HAWAI'I UNDERSEA RESEARCH LABORATORY

QUICK LOOK REPORT
DIVE: Pisces IV - 145

MISSION STATUS

Location: Kingman Reef, northern Line Islands

Latitude: 06°22.845'N **Longitude:** 162°19.774'W

Mission Date: 23 July 2005 **Duration:** 9 hours 38 mins

Maximum Depth: 740 meters

Project Title: Exploration of the deep slopes of the US Line and Phoenix Islands to investigate the biogeography of deepwater fish and corals, and identify paleo-shorelines.

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Pilot 1: Max Cremer

Pilot 2:

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

Objectives: To collect data for 1) a comparison of fish and coral community structure at 300-500 m between the U. S. Line Islands and the Northwestern Hawaiian Islands (NWHI), and for 2) a comparison of the submerged paleo-shorelines of the U. S. Line Islands with those of the NWHI. Survey protocols are those previously used for surveys in the NWHI.

Observations, findings, etc:

The dive began at 8010 when the Pisces IV was cleared to descend. At 0841, we reached the bottom at 740 m (position = 06°22.845'N,162°19.774'W; temperature = 4.6°C). The bottom at this depth was a gentle, almost flat slope covered with thick, fine sediment. Dominant organisms included stalk-like sea pens (*Funiculina* sp. 2), *Nematocarcinus* and *Plesiopenaeus* shrimps, and a few broader, feathery sea pens. A noticeable current was present. After several minutes needed to stabilize the submersible's trim, a sediment sample (scoop #2) was taken at this location at 0857.

After filming and photographing animals at 740 m, we began moving upslope at 0921. At 0933, a 30 cm deep-bodied ophidiid (*Pycnocraspedum* sp.?) and several other smaller animals of interest were seen near a small rock outcrop in the sediment at 702 m (4.9°). We stopped to obtain images of these. While we were filming, two large (ca. 160 cm) oilfish (*Ruvettus pretiosus*) swam to the submersible and inspected us. After filming these, we continued to move upward. At 1001, a moderately large (ca. 40 cm) congrid eel (similar to "congrid white fins" of the HURL identification aids, perhaps a *Bathycongrus* sp.?) was found and filmed at 617 m (5.8°; 06°22.845'N,162°19.774'W). We continued upslope until the 500 m depth was reached at 1024 (6.5°; 06°22.939'N,162°19.901'W). This depth was at the bottom of the steeper carbonate rock substrate, and the heavily sedimented plain ended here.

The first sampling transect, at 500 m, began at 1038, from the location where we stopped the upslope transit. This transect moved westward across steep rock slopes, ridges, and gullies, and over less steep sedimented areas. Fewer gorgonians than anticipated were seen on this and the other transects on this dive. Small *Dendrophyllia* fans were the most abundant. Galatheid crabs, *Eumunida* and smaller species (*Munida*?), were seen in association with the fans and in holes of the substrate. A few *Bathypathes conferta,* an antipatharian, were found, including one beautiful 3 m tall plume with a long stalk overgrown by bushy colonies of a hydroid; the transect was paused to film this. Other dominant organisms were actinarians, crinoids, a grey-tan holothurian with cirri on the body, sea urchins that were probably an *Araeosoma* species, and macrourids. The transect ended at 1119, 502 m depth (6.7°; 06°22.635'N,162°20.197'W), on a slight, soft sediment slope.

From the end of that transect, after obtaining images of organisms at the site, we moved upslope at 1131 to 486 m. At 486, we reached the end of the heavily sedimented slope at the base of a steeper rock escarpment (7.1°; 06°22.656'N,162°20.197'W). Another sediment sample was collected at 1135 (scoop #3), for the planned 450-500 m sample. The area and nearby animals were filmed. At 1151, we resumed transit upslope, reaching 456 m at 1210 (7.2°; 06°22.669'N,162°20.217'W). A position was obtained here because the surrounding rock escarpment was steep, and a perch for the submersible was nor available at 450 m. The 450 m transect began from this point at 1213, moving westward again because of a request from the KOK captain to do so for safety of the ship during tracking, necessitated by wind and sea conditions. The transect was paused at 1235 to change videotapes in order to capture the entire survey, with the transect resumed at 1237. Many of the dominant organisms at 450 m were those on the previous transect, although *Dendrophylla* were less abundant, and numbers of the same unidentified sea urchin collected at Jarvis Island were seen in aggregations on escarpment edges. *Plesionika* shrimp were seen often. *Epigonus,* macrourids, and morids were seen, as well as a couple of tinselfish, *Grammicolepis brachiusculus*. A small (3-4 cm) scorpaenid species, probably juvenile *Setarches*, seen resting on sedimented areas was the numerically dominant fish. The transect ended at 1258 and 452 m (7.1°; 06°22.619'N,162°20.708'W).

After filming animals at the terminus of the 452 m, we began moving upslope a 1306, pausing to obtain more images as animals of interest were encountered. At 1323, we reached 400 m (7.5°; 06°22.676'N,162°20.717'W). The 400 m transect began from that location at 1331, continuing westward. As with the previous transect, this one crossed steep escarpments incised with canyons having sedimented floors. Dominant organisms

continued to be the *Dendrophyllia*, various anemones, *Araeosoma* urchins, the unidentified precipice edge urchin, the gray cirrate holothurian, *Plesionika*, and *Epigonus*. *Chrionema chryseres* were seen occasionally. The juvenile scorpionfish (*Setarches*?) were especially abundant, at 1-2 per square meter in many areas. *Grammicolepis* were seen again, and the transect was paused at 1339-1341 to film two that were together at one outcrop. The transect ended at 1432 and 405 m (7.8°; 06°22.608'N,162°21.277'W).

We then moved upslope at 1441 from the position of the 400 m transect end. At 1449 we stopped to collect one of the gray-tan holothurians with cirri that we had been seeing throughout the dive (350m, 7.9°, 06°22.658'N,162°21.285'W). A *Lophiomus* anglerfish and a *Satyrichthys* armored searobin in the same area, along with a number of the small scorpionfish, were filmed and photographed [these fish may have been between the 450 and 400 m transect, but memory fails]. A sediment sample had been planned for the 350-400 m depth range, but when one was requested at this location it was discovered that only two samplers had been loaded into the submersibles basket, even though we had been told that three samplers had been loaded. The 350-400 m sample could not be taken because of this. We began the 350 m transect from this location at 1501, once again moving west. No *Dendrophyllia* or juvenile scorpionfish were seen on this transect. *Cirrhipathes spiralis* were the dominant soft coral at 350 m. Other organisms often seen included anemones, unidentified sea stars, various urchins, the gray-tan holothurian, and *Epigonus* species. No deepwater species of predominately shallow-water families were seen on this transect. The transect ended at 1521, at 349 m (7.8°, 06°22.545'N,162°21.926'W) on a very small ledge of an otherwise steep escarpment. This ledge had several animals of interest that were filmed and photographed.

At 1548, after the transects were completed, we moved upslope for the remaining minutes left before the submersible needed to move offshore for retrieval. The uppermost depth of this transit was 261 m (9.3°, 06°22.595'N,162°21.930'W). Three large, multiarmed sea stars similar to *Coronaster eclipes*, but white rather than red, were at the stopping point of the dive.

At 1603, the survey was stopped and the submersible left bottom for movement out into open water toward the ship. The video cameras were turned off. At about one minute of travel time outward from the slope we encountered a swarm of many small semi-transparent fish with dusky abdomens and heads. From their general shape, size, and appearance, as well as from midwater trawl samples taken in the boundary-fauna sound scattering layer arising nocturnally from the slope of Palmyra Atoll, it seems probable that these were the small hatchetfish relative *Araiophos eastropas*. The Pisces IV surfaced at 1648 and was on deck for the end of the dive at 1701.

Overall, animal life was sparse and most of the rock was barren, much like Rose Atoll and unlike Jarvis Island. No eteline snappers or any grouper species were seen. Large fish in general were rare at this site. No *Symphysanodon* were observed; the dominant smaller fish were the *Setarches*-like scorpaenid and *Epigonus* species. No *Acanella*, *Gerardia*, or *Corallium* were seen; the dominant corals were *Dendrophyllia* at 500-400 m, and *Cirrhipathes spiralis* at 350 m and shallower.

Species list:

Cnidarians (gorgonians and antipatharians):
Dendrophyllia sp. (orange fan gorgonian, Dendrophyllidae)
Callogorgia gilberti (feathery gorgonian, Primnoidae)
Paramuriceid blue (blue fan gorgonian, Paramuriceidae)
Bathypathes conferta (feather-shaped antipatharian, Antipathidae)
Cirrhipathes spiralis (spiral sea whip, Antipathidae)

Cnidarians (other):
Funiculina sp. 2 of the HURL identification guides (a slender sea pen, Funiculinidae)
An unidentified feathery, broad, dark red sea pen (similar to Kophoblemnidae or Pennatulidae)
Tubulariid hydrozoan overgrowing stalk of *Bathypathes* (Tubulariidae)
Anthomastus sp. "red" of HURL identification aids (Alcyoniidae)
Various sea anemones, including an abundant brown anemone ca. 4-10 cm disk diameter (family unknown)
Orange *Corallimorphus* "sp. 2" of the HURL identification aids (Corallimorphidae)

Ctenophora:
Lyrocteis sp. (sessile brown comb jelly, Coeloplanidae)

Crustacea:
Nematocarcinus tenuirostris (long-legged shrimp, Nematocarcinidae)
Plesiopenaeus edwardsianus (large, red shrimp with large, flexible swimmerets, Penaeidae)
Plesionika cf. species 2 of the HURL identification aids (pinkish, slightly iridescent shrimp with indistinct bars)
Euminida? species (large squat lobsters living on or near gorgonians and antipatharians, Chirostylidae)
Munida? Species (smaller squat lobsters living in substrate holes, Galatheidae)
Unidentified large crab with a body and chelae similar to a Dungeness crab but with long legs similar to a majid or homolid (species also seen at Jarvis, family unknown)
Unidentified large crab with a rounded carpace similar to *Randallia*, but short legs and chelae, and grooves and bulges on the carapace (species not in HURL identification aids, family unknown)
Paramola alcocki (decorator crab, Homolidae

Echinodermata:
Various unidentified crinoids
Various unidentified ophiuroids (brittle sea stars, Ophiuroidea)
Light orange sea star with a broad disk and short triangular arms (family unknown)
Multiarmed sea star resembling *Asthenactis papyraceus* but not "fuzzy" and with more tapered arms (family unknown)
White sea star similar to *Coronaster eclipse* (Asteriidae)
Novodinia pacifica (a 16 armed seastar resembling a crinoid but with much more robust arms and spines on the arms, Novodiniidae)
Araeosoma species (large, purple-gray urchin with depressed test and moderately short spines)
Unidentified gray sea urchin (living in colonies on upper edges escarpments, family unknown)
Unidentified holothurian (gray-tan with cirri or tube feet on dorsal and lateral body surfaces, voucher specimen collected, family unknown)

Other invertebrates:
A clumping, raggedly bushy organism resembling gray-brown algae, perhaps a gorgonian or other cnidarian, worm tubes, or a bryozoan (family and phylum undetermined)

Sharks:
Etmopterus sp. (small, black dogfish, Etmopteridae)

Bony fishes:
Unidentified congrid eel similar to "congrid white fins" of HURL identification aids

(Congridae)
Araiophos eastropas? (small hatchetfish relative, seen in midwater while traveling offshore at end of dive, Sternoptychidae)
Ijimaia sp. (jellynose "eel", Ateleopodidae)
Lophiomus cf. *setiger* (goosefish, Lophiidae)
Pycnocraspedum cf. *armatum* (deep-bodied brotulid, Ophidiidae)
Various unidentified rattails (Macrouridae), including a *Caelorinchus* species with two bars near the dorsal fin, a larger *Caelorinchus* similar to *C. tokiensis*, a species probably in *Nezumia*, small *Hymenocephalus*, and others.
Unidentified morids (probably *Physiculus* species, codlings, Moridae)
Grammicolepis brachiusculus (tinselfish, Grammicolepididae)
Small (2-4 cm) scorpionfish, probably juvenile *Setarches guentheri* (scorpionfish, Scorpaenidae)
Satyrichthys sp. (rakefish or armored searobin, Peristidiidae)
Synagrops argyrea (laternbelly, Acropomatidae)
Epigonus atherinoides (elongate 5-8 cm deepwater cardinalfish, Epigonidae)
Epigonus species (smaller 2-3 cm deepwater cardinalfish with dark fin edges, Epigonidae)
Chrionema chryseres (green-spotted duckbill, Percophidae)
Ruvettus pretiosus (oilfish, Gempylidae)
Unidentified snake mackerel (identified as *Rexea* sp. at depth, but more likely *Nealotus, Promethichthys*, or another dark species, Gempylidae)

MISSION EVALUATION:

Limitations, failures, or operational problems noted: The Sony camera on the top middle of the submersible failed at 1335, a little after halfway during the dive. Examination by Collin Wollerman determined that water in the camera cable caused the failure. Collin repaired the cable and had the camera operational for the next day's dive.

The dive plan was to do alternating transects at four depths, moving in opposite directions to end above the first transect's starting position. Wind and sea conditions necessitated alteration of this plan for the safety of the KOK working near the reef. The transect paths were therefore modified to a stepped pattern moving consistently to the west, to keep the dive safe. This makes it difficult to determine if the progressive attenuation of biodiversity seen during the survey was related to change at depth versus change related to a westward transition of topography.

A sediment sample that had been planned for 350-400 m could not be taken because only two sampler had been loaded in the submersible's basket, instead of the three requested.

Otherwise, all operations and equipment functions were excellent.

Recommendations for corrective action or improvement: None. Responses to the minor limitations on this dive were excellent.

In your opinion, did the mission essentially achieve its purpose? Compare actual work accomplished with the work that was expected to be accomplished.
The mission achieved its purpose and all work planned was accomplished except for collection of one of three sediment samples. The pilot, Max Cremer did an excellent job in maneuvering the submersible and obtaining samples. Collin Wollerman's work to fix the Sony camera cable problem after the dive is appreciated. Special thanks are due to John Smith for his 24 hour Seabeam mapping effort for Kingman Reef during the day and night prior to the dive. John's sustained effort gave us information that we otherwise would not have had to identify dive sites when we began surveys at this unmapped area.

List specimens or samples collected on the mission.

One unidentified gray holothurian with cirri on the body, a dominant species during much of the survey (collected by Bruce Mundy; specimen to be sent to the U. S. National Museum for identification).

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. Photos taken by Jim Maragos, however, will require prior permission from the photographer.

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_____(date) in the following way:

a. CTD data by_____(date)

b. video and images by_____(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

Bruce C. Mundy