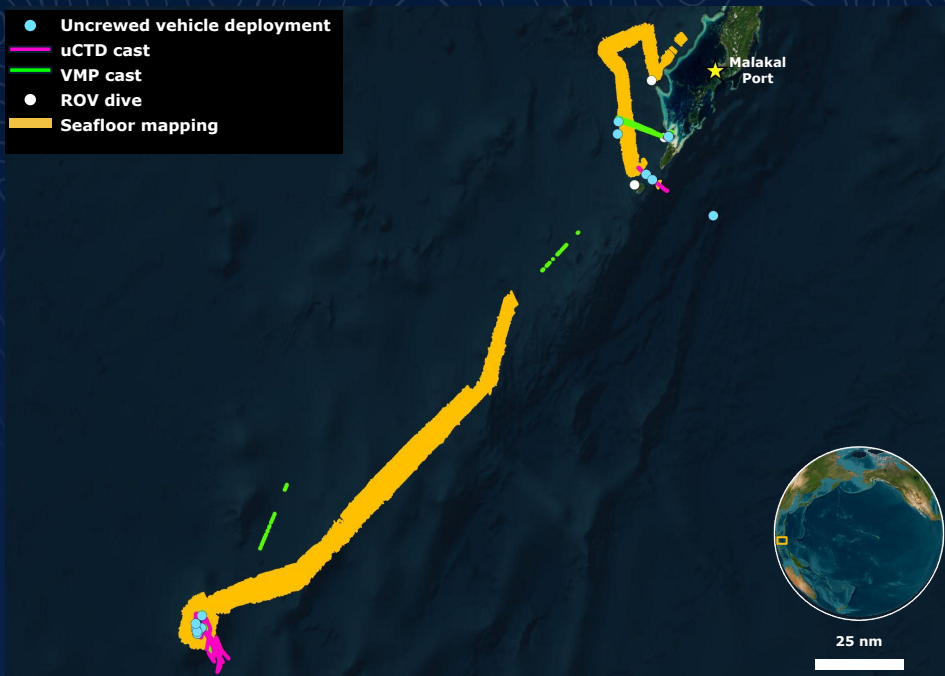


Mapping & Water Column Exploration Around the Palauan Islands (NA169)

November 25 - December 12, 2024

- 17 days at sea
- 2,850 km² of seafloor mapped
- 3,112 km of water column mapped
- 85 h of CTD & VMP casts
- 17 successful uncrewed vehicle deployments
- 4 successful ROV dives
- 33 primary samples collected
- 67 live ship-to-shore interactions
- 2,083 ship-to-shore participants
- 64,302 highlight video views
- 65,982 live stream views
- 37,000,000 social media impressions

- Uncrewed vehicle deployment
- uCTD cast
- VMP cast
- ROV dive
- Seafloor mapping

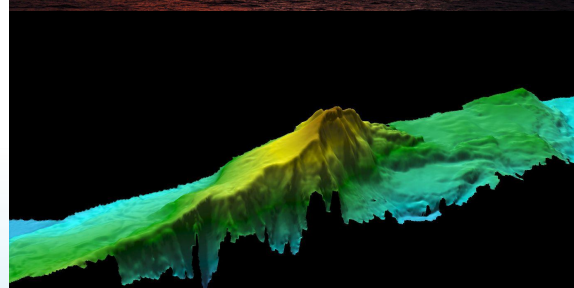


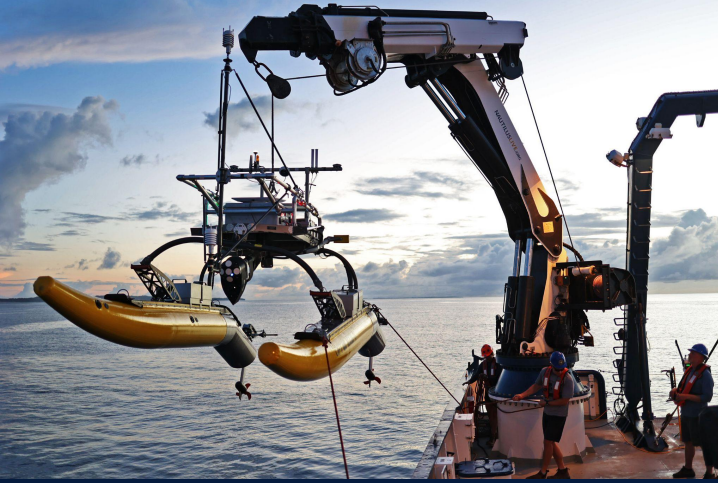
OVERVIEW

Between November 25 and December 12, *E/V Nautilus* conducted an expedition to explore the physical and biological oceanography around the Palauan Islands. The expedition utilized a variety of complimentary exploration technologies to study the physics and biological response associated with the island effect, in which flow around islands leads to higher biological productivity due to mixing of nutrient rich waters. [Funded by NOAA Ocean Exploration as a contribution to the US Government commitment to support ocean mapping in Palau](#), this Ocean Exploration Cooperative Institute expedition used the mapping, remotely operated vehicle (ROV) and telepresence systems of *E/V Nautilus*, in combination with uncrewed vehicle assets from the Scripps Institution of Oceanography to advance priorities of [Seabed 2030](#), the [Beyond the Blue: Illuminating the Pacific campaign](#), as well as long-standing scientific collaborations between the US and Palau.

MAPPING SUMMARY

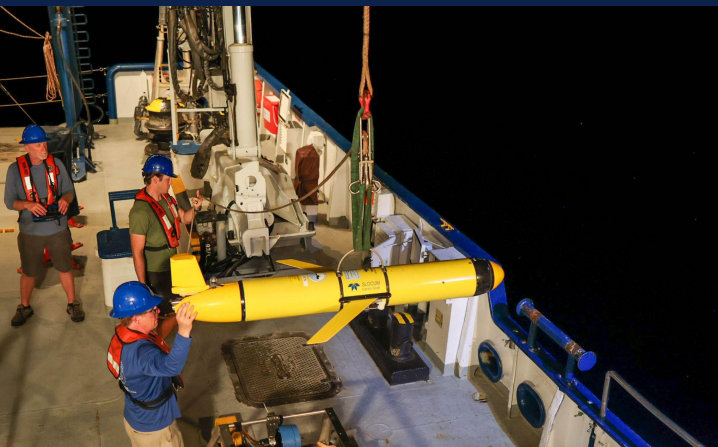
Ship-based mapping operations primarily focused on utilizing *E/V Nautilus*' dual Kongsberg Simrad EC150-3C to collect water column current data using the the acoustic Doppler current profiler of the sonar, and water column backscatter data using the EK80 functionality of the sonar. The sonar was operated in a unique fashion during the expedition, in which transmissions were interleaved, allowing for concurrent mapping of the biota in the water column (volume backscatter) and water current profiles (via Doppler processing). Water column mapping data was collected over a trackline of 3,112 kilometers. Additionally, the expedition utilized *E/V Nautilus*' EM302 multibeam echosounder to map seafloor during transits between survey sites, focusing on areas where no previous seafloor mapping data was available. A total of 2,850 square kilometers of seafloor were mapped, including 1,713 square kilometers inside the Palau National Marine Sanctuary.





OCEANOGRAPHIC SURVEYS SUMMARY

The oceanography was surveyed around the Palauan Islands using a constellation of uncrewed assets piloted by the Scripps Institution of Oceanography. This included successful deployments and recoveries of Boeing Liquid Robotics Wave Gliders on 2 occasions, Teledyne SLOCUM Buoyancy Gliders 5 times, and WAM-V 16 Uncrewed Surface Vessel 10 times. Additionally, the expedition collected water column oceanographic data using a ship-mounted vertical microstructure turbulence profiler (VMP) and an underway CTD. 294 VMP casts between the sea surface and 760 meters were conducted for a cumulative time of 37.2 hours, covering a trackline of 128.5 kilometers. 420 underway CTD casts between the sea surface and 500 meters were conducted for a cumulative time of 47.4 hours, covering a trackline of 440 kilometers. The concurrent operations of the E/V *Nautilus* with uncrewed assets enabled a unique capability for densely sampling complex oceanic physics, achieving a level of resolution and coverage unattainable by other methods.



ACKNOWLEDGEMENTS

Special thanks to the captain and crew of E/V *Nautilus*, the *Nautilus* Corps of Exploration, and all that supported the expedition from shore. The expedition was funded by NOAA Ocean Exploration via the Ocean Exploration Cooperative Institute, with additional support from the Office of Naval Research. Expedition activities were executed under Palau National Marine Research Permit RE-24-15 authorized by the Palau Ministry of Agriculture, Fisheries, and the Environment; and Palau State Permits including Marine Research Permit 92 authorized by the Koror Governor; Angaur Research Permit 57-2024 authorized by the Angaur Governor; Marine Research Permit authorized by the Peleliu Governor; and Sonsorol Entry Permit 555623 authorized by the Sonsorol Governor.

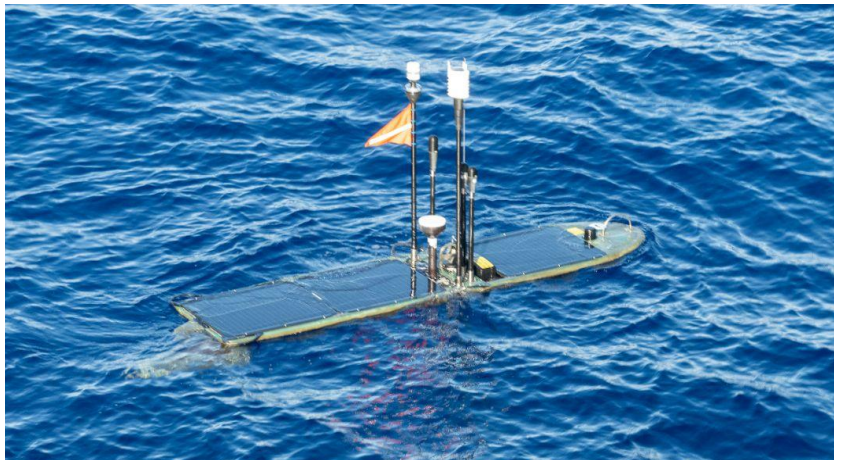
ROV SUMMARY

The expedition completed 4 successful ROV dives for a total dive time of 29 hours and 25 hours of exploring the seafloor at depths between 170-763 meters. ROV dives focused on exploring benthic habitats and seabed composition, particularly the seabed geomorphology under the influence of strong currents along the steep slopes of the Palauan Islands. A total of 24 primary biological, 6 sediment, and 3 rock samples were collected during ROV dives to support studies on the biodiversity and oceanography of the region.



EDUCATION & OUTREACH

Over the course of the expedition, live-stream video feeds received over 65,982 views and highlight videos garnered over 64,302 views. Expedition content on OET's social media channels attracted over 37 million impressions. While at sea, the team created 3 new highlight videos and 2 new blogs, and hosted 67 live ship-to-shore interactions with schools, community events, and professional meetings, reaching 2,083 people across Palau, 25 US States, and 5 other countries. While operating near the remote island of Sonsorol, the team conducted both in-person and telepresence outreach to the 9 school age kids that live on the island. Early expedition findings were published in 63 press stories published in 22 countries and in 8 different languages.



DATA ACCESS

Data collected during the expedition has been sent to repositories for archiving and public distribution, links to which are provided below.

ARCHIVE	DATA TYPES
NautilusLive.org	Expedition summary, background information, highlight imagery and informational materials
Rolling Deck to Repository (R2R)	Ship navigation, weather and mapping data
Marine Geoscience Data System (MGDS)	Mapping and ROV data
YouTube	Full ROV videos
Marine Geological Samples Lab at the University of Rhode Island (MGSL)	Geological samples
Harvard University's Museum of Comparative Zoology (MCZ)	Biological samples
Coastal Observing Research and Development Center	Waveglider, buoyancy glider, WAM-V, underway CTD, and vertical microstructure profiler data