


## OKEANOS EXPLORER ROV DIVE SUMMARY

|   |   |  |   |   |
|---|---|--|---|---|
| <b>Site Name</b>  | South of Pioneer Bank                                       |  |   |  |
| <b>ROV Lead/Expedition Coordinator</b>  | Karl Mcletchie/ Brian RC Kennedy                            |  |   |   |
| <b>Science Team Leads</b>   | Daniel Wagner and Jonathan Tree                             |  |   |   |
| <b>General Area Descriptor</b>  | Papahānaumokuākea Marine National Monument                  |  |   |   |
| <b>ROV Dive Name</b>  | Cruise Season   | Leg  | Dive Number   |   |
|   | EX1603  | 1  | DIVE03  |   |
| <b>Equipment Deployed</b>   | ROV:  | Deep Discoverer  |   |   |
|   | Camera Platform:  | Seirios  |   |   |
| <b>ROV Measurements</b>   | <input checked="" type="checkbox"/> D2 CTD                  | <input checked="" type="checkbox"/> Depth                      | <input checked="" type="checkbox"/> Altitude          |   |
|   | <input checked="" type="checkbox"/> Scanning Sonar          | <input checked="" type="checkbox"/> USBL Position              | <input checked="" type="checkbox"/> Heading           |   |
|   | <input checked="" type="checkbox"/> Pitch                   | <input checked="" type="checkbox"/> Roll                       | <input checked="" type="checkbox"/> HD Camera 1       |   |
|   | <input checked="" type="checkbox"/> HD Camera 2             | <input checked="" type="checkbox"/> ROV HD 2                   | <input checked="" type="checkbox"/> Seirios CTD       |   |
|   | Temperature Probe   | <input checked="" type="checkbox"/> D2 DO Sensor               | <input checked="" type="checkbox"/> Seirios DO sensor |   |
| <b>Equipment Malfunctions</b>   | The Seirios CTD data had some erroneous spikes in the data. |  |   |   |
| <b>ROV Dive Summary (From processed ROV data)</b>                                 | Dive Summary: EX1603_DIVE03                                 |  |   |   |
|   | ~~~~~   |  |   |   |
|   | In Water:   | 2016-03-02T18:57:01.441000<br>25°, 25.182' N ; 173°, 32.502' W |   |   |
|   | Out Water:  | 2016-03-03T02:35:44.710000<br>25°, 26.298' N ; 173°, 32.634' W |   |   |
|   | Off Bottom:   | 2016-03-03T01:15:24.712000<br>25°, 25.812' N ; 173°, 32.583' W |   |   |
|   | On Bottom:  | 2016-03-02T20:16:28.037000<br>25°, 25.457' N ; 173°, 32.625' W |   |   |
|   | Dive duration:  | 7:38:43  |   |   |
|   | Bottom Time:  | 4:58:56  |   |   |
| Max. depth:   | 2361.8 m  |  |   |   |
| <b>Special Notes</b>  |   |  |   |   |
| <b>Scientists Involved (please provide name / location / affiliation / email)</b> | <b>Name</b>   | <b>Affiliation</b>   | <b>Email Address</b>                                  |   |
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|   | Scott France  | University of Louisiana at Lafayette                           | france@louisiana.edu                                  |   |

|  |                  |  |  |
|--|------------------|--|--|
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|  | Daniel Wagner    | NOAA PMNM  | daniel.wagner@noaa.gov                   |

**Purpose of the Dive**

This dive was located on a rift zone ridge extending to the south of Pioneer Bank. Previous dives on the ridge have been conducted by both the *Okeanos Explorer* in 2015 (maximum depth = 2119 m) and the *Hawaii Undersea Research Laboratory* in 2003 (maximum depth = 1813 and 1825 m). These dives documented one of the largest communities of deep-sea corals and sponges in the Monument. This high-density community extends for at least 5 miles at depths ranging between 1800-2100 m along the top of the ridge. The objective of this dive was to survey the area below previous dives on the ridge in order to determine the lower depth limit of the high-density community. The target start point of the dive was approximately 5 miles south of the dive conducted on Pioneer Bank Ridge by the *Okeanos Explorer* in 2015. The plan was for the ROV to land on the ridge crest at a depth of 2390 m, and then move along the ridge towards the north until a final target depth of 2258 m, documenting the density of corals and sponges

**Description of the Dive:**

The ROV landed on the ridge crest at a depth of 2352 m. The substrate consisted of intact pillow lava flows and interspersed volcanic rubble with light sedimentation. The volcanic flows and rubble were covered with a moderate density of corals and sponges. There was negligible current at the landing site, but a sediment patch showed clear sand ripples oriented north to south. Moving along the ridge to a local topographic high, clear pillow tumulus flow structures indicated flow direction down and away radially from this mound. This was interpreted as evidence that this was the volcanic vent that extruded the intact lava flows observed at the landing site. As the ROV moved north along the ridge crest, the density of animals remained moderate and consisted mainly of primnoid and black corals, with scattered anemones and crinoids. The majority of corals and sponges were very small in size, with the exception of larger individuals of the farreid sponge (*Aspidoscupulia* sp). Most of the intact lava flow and debris piles were heavily cemented by Mn-crust. A Mn-crust rock sample was collected at a depth of 2353 m which had hydroids growing it. This sample is very well preserved with minimal Mn-crust (~1-2 mm) and a <1 mm alteration rim with 9.2 kg of seemingly unaltered, dense, and sparsely vesicular volcanic material within. As the ROV moved further north, dead pieces of farreid sponges were frequently seen amongst rocks. Additionally, the ROV came upon several patches of rubble that consisted of barnacle plates and other unidentified biological material. At 2311 m, the ROV collected another Mn-crust rock

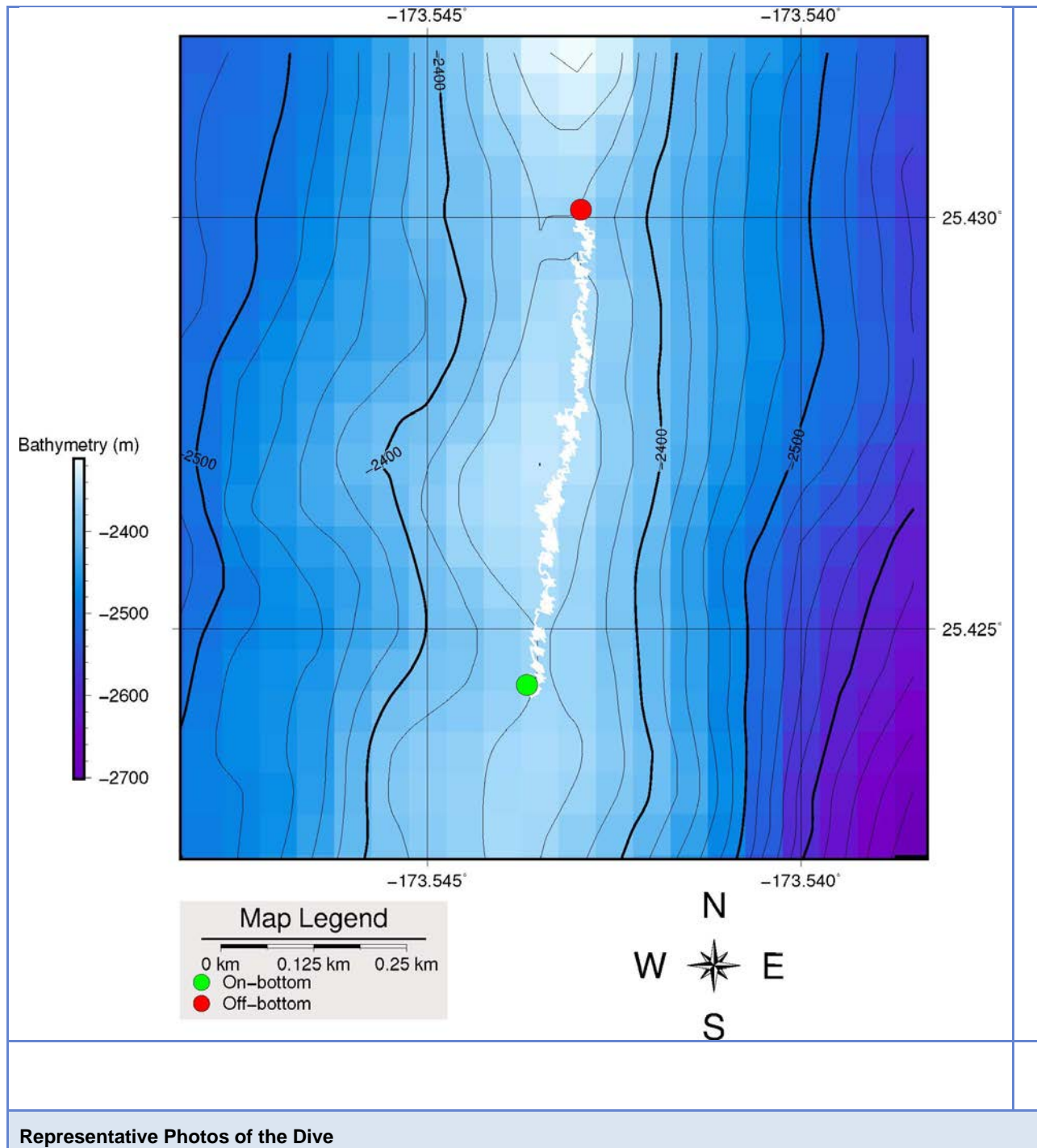
sample. This second geological sample has a mass of 9.9 kg and is a rounded volcanic with thicker Mn-encrustation. Along the transit up the ridge, multiple local highs were interpreted as vent sources for proximal intact pillow lava flows. These elevated structures supported noticeable higher densities of organisms, and consisted mainly of small primnoid colonies. At 2331 m, the ROV collected specimens of both a *Chrysogorgia* sp. and a *Pleurocorallium* sp. colony that were right next to each other. As the ROV continued to move along the ridge crest, the densities of animals remained moderate to high. The ROV left the bottom at a depth of 2343 m, having covered a linear distance of approximately 700 m in 4:57 h of bottom time.

### Animals observed during dive

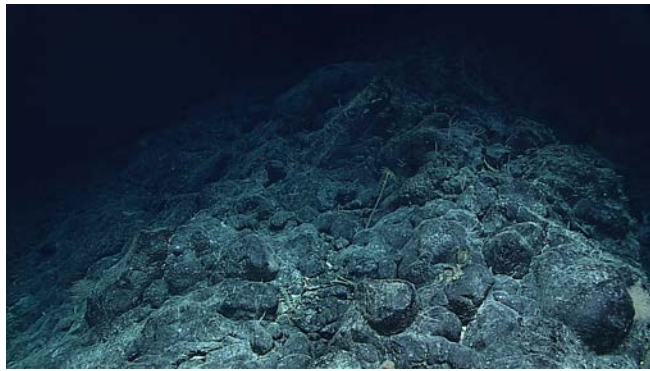
| Phylum     | Group          | Species                             |
|------------|----------------|-------------------------------------|
| Anellida   | Polychaetes    | Polynoid                            |
| Arthropods | Amphipod       | Amphipod                            |
| Arthropods | Barnacles      | Balanoidae                          |
| Arthropods | Shrimp         | Heterocarpus laevigatus             |
| Arthropods | Shrimp         | Lebbeus sp.                         |
| Arthropods | Shrimp         | Mysid                               |
| Arthropods | Shrimp         | Unidentified shrimp in water column |
| Arthropods | Squat lobsters | Gastroptychus sp.                   |
| Arthropods | Squat lobsters | Munidopsis sp.                      |
| Bryozoans  | Bryozoan       | Bryozoan                            |
| Cnidarians | Actinarians    | Actinostolidae                      |
| Cnidarians | Actinarians    | Exocoelactis sp.                    |
| Cnidarians | Antipatharians | Bathypathes cf. alternata           |
| Cnidarians | Antipatharians | Bathypathes alternata s.s.          |
| Cnidarians | Antipatharians | Bathypathes conferta                |
| Cnidarians | Antipatharians | Parantipathes cf. euantha           |
| Cnidarians | Antipatharians | Trissopathes tetracrada             |
| Cnidarians | Gorgonians     | Chrysogorgia sp.                    |
| Cnidarians | Gorgonians     | Chrysogorgia sp. branched           |
| Cnidarians | Gorgonians     | Chrysogorgia chryseis               |
| Cnidarians | Gorgonians     | Chrysogorgia geniculata             |
| Cnidarians | Gorgonians     | Chrysogorgia sp. sandbags           |
| Cnidarians | Gorgonians     | Chrysogorgia flavescens             |
| Cnidarians | Gorgonians     | Hemiorallium sp.                    |
| Cnidarians | Gorgonians     | Keratoisinae nodal sparse           |
| Cnidarians | Gorgonians     | Iridogorgia magnispiralis           |
| Cnidarians | Gorgonians     | Jasonisis sp.                       |
| Cnidarians | Gorgonians     | Keratoisidinae D-clade              |
| Cnidarians | Gorgonians     | Metallogorgia melanotrichos         |
| Cnidarians | Gorgonians     | Narella bowersi?                    |
| Cnidarians | Gorgonians     | Narella macrocalyx?                 |
| Cnidarians | Gorgonians     | Narella sp.                         |
| Cnidarians | Gorgonians     | Paragorgia sp.                      |
| Cnidarians | Gorgonians     | Pleurocorallium sp.                 |
| Cnidarians | Gorgonians     | Pleurogorgia militaris              |

|             |                |                               |
|-------------|----------------|-------------------------------|
| Cnidarians  | Hydrozoans     | Hydroidolina                  |
| Cnidarians  | Hydrozoans     | Corymorphidae                 |
| Cnidarians  | Hydrozoans     | Tabulariidae                  |
| Cnidarians  | Pennatulaceans | Anthoptilum sp.               |
| Cnidarians  | Scleractinians | Desmophyllum/Javania sp.      |
| Ctenophores | Ctenophores    | Pelagic ctenophore            |
| Echinoderms | Asteroids      | Evoplosoma sp.                |
| Echinoderms | Asteroids      | Henrecia pauperrima           |
| Echinoderms | Crinoids       | Glyptometra lateralis         |
| Echinoderms | Crinoids       | Sarametra triserialis         |
| Echinoderms | Crinoids       | Naumachocrinus sp.            |
| Echinoderms | Crinoids       | Stalked crinoid               |
| Echinoderms | Holothurians   | Psychropotidae                |
| Echinoderms | Holothurians   | Unidentified holothurian      |
| Echinoderms | Ophiuroids     | Ophiuridae                    |
| Echinoderms | Ophiuroids     | Ophiocantid                   |
| Fishes      | Eels           | Synaphobranchus brevidorsalis |
| Fishes      | Eels           | Ilyophis sp.                  |
| Fishes      | Macrourids     | Bassozetus sp.                |
| Fishes      | Macrourids     | Kumba sp.                     |
| Sponges     | Hexactinellids | Aspidoscupulia sp.            |
| Sponges     | Hexactinellids | Bolosoma sp. A                |
| Sponges     | Hexactinellids | Bolosoma sp. B                |
| Sponges     | Hexactinellids | Caulophacus (Oxydiscus) sp.   |
| Sponges     | Hexactinellids | Pheronematidae                |
| Sponges     | Hexactinellids | Poliopogon sp.B               |
| Sponges     | Hexactinellids | Tretopleura sp1B              |

Map of ROV Dive Area


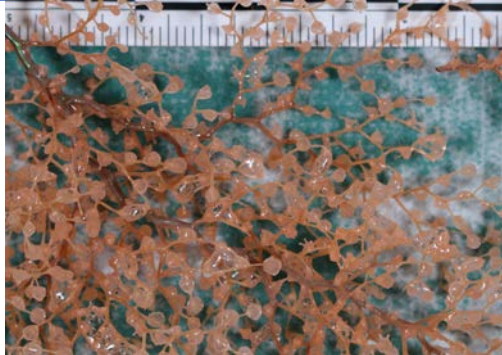
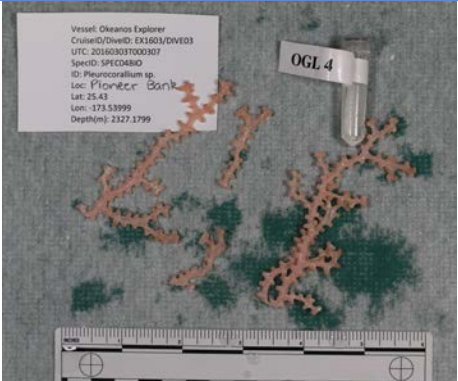






### Samples Collected

|                  |  |   |
|------------------|--|---|
| Sample ID        | EX1603_20160302T215420_D2_DIVE03_SPEC01GEO     | <p>Vessel: Oceanus Explorer<br/>CruiseID/DiveID: EX1603/DIVE03<br/>UTC: 20160302T215420<br/>SpecID: SPEC01GEO<br/>ID: Mn-encrusted volcanic<br/>Loc: Pioneer Bank<br/>Lat: 25.48<br/>Lon: -178.5299<br/>Depth(m): 2320.05</p> |
| Date (UTC)       | 20160302                                       |   |
| Time (UTC)       | 21:54:20                                       |   |
| Depth (m)        | 2320   |   |
| Temperature (°F) | 1.67   |   |
| Field ID(s)      | Mn-encrusted volcanic                          |   |
| Comments         |  |   |
| Sample ID        | EX1603_20160302T215420_D2_DIVE03_SPEC01GEO_C01 | <p>Vessel: Oceanus Explorer<br/>CruiseID/DiveID: EX1603/DIVE03<br/>UTC: 20160302T215420<br/>SpecID: SPEC01GEO-C01<br/>ID: Hydrothermal<br/>Loc: Pioneer Bank<br/>Lat: 25.48<br/>Lon: -178.5299<br/>Depth(m): 2320.05</p>      |
| Date (UTC)       | 20160302                                       |   |
| Time (UTC)       | 21:54:20                                       |   |
| Depth (m)        | 2311   |   |
| Temperature      | 1.69   |   |

|                         |  |  |
|-------------------------|--|--|
| <b>e (°F)</b>           |  |  |
| <b>Field ID(s)</b>      | Hydrodoilina                               |  |
| <b>Comments</b>         |  |  |
| <b>Sample ID</b>        | EX1603_20160302T231555_D2_DIVE03_SPEC02GEO |    |
| <b>Date (UTC)</b>       | 20160302                                   |  |
| <b>Time (UTC)</b>       | 23:15:55                                   |  |
| <b>Depth (m)</b>        | 2311                                       |  |
| <b>Temperature (°F)</b> | 1.69                                       |  |
| <b>Field ID(s)</b>      | Mn-encrusted volcanic                      |  |
| <b>Comments</b>         |  |  |
| <b>Sample ID</b>        | EX1603_20160302T235504_D2_DIVE03_SPEC03BIO |   |
| <b>Date (UTC)</b>       | 20160302                                   |  |
| <b>Time (UTC)</b>       | 23:55:04                                   |  |
| <b>Depth (m)</b>        | 2328                                       |  |
| <b>Temperature (°F)</b> | 1.68                                       |  |
| <b>Field ID(s)</b>      | Chrysogorgid sp.                           |  |
| <b>Comments</b>         |  |  |
| <b>Sample ID</b>        | EX1603_20160303T000307_D2_DIVE03_SPEC04BIO |  |
| <b>Date (UTC)</b>       | 20160303                                   |  |
| <b>Time (UTC)</b>       | 00:03:07                                   |  |
| <b>Depth (m)</b>        | 2327                                       |  |
| <b>Temperature (°F)</b> | 1.69                                       |  |
| <b>Field ID(s)</b>      | Pleurocorallium sp.                        |  |

**Comments**

**Please direct inquiries to:**

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