HAWAI'I UNDERSEA RESEARCH LABORATORY

QUICK LOOK REPORT
DIVE: Pisces V - 653

MISSION STATUS

Location: Jarvis Island, Line Islands

Latitude: 00°23.075'S **Longitude:** 160°01.514'W

Mission Date: 20 July 205 **Duration:** 7 hours 46 mins

Maximum Depth: 746 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

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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 0808 when the submersible was cleared to descend. At 0848, the bottom was reached at 746 m (position = 00°23.075'S, 160°01.514'W; temperature = 5.6°). Crinoids were very abundant at this depth. The Pisces V moved upslope, surveying the fauna, substrate, and topography, stopping often to obtain images. Large fish observed at these depths included *Plesiobatis daviesi*, a torpedo ray (first record of the family Torpedinidae in the central Pacific outside of Hawai`i), and a very large (1.5 m) *Ijimaia* species. Among the smaller fish observed were macrourids and what seems to be a *Neocyttus* species (family Oreosomatidae). The latter, also seen in abundance during the previous night's ROV transect, is a new record for this family in the tropical oceanic Pacific. At ca. 0910, the Pisces V stopped at ca. 675 m (temperature = 5.8°C) and held position to await the descent of the Pisces IV. At 925, the Pisces V moved north to 670 m (6.1°) to rendezvous with the Pisces IV. The biota and substrate were filmed at that location. When the Pisces IV arrived, sample collection of a dead gorgonian and live sponge began. The Pisces IV filmed the Pisces V collecting samples (position = 00°22.440'S,160°01.457'W). The two submersibles filmed each other for about 20 minutes, for documentation of the work at the Line Islands.

At 1034, the submersibles parted for their respective surveys and sampling. The Pisces V moved upslope toward the 500 m transect depth. A large aggregation of pink coral initially identified as a *Corallium* species (similar to *C. niveum*, but Rob Dunbar's group identified most of these as *Dendrophyllia*), was encountered on the moderately (45°) sloping carbonate shelf there. A recording thermistor (pot #8) was deployed with a marker (#47) at 496 m (7.7°, 00°22.947'S,161°01.349'W), among the coral. The thermistor has two recorders, one set to record for one year and the other for five; it is hoped that they can be located and recovered in the coming few years.

At 1053, the 500 m survey transect began from the location of the thermistor, moving toward the north. The topography at this depth had changed from the ca. 30-45° slope at 670 m to a steep escarpment base of about 60°. Isolated, sparse patches and single fans of the *Corallium* and/or *Dendrophyllia* were seen on this transect. Continuous transecting was interrupted to obtain images of animals of interest, for archival and outreach use, as well as to assist in identifications. The transect ended at 1149, 495 m (7.8°), and 00°22.551'S,160°01.263'W. From that location, we moved upslope, filming organisms of interest, to 459 m.

The 450 m transect began at 1208, 459 m (8.0°), and 00°22.576'S,160°01.280'W. The depth, slightly greater than planned, was necessary because the escarpment was almost vertical at this depth. Several deeply incised canyons, alternating with ridges and overhanging outcroppings, made this cliff face a challenging feature to navigate. Dominant deepwater corals at this depth included groves of *Acanella dispar*, occasional *Gerardia* fans, *Corallium*, and *Dendrophyllia*. The other dominant invertebrate was an unusual sea urchin, with the general appearance of a pale shortspined diadematid, that formed large colonies (ca. 10-100 individuals) in bands along the upper edges of outcroppings and ridge tops; this urchin lived in the same habitat as the gorgonians, but was seen in areas adjacent to the gorgonian stands. A single specimen of this urchin was collected at 1238 for later identification. The dominant fish on this transect were small *Epigonus* species. Several *Randallichthys filamentosus* were seen on the transect and while the urchin was being collected; this species was the only eteline reliably identified during the dive. Continual transecting was interrupted to obtain images of animals of interest. The transect ended at 1257, 450 m (7.7°), and 00°22.915'S,160°01.281'W. Following the transect, at 1305, we moved upslope toward the 400 m depth, stopping to obtain images. The 400 m depth was reached at 1315.

The 400 m transect began at 1328, 00°22.906'S,160°01.238'W, but at 396 m (8.8°) where purchase could be found on the escarpment. As with the previous transect, the substrate was primarily vertical with large canyons, ridges, and overhangs. The dominant

gorgonians were *Acanella dispar*, which was often seen in dense groves, and *Gerardia*. The *Corallium* and/or *Dendrophyllia* were mostly absent, but a blue fan-shaped gorgonian similar to "paramuricid blue" of the HURL identification aids was abundant on some outcroppings. Swarms of small (3-4 cm) half-red shrimp or mysids were extremely abundant in midwater off of a few ridges and outcroppings, more so on the escarpment side of the submersible than further out in the water. The dominant small fish on this transect were *Epigonus* of at least two species. The transect ended at 1402 after 34 minutes 15 seconds, at 398 m (8.3°), 00°22.867'S,160°01.238'W. From there we traveled upslope to 347 m, arriving at 1428.

The final transect began at 1443, 347 m (10.0°, 00°22.589'S,168°01.206'W), and proceeded south along the 350 m isobath. As with the previous transects, much of the slope was steep escarpment with canyons, ridges, and overhangs, but this transect appeared to be on the upper edge of the escarpment. A good part of the transect was over flatter substrate of 30-45°, at the upper edge of the dropoff. Relatively little *Acanella* was seen. The dominant gorgonian was the blue paramuricid seen at the 400 m depth; at 350 m hundreds of colonies were observed. The fish fauna at 350 m contained a significant deep-reef component (e.g., deepwater species in families characteristic of shallow reefs), including *Plectranthias*, *Holanthias*, and *Antigonia* species. *Epigonus* continued to be the dominant small fish, and no *Symphysanodon* or smaller anthiins were seen. A sea urchin resembling *Diadema* was the dominant invertebrate, restricted mostly to the less steep areas of the transect. At one point near the end of the transect, a large *Seriola dumerili* swam downslope to inspect the sub; remarkably, this was the only amberjack observed and it did not linger after swimming past. This final transect ended at 1522, 346 m (9.4°), 00°32.934'S,160°01.139'W.

Although sediment samples were to be collected at 450-500 m and 350-400 m, none were taken because no sediment other than a light dusting was found on the steep slopes during this dive. The only area with appreciable sediment was the first depth of descent, at 746-670 m, and a sediment sample was not taken there because it was not the target sample depth range.

Following the transect we moved briefly up to 341 m (9.5°) for a better perch than the submersible could get at 346 m. Immediately thereafter it was time to end the dive so that the Pisces V could be retrieved before the Pisces IV ascended. The Pisces V left the bottom of 341 m at 1533 from 00°22.934'S,160°01.139'W. The sea surface was reached at 1552 and the submersible was on board and secured at 1603.

The most notable observations of the dive were: 1) The steep escarpment topography of the depths surveyed, with canyons incised in the wall; 2) the absence of terraces or signs of ancient sea level stands at the depths surveyed, except for the landing depth of 746 m and the departure depth of 341 m; 3) the high abundance of *Acanella*, the blue parmuricid, and the outcrop-dwelling sea urchins; 4) the presence of *Gerardia* and *Corallium* at Jarvis Island; 5) the high abundance of plankton, jellyfish, tunicates, and midwater shrimp in the water just off the escarpment slope; 6) the absence of eteline snappers (except *Randallichthys filamentosus*) or large groupers, and of suitable habitat for those fish; and 7) the observations of a torpedo ray and *Neocyttus* species at ca. 700 m as the first records of the families Torpedinidae and Oreosomatidae at central Pacific oceanic islands (other than the Hawaiian Islands for the torpedo).

Species list:

Sponges: Various unidentified species including one white round species with short struts attaching to the substrate, observed several times at 760-450 m and with a voucher specimen collected,
and another white but columnar species that formed small colonies, ca. 5-30 cm across

and of 5-30 individuals at 400-350 m.

Cnidarians (Gorgonians)
A branching white fan, perhaps *Candidella helminthophora*.
A branching orange-tan fan resembling *Fanellia euthyeia*
Corallium species with white basal stalks and pink branches. (precious coral).
Dendrophyllia (orange fan-like coral resembling *Corallium* but with defined, alternating calices on each branch)
Gerardia species (gold coral)
Acanella dispar (branching bamboo coral)

Cnidarians (other)
A large anemone with and orange body and pale orange tentacles terminating in small balls, resembling but probably not the same as HURL's "actinostolid orange" or orange corallomorph.
Commensal anemone, like *Stylobates*, on shell of *Sympagurus* or *Dardanus* hermit crab
Eguchipsammia cf. *fistula*
Four tube coral with wide, short calices forming small colonies near the *Eguchipsammia*
Various pelagic jellyfish

Crustaceans: Poecilostomatid barnacles on spines of the urchin *Histocidaris variabilis*
Various unidentified hermit crabs.
Several galatheid crab species both in holes of the carbonate substrate and living as commensals on or next to gorgonians, including a large (7-8 cm carapace length) *Eumunida* ? and a smaller banded *Munida*
A very large (ca. 33 cm carapace width), robust crab at 760-650 m that resembled a Dungeness crab in its body (but deeper-bodied) and chelae, but with longer legs like a majid or homolid.
Plesionika cf. *pacifica* or cf. sp. 2
Abundant, small unidentified midwater shrimps or mysids (probably mysids, because some in the images appear to have brood pouches)

Echinoderms: Several numerous unidentified crinoids (sea lilies), including large brown comatulid on *Corallium*
Several unidentified ophiuroids (brittle sea stars)
Asteroschema species (brittle sea star commensal on gorgonians)
Gorgonocephalidae (basket sea star)
Unidentified light orange sea star with long, straight, tapered arms edged with spines, and a small disk (somewhat resembles *Astropecten productus*, but not that species)
Unidentified sea star, pale tan or white with orange wedges, pentagonal with broad disk (likely a species not previously observed)
Unidentified white sea star resembling, but not, *Ceramaster bowersi*
Unidentified white goniastrid sea star with a dorsal star-shaped pattern
Unidentified pink pentagonal sea star, perhaps *Hymenaster* species
Aspidodiadema species (sea urchin with a small test and long, curved, very slender spines)
Unidentified large, grey, depressed urchin this moderately short spines, perhaps an *Araeosoma* species (referred to as a "*Micropyge*-like urchin" on the video soundtrack).
Histocidaris variabilis (reddish sea urchin with slender pale spines)
Stereocidaris cf. *hawaiiensis* (whitish-tan urchins with pale spines, no spines on top of test, and without darker blotches at spine bases)

Other invertebrates: Various pelagic colonial and solitary salps

Sharks: *Echinorhinus cookei* (prickly shark, Echinorhinidae)

Rays: *Plesiobatis daviesi* (deepwater stingray; Plesiobatidae)
Unidentified Torpedinidae (torpedo or electric ray)

Bony fishes:
Congrid eels ca. 30-45 cm, probably *Bathyconger* or *Bathyuroconger*
Unidentified congrid, ophichthid, or chlopsid eel, green dorsally and white ventrally with a black lateral stripe, ca. 33 cm (likely a species not seen alive before)
Unidentified gonostomatids in midwater near the substrate (bristlemouths, Gonostomatidae)
Various unidentified myctophids in midwater near the substrate (lanternfish, Myctophidae)
Unidentified *Ijimaia* species (jellynose eel; Ateleopodidae)
Deepbodied ophidiid, probably *Pycnocraspedum* cf. *armatum*, also seen on the ROV dive (cusk eel, Ophidiidae)
Nezumia? Species (rattail, Macrouridae)
Caelorinchus species (rattail, Macrouridae)
Hymenocephalus species (rattail, Macrouridae)
An unidentified small macrourid species living in association with *Acanella dispar* and *Gerardia* (rattail, Macrouridae – perhaps the first observation of such an association of a rattail species with gorgonians)
An unidentified small gray morid, probably *Physiculus* species living in association with *Acanella dispar* and *Gerardia*
An unidentified larger dark brown morid, perhaps a *Gadella* or *Physiculus*, in substrate holes.
Neocyttus species (oreo dory, Oreosomatidae)
Antigonia capros (redbarred boarfish, Caproidae)
Hoplostethus species, silvery gray (roughy, Trachichthyidae)
Photoblepharon palpebratus? (flashlight fish, Anomalopidae)
Several unidentified small Scorpaenidae (scorpionfishes)
Pontinus species with long ocular cirri.
Holanthias species, pale orange brown with a white bar or spots on the caudal peduncle, similar to but not *H. elizabethae* (basslet, Serranidae, Anthiinae)
A red-barred large *Plectranthias* species (or a small, deepwater *Epinephelus*, but more likely *Plectranthias*) (basslet or grouper, Serranidae)
Small yellow *Plectranthias* species (perhaps juveniles of the *Holanthias*) (basslet, Serranidae, Anthiinae)
Grammatonotus laysanus (Callanthiidae)
Unidentified *Grammatonotus* with a round tail and a red spot on middorsum of body
Seriola dumerili (greater amberjack, Carangidae)
Caranx lugubris (black jack, Carangidae)
Randallichthys filamentosus (Randall's snapper, Lutjanidae)
Hollardia cf. *goslinei* (Hawaiian spikefish, Triacanthodidae)

MISSION EVALUATION:

Limitations, failures, or operational problems noted: None.

Recommendations for corrective action or improvement: None.

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

All work planned was accomplished on this dive, with the exception of sediment sample collection which was not done because sedimented substrates were not found at the depths where samples were needed. All four planned survey transects were completed, video and still images of species of interest were obtained, and a few specimens of interest were collected. One recording thermistor was placed among a cluster of gorgonians for retrieval in later years.

The steep, incised topography of the survey area made positioning of the submersible very difficult for transect surveys along isobaths, for navigation checks, for sample collection, and for imagery, but the submersible pilot, Max Cremer, did an excellent job with all operations. His excellent piloting abilities enabled us to complete all planned operations that could be done at this site.

The sustained effort of John Smith for Seabeam mapping of the area the day and night before the dive is also greatly appreciated. His marathon work to produce a map of possible dive sites enabled us to make informed choices of dive sites.

List specimens or samples collected on the mission.

One dead gorgonian branch for identification and possible ageing studies, collected by Jim Maragos, given to Rob Dunbar's group.

One unidentified sponge from 670 m.
Three ophiuroids (probably two species) and one hermit crab in shell, attached to the sponge.
One unidentified sea urchin as a voucher specimen of the most abundant urchin species seen during the surveys.
All of the live organisms collected by Bruce Mundy.

- All of these except for the dead coral branch are intended to be sent to the U. S. National Museum of Natural History for identification after the cruise.

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 with his camera, however, will require prior permission from him for use.

Fill in the appropriate statement below and sign this form.

I hereby release the data archived by HURL for public consumption following mission "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."

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