



Explorations Far Above the Musicians Seamounts

Expedition: [Deep-Sea Symphony: Exploring the Musicians Seamounts](#)



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A Crescendo for Midwater Explorers

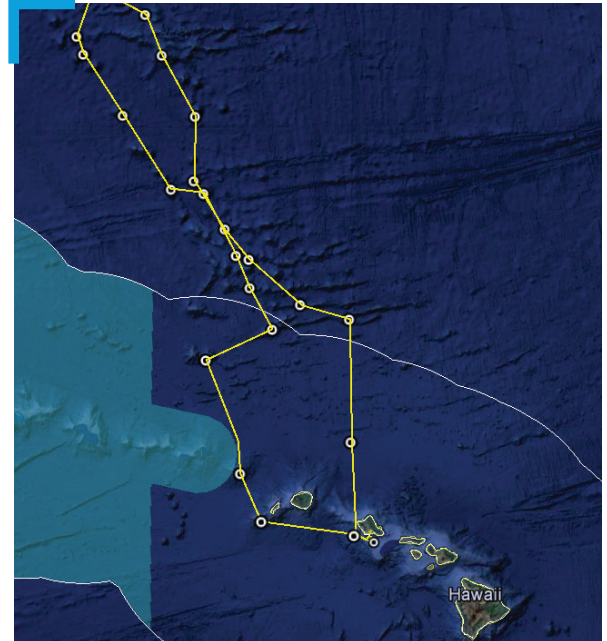
Ocean exploration at the Musicians Seamounts hit a crescendo that echoes in our minds today. We peered through the high-definition video cameras of the remotely operated vehicle *Deep Discoverer* (ROV *D2*). Amazing images appeared onscreen at exploration command centers around the world. Satellite technology can send video and data from the deep ocean instantly to our labs. This allowed us to experience *D2*'s dives from NOAA Ship *Okeanos Explorer* without being present at sea.

Our team of explorers included zoologists, ecologists, engineers, and oceanographers. They study fishes, jellies, squids, and other creatures that live in an enormous ocean realm called the midwater. The midwater is a part of the deep ocean that plunges from 200 meters (~656 feet) down to the seafloor around the globe. It is the largest habitable region on Earth for multicellular life forms. We had the great pleasure of being the first explorers to look into this unseen part of the central Pacific Ocean.

Banding Together to Record Observations

After four benthic dives during this expedition, we also explored the midwater on our way back up from the seafloor. These were short tours before recovering the vehicles for the night. On two special days, we engaged in a marathon of exploration with full-day midwater dives. This was a first for our band of scientists and a milestone for NOAA's ocean exploration efforts. We sat at the edge of our seats and pushed ourselves mentally to the limits. We busily communicated what we saw and logged observations into our data systems.

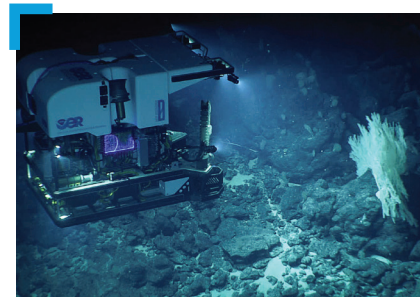
We did not know what lives in the midwater in this part of the ocean. Our plan was to describe the distinctive features of the ocean we explored. We wanted to document everything as precisely as possible and analyze our results. After all, we were the first ones to look into this part of the ocean. So we collected as many types of data as possible from this big blue world.



The Musicians Seamounts are north of the main Hawaiian Islands. The circles mark ROV dive sites for the expedition. *Map courtesy of NOAA Ocean Exploration.*



Telepresence allows scientists from around the world to participate in ocean exploration virtually. These researchers are at a Command Center at Florida Atlantic University. *Image courtesy of NOAA Ocean Exploration.*



During the expedition, ROV *Deep Discoverer* (*D2*) explored the midwater and documented the benthic (bottom-dwelling) communities at Paganini Seamount (Musicians Seamounts). *Image courtesy of NOAA Ocean Exploration.*

LEARN MORE

Scientists identify species and describe their surprising discoveries in the midwater column. *Video courtesy of NOAA Ocean Exploration.*



EXPLORATION NOTES Seamounts

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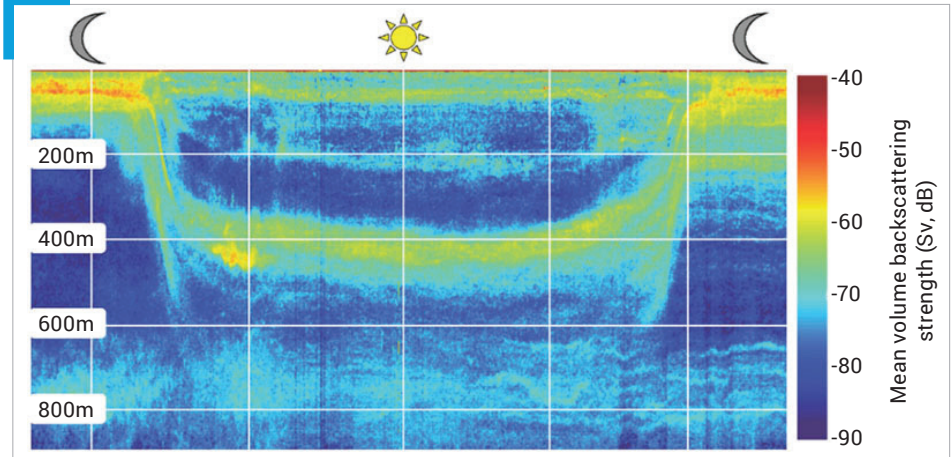
The Instruments and Sounds of Exploration

Every time orbiting satellites passed over NOAA Ship *Okeanos Explorer*, we would get maps of surface algal concentration, sea surface temperature, and surface ocean currents. Like maps of the seafloor, these satellite images tell us what features on the surface might affect what or how many organisms we would see at depth.

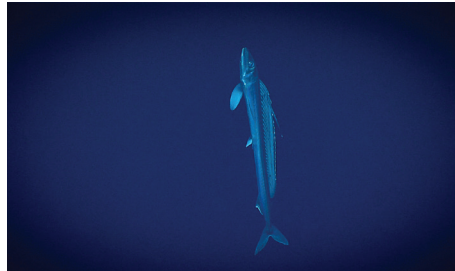
We also used ship sonar and oceanographic instruments on *D2* to look vertically through the water column. Our precise ship sonar bounced many wavelengths of sound off layers of fish and jellies. This layer, the deep scattering layer, is the sweet spot for finding midwater animals. Our oceanographic instruments on *D2* told us about any distinct layers of saltiness (called salinity), temperature, and oxygen. These provide clues about deep ocean currents that can transport different animals into our viewing area.

High Notes of Discovery

We made nearly 1,200 observations during 24 hours of ROV time, and our exploration command center would erupt in cheers when we saw new or rare species. We found several new species and extended the known range of many others, leading to a better understanding of how the midwater food web works and how the environment affects life down there. The images to the right are a few of the organisms we observed. More from the midwater and from the full expedition can be seen on the [Deep-Sea Symphony expedition Image and Video Gallery](#).



The yellow-green band at 400 meters depth depicts the “deep scattering layer.” Organisms migrate downward and upward through the water column during dawn and dusk. The color scale represents the strength of the sound that is reflected by the organisms in the water column from the ship-based sonar. Cooler colors (blue) show less sound reflected. Warmer colors (yellow, orange) show more sound reflected, indicating the presence and density of animals. Image courtesy of Kevin Boswell, Florida International University and the DEEPEND (Deep Pelagic Nekton Dynamics of the Gulf of Mexico) Consortium.



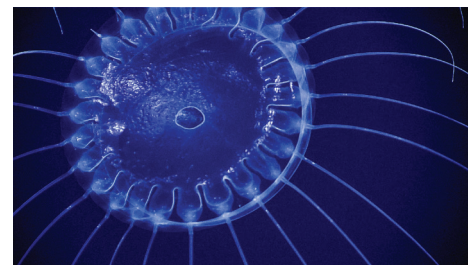
Alepisaurus ferox, also known as the lancetfish. This individual was looking toward the surface when we encountered it in the midwater. Image courtesy of NOAA Ocean Exploration.



After seeing some squid ink in the water, we encountered this boarlet squid from the family of glass squids. Image courtesy of NOAA Ocean Exploration.



A siphonophore, an animal composed of many smaller individuals called zooids, observed in the water column during the second full day of midwater exploration. Image courtesy of NOAA Ocean Exploration.



This species of *Solmissus*, or dinner plate jelly, was seen during our last set of midwater transects of the expedition. Image courtesy of NOAA Ocean Exploration.

Original blog: <https://oceanexplorer.noaa.gov/okeanos/explorations/ex1708/logs/sept23/welcome.html>

Expedition: <https://oceanexplorer.noaa.gov/okeanos/explorations/ex1708/welcome.html>

Explorers: <https://www.fisheries.noaa.gov/contact/mike-ford-phd>; <https://oceanexplorer.noaa.gov/explorations/16arctic/background/explorers/explorers.html>;

<https://oceanexplorer.noaa.gov/okeanos/explorations/ex1705/background/explorers/explorers.html>

Musicians Seamounts (map): <https://oceanexplorer.noaa.gov/okeanos/explorations/ex1708/background/plan/media/map-hires.jpg>

Telepresence (image): <https://oceanexplorer.noaa.gov/okeanos/explorations/ex1402/logs/apr26/apr26.html>

ROV *Deep Discoverer* (*D2*) (image): <https://oceanexplorer.noaa.gov/technology/subs/deep-discoverer/deep-discoverer.html>

World of Water (WOW) (video): <https://oceanexplorer.noaa.gov/okeanos/explorations/ex1708/dailyupdates/media/video/dive11-wow/wow-1280x720.mp4>

Deep scattering layer (image): <https://oceanexplorer.noaa.gov/technology/development-partnerships/21scattering-layer/features/scattering-layer/media/echogram-hires.jpg>

Lancetfish (image): <https://oceanexplorer.noaa.gov/okeanos/explorations/ex1708/logs/sept23/media/lancetfish-hires.jpg>

Boarlet squid (image): <https://oceanexplorer.noaa.gov/okeanos/explorations/ex1708/logs/sept23/media/piglet-hires.jpg>

Siphonophore (image): <https://oceanexplorer.noaa.gov/okeanos/explorations/ex1708/dailyupdates/media/sept22-2-hires.jpg>

Solmissus (image): <https://oceanexplorer.noaa.gov/okeanos/explorations/ex1708/logs/sept23/media/solmissus-closeup-hires.jpg>

Deep-Sea Symphony expedition Image and Video Gallery: <https://oceanexplorer.noaa.gov/okeanos/explorations/ex1708/logs/photolog/welcome.html>