HAWAIʻI UNDERSEA RESEARCH LABORATORY
QUICK LOOK REPORT
DIVE: Pisces IV 148

MISSION STATUS

Location: Palmyra Atoll

Latitude: ***Begin*** 5° 50.7'N **Longitude:** ***Begin*** 162° 07.0W

Mission Date: 26 July 05 **Duration:** 6hrs 12min

Maximum Depth (m): 1141m

Project Title: Past Decadal-Centennial Climate Variability Revealed by Deep Sea Corals from the Central North Pacific Gyre

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Address: RBD (as above).

Observer 2: T.P. Guilderson
T Guilderson: Center for AMS, UC/LLNL Livermore CA,
also at Dept. of Ocean Sciences, UC Santa Cruz, Santa Cruz CA

Pilot 1: Terry Kerby **Pilot 2:**

Scientific Data Acquired:
Video record of distribution and abundance of deep-sea corals along a vertical transect on southern side of Palmyra Atoll, roughly offshore of the "Cabbage Falls" SCUBA dive site. Fossil, sub-fossil, and living deep-sea macrofauna were sampled using the Pisces IV and were returned to the surface in a coral collection basket.

Objectives: Acquire direct observation (e.g., video and notes) of the i) vertical distribution of deep-sea invertebrate macrofauna with an emphasis on deep-sea corals and related genera; ii) substrate/topography with a view towards establishing the relationship with benthic community properties. A primary mission goal is to collect fossil, sub-fossil, and live specimens of deep-sea corals across a range of depths and habitats.

Observations, findings, etc: (Also see Appended Dive Log)

Once again, John Smith stayed up all night and produced a fabulous swath map of the seafloor topography surrounding Palmyra – as he did at all of our dive sites this trip. This map was invaluable in the selection of dive sites. Kudos also to everyone involved in the maintenance of the submersible in the evening.

On PIV-148, Pisces V touched down at 1141 m on a gently sloping fine-to-coarse carbonate sand surface. The dominant benthic macrofauna was a large sea urchin. Significant numbers of benthic fish species were observed including 1 chimaera fish on this sandy slope. Above 1000 meters, we began to encounter small limestone scarps (1 to 4 meters in height). In some cases, hard rock surfaces were visible however, sands covered most surfaces. Occasionally, we encountered rubble in debris fans and debris fields. Some of these debris fans included large boulders of carbonate limestone float material.

Continuing upslope, the terrain steepened above 900 meters to >45 degrees with escarpments increasing in height up to 20 to 30 meters. Again, nearly all surfaces were sediment covered, even on fairly steep slopes. Only vertical surfaces were primarily hard rock and the bases of these were often fine sediment debris piles, indicative of an active and pervasive downslope sediment transport regime – one that is not entirely restricted to large-scale sediment transport channels.

Dendrophyllia was observed above about 750 meters, with some large colonies at ~550 meters. Above 500 meters, we encountered another large sand and gravel debris slope. At 320 meters we began to traverse along the 320 meter isobath to the west and began observing large vertical escarpments that were at least 60 meters high. Deep sea corals, including *Gerardia* and *Acanella* were found along one cliff face, with most specimens growing outward from the cliff or downward from the hanging wall of a cavernous depression in the limestone wall.

Species List: (not meant to be completely inclusive)

Deep sea corals observed: *Acanella* sp. (minor), *Dendrophyllia* sp. (major), Gerardia sp. (moderate at end of dive), cup corals, *Narella*, *Bathypathes*

Echinoderms: *Diadema spp., Araeosoma sp., Phormosoma sp.*

Other: *Echinorhinus cookei*, rat tails, Jelly-nose eels, cusk eels, Goosefish (*Sladenia sp.*), *Satyrichthys sp.* (rake fish), Chimaera fish, octopus (*Cirroteuthis sp*.), *Paleopatides*, crinoids, *Plesiopenaeus (c.f. edwardsianus)*, octopus *(Grimpoteuthis sp.), galatheid crabs, salps*

MISSION EVALUATION:

A. Limitations, failures, or operational problems noted:

The submersible operated just fine albeit without a working laser sizing system. We did lose about 2 hours of dive time because of a broken brake on the main submersible deployment winch (lifting winch).

B. Recommendations for corrective action or improvement:

This was the first morning that the A-frame and winch system were not checked during rounds at ~5am, usually associated with passing the dive location to the back winch cabin. The swath mapping and final site selection extended to ~6:30 which interrupted the normal routine.

C. In your opinion, did the mission essentially achieve its purpose?

YES.

D. Compare actual work accomplished with the work that was expected to be accomplished. All expected work was accomplished. We were especially please to encounter *Gerardia* specimens at the end of the dive, including some very large fossil/subfossil specimens.

E. List specimens or samples collected on the mission. (See Sample List Below):

Dive PIV-148

Sample Number	Time (L)	Latitude Min/decM	Longitude Min/decM	Depth(m)	Comments
P4-148-1	1329			675 m	Live Dendrophyllia
P4-148-2	1345			588 m	Live Dendrophyllia (pinkish)
P4-148-3	1345			588 m	Fossil Dendro (next to live dendro)
P4-148-4	1440			331 m	Large fossil dendro
P4-148-5	1514			340 m	Branch of Acanella
P4-148-6	1544			436 m	Dead Geradia (in float) likely from above 350-370m
P4-148-7	1548			436 m	Dead Geradia (in float) " " " "
P4-148-8	1552			436 m	Dead Geradia (in float) " " " "