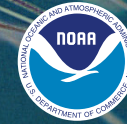


Océano Profundo 2018: Exploring Deep-Sea Habitats off Puerto Rico and the U.S. Virgin Islands (EX1811)

NOAA Ship *Okeanos Explorer*
October 30 - November 20, 2018



Ocean Exploration
and Research

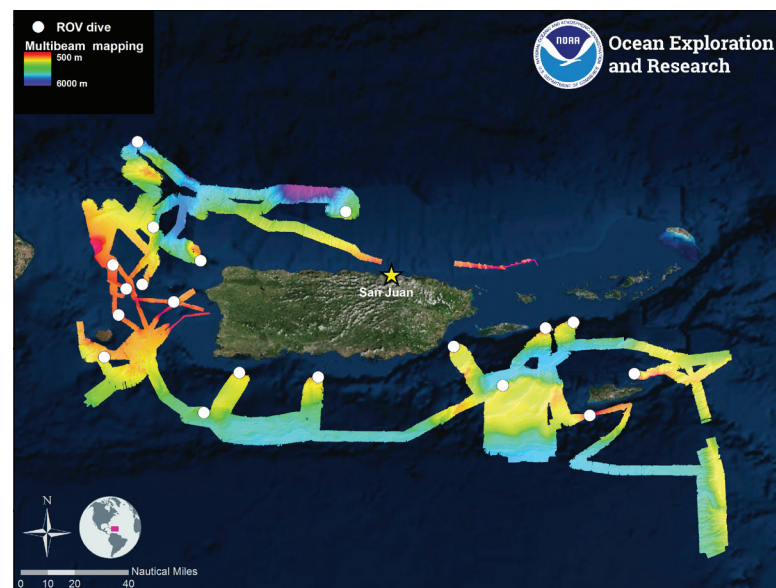
Océano Profundo 2018: Exploring Deep-Sea Habitats off Puerto Rico and the U.S. Virgin Islands was one of several expeditions being conducted from NOAA Ship *Okeanos Explorer* as part of the [Atlantic Seafloor Partnership for Integrated Research and Exploration \(ASPIRE\)](#) campaign, a major multi-year, multi-national collaborative field program focused on raising collective knowledge and understanding of the North Atlantic Ocean.

Summary of Accomplishments

Océano Profundo 2018 was a 22-day telepresence-enabled expedition to collect critical baseline information about unknown and poorly understood deepwater areas surrounding Puerto Rico and the U.S. Virgin Islands. This expedition involved exploration of a diversity of features in the U.S. Caribbean Region with mapping and remotely operated vehicle (ROV) operations targeting areas of deep-sea fish habitats, deep-sea coral and sponge communities, midwater habitats, submarine canyons, submarine landslides, and other unique geological features. Mapping data collected during this expedition filled major data gaps in the region and also contributed to [Seabed 2030](#) goals for mapping unexplored regions of Earth's ocean basins. The major accomplishments from this expedition are summarized below.

Conducted 19 successful ROV dives, ranging in depth from 250 to 5,000 meters. All dives were conducted in completely unexplored areas, thereby improving our knowledge of unknown areas within the U.S. Exclusive Economic Zone (EEZ) and as part of the [U.S. Extended Continental Shelf Project](#), informing management needs for sensitive habitats, marine resources, and potential maritime heritage sites. Data collected will also be used to increase our understanding of deep-sea ecosystem connectivity across the Atlantic basin. Highlights from the dives include:

- Collected 81 biological samples (39 primary and 42 associated taxa) and eight rock samples. Nineteen of the primary biological samples represent substantial range extensions, and several of these may be new species to science. Other biological samples were collected to support studies on connectivity and biogeographic patterns across the Atlantic Ocean. Geological samples will be used to better understand the geologic history of this region, as well as to characterize habitat substrate.



Overview map showing the locations of ROV and mapping operations completed during the *Océano Profundo 2018* expedition. Map courtesy of the NOAA Office of Ocean Exploration and Research.

- Observed hundreds of different species of animals, including several potential new species, new behaviors, and numerous significant range extensions. Some noteworthy observations included:
 - o Translucent egg case with a catshark embryo actively swimming inside seen at a depth of 250 meters during Dive 15 of the expedition.



Catshark embryo actively swimming inside an egg case attached to a deep-sea coral at 250 meters. *Image courtesy of the NOAA Office of Ocean Exploration and Research, Océano Profundo 2018.*

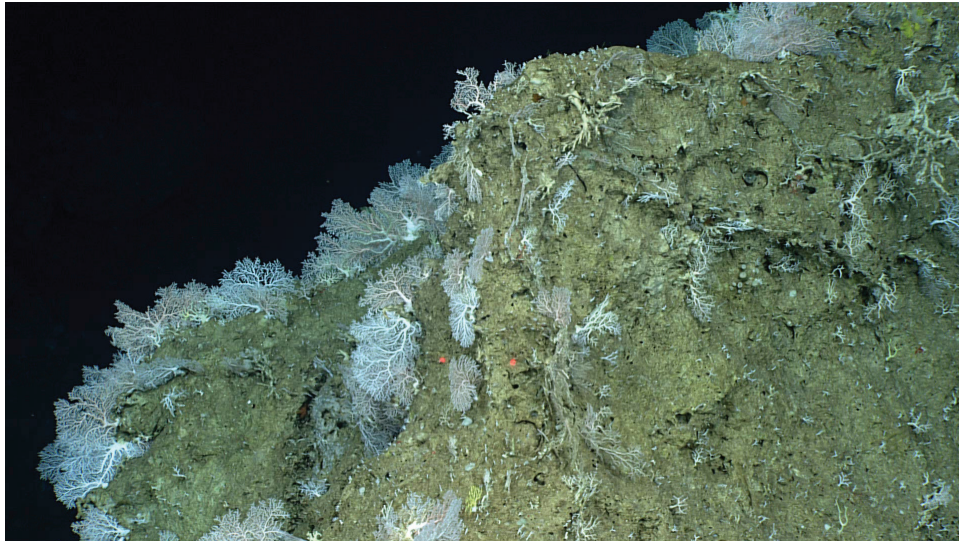
- o Commercially valuable queen snapper (*Etelis oculatus*), silk snapper (*Lutjanus vivanus*), and misty grouper (*Hyporthodus mystacinus*) seen at depths between 250 to 539 meters on six different ROV dives of the expedition. This included the sighting of the queen snapper at a record depth of 539 meters on Dive 7, thereby surpassing the previous known depth record of this species (450 meters) by a substantial margin.
- o First-time documentation of several species of deep-sea urchins feeding, including urchins feeding on crinoids, carnivorous sponges, black corals, and bamboo corals.
- o Documentation of five particularly rare sea star species, including three that are likely new species to science.
- Conducted five ROV dives in four different marine managed areas, including the deepest dives ever conducted inside the Buck Island Reef Marine National Monument (1,812 meters), Mona Island Natural Reserve (1,212 meters), La Parguera Natural Reserve (1,101 meters), and Inés María Mendoza Natural Reserve (877 meters).
- Conducted nine ROV dives focused on exploring areas of interest to commercially important fishery species, including areas prioritized for exploration by the Caribbean Fishery Management Council, fishery biologists, and fishers.



Commercially valuable deepwater snappers and groupers were documented during six different ROV dives of the expedition, including this queen snapper, *Etelis oculatus*, seen at a record depth of 539 meters. This sighting surpassed the previous known depth record of this species (450 meters) by a substantial margin. *Image courtesy of the NOAA Office of Ocean Exploration and Research, Océano Profundo 2018.*

Located and characterized deep-sea coral and sponge communities.

- Documented coral and sponge communities during all 19 of the ROV dives, including six high-density communities of deep-sea corals (Dives 4, 5, 13, 14, 15, and 18), one of which, seen at a depth of 2,000 meters, is currently among the deepest high-density communities known from the U.S. Caribbean Region.



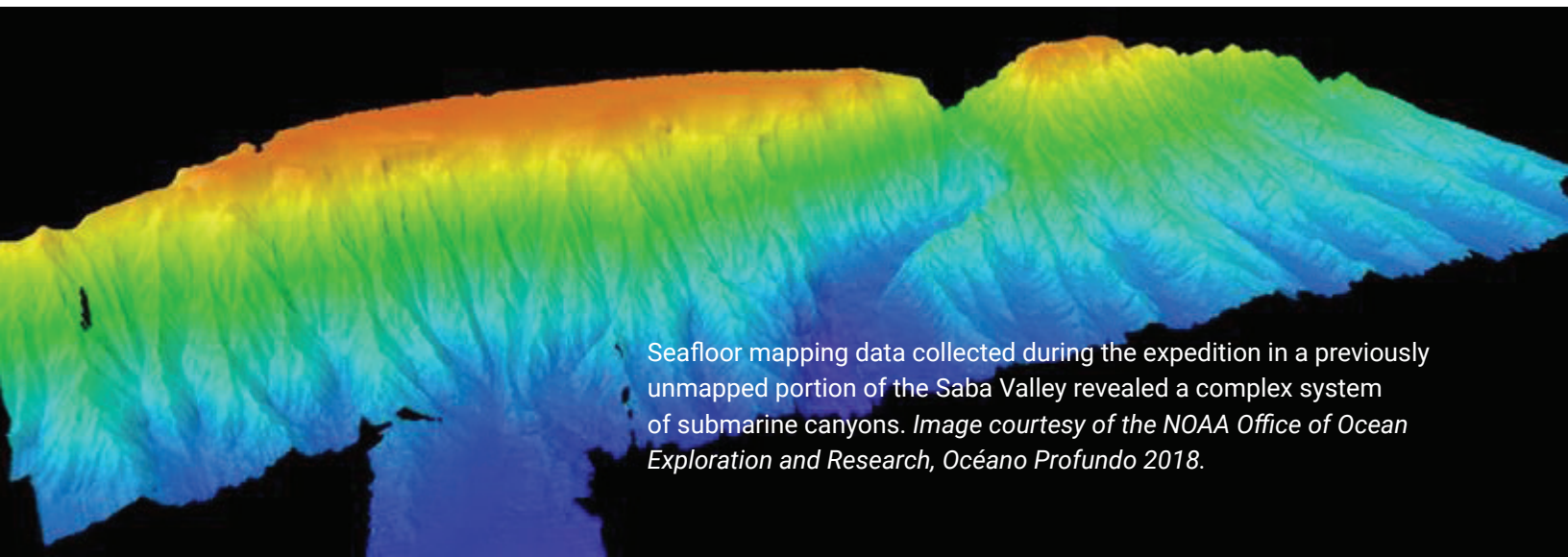
High-density community of deepwater stylasterid corals recorded at 300 meters west of Desecheo Island off the west shore of Puerto Rico. This was one of six high-density coral communities recorded during the *Océano Profundo 2018* expedition. *Image courtesy of the NOAA Office of Ocean Exploration and Research, Océano Profundo 2018.*

Characterized water column habitats using acoustics, visual observations, and emerging technologies.

- Conducted midwater explorations at depths ranging from 300 to 900 meters during two ROV dives to investigate the diversity and abundance of the largely unknown pelagic fauna of the region.

Extended bathymetric mapping coverage in the U.S. EEZ and international waters in support of Seabed 2030.

- Mapped more than 14,959 square kilometers of seafloor, including 14,429 square kilometers in the U.S. EEZ and 530 square kilometers in the EEZ of the Dominican Republic.
- Mapped several areas that had never before been mapped with high-resolution multibeam sonars including deep-sea areas around Mona Island, Saba Valley, Engaño Canyon, and Engaño Bank.



Seafloor mapping data collected during the expedition in a previously unmapped portion of the Saba Valley revealed a complex system of submarine canyons. *Image courtesy of the NOAA Office of Ocean Exploration and Research, Océano Profundo 2018.*

Collected mapping data and conducted ROV dives to support enhanced predictive capabilities for vulnerable marine habitats and submarine geohazards.

- Investigated a wide variety of different geological features including submarine canyons, escarpments, seamounts, trenches, terraces, troughs, and submarine landslides.
- Conducted two ROV dives on large submarine landslides, including one landslide which is believed to have caused the large tsunami of 1918. Data collected during these dives will increase our understanding of past, present, and future geohazards of the region.

Leveraged international partnerships to conduct coordinated exploration and mapping of priority high-seas areas of the North Atlantic.

- A total of 63 scientists, managers, and students from seven different countries and 15 U.S. states participated in the expedition regularly via telepresence technology as members of the shore-side science team.

Engaged diverse audiences around the world, opening a window to the deep sea.

- Live video feeds from the expedition received more than 166,900 views. Expedition content on the [OceanExplorer.NOAA.gov](https://oceanexplorer.noaa.gov) website received over 18,900 views during the expedition.
- One new exploration command center was brought online at the EcoExploratorio Science Museum of Puerto Rico, thereby facilitating participation by local scientists and the general public. Over 6,100 people visited the EcoExploratorio during the expedition, and social media posts and Facebook live events hosted by the museum received over 967,500 views.
- Conducted eight live telepresence interactions with over 675 individuals with various venues around the country, including partners at the EcoExploratorio Science Museum of Puerto Rico, St. Croix National Park Service, Gulf and Caribbean Fisheries Institute Conference, National Ocean Exploration Forum, New England Aquarium, South Carolina Aquarium, University of Hawaii, and Atlantic Seafloor Partnership for Integrated Research and Exploration (ASPIRE) Workshop.
- Conducted seven tours of NOAA Ship *Okeanos Explorer* with a total of 49 resource managers and scientists representing federal and territorial management agencies, non-governmental institutions, academic institutions, and the private sector.
- Conducted expedition science and outreach communications in both English and Spanish, including bilingual coverage on the live video narrations, expedition website, live interactions, and ship tours.
- Received news and media coverage by numerous international, national, and local media sources, including feature stories by the Associated Press, CNN, NBC, ABC, USA Today, Ciencia Puerto Rico, El Nuevo Dia, Virgin Islands Consortium, St. Croix Source, Irish Examiner, News & Observer, Miami Herald, Post & Courier, as well as others.

Data collected during this expedition will inform initial characterization of the areas visited and includes multibeam, single beam, subbottom, ADCP, XBT, CTD and dissolved oxygen profiles; surface oceanographic and meteorological sensors; video and imagery; and physical specimens. All data from this expedition will be publicly available through national archives. [OceanExplorer.NOAA.gov](https://oceanexplorer.noaa.gov) will provide a direct link to the expedition data archive once available.

For More Information

[OceanExplorer.NOAA.gov/okeanos/explorations/ex1811/welcome.html](https://oceanexplorer.noaa.gov/okeanos/explorations/ex1811/welcome.html)



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