

SEAMOUNTS OF THE SOUTHEAST PACIFIC

FKt240108 | #SoutheastPacificSeamounts

*Image credit: ROV SuBastian /
Schmidt Ocean Institute*




8 January - 11 February 2024

Salas y Gómez, Nazca, and Juan Fernández Ridges

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 **35**
science days

 **55,745**
square kilometers
mapped

7 
CTD &
rosette casts

 **20**
ROV dives

11 
terabytes of data
collected

699 
ROV samples
collected

EXPEDITION OBJECTIVES INCLUDE:

- Assessing whether distinct [biogeographic boundaries](#) between animals living in the upper bathyal zone in the Indo-West Pacific and the East Pacific are also present at deeper depths; the science team is interested in how the deep-sea organisms on the lower slope of the seamounts are related to animals studied on other ridges and seamounts in the Pacific.
- Creating detailed bathymetric maps of ten selected seamounts, including three in international waters and six in Chilean marine protected areas.
- Investigating biodiversity and distribution patterns of large invertebrates such as deep-sea corals, sponges, associated fauna, and fish.
- Evaluating the impact of intensive fishing on seamounts and assessing recolonization and recovery dynamics of those seamounts after fishing was banned.

The Salas y Gómez, Nazca, and Juan Fernández Ridges are underwater mountain ranges created by volcanic activity that stretch over 2,900 square kilometers. The Atacama Trench, the Humboldt Current system, and a large oxygen minimum zone further isolate the region, leading it to be considered as a separate biogeographic province with some of the highest [marine endemism](#) globally. Recent studies of the area were limited to depths between 30 and 300 meters; limited insights about deeper areas were pulled from commercial fisheries data. The interdisciplinary science team believed the area would have substantial undiscovered biodiversity.

During the 35-day expedition, the researchers explored and characterized the biogeography of ten seamounts along these ridges. The science team believes they may have discovered more than [100 species](#) likely new to science. They also observed deep-sea corals, glass sponges, sea urchins, amphipods, squat lobsters, and many other animals endemic to the region. Researchers will analyze the physiology and genetics of all the specimens to confirm whether they are species new to science; the process could take several years. Additionally, the team set a record for sighting the deepest-known photosynthesis-dependent animal in the world: a *Leptoseris*, commonly known as a wrinkle coral.

Image credit: ROV SuBastian /
Schmidt Ocean Institute

The expedition was the first opportunity for scientists to combine data on species distribution with deep-sea sampling and visual observations to study the animals and habitats associated with underwater mountains. This allowed them to investigate the biodiversity of the deep-sea animals and compare them with other seafloor communities.

The team also mapped 52,745 square kilometers of seafloor, discovering four seamounts within Chilean waters. The tallest of the four, a 3,530-meter seamount, was unofficially named Solito; they are working with Chilean authorities to name the seamount based on international protocols.

Each seamount explored hosted distinct ecosystems, many of which are [vulnerable](#), including [thriving deep-sea coral reefs and sponge gardens](#). Using the ship's underwater robot, ROV *SuBastian*, imagery, data, and samples were collected, which will be used to inform management plans for existing protected areas in the country's jurisdiction. Further, Chilean agencies are participating in efforts to create a marine protected area beyond national jurisdiction; this data will be valuable to their efforts. The observations of biodiverse hotspots in the region highlight the need to protect these ecosystems before they are damaged or lost.

RESULTING HIGHLIGHTS INCLUDE:

- Observing over 100 species thought to be new to science and expanded habitat ranges for several other species that had not been observed in the region before.
- Discovering four seamounts within Chilean waters, the tallest, Solito, has been submitted for formal naming.
- Revealing new data and imagery in an essential, previously understudied area and acquiring valuable knowledge to inform decision-makers as they work to manage marine protected areas in Chile and establish new ones in areas beyond national jurisdiction.

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