

# INTERDISCIPLINARY INVESTIGATION OF THE PESCADERO BASIN



## #PescaderoVentDiving2

10/7/2021 – 11/10/2021


La Paz, Mexico


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## Expedition Objectives

 Systematically map the Carmen, Farallon, and Pescadero pull-apart basins for exploring shallower seafloor shape and structure in order to better characterize tectonic activity in the region

 Collect heat flow measurements around the vent fields and sample vent fluids from as many significant vents as possible to understand what is going on beneath the earth's surface

 Further document the variability in microbial and macro-invertebrate communities and understand their relation to temperature and fluid chemistry and the potential origin of life on earth

The three-part expedition investigated basin-scale tectonics and hydrothermal venting in the southern basins of the Gulf of California. The first leg focused on collecting high-resolution multibeam mapping data of the Carmen, Farallon, and North Pescadero Basins. Legs two and three utilized ROV SuBastian for investigating the Auka and JaichMaa 'ja'ag hydrothermal vent fields in the South Pescadero Basin.

Scientists on Leg 2 focused on using heat flow measurements to understand the nature of fluids flowing beneath the earth's surface and how they feed the vents. Scientists on Leg 3 focused on conducting biological and ecological studies of the chemosynthetic communities living on and near the vent sites.



The science team collected Bathymetric data in largely unexplored parts of the Gulf of California basins, including the Carmen, Farallon, and northern Pescadero pull-apart basins. The data added to mapping data *Falkor* previously collected in 2018. The combined area mapped between 2018 and 2021 is one eighth the total surface area of the Gulf of California, adding a significant contribution to global mapping efforts. The mapping data additionally aids in our understanding of tectonic activity in the Gulf of California and could lead to better prediction of earthquakes in the future.

New high-temperature vents discovered at the northern and southern extreme of the JaichMaa 'ja'ag vent field greatly extend the area of known hydrothermal venting in the Pescadero Basin. The two newly discovered vent

areas remain unsampled, making these locations essential targets for future exploration. Additionally, heat flow measurements were combined with vent fluid samples to better understand what is happening beneath the seafloor that is creating the vent systems. The hydrothermal vents in Pescadero Basin are unlike other known vents around the world, as they emit clear, shimmering liquid instead of opaque liquid. The science team is working to understand if the liquids all come from the same source or from separate cracks in the earth's crust. Lastly, the scientists collected biological specimens and sediment cores to examine the ecology, animals, and microbes present in the southern Pescadero Basin in order to understand symbiotic relationships between animals and bacteria and how they survive in such extreme conditions.



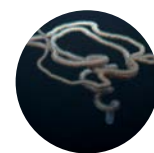
The mound between Auka and JaichMaa 'ja'ag will be named Maijia awi, after the divine serpent of water in the creation myth of the Kumiai people, one of the Yuman indigenous groups of Baja California.

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The scientists observed 10 known species not previously found before in the Pescadero Basin.

Photo by Monika Naranjo



The southern mound is to be named 'melsuu', after the word for "blue" in the Kiliwa language, referring to the dense population of iridescent blue scale worms found at the site.

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Six or more possible new species were discovered, including polychaetes, arrow worms, crustaceans, mollusks, and roundworms.

Photo by Monika Naranjo

