HAWAIʻI UNDERSEA RESEARCH LABORATORY
QUICK LOOK REPORT
DIVE: Pisces IV 147

MISSION STATUS

Location: Palmyra Atoll

Latitude: ***Begin*** 5° 54.9'S **Longitude:** ***Begin*** 162° 08.2'W

Mission Date: 25 July 05 **Duration:** 8hrs 38 min

Maximum Depth (m): 1245 m

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

Principal Investigator: Robert B. Dunbar
Department of Geological and Environmental Sciences
Stanford University
Stanford, CA 94305-2115

Phone: 650-725-6830 (wk) 650-725-0979 (fax)

Observer 1: T Guilderson
Address: Center for AMS, UC/LLNL, Livermore CA
also at Dept. of Ocean Sciences, UC Santa Cruz, Santa Cruz CA

Observer 2: B. Roark
Department of Geological and Environmental Sciences
Stanford University
Stanford, CA 94305-2115

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

Scientific Data Acquired:
Video record of distribution and abundance of deep-sea corals along a vertical transect on northern side of Palmyra Atoll. Selected fossil, sub-fossil, and living deep-sea macrofauna were sampled using the Pisces IV and 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)

This dive was a vertical transect from approximately 1200m to less than 300m. The slope had two significant hinge points beginning with a steep (45deg or more) slope from 1245- ~600m). The first hinge point occurred between 600 and 540 meters at the base of the first of two cliffs and or walls. The first extremely sleep slope ran ran from ~540 to ~400 followed by a near vertical wall between 400 and 230m with a return to a 45 degree or more slope between ~230 and 218m. The break or hinge points on the terrain vary slightly in the east-west direction. From depths of 1245 to ~540 m, the terrain consisted of limestones, mostly well-bedded, some massively bedded and some finely bedded. We encountered nodular-appearing limestones as well as limestone conglomerates and breccias. The carbonate hardground was a blend of creamy white with some yellowish or chalky patches. Sand scoured channels in the limestone hardground were frequently encountered regardless of slope. Channels varied in spatial scale from a few inches to several feet across and depths to a foot or more. At depth, elongate ridge features of 1-3m vertical relief were encountered. The ridge features were perpendicular to the slope – likely these are erosional features created by sand scour of the carbonate hardground. The ridge features were frequently Mn-coated. This was a sediment depauperate region with only a light coating of fine grained material trapped in sparse pockets or under overhangs of the 1-3m carbonate elongate ridge features. Walls had large dissolution features apparent in the cliff wall, ranging from small dissolution pits to large-scale cavernous features. The terrains between 500 and 280 meters included large overhangs, as well as canyon and amphitheater like erosive features in the cliff wall. Large blocks were found between ~540 and ~500m. Pockets of talus and coarse debris including sub-fossil Dendrophyllia branches were frequently encountered at the base of the wall and on the odd ledge. At the shallowest depths we returned back to coarse carbonate hardground with sand.

Numerous soft coral colonies (sea whip type and primnoid), and large black corals (possibly *Antipathes* or close relative) were observed growing out from vertical walls between ~320 and 400 meters. Portions of the wall environment supported numerous solitary cup corals in a tight acme zone between ~350 and ~320meters. Smaller sized primnoid acme zone (possibly Calyptrophora) seemed to be deeper at ~500m and focused on the leading edge of angular outcrop features on the wall.

Although not large in diversity, numerous eel and eely-fishes were encountered between ~1200 and ~800m. Pockets of tiny scorpionfish (?) sitting out on the hardground were encountered at mid depths. One large (> 1x1m) round ray was encountered.

Species List: (not meant to be completely inclusive)

Deep sea corals/gorgonians/sea fans/whips observed: *Acanella* sp., *Dendrophyllia sp*., *Iridogorgia superba, Bathypathes sp., Antipathes spp.(?)*

Echinoderms: *Cidarid urchins, Caliderma spp.*, Brisingid sea star, crinoids, *Histocidaris variabilis,*

Other: rat tails, cusk eel (Brotula), *Coryphaenoides sp*., *Caelorinchus sp. (cf. tokianus)*, *Sladenia sp.*, flatfish, grey goosefish *Lophiodes miacanthus*, round ray *plesiobatis daviese*, *Grimpoteusthis sp.*, lots of shrimp; *Nematocarcinus tenuirostris*, galloping shrimp, among others.

MISSION EVALUATION:

A. Limitations, failures, or operational problems noted:

None**.**

B. Recommendations for corrective action or improvement:

We need to devise a better system for retaining delicate coral samples during recovery. On the next dive, we propose to load the "bio-box" into the basket.

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.

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

Dive PIV-147

Sample Number	Time (L)	Latitude Min	Longitude Min	Depth(m)	Comments
P4-147-1	1008	5 54.779'N	162 8.168'W	1064 m	Live Acanella
P4-147-2	1056	5 54.395N	162 8.174'W	743 m	Live Dendrophyllia
P4-147-3	1122			653 m	Fossil Dendrophyllia
P4-147-4	1342			480 m	Live primnoid gorgonian
P4-147-5	1539	5 54.223'N	162 8.476'W	623 m	Fossil Dendrophyllia