

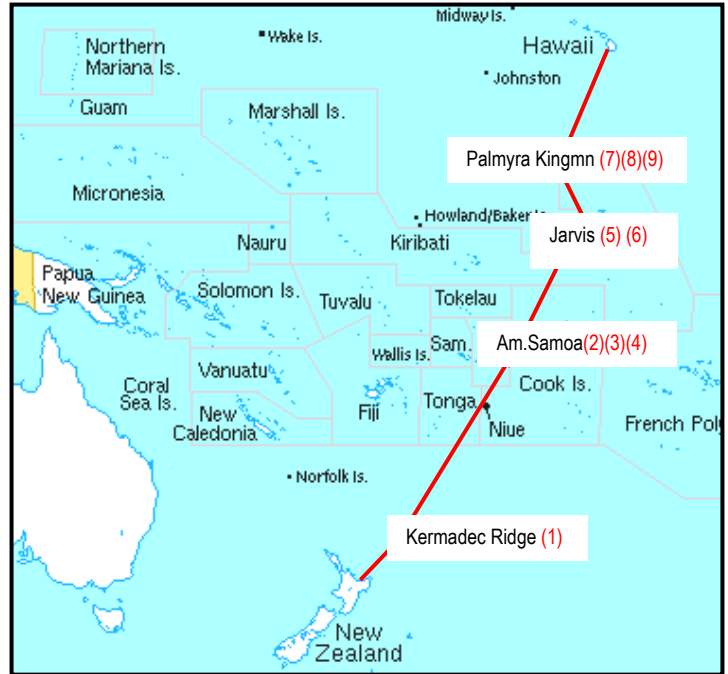
## NURP Supports Pioneering Voyage to the South Pacific

On March 18, 2005, the Hawaii Undersea Research Laboratory (HURL), NOAA's Undersea Research Program for Hawaii and the Western Pacific, began the longest, most-challenging research expedition in its 25 year history. The pioneering cruise, funded largely by NOAA's Undersea Research Program (NURP); NOAA's Office of Ocean Exploration; and scientific communities from New Zealand and Germany, over a period of four months conducted the first extensive deep-sea scientific investigation of U.S. territories in the South Pacific Ocean. Scientists studied the region's many rare and endangered species of fish, mammals, and benthic fauna; thousands of acres of coral reefs; and active submarine volcanoes.

**Cruise Logistics** The round trip journey from Hawaii to New Zealand took place aboard the R/V Ka'imikai-o-Kanaloa (K-O-K), which HURL has equipped with two *Pisces* deep diving submersibles, an ROV-150 remotely operated vehicle, and a sonar system capable of producing detailed bathymetric maps. Scientists conducted 67 deep-sea investigatory dives during the expedition. NOAA-funded research was conducted at Kermadec Ridge, American Samoa, Jarvis Island, and Kingman Reef & Palmyra Atoll.

### Research Projects

At Brothers, a submarine volcano in the highly active **Kermadec Ridge (1)** (see above map), scientists from NURP's National Institute for Undersea Science and Technology (NIUST) investigated the metabolites associated with hydrothermal vent bioprocesses, which may have applications in the pharmaceutical industry.



Cruise Itinerary. Red numbers indicate NURP research sites.



*Pisces V* submersible. The *Pisces* are two of only nine submersibles in the world that can dive to depths of 2000 meters.  
Photo: HURL



Black tipped shark (left) and butterfly fish, Palmyra Atoll.  
Photo: The Nature Conservancy

## NURP & OE Perspective

The expedition continued to **American Samoa**, a group of highly eroded volcanic islands surrounded by 114 sq miles of coral reefs. Pago Pago, a natural deepwater harbor located on the island of Tutuila, is home to the National Park of American Samoa.

Vailulu'u, an active undersea volcano, lies just east of the Samoan island of Ta'u. Its crater, two miles in diameter, offers a rare opportunity to study processes that have occurred for billions of years in the Earth's crust and mantle. Hubert Staudigel (University of California San Diego (3)) investigated microbial mediation of basaltic glass alteration, an important process that contributes to the flux of many elements between oceanic crust and seawater. Craig Young (University of Oregon (4)) studied the biotic communities associated with Vailuluu's hydrothermal vents, which play a key role in fostering the region's highly biodiverse marine environment.



Left: Razor clams & starfish on submarine volcano along Kermadec Ridge, NOAA. Right: Deep water Roughy seen at Rose, Jarvis and Kingman Atoll . Photo:NOAA

Researchers next stopped at **Jarvis**, a small tropical island located just south of the equator. Here, Brendan Roark (Stanford University,(5)) and Bruce Mundy and Frank Parrish (NOAA Fisheries (6)) investigated the coral habitats of the island's fringing reef. The final research site, **Kingman Reef and Palmyra Atoll**, is comprised of 680 acres of land and over 15,000 acres of reefs that provide habitat for hundreds of species of fish and coral. Palmyra also hosts many rare and endangered species, including black-tip sharks, giant clams, pilot whales, and green turtles. Owned in part by the Nature Conservancy, Palmyra is under U.S. jurisdiction.

Jim Maragos of the US Fish & Wildlife Service, surveyed a shipwreck at Rose Atoll. Brendan Roark (Stanford University) (8) studied growth patterns of deep sea corals to better understand climate variability at the decadal to centennial scales. Bruce Mundy and Frank Parrish (NMFS) (9) investigated the area's deep-water fish and coral habitat where they found far less biological density than expected.

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