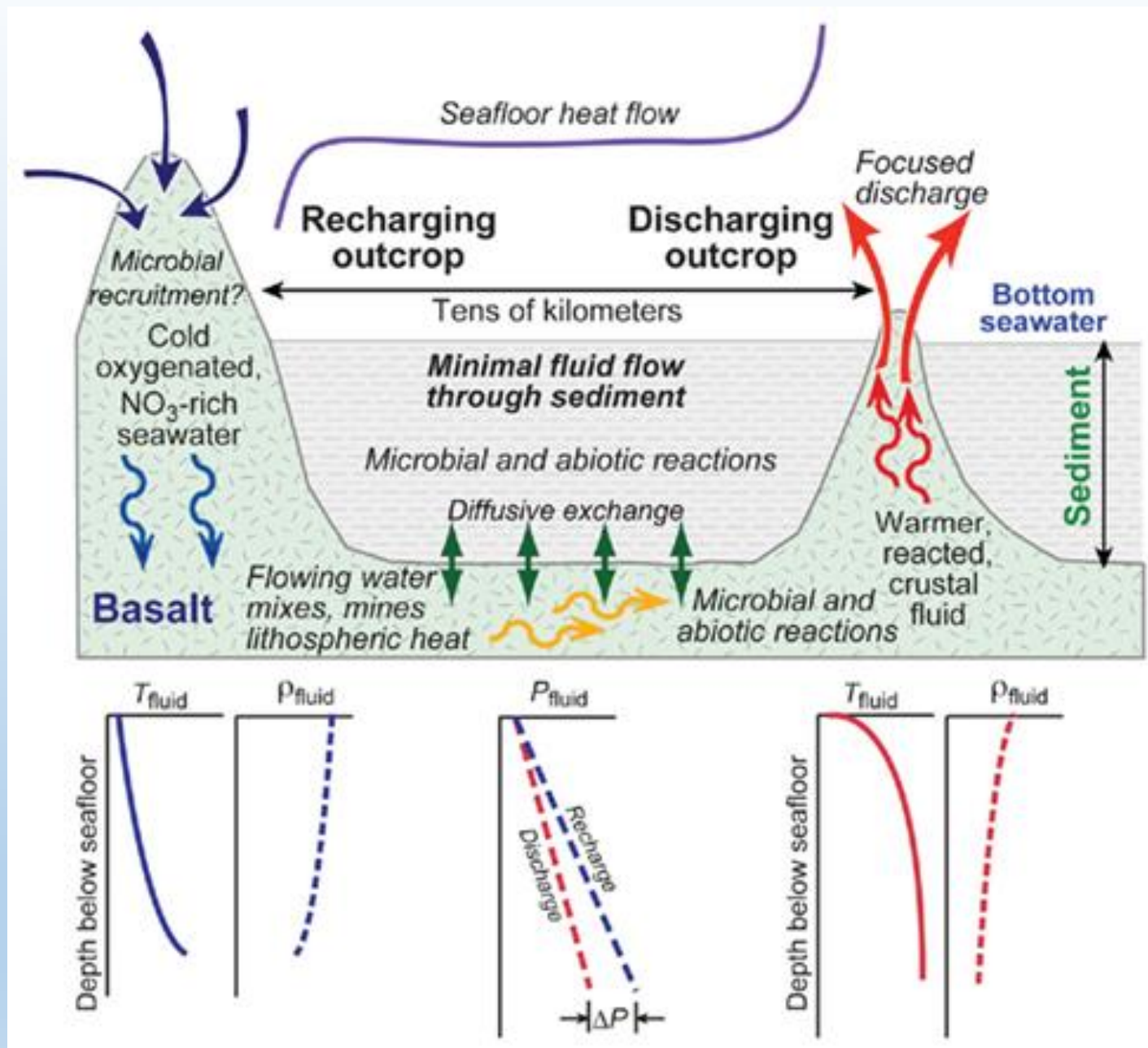
Researching with NOAA and the Ocean Exploration Trust this week spotted a rare Dumbo octopus, also known as an umbrella octopus, at roughly 7 miles deep in the Pacific Ocean in the Monterey Bay National Marine Sanctuary off Davidson Seamount. (Photo: Ocean Exploration Trust/NOAA.)

By PAUL ROGERS | [progers@bayareanewsgroup.com](#) | Bay Area News Group
PUBLISHED: October 26, 2018 at 12:30 pm | UPDATED: October 27, 2018 at 5:53 am

Getting an unusual glimpse a lovable deep-sea creature, marine scientists this week filmed a rarely seen Dumbo octopus far below the ocean waters of the Monterey Bay National Marine Sanctuary.

The animal, which was swimming two miles below the surface near a dormant underwater volcano known as Davidson Seamount, takes its name from the large ear-like fins it has that are reminiscent of the young elephant in the 1941 animated Disney classic Dumbo.

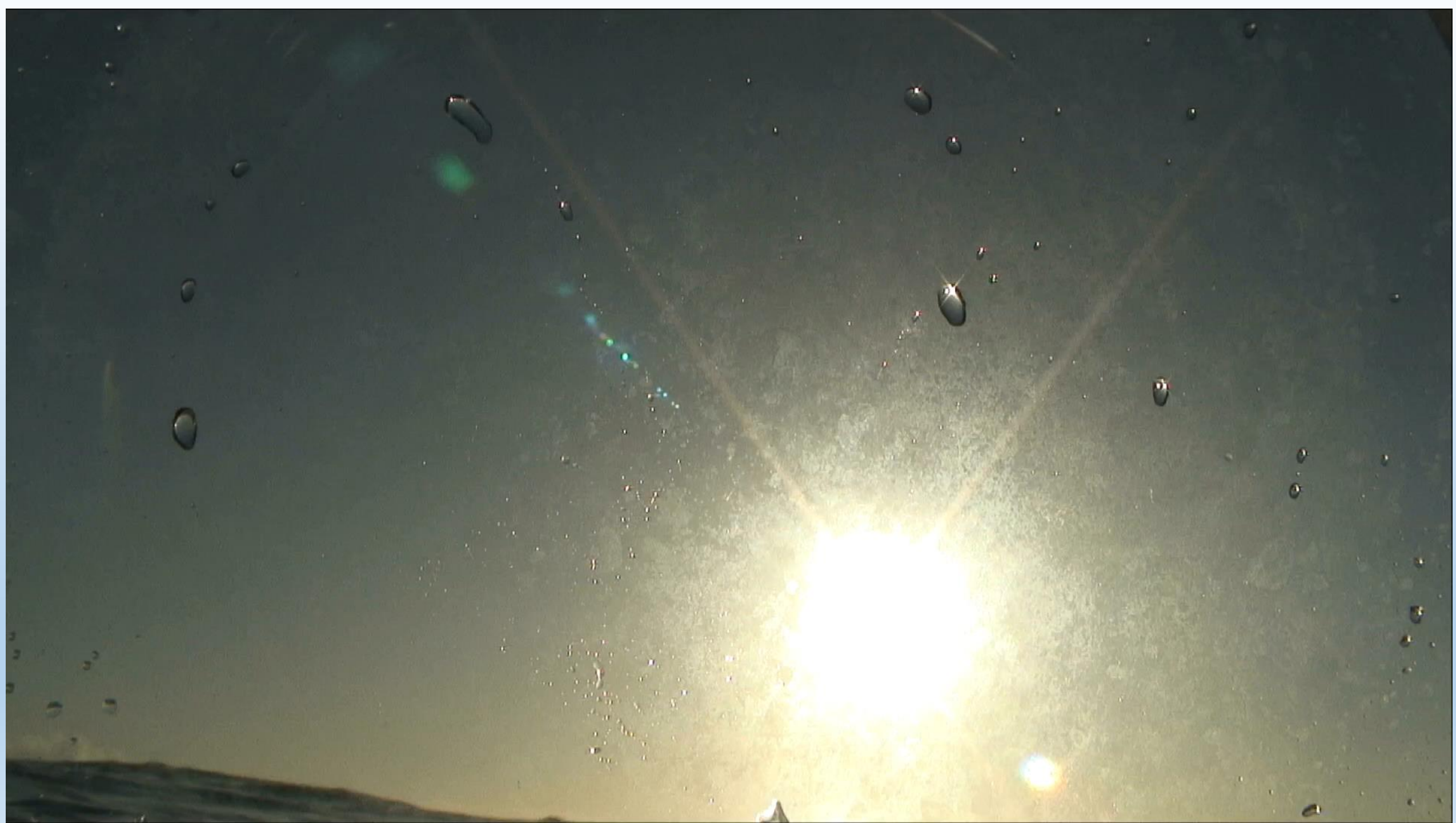
- Probably a Low Temperature Ridge-Flank Hydrothermal System
- Maybe only the third such system discovered (Dorado, Juan de Fuca)





BLUE PLANET LIVE

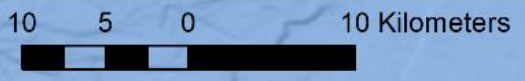




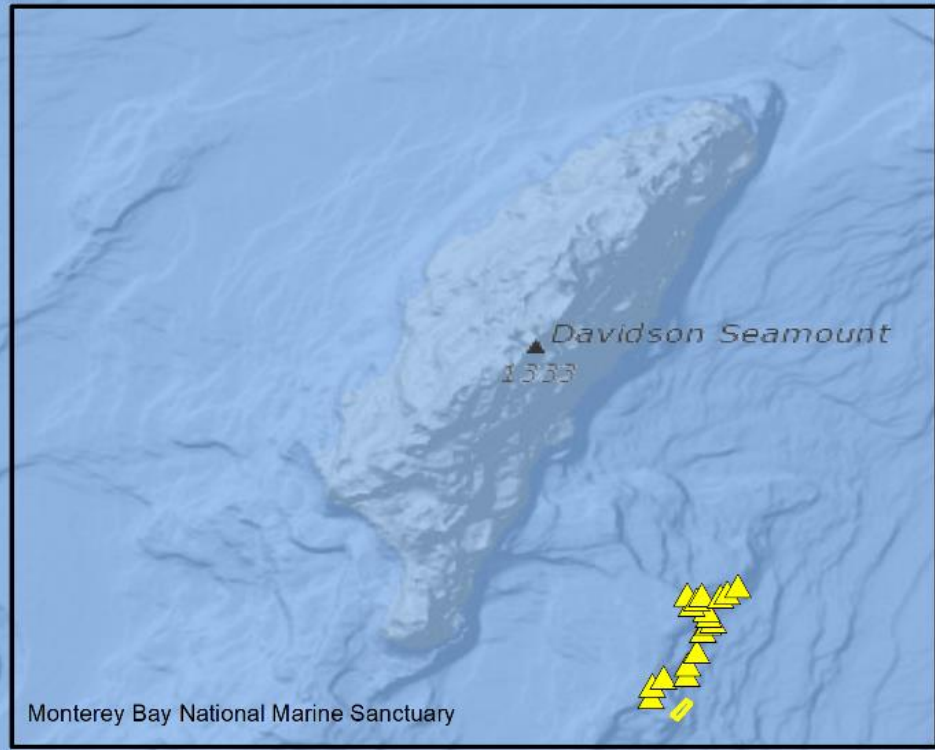


October 2019 Nautilus Expedition NA117

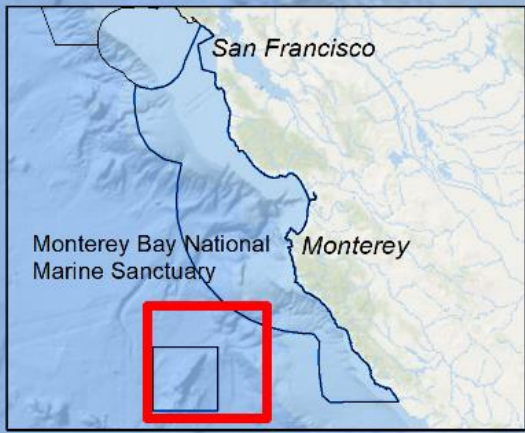
- ▲ Dive #2 waypoints
- Dive #1 exploration area

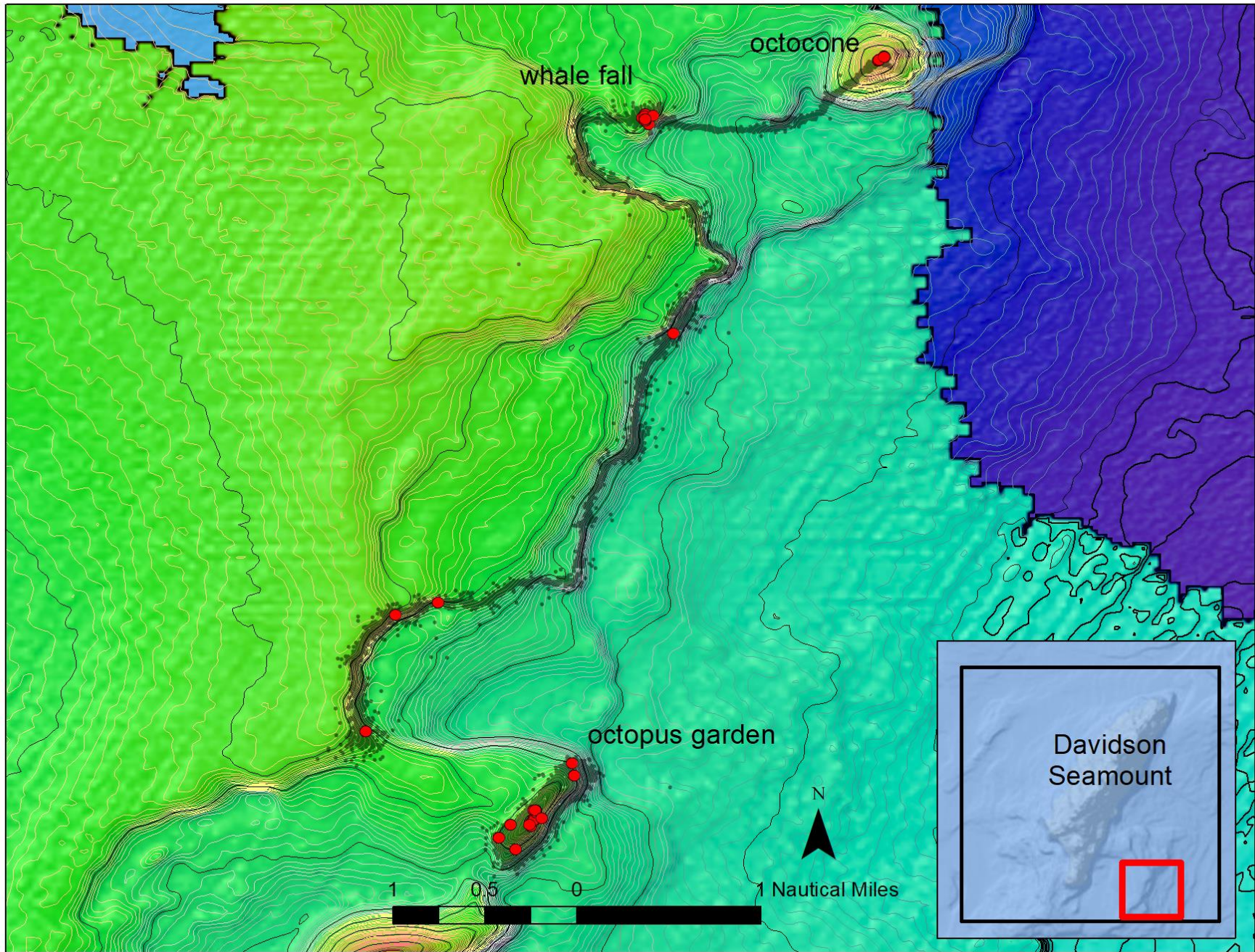


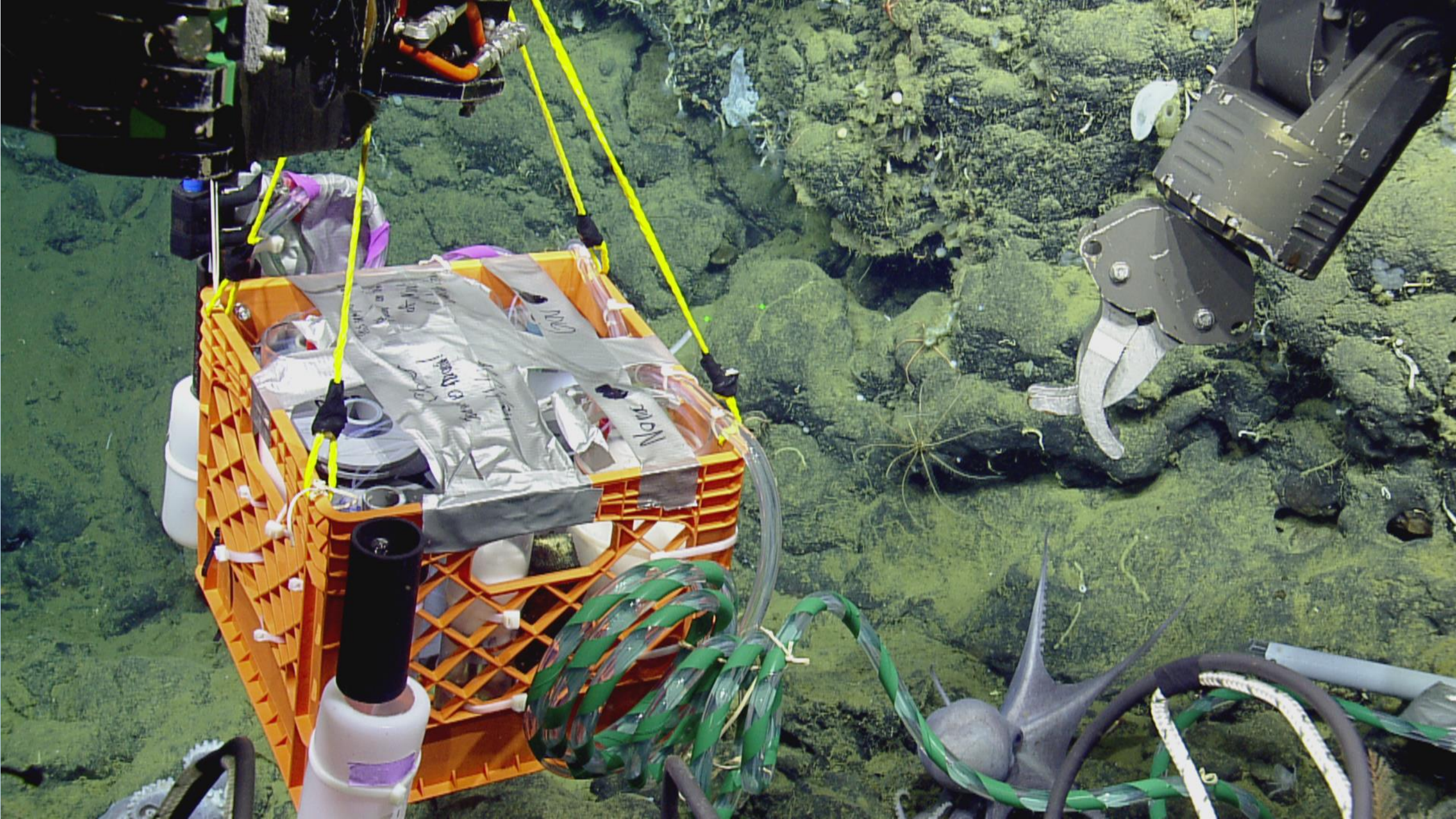
Monterey Bay National Marine Sanctuary

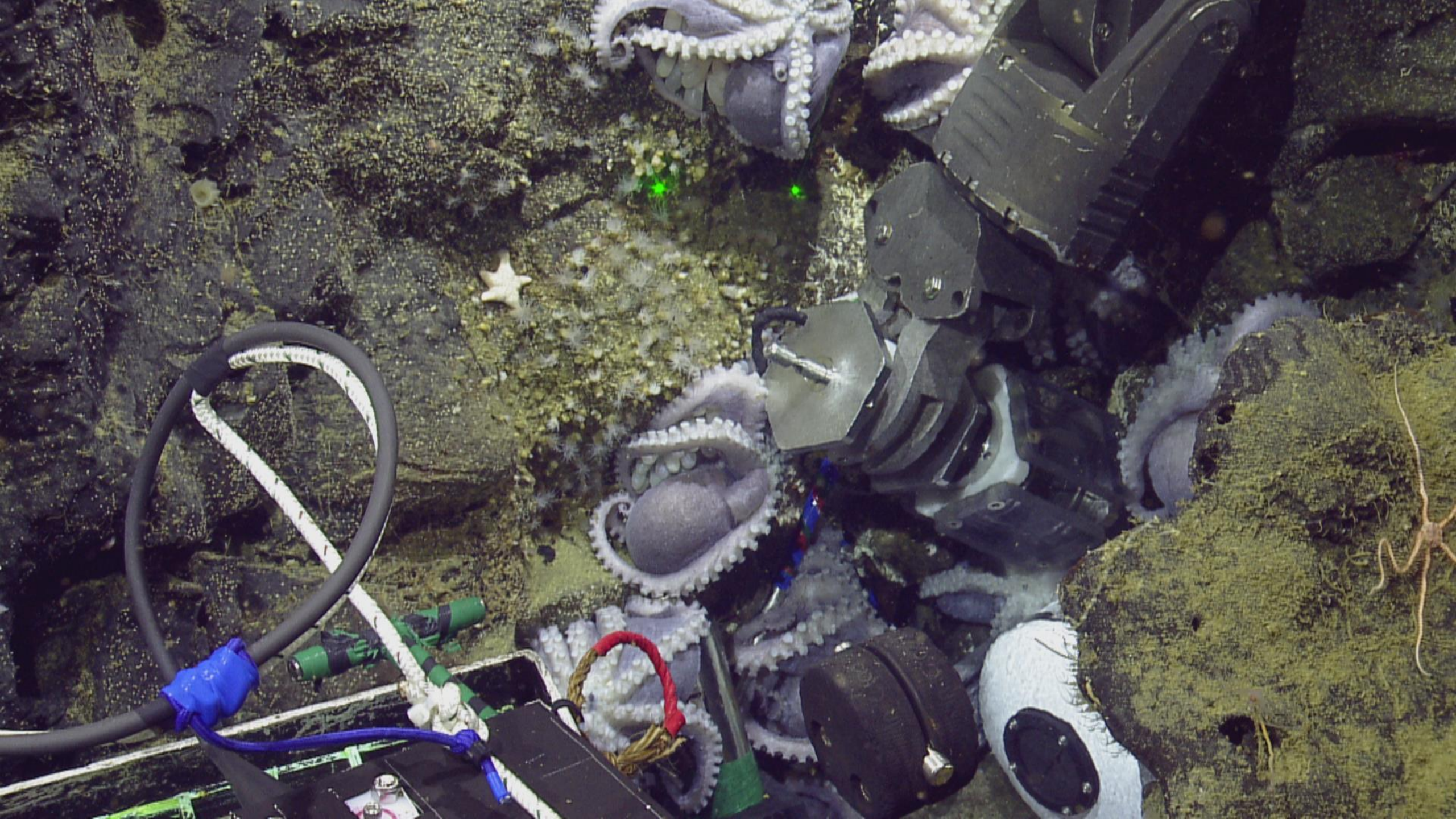


3730







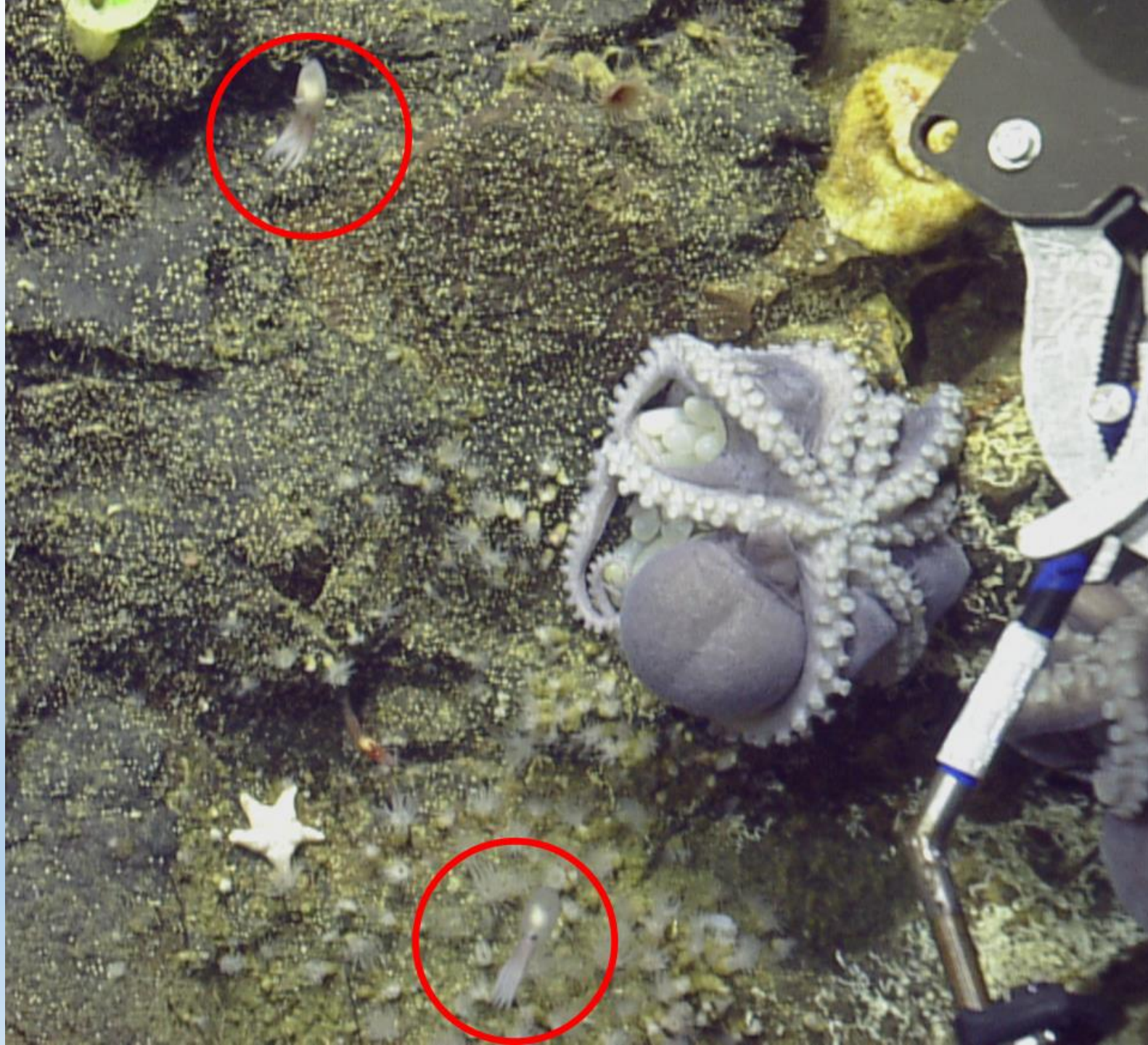


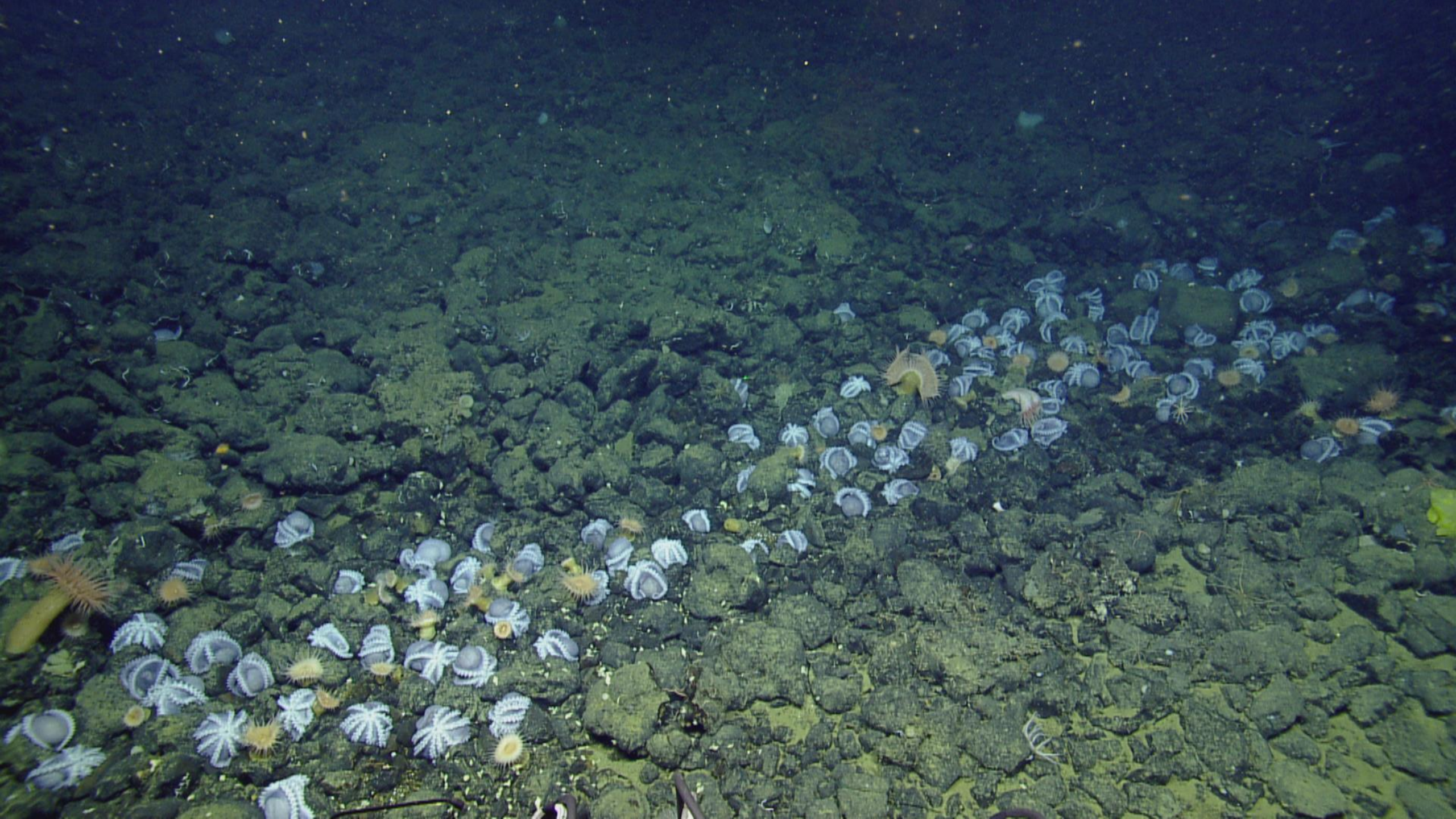


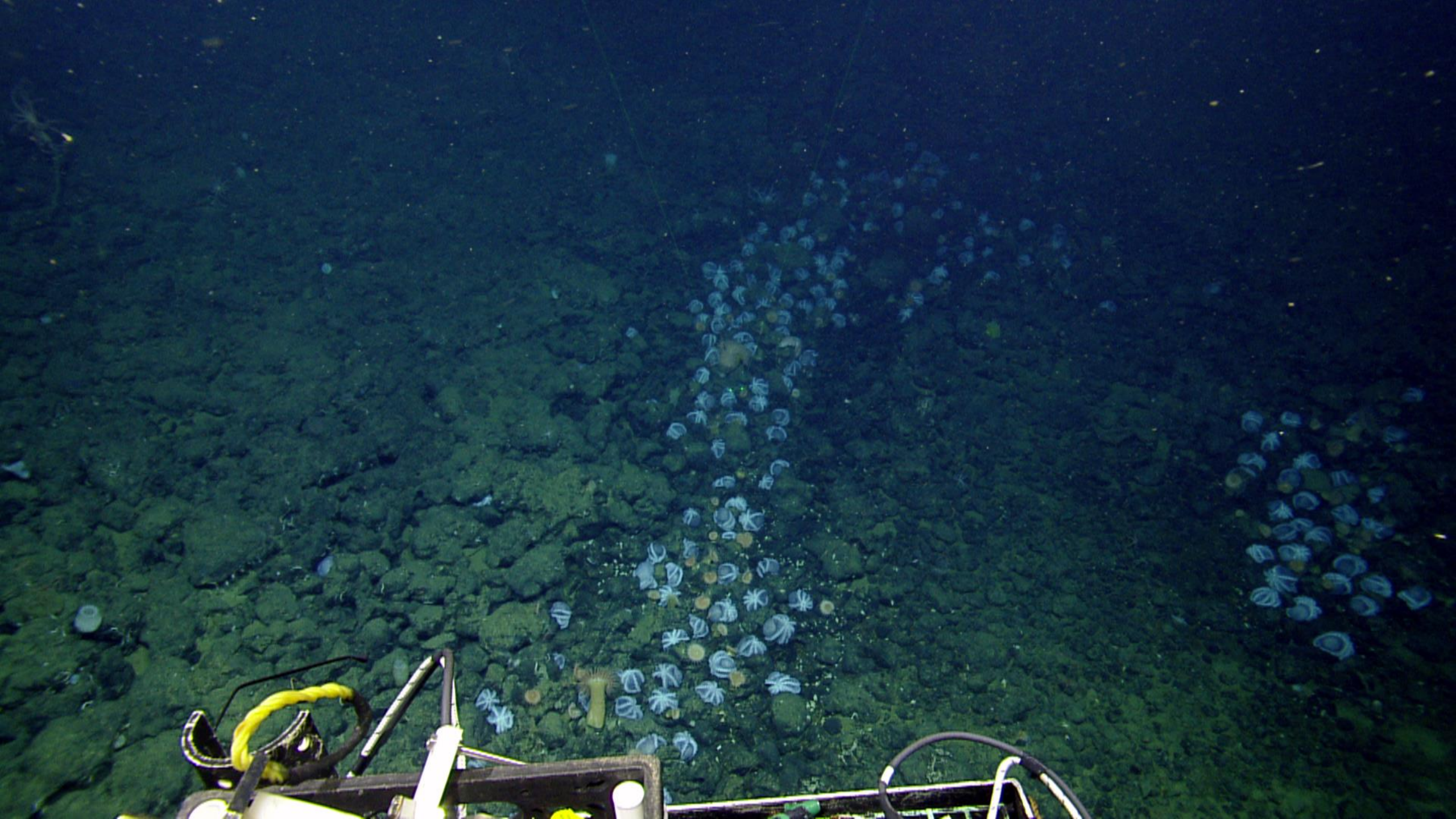










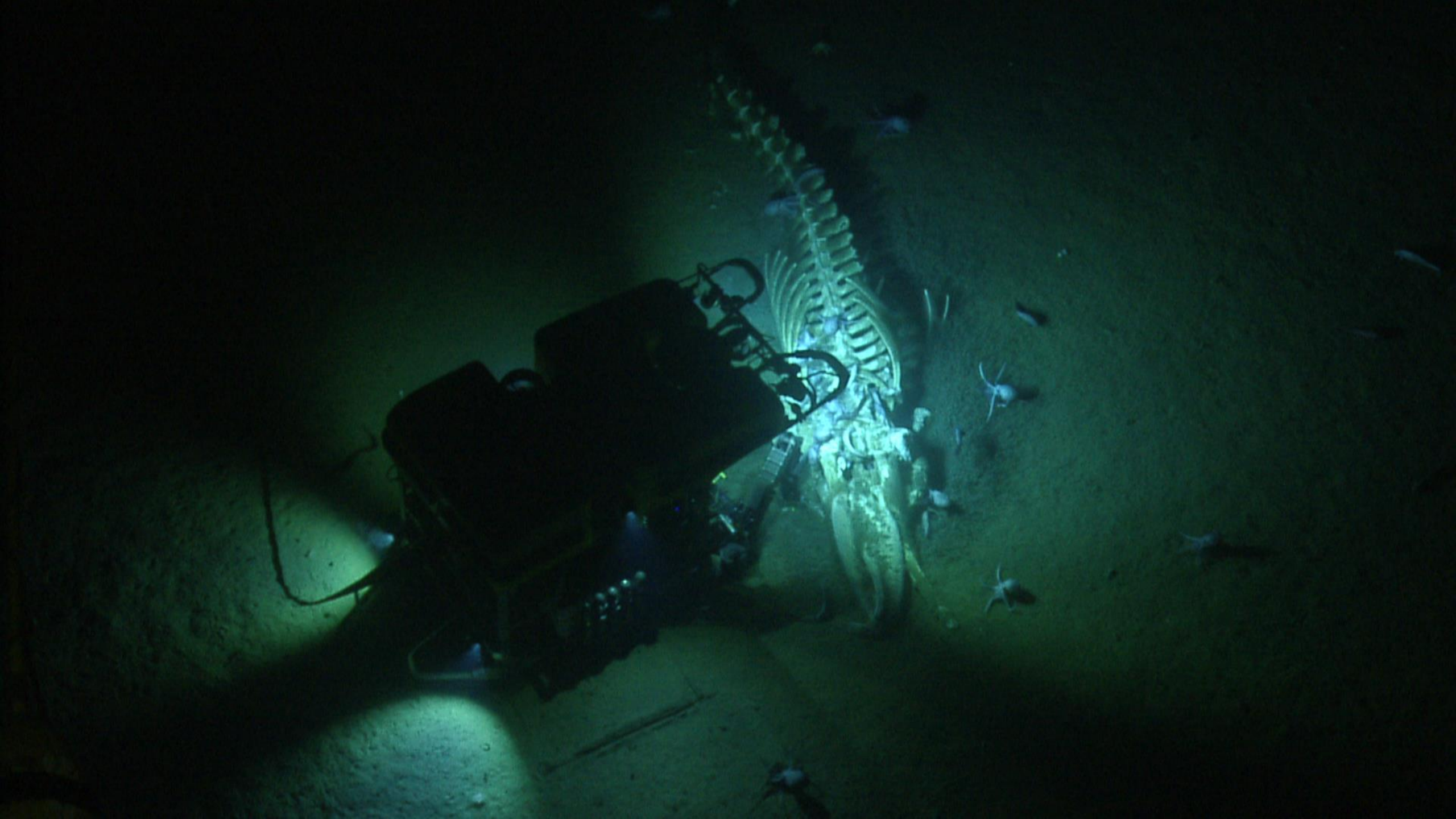


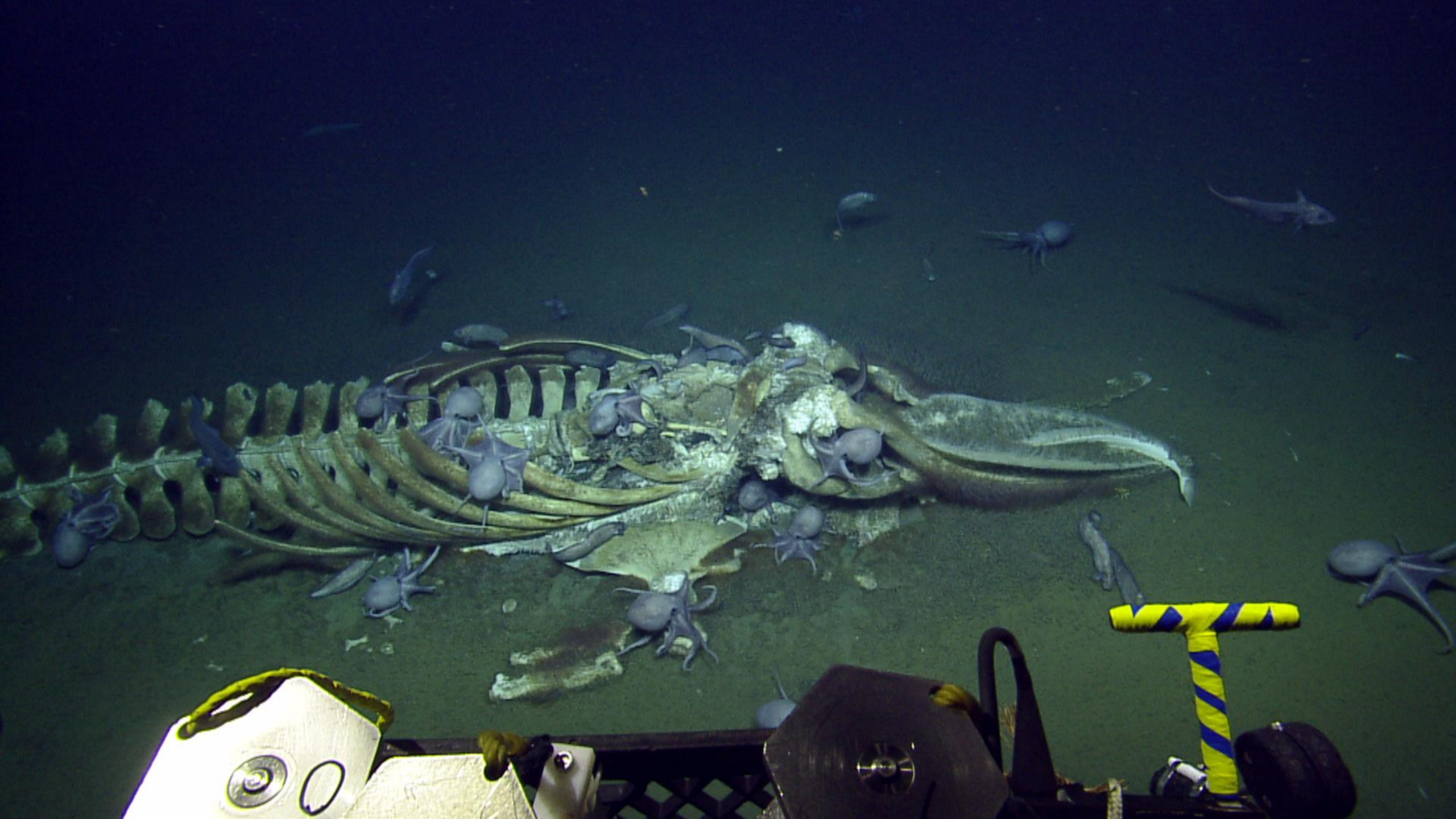


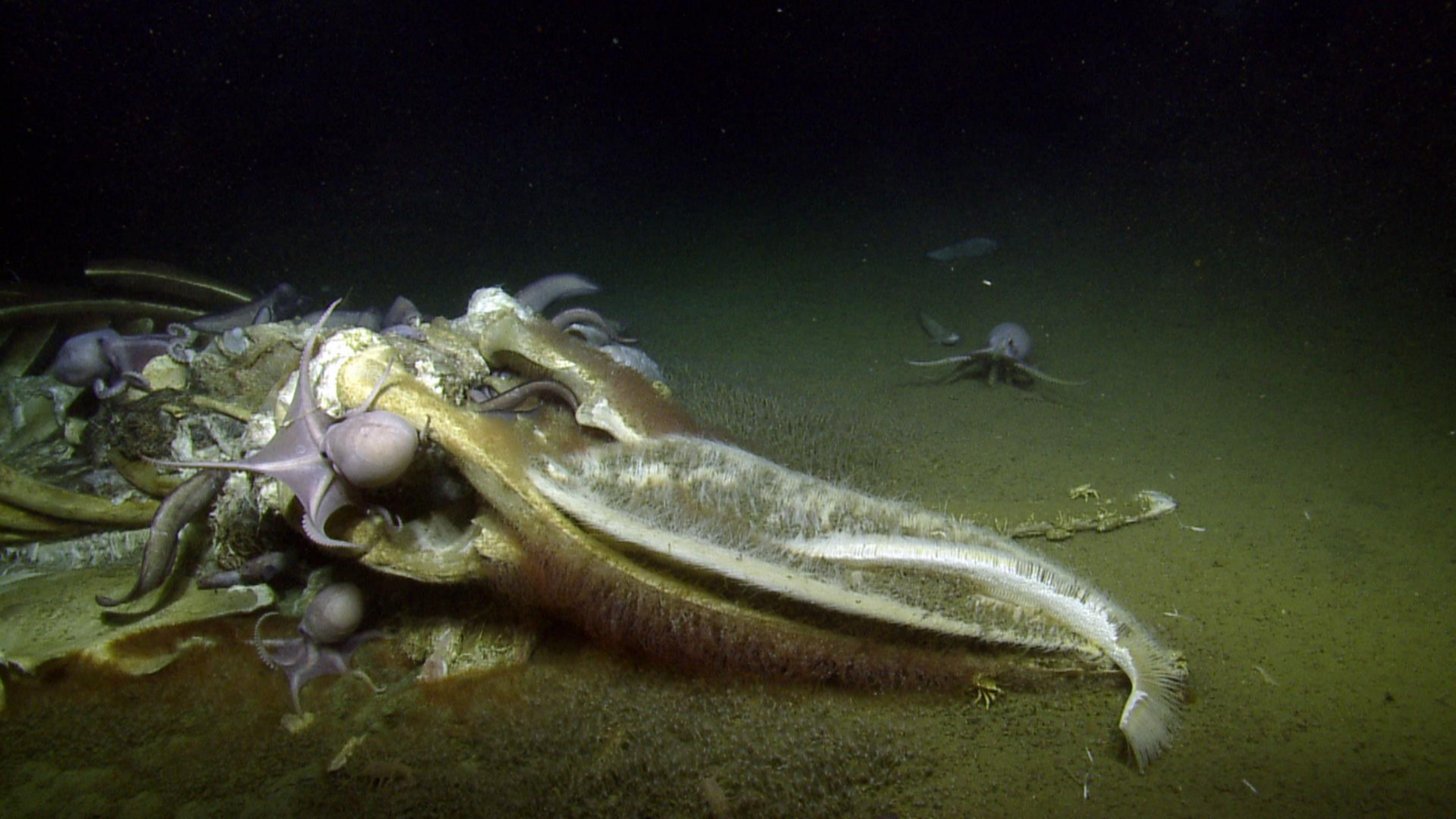






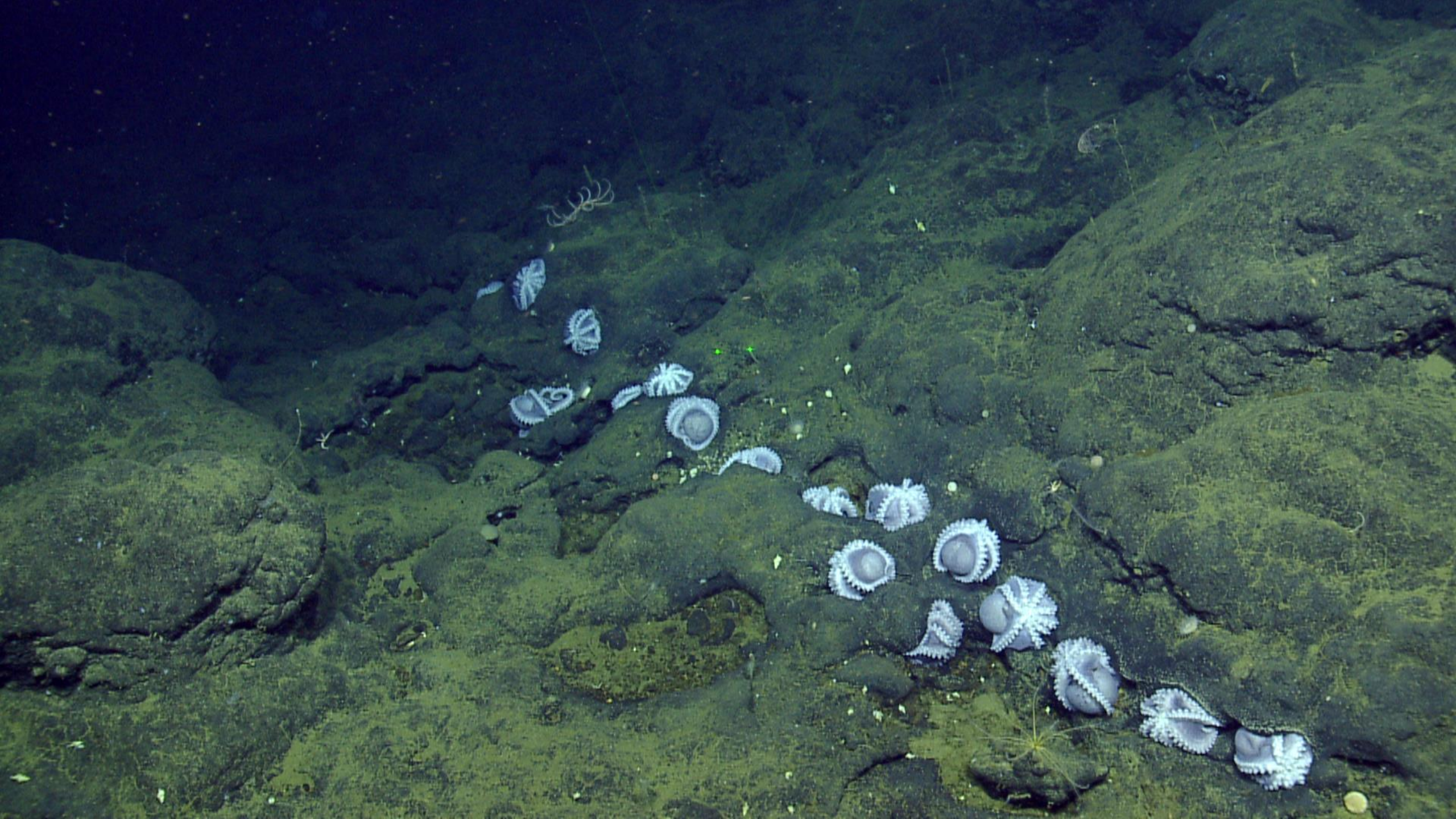


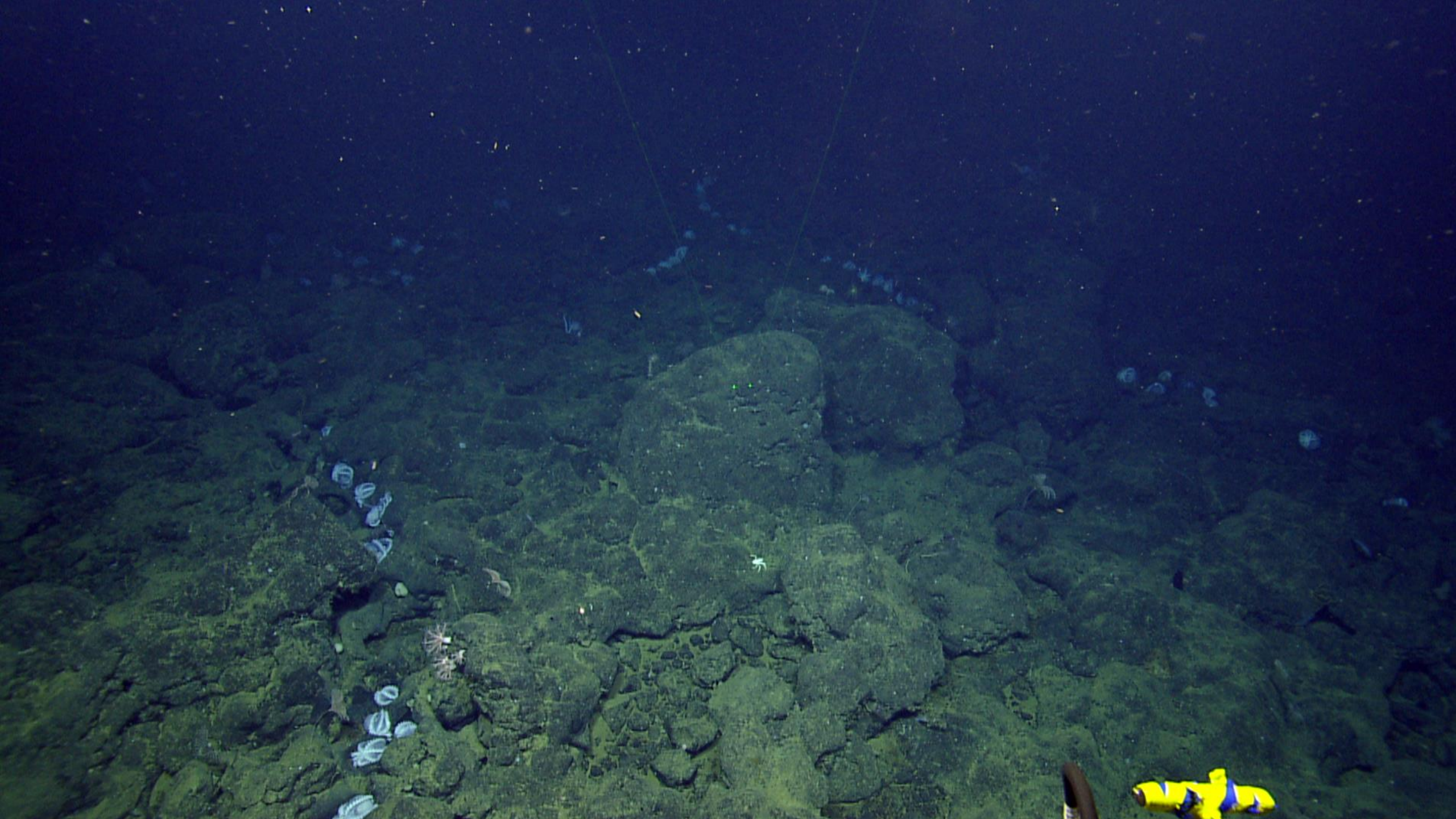














NA117 Accomplishments – Dive 1

- Used the ROVs to further characterize the “octopus garden”
 - 28.34 hours of bottom time, 34.23 hours in water
 - deployed 2 OsmoSamplers, long-term temp/DO sensor and 2 long-term temperature loggers in a seep near original octopus garden
 - collected venting seawater to assess its composition
 - deployed 2 long-term temperature sensors at octopus spa
 - measured in-situ temperature and DO at various seeps
 - quasi-transects across hard outcrop feature (1 km x 600 m) to quantify minimum octopus population
 - biological and geological samples
 - collected water and sediment samples for persistent organic pollutants
 - 5 Niskins fired at various seep locations and 1 background

NA117 Accomplishments – Dive 2

- Used the ROVs to explore ridgelines and hard outcrops
 - 29.84 hours bottom time; 34.74 hours in water
 - discovered massive sedimentary cliffs
 - discovered a new whale fall
 - discovered a second octopus garden (“octocone”)
 - collected *Osedax* and other tubeworms from sediment and on whale bones
 - collected 4 sediment cores @ whale fall (2 at base, 2 @ 3m away)
 - collected venting seawater to assess its composition
 - measured in-situ temperature and DO at one seep
 - biological and geological samples along ridgeline, whale fall and octocone
 - 5 Niskins fired at various seep locations, whale fall and 1 background
 - collected water and sediment samples for persistent organic pollutants

NA117 Outreach Statistics

- Minutes watched: 1,396,981 or 970 days
- 153,020 views
- Bonus stat: from 4.3K to 56K views in a single day for whale fall
- Incoming messages: 4,803
- Countries that watched: 80
- Highlight video views: 5.5 million (YouTube, Twitter, Instagram)
- 35 ship-to-shore interactions reaching ~ 1,375 students and public



Whale Fall Actively Devoured by Scavengers at Davidson Seamount | Nautilus Live

1,014,441 views · Oct 16, 2019

9.8K 282 SHARE SAVE ...



EVNautilus
239K subscribers



Samples

Total bulk samples attempted (without subsamples):	40
Total samples attempted (with subsamples):	101
# in EtOH:	37
# dried:	7
# core tube:	8
# eDNA:	8
# frozen:	39
# other:	2
# lost:	0
Sum:	101



Samples to Collaborators

- **Museum of Comparative Zoology at Harvard – 30 samples** (rocks w/biota, squat lobster, *Osedax*, sponges, octopus eggs, whelks, isopods, limpets and more)
- **University of Rhode Island – 7 samples** (rocks, shrimp, whelks, whelk eggs, squat lobster)
- **Dr. Geoff Wheat (UAF) – 28 samples** (niskins, squeeze samplers)
- **Dr. Amanda Kahn (MLML) – 5 samples** (sponges and *Osedax*)
- **Dane Hardin (Applied Marine Sciences) – 6 samples** (POP cores and water samples)
- **Dr. Carol Stepien (NOAA PMEL) – 6 samples** (seawater filtered for eDNA)
- **Dr. Shana Goffredi (Occidental College) and Dr. Greg Rouse (Scripps) – 10 samples** (*Osedax*, whale bones, sediment cores, seawater filtered for eDNA)
- **Dr. Jason Sylvan (Texas A&M) – 10 samples** (squeeze sampler water filtered through 2 micron filter for bacterial work)
- **Ben Smith (MBARI) – video and spatial data to create 3D model of whale fall**

What's Next?

- Results from collaborators
 - a new species of *Osedax*!
- Visit with MBARI in Dec 2019
- MBARI will map area with AUV in 2020
- Probable 2020 Nautilus expedition
 - Retrieve all loggers
 - Explore additional targets for octopus sites



Questions?

