

EXPLORATION NOTES Seamounts



From Modeling to Diving with *SuBastian*

Expedition: [Seamounts, Canyons, & Reefs of the Coral Sea](#)



By [Zhi Huang](#),
Marine Environmental Modeler

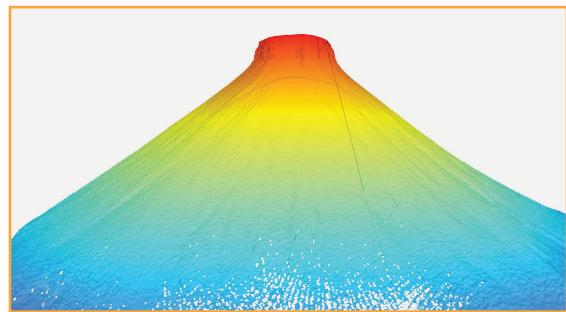
My name is Zhi Huang, and I am a marine environmental modeler at Geoscience Australia. I sailed on the research vessel (R/V) *Falkor* in the [Coral Sea Marine Park off the coast of Australia](#). For a first-timer on a marine survey, this was a dream come true. This voyage not only gave me first-hand experience collecting data, but I also gained a much better understanding of the strengths and the limitations of data that is collected at sea. For me, life aboard the R/V *Falkor* was full of excitement and anticipation as we mapped and sampled from a huge variety of habitats. In addition to analyzing the data we collected using sonar technology, I also got to watch spectacular sunrises at sea!



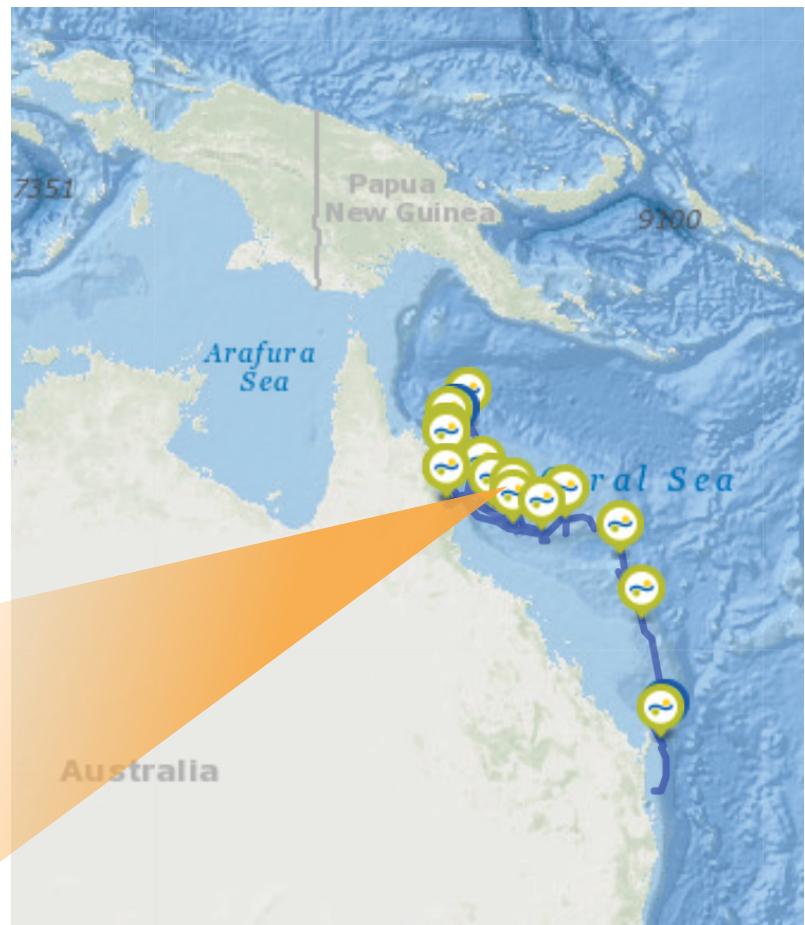
Dr. Zhi Huang. Image courtesy of Dean Miller/Schmidt Ocean Institute.

Solving Seamount Mysteries

During the second dive of the expedition, we explored Cairns Seamount. It is located 150 kilometers (93 miles) east of the coastal city of Cairns, in a very large depression in the seafloor called the Queensland Trough. Cairns Seamount is a “shallow water” seamount that rises from a depth of around 1,200 meters (3,900 feet) up to 60 meters (200 feet). The seamount is conical in shape and relatively small – its base covers 8.2 square kilometers (3.2 square miles) and the flat top covers 0.2 square kilometers (0.08 square miles). The area near Cairns Seamount is a popular fishing destination, but scientific knowledge of the seamount is limited. We hoped to discover the origin of the seamount, learn more about the organisms living on and around it, and determine its oceanographic characteristics.



A three-dimensional image of Cairns Seamount. Model courtesy of Dr. Zhi Huang, Geoscience Australia.



The site of this expedition was the Coral Sea Marine Park, off the northeast coast of Australia, near the Great Barrier Reef. Map courtesy of Schmidt Ocean Institute.



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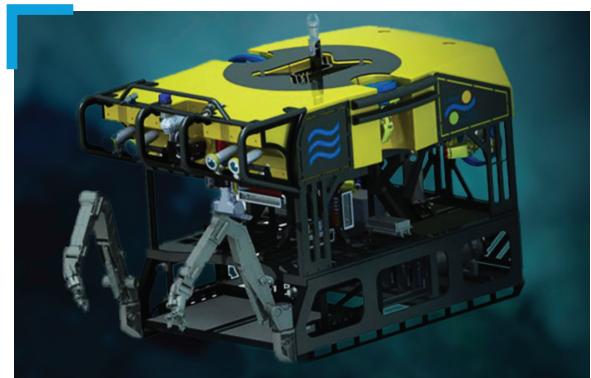
Solving Seamount Mysteries cont.

To answer our research questions, we used a variety of scientific tools to collect data. We used R/V *Falkor*'s [multibeam echo-sounders](#) (a type of sonar) to take bathymetry (water depth) measurements, which allowed us to create high-resolution maps of the area. We also used underwater robots like remotely operated vehicle (ROV) *SuBastian* and an autonomous underwater vehicle (AUV) *Sirius* to collect geological and biological samples, and take high-resolution photos. Using all of this information allowed us to describe the biodiversity on and around the seamount and gain insights into processes that impact where organisms live on the seamount.

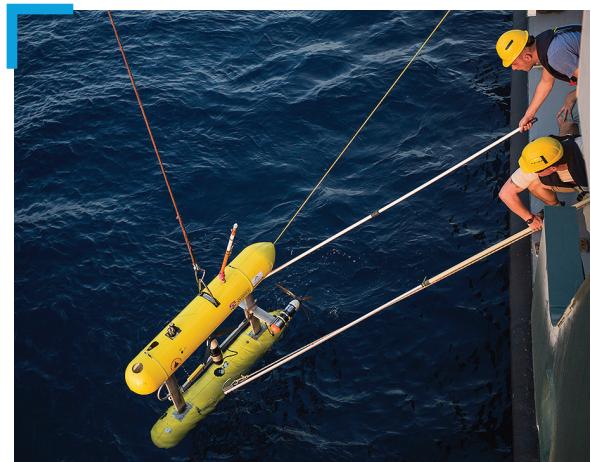
Deep-Sea Discoveries

The [high-resolution video](#) and photos revealed a variety of benthic (bottom-dwelling) species. We also observed many animals in the water column, including fish and jellyfish. Their food source is very small food particles called "marine snow." Marine snow is detritus (organic matter) that falls from the water above. These particles also feed deep-water corals and sponges that have colonized the seabed.

As ROV *SuBastian* rose near the edge of the seamount, we observed major changes in benthic communities. These included barren areas of exposed hard rock, with some stony and soft corals and sea urchins at mid-water depths of 400–600 meters (1,310–1,970 feet). The abundance and diversity of species increased dramatically in the shallow-water section of the seamount, at less than 200 meters (660 feet) depth, where some sunlight reaches the seabed. Various coral species, sponges, algae, and reef fish were observed in this [mesophotic](#) (low light) environment. Cairns Seamount is clearly an important feature of the Coral Sea Marine Park that supports much biodiversity.



ROV *SuBastian* includes sensors and scientific equipment to support data and sample collection in the deep ocean. *Image courtesy of Schmidt Ocean Institute.*



Crew prepare to retrieve AUV *Sirius* after a mission. *Sirius's primary purpose is to collect imaging data used to create 3D maps of geography and corals. Image courtesy of SOI/Logan Mock Bunting.*



The benthic community on Cairns Seamount includes corals, sponges, fish, and crustaceans. *Image courtesy of ROV SuBastian/SOI.*

Original Cruise Log: <https://schmidtocean.org/cruise-log-post/from-modelling-to-diving-with-subastian/>
Expedition: https://schmidtocean.org/cruise/seamounts_canyons_reefs_coralsea/

Explorer (bio): <https://schmidtocean.org/person/zhi-huang/>

Coral Sea Marine Park (webpage): <https://parksaustralia.gov.au/marine/parks/coral-sea/>

Dr. Huang (image): <https://schmidtocean.org/wp-content/uploads/FK200802-Web-Zhi-Huang-20200810-MILLER-6019.jpg>

Coral Sea Marine Park (map): https://schmidtocean.org/cruise/seamounts_canyons_reefs_coralsea/

Cairns Seamount (images): <https://schmidtocean.org/wp-content/uploads/FK200802-CairnsSeamount-20200807-MILLER-1.jpg>

Multibeam echo-sounders (webpage): <https://schmidtocean.org/technology/seafloor-mapping/>

ROV *SuBastian* (webpage and image): <https://schmidtocean.org/technology/robotic-platforms/4500-m-remotely-operated-vehicle-rov/>

AUV *Sirius* (webpage and image): <https://schmidtocean.org/cruise-log-post/auv-sirius-a-profile/>

Rapid Transformation (video): <https://schmidtocean.org/cruise-log-post/rapid-transformation-video-update/>

Benthic community (image): <https://schmidtocean.org/wp-content/uploads/FK200802-BenthicCommunity-onCairnsSeamount-20200808-MILLER-4.jpg>

Mesophotic (webpage): <https://oceanservice.noaa.gov/facts/mesophotic.html>

LEARN MORE

Exploration of Cairns Seamount was part of the [Seamounts, Canyons, & Reefs of the Coral Sea Expedition](#) which focused on mapping the Coral Sea Marine Park in high resolution. Check out the Video Update to learn how the mapping images and samples collected supported this effort.

Video courtesy of Schmidt Ocean Institute.



Rapid Transformation - Video Update