HAWAI'I UNDERSEA RESEARCH LABORATORY

QUICK LOOK REPORT
DIVE: P5-698

MISSION STATUS

Location: East Brooks Bank, NWHI

Latitude: 23° 57.5'N **Longitude: 166° 43.8'W**

Mission Date: 10 Nov 07 **Duration: 8 hours 20 mins**

Maximum Depth: 602 meters

Project Title: Deep sea coral research activities in Papahanaumokuakea Marine National Monument (Monument permit # PMNM-2007-050)

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Scientific Data Acquired: Prepare an abstract outlining your objectives, techniques, findings, etc.

Objectives: Deep-sea corals are a new and unique paleoclimate/paleoceanographic archive that can extend our observations of ocean physics and climate to periods well before the onset of the instrumental record. Using a collection of submersible- and ROV-recovered specimens of a variety of deep sea coral species our research program is working on the development of climate time series that will improve our understanding of North Pacific variability over decadal to centennial timescales. Preliminary results on deep-sea corals from Hawaii, the Line Islands, and the Gulf of Alaska document great longevity (live collected corals that are over 4,000 yrs old) and good preservation of even older fossil corals.

The primary objective of our research efforts in the PMNM is to recover a suite of different deep-sea corals, both living and dead, from a range of locations and depths (300-1800) to develop long climate time series. We will focus the majority of our work in the

upper 700 meters where deep-sea corals are most abundant and are also at an optimal depth to monitor variations in the permanent thermocline. Different sites are needed to assess the degree to which we are seeing artifacts associated with island or bathymetry effects that can influence the extent to which any specific site records regional versus local signals.

Deep sea coral species such as *Corallium* spp., Dendrophyllia, sp., and *Isididae* as well as colonial zooanthids such as *Gerardia* (gold corals) and *Leiopathes* (black corals) collected alive are the primary objectives. These are the species we have been working with to date as they hold the greatest promise as paleoclimate archives and are sometimes harvested as part of the precious coral trade.

Observations, findings, etc:

This dive began at 576 m on the southern side of East Brooks Bank (see map). Our objectives were to collect *Dendrophyllia, Corallium, Gerardia*, and *Leiopathes* from a depth transect extending from as deep as possible to as shallow as possible. The primary purpose for this collection transect is to use C14 and U/Th dating to reconstruct past changes in ventilation age of the thermocline water of the North Pacific gyre. We selected our dive site based on the swath map, the location of the Parrish study site at Brooks, and the results of several prior ROV transects. We chose not to collect at the Parrish study site but rather chose to work along a transect beginning about 2 nm distant and ending near the study site.

We started the dive by going deeper, down to 600 m, and began an along-contour transect pattern: 0.3 nm at 600 m and then 0.3 nm at 550 m. We then ascended to 500 m along a rocky ridge. After the ridge died out we ascended up to 363 m moving NW. Finally began a transect towards the Parrish study site that caused us to descend to a depth of 472 m.

We observed that corals were less abundant below 560 m and above 420 m. The most significant finding was of a very dense and diverse deep sea coral bed at 550 m. This bed contained many Corallium and bamboo corals. Corals were collected from depths between 599 m (Dendrophyllia) and 390 m (Corallium). Will advise dive group tomorrow to collect additional Dendrophyllia and will conduct a deeper ROV run tonight.

Species list:

Coral samples were taken as follows:

	Sample	Time		Lat			Long		Depth
Sample 1	dead Gerardia branch unattached on sand	9:06 AM	23	57.576	N	166	43.883	W	591
Sample 2	Dendrophyllia (live) base only	9:41 AM	23	57.639	N	166	44.03	W	600
Sample 3	Corallium Regale (live) base + big branch	10:31 AM	23	57.732	N	166	43.881	W	549
Sample 4	Bamboo coral (live)	11:06 AM	23	57.732	N	166	43.881	W	538
Sample 5	dead Gerardia stump	11:17	23	57.766	N	166	43.869	W	529

		AM							
Sample 6	dead stump bamboo(?)	11:36 AM	23	57.766	N	166	43.869	W	529
Sample 7	Corallium regale (live)	11:46 AM	23	57.766	N	166	43.869	W	529
Sample 8	dead Gerardia stump	12:40 PM	23	57.813	N	166	43.741	W	502
Sample 9	Corallium (live)	1:43 PM	23	57.859	N	166	43.54	W	390
Sample 10	dead Gerardia stump	2:28 PM	23	58.64	N	166	44.18	W	420
Sample 11	Leiopathes (live)	2:41 PM	23	58.64	N	166	44.18	W	424
Sample 12	Corallium secundum? live	3:04 PM	23	58.64	N	166	44.18	W	443
Sample 13	dead Gerardia	3:13 PM	23	58.786	N	166	44.21	W	459
Off Bottom		3:45 PM	23	58.78	N	166	44.21	W	472

MISSION EVALUATION:

Limitations, failures, or operational problems noted:

The Titan arm worked fine during the mission. The basket worked well for corals, especially the new “lid” to help keep corals in the basket during recovery.

Recommendations for corrective action or improvement:

In your opinion, did the mission essentially achieve its purpose? Compare actual work accomplished with the work that was expected to be accomplished.

Yes, we achieved our main objectives.

List specimens or samples collected on the mission. (see above)

DATA RELEASE

Data may be retained by the project leader for up to 2 years after the mission date with the following exception. NOAA may request to use photos for publication or publicity purposes at any time.

Fill in the appropriate statement below and sign this form.

I hereby release the data archived by HURL for public consumption following mission (project title)

held on 11/2/07 (date) in the following way:

a. CTD data by immediately (date)

b. video and images by 11/2/08 (date)

c. other _____ (date)

d. I will give my written consent to individuals wishing to use these data prior to the above dates depending on the nature of the request(s).

_____ Principal Investigator

Robert B. Dunbar (dunbar@stanford.edu)