CRUISE REPORT

R/V Revelle, RR 2403
ROV Jason

March 29 - April 27, 2024
San Diego, CA to Manzanillo, Mexico

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Cruise Overview

Our study aims to explore the origin and evolution of magmatism at the Revillagigedo archipelago and associated seamounts. The area is a UNESCO World Heritage Site and Mexico's largest national park. It comprises four emergent volcanic islands, Socorro, San Benedicto, Roca Partida, and Clarion, in addition to numerous seamounts, that are situated in varying proximity to the Mathematician Ridge (MR), an abandoned spreading center that ceased active spreading at ~3.5 Ma (Klitgord and Mammerickx, 1982). Two of the islands, Socorro and San Benedicto, sit atop the MR near its northern termination at the Rivera fracture zone, and these islands are both sites of historic volcanic activity (e.g., Richards, 1959; Siebe et al.,1995). Roca Partida sits ~110 km west of Socorro. Clarion is ~150 km south of the Clarion fracture zone and ~400 km west of the MR. A bathymetric lineament extends eastward from Clarion towards the MR. No historic volcanism is documented at Clarion or Roca Partida, and subaerial rocks appear weathered, but seamount dredges along the eastward-trending lineament recovered extremely fresh 'popping rocks' (Batiza and Vanko, 1985) suggesting recent, volatile-rich magmatism.

This region is of particular interest because young, alkalic volcanism has been linked to both a 'superficial' oceanic hotspot and an abandoned mid-ocean spreading center. The MR transitioned to more alkalic compositions as active spreading waned, and the youngest apparent volcanism related to the MR is relatively fresh, but not dated. Young volcanism may also be distributed broadly on the Pacific plate in this region, but the highest magma flux appears to be focused at the former plate boundary. Volcanism may also have persisted through time in a fixed spot over which this region now sits. Is the ongoing volcanism in this region the result of 1) the remnants of a failed spreading center, 2) a weak hotspot rooted in the upper mantle, 3) tapping of a common melt layer at the lithosphere-asthenosphere boundary (LAB), or 4) decompression melting enabled by unusually thin lithosphere as it traverses the underlying asthenosphere? Why would voluminous, silicic magmatism emerge after spreading has stopped?

This area also provides a unique setting to investigate the volcanic processes associated with eruption of gas-rich magma over a range of water depths. Through observation and analysis of seafloor deposits of both lava and volcanic tephra, our research will address the roles of water pressure and magma gas content in regulating the eruptive styles and explosivity of submarine volcanic eruptions. This is of particular importance to volcanic islands like Socorro and San Benedicto, both of which appear to host numerous submarine vents at variable water depths.

Studies of the lava chemistry of the islands and seamounts are sparse and have focused thus far on Socorro island, but existing data for the emergent islands are insufficient to assess the mantle source composition and conditions that may contribute to long-lived magmatism in the region. Moreover, three of the four emergent Revillagigedo volcanoes and one known seamount have a significant evolved, peralkaline trachytic component that extends as far as rhyolite at Socorro and represents the only known peralkaline, silicic magmatism in the Pacific. Most of the subaerially exposed rocks on the islands are evolved, and thus not ideal for assessing parental melt and mantle source characteristics. The few submarine samples from these volcanoes suggest edifice roots are significantly more mafic. Yet, the evolved magmas also afford means to test models of how these silicic, peralkaline compositions arise. Similarly peralkaline, evolved magmas are present at some Atlantic oceanic islands, but this Pacific locality has them in greater proportion, providing a means to test models based largely on observations in the Atlantic where peralkaline compositions are more sparse. Existing models to explain the evolved compositions at Socorro Island invoke assimilation of altered oceanic crust or pre-existing alkalic crust by ascending basalt. Yet, these models raise further questions and remain to be tested with broader sample coverage and new data sets that will be collected as a result of this research collaboration.

GOALS AND OBJECTIVES

1. Perform 9 dives using Remotely Operated Vehicle (ROV) Jason to document and sample the

seafloor geology in the study area.

2. Collect geological samples (lava and tephra) from submarine volcanic sites located between Clarion Island, the Mathematician Ridge, and the Rivera Fracture Zone.

3. Collect video and still imagery of the seafloor geology, in addition to the overall benthic environment (including biology), at the ROV dive sites.

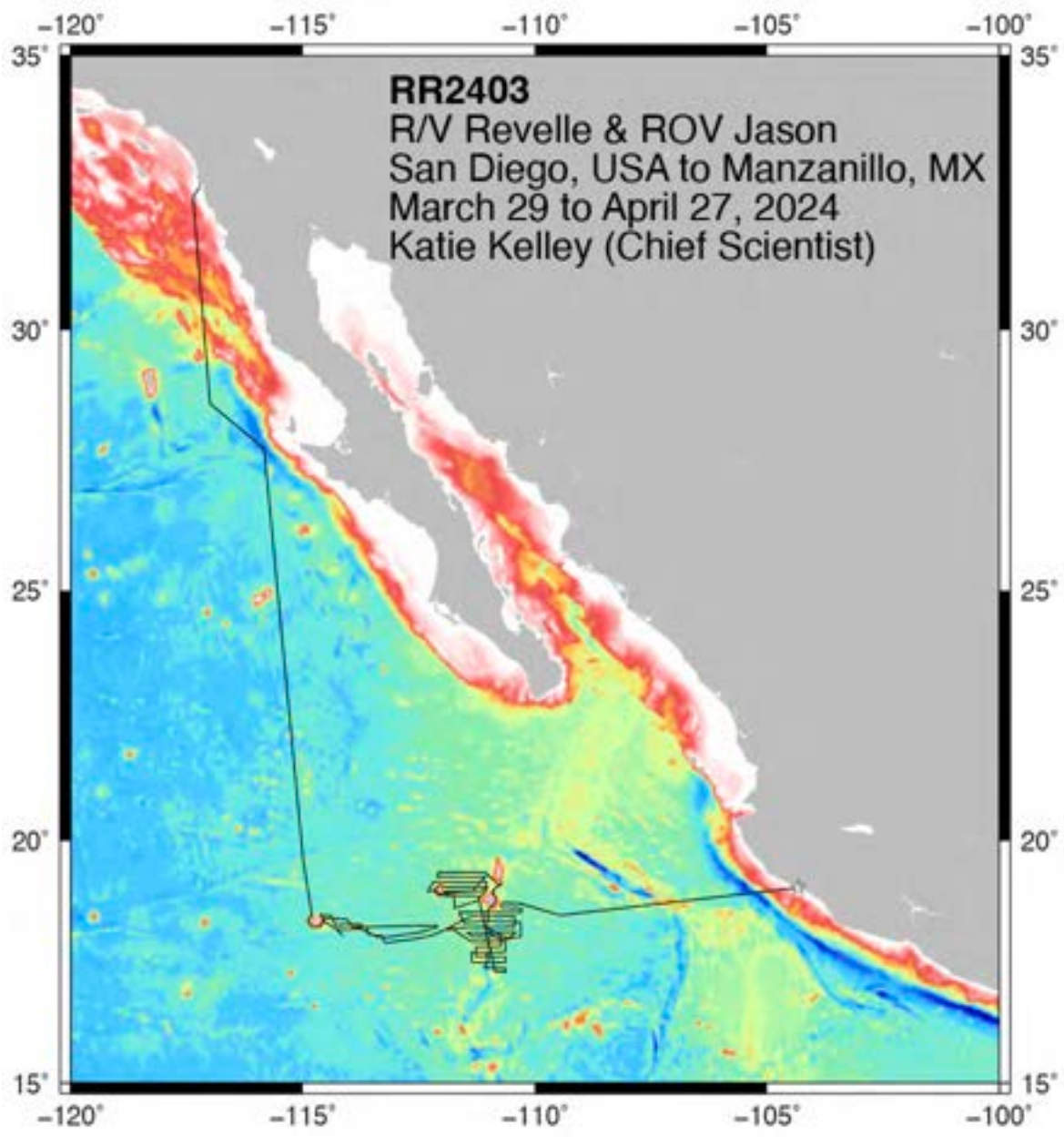
4. Collect geophysical data (bathymetry, acoustic backscatter, gravity, magnetics).

5. Use post-cruise geochemical analysis of volcanic samples to characterize the source of the regional magmas and test models for their formation and evolution, and to compare rock chemistry (esp. secondary mineralization) to the local seawater chemistry.

6. Synthesize geophysical data with geochemical results to develop a model explaining the origin of magmatism in this area.

7. Use post-cruise geochemical, textural, and video analyses to evaluate the eruptive behavior of submarine volcanoes as a function of the magma gas content and the water depth.

Cruise Track:



Cruise Summary

Expedition RR2403 took place over 30 days in March-April 2024, aboard R/V Roger Revelle. The cruise conducted several types of research and engineering operations in support of the scientific goals of the project as outlined in the Cruise Overview. After departure from San Diego on 29 March, we occupied a station above the Guadeloupe Trough at ~4500 m depth in order to unspool a new 4000 m fiber optic cable for the Jason vehicle. The Jason team unspooled and respooled the cable 4 times, while measuring its rotation during the down and return trips, for the purpose of both relaxing the new cable and studying its rotation in order to inform necessary vehicle operations during descent and ascent during dives. Once complete, we proceeded to the study area and began mapping operations on Clarion island in order to site the first dive, J2-1563.

Jason dive operations are summarized briefly below, and in detail later in this report. All dives except for one (J2-1575) were completed as planned and achieved all science goals. Dive J2-1575 was aborted after a brief time on bottom because the Jason team noticed water in some of the vehicle's systems. The turnaround for repairs was fast enough that we were able to re-deploy and conduct a slightly shortened dive at the same site that achieved the main science objectives of the dive.

Thanks to exceptional weather and an absence of time-consuming technical issues with the ROV, our cruise worked with great efficiency. In addition to the 9 dives originally planned for our project, we performed 4 additional ROV Jason dives on supplemental sites to support our overall science goals. We completed 4 dives along an E-W trending bathymetric lineament that extends from Clarion to the MR, which provides a key test of the potential melt formation models, between which our project aims to resolve. One dive on a seamount on the east side of the Mathematician Ridge will further help to test melting models related to the formation of the young volcanoes. Three dives on the Mathematician Ridge constrain its output as both a mature spreading center and during its final stages of activity, as well as its complex tectonic history. Two dives on previously unsampled areas of the volcanically active islands Socorro and San Benedicto will help to constrain the temporal history of the islands' formation and their relationship to the MR. Three dives between Roca Partida Island and San Benedicto will further constrain the regional variations in and ages of magmatism.

Bathymetric and acoustic backscatter mapping, gravity, and magnetics surveys were also performed on transits between dives, with particular focus on producing a regional bathymetric map of the volcanically dense eastern region of the Revillagigedo National Park, and on resolving the tectonic history and lithospheric structure of the Mathematician ridge south of Socorro.

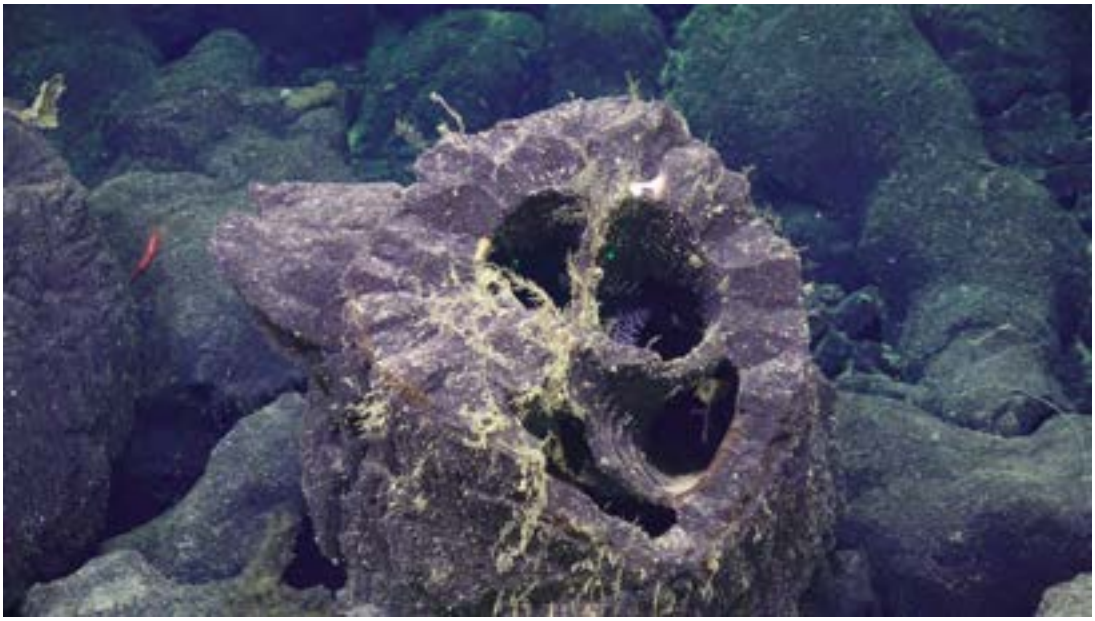
On April 8, 2024, our cruise track whilst mapping the Mathematician Ridge conveniently intersected the totality path of the 2024 total solar eclipse, which the science party and ship's crew observed in a festive atmosphere from the fantail. The Revelle's ADCP system and PAR sensor captured aspects of the eclipse including a dip in photosynthetically available radiation (PAR) coincident with an upward migration of phytoplankton in the water column during the totality phase of the eclipse.

Acknowledgments: This project was funded by the National Science Foundation, which supports the operation of R/V Roger Revelle through Scripps Institution of Oceanography, the operation of ROV Jason through the National Deep Submergence Facility at Woods Hole Oceanographic Institution, and the scientific research of the PI team through grants OCE-2026840 (URI) and OCE-2026799 (Miami Univ.).

Dive Briefs

J2-1563
Launch Location: 18.33873°N, 114.56512°W
Launch Depth (m): 2057 m
In Water (GMT): 2024-04-03T19:39:59.173Z
On Bottom: 2024-04-03T21:13:34.163Z
Off Bottom: 2024-04-04T18:11:04.434Z
On Deck: 2024-04-04T19:20:13.695Z

J2-1563 took place over a 24 hour period off of the eastern flank of Clarion island, returning samples 001 through 019. The objective of this dive was to examine two morphologically young seamounts and collect samples from the summits of both. Marine life such as sea cucumbers, sponges, shrimps, corals, and sea urchins occupied the benthic environment in this area. The geology on the seafloor varied as the dive progressed up the slope of the southern submarine volcano. At the bottom of the slope there was an abundance of ferromanganese-crusted rocks, broken pillows, sediment, and large pillow flows. As the slope steepened, angular to sub-angular blocks became more prevalent, with less sediment cover. The top of the seamount had a large crater with blocky basalt defining the inner edge, with sediment and talus in the center. Exiting the crater, a large vertical unit that appeared to be a dyke was encountered. The traverse northward downslope revealed a cross-section of massive flow units and intermingled pillow basalts. The Jason team experienced a cable snag on a fishing line, but the pilots were able to maneuver the vehicle around this obstacle and proceed with the dive. The terrain in between seamounts included sedimented pillows and talus. The northern cone exhibited sheet flows, thicker pillow flows, and possible dykes. Beyond the summit, talus and sediment were present, while the dyke-like structure continued more north. The samples were collected evenly across the dive transect.



J2-1563 figure: Hollow pillow tube housing corals.

J2-1564
Launch Location: 18.2305°N, 113.79243°W
Launch Depth (m): 2267 m
In Water (GMT): 2024-04-05T18:19:50.859Z
On Bottom: 2024-04-05T19:55:25.002Z
Off Bottom: 2024-04-06T17:09:13.196Z
On Deck: 2024-04-06T18:09:43.401Z

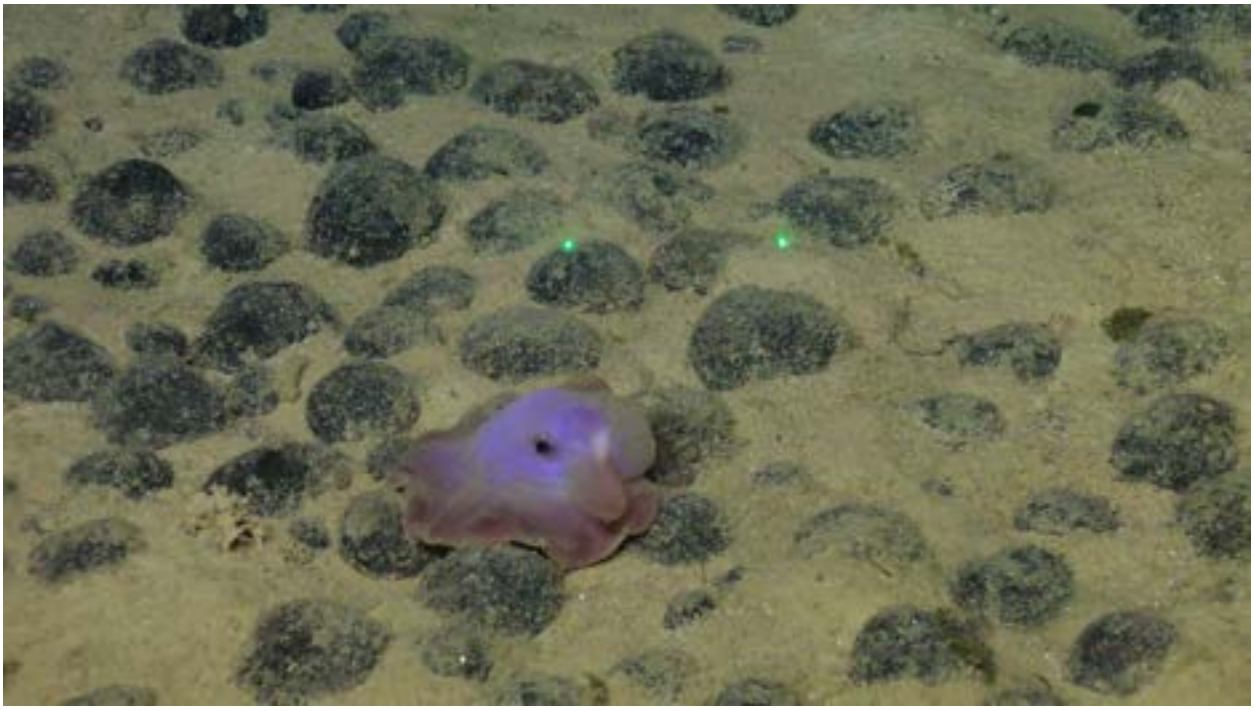
J2-1564 took place on an east-west running ridge to the east of Socorro island, collecting rock and scoop samples 020 through 041. One goal of this dive was to collect an old lava sample from the starting point, the “pancake” flow at <2000 meters depth. Initially at bottom, the sediment looked as if it had volcaniclastic deposits and large pillow flows were present. A sample of both the sediment and pillow from the pancake were taken. The benthic environment in this area contained marine life including sponges, brittle stars, shrimps, anemones, crinoids, and fish. Ropey pillow flows were abundant as Jason traversed east across the ridge, sheet flows and lobate flows were observed next to pillows. Traveling from peak to peak there were talus and sediment in low areas. The sediment had a light color with finer black flecks (volcaniclastics or ferromanganese) atop, bioturbation was observed as well as some north-south linear collections of the black flecks. The top of the third peak had a spectacular coral garden. When rising to and descending from peaks, cross section pillow walls were observed.In-place pillows/lava tubes were prevalent at shallower depths, and talus/sediment were more common at greater depths. The sediment continued to have a darker gray/ black component throughout the dive. Rock and scoop samples were collected evenly along the dive transect.

J2-1564 figure: Textured pillow lava with a line of tunicates.

J2-1565

Launch Location: 18.023°N, 113.388°W
Launch Depth (m): 3327 m
In Water (GMT): 2024-04-06T23:12:57.344Z
On Bottom: 2024-04-07T01:19:40.439Z
Off Bottom: 2024-04-07T21:22:02.176Z
On Deck: 2024-04-07T23:22:40.941Z

Dive J2-1565 investigated two deep, pancake-shaped volcanoes with an ESE trend. The dive began at the southern part of the western pancake and traversed NE to its main crater and then east out of the crater towards the valley between the two volcanoes. This dive recovered samples 042 through 054. The initial landscape up-slope included pillow walls with sedimented terraces and fields of ferromanganese nodules. Pavemented FeMn deposits blanketed the sediment, and the developed crust suggests that these rocks may be older than the previous dive sites. Two dumbo octopuses were spotted along with sea cucumbers, crinoids, fishes, jellies, sponges, anemones, and sea stars. Approaching the top of the volcano, we observed a cliff of intersected pillows, talus, and fewer FeMn nodules. Talus was persistent along the flat top of the pancake. The center of the crater contained sandy sediment, pillow lavas, and occasional large pillow boulders. When exiting the crater, we encountered four terraces with large pillows and exposed flow units. Once out of the crater, the morphology returned back to FeMn nodules, sediment, and sparse pillows. Lava samples were collected from in-place settings, and so sampling was heterogeneous along the dive track.

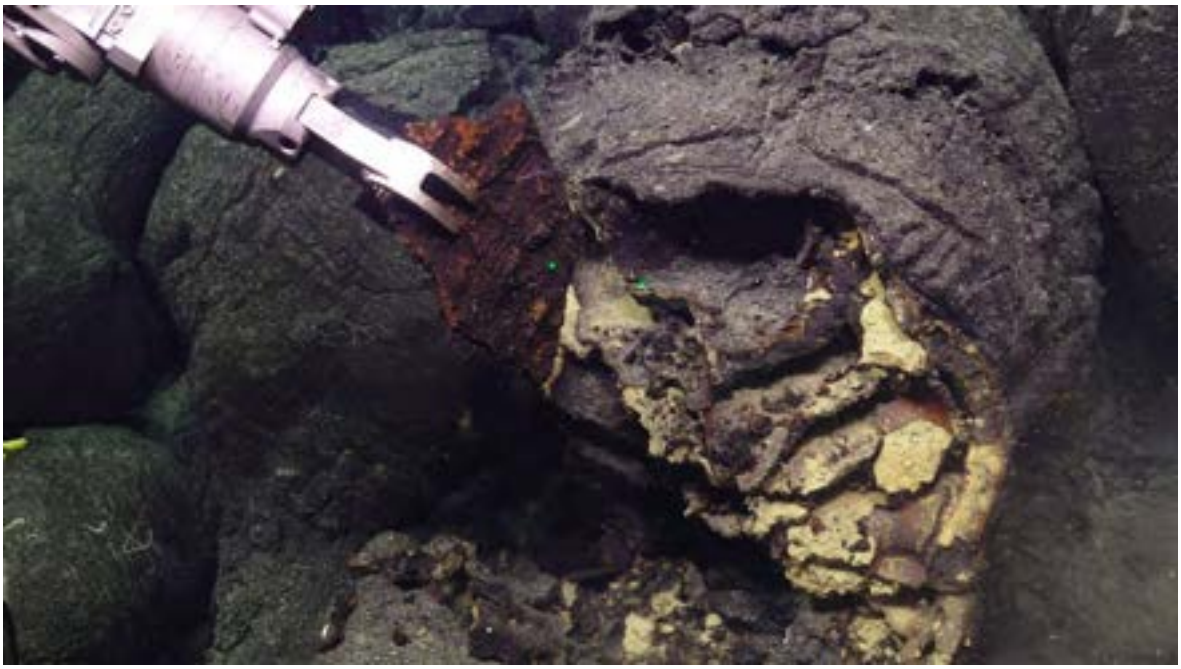


J2-1565 figure: Dumbo octopus on a sedimented bottom with ferromanganese-crusted rocks.

J2-1566

Launch Location: 18.16339°N, 111.89312°W
Launch Depth (m): 2857 m
In Water (GMT): 2024-04-09T01:11:48.670Z
On Bottom: 2024-04-09T03:07:43.792Z
Off Bottom: 2024-04-10T00:05:00.736Z
On Deck: 2024-04-10T01:27:21.645Z

J2-1566 took place on a 50-km-long, unnamed NE-SW trending seamount located ~100 km west of the Mathematician Ridge. A previous dredge from this feature returned “popping” rocks. This dive returned samples 055 through 075. At the bottom landing sites, we observed large pillow flows, lava tubes, and break out buds. Continuing north-northeast, the center of a pancake structure had a shallow crater with collapsed lava flows and sediment filling in the feature. Continuing up the shallow slope, there was an exposed pillow cliff face with lava tubes and columnar jointing. The USBL system on Jason crashed and the dive was paused while the team troubleshooted the issue. The seafloor had bulbous pillows, lava tubes, sheet flows and relatively young and glassy lavas. Flatter terrain up-slope contained more talus and sediment. Continuing north, the morphology changed to hackly lava flows, to sediment, to large pillows with break-out buds up to the summit. The peak had an abundance of corals. Descending the slope to the northeast, lots of talus and sediment were observed with sparse pillows. The pillows were fragile and would crumble when Jason attempted to grab one, and the sediment had volcaniclastic cover. This morphology pattern repeated up the next slope with sediment and then talus, topped by a pillow cliff. Samples were collected evenly along the dive track. No popping rocks were observed on recovery.

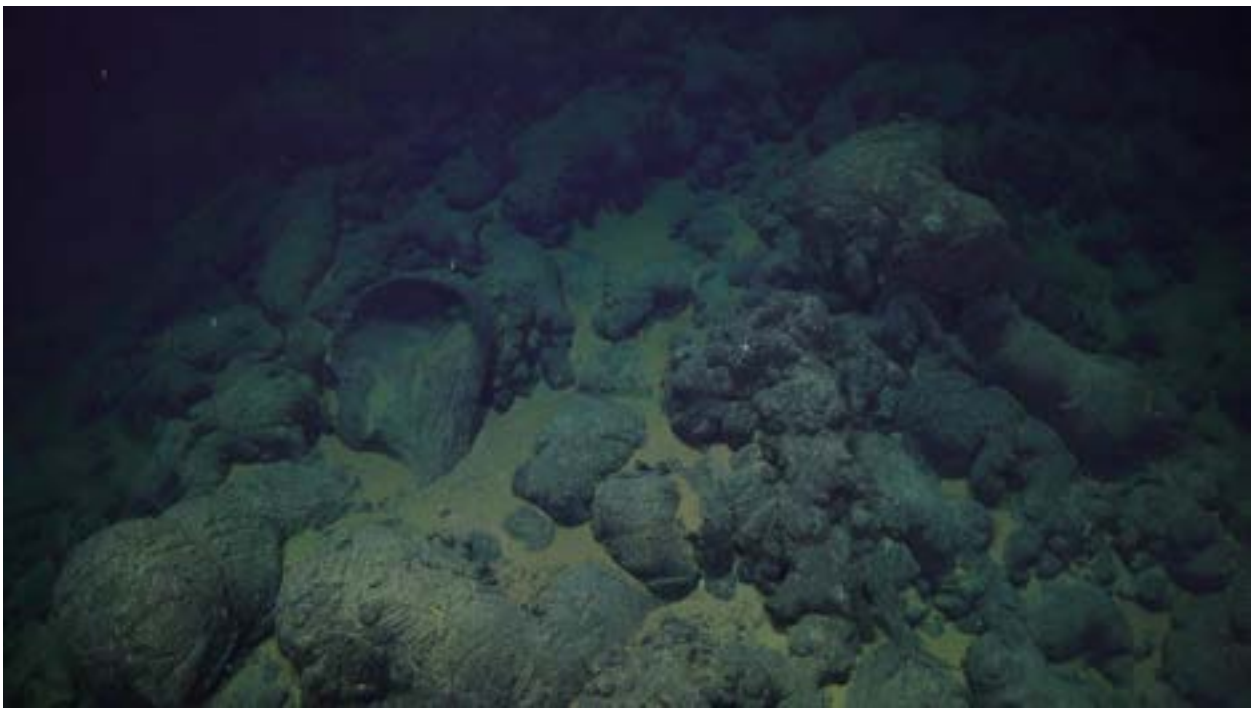


J2-1566 figure: Jason collecting a sample from a flakey, layered lava tube face.

J2-1567

Launch Location: 17.62837°N, 111.00141°W
Launch Depth (m): 3779 m
In Water (GMT): 2024-04-11T18:34:49.550Z
On Bottom: 2024-04-11T20:54:04.233Z
Off Bottom: 2024-04-12T16:28:47.645Z
On Deck: 2024-04-12T18:25:40.508Z

Dive J2-1567 took place on the western axial valley wall of the Mathematician Ridge. The goal of the dive was to examine and sample three exposed fault scarps that bound the western side of the axial valley. This dive recovered samples 076 through 091. The benthic environment in this area included marine life such as corals, shrimps, jellies, fish, anemones, worms, crinoids, cucumbers, and sea stars. At bottom, the seafloor was heavily sedimented, the first rocks observed were sedimented talus. Traveling west to the first fault, talus and sediment were prominent until near the top of the scarp, where a steep pillow wall was exposed. The pillows had a thick ferromanganese crust, making it harder to sample, although the lava in this area had lots of smaller buds that may signify a lower viscosity. Once atop the first scarp, the geology included a highly sedimented area of sparse pillows and talus. Continuing west, the second fault had a talus slope, occasional pillow pieces, and sediment; sea life was sparse. Atop the second scarp, the flatter terrain consisted of pillows and sediment. The dive concluded before making it to the base of the third scarp.

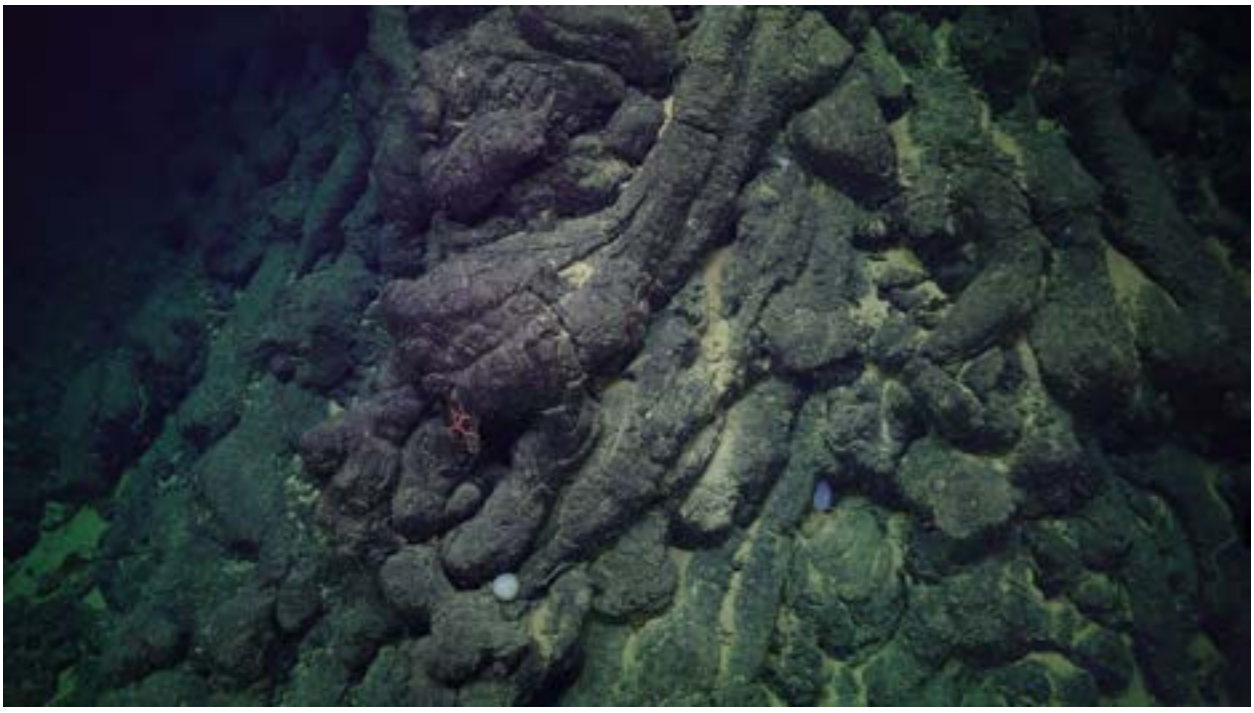


J2-1567 Figure: In-place pillow lavas with a breakout feature at left and an example of small pillow buds at right.

J2-1568

Launch Location: 17.73864°N, 110.95308°W
Launch Depth (m): 2619 m
In Water (GMT): 2024-04-12T23:14:48.585Z
On Bottom: 2024-04-13T01:03:08.745Z
Off Bottom: 2024-04-13T23:48:42.443Z

Dive J2-1568 took place on the axial high of the failed Mathematician Ridge. The goal of the dive was to collect samples from the late stage volcanism at the dead spreading center. This dive recovered samples 092 through 109. Sediment, pillows, and lava tubes occurred at the bottom landing site. The landscape had us transiting up and down mounds of pillows, with extensive talus between peaks. Morphology changed from pillows to hackly and jumbled sheet flows, to beautiful glassy sheet flows. Continuing north along the former ridge axis, pillow lavas, light sediment, and talus transitioned into a large, 30 meter tall, pillow wall. The wall held an abundance of marine life such as large sponges, corals, anemones, and crinoids. For the remainder of the dive, the ridge's morphology included pillows, lava tubes, sediment, and talus. The lava samples collected had little FeMn crust, suggesting a younger age than previous dives. Samples were collected evenly along the dive track.



J2-1568 figure: Lightly sedimented, draping lava flows.

J2-1569

Launch Location: 18.87418°N, 111.82953°W
Launch Depth (m): 2163 m
In Water (GMT): 2024-04-15T01:13:26.099Z
On Bottom: 2024-04-15T02:47:49.197Z
Off Bottom: 2024-04-16T00:00:26.597Z
On Deck: 2024-04-16T01:22:59.100Z

Dive J2-1569 took place on an east-west trending seamount, south-southeast of Roca Partida Island that the science party nicknamed “Pythagoras”. This dive's purpose was to explore two volcanic cones. The ROV landed in an outcrop of young, in place pillows, and the start of the dive included sheet flows, lava tubes, and pillows. The morphology changed up-slope to talus and sediment cover. The sediment had thick, cemented volcaniclastic flow deposits. The peaks of the first cone had young pillow outcrops along with talus and sediment cover. The landscape downslope towards the second cone included sheet flows, possible scoria, pillow terraces, and pillow walls. The low point between the cones had a large stretch of talus, sediment, and occasional pillows. Traveling up the slope of the second cone, there were mostly broken pillows and thin lava tubes. The small peak had pillow cross-sections, little talus, sediment and more of the volcaniclastic pavement. Descending down the slope of the westward cone, the features included talus, sediment, and sparse pillows. Samples 110 through 130 were collected and marine life such as corals, fishes, jellies, anemones, cucumbers, sponges, crinoids, sea stars, and tunicates were seen on this dive.

J2-1569 figure: Intertwined and deflated lava tubes.

J2-1570

Launch Location: 18.97102°N, 112.17037°W
Launch Depth (m): 2101 m
In Water (GMT): 2024-04-16T18:15:36.662Z
On Bottom: 2024-04-16T19:42:22.869Z
Off Bottom: 2024-04-17T17:15:56.554Z
On Deck: 2024-04-17T18:26:19.071Z

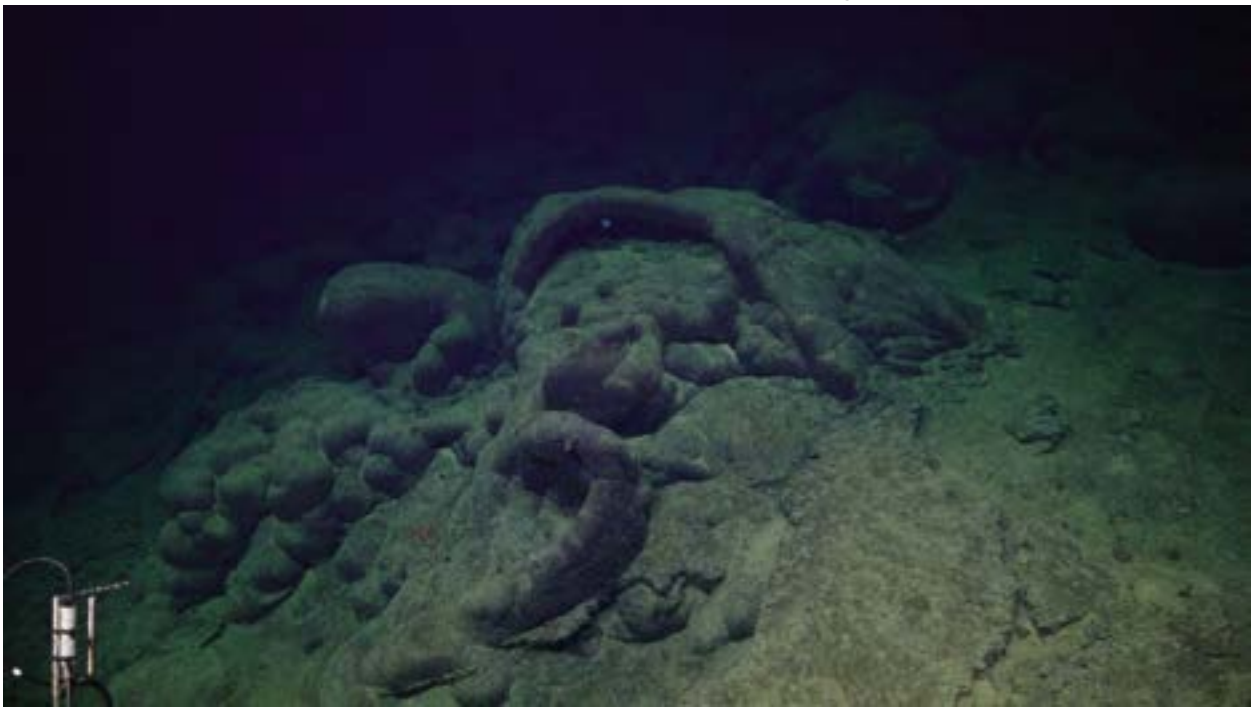
The USBL system was not functional for this dive, and vehicle location in the water was inferred but not known. Dive track and sample locations for this dive use the ship navigation, and include a likely ~150 m maximum uncertainty. This dive explored and sampled the southwest flank of Roca Partida Island. The goal of the dive was to collect in-place samples from a range of depths across the planned dive track. This dive returned samples 131 through 150. At the landing site, we observed rubbly pillows or possible lava bombs and hackly sheet flows. The landscape then transitioned sharply from pillows to a heavily sedimented area. Climbing the first cone, the morphology shifted to hackly sheet lavas, suggesting a distinctive eruptive style. The top of the cone had blocky lava and possible lava bombs that increased in size as the dive progressed upwards. Downslope was mostly talus and occasional pillows surrounded by light sediment. Continuing southeast, a small peak had draping pillows, lava tubes, large pillow cross sections, columnar jointing, and volcaniclastic flows. The dive path then curved east into an area of large pillow flows, sheet flows, and ripple marks in sediment. Heading northwest, sediment, talus, and sparse pillows continued. The entire dive area included a remarkable abundance of volcaniclastic pavement. Benthic fauna included cucumbers, corals, sea stars, sponges, shrimps, fishes, and anemones.

J2-1570 figure: Sedimented fractured pillow faces.

J2-1571

Launch Location: 18.976423°N, 111.30026°W
Launch Depth (m): 2857 m
In Water (GMT): 2024-04-18T01:32:34.388Z
On Bottom: 2024-04-18T03:33:44.873Z
Off Bottom: 2024-04-19T00:01:00.000Z
On Deck: 2024-04-19T01:21:06.361Z

The dive took place on an unnamed seamount which sits west of, and between, Socorro and San Benedicto Islands, which the science party nicknamed “Salicrup.” This dive collected samples 151 through 166. Once on bottom, the dive started heading north up the flank of the seamount. The dive began with a heavily sedimented area with an occasional pile of heavily crusted pillows. Continuing north, the morphology changed to volcaniclastic material, ferromanganese crusted pillows, old pillow tubes, and a large pillow wall. Lava samples were difficult to collect due to a thick encasing ferromanganese crust. Lavas, sediment, talus, FeMn pavement, and occasional scoria occurred along the slope. Once the slope began to level at the top, exposures included draping pillows, crusted talus, breakout buds, and a massive pillow wall. On the top of the seamount, morphology changed to be more heavily sedimented with sparse pillows. While samples were harder to collect on this dive due to the FeMn crust, they were evenly dispersed along the dive track.



J2-1571 figure: Heavily encrusted lava tube breakout.

J2-1572

Launch Location: 19.078814°N, 110.761°W
Launch Depth (m): 2587 m
In Water (GMT): 2024-04-19T19:19:05.292Z
On Bottom: 2024-04-19T21:00:41.296Z
Off Bottom: 2024-04-20T19:08:08.594Z
On Deck: 2024-04-20T20:16:11.252Z

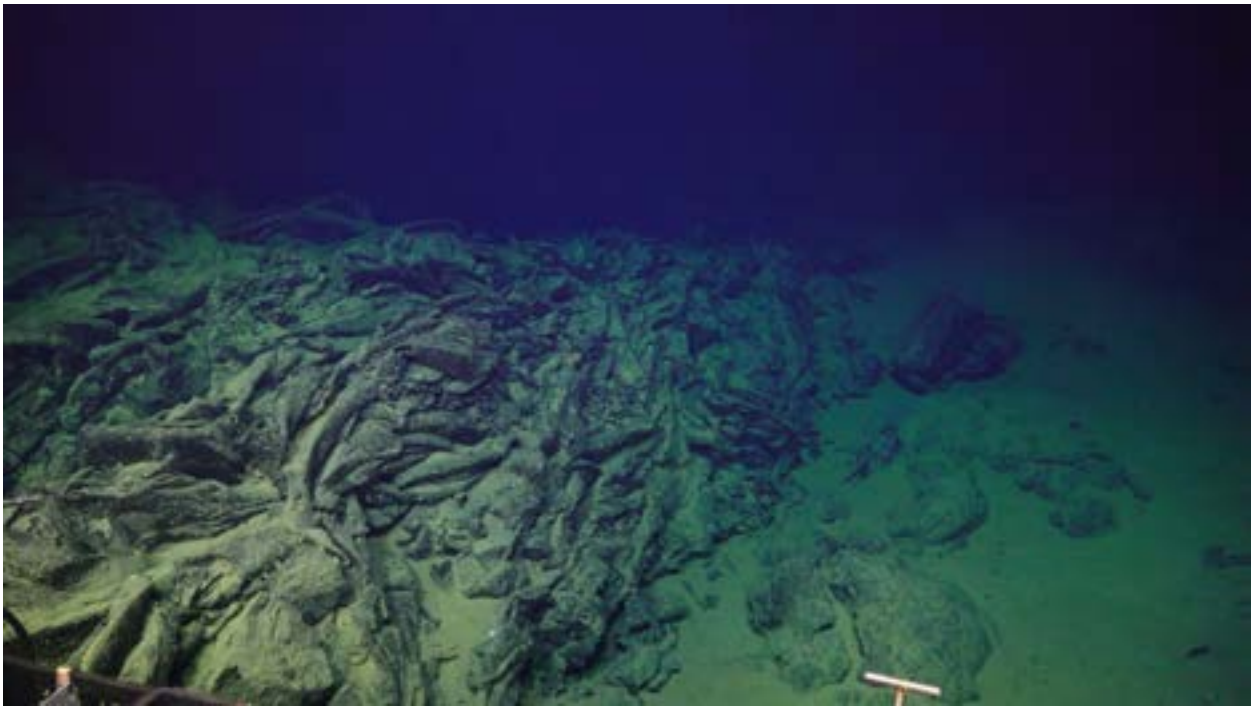
J2-1572 was conducted on the southern ridge of San Benedicto, the goal of the dive was to collect in place pillow lavas from key depth ranges. This dive recovered samples 167 through 186. Benthic fauna included sea anemones, cucumbers, corals, crinoids, fishes, sponges, jellies, worms and sea stars. The dive began on the southwestern flank of the ridge, heading northeast up a shallow slope. At bottom, the seafloor was composed mostly of sediment with a dark gray layer of ash potentially from the 1950's Barcena eruption. Moving up the ridge, pillow flows and pumice pieces became more abundant. Approaching the western side of the ridge, morphology alternated between sediment and low-relief pillow ridges and lava tubes. Climbing the steeper slope to the ridge, talus, sediment, and sparse pillows became more prevalent. The peak of the ridge had a thick pillow wall, lava flows, and broken pillow pieces. A few pumice fall/float samples were collected, but in-place lavas were the primary focus, and these were collected at a set of target depths along the dive track.

J2-1572 figure: Lava tube covered in small brittle stars.

J2-1573

Launch Location: 18.99307°N, 110.89734°W
Launch Depth (m): 2534 m
In Water (GMT): 2024-04-21T01:06:39.932Z
On Bottom: 2024-04-21T02:50:52.319Z
Off Bottom: 2024-04-22T00:04:37.585Z
On Deck: 2024-04-24T06:22:05.395Z

Dive J2-1573 took place on the deep northwestern flank of Socorro Island. The dive aimed to sample the basal lava from Socorro Island. This dive returned samples 187 through 207. At bottom, the seafloor exposures included pillows, talus, sediment, and volcaniclastic deposits. Continuing south east through a pancake feature, mainly sediment, talus, pumice, and occasional pillows were observed. We observed a large area of broken and craggy pillows that could be possible lava bombs or evidence of more explosive volcanism. Headed south east up a slight slope to a pancake feature, we encountered an area of collapsed sheet flows with holes a few meters in diameter. Traversing southwest up to the second pancake, prevalent deposits included talus, pillows, and sediment. The top of the second pancake had volcaniclastic deposits on top of sediment with outcrops of sheet flows and pillows. We observed a 3-4 meter cross section of lavas with columnar jointing. Pillow lavas, sheet flows, and lava tubes persisted throughout the remainder of the pancake. Samples were collected regularly along the dive track.

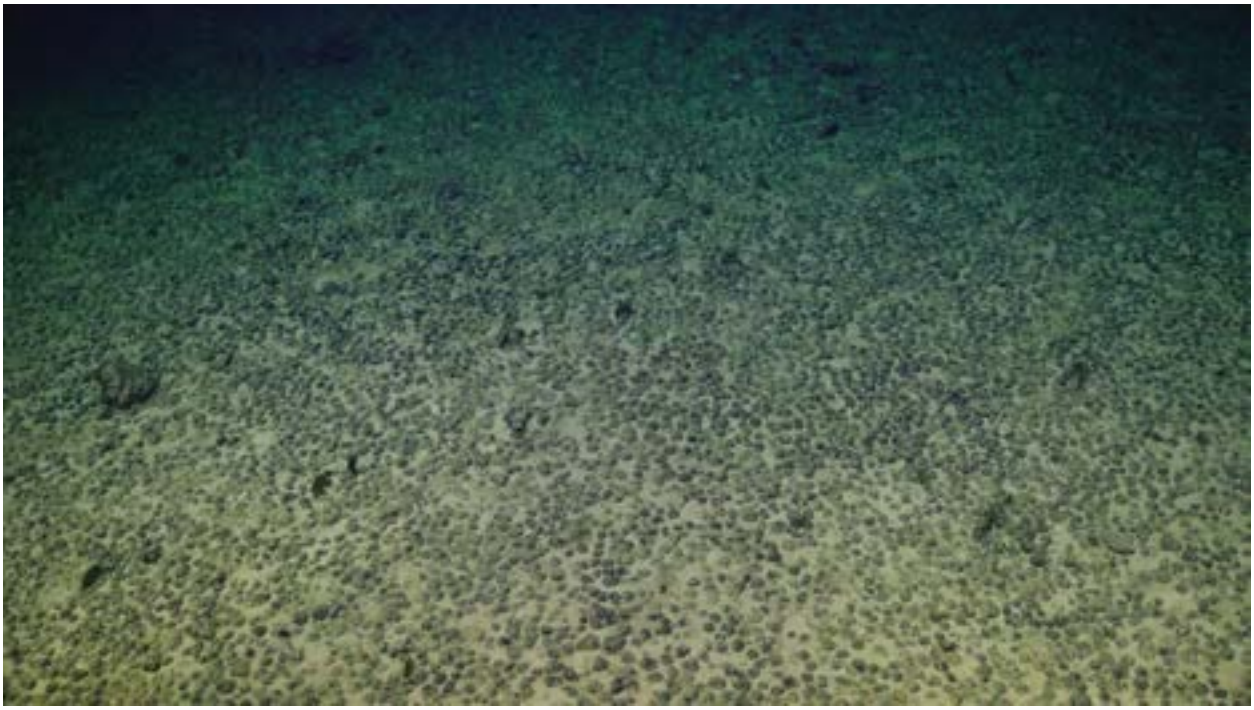


J2-1573 figure: Sedimented, draped sheet flows.

J2-1574

Launch Location: 18.198°N, 111.017°W
Launch Depth (m): 3461 m
In Water (GMT): 2024-04-22T22:12:37.802Z
On Bottom: 2024-04-22T23:47:40.306Z
Off Bottom: 2024-04-23T18:48:39.180Z
On Deck: 2024-04-23T20:10:54.870Z

Dive J2-1574 took place on the flanks and nested craters of pancake-shaped flows on Clairaut Seamount, east of the Mathematician Ridge. This dive recovered samples 208 through 226. The goal of this dive was to sample a prominent seamount on the east side of the Mathematician ridge, which will help test models of the magma formation on the west side. Once on bottom, pillow lavas had an older appearance and sediment included abundant ferromanganese nodules. Heading northeast up the pancake volcano, we observed encrusted talus, sediment, nodules, and pillow terraces. Nearer the top of the pancake, we saw large fields of manganese nodules, sediment, talus, and occasional pillows and tubes. A large pillow wall made up the rim of the crater on the pancake. The center of the crater contained talus deposits, sediment, occasional pillow lavas, and pumice. Headed southeast to the second crater, the morphology changed to FeMn pavement, occasional more massive pillows, talus, and sediment mounds. The second crater rim hosted in-place pillow outcrops and massive flow units, with a talus slope and sedimented center. Samples were regularly spaced along the dive track.

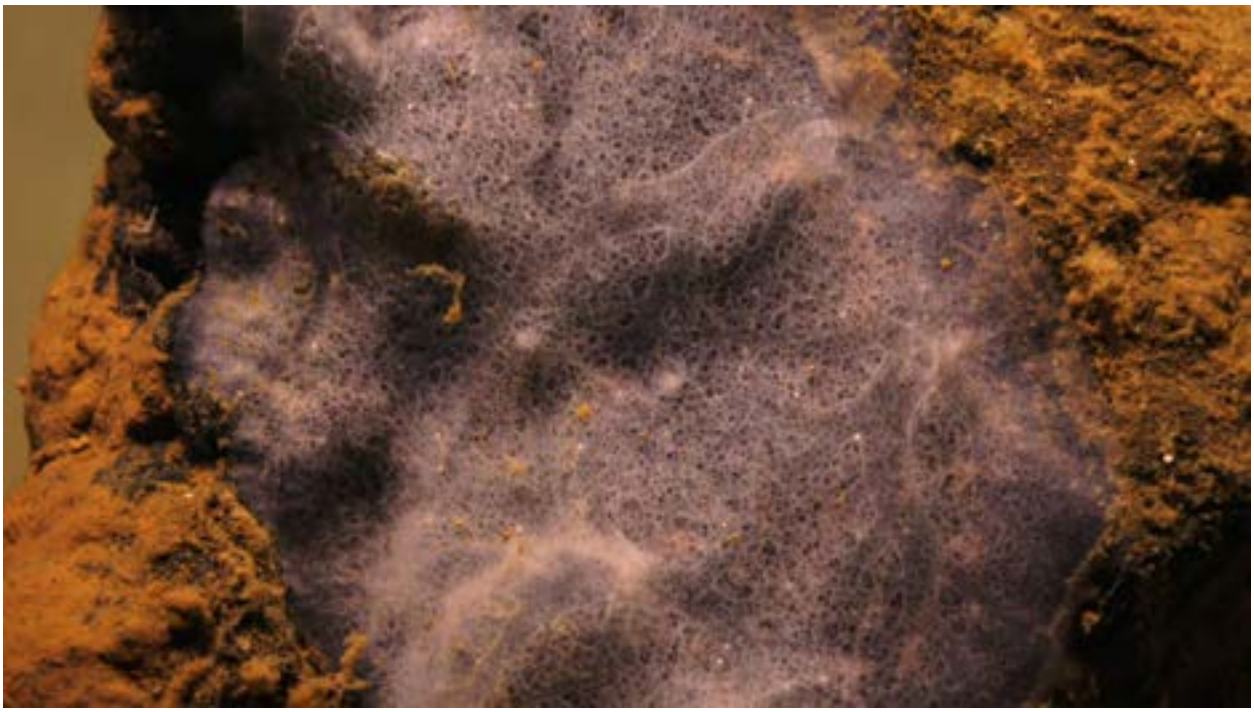


J2-1574 figure: Ferromanganese nodules blanketing the seafloor.

J2-1575

Launch Location: 18.198°N, 111.017°W
Launch Depth (m): 3461 m
In Water (GMT): 2024-04-24T01:04:13.051Z
On Bottom: 2024-04-24T03:12:46.248Z
Off Bottom: 2024-04-24T04:13:51.242Z
On Deck: 2024-04-24T06:22:05.395Z

Dive J2-1575 objectives were to examine a crustal block in a non-transform offset of the Mathematician Ridge with prominent and unusual deformation features. The block includes at least 3 sets of faults apparently related to abyssal hill formation and later rotation and deformation. Once on bottom, there was sediment, pillows, and many sea cucumbers. Shortly after the dive began, the Jason pilots observed one of the thruster oil reservoirs was empty or nearly empty. The dive was aborted and no samples were collected.

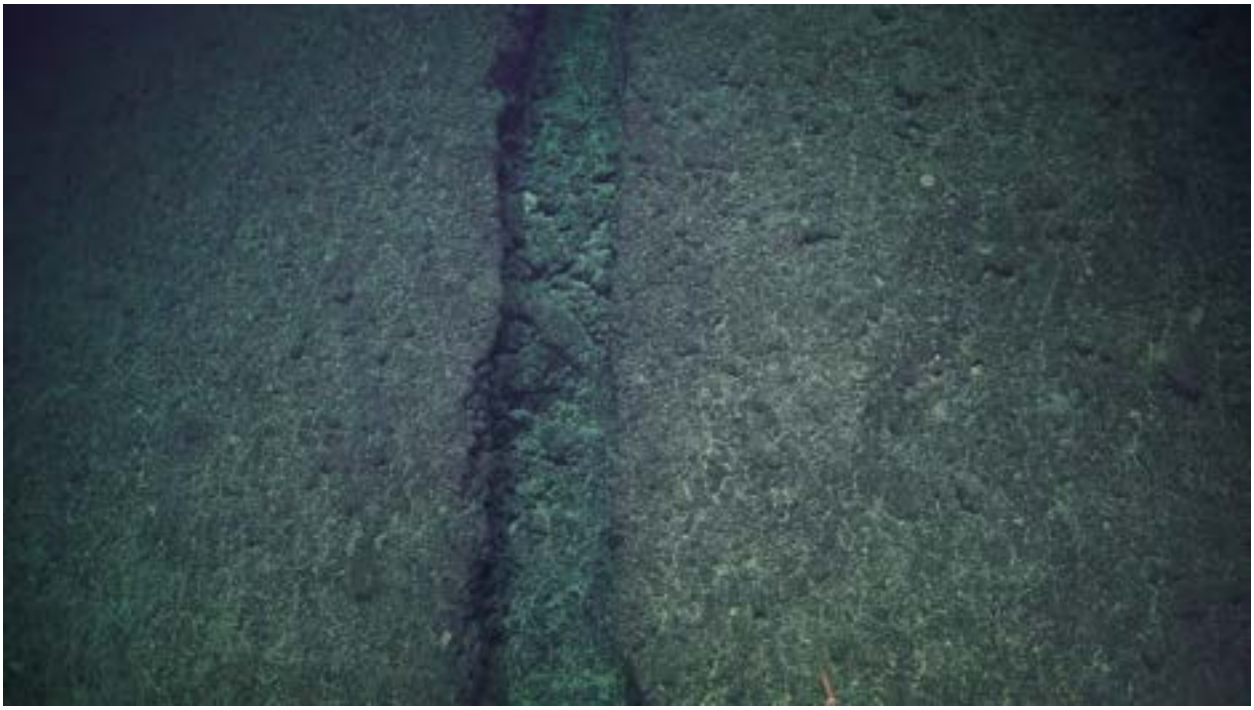


J2-1575 Figure: Encrusting sponge on a fragment of basaltic float.

J2-1576

Launch Location: 18.20688°N, 111.06186°W
Launch Depth (m): 2243 m
In Water (GMT): 2024-04-24T15:20:07.704Z
On Bottom: 2024-04-24T23:59:08.782Z
Off Bottom: 2024-04-24T23:59:08.782Z
On Deck: 2024-04-25T01:26:01.379Z

J2-1576 was a repeat attempt at dive J2-1575, with the same goals. The start point was adjusted to a shallower spot based on observations during J2-1575. This dive recovered samples 227 through 237. Once at bottom, FeMn nodules were dispersed on the seafloor, and transitioned to a talus slope continuing southwest. The dive path revealed FeMn pavement, talus, and minor, heavily encrusted, pillows and lava tubes. The main fault scarp appeared as a nearly featureless vertical wall, occasionally cut with vertically oriented inverted channels that may be a set of faults perpendicular to the main fault scarp. Continuing south, sediment, talus, and possible in-place pillows became more apparent. Another fault escarpment was observed cutting through pillows, leaving sediment and talus blocks in the valley. Benthic fauna included cucumbers, sponges, squat lobsters, shrimps, corals, sea stars, fishes, tunicates, jellies, and anemones.



J21576 Figure: Example of brecciated lava/cemented talus scarp face that has been cut by a near-vertical fault.

RR2403 – Daily Narrative (Dates/Times are local)

29 March 2024: All participants finally have visas, and we got the permits approved, and Claus Siebe is approved as the official observer! R/V Revelle departed port in San Diego as scheduled at 1200, in transit to our first stop, a deep-water site where the Jason team will perform an unspooling operation on a new fiber optic cable. We held a brief science meeting at 1230 to go over the major cruise plan and objectives. No one seems to be too seasick so far.

30 March 2024: We modified the waypoint for the Jason cable operation, to be guaranteed that the water depth is >4000 m. We held a science meeting at 1000 to take a look at some real ROV dive footage. At 1400, Claus gave a brief science talk on the geology of Socorro Island and the 1993 eruption. We arrived on station at ~1600 and the Jason team deployed their fiber optic cable. This operation is necessary because the cable is new and the Jason team needs to know how many times it rotates on descent and ascent, so that they can compensate for this with the vehicle and avoid cable hackling on recovery. They will unspool and respool the cable 3 times, and the operation is planned to take 24 hours. We also settled on a carton configuration for Jason's front porch, for the first dive. We will have 12 cartons, 9 of which will have ½ dividers, and 3 of which will be left undivided. There will also be one undivided, closed bio box on each of two swing arms on the sides of the ROV. There will be two push cores (we are providing the core barrels), and canvas bag scoops (3 or 4? I can't remember). This seems like ample storage capacity, and is significantly more than Hercules can store (Jason is a bit bigger than Hercules overall as well). No major seasickness so far, but Rob says we will have some bigger waves coming up.

31 March 2024: Happy Easter! We had a small chocolate hunt in the main lab. Coralie worked with Scotty to set up and configure Sealog with our preferred buttons, etc. Doing this also helped us better understand the Logger duties in the Jason control van, and in response we reconfigured the watch staffing a little bit. Cable spooling operation went smoothly, but the Jason team decided to do a 4th lowering to be sure they had gotten the cable to relax enough. Operation concluded at ~1700, and we provided the captain with a waypoint for Clarion Island and began our transit. Captain notes that there is a 12 mile exclusion zone around Clarion that is claimed by the Mexican Navy, and has asked Hannah to look into how we work with/around this. The main regional naval base is on Socorro, with a small outpost on Clarion. Our permits mention nothing about the exclusion zone around Clarion, but we have time to figure out how to work with it if needed. Multibeam watches started at 2000.

1 April 2024: Transit. Multibeam is being fussy, so Howie is rebooting the entire thing. From the multibeam, we are passing over abyssal hills and some seamounts, including a nice donut-shaped one with 3 apparent caldera features at ~2000. Jason team replaced a manipulator arm that was leaking oil. Looks like we will begin mapping around Clarion Island tomorrow, with first dive possibly beginning on April 3. Captain is seeking some guidance from shore about whether or not we need to "check in" with the naval base on Socorro before beginning our work, and whether or not we are allowed to pass within the 12 and 6 mile military exclusion zones around Clarion Island.

2 April 2024: Transit. Multibeam has been working all right through the last day or so. Captain has not yet heard back about exclusion zones or check-in with Socorro. Jason team is having issues with refrigeration units on two of its vans – winch van and control van. The bigger issue is with the winch van, which must maintain temperature for the electronics that control the winch, otherwise Jason could get stuck in the water. We discussed possible contingency of ditching for Manzanillo to get the AC units repaired, but ship and Jason engineers are also working to see if the issues can be fixed. Jason team fixed the control van A/C with some on-board supply of the right coolant; decided to go ahead with winch A/C at ~25%. Will keep an eye on it. Will map around Clarion and towards the E-W ridge overnight tonight and plan to dive tomorrow.

3 April 2024: Jason in the water at ~1200! Started J2-1563 today, with no major issues. Dive began on two small volcanic cones east of Clarion, moving from south to north. The southern cone has a crater at the top. Dive reveals that it is older, with sediment interspersed among pillow lavas and more massive flows, with some faulting evident. Given that it took 3 watches to ascend the first cone and explore the summit, we may skip a couple of waypoints of detour towards the northern cone and allow for 2 watches to ascend it.

4 April 2024: Dive J2-1563 continued through the AM, with expected vehicle recovery at ~1200. Morning watches did skip some waypoints to reach the second cone to finish off the dive. Second cone has diking structures at the summit similar to the first cone. 8-12 watch noted some sheet flows on the northern cone, unusual for non-ridge axis volcanoes. On recovery, samples were fresher than expected, some with glass remaining on rims, although many also had FeMn crusts and weathering evident on the exterior. Afternoon watches completed rock cutting, photography, and descriptions, and Abhijeet identified two samples that might work for gas chemistry. Samples should be subsampled and packed away before the next dive tomorrow at ~1100.

5 April 2024: Dive J2-1564 launched at ~1100, to sample and observe the submarine peaks of a cluster of coalesced cones that make up the E-W ridge. Our new multibeam data show that the volcanic expression of the ridge extends much farther east than is evident from the gravity-based regional bathymetry. Dive progressed up a long, steep slope at the outset, traversing lava flows and talus. Bottom has more black particles in the sediment than the previous dive had, but also has significant sediment in the interstitial spaces between pillows, rocks looks fairly weathered, and many rocks are colonized by sessile animals, suggesting that the last volcanic activity in this area was long ago.

6 April 2024: Dive J2-1564 completed at ~1100, with a haul of moderately weathered/encrusted rocks, many of which had glass rims and vesicles. We re-deployed Jason at ~1600 for dive J2-1565 on the smaller chain of volcanoes ESE of the main E_W ridge. These volcanoes appear older, with lots of sediment and a smooth coating of FeMn crusts on most lavas that makes them hard to pick up. Chief Sci. Kelley took a turn driving Jason on the 4-8 watch when the vehicle arrived on bottom. This dive will proceed through ~1600 tomorrow, at which time we will begin vehicle recovery with expected departure from this area at ~1800. We need to move quickly through sample workflow so that we do not get backed up with the samples from the previous dive.

7 April 2024: Completing remainder of dive J2-1565 today, with lots of sedimented bottom with FeMn nodules on the flat tops of these volcanoes. Occasional lava pokes through the sediment, and cliff faces in the crater showed a lava flow stratigraphy. Several octopus sightings in the dive footage in this location. Jason off bottom at ~1430, slightly earlier than planned due to a miscommunication with watch lead. They did get a sample of the base of the pancake volcano before ascending. With Jason on deck, we are mapping through the night towards the Mathematician Ridge and the popping rocks site. Jason's fiber optic cable is showing some signs of wear as a result of some uncertainty about the "turns table" they created during the cable spooling operation. They are trimming the cable back to remove the worn parts and fitting a fresh end to Jason. This work should be completed before a dive goes in tomorrow.

8 April 2024: Mapping over the Mathematician Ridge this morning intersected a total eclipse of the sun at 1049. We had a viewing party on the fantail, with deck chairs and music. The New York Times published a short article about us on their website. Post-eclipse, we continued mapping and arrived on station at ~1730 today for dive J2-1566, which began at 1800 on the "pop rocks" seamount SW of Socorro. First views of the small pancake flow at the base where the dive began were of beautiful pillows, many with small breakout buds that reminded viewers of nursing piglets, ginger root, or tardigrades.

9 April 2024: Dive J2-1566 continued this morning with slow progress going up the slope to the first peak. At the 8 am watch change, the dive encountered an unusual, hackly-looking lava flow that was remarkably fragile and difficult to sample. 4-8 watch took a sample of the lava, and 8-12 took a scoop of the black volcaniclastic sediment in this area, but the flow was limited in extent and the dive progressed past it fairly quickly. 12-4 watch also encountered a lava flow with remarkably fragile flow tops. Jason had a spectacular encounter with a very large dumbo octopus late in this dive. On recovery, everyone wore PPE as requested for the popping rocks, but nothing popped. Total disappointment. But the rocks were very fresh and glassy on this dive, and should be excellent for our research. Tonight and through tomorrow, we will be mapping on the Mathematician Ridge, and expect to dive again on 11 April.

10 April 2024: Mapping on the Mathematician Ridge today and through the night. Finalized dive plan for J2-1567, and will settle on dive plan for J2-1568 in the morning. We spent today finishing workflow on rocks from J2-1566.

11 April 2024: Completed mapping in the AM, and then steamed to the launch site for dive J2-1567, on the western bounding fault scarp of the Mathematician Ridge valley. Jason team had some hiccups with navigation systems during launch and during the dive, but these did not significantly delay things. Dive began on heavily sedimented valley floor and proceeded up along the easternmost fault scarp, which was also heavily sedimented at its base. Not until near the top of the scarp did the dive encounter in-place rock outcrops, which were pillow lavas. Rocks here are more difficult to sample due to a FeMn crust and the denser nature of the MORB lava, which makes for stronger lava with fewer holes and cracks to exploit for sampling.

12 April 2024: J2-1567 completed at 1100. Mathematician ridge faulted wall contained lots of talus and sediment, so sample basket was not full upon recovery. Rocks had a few glassy crusts, but many were altered. These should be tholeiitic MORBs, but no dikes were recovered or observed in the exposed valley walls. Upon completion of this dive, we steamed to the second Mathematician site in the axial valley. Dive J2-1568 began at 1600, with pillow lavas and talus. The southern end, where the dive began, also seems older, with a fair sediment cover and Mn crust on the flows. A dumbo octopus bumped its head on a rock on the PM 8-12 watch.

13 April 2024: Dive J2-1568 continued along the axial high of the Mathematician Ridge, in alternating pillows and talus. In hindsight, waypoints should have been more deliberately placed on the high line if the ridge to avoid talus and get the best exposures of lava. The lavas here were very hard to sample, with a coating of FeMn crust that cemented most rocks in place on the seafloor. Jason pilots showed great patience and persistence with these rocks, and we recovered a nearly-full sample basket. Beneath the Mn crust, most of these rocks were very glassy and will make for excellent geochemical work. It is remarkable how thick the crusts are on such young volcanics, and this has been the case with many rocks recovered at all sites so far. Tonight we are mapping our way up to the Roca Partida vicinity, and will plan a dive (J2-1569) on the seamount ESE of Roca Partida for tomorrow evening.

14 April 2024: We completed mapping around Roca Partida and nearby seamounts, and made a dive plan for J2-1569 on the seamount ESE of Roca Partida, which we have nicknamed “Pythagoras” in the spirit of the Mathematician Ridge. Its N-S cross-section is triangular, so the name seems fitting. Roca Partida was briefly visible in the far distance today during our survey, and we also had views of Socorro for a short time. The dive began at ~1800 today, in pillow lavas. There is less sediment and FeMn crust on the rocks in this spot, and the rocks seem easier to sample. Some areas are coated in a dark pavement over the sediment which could be cemented volcaniclastic deposit, from this seamount, or perhaps from an explosive eruption of Roca Partida. One sample of the pavement was taken on the 8-12 watch.

15 April 2024: Watches overnight also noted the presence of dark, hardened pavement on top of sediments during dive J2-1569. Lots of pillow lava, though the peaks of cones on this feature seem to have more broken up, talus-like and larger blocks instead of lava flows. Perhaps the summits experience more explosive activity, whereas the flanks have more effusive fissure-style eruptions. Dive came up at ~1800, and samples are highly vesicular and many are glassy. The pavement is a volcaniclastic sediment of some kind. We are mapping overnight and will begin dive J2-1570 at 1100 tomorrow.

16 April 2024: Dive J2-1570 got underway on the SW flank of Roca Partida at 1100. Jason lost USBL within the first few minutes, and never recovered it, and so the navigation on this dive has larger uncertainties (~150 m) because we only really have the ship GPS navigation. The USBL had been having intermittent errors throughout the cruise, but was never lost completely. Jason team did some heroic mathematics, including usage of the Pythagorean theorem, to estimate Jason’s position and managed to make the dive work despite being relatively blind to Jason’s position in the water. These volcanic island flanks contain lots of cemented volcaniclastics, and for the first time here we

have seen these overlying rocks instead of sediment in some places. Deposits seem thicker here, but there are also pillow lavas and chunky clasts that suggest more energetic eruptive styles at Roca Partida.

17 April 2024: Dive J2-1570 came off bottom at 1015 with recovery at ~1100. Morning views of submarine Roca Partida included sediment, thick volcaniclastic deposits, and large pillows blocks, including a faulted wall of massive pillows and flows. Roca Partida itself is also visible from this ship at this close proximity. We had a ~5 hour transit from Roca Partida to the 9th dive site, "Salicrup," during which time the Jason team identified the source of the problem with the USBL, and developed a workaround that allows us to return to more or less normal navigation (uncertainties on X-Y position are now more like 5-10 meters) and to operate Jason with greater confidence and less risk. Dive J2-1571, "Salicrup," began at 1800. Rocks on this seamount are heavily Mn-encrusted, and the most difficult to sample of the cruise thus far. Dive began in a flat expanse of sediment, with a small protrusion of lava that was impossible to sample. Lots of views of unusual sea cucumbers.

18 April 2024: Dive J2-1571 completed at ~1800. Most of today, the dive was in pillow lava with some spectacular faulted blocks exposing cut sections of pillows. All rocks were coated in a thick FeMn crust that made sampling incredibly difficult. Jason pilots worked with great persistence and patience to find rocks that could be broken off. Most of these were large pillow buds with a downward angle, which allowed pilots to gain leverage pushing upwards with Jason pressed to the seafloor. Upon recovery, all of the large rock pieces contain glass underneath ~2-8 cm of crust. This was a very successful dive despite the difficult sampling. Tonight we are mapping, and tomorrow we begin the bonus round of the cruise because we have completed all of the original planned dives, but still have a week of time remaining. Rebecca Lippitt has planned dive J2-1572 on the SE ridge of San Benedicto Island, to fill a gap in the depth range of island samples. Mauro Mingo has planned dive J2-1573, which will sample the deepest volcanic foundations of Socorro Island on its northern flank, in the saddle between the two active volcanoes. Dive J2-1572 will begin at 1100 tomorrow.

19 April 2024: Mapping concluded and pre-dive checks began at 1100 for dive J2-1752 on the volcanic ridge on the SE flank of San Benedicto. The Jason crane had an issue during the launch prep, and we had to delay to launch until after lunch so that the Jason team could replace the controller box. The issue was resolved and the dive launched at ~1215. This dive was designed by Rebecca Lippitt to capture a depth range of volcanism from one of the islands that is missing from the existing sample collection (1500-3000 m), and so sampling of in-place lava was planned for specific depths across the depth range of the dive. The beginning of the dive revealed plenty of in-place lava flows from which to sample, but in many areas the lava flows were partially covered in a thick layer of sediment, which is likely to contain a large fraction of volcanic ash from the 1950's eruption of Barcena. The dive also encountered abundant, large blocks of pumice scattered across the seafloor, also likely from Barcena. A few samples of the pumice were collected for verification.

20 April 2024: Dive J2-1572 concluded at 1300 after collecting rocks at most of the requested depths from SW San Benedicto. Most rocks contained glassy rinds and had relatively fresh interiors. Dive J2-1573 began at 1800 on the deepest northern flank of Socorro island. The goal is to collect rocks that represent the foundational volcanism of the island, perhaps capturing the transition from

MR to island magmatism. Despite its likely older age, this dive began in well-exposed pillow lavas that do not seem to be problematically encrusted. Sampling is fairly straightforward with these. 8-12 watch observed a peculiar stalked sponge that doesn't seem to appear in any online identification guides – we had one previous observation of this type of sponge from earlier in the cruise as well. Jade has self-nominated to organize a ping-pong tournament in our final week at sea.

21 April 2024: Dive J2-1573 concluded and returned on deck at ~1800. This dive boasted some of the best landscapes of the cruise, with large sheet flows with fissure-sized cracks and a trench large enough to drive Jason down (while pretending at Star Wars). Rock sampling was relatively easy on this dive, and Akel managed to get a remarkably large pillow tube to mark sample #200. On recovery, most rocks were quite glassy and very fresh. We opted not to try to cut the enormous pillow tube, but will do so at MGSL on the big saw. The pilot camera on Jason showed some glitches in the van late in the dive. We are mapping tonight and will decide the dive plan for J2-1574 in the morning. The site for tomorrow is Clairaut Seamount, on the east side of the Mathematician Ridge, and this spot will help to test the potential melt generation models for the region.

22 April 2024: Mapping completed and we aimed to launch at 1100 for dive J2-1574. Jason team needed some extra time to repair an optical cable for the Pilot Cam, so launch was delayed until 1200. During launch, after Jason came off deck, the crane blew a hose, which further delayed launch to allow for cleanup and repair. On the 3rd try, Jason launched successfully (~1500) for dive J2-1574, on Clairaut seamount, which is east of the Mathematician Ridge and contains several nested craters. Site has excellent FeMn nodules on the flat terrain near the beginning of the dive.

23 April 2024: Dive J2-1574 continued through the morning, with recovery at ~1300. The dive progressed into the deep crater of the summit, and found a sedimented bottom, but nice exposures near the top of the crater walls. Thick FeMn crust made sampling challenging. On recovery, most rocks were dense with low vesicularity, and altered, but remarkably with fresh glass preserved beneath the crust. We launched dive J2-1575 at ~1600 on a faulted and rotated block of the Mathematician Ridge, with early views of a very steep and sedimented bottom. After progressing ~100 m up slope, Jason pilots noted that oil pressure was low and a thruster appeared to have lost oil. Dive was aborted and returned on deck at ~2300 with no samples. Evaluation and repairs were begun overnight, with hope to re-launch around 7 AM.

24 April 2024: Jason team accomplished replacement of seals on the sole affected thruster, though they could not source the exact problem. Dive J2-1576 launched at ~0800 using a revised dive plan from J2-1575. We decided to skip the lower portions of the cliff face and instead focused on fault scarps near the top of the deformed block. This dive aims to use Jason's magnetometer to help constrain the direction of rotation of the deformed block. The fault scarps are made almost entirely of FeMn encrusted talus/breccia, but are cut by numerous, near-vertical faults that have loose blocks within. We sampled some of the looser blocks, which all turned out to be basalt. Dive recovered at ~1800, and this was the last dive of the cruise. Science activities continued with mapping overnight until the time required for departure to Manzanillo.

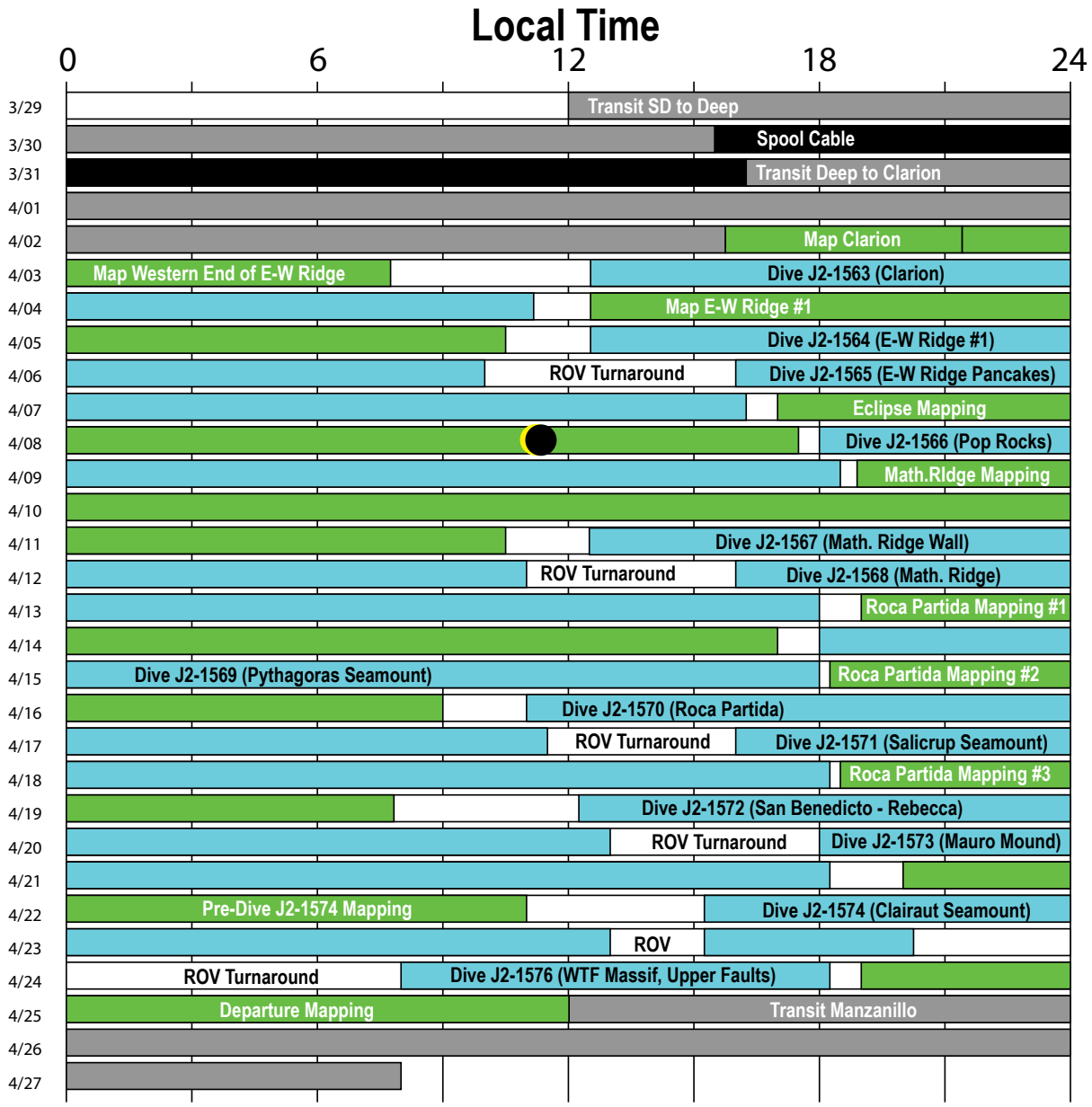
25 April 2024: This morning we continued with a mapping and magnetometer survey until ~midday when we turned our track towards Manzanillo. Magnetometer was brought in at ~2000. Lab activities included completing sample workflow for the final dive, and then packing the final 20 buckets. Amazingly, almost all of our 237 rocks fit into the 60 buckets we brought on board – the ones remaining are too large or awkwardly shaped to fit into buckets. Watches accomplished lab cleanup and packing of most of our remaining supplies. We will plan to load pallets tomorrow.

26 April 2024: Transit to Manzanillo. We will continue multibeam mapping along most of the transit route. We are scheduled to meet the pilot boat at 0730, and to tie up at the passenger terminal in Manzanillo at 0800 tomorrow. Today we assembled pallets for shipment and packed up remaining science supplies. We took a group photo on the fantail with Jason, and I took down the pet wall from the white board in the hallway. We are almost done!

27 April 2024: Land in sight! Ship arrived in Manzanillo this morning and has moored at the passenger terminal in downtown Manzanillo. All rocks are packed up except for oddities that won't fit or need special packaging (sample 200, pumice, push cores, etc.). Revelle cruise data drive has been handed off, and Jason data drive is in process. And….done!

Cruise Timeline

	Start (GMT)	Finish (GMT)	Days	Start (local)	Finish (local)
Depart San Diego	3/29/24 19:30	3/30/24 22:30	1.13	3/29/24 12:30	3/30/24 15:30
Spool Cable	3/30/24 22:30	4/1/24 0:15	1.07	3/30/24 15:30	3/31/24 17:15
Transit to Clarion	4/1/24 0:15	4/2/24 22:15	1.92	3/31/24 17:15	4/2/24 15:15
Map Clarion	4/2/24 22:15	4/3/24 14:30	0.68	4/2/24 15:15	4/3/24 7:30
Dive J2-1563 Clarion	4/3/24 19:40	4/4/24 18:11	0.94	4/3/24 12:40	4/4/24 11:11
E-W Ridge Survey #1	4/4/24 19:45	4/5/24 17:37	0.91	4/4/24 12:45	4/5/24 10:37
Dive J2-1564 EW#1	4/5/24 19:55	4/6/24 17:09	0.88	4/5/24 12:55	4/6/24 10:09
Dive J2-1565 EW#2	4/6/24 23:12	4/7/24 23:22	1.01	4/6/24 16:12	4/7/24 16:22
Eclipse Mapping	4/8/24 0:03	4/9/24 0:29	1.02	4/7/24 17:03	4/8/24 17:29
Dive J2-1566 Pop Rocks	4/9/24 1:00	4/10/24 1:30	1.02	4/8/24 18:00	4/9/24 18:30
Math. Ridge Mapping	4/10/24 1:50	4/11/24 17:30	1.65	4/9/24 18:50	4/11/24 10:30
Dive J2-1567 Math. Ridge Wall	4/11/24 19:15	4/12/24 18:00	0.95	4/11/24 12:15	4/12/24 11:00
Dive J2-1568 Math. Ridge Axis	4/13/24 1:00	4/14/24 1:25	1.02	4/12/24 18:00	4/13/24 18:25
Roca Partida Mapping	4/14/24 1:57	4/14/24 23:53	0.91	4/13/24 18:57	4/14/24 16:53
Dive J2-1569 Pythagoras Seamount	4/15/24 1:15	4/16/24 1:15	1.00	4/14/24 18:15	4/15/24 18:15
Roca Partida Mapping #2	4/16/24 1:45	4/16/24 16:00	0.59	4/15/24 18:45	4/16/24 9:00
Dive J2-1570 Roca Partida	4/16/24 18:15	4/17/24 18:30	1.01	4/16/24 11:15	4/17/24 11:30
Transit to Salicrup Seamount	4/17/24 18:30	4/17/24 22:45	0.18	4/17/24 11:30	4/17/24 15:45
Dive J2-1571 Salicrup Seamount	4/18/24 1:15	4/19/24 1:15	1.00	4/17/24 18:15	4/18/24 18:15
Roca Partida Mapping #3	4/19/24 1:34	4/19/24 15:50	0.59	4/18/24 18:34	4/19/24 8:50
Dive J2-1572 San Benedicto - Rebecca	4/19/24 19:15	4/20/24 20:00	1.03	4/19/24 12:15	4/20/24 13:00
Dive J2-1573 Socorro - Mauro	4/21/24 1:05	4/22/24 2:18	1.05	4/20/24 18:05	4/21/24 19:18
Pre-Dive J2-1574 Mapping	4/22/24 3:00	4/22/24 18:00	0.63	4/21/24 20:00	4/22/24 11:00
Dive J2-1574 Clairaut Seamount	4/22/24 22:15	4/23/24 20:00	0.91	4/22/24 15:15	4/23/24 13:00
Transit to WTF Massif	4/23/24 20:30	4/23/24 23:59	0.15	4/23/24 13:30	4/23/24 16:59
Dive J2-1575 WTF Massif (aborted)	4/24/24 1:05	4/24/24 5:05	0.17	4/23/24 18:05	4/23/24 22:05
Dive J2-1576 WTF Massif (Upper Faults)	4/24/24 15:05	4/25/24 1:15	0.42	4/24/24 8:05	4/24/24 18:15
Departure Mapping	4/25/24 1:54	4/27/24 13:45	2.49	4/24/24 18:54	4/27/24 6:45
At Dock in Manzanillo	4/27/24 15:30			4/27/24 8:30	


Local Time
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Transit SD to Deep
Spool Cable
Transit Deep to Clarion
Map Clarion
Map Western End of E-W Ridge
Dive J2-1563 (Clarion)
Map E-W Ridge #1
Dive J2-1564 (E-W Ridge #1)
ROV Turnaround
Dive J2-1565 (E-W Ridge Pancakes)
Eclipse Mapping
Dive J2-1566 (Pop Rocks)
Math.RIdge Mapping
Dive J2-1567 (Math. Ridge Wall)
ROV Turnaround
Dive J2-1568 (Math. Ridge)
Roca Partida Mapping #1
Dive J2-1569 (Pythagoras Seamount)
Roca Partida Mapping #2
Dive J2-1570 (Roca Partida)
ROV Turnaround
Dive J2-1571 (Salicrup Seamount)
Roca Partida Mapping #3
Dive J2-1572 (San Benedicto - Rebecca)
ROV Turnaround
Dive J2-1573 (Mauro Mound)
Pre-Dive J2-1574 Mapping
Dive J2-1574 (Clairaut Seamount)
ROV
ROV Turnaround
Dive J2-1576 (WTF Massif, Upper Faults)
Departure Mapping
Transit Manzanillo

Geophysical Methods

Underway geophysical data were obtained with a Simrad hull-mounted EM124 12 kHz multibeam swath-mapping system, a Knudsen 3260 digitally recorded 3.5 kHz sub-bottom profiler, a split-beam Simrad EK70 echosounder, a Marine Magnetics SeaSPY magnetometer (Bob), and a Bell Laboratories BGM-3 gravimeter (SN218).

Multibeam:

Data Collection: *Simrad EM124 12 kHz*

Multibeam bathymetry and backscatter data were collecting during most transit periods of the cruise. The only exceptions were during short transits between dive location that had been previously mapped during the cruise. Characteristic swath widths are 4-5 times the water depth with acoustic footprint resolutions of about 50 m across-track and 100 m along track. The total area mapped during the cruise is approximately 90,000 km^2 with ~30,000 km^2 collected during transits to and from the primary work area and ~60,000 km^2 in our primary study area (or about 15 Rhode Islands).

Processing:

Additional processing of the Multibeam data with MBsystem (MB-System 5.7.9beta69) and Generic Mapping Tools (GMT 5.4.5) software is required to "edit" bad pings and create gridded bathymetry and backscatter data for analysis. This process included using:

1) MBclean (to remove individual bad pings),
2) MBedit (to remove individual bad pings),
3) MBprocess (to incorporate edits),
4) MBdatalist (to create list of data to be used)
5) MBbackangle (to correct backscatter for geometry & topographic effects)
6) MBgrid (to create bathymetry grid of survey area)

C-Shell scripts (to process data and enact GMT utilities to create postscript plots)

- initial_process.csh (pre-clean data)
- final_process.csh (including all edits and create bathymetry & backscatter grids)
- plot_dive_sites.csh (create initial bathymetry plots with waypoints for watches)
- plot_dive_sites_post.csh (bathymetry plots with time ticks and sample locations)
- plot_dive_profiles_post.csh (bathymetry profiles with time and sample locations)

Chirp: *Knudsen 3260 echosounder*

Data Collection:

Chirp data were collected intermittently during the early part of the cruise to test if sediment thicknesses could be derived and used as a proxy basement exposure. Our initial observations indicated this approach would not be useful due to rough topography (side-echoes) and fortunately thin sediments in our targeted areas.

Processing:

No processing of the Chirp data was attempted or required for cruise objectives.

Splitbeam Echosounder: *Simrad EK70*

Data Collection:
Simrad EK70 data were collected on April 8th for several hours to capture the potential impacts of zooplankton migration during the solar eclipse.

Processing:
No processing of the Simrad EK70 occurred during the cruise. We attempted to use an open-source, Matlab-based software (ESP3), but the software required a more recent version of Matlab (v. 2022a) than installed on available computers.

Magnetometer: *Marine Magnetics SeaSPY (Bob)*
Data Collection:
Magnetometer data were collected routinely coincident with multibeam mapping in the primary study area and during the transit to Manzanillo. The towfish was streamed at 300 m behind the ship and collected date on the total magnetic field intensity.

Processing:
Initial processing of the magnetics data during the cruise involved calculating the anomalous field intensity by removing the predicted regional field intensity from the collected total field data with a C-shell script using GMT (plot_mag.csh). The regional field intensity was obtained from a NOAA website (https://www.ngdc.noaa.gov/geomag/calculators/magcalc.shtml#igrfgrid) for the region for April 15th, 2004.

Gravimeter: *Bell Laboratories BGM-3 gravimeter*
Data Collection:
Gravity data were collected during the entire cruise with tie points in San Diego and Manzanillo.

Processing:
No processing of the gravity data occurred on the cruise. Post-processed data will be made available shortly after the cruise through the Woods Hole Potential Fields Pool Equipment facility.

ROV Methods

Seafloor samples and video were collected using the Jason ROV system, which is an asset of the WHOI National Deep Submergence Facility. Jason operates with a team on each watch consisting of pilot, navigator, and engineer, with guidance from a science team watch leader.
Our cruise used Jason in its single-body configuration and equipped with the science sled (two swing arms and a large front basket). The Jason vehicle is equipped with a host of cameras, sensors, and tools to enable seafloor observations and sampling:

Cameras
- Science Camera (starboard side): Sulis 4k
- Pilot Camera (port side): Mini Zeus HD
- Brow Camera: Mini Zeus HD

Major Sensors
- SeaBird Seacat19v2 Profiler CTD

- Honeywell 3-axis magnetometer with HMR2300 sensor
- Oxygen sensor

Manipulators
- Schilling Robotics TITAN 4 Manipulator (2)

Push core rig
- 2.5″ ID by 12″ long, clear polycarbonate (2)

Scoop samplers
- Canvas bag scoops (3)

Sample baskets
- Milk crates with half dividers (9)
- Milk crates, undivided (3)
- Milk crates reserved for ballast (1.5)
- Bio boxes on swing arms (2)

Elevator
- Elevator was equipped for our cruise, but not used

Geological Samples Methods

Naming Conventions

1. All samples follow the same naming convention:
   cruise ID - dive # - sample # - type code (e.g. RR2403-J2XXXX-001-R). Type codes include:
   R - Rock
   P - Push Core
   S - Scoop sample

   Sample number continually increases throughout the duration of the cruise -001-, -002-, -003-, etc. Naming for a new dive picks up where the last dive ended. For example, if a dive ended with RR2403-J2XXXX-032-R, the first sample of the next dive was named RR2403-J2XXXY-033-X.
2. Post recovery, if people subsampled a given rock, we did not rename the samples. Subsamples were coded with the original sample name and initials of the requester.
3. A small white board in the control van was kept current with the last sample number from the previous dive and the starting sample number for the next dive. The clipboard logger controlled this board.

During sample collection (ROV on bottom)

1. One person on watch was designated as Event Logger. They used Sealog to note and name all sampling events (time of sampling event, type of sample, method of sampling, rough size estimate, color, basic morphology, sample location on vehicle, depth, lat/long, etc.), and recorded general observations of seafloor environment, including geology and biology, in Sealog.
2. One person on watch was designated as Video Logger. They recorded video highlights and still images, and logged these in Sealog and in other spreadsheets.
3. One person on watch was designated as Clipboard Logger. They were the master keeper of sample names and locations on the vehicle. Naming of samples followed the convention laid out above under *Naming Convention for Samples*. This person was also responsible for directing the offloading of samples from Jason post-dive.
4. In addition to Sealog, we used a physical Sample Description Sheet where similar info was logged for a physical copy. The Clipboard Logger was responsible for initiating physical Sample Description Sheets while in the control van during each dive. This paper moved with each sample through the Wet Lab Work Flow where a more comprehensive description was added.
5. We maintained a paper copy of a map with the layout of the sample storage on JASON and the sample elevator. The Clipboard Logger noted where each sample was placed on the ROV or sample elevator.

Prior to Recovery of ROV (ROV Off Bottom)

1. Sample Description Sheets and the sample storage location map were moved to the wet lab once the ROV came off bottom. Sample Description Sheets were placed in plastic bags in order to follow their corresponding sample around.
2. Buckets designated for transport between the ROV and Wet Lab were labeled with a sample name on a piece of tape.
3. Each bucket was filled with seawater to ensure samples were submerged upon removal from the ROV. Lids were kept on hand in case of popping rocks.
4. PPE (gardening gloves, eye protection, long sleeves/ pants) was worn by the group recovering samples from the ROV to protect against cuts from glassy samples and popping rocks.

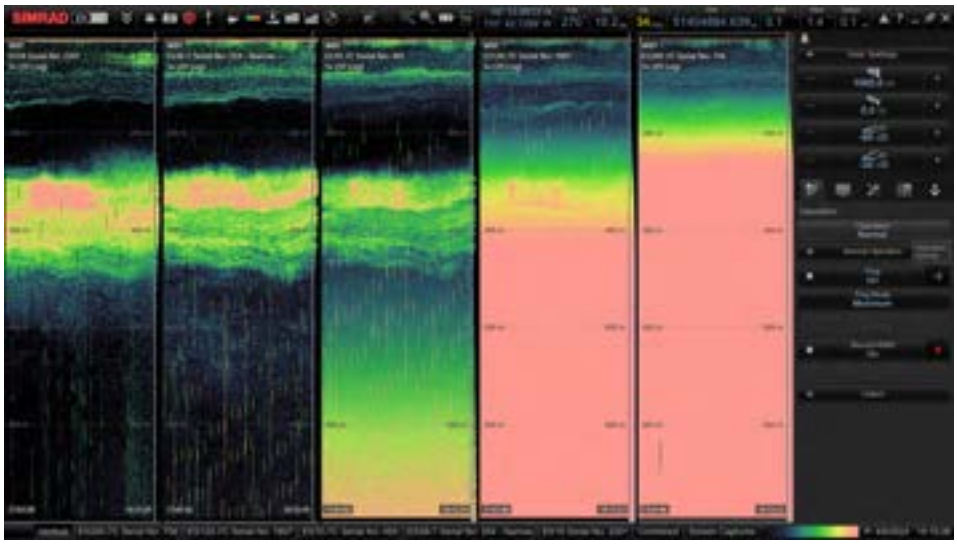
ROV on Deck

1. Samples in porous containers (e.g. in milk cartons and not the enclosed bio boxes) were collected from the ROV first and placed immediately into their corresponding seawater-filled buckets as quickly as possible to avoid atmospheric contamination.
2. Popping rocks, if found, were submerged in a bucket with a lid until popping ceased.
3. Samples in enclosed bio boxes were last to be removed from the ROV and resubmerged in transport buckets.
4. Samples remained submerged in seawater and untouched until Abhijeet Chakraborty checked each rock for glass and selected the best candidates for gas geochemistry.
5. Once the gas geochemistry samples were selected, the remaining rocks were transferred into gray tubs along with the tape labels from their respective buckets, for follow-up workflow.

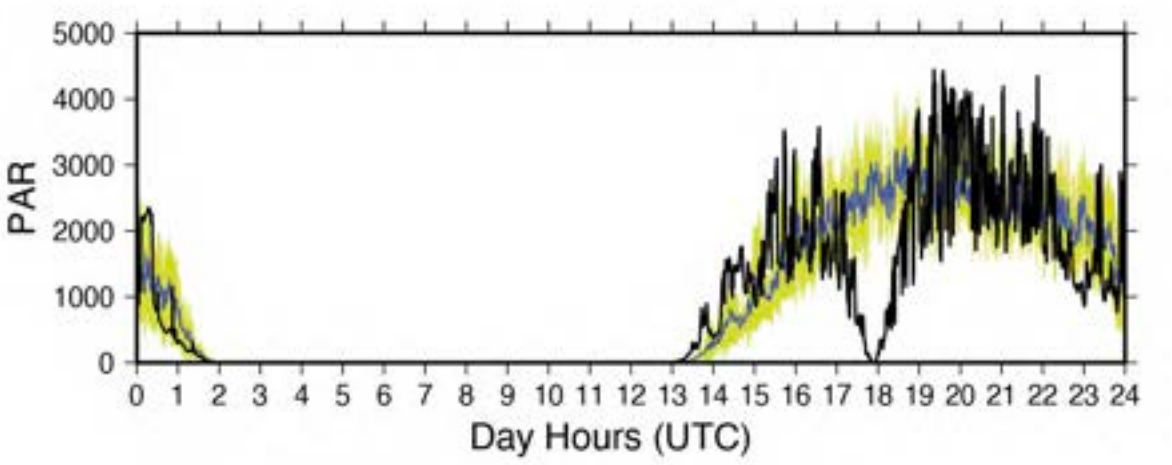
Wet Lab Work Flow

1. Samples were measured and photographed with a scale bar and a label using the Cruise iPad.
2. Samples were cut using the rock saw and laid out to dry in their corresponding labeled buckets.
3. Once samples were mostly dry, a more comprehensive description of each was recorded by hand on its Sample Description Sheet (rock type, phenocrysts, vesicles, Fe-Mn crust, etc.).
4. Photos of the cut samples were also taken with the iPad, a scale bar, and a label.
5. Subsampling of the parent rock then took place (glass, pieces of whole rock, etc.). Subsamples did not get new names, but bags were labeled with the initials of the requester. Each person taking a subsample recorded what type of and, if applicable, how much material they were taking on the Sample Description Sheet and in the Sheet titled *RR2403 Sample Split Tracking* on the shared cruise drive.
6. Once samples were processed and subsampled, they were placed in labeled bags and packed into numbered Home Depot buckets with lids. The numbered bucket in which each sample and subsample was stored is noted in the sheet titled *RR2403 Sample Tracking*. The buckets were secured for transit using bungee cords under lab tables.
7. Upon the completion of sample processing, the information from the Sample Description Sheets was transcribed to the sheet titled *RR2403 Sample Descriptions* in order.
8. Lastly, the physical Sample Description Sheets were 3-hole punched and placed into the Sample Log Binder along with the Jason sample map from each dive.

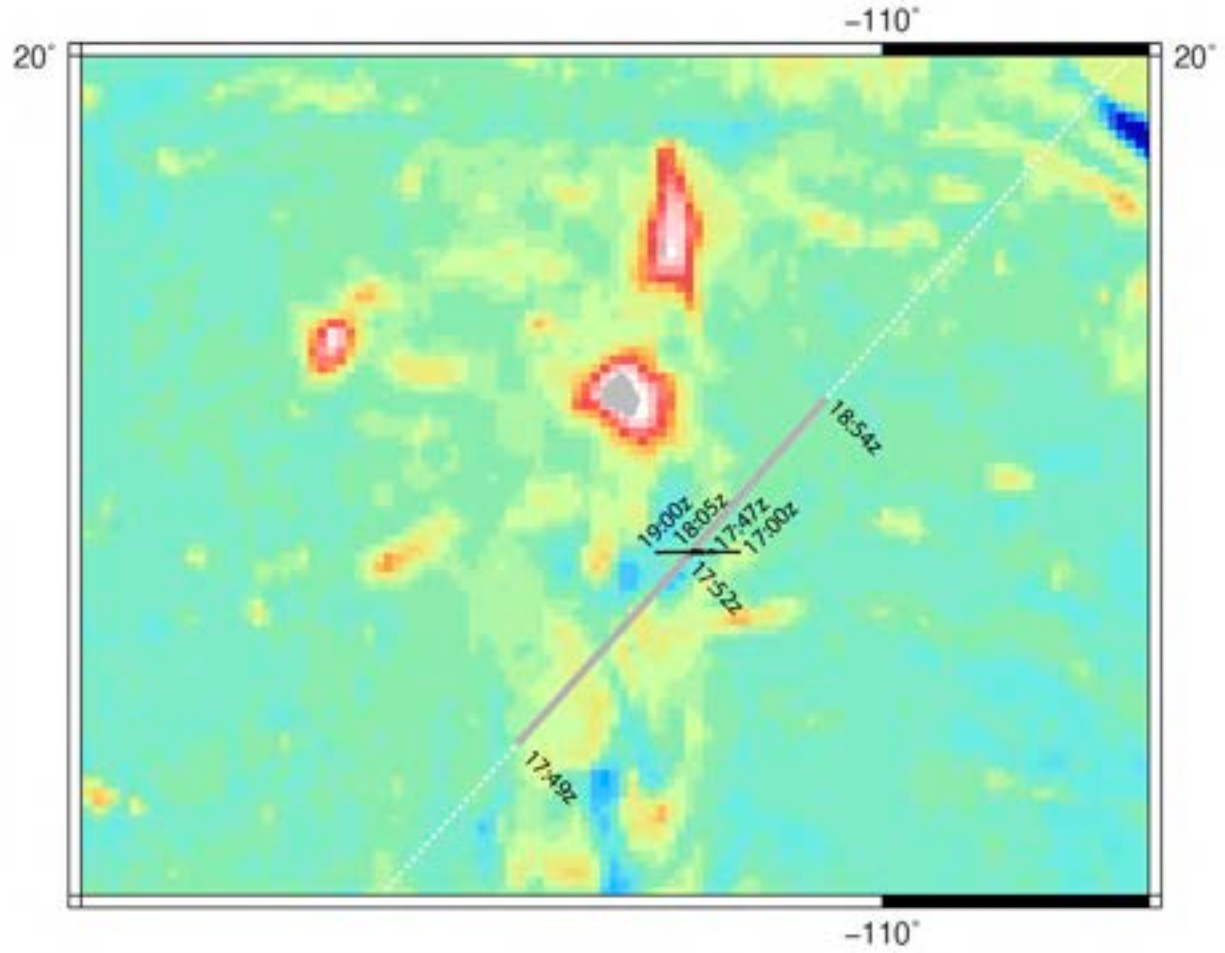
Eclipse Zooplankton Migration Response



Screen capture of backscatter intensity in the water column showing the vertical migration of zooplankton during the 4/8/2024 eclipse. The various panels indicate different Simrad echosounder frequencies (18, 38, 70,120, & 200 kHz, from left to right). Individual panels span about 30 minutes of time with earlier measurements on the left and more recent measurements on the right. The vertical axis is depth increasing downward to 1000 m. Hotter colors indicate greater backscatter intensities (i.e. more zooplankton). The vertical migration is best observed in the lower frequency leftmost panels as the thin pinkish band initially located at about 350 mbsl expands upward for about 15 minutes with the totality of the eclipse occurring midway between the upward migration.

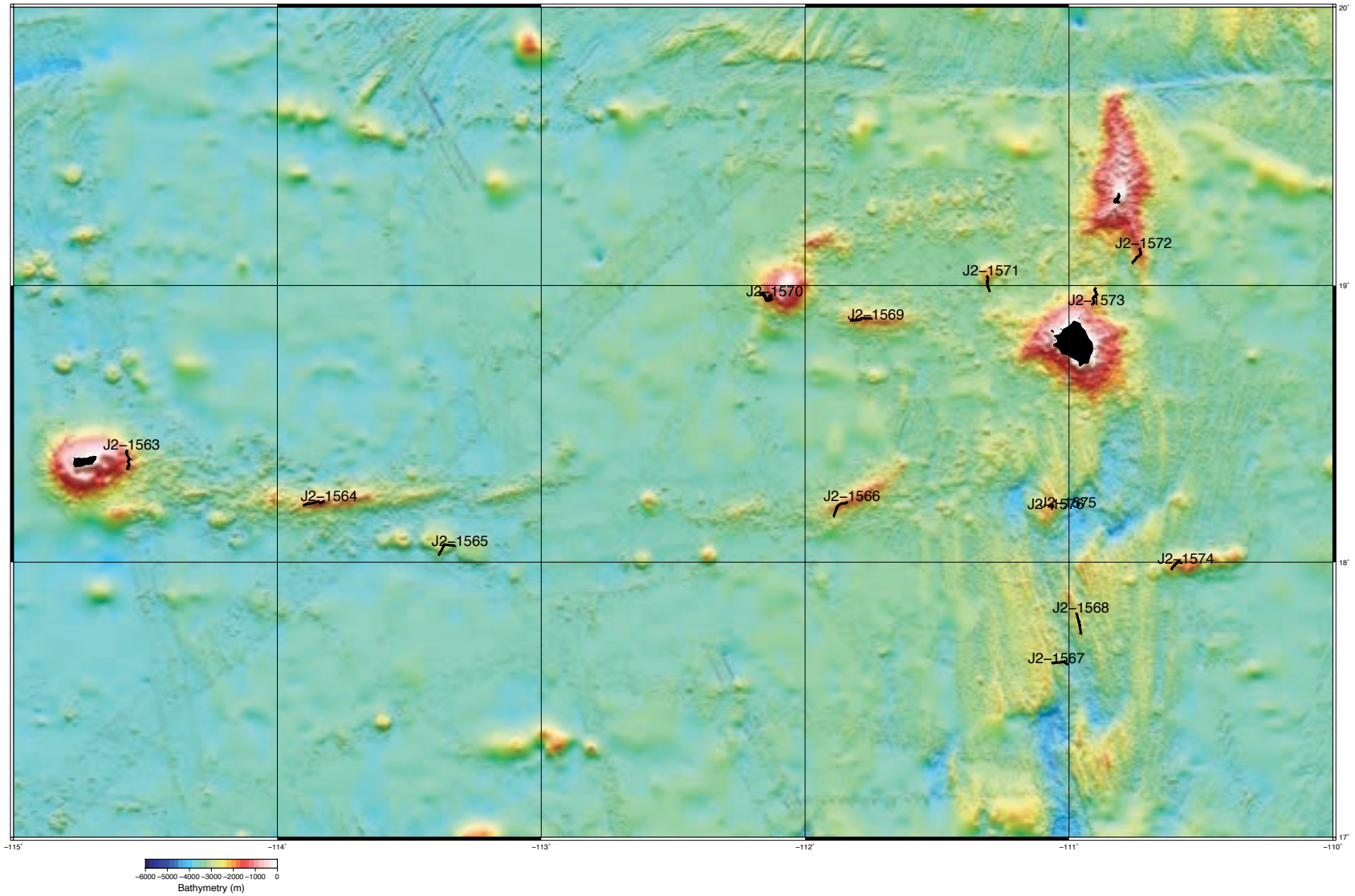


Plot of photosynthetically active radiation (PAR). Blue line is the mean and yellow region is the first standard deviation of the PAR data from April 3rd to April 11th 2024, excluding data from April 8th, the day of the eclipse. The black line is the PAR data from the day of the eclipse.



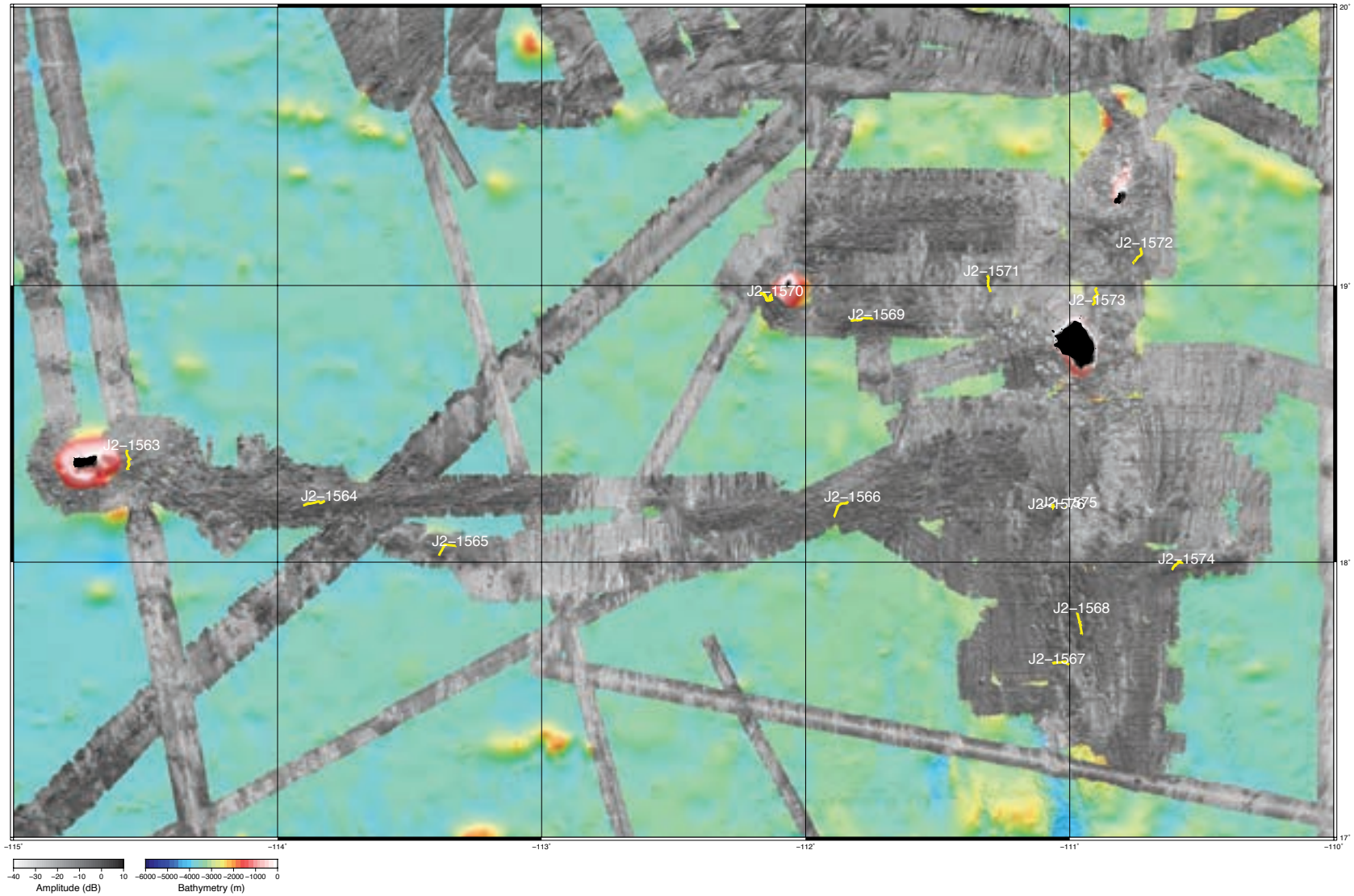
Plot of eclipse path and vessel location in and around the time of the eclipse (https://nso.edu/for-public/eclipse-map-2024/). The dashed white line indicates the path of eclipse totality, the gray line indicates the location of the start and end time of eclipse totality, and the black circle indicates the location and time of maximum eclipse in the approximate location of the vessel. The thin black line indicates the vessel's trackline at the approximate times when the PAR decreases below the first standard deviation (see figure above). The thicker blackline indicates the vessel's location during the vertical migration of the zooplankton (first figure), and the white circle is the approximate vessel's location at maximum eclipse (~17:52z).

Regional Bathymetry Map



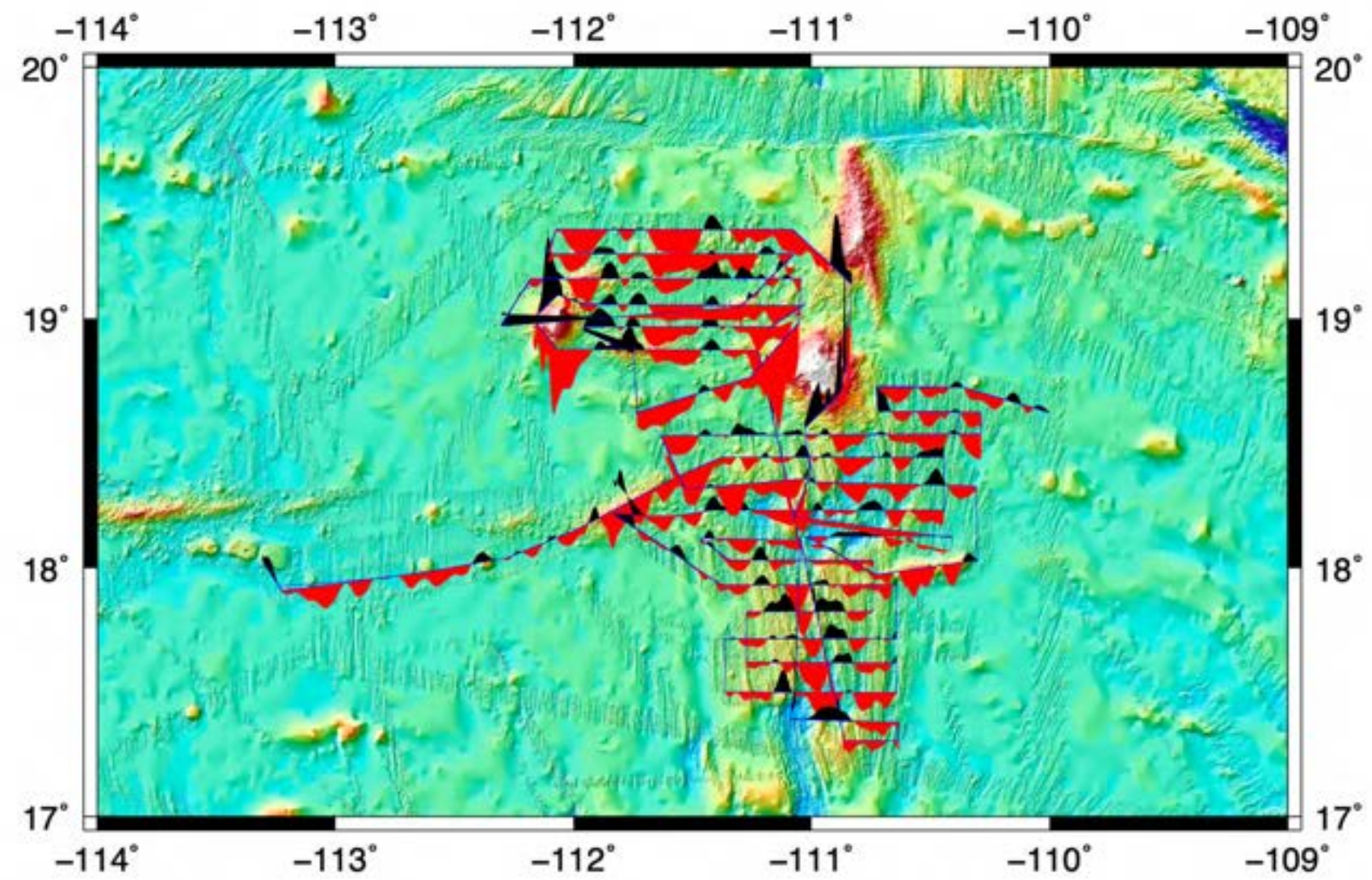
Plot of new bathymetric data integrated with previous bathymetry from the global multi-resolution topography (GMRT) compilation of Ryan et al. (2009).

Regional Acoustic Backscatter Map



Plot of new acoustic backscatter data integrated with previous backscatter data available from the global multi-resolution topography (GMRT) compilation of Ryan et al. (2009).

Marine Magnetic Data

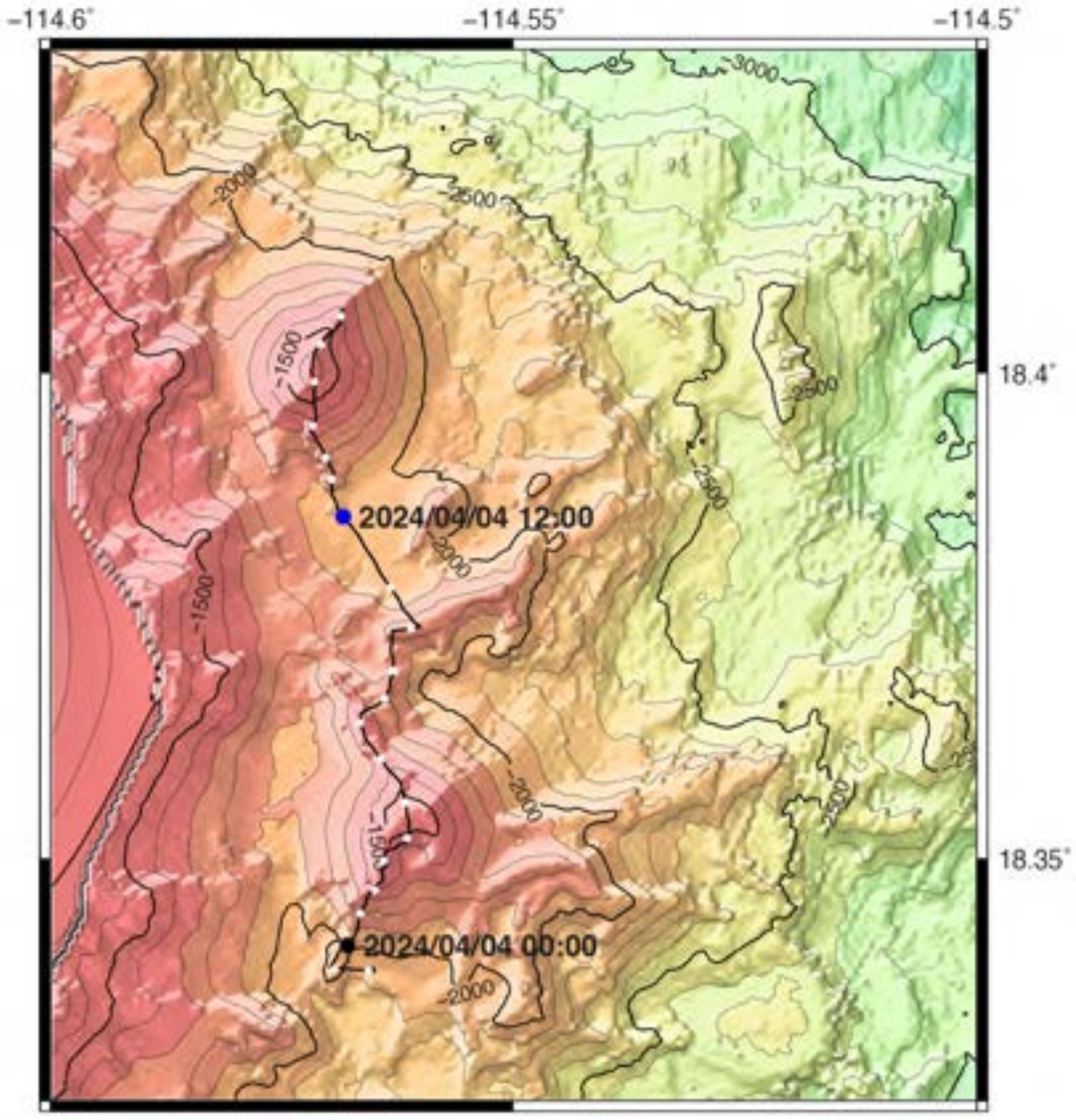


Plot of marine magnetic anomaly data derived from total field intensity collected with surface-towed magnetometer (Bob) overlain on seafloor bathymetry. Black and red portions of the “wiggles” are positive and negative anomalies, respectively.

Dive J2-1563 Summary Report
Date: 04/04/2024
Site Description: two small, morphologically young volcanoes on the east flank of Clarion
Physiographic Feature: seamount or seamount province
Physiographic Feature Name: Clarion Island

Launch Location:	18.33873°N, 114.56512°W
Launch Depth (m):	2057 m
In Water (GMT):	2024-04-03T19:39:59.173Z
On Bottom:	2024-04-03T21:13:34.163Z
Off Bottom:	2024-04-04T18:11:04.434Z
On Deck:	2024-04-04T19:20:13.695Z

Dive Map:



WATCH END SUMMARIES:

12-4: Jason was off deck at 19:39, in water at 19:42, and on bottom at 21:13. At first glance, the seafloor has patches of blocky, Fe-Mn encrusted lava with sandy sediment. While the Jason team ran some engineering tests, we observed abundant sea cucumbers, shrimp, some small fish, and a few squat lobsters. One rock sample with Fe-Mn crust was taken on bottom. On the way up the southern-most ridge to the second waypoint, more rock was observed, and morphology changed to show more broken up pillow pieces before transitioning into pillow flows. Two samples from different pillow flows were collected before the watch change.

4-8: Navigated up ridge in direction NNE to crater rim of Southern Cone from waypoint 02 to waypoint 03 and further toward waypoint 04. Took 5 samples (03, 04, 05, 06, and 07) of pillow lavas (tried to collect mostly outer glassy layer).

Lower slopes were less steep and surfaces of pillow lava lobes clearly visible between patches of whitish sand with ripples. The steeper it became, the more slope-scree composed mostly of gravel to blocks of broken sub-angular pillow fragments (no white sand anymore) occurred. Further on, large sections of almost vertical walls of pillow lavas, well exposed in cross-section (fault parallel to ridge?) were encountered.

Not much marine life (low-oxygen zone). Occasional sponges, echinoderms, bluefish, shrimps, corals, worms, sea urchins.

8-12: Began watch between wpt 3 & 4 on the southern side of the first cone on a slope of primarily talus blocks of basalt with sediment in between blocks. This terrain continued until the top of the cone at wpt4. We then traced the rim of the crater in a clockwise direction until we were near the western limit. As we entered the crater, we sampled a blocky outcrop of basalt that appeared to define the inner edge. We then proceeded down into the crater where we passed over successive ledges of relatively thick (1-2 m) flow units (we filmed a highlight of one of these shelves. We headed toward what we thought was a small hill/cone in the middle of the crater from the bathymetry, but nothing materialized except the ubiquitous talus and sediment between the blocks. As we headed out of the crater, we encountered a relatively wide (meters) vertical unit that appeared to by a dyke. We followed this feature out of the crater and took a pair of samples at the top of the dyke on an isolated high near wpt 5. We then proceeded northward down the narrow “tail” or ridge, which had some broken pillows, sediment, and talus on the top. However, sliding off to the western edge, we encountered a series of extensive “road cuts” on the way to wpt 6 that revealed intermingled outcrops of large 1-3 m wide pillow basalts and massive flow units. Our watch ended just past the northern side of wpt 6.

12-4: Watch began just north of wpt 6. We descended the ridge on the northern side of the first volcanic cone. Lots of talus/ blocky lava was observed. Morphology changed around wpt 7 to pillow flows and a sample was taken from the top of a pillow. Jason pilots noticed that we weren’t able to move the vehicle and deduced that the cable was snagged on something. After some maneuvers, it was clear that the cable was caught on a fishing line (Cable camera). Pilots were able to reposition Jason and move around the fishing line. Between wpts 7 and 8, there was a heavily sedimented area of pillow basalts. A sample was taken as a candidate age dating (possible oldest endmember).

We traversed to wpt 9 on the NE-SW ridge and collected one sample around wpt 9. Next, we moved east along the ridge and observed abundant talus. We decided to jump off the ridge, cutting out wpts 9-12, and heading straight to wpt 13 at the base of the second cone.
4-8: Dropped waypoints 10, 11, and 12 and made a shortcut from waypoint 9 directly across sandy flat area to waypoint 13. Saw “rotten whale bone” (maybe) areas, several m across, in the whitish sandy plain. This took more than an hour until reaching a small ridge (pillow lavas), oriented NNW and pointing toward summit of North Cone. Followed that ridge upward and collected three pilow-lava samples (samples 15, 16, and 17). Some parts were steep walls. At the end of the watch-time we had almost reached the summit area of the North Cone. Again, not much sea-life. Occasional corals, “Spanish Dancers”, Wedding sponges”, etc.
8-12: We begen watch near wpt 14 at the top of a pillow ridge on the “tail” extending southward from the northern cone. We headed upslope through sedimented talus with occasional outcrops of in-place pillows. Sheet flows were observed at 1537 mbsl with more and thicker pillow flows near the top of cone at 1365 mbsl. We continued on the ridge past the peak ond only observed broken pillows and rubble on the dyke-like feature to the north.
12-4: Recovered Jason and on deck around 19:18 GMT. Samples were recovered in buckets of seawater. Abhijeet took 2 samples for possible noble gas analysis (005 and 006). Sample workflow was completed through cutting and a freshwater dunk. All samples (001-019) are drying in main lab.

SEALOG SUMMARY:
19:39:59.173- Jason in water, saw sea cucumber and shrimp on descent.
21:13:34.163-Jason on bottom, saw sea cucumbers, green soda can, shrimp, fish, sea star.
21:48:48.241-entered area with thick white fine grained sediment layer and sparse basalt blocks, saw crab, small shrimp swimming.
22:02:37.198- took first sample 001 ~30cm lava block with FeMn crust with ROV grab, saw sponge, white crab, squat lobster, cucumber, and sea anemone.
22:34:58.644-transition to abundant pillow lava, saw jelly fish, coral, red shrimp.
22:48:29.624- took sample 002 lava fragment with ROV grab, saw abundant pillow lavas and tubes, shrimp, cucumber, crinoid.
22:59:13.706-took sample 003 chunks of pillow flow with ROV grab, saw white sea star, yellow crinoid, starfish.
23:13:56.412-took sample 004 piece of lava tube with FeMn crust ~10cm triangle with ROV grab, saw starfish, multiple large corals, small corals, sponges, purple cucumber.
23:20:36.892-entered steep slope with many pillow flows, saw purple cucumber,
23:26:01.723- entered a heavily sedimented area with no flows found.
23:27:14.142- entered slope with pillows, saw purple cucumbers and spiky cucumbers some were swimming, shrimps, corals, crinoids, fishes, sponges and stalked sponges, sea star, star fishes.

23:48:47.467- entered steep edge of pillow flows, attempted and failed to collect sample, saw stalked sponge and cucumber.
23:57:49.210- took sample 005 piece of lava tube FeMn crust ~10cm rectangular with ROV grab, saw tall white corals and bamboo coral, orange Sea anemone, purple/pink Fish, purple/pink Cucumber, greenish Sponge, glass Sponge, spiny dark purple Sea urchin
00:24:11.412-entered highly sedimented area, saw tripod fish, purple cucumber, shrimp, fish
00:36:39.398-entered area with some pillows visible, but areas that are highly sedimented as well, saw large stalked glass sponge
00:38:09.519- entered large slope with pillow breccia, and then into area with pillow tubes, saw shrimp, large (thick stalk) and small stalked sponges, glass sponge, lighter colored cucumber, pink cucumbers.
00:49:20.766- entered area with mix of flatter small sheet-like features as well as some fragmented rock, covered in moderate sedimentation.
00:50:48.149- entered area with large pillows, as well as slopes covered in sediment, saw corals, crinoid, cucumber.
00:54:40.634-approached local high of a lot of pillows, saw purple cucumber.
00:57:09.964-entered steep slope of pillows, saw sponges (a lot of small sponges), coral whips, and a couple shrimp,
01:05:15.900-took sample 006 3 pieces of rock with ROV grab, saw purple/blue fishes, breccia field going up slope, pink/purple cucumbers, stalked sponge, purple sea urchin, big pillow tubes within the breccia, coral whips, shrimps, and stalked sponge, and huge pillow tubes, broken pillow tubes, crinoid.
01:36:18.491- took sample 007 breccia ~10cm boulder with FeMn crust with ROV grab, saw large stalked sponge, large pillow tubes and then breccia field next to them, purple cucumbers, coral whips, Glass sponges, shrimp, pink Cucumber,
01:55:14.872- entered mass of lava flow, saw breccia field in between another steep pillow lava flow, pink cucumber, a couple of small corals on local high, fish, Sea anemone, a couple corals with snake star associates, glass sponge, corals,
02:06:29.885-entered area with not a steep slope large pillow flows, saw large coral, purple Sea urchin
02:09:23.031- entered steep pillow slope, saw pink and purple cucumber, as well as coral whips, and a shrimp, ctenophore swimming, corals with snake star associates, stalked crinoids (some just the stalks), star fish, bamboo whips,
02:17:13.637- entered area with moderately sloped pillows, sponges and stalked sponges, Sea anemone,
02:25:51.061- entered breccia field on slope, saw pink cucumber, large lava flow (steep), a lot of breccia, Fish, pink cucumbers, shrimp, small orange coral, small sponge,
02:36:52.872-entered steep talus slope, saw shrimp, steep breccia wall, pink cucumbers, sponges, fish, orange cucumber, yellow crinoid, purple cucumbers, glass sponges, bamboo coral.

03:03:57.014- saw large breccia blocs among talus, Rat tail fish, pink fish, star fish, crab, shrimp, sea star on large pillow, lots of big basalt blocks on rim of crater, large pile of rocks on rim.
03:19:44.790-took sample 008 around 10 cm chunky block of pillow in sample box 4 with ROV grab, saw small pillows and large flows on ridge edge,
03:33:15.039- Start of the cliff, saw potential massive dike, large sediment patches in crater covering pillows, purple cucumbers in sediment, fishes, Sea anemones, sea stars,
04:01:21.740-ascended to point of high topography in crater, larger pieces and more breccia, saw sponges, large talus pile,
04:07:28.228-approached steep slope to peak of high topography in crater, saw vertical lava flows, steep cliff looks like a dike, lots of fractures in cliff,
04:09:54.823-top of vertical cliff: it looks like columns of a dike, large pillow on side of cliff, almost at peak, saw dike, and pillows at peak,
04:17:27.380- took sample 009 less than 10cm 2 blocky pillows with ROV grab, saw fishes, large bubblegum coral, with other corals, shrimp, squat lobster,
04:42:48.302- transit to next destination has large talus fields of varying clast sizes, bamboo coral, fishes, Pillow breccia, occasional clasts of bigger sizes some of them have lines of alteration (white), Sea anemone, group of larger pillows among talus,
05:26:16.838-entered area of different, larger, broken pillows, saw fan shaped corals (could be black corals), corals with stars, purple jelly and bag fish, Jelly fish floating on pillow lavas (big circular to elongated), large sponges, look mushroom like, sitting on large broken pillow, Sponge (30 cm long) with star fish and anemone on top of pillow lavas.
05:35:42.418-approached ridge of tail, diverse biology, larger pillows among talus, saw fishes, Pillow breccia going down slope, after crossing S-N the first big volcano sampled, can also see broken pillows showing the radial cooling texture,
05:41:45.945-Went down a few more meters the talus is more dominant and the sediment cover is smaller, the pieces of pillow are bigger in size, saw anemone, large group of pillows, large tube, pillow ridge, In the pillow ridge: top is mainly formed by pillow tubes (toothpaste pillows) with low concentration of sediments, while the sides are dominate by pieces of breccia (talus) with major content of sediments, dead sponges, as we descended the ridge there are smaller pieces of broken pillows, Still on the side of the ridge. Pillows breccia they look more conglomerated in this area with a sediment-matrix, flow units present, turned around the border of the bridge, big pillow lavas some of them look splashed, pretty steep ridge of bulging pillows, large outcrop.
06:00:35.779- took sample 010 Mn crust, large piece and small, the small piece fell into spot number 2, large piece 30 cm in spot 1 with ROV grab. Saw large folded layered pillows among broken pieces, orange coral. Returned back in talus field, all smaller pieces of broken pillows.
06:14:51.433-navigation issue. system crashed. jason and ship are not moving.
06:21:02.556-system back, jason and ship are moving. Some parts of the seafloor look like breccia conglomerates where the sediments work as cement (matrix) of the rocks. And the bigger pieces look slightly looser. Saw dead sponge. In the slope of the

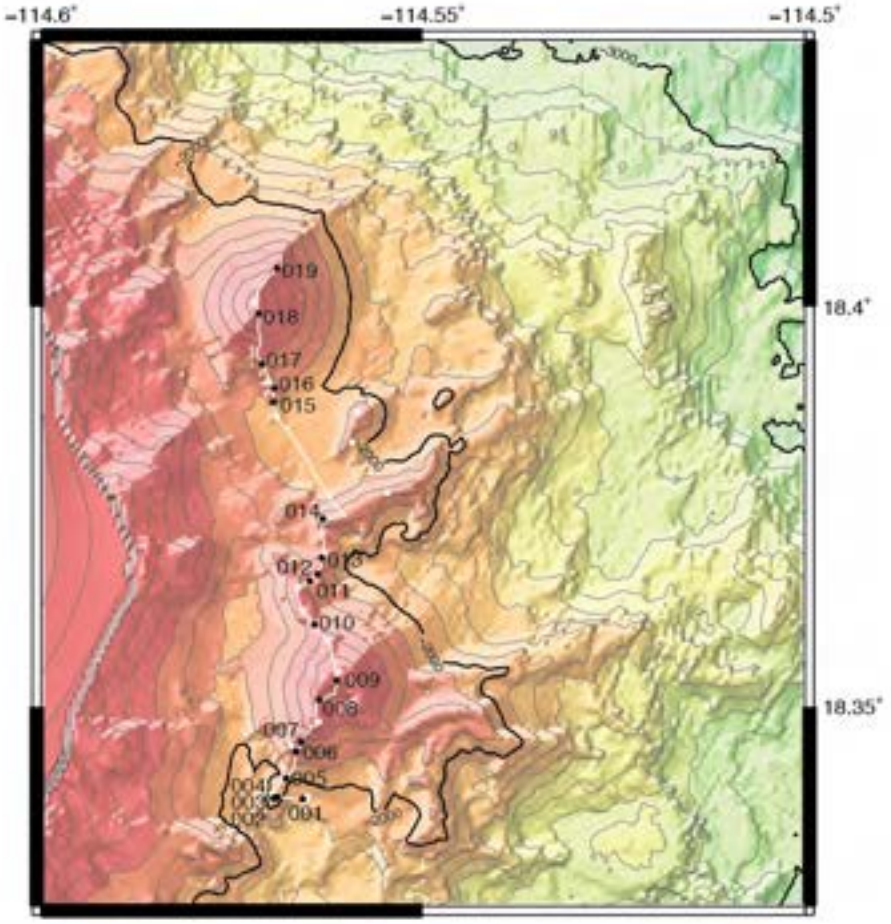
structure, we see bigger pillow lavas (>1 m) among smaller pieces (breccia). The sediment between the rocks is visible (10% aprox). Saw bamboo coral, fan shaped coral, fragments of pillow lavas start to be bigger >10 cm, also toothpaste pillows (>1m aprox), lava tubes,
06:38:52.887- returned to the breccia pillow (talus).
6:46:45.993-Still in the slope of the first volcano sample. Went to the "tiny dome" and saw bigger pieces of pillow lavas, some of them look like incomplete sheets. Also saw massive coral, bamboo coral.
06:56:12.544-went from talus area to larger pillows, saw barrel sponge, coral with brittle star on it, black coral (salmon colored), white bubble gum coral, bamboo coral garden/patch, Sea anemone, Sponge, fish,
07:24:04.316-pillows, some tubular. Saw glass sponge, gastropod.
07:26:58.726-took sample 011, pillow fragment, square shape, ~20 cm x 20cm with ROV grab. Saw shrimp, glass sponge, black coral and others, reddish cucumber, Anemone,
07:47:31.400- took sample 012, pillow lava surface fragment, dense lava coverage area, tubes & pillows, minor sediment. Saw Shrimp, anemone, pink cucumber, gelatinous larvacean, long stringer (nearly got tangled up in it), many black corals, bamboo, some branches broken off, blue sea cucumber, large white bamboo coral, coral on pillow lava, orange Sea anemone.
08:42:03.063-took sample 013 surface fragment of pillow, oxidized, ~30x40 cm, thick sediment, sparse lava coverage with ROV grab. Saw glass sponge and bamboo coral, shrimps, pink sea cucumbers, multiple species of Corals, sediment field with almost no lava exposed, brittle stars, floating shrimp, blocky lava, red Cucumber,
09:13:18.485- back into pillows, followed along ridge. Saw little purple fish, Coral, blocky lava, orange Sea star,
09:35:32.239-saw abundant pillows, Corals.
09:40:06.829-took sample 014 pillow surface fragment, ~20 cm with ROV grab. Saw white Coral, orange Sea star, crinoids, purple spiny Sea anemone, glass sponge, Sea anemone with long spines/tentacles, shrimp, skipped over bottom of seafloor beginning around 10:30. Saw >100 floating cucumbers, small orange fish.
11:19:06.729- got closer to bottom of seafloor; area with two patches of different colored outcrop that looks like sediment. Saw long skinny fish, large & small fishes, outcrops of pillow lava blocks, fishes and cucumbers, ctenophore, purple Sea urchin,
12:04:01.887-got into area with steeper slope and more flow visible. Saw stalked Sponge, small and skinny Fish,
12:07:41.234- back to heavily sedimented area,
12:09:15.439- steep slope with pillows. Saw Fish, small corals, stalked Sponge, purple Fish,
12:12:44.540- slope relaxed as we went from pillows to sediment. Saw purple Sea urchin, small Fish.
12:18:08.988- approached local high with lots of sedimented pillows.
12:18:35.132- went downslope, more pillows. Saw stalked sponges, shrimp, purple cucumber, black sediment in wave pattern of lighter colored sediment,

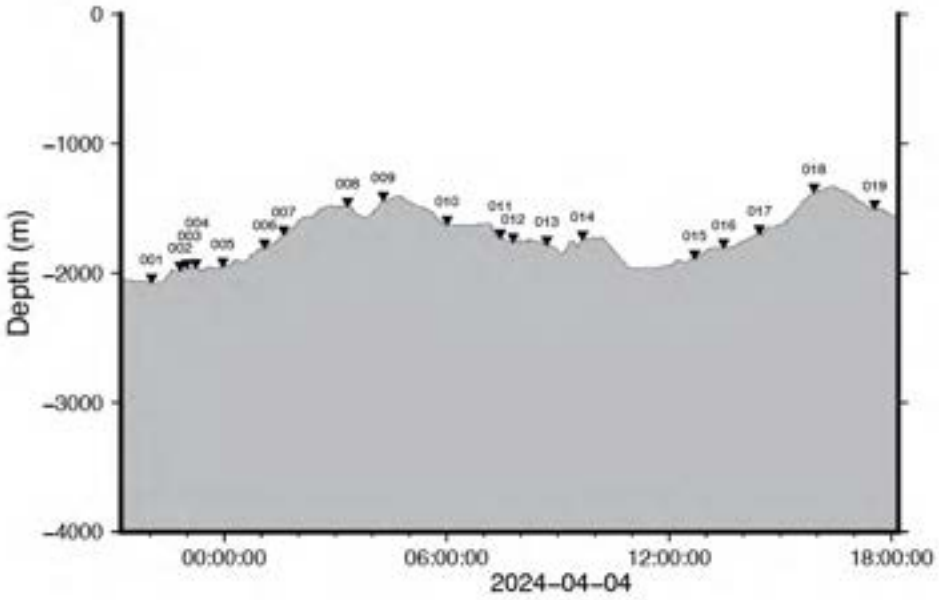
12:30:28.252- breccia pieces going up a slope. Saw ctenophore, purple cucumber, stalked sponge, shrimp. Approached large talus slope with pillows. Saw pink cucumber and large pillow flows.
12:41:23.073-took sample 015, piece of lava tube broken off; over 10 cm blocky with ROV grab. Saw swimming crinoid, pink cucumber, steep slope of pillow flow, glass sponge.
12:55:28.465-approached breccia slope/ talus. Saw pink cucumber, sea spider, crinoids, glass sponges of varying sizes,
13:00:39.832- went up a ridge of the cone, breccia/ talus and pillow flows visible. Then slope not as steep, heavy sediment with some outcrops of breccia. Saw stalked (tall) glass sponge, fish. Approached steep slope of pillow flows, saw light pink coral, small sponges.
13:28:31.066-took sample 016, broken off piece of pillow tube; ~10cm, multiple pieces collected with ROV grab. Saw Coral with a couple of corals with snake star associates, ctenophore, outcrop of pillows in sediment.
13:48:22.497- pillow flows at base of slope. Saw spiky cucumber and went up pillow slope. Saw stalked sponge, floating purple cucumbers.
13:55:02.354- base of cone, made it to second to last waypoint, talus slope. Saw large glass sponge. In area of mostly breccia a little bit of pillow flow visible. Saw pink/purple/and spiky cucumbers, small corals, fish, and large tubes, stalked sponge, coral whip, crinoid.
14:05:41.103- end of pillows and entered highly sedimented area. Saw sponge, outcrops of pillow flow, a lot of pillow tubes at base of slope, stalked sponge.
14:19:08.238- Saw sediment and some breccia at base of next slope. Saw large pillow flows, crinoid.
14:26:14.982-took sample 017, flat piece broken pillow tube, ~20cm across with ROV grab. Saw talus/ breccia and some pillows, purple cucumbers, small area of sediment and then a talus slope, big coral.
14:40:51.456- pillow flows. Saw coral (iridigorgia and other species), cucumbers, breccia, shrimp, biogenic ooze.
14:54:32.398- Pillow lavas started to be more abundant. Cluster of broken pillows on sediment. Saw glass sponge, large fish.
15:02:11.217- went up talus slope with blocky pillow fragments and sediments. Saw Outcrop of pillow lavas, mainly toothpaste looking with sediments. Major cover of sediments on top of the pillow lavas. blocky broken pillows, barnacles on coral. outcrop of toothpaste pillow with cover of sediments. Saw purple urchin, couple pillow circles and tubes among sediment, shrimp, more tubey, intact pillows, hummocky sediment piles, lava flow, large pillow segment, large sheet flow (bendy, off axis flows).
15:24:17.293- back to tubey pillows. Saw long thin fish, intact pillows, shrimp, Broken pillow lavas (breccia) with sediments, glass sponge, larger pillows with smaller broken pieces as we ascend slope. in place pillows, weathered, and sedimented. broken pillows (talus), sediment, no large pillows. smaller talus pieces and more sediment. Saw glass sponge, large in place pillows, Fishing line, larger pieces of broken pillows as we

reached the top of the slope. pillow breccia with sediments (up to 40 cm). in place pillow flow winding, talus slope surrounding. bigger pillows (in place).
15:54:40.019-took sample 018, bottom of pillow slope, broken from larger pillow, ~10 cm, blocky, with ROV grab. Saw worm, fishes, sponge, Sea star, varying sizes broken pillows as we ascended slope. sedimented sheet flow, bubbly looking (ropey). broken talus with varying pillow sizes and sediment patches. pillow layers of lava and lava tube.
16:16:42.082- talus slope approached top of ridge. Saw bubblegum coral, cucumbers, pillow breccia with sediments between blocks, squat lobster, heavy talus cover, varying sizes mostly ~20 cm blocky pieces with smaller and much larger pillow segments. Saw glass sponge, larger pillows are very fractured and brecciated, white cucumber, broken and fractured pillows at highest point on ridge, spider crab surrounded by 3 white corals, dike feature present.
16:28:57.817- talus slope descending off ridge. Saw corals, very fractured pillow, steep talus slope, occasionally bigger pillow (1m aprox.) among breccia blocks, fish, red/purple jelly, bamboo coral (very long ~ 1.5 meters), Bigger pillow lavas (1m aprox) among smaller pieces of breccia and sediments between blocks, fish, dead sponge, very broken flow units, talus slope, clear line of different sized talus, larger pieces on left sediment in middle and smaller on right, Breccia pillow of bigger sizes (up to 2-3m) with sediments between blocks. The sediments are in low proportion (<5%), large pillowy ridge, broken pillows, talus field of similar size clasts.
16:54:17.424- saw fishing line, 2 tall coral on each side of fishing line, glass sponge, large bamboo corals. Down slope: two main sizes of clasts filled with sediments between blocks. stick like coral in talus. ~1m thick flattened pillow among talus, steepness in slope and smaller pillow blocks, fractured seafloor pillows with sediment filling in cracks, talus slope, small fragments, more sediment. some larger, flat pillows. The distribution of sizes is bimodal, similar to emplacement of a sequence of lavas with bands (layers) of breccia
and more massive rocks (1m aprox). Sediments are presents between and inside blocks.
17:08:46.252- Down in the slope breccia is more abundant, but occasional big blocks are present. Saw cucumbers, broken pillows, talus, branchy white coral, Pillow breccia (subangular) with occasional sediment patches, multiple corals (primnoid), talus with sediment patches, Toothpaste lavas down the base of the slope (flat surface covered by them), large outcrop of intact but fractured pillows, Toothpaste pillow lava field, corals and sponges on pillows. As we head more north the outcrop of nice pillows become more fractured, blocky pieces.
17:30:25.610- Top of the toothpaste pillow lava field. Saw flow layers exposed, fractured pillows.
17:32:45.733-took sample 019 taken out of fractured pillow ~25 cm, blocky, weathered, with ROV grab. Saw tube structure pillows with middles hollowed out, larger pillow fragments(more intact, still fractured), large sponge, broken pillow basalt/talus, shrimps, translucent jelly, small fish, Larger block of pillow lavas (generally well rounded), larger pillows, fractures but not broken apart (The larger pillows (fractured but not apart), are in

top of broken smaller pieces (<60cm). Sediments are visible between cracks and blocks). Sea Anemone
In talus.
18:08:12.758- connected pillows, smaller but not fragmented. Saw talus, broken basalt.
18:11:04.434-off bottom, saw two jellies.

Sample and Terrain Maps:





Sample Photographs
Dive: J2-1563

RR2403-J21563-001R IGSN: 10.58052/URI00036N

RR2403-J21563-002R IGSN: 10.58052/URI00036O

RR2403-J21563-003R IGSN: 10.58052/URI00036P

RR2403-J21563-004R IGSN: 10.58052/URI00036Q

RR2403-J21563-005R IGSN: 10.58052/URI00036R

RR2403-J21563-006R IGSN: 10.58052/URI00036S

RR2403-J21563-007R IGSN: 10.58052/URI00036T

RR2403-J21563-008R IGSN: 10.58052/URI00036U

RR2403-J21563-009R IGSN: 10.58052/URI00036V

RR2403-J21563-010R IGSN: 10.58052/URI00036W

RR2403-J21563-011R IGSN: 10.58052/URI00036X

RR2403-J21563-012R IGSN: 10.58052/URI00036Y

RR2403-J21563-013R IGSN: 10.58052/URI00036Z

RR2403-J21563-014R IGSN: 10.58052/URI00037A

RR2403-J21563-015R IGSN: 10.58052/URI00037B

RR2403-J21563-016R IGSN: 10.58052/URI00037C

RR2403-J21563-017R IGSN: 10.58052/URI00037D

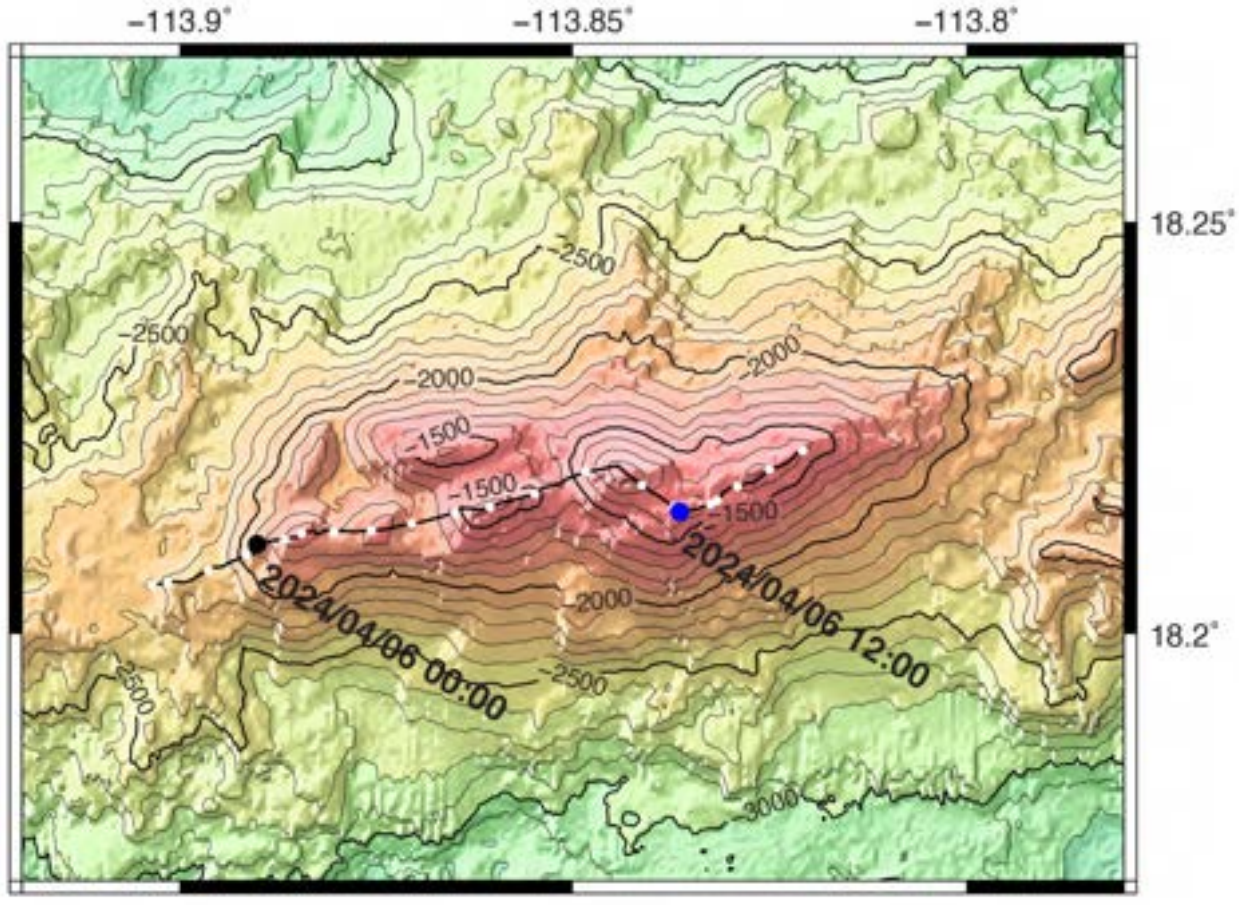
RR2403-J21563-018R IGSN: 10.58052/URI00037E

RR2403-J21563-019R IGSN: 10.58052/URI00037F	
	

Dive J2-1564 Summary Report
Date: 4/5/2024
Site Description: E-W ridge, east of Clarion
Physiographic Feature: seamount or seamount province
Physiographic Feature Name: Unnamed

Launch Location: 18.2305°N, 113.79243°W
Launch Depth (m): 2267 m
In Water: 2024-04-05T18:19:50.859Z
On Bottom: 2024-04-05T19:55:25.002Z
Off Bottom: 2024-04-06T17:09:13.196Z
On Deck: 2024-04-06T18:09:43.401Z

Dive Map:



WATCH END SUMMARIES:
8-12: Launch and blue water.
12-4: Watch started on descent and Jason was on bottom at 19:55:30. Prior to launch, the engineers noticed that there was something happening with the cable near the football floats. A few meters of fiber seemed to be loose and were secured with fiberglass tape. Once on bottom, a few engineering tests were run prior to sampling

(~25 min). Sediment on the bottom here looks different from that of the sediment from the last dive around Clarion and is more reminiscent of the sediment around Socorro. This seems to have more volcanoclastic material, so a scoop sample was taken right at wpt 1. A sample from the outside of a big pillow was also taken in the same vicinity as the scoop. The bottom around wpt 1 had a lot of nice pillow flows, maxing out ~120 cm in diameter. Fauna includes sponges, shrimp, brittle stars, anemones, and a variety of fish. After following a small ridge east and upwards, morphology changed to sheet flows ~ 1/3 of the way between wpts 1 and 2. A sample of sheet flow was taken. As we continued on from the sheet flow, we quickly transitioned back into pillow flows and the amount of sediment increased. All of the pillows on the dive have really nice ropey striations and many in this area ~1/3 of the way to wpt 2 have tunicates attached to them. We ended watch ~ ½ way between wpts 1 and 2 in a large field of talus (blocky lava, broken pillows, fallen lava tubes).

4-8: Picked up the watch at 2012 m depth between wp1 and wp2 and ascended the slope to the east (took pillow-lava samples 24 and 25). Near wp2, here and there, patches of white sediment filling small areas between lava lobes. Took scoop-sample no. 26 of white sandy sediment (pumiceous?). Then, descended to the saddle between wp2 and wp3. During the entire watch only pillow lavas were encountered. Sponges, corals, echinoderms, fish only occasionally.

8-12: We began watch about midway between wpts 2 and 3 on the downward slope, where we initially saw pillows with fairly long and continuous feeder tubes. As we continued downslope, the pillows transitioned into talus blocks and sediment into until we reached the top of a low-relief ridge of large (2ish m diameter), in-place pillows. We continued upslope through talus and grabbed a pillow basalt sample near wpt 3 (#27). We proceeded eastward down the from the wpt3 peak into a sedimented valley with black flecks of coarse material strewn over the finer, lighter colored sediment. The distribution of flecks was nearly continuous except in regions of recent bioturbation and somewhat linear collections trending somewhat N-S. We took a nearly full & successful pushcore, which showed the black flecks most visible at the top of the core. As we continued upslope toward wpt 4, we crossed over a narrow band (5 m-wide) of distinct ripples before a long transit up a talus slope of basalt blocks. Near the top of the peak of wpt 4, we encountered a wall of exposed and pillows where we took a rock sample (#29). Above this wall, we arrived at a near, continous region of large (2ish m diameter), intact pillows with significantly more numerous yellow coral until we changed watch at about 200 m west of wpt 4.

12-4: We began our watch ~100 m west of wpt 4 heading along a ridge with a really lovely coral garden. A sample (#30) was collected from a basalt pillow in the coral garden ~700m east of wpt 4. Halfway between wpts 4 and 5, there was a change in morphology from pillows to talus. A sample (#31) was collected from a pillow right before the morphological change. The talus (up to ~10cm pieces) slopes had some larger boulders (~120-400 cm in diameter) mixed in. There were abundant crinoids and brittle stars on the talus. Coral coverage increased as we shallowed approaching wpt 5 and talus became less coarse. Wpt 5 was reached at 9:21:23 and all the rocks appear craggy and broken up. Just east of wpt 5, a sample (#32) was collected from a craggy

rock feature. We then descended and traversed the valley between wpt 5 and 6. On the ascent, about 160-80m from wpt 6, we saw heavily sedimented sheet flows and a crinoid garden with some tripod fish. The top of the sediment had a lot of black material that may be volcanic ash. A scoop sample was taken of this material ~80 m west of wpt 6 before watch change.
4-8: Picked up the watch near wp6, where scoop-sample 33 had just been taken by prior watch at a depth of 1328 m. Continued ascending slope of loose dark-grey ash populated by crinoids. At ridge (ca. 1300 m), took lava sample 34 from first massive lava encountered after dark ash area. Continued along ridge (pillow lavas) in direction ENE, and took lava sample 35 (massive inner pillow) at 1380 m, lava sample 36 (outer crust), and lava sample 37 (large specimen). End of watch at 1390 m, ca. 1 km before wp7. Lava flows are sparsely populated by corals, sponges, and occasional fish and shrimp.
8-12: We began our watch on top of the easternmost summit/ridge just to the east of wpt 6. The entire ridge alternated between walls of "roadcut" pillow basalts, lava tubes draping down the slope, and Jade's favorite talus. The lava tubes in this region were generally a little smaller diameter (1m) than the larger tubes seen earlier in the dive. We had 3 successful ROV grabs with the final one at the end of the dive about 100 m west of wpt 7. Lotsa coral, sponges and critters along the tops of most of this dive.

SEALOG SUMMARY
19:55:25.002-On bottom. On pillows, thick sediment. Pillows & tubes, sparse sed in most of area. Did engineering tests. Saw squat lobster & crab, coral w/ polyps.
20:19:31.350-took sample 020 white fine grained sediment w/ larger black (lava?) fragments, in pocket between pillows way point 1 with ROV grab. Saw Sea urchin, small tubes & pillows, abundant, minor sediment.
20:33:24.478-took sample 021, pillow lava surface near waypoint 1, oxidized appearing with ROV grab. Saw glass sponge & cucumber, sheet flow with occasional pillows, abundant sponges, orange Sea anemone.
20:45:41.096-took sample 022, lava blocks on top of sheet flow, near way point 1, 2126m; ~15 cm equant block, black lava with ROV grab. Saw brittle star, lava blocks on talus slope, ridge to E of waypoint 1. Dense coverage of lava blocks on ridge @2200m. Saw abundant star-like creatures, purple Cucumber, snails(?)/gastropods covering rocks in lines everywhere, two glass sponges next to each other, big white bulbous sponge, broken part of glass sponge, blue spiny Cucumber, sponge garden, orange Sea star.
21:00:11.156-went back into pillows, 2132m. Saw glass Sponges, bamboo coral and other corals, abundant pillows & tubes, striations on cooling surfaces, purple cucumbers, narrow ridge (lava flow or fissure, drops off to both sides), blocky lava along ridge, very abundant snail or limpets in white lines on lava, orange fish, sheet flow (wider, flatter expanse; some small tubes).
21:38:06.013-took sample 023, surface fragment of pillow lobe of larger sheet flow, 2125m, ~1/3 way from waypoint 1 to 2 with ROV grab. Saw discrete pillows and more sediment, large white coral, abundant pillows & tubes, dense coverage of pillows(little

sediment), dense coverage of tubes(sparse sediment), unidentified creatures, Sponges, Fishes, sparse pillows (lots of white sediment), denser pillow coverage (sparse sediment), red/purple/ orange Cucumbers, orange Sea anemone, dense pillow piles (sparse sediment), rattail fishes, blocky lava flow (moderate sediment), orange Sea star, blocky talus, tubes and pillow fragments with striated surfaces, dense coverage with lava tubes(minor to moderate sediment).
22:35:31.903- striated lava tubes. Saw fishes, large sediment expanse (black particles abundant in white sediment), blocky lava field again, shrimps, sponges, corals, blocky lava talus(variably sparse on abundant sediment), Sea star, blocky lava talus (moderate sediment), Cucumbers, Sea anemone, stalk of an organism, big pillow flow, coral whip, and a jelly.
23:11:49.157-arrived at waypoint 2. Saw sponges (stalked and unstalked), corals, shrimps, cucumbers, large pillow flows, sediment within pillow blocks (able to see wave action), Sea anemone, stalked and unstalked crinoids, coral whips (some bamboo some unidentified), well-formed pillow lava flows, lava talus blocks/breccia, dead sponge, corals with snake star associates, fish.
23:55:49.158- took sample 024 ~20 cm square shaped FeMn crust coated with ROV grab. Saw many shrimps, corals, crinoids, sea anemones, pillow flows and tubes, glass sponges, block lava/talus, lava tubes with striated surfaces, cucumbers, corals with snake star associates, dead sponge.
00:45:54.518- broken pillows and slope leveled out (some sedimentation present). Saw coral with snake star associates, crinoids, corals, sea anemone, shrimp, cucumber.
00:52:53.085-took sample 025 first is a little less than 10cm; cobble, FeMn crust, some Fe oxidation, second is less than 10cm, sampled behind first sample with ROV grab. Saw brittle star, cucumbers, different species of corals, sea anemones, sea stars, coral with a dying stalk, dead sponge, corals with snake star associates, crinoids, sponge, bamboo whips.
01:44:25.248-took sample 026 of sediment with scoop. Saw cucumber, small cobbles in sediment pit within large pillow flow, corals, crinoid, coral whips, shrimp.
02:03:11.964-arrived at waypoint 3. Saw pillow tubes, jelly, corals, cucumber. Went into area where breccia slope not as steep. Saw Sponges, sea anemone, coral with snake star associates.
02:14:31.822-descended ridge, large pillow blocks and small areas of sediment within the pillow blocks. Saw cucumbers, sponges, corals, sea anemones, coral with snake star associates, large pillow flows, coral whip, crinoid.
02:29:41.760-entered area with steeper slope entered mid-water type position.
02:30:06.050- going back down towards large pillow tubes. Saw cucumbers, corals, sponges, tunicates, sea anemones, coral with snake star associates, shrimps, long fairly straight tube-y pillows.
02:58:40.598-went into Transition between lobate and breccia and moved into area of pieces of broken pillows/talus. Saw fish, talus area and sediment, sponge, breccia pillow with occasional lobate pillows pieces of 1.5 m approx. corals, tunicates, high talus cover, branching sponge.

03:09:43.377-went into Transition between block of breccia of up to 60 cm subangular to subrounded with no covered of sediments to a zone with smaller pieces of breccia more subangular and occasional lobate pillows. Sheet flow in middle of pillows. Saw sponge, larger pillow flow (fractured with smaller talus surrounding). Climbed pillow wall, large pieces of broken pillow with abundant biology, large pillow pieces (textured faces). Lobate pillows (>1 m) with occasional pillow lavas and sediment patches between pillows. Saw sponges, corals, dead sponges, Lobate pillows field (low sediment cover), area of large tubey pillows, large broken pillow with abundant corals, sea star,
03:23:26.094- Went Uphill more (broken pieces of pillows, followed by a flat area and lobate toothpaste pillows appeared again). Saw pillow lava (some uplift crust visible). Sheet flow among pillows, broken pieces of crust with ropy texture (60 cm to1 m), large pillows that have fractured faces, lobate (toothpaste) lavas with some sediments in the fractures, corals, Lobate lavas have more ropy crusts, very large branchy coral (bamboo coral, proteinaceous nodes), pillow tubes.
03:34:33.338- entered talus area and larger pieces of broken pillows. After a flat area (valley), some ropes were covered by sediment, going uphill we saw some textures like lobate pillows with broken pieces with ropy textures and smaller blocks. Saw sponges. after passing a talus with breccia we are back to big lobate pillows (low sediments) with some patches of breccia with more sediments. Observable pieces with ropey crusts while some without were also present. Saw tunicates. some sheet flows and lobate pillows, Small sediment patches (<30 cm) between the broken pieces. connected pillows and tubes but fractured and ropy. On the downward slope can see intact pillows, to fractured pillows, to talus deposits. Headed up slope. Broken pieces of pillow without ropy texture. They have smooth surface and are subangular to subrounded. The sizes varied from 20 to 60 cm. Occasionally big blocks up to 1.5 m. Sediments scare in small patches (<30 cm). Small pieces of breccia looked to be deposit in a restricted area among big blocks of broken pillows (>60 cm), continuing going uphill the big blocks are more frequent and occasionally with ropy surfaces. Some blocks are rounded while others ranged from subangular to subrounded. Saw possible crinoids, larger pieces of broken bulbous pillows. Lobate pillows with ropy surface starting to be more frequent. Sediment patches larger (50 cm). Lobate pillows with ropy surface starting to be more frequent. Sediment patches larger (50 cm).
03:53:45.912-took sample 027 chunk of pillow grabbed from fractured, larger, in place pillow, A layered piece >25-30 cm with ROV grab. Got just past waypoint 3. on way up to peak. pillows are large, layered and bulbous. Large lobate lavas with atches of sediments (~1m). Pillows with ropy textures, some cracked up in the middle (similar to bread texture), sediments between the cracks of the ropy, occasionally round pillow lavas smaller in size. Saw nice large pillowy tubes, sponges, Occasional pillow lavas with cracked and collapsed crusts (1-2 m). Mainly round pillows. Still in long lobate (>2m) lava field. Occasionally sediment patches between lobate flow. Saw weirdly crcked pillows, Lobate pillows field: superposition of pillows is visible, pillows below look more ropy and flat while top pillows vary from ropy lobate to fractured round pillows, sediments between pieces(1651 m in depth), saw long bamboo coral.

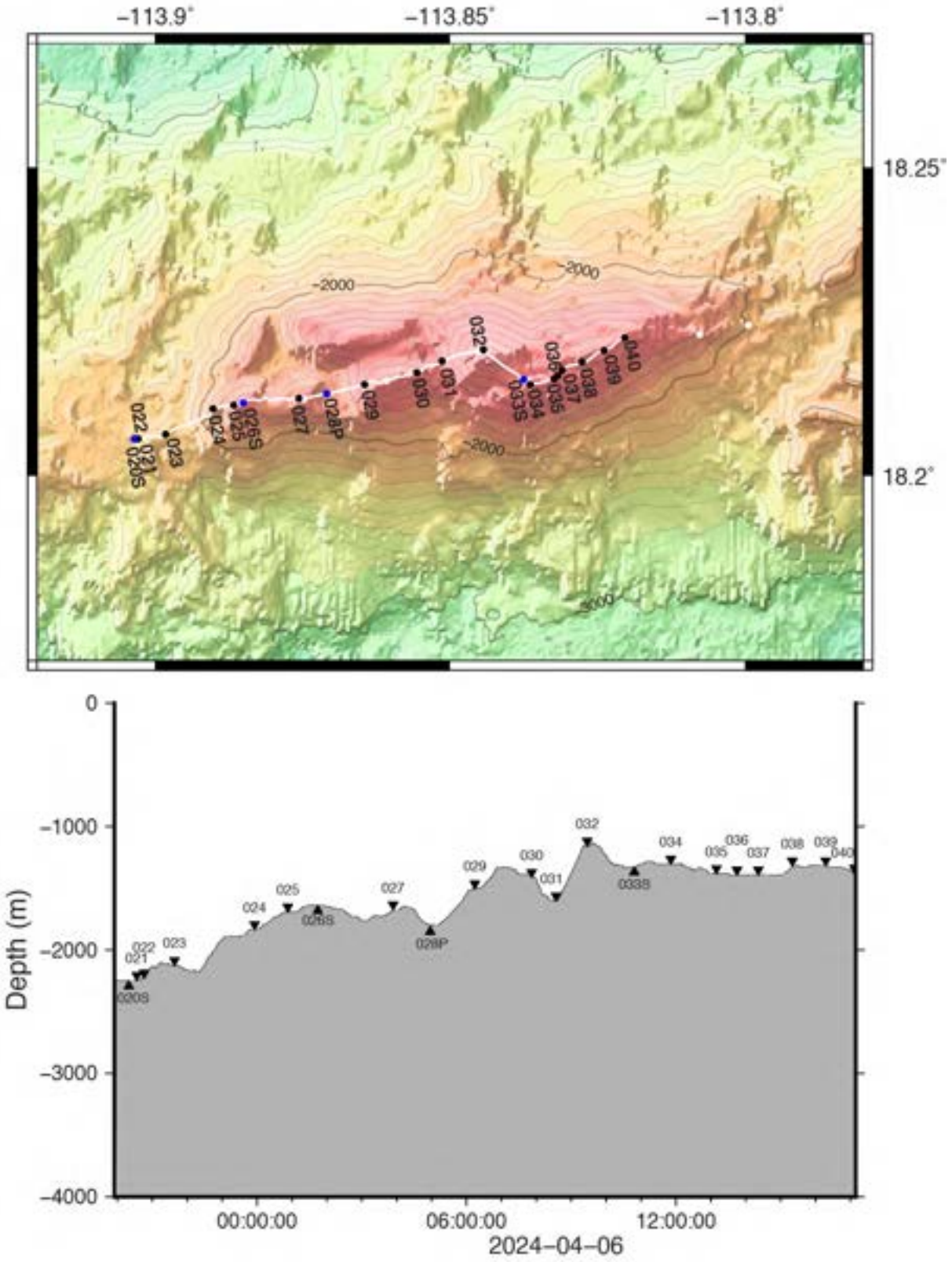
04:21:36.592- fractured pillows, large pieces. Saw corals, broken ropy lava (mainly rounded with very low sediments, no sediment patches visible), old cracked basalts, pretty flat, not much talus.
04:29:30.922- entered talus field of broken pillows (biologically rich). Broken pillow lava blocks on a steep slope (there is fine-grained sediment among the blocks). Saw corals, tunicates, sponges. Pillow breccia on a steep slope (the fragments are subangular and of different sizes but not too large).
04:37:46.463- Pillow lavas with ropy textures surrounded by pillow breccia on a steep slope (there is sediment between the breccia fragments).
04:38:06.954- Talus field at bottom of pillowy slopes. Saw coral, smooth lobate flows surrounded by pillow breccias on a steep slope (there was sediment between the fragments), tube pillows among talus, lobate flows with ropy texture on a steep slope (they were surrounded by some pillow breccias with sediment).
04:43:33.540- Pillow breccia set in a fine-grained sediment matrix (the slope was not too steep). Saw sponges, pillow breccia set in a sediment matrix (the amount of breccia was low), flat surface with abundant sediment and just a few lava blocks.
04:50:52.699- mostly sedimented area. Flat surface with sediment (No lava fragments, the sediment has a patchy look with some white zones and dark zones).
04:53:53.302-took sample 028, varying colored sediment, light colored sediment with darker larger pieces on top with pushcore. Saw tunicates, hummocky sediment, striations of darker and lighter colored sediment (could be due to the fining of grains downslope).
05:00:05.500- transitioning into broken blocky pillows (biology rich). Toothpaste lavas field similar to a "worm nest" followed by a patch of sediments (2 m uphill) and lobate ropy lavas start to appear (Occasionally collapse lavas). Large billowing pillows and tubes (fractured).
05:04:18.298- back to sedimented area (striations persistent). Saw sea stars. Still in sediment area: the ratio sediment/black sediment is almost 1:1; sometimes there are patches of higher layers of sediments; we are in direction of the open crater of the structure of waypoint 3. Saw ripples in sediment and talus field after the ripples.
05:11:10.541- Transition between sediments to breccia subangular from 10 to 60 cm. Saw more sediment and talus, bamboo coral, think layer of black sediments with marine sediment. Block of broken pillows (breccia) subangular to subrounded occasionally block with ropy texture. Saw polyps replaced by zoanthids and tiny fish next to it, smaller pieces of breccia (<30cm) in a band (several meters wide) with bigger (>30 cm) blocks subangular occasionally with ropy textures, smaller bits of talus in sediment.
05:25:04.895-Uphill slope of the structure of waypoint 4, occasionally channels of marine sediments with some black sediment, mainly subangular blocks of broken pillows (<60cm). landslide formations as we ascend slope. Saw coral, sponge, larger sized broken pillows. Possible manganese nuggets within pillow talus.
05:30:19.447-uphill structure of point 4 (1718 m) smaller pieces of broken breccia (<10 cm), especially in a channel (Mn-nodules) surrounded by blocks of breccia (10-70 cm). possible manganese nuggets within pillow talus. Less Mn-nodules more breccia with Mn crust pieces are smaller than 30 cm subangular, Sediments (marine) between blocks.

05:35:49.857- uphill structure of point 4 (1691 m), Breccia with a range of sizes from ,10cm to up to 60 cm; Subangular blocks; Occasional patches of small nodes (Mg); Also occasional rounded pillows lava fragments (~60 cm) with smooth surfaces. Saw fish, welded talus.
05:39:08.412- From 1691 to 1673m in depth we observed layers of smaller clasts (<10 cm) to blocks (30 cm). Some layers of clasts <10 cm looks like channels and cemented with the marine sediments. Occasionally that layer have subangular blocks (up to 40 cm). Some blocks in that layer. talus cemented, looking almost flat but still sloped. Saw crinoid.
05:45:42.315- (1644 m in depth) Bigger clasts, but patches of <10 cm clasts cemented below a cover of subangular blocks. Saw fish and larger pillows beginning to show up. Flat surface layer beneath blocks (30-90 cm). Layer looks made of cements clasts (<10 cm). still some cemented looking talus with free talus on top. larger pillow flows barfing lava. Saw corals, sponge. "football" type blocks of pillow with ropy texture; some more toothpaste looking (1-2 m). Staked tube flows, larger pillows and tubes. large stacked tube flows, windy, in place. Channel of small clasts (<10 cm) among blocks sub angular to rounded of broken pillows. Saw crinoid and fish. Lobate lava flows surrounded by small pieces of breccia. Cemented layer of small clast with large lobate blocks. very large stacked lava tubes, attempting to collect sample.
06:11:44.363- massive outcrop of exposed face pillows and lava tubes. cemented surface on top of the massive outcrop of pillow lavas. top of slope has more crusty rocks and sediment, corals and biology present.
06:14:31.588-took sample 029 taken from fractured pillow, surrounded by other tubey pillows. ~50 cm, vesicular, possible crust, with ROV grab. Saw corals, twisty lava tubes, sheets with pillows, Patches of cemented clasts (<10 cm) among lobate lavas with corals (this pattern repeats). Varying pattern of pillow lava tubes and talus, pillows look like they’re barfing out lava. Lobate lava flows with ropy textures over a cemented relatively flat surface made of lava. At top of mount, smaller pillow fragments with a cemented talus basement.
06:30:08.844-At top of one of the coalesced cones (near point 4). Saw glass sponge, pillow outcrop, cliff with lobate pillows exposed, corals, talus, lavas with ropy texture similar structure to sheet lavas with patches of cemented small clasts (<10cm). cemented clasts layer is predominant with occasional rounded blocks. Larger blocks of lavas (elongated and rounded) are more common (60-70 cm). Cemented layer is still present. flat cracked surface pillow exposed under layer of small clasts (<20 cm). Talus field. Occasional surface of larger lobate lavas exposed, also some patches of small clasts (<10 cm) among the breccia formed by subangular blocks (<40 cm). Lobate toothpaste pillows (>1 m) with some ropy texture with sediments in the ropy. larger intact pillows, fractured but connected. Saw coral field, fish, brittle star, purple sea star, fish, shrimps, jelly, crinoid.
07:29:54.015-Pillows and tubes. Saw corals, shrimp, fish.
07:41:14.518- abundant pillows, sparse sediment. Saw coral, spider crab, sea anemone, sponges, corals, shrimps, fish, pillows with moderate sediment.

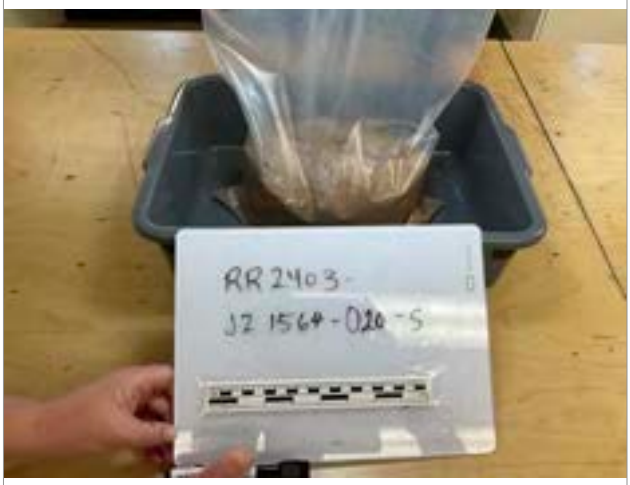
07:52:04.971-took sample 030 pillow fragment, 1412m, ~700m past waypoint 4 with ROV grab. Saw corals, fishes, shrimps. Went over a valley. Pillows and tubes. Saw ctenophore, pillows with moderate sediment.
08:33:40.231- took sample 031, pillow surface fragment, a little past halfway point between waypoints 4 & 5, 1602m with ROV grab. Saw sea anemones, blocky talus slope, sea stars, sponges, crinoids, corals, fishes, shrimp, cucumbers, pacific flatnose fish, corals with brittle stars on them, sea spider, crustacean.
09:12:52.552- blocky talus, smaller fragments. Saw fishes, cucumber, sea star, corals (some with brittle stars), shrimp, sponges, crinoid.
09:27:35.930-took sample 032 surface of large craggy rock chunk, rocks covered with greenish bacteria, 1158m, just past waypoint 5 with ROV grab. Saw blocky flow surface fishes, coral, sea star, shrimp.
09:41:31.754- flew over valley. Saw fishes, jelly, unknown blue jelly-like transparent organism, squat lobsters, corals.
09:50:10.721- still on blocky surface. Saw fish.
09:50:44.207- over another valley. Saw fishes.
09:56:05.222- blocky lava surface. Saw fishes.
10:01:32.489- went into the abyss. Saw fishes, shrimp, blocky lava, thick sediment, cucumber, sea stars, sea anemone, coral, shrimps, crinoid field, sponge, sea star, tripod fish, sea urchin.
10:48:27.569-took sample 033 sediment sample, maybe black volcanic ash (yellow dust cloud), 80m NW of waypoint 6, 1329m with scoop. Saw sea stars, fishes, end of crinoid field.
11:10:44.232- continuing in ash area. Saw crinoids.
11:15:16.197- made it to waypoint 6. entered another crinoid field, saw yellow sea star, blocky pieces of volcanic ash.
11:28:23.715- feature appeared to be a cinder cone. Saw huge orange crinoid, brittle star, sea anemone.
11:51:11.044-took sample 034 first chunk more than 10cm block, second chunk also block bigger than 10cm, with ROV grab. Saw slope with crinoid field, stalked crinoid, starfishes, corals (varying sizes), corals with snake star associates, coral whips, squat lobster, dead sponge, sea anemones (varying sizes), fish.
12:41:10.752- going down slope. Saw shrimp, huge orange crinoid and crinoids of varying sizes, corals, corals with snake star associates, starfish, dead sponge, cucumber, fish, crinoid.
13:09:37.543-took sample 035 little less than 10cm, flat piece broken off, FeMn crust; and 10cm flat piece broken off, FeMn crust with ROV grab. Saw corals, crinoid, sea anemones, sponge, pillow lavas, large tubes, shrimp, unknown small sand colored circular organism.
13:45:01.004- took sample 036, 20x more than 20cm flat piece of broken lava tube, FeMn crust box, with ROV grab. Saw sea anemones, fish, crinoid, corals, sea spider, squat lobster, cucumber.
14:13:46.783- Navigation issue, stopping the ship.
14:16:42.093- Nav back put in ship move.

14:21:41.031-took sample 037, big piece, didn't look very in place, blocky, with ROV grab. Saw sea anemone, pillow tubes with breccia, one coral with a snake star associate and a different species of coral, bamboo whip, purple fish, toothpaste lava, breccia interspersed within toothpaste lava, protist, fishes, sea anemone, crinoid.
14:56:29.174-went to broken pillow wall. Saw sea anemone, sponge, outcrop of pillow lavas, crinoid, fish, some in tact tubes but mostly broken talus, in place large fractured pillows, Long lobate lavas, sponges, jelly, corals, fractured pillows.
15:20:11.326-took sample 038, collected from broken pillow wall, looks crusty. 10cm by 25cm approx. with ROV grab. Saw lots of corals and crinoid on broken pillows.
15:31:20.011- continued on broken pillow wall, biology abundant, larger pieces. Saw sediment patches among broken pillows, in tact pillows and winding lava tubes, crinoids.
15:40:25.025- Lobate toothpaste lava field; pillows smooth to slightly wrinkle crust. Tree trunk lava tubes transitioning to area of talus. Saw corals, rounded broken pillows, wall of stacked pillows, sea anemones, glass sponge.
15:59:03.307- Transition from rounded pillow to a channel of angular t subangular breccia (<20 cm).
16:00:23.006- Back to blocks rounded to subangular (80 to 30 cm) with sediment patches (<20 cm).
16:02:21.231- Transition again to channel of smaller breccia; subangular <30 cm with occasional round blocks of pillow (90-100cm). Saw talus, corals, squat lobster, fishes, flat surfaces of lobate lava Cracked and open surfaces exposing inside lavas, basket star bush.
16:17:27.922Z-took sample 039, collected from fractured pillow with lots of bio around it ~35 cm crusty rock with ROV grab. Saw Corals, stars, sponges, basket star, slime, Lobate flows with some cover of broken pieces. Smooth to wrinkle surfaces, some in tact pillow flows between talus, crinoid, crustacean.
16:37:11.463- transition from pillows to broken pieces. Saw sponges, talus, coral garden, cemented looking broken pillows, Lobate lavas field with corals, bubbly pillow flow with corals nestled in fractures of rock.
17:02:47.764- transitioning from puffy pillows to talus bits.
17:06:54.603-took sample 040, talus piece taken from pillow outcrop ~30 cm rock with ROV grab. Didn’t make it to waypoint 7.
17:09:13.196- Off bottom. ascending and talus is prevalent.

Sample and Terrain Maps:



Sample Photographs
Dive: J2-1564

RR2403-J21564-020S IGSN: 10.58052/URI00037G	
	

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RR2403-J21564-023R IGSN: 10.58052/URI00037J	
	

RR2403-J21564-024R IGSN: 10.58052/URI00037K	
	

RR2403-J21564-025R IGSN: 10.58052/URI00037L	
	

RR2403-J21564-026S IGSN: 10.58052/URI00037M

RR2403-J21564-027R IGSN: 10.58052/URI00037N

RR2403-J21564-028P IGSN: 10.58052/URI00037O

RR2403-J21564-029R IGSN: 10.58052/URI00037P

RR2403-J21564-030R IGSN: 10.58052/URI00037Q	
	

RR2403-J21564-031R IGSN: 10.58052/URI00037R	
	

RR2403-J21564-032R IGSN: 10.58052/URI00037S	
	

RR2403-J21564-033S IGSN: 10.58052/URI00037T	
	

RR2403-J21564-034R IGSN: 10.58052/URI00037U	
	

RR2403-J21564-035R IGSN: 10.58052/URI00037V	
	

RR2403-J21564-036R IGSN: 10.58052/URI00037W	
	

RR2403-J21564-037R IGSN: 10.58052/URI00037X	
	

RR2403-J21564-038R IGSN: 10.58052/URI00037Y	
	

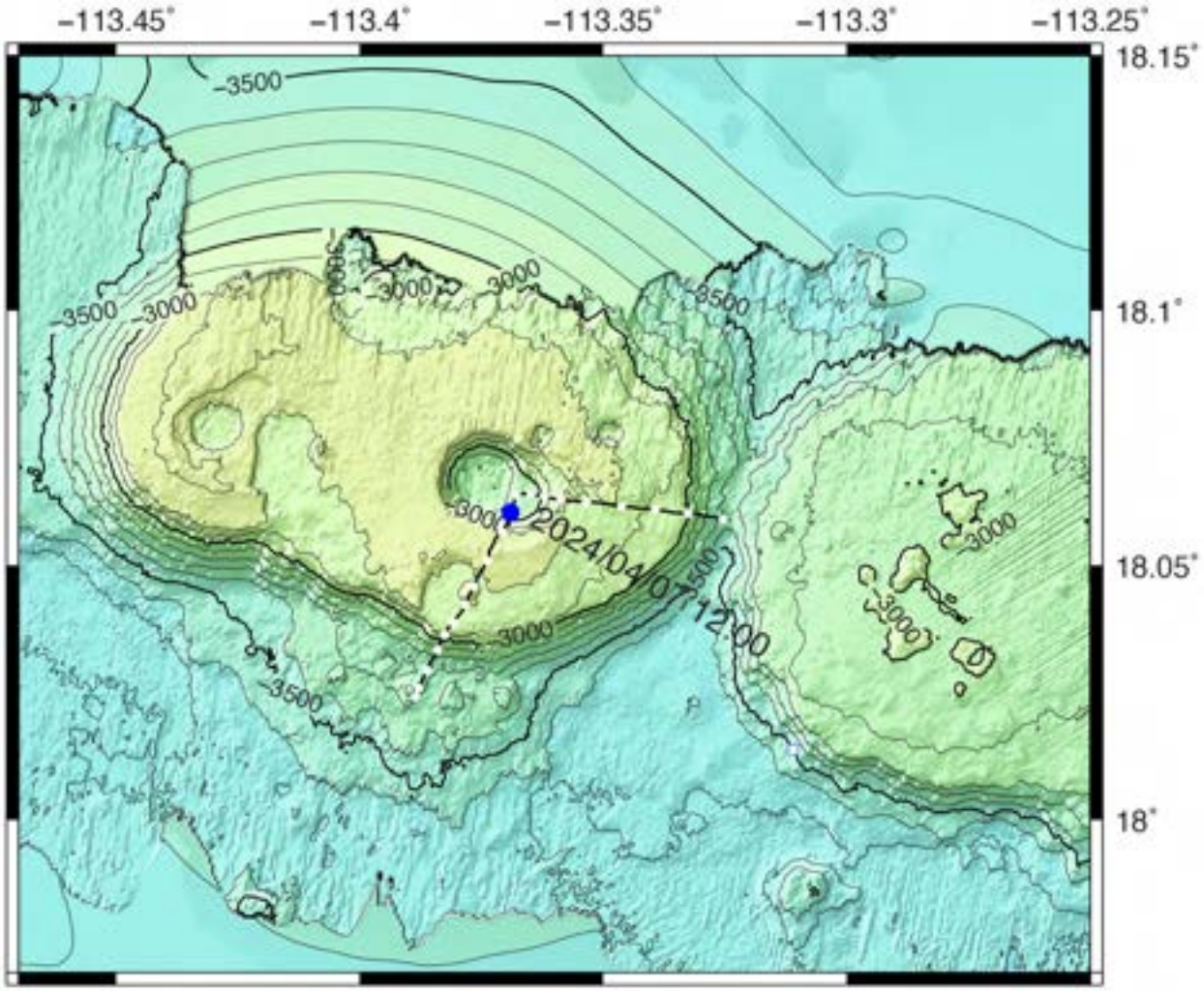
RR2403-J21564-039R IGSN: 10.58052/URI00037Z	
	

RR2403-J21564-040R IGSN: 10.58052/URI00038A	
	

Dive J2-1565 Summary Report
Date: 4/7/2024
Site Description: Series 600- to 900-meter high, pancaked-shaped volcanoes with a regional ESE trend. Our primary target is the eastern half of “coalesced” volcanoes with a 300-m deep central crater and a smaller crater on the southern edge.
Physiographic Feature: seamount or seamount province
Physiographic Feature Name: Unnamed

Launch Location:	18.023°N, 113.388°W
Launch Depth (m):	3327 m
In Water (GMT):	2024-04-06T23:12:57.344Z
On Bottom:	2024-04-07T01:19:40.439Z
Off Bottom:	2024-04-07T21:22:02.176Z
On Deck:	2024-04-07T23:22:40.941Z

Dive Map:



WATCH END SUMMARIES:

4-8 PM: Submersion of Jason occurred at 16.13 PM (local) and bottom was reached at 18.15 PM at a depth of 3280 m near wp1. Navigated in direction NNE toward wp2. Distal pillow lavas of "donut-shaped" volcano were soon sampled (No.41). Sample 42 was taken from talus at small ridge consisting of clast-supported pillow lava breccia at 3253 m.

8-12: We began the survey halfway between of wpts 1 & 2 and proceeded up slope from 3240 m in pillows along the "ramp" abutting the south side of the western pancake. The steep edge of the scarp is composed of a series of pillow walls and sedimented terraces with Mn nodules. Extensive regions of manganese pavement also blanketed some of the steeper slopes. The nodules and pavement steepened and finally transitioned into pillows at the top of the scarp at the end of the dive. The rock exposures along this section were heavily encrusted in Mn and appear to be older than the previous 2 dives (J2-1563 & J2-1564).

12-4: We began our watch between wpts 2 and 3 on top of the donut feature about 730 m South of wpt 3. There are nice bulbous pillow flows that are heavily coated in Fe-Mn crust. In between the pillow sections is a heavily sedimented seafloor with abundant Fe-Mn nodules ranging in size from a few cm to ~12 cm. Ronnie is training as an ROV pilot and practiced picking up a couple samples around 7:25 in the dive video – these went in the milk crates with the ballast weights and are NOT part of the sample collection. We observed some areas of the seafloor where the nodules are in weird shapes on the floor with only sediment in the middle. A sample (#46) was taken ~ 200 m South of wpt 3. It is a bulbous piece ~ 15 cm in diameter and was taken from a large section of pillow flows. A sample (#47) was taken at wpt 3 ~8:43, the top of a small, elevated feature on the plateau of the donut. The pillow flows at the top were heavily sedimented. Two octopuses hanging out of a rock were also observed in addition to lots of sea cucumbers. The north of the feature where wpt 3 sits is covered in heavily sedimented fields of nodules, so much so that it almost looks like desert pavement (quick change ~9:32). A sample (#48) was collected from large, bulbous pillow features ~800 m NE of wpt 3 at 9:44. There is talus right above the location where sample 48 was taken and is followed by a big pillow cliff face before plateauing to a flat surface with sparse pillows and Fe-Mn nodules. We ended watch less than 900 m South of the crater rim.

4-8 AM: Picked up watch near crater-rim of "donut-shaped" volcano (between wp3 and wp4). Surface displayed pillow lavas, nodules, and whitish sandy sediment. Sample No. 49 (angular block) was obtained from talus breccia at crater rim. From there navigation continued down the steep inner crater wall that exposed talus breccia, consisting mostly of subangular to subrounded lava blocks. The lower inner slope became less steep and more covered with sandy sediment with occasional boulders. After crossing ± level terrain (at ca. 3008 m) and reaching center of crater (wp4), navigation turned from NNE to E toward wp5. Near wp4, two pillow-lava flow samples (Nos. 50 and 51) were taken. When reaching the eastern inner crater-wall, sample 52 was taken from the talus-breccia. Overall, not much fauna, few fish, brittle star and other echinoderms, etc.

8-12: We began our dive between wpts 4 & 5 and the base of the steep slope on the eastern side of the crater at about 3017 m depth. We proceeded eastward out of the crater along a slope composed of a series of 4 terraces. The terraces in the deeper sections were primarily larger pillows, which seemed to evolve to exposed 1-2 m-thick flow units in the upper terraces and finally topped with pillows at the top. Once on top of the pancake, we observed alternating region of pillow basalt ridges and mounded outcrops and extensive regions of nodule-covered sediment. Numerous meter-wide and several meter-long troughs or ditches were seen in these sediments (and also in the sediments in our previous watch), which we hypothesized as formed by diving beaked whales. Our dive ended about 200 m west of the eastern edge of the pancake.
12-4: We started our watch a few hundred meters from the eastern edge of the donut feature between wpts 5 and 6. The top of the plateau is heavily sedimented with abundant Fe-Mn nodules and sparse pillow features. At 20:00 we came across a dumbo octopus. Morphology stayed rather constant as we traversed down the eastern flank of the donut into the valley. Sample #54 was taken from a pillow feature at wpt 6. We were off bottom and started our ascent after sampling the base of the pancake feature at wpt 6 around 21:20.
4-8 PM: Picked watch when Jason was being recovered and had almost reached the surface (150 m). At 16.20 it exited the water and was secured on board. 10 minutes later samples were unloaded.

SEALOG SUMMARY
Date: 2024-04-06--2024-04-07, times in UTC
23:10:32.631- Jason off deck.
23:12:57.344- Jason in water. Saw ctenophores, jellies, fishes, shrimps, squid.
01:19:40.439- On bottom. Made it to waypoint 1. Saw shrimps, gelatinous organism.
01:48:29.132- Big pillow lavas, some sediment patches interspersed, some small rock fragments sitting within the sediment. Saw breccia, brittle star, squat lobster, spiky cucumber.
02:20:25.401-took sample 041, block of altered basalt, FeMn crust, with ROV grab. Saw stalked crinoid, tiny sponge, brittle star. FeMn crust coating on rocks making it hard to see lava textures underneath. Saw blocky pillows and talus, they transitioned from rounded to angular. Saw orange cucumber.
02:33:16.455- Collected sample 042, blocky, ~15cm across sub-triangle shaped, two smaller cobble shaped rocks as well, with ROV grab. Saw sediment conduit into large pillow tubes, sediment conduit into large pillow tubes, purple cucumber.
02:45:31.094- Saw a slope of talus, FeMn nodule patch, pillow lavas, a jelly, a transition into FeMn nuggets.
02:58:31.401- Collected sample 043, FeMn nuggets, with scoop. Saw welded FeMn pavement with nuggets on top, the transition from ferromanganese basement crust into scattered pillows and sediment, sea anemone.
03:11:44.793- Saw small talus pieces, old, weathered, and crusty, a crinoid, the transition into larger broken pillows, botryoidal crusts on pillows, nice tubey pillows, a stalked sponge, halosaur fish, large botryoidal outcrop of crusty pillows.

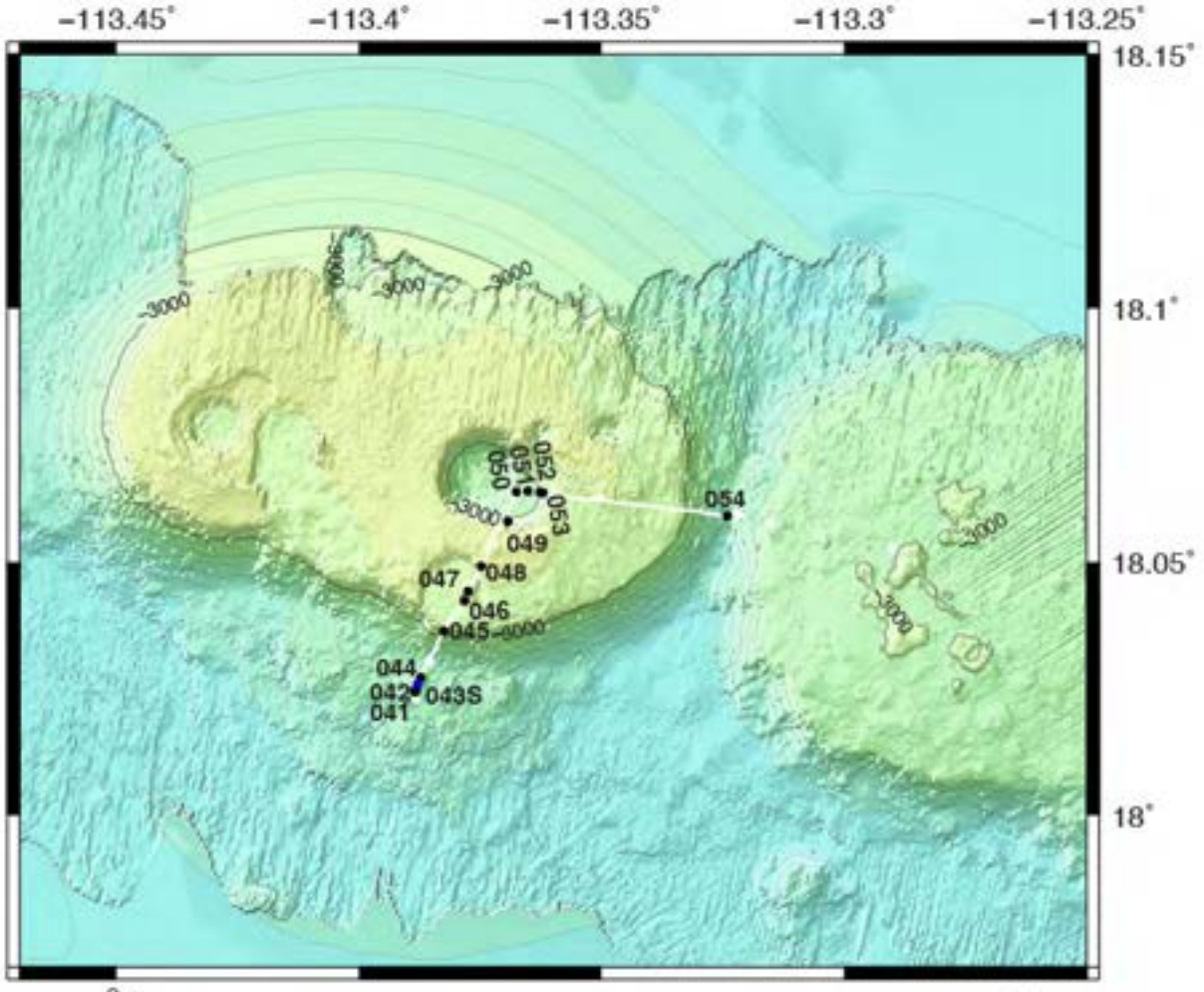
03:27:39.639- Sample 044 collected, crusty pillow ~20 cm, ROV grab. Saw tubey pillows, squat lobster, the transition from pillows to sediment at bottom of slope with some FeMn nodes, the transition from pavement Mn nodes to pillows still looking botryoidal with smooth surface, a tubey pillow deposit, a fish, and a crinoid.
03:47:20.545- Transition back to flat sedimented area with FeMn nodes, saw a possible whale scratch on sediment, sea anemone, jelly, interestingly shaped sediment patch in nodules, a swimming tube with legs (cucumber?), a cucumber, more cemented FeMn pavement with sporadic sediment uplift patches, stalked sponges, rat tail fish, pillows reoccurring in sedimentary area, pillows having smooth botryoidal surfaces.
04:22:47.147- Transition between sediment cover and botryoidal pillows, going upslope. Saw stalked sponge, crinoids, broken pillow wall up steep slope, some sediment still exposed, weathered pillows and nodules and sediment, talus piles, a fish, FeMn pavement.
04:40:57.798 – 200 meters past waypoint 2, onto waypoint 3. Saw purple cucumber, green spikey sea urchin, coral, grenadier, sponges, cucumber, sediment patches in between pavemented nodes, small crusty broken pillows, botryoidal broken pillows covered in sediment.
05:21:10.190- Going uphill, there is Fe-Mn pavement with sediment and rounded pillow lava fragments. Saw crinoids, lots of welded pavement, fresher less crusted pillows, varying large pillows on top of crusty pavement, the transition between pavement and talus, talus on top of FeMn pavement, larger fragments of broken pillows on sediment and flatter flows, jelly, larger in tact pillow with sediment between blocks.
05:57:38.006- Outcrop of pillows with botryoidal texture, long intact lava flows, jellys, translucent sea animal.
06:11:22.194- Sample 045 taken, ~25 cm collected from botryoidal broken pillow with a struggle to unwedge from outcrop, ROV grab. Saw broken pillows and sediment, large ridge with round bulbous pillows, in tact pillows, flying cucumber, talus and sediment, botryoidal pillow wall, jelly, terraced walls of exposed pillow faces, FeMn nuggets at top of wall, sea star, stalked sponge, crinoid, FeMn nuggets flowing like a river in between crusty pillows.
06:39:51.627- Transition to broken pillows and sediment, not many nuggets anymore. Saw rat tail fish, stalked sponge, larger pieces of broken pillows, cucumber, pillow tubes with lots of sediment cover, FeMn nodules, crinoid, shrimp, sponge, thick white sediment with no more FeMn nodules, fishes, occurrence of nodules again, sea star, sea anemone, shrimp.
07:30:35.285- Thick sediment, sparse pillows surface exposed, moderate Mn nodules. Saw basket star, shrimps, possible sea star, small cones with holes central holes; all over sea floor; possible worm holes, cucumbers, potential xenophyophores, sea animal that looked like stalked venus fly trap.
07:54:27.925- Pillow & tube piles surrounded by thick sediment. Saw sea anemones, cucumbers, shrimps, brittle star, squat lobster, sponges, crinoids, xenophyrophore.
08:17:03.541- Sample 046 collected 200 meters south of waypoint 3, pillow lava chunk, ROV grab. Saw fish, abundant nodules, cucumbers, acorn worm, xenophyrophres, shrimps, sea stars, ctenophore, pillows with striations, talus.

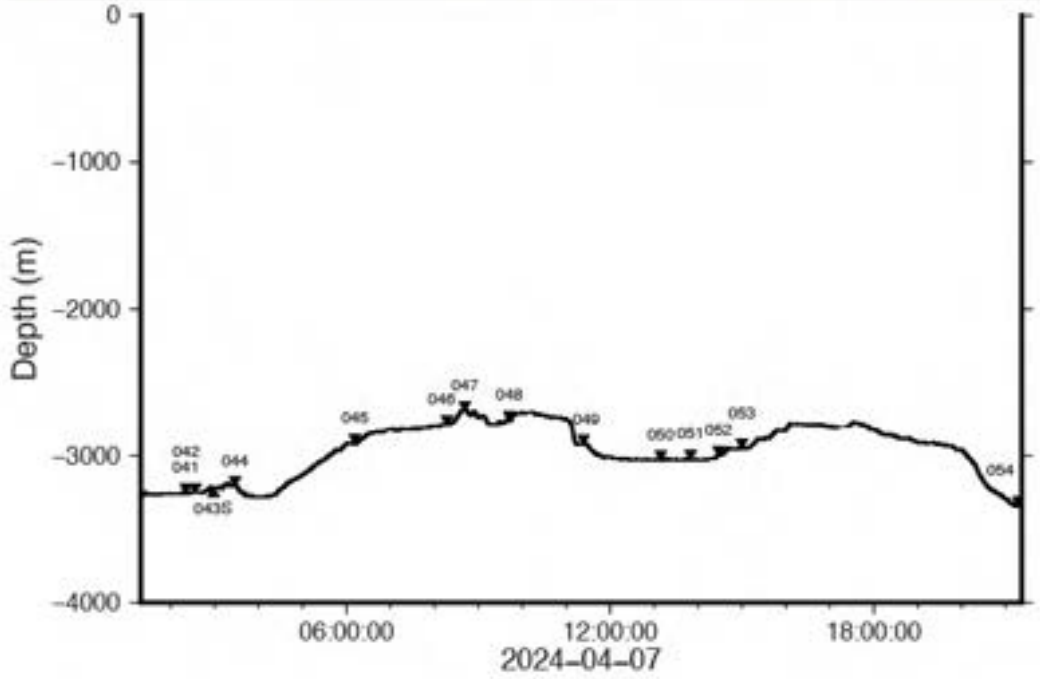
08:41:24.995- Sample 047 collected, pillow lava piece, way point 3; 2694m. Flying off waypoint 3 highpoint. Saw abundant sediment as we climbed upslope, purple octopi, white sediment on rocks, blue water, shrimps, fish, coral, sea star, sea urchins, FeMn nodules, abundant cucumbers, abundant FeMn nodules, crinoid, sponges, possible sea spider, pavemented FeMn nodules.
09:36:51.427- Transition from FeMn field to pillow flows. Saw pillow field with interspersed Mn nodules and white sediment, shrimps, nodules abundant in flat patches between pillow areas, and a cucumber.
09:42:10.222- Sample 048 collected, pillow piece, 2762m, 800m NE of waypoint 3, on edge of rim, ROV grab. Saw talus, shrimps, pillow cliff, sediment field with sparse pillows and Mn nodules, patches of pillows interspersed with patches of nodule covered sediment, possible sea spider in water column, headless chicken monster (cucumber), sediment area with small nodules, gelatinous possible ctenophore, pink cucumber, isolated pillow on sediment area with nodules, nodule field, sea urchins, xenophyophore, cucumbers, fishes.
10:22:12.917- Transition from sediment to blocky lava. Saw cucumbers, sea urchin, shrimps, pillow lavas, sediment, potential flatform in water column or shrimp, squat lobster, xenophyophores, crinoids, nodules within sediment, jelly, outcrop of blocky lavas, steep slope of larger pillow tubes, FeMn nodules on top of local high (flat), steep drop off, in midwater as we tried to traverse down slope.
11:12:27.712- Made it to seafloor, blocky FeMn encased rocks within sediment. Saw breccia, brittle star, jelly, shrimp, worm.
11:23:29.400- Collected sample 049, blocky piece of talus, not in place, ~10cmx20cm,FeMn crust coated, ROV grab. Saw cucumber, sparse rocks, mostly sediment and some FeMn nodules, tiny fish, depression in sediment, entered area of blocky pieces within sediment; small slope to no slope, unidentified swimming organism, ctenophore, fishes, pattern in sediment most likely from an organism, unidentified gelatinous organism (jelly), shrimp.
12:40.297- moved from area with sediment with blocky pieces to area with mainly sediment. Saw fish (cusk eel), purple fish, pillow lava outcrop, shrimps, large (over 20cm) cucumber, smaller cucumber, sea urchin, echinoderm.
12:35:52.782- Passed waypoint 4. Sample 050 collected, ~10cm block of altered basalt, light FeMn coating, ROV grab. Saw sea anemone with long tentacles, pink cucumber, anemones, larger pieces of basalt within sediment in the crater, shrimps, sea star, barnacle looking organism, stalked crinoid, small circular openings, sediment inside with some FeMn nodules, swima polychaetae worm.
13:49:50.592- Sample 051 collected, ~15cm block of broken altered basalt, light FeMn coating, box 2, most of it may have crumbled, ROV grab. Saw swimming crinoid, purple cucumber, shrimp, polychaetae worms (swima), more hard rock visible and less sedimentation, hard rock not visible, mostly sediment and FeMn nodules, jellies, huge field of FeMn nodules, sea urchin, sea anemones, cucumber, sea star, ctenophore, many circular shapes in sediment with FeMn nodules; most likely due to an organism.
14:24:33.661- Base of the cliff on crater ridge. Saw large pieces of breccia; pieces bigger on right side than left, talus.

14:28:11.311- Sample 052 collected, piece of breccia, didn't look in place, more than 20cm long and blocky, altered basalt with light coating of FeMn crust, ROV grab. Saw varying sizes of breccia as we went up slope of crater cliff.
14:59:49.837- Sample 053 collected, ~30 cm piece of broken pillow on outcrop of crusted, in place pillows, ROV grab. Saw crusty broken pillow slope, unidentified frog looking animal; purple and pink, talus in sediment and nugget pavement, pillow wall coming out of crater; crusty and botryoidal, a jelly, a massive broken pillow wall more intact; can see spiral tube faces, halosaur fish, sedimented chasm between flat, broken, crusty pillows, sea anemone.
15:26:49.315- FeMn nuggets among talus. Saw light colored sediment with larger dark colored grains on top, possible whale scratch in sediment, transition between sediment and talus, sea urchin, glass sponge, crinoid, talus cover, flat botryoidal pillows, FeMn pavement and nuggets, similar size, shape FeMn nodules, fish.
15:58:52.658- Transition between sediment and talus. We saw a possible cusk eel, pillow wall, coral, jelly, very old and layered lava flow pillow outcrop, stalked sponge, broken pillows and FeMn nodules on top of wall.
16:09:25.495- Transition from the flat surface area to sediment covered area (a step below lava area. Saw halosaur fishes, small patches of broken pillows on sediment, stalked sponge, patches of possible FeMn crust or pillow in sediment, large intact pillow in middle of sediment field, two possible acorn worms, lime green sea urchin, black sea urchin, sea anemone, bulbous pillows.
16:55:29.322- Large patch of sedimented area. Saw flat pillows, FeMn nodes, and sediment, acorn worm, many depression imprints on sediment, sea urchin, intact crusty pillows, a rubber boot, stalked sponge, pillow botryoidal lavas; occasional big blocks on sediments, squat lobster, rat tail fish, unidentified flowery swimming orb (jelly?).
17:42:48.061- Patch of crusty pillows and FeMn nuggets, still in sedimented area. Saw sponges, areas of larger in tact pillows, crusty broken pillows, FeMn nodules, sea star, botryodial crust on pillows, unidentified translucent swimming creature, shrimp, fish, sediment cover.
17:56:58.542- Transition between sediment patch and broken crusty pillows with FeMn nuggets. Saw baby coral, adult corals, pillow lava tubes, sea stars, fishes, possible vampire squid, bigger crusty pillow on sediment; less Mn nodules, sponge, sea urchin, possible biology caused depressions in sediment, acorn worm.
18:23:57.860- Botryoidal pillow outcrop and then back to sediment stretch with small FeMn nuggets. Saw cucumbers, dumbo octopus, animal scratch in sediment, sponges, shrimps, crusted pillows, glass sponge, high FeMn nodule cover.
9:19:32.862- Walls of Mn nodules around sediment depressions; footprint-like shapes. Saw larvacean, brittle stars on pillows, no more pillows, all Mn nodules on sediment, cucumbers, sea urchin, shrimps, sediment mounds, coral, Mn nodules with occasional pillows, worm (poop trail?), acorn worm.
19:45:23.974- Heading downslope into valley. Saw sea spiders, cucumber, larvacean, Mn nodues and sparse pillows transition to abundant sediment and sparse nodules, acorn worm, sea urchin, dumbo octopus, coral, nodule pavement, squat lobster, crinoid, shrimps, fish, sea stars, possible glass sponge.

20:09:56.017- Starting steep descent. Saw fish, cucumbers, crinoids, shrimps, Mn nodules on pillows, jellies, possible sea spider, blocky lava fragments, nodule pavement, flat worm, nodules and sediment, sea anemones, sea urchins.
20:43:23.797- Nodule and sediment field. Saw sea urchin, shrimps, sea anemones, fish, worm, unidentified bubbly blob, Mn nodule field, 6 legged spider like animal in water column, cucumbers, crinoids, squat lobster, polychaetae worms, sparse pillows, abundant sediment.
21:17:08.546- Sample 054 collected, pillow basalt, covered with bacteria (?), abundant yellowish sediment around, ROV grab. Saw bottom of valley, 10 shrimps, fishes, gelatinous - larvacean or ctenophore, worms, 15 ctenophores.
23:22:40.941- Jason on deck.

Sample and Terrain Maps:





Sample Photographs
Dive: J2-1565

RR2403-J21565-041R IGSN: 10.58052/URI00038B	
	

RR2403-J21565-042R IGSN: 10.58052/URI00038C	
	

RR2403-J21565-043S IGSN: 10.58052/URI00038D

RR2403-J21565-044R IGSN: 10.58052/URI00038E

RR2403-J21565-045R IGSN: 10.58052/URI00038F	
	

RR2403-J21565-046R IGSN: 10.58052/URI00038G	
	

RR2403-J21565-047R IGSN: 10.58052/URI00038H	
	

RR2403-J21565-048R IGSN: 10.58052/URI00038I	
	

RR2403-J21565-049R IGSN: 10.58052/URI00038J	
	

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RR2403-J21565-051R IGSN: 10.58052/URI00038L

RR2403-J21565-052R IGSN: 10.58052/URI00038M

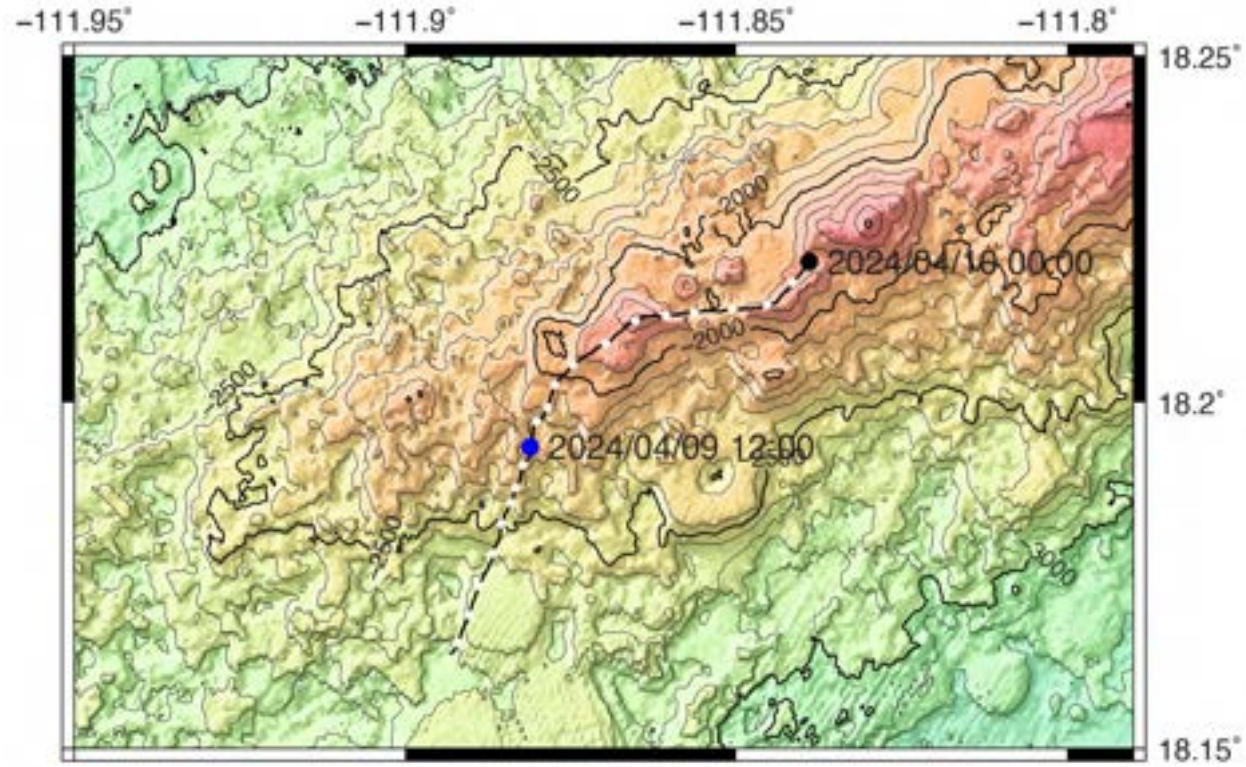
RR2403-J21565-053R IGSN: 10.58052/URI00038N	
	

RR2403-J21565-054R IGSN: 10.58052/URI00038O	
	

Dive J2-1566 Summary Report
Date: 4/9/2024 – 4/10/2024
Site Description: 50-km-long, NE-SW trending ridge with total relief of about 1300 m located ~100 km west of the failed Mathematician Ridge. This is the site where R. Batiza dredged “popping” rocks in 1984.
Physiographic Feature: seamount or seamount province
Physiographic Feature Name: Unnamed, “Pop Rocks”

Launch Location:	18.16339°N, 111.89312°W
Launch Depth (m):	2857 m
In Water (GMT):	2024-04-09T01:11:48.670Z
On Bottom:	2024-04-09T03:07:43.792Z
Off Bottom:	2024-04-10T00:05:00.736Z
On Deck:	2024-04-10T01:27:21.645Z

Dive Map:



WATCH END SUMMARIES:
4-8 PM: Submersion of Jason occurred at 18.12 PM (local) and bottom was reached at 20.07 PM at a depth of 2867 m near wp1. Not far from wp1 sample No.55 was taken from a pillow lava, shortly after Rob’s watch had initiated (see below).
8-12: We began watch just as the ROV was on bottom near wpt #1. Claus took the first sample of a pillow rim (sample No.55) in mostly sedimented slope with broken pillows. As we proceeded up-slope, we observed large pillow “heads” with many “knobs” or

pillow protuberances (aka nubbins) on down-sloping pillow tubes. On top of the initial pancake-shaped feature was mostly sediments with pillows poking through occasionally. Near the middle of this feature, we observed a shallow crater with collapsed lava flows (not pillows) observed along the edges. There was an abundance of black, halfmoon-shaped creatures observed in the mostly sedimented regions on this feature.

12-4: We began watch ~ 500 m south of wpt 2. The area looked heavily sedimented and had pillow flows that appear fresh and not coated in Fe-Mn crust (can still see textures). As we proceeded upslope, the pillow flows appeared to be more broken up until we reached a slope of talus. Shortly after, we came across a beautiful ridge/ cliff of pillows and lava tubes where we took a sample (#57). This sample was of a beautiful pillow in cross section with radial columnar jointing. As for the morphology on the seafloor, the pattern of heavily sedimented region with some pillows -> talus slope -> lovely pillow cliff continued throughout the watch as we proceeded to wpt 2 and 3. We also observed an abundance of those black, halfmoon-shaped creatures that they saw on 8-12 and we believe they are sea cucumbers. At 8:01 we saw two swimming crinoids as we set up to take a sample (#58). This sample is a huge piece of a pillow taken 70 m N of wpt 2. At 8:16, we lost connection to USBL and had to stop as the Jason team performed some trouble shooting. We were stopped on a pile of blocky talus. We proceeded to move after ~10 minutes. At 9:04, USBL was lost again, but recovered soon after. Sample #59 was collected at 9:21 ~465 m NNE of wpt 2 and was taken from a lava tube feature on a pillow ridge. It appears to have some shiny black on it (yay glass!). At 9:48 lava tubes and sheet flows pave over everything. There are a few very large (~50x120 cm) bulbous pillows mixed into the sheet flows. Sample #60 was taken at 10:22 off of a pillow flow ~ 600 m NE of wpt 2. We continued to transit towards wpt 3 and ended our watch ~ 1700 m SW of wpt 3.

4-8 AM: Picked up watch between wp2 and wp3 on southern slope of seamount and navigated in direction NE toward western summit of ridge (wp3).

At 2242 m depth, sample 61 was obtained from pillow lava flow. Further on, sample 62 (pillow lava, glassy crust) was taken. Slope became quite steep, displaying wall of pillow lavas, followed by sections of coarse talus breccia (sample 63, dense interior of pillow). Mn-coating not obvious, maybe only incipient, reflecting on youthfulness of the flows. At a few hundred meters from summit, the slope became less steep and samples 64 (pillow glassy crust) and 65 (glassy, brittle angular breccia) were obtained.

Few sponges, crinoids, shrimps.

8-12: We began the dive about 300m SW of wpt #3 in a region of hackly flows, where Claus was just finishing sampling. We took a sediment scoop of dark-colored sediment ponds located in low-lying regions of these pillows. We anticipated seeing more hackly flows, but we quickly moved into the more typical region of large pillows with knobs. Interesting occasional outbreaks or rows of barnacles were present on many of the large pillows. This general pillow morphology characterized much of the region between wpts #3 & #4. Not much in the way of coral until near the summit at wpt 4 where we finished our watch.

12-4: We began watch ~340 m E of wpt 4, descending into the saddleback between wpts 4 and 5 which was full of a mix of talus with sparse pillow features. Sample #70 was taken at 19:50 ~812 m E of wpt 4. The lava is very crumbly and delicate, like that observed at Socorro in 2017 (gas-rich, glassy, lots of vesicles). A short way after the sample, we got to a heavily sedimented region with lots of gray/ black specs on top. This is likely similar to the volcaniclastics sampled earlier in the dive with a scoop. It persisted for ~ 50 m before transitioning back to pillows. Sample #71 was collected from a ridge of pillows ~1050 m W of wpt. 5. Sample #72 was collected at 21:08 from a pillow ridge 649 m W of wpt 5. Sample #73 was collected at 21:25 from a pillow ridge 600 m W of wpt 5. Sample #74 was collected at 22:21 from a pillow ridge 90 m W of wpt 5. IN between sampling events, the morphology followed along with the same pattern noted on the previous 12-4 watch: sedimented region with some pillows -> talus slope -> lovely pillow cliff. We ended watch a little ways NNE past wpt 5.
4-8 PM: We picked up watch between wp5 and wp6 at 1820 m. Areas of pillow lavas alternated with ashy-gravelly talus-scree. Intended taking scoop of ashy-gravelly deposits, but only scratched the surface (apparently sediment is densely packed) and obtained a small sample (labeled No. 76). Not far from scoop sample, a glassy crust was obtained from pillow (sample No.75). Shortly after 17.00, the recovery of Jason started at a depth of 1830 m, ca. 660 m before having reached wp6.
Jason reached surface after 18.00 PM, was secured on board, and samples were unloaded.

SEALOG SUMMARY

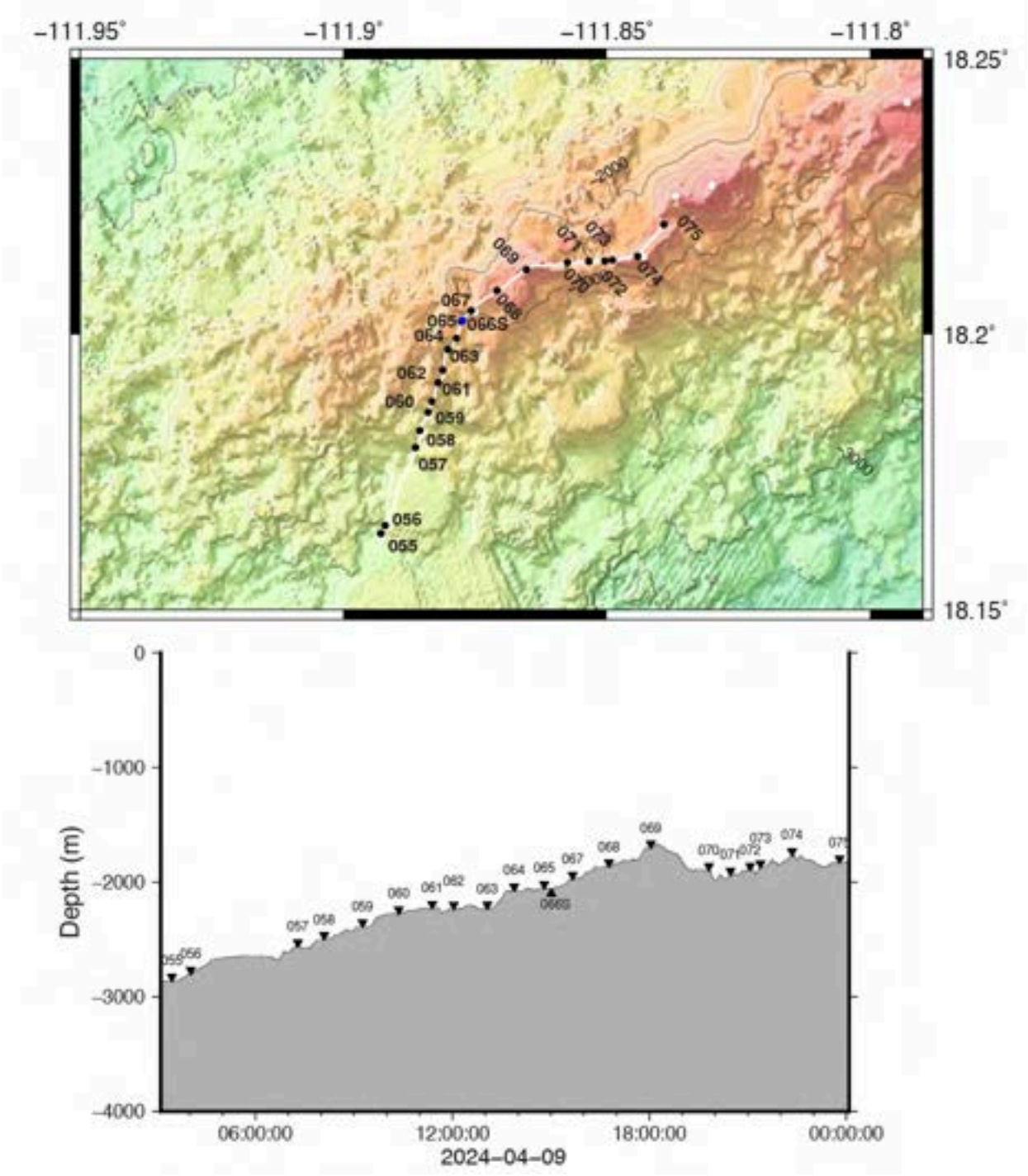
01:09:00.859- Jason off deck.
01:11:48.670- Jason in water. Saw striped fish, ctenophores, jellies, small fish, worm.
03:07:43.792- On bottom. Saw pink cucumber.
03:11:09.064- First point reached: broken pillows with wrinkle surface. Sediments are abundant. Saw broken pillows showing striations (fresh), Occasional blocks with botryoidal texture (1 m), sponge.
03:27:09.164-took sample 055, crumbly pillow crust, possible glass, ~30 cm with ROV grab. Saw sponge, sea stars, broken but bulbous pillows in sediment, cucumber, sea urchin.
03:43:59.056- young pillows with flow texture, and pimply bumps. Saw crinoid, sponges, sea star, long thin pillow tubes (in tact).
04:01:42.395-took sample 056, pillow nub. ~20 cm cylinder shape with ROV grab. Saw crinoids, high sediment cover and larger broken pillows, cucumber, circular sediment depressions, circular sediment depressions, sea urchin, coral, sea stars, sponge, flow texture, Lobate lava flows with flow and bud textures, shrimp, large, intact pillows showing broken open lava sheets, worm.
04:44:07.129- lots of sediment on top of pillow pieces, mostly sediment covering. Saw cucumbers, sponges, coral, sea anemones, fishes, burrows in sediment (small rounded pillows), sea urchin, long thin tube intact.

05:20:43.076- continued in sedimented area with some broken bulbous pillows. Saw cucumbers, sea urchin, fish, nice face showing a sheety flow, black disc shaped things poking out of sediment.
05:46:33.917- mostly sediment with fractured pillows. Saw cucumber, black disc organism.
06:05:19.211- ropey pillow wall into canyon filled with sediment. possible lava lake, nice thin sheet lava wall bordering crater wall. sediment cover. Lava sheet with tumuli looking surface before sediments area. Saw sea urchin, cucumbers.
06:20:21.821- Pillow lavas starting to be more abundant. broken, sediment covered pillows. Round pillow lavas with fracture surfaces, occasionally they look inflated exposing a layering texture (wrinkly to ropy texture filled by sediments). Saw sea urchins, sea star, sponges, talus breccia, cucumbers, shrimps, crinoids, squat lobster, brittle star, sea stars, worm.
07:17:25.171-took sample 057, pillow piece, with ROV grab. Saw cucumbers, shrimps, sponges, sea stars, ctenophore, acorn worm, crinoid, xenophyophore, talus, squat lobster, striations in pillows.
08:05:29.906-took sample 058, pillow fragment with ROV grab. Saw cucumbers, sponge, coral, fish, xenophyophores, sea urchin, talus & sediment, sea stars, shrimp, corals, crinoid, acorn worm.
08:29:39.576- checked out voltage issue.
08:34:09.551-okay for now. Saw brittle stars, talus & pillows, sponges, pillows & sediment, cucumbers, sea stars, crinoids, shrimps, fishes, sea anemone, swimming, leggy creature.
09:15:43.885-took sample 059, pillow piece with ROV grab. Saw squat lobster, shrimps, sponges, cucumbers, sea anemones, coral, crinoid, fishes, sea star, abundant pillows (moderate sediment), dense pillow coverage (sparser sediment), xenophyophore, polychaete worm. Pillows & tubes, dense coverage, sparse sediment.
10:21:55.214-took sample 060, pillow fragment with ROV grab. Pillows and long tubes. Saw larvacean, cucumbers, corals, sponges, crinoids, xenophyophores, tunicates, fish, shrimp, unidentified organism. Can see pahoehoe in some of the pillows.
11:23:03.552-took sample 061, broken pillow fragment ~10cm block; on top of 52 with ROV grab. Large pillow tubes.
11:39:17.323- in midwater went towards bottom again. Saw cucumbers, corals, shrimps, fishes, crinoid, sea anemone, sea star. Could see striations on pillows. large pillows into ropey fragmented pieces of basalt. lava tubes. back into lava tubes.
12:02:21.037-took sample 062, ~10 cm block of broken pillow with ROV grab. went from pillows to talus and breccia. Saw corals (one was bathypathes), shrimps, sea anemones, sea star, cucumbers, fish.
12:21:19.459- made it to area with in-place lava tubes. Saw bamboo whips, bathypathes, brittle star, corals, crinoids, sea star.
12:34:04.186- went in midwater. Saw cucumber, crinoids, shrimp.
12:37:35.897- made it back towards bottom, there were areas of broken breccia/talus as well as in place pillows. Went into area with mostly in place large pillow tubes. Saw

sponges, corals, breccia/talus, crinoids, tunicates, shrimps, Large rounded broken pillow fragments as well as smaller angular pieces.
13:03:43.899-took sample 063, ~20cm triangular block, not in place with ROV grab. large pieces of angular breccia/talus. Saw fishes, sponges, shrimps, crinoids, coral whip, corals.
13:32:43.469- went up steep side of large pillow flow. Saw corals and crinoids.
13:43:25.345- the slope lessened in the pillows, big tubes. Saw sponge, coral, crinoid, shrimp.
13:52:43.855-took sample 064, ~10cm flat block of broken pillow with ROV grab. Saw crinoids, cucumbers, sponges, sea anemone, corals, fish, shrimps. Went into midwater a few times and back to bottom. flows with ropy texture.
14:41:44.860- Made it to slope of popping rocks. Saw shrimp.
14:47:47.338-took sample 065, crumbled bits of broken flow; ~10cm flat piece with ROV grab. weird hackly flows. lots of dark patriculets in sediment. weird hackly flows. lots of dark particulates in sediment. Saw crinoids, sponges, fish, rounded broken pillows.
15:00:43.330-took sample 066, dark particulate on sediment with scoop.
15:11:59.275- Transition from the pillow lobate to a flat area looking sedimentary but also "surface lava" looking to a breccia area with complete pillow lavas with smooth to wrinkly surfaces. Saw crinoids, corals, tunicates, sponges, sea anemone, talus and pillow wall. Was in area of dark sediment layer and broken tube pillows. small broken bud pieces transitioning into larger pillows, then back to small.
15:39:30.306-took sample 067, small tube bud from larger pillow. ~25 cm with ROV grab. transitioning into flatter pillow flows (lots of barnacles). volcanoclastic layer on sediment. Saw crinoids, sea stars, cucumbers, corals, sponges, sea anemone. Lobate lava flows, smooth to wrinkly surface. Almost flat surface of the pillows with sediments (black and marine) between blocks. Sediment patches >1m. larger pillows, some intact, most broken. nice covering of varying sized pillows, some smaller tube flows and larger pillows, very textured, all covered in barnacles. cool wall of large pillows on left and small tubey flows on right. BIG PILLOW with lineated texture, less or no sediment. steady pillow cover, varying sized clasts and textures. small broken and fractured pillows, barnacles on fractures. small rounded talus.
16:46:03.035-took sample 068, ~30 cm rock, bud from pillow with ROV grab. large cracked pillows. Saw crinoids, fishes, sponges, corals, sea stars. thick covering of pillows, little to no sediment. rubble and talus on down slope of a depression hole found.
17:09:48.787-Talus breccia with some round blocks, transitioning to mainly pillows outcrop. pillow wall with exposed tube faces, barnacles on top. Saw sponges, crinoids, fishes, corals, sea anemone, tunicate. transition to talus field with more sediment cover. transition from talus to larger pieces of broken pillow, and back to talus. larger broken pillows and broken tubes.
18:02:30.795-took sample 069, thin crusty piece grabbed from broken pillow. ~15 cm with ROV grab. Saw fish, crinoids, sea anemones, corals, tunicates, sponge, shrimps, limpets, xenophyophore, sea stars. cover of smaller broken pillow pieces. many layers of pillows. Pillows and blocks.

19:48:42.774-took sample 070, pillow surface fragment with ROV grab. Abyss. Talus and some pillows. Sparse pillows with abundant sediment. Saw sponges, sea stars, brittle stars, corals, fish, sponge, crinoids, squat lobster, sea anemone, cucumber. Pillows with sediment. Talus with pillows. Sediment with sparse pillows.
20:28:17.967-took sample 071, pillow fragment with ROV grab. Pillows and tubes with sparse sediment. Pillows and dripping tubes. Pillows almost no sediment. Pillows and blocks. Saw limpets, corals, sea star, crinoids, cucumbers, shrimps, xenophyophores.
21:04:08.230-took sample 072, pillow fragment with ROV grab. Abyss. Talus and blocky. Lava and pillows. beautiful columnar interiors (pillows). striated tubes (pillows). dense coverage, pillows & tubes, no sediment. Saw shrimps, fish, corals, cucumbers, crinoids, sea anemone, sponge, dead sponge, bacteria.
21:22:58.199- took sample 073, pillow fragment with ROV grab. patches of small coral/ xenophyophores on pillows. Talus with some pillows. Pillows and tubes. Pillows and little sediment. Saw cucumbers, sea stars, corals, crinoids, sea anemones, sponges.
21:45:30.517- going through abyss. Saw corals, crinoids, sea stars, sea anemones, shrimps, sponges (glass), jelly, cucumbers, tunicates, fishes, talus, blocky lava, pillows, dumbo octopus, squat lobster.
22:20:36.239- took sample 074, pillow fragment with ROV grab. Saw shrimp, corals, sponges.
22:25:05.947- abyss. Saw talus, corals, sponges, shrimps, crinoids, sea anemones, cucumbers, sea stars, brittle stars, pillows and sparse sediment, striations on pillows.
23:13:21.402- went into area with bulbous large pillow flows. Saw corals, black volcaniclastics in sediment, on slope within lobate pillows, crinoids, sponges, sea stars, cucumber, corals with snake star associates. divide between lobate flow and all sediment, bedded basaltic ash. back into lobate pillows, some dark volcanic sediment present. Went back into basaltic bedded ash/ dark sediment.
23:29:37.335- Went back into lobate flows and moving upside (previously was moving laterally). Saw Cucumber, Corals (one potentially dead coral with many snake star associates), corals with snake star associates, Crinoid, huge sponge, sea star, tunicates, squat lobster. reached local high and back in area with a lot of dark sediment again.
23:47:26.412- took sample 075, broken piece of pillow within large sediment area, ~30cm, with ROV grab. sediment and steep slope up with flow. Saw crinoids, sponges, cucumber, squat lobsters, corals, shrimps, sediment with black patch.
00:05:00.736- Off bottom. Saw jellies, shrimps, fish.
01:27:21.645- Jason on deck.

Sample and Terrain Maps



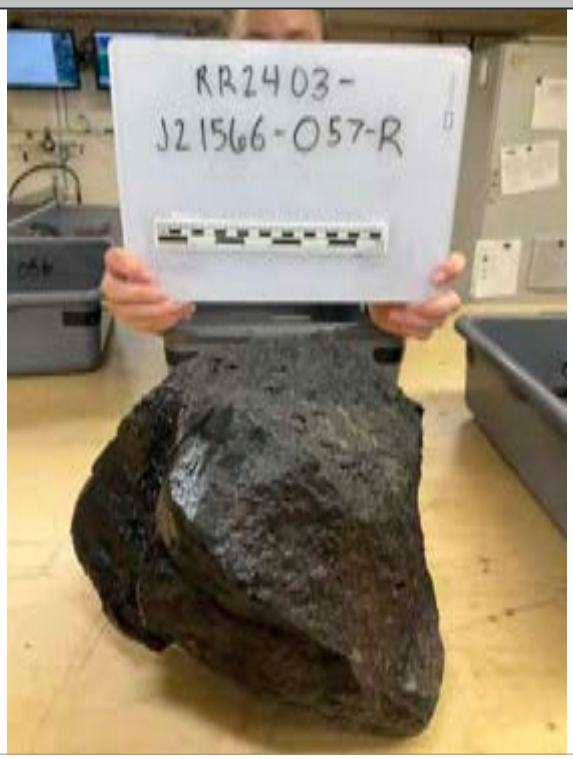
Sample Photographs

Dive: J2-1566

RR2403-J21566-055R IGSN: 10.58052/URI00038P

RR2403-J21566-056R IGSN: 10.58052/URI00038Q

RR2403-J21566-057R IGSN: 10.58052/URI00038R



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RR2403-J21566-073R IGSN: 10.58052/URI00039H

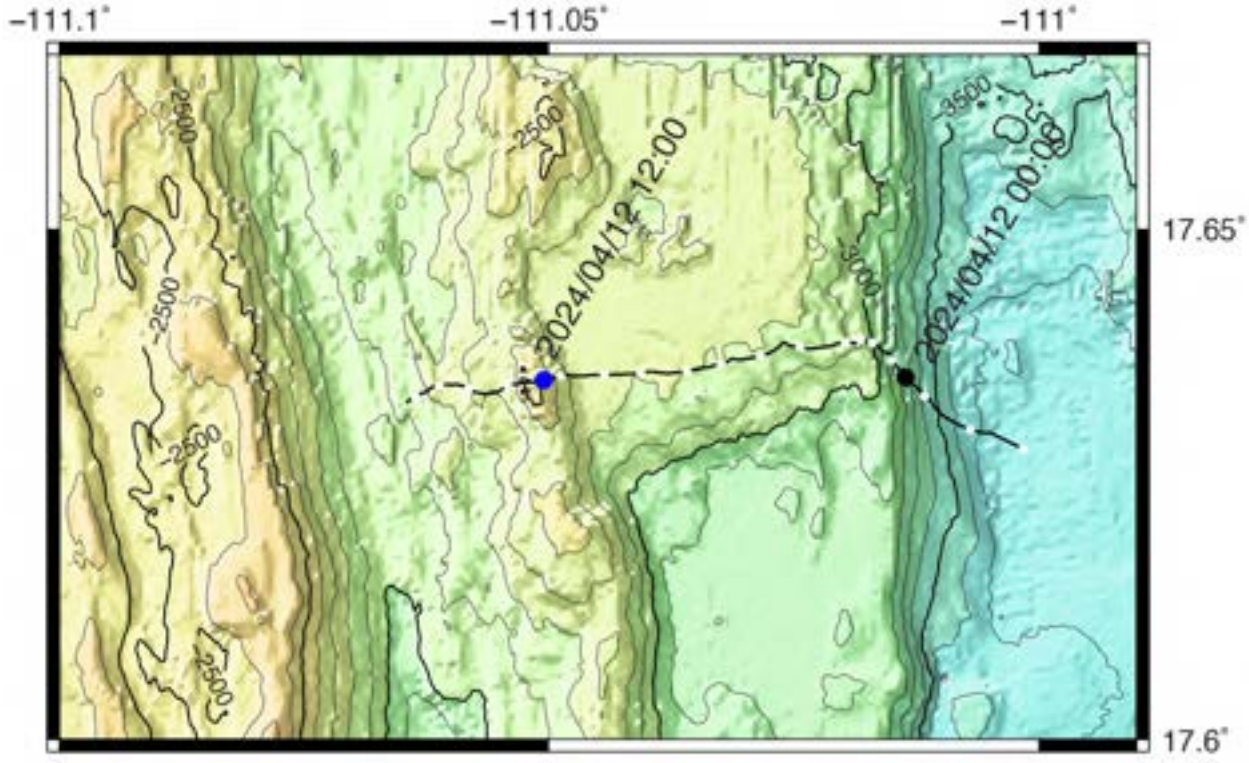
RR2403-J21566-074R IGSN: 10.58052/URI00039I

RR2403-J21566-075R IGSN: 10.58052/URI00039J	
	

Dive J21567 Summary Report
Date: 4/11/24 to 4/12/24
Site Description: Western axial valley wall, Mathematician Ridge
Physiographic Feature: Axial valley
Physiographic Feature Name: Mathematician Ridge

Launch Location:	17.62837°N, 111.00141°W
Launch Depth:	3779 m
In Water:	2024-04-11T18:34:49.550Z
On Bottom:	2024-04-11T20:54:04.233Z
Off Bottom:	2024-04-12T16:28:47.645Z
On Deck:	2024-04-12T18:25:40.508Z

Dive Map:



WATCH END SUMMARIES:
12-4 pm: We started watch in blue water ~ 150 m depth and reached bottom at 20:53. The bottom is heavily sedimented with sparse single-stalk corals and lots of little critter trails in the sediment. There are also lots of large shrimp with long, tall antenna who are putting on aggressive displays for Jason. At 22:00 the sediment gets coarser with lots of white specks and anemones start to appear. At 22:13 we see our first rocks which appear to be a heavily sedimented talus slope. We reached wpt 2 at 22:29 and see an orange spherical jellyfish (crown jelly?) and end watch a little ways past wpt 2.

4-8: We picked up watch at 3460 m depth near wp2. Sandy, light brown sediment predominated, but also gravel and blocks along the stretch approaching steep fault scarp. Climbed scarp diagonally toward the NW in direction of wp3. First, patches of talus scree consisting of angular lava blocks (sample 76, 3398 m). After taking sample 77 (3284 m, also subangular block), we continued upward and sampled pillow lavas from steep wall (samples 78, 79, 80, 81). Watch ended at 2920 m, 120 m before reaching wp3.
8-12: We began our watch near the top of the innermost rift valley wall, just SE of wpt 3 in broken pillows. We shortly crested the wall into complete pillow flows with Mn crusts that made it difficult to get our first sample (#82). The top of this faulted bench alternated between sedimented & talus regions and pillow mounds with disparate characteristics. Some pillow mounds were very Mn encrusted, while others had numerous knobs and other "ornaments." We took our second sample (#83) of a long, narrow pillow bud along a N-S trending pillow ridge just short of wpt 4. Our watch ended shortly after this sample.
12-4 am: We began watch a little ways past wpt 4 in a heavily sedimented, flat area with sparse pillows. We reached wpt 5 ~ 8:45. Sample #84 was collected at 9:30 off a pillow ~350 m W of wpt 5. After sample collection, we had to pause to fix an issue with navigation. The problem was fixed at 9:57 and we continued on. Sheet flows appear at 10:12 and then more heavily sedimented areas with black particles (volcaniclastics) on the uppermost layer. Sample #85 was collected at 10:37 off a large pillow outcrop (vertical cliff) ~ 370 m E of wpt 6. As we continue to climb the pillow outcrop and the fault, the morphology changes to a talus slope. We ended watch <180 m E of wpt 6.
4-8: We picked up watch at 2652 m, 180 m east of wp6. Sample No. 86 was taken from pillow lava at 2598 m (still 171 m before reaching wp6) and sample No. 87 at 2496 m, from the uppermost section of slope, before reaching more flat terrain at wp6. From wp6 onward we descended continuously in direction of wp7 toward the WSW, observing sandy sediment between lava blocks. Took sample of pillow lava (No. 88, 2698 m), before handing over the watch at 2769 m. Sea life is sparse, occasional fish, sponges, echinoderms, etc.
8-12: Our watch began between wpts 6 & 7 at the base of a small, faulted scarp composed mostly of pillows. The back side of the slope was a mixture of pillow flows and sedimented regions… not very interesting at all. After realizing we would not be able to reach the last scarp on the transect, we decided to take a scoop of not-so-great nodules and a final "Hail Mary" rock sample.

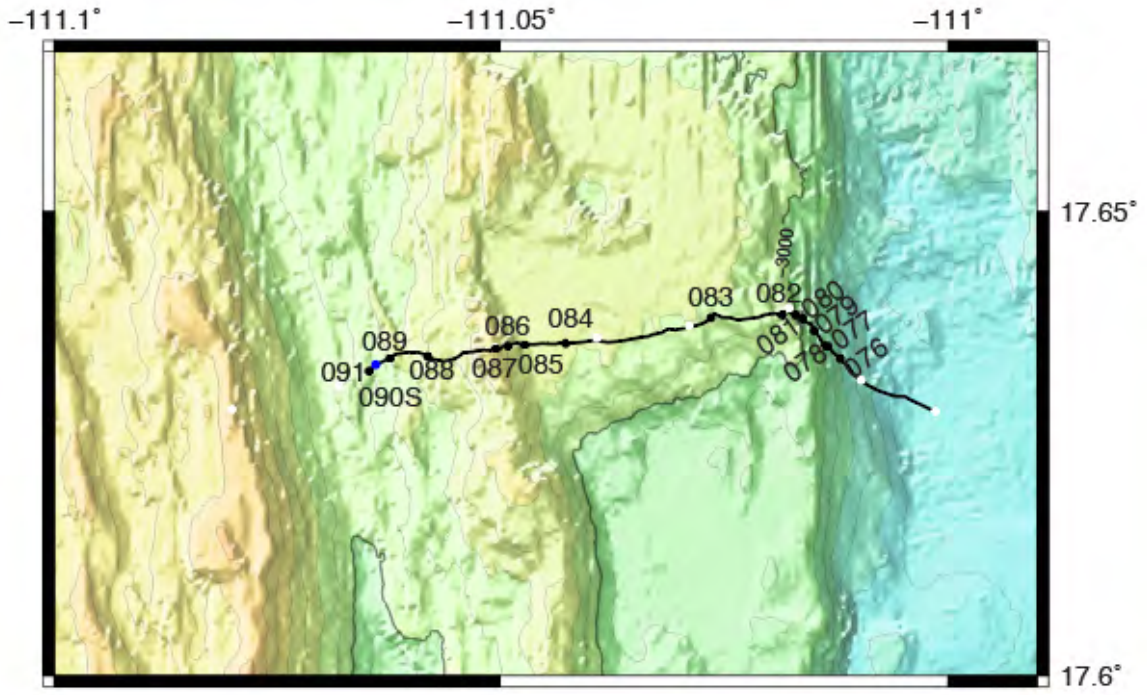
SEALOG SUMMARY:
Date: 2024-04-011--2024-04-012, times in UTC
18:34:49.550- Jason in water. Saw shark (in cable cam), fish, shrimps, jellies, siphonophore.
20:54:04.233- On bottom. waypoint 1. Saw fishes, cucumbers, polychaete worms, shrimps, jelly, corals, ctenophores, acorn worm, xenos, sea anemones, acorn worm circle in sediment, white debris in sediment.

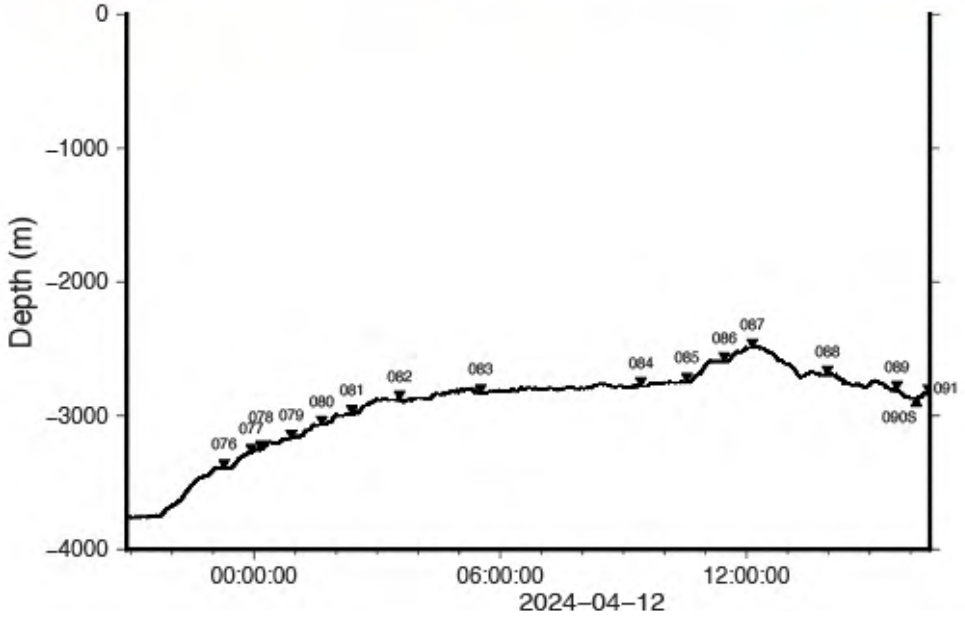
22:13:38.476- rocks sparse, mostly sediment. Saw sponge, shrimps, xenos, cucumbers, ctenophores, corals, fishes, polychaete worm, sea anemone, jelly, sea urchin, orange orb with legs, ,narrow talus trail within mostly sediment. White patches in sediment.
22:29:51.080- waypoint 2.
22:47:19.957- small rock patch. Saw coral, fish, jellies, cucumber, shrimps, brittle star, crinoid with snake star associate, track in sediment from an organism. entered area with higher abundance of rock within the sediment. Saw Shrimps, Cucumber, sea spider, fish, Sea urchin, coral whip, stalked sponge, brittle star, polychaete worm.
23:16:19.018-took sample 076, ~15cm block of talus/ rock not in place with ROV grab. went back and forth through areas with higher abundance of talus and high levels of sediment. Saw corals, Crinoids, Shrimps, sea pig, sea spider, brittle stars, coryphaenoides, polychaete worm, Sea anemones (one retracted its tentacles).
23:56:10.140-took sample 077, ~20+cm block of talus/rock not in place, sediment cover; FeMn coating with ROV grab. steep talus slope, abundant rocks, in pace rocks/pillows on steep slope. Saw Sponge, Crinoid, Coral, brittle star.
00:10:11.164- took sample 078, pillow sample from pillow mound on steep slope; moderate sediment cover with ROV grab. pillow ridges alternating with talus. thick pillows, nice cooling structures. Saw Sponges, Jellies, Shrimp, Cucumbers, brittle stars, venus fly trap anemone, ctenophore, Sea star with 11 legs, brisingid. went laterally across cliff, there was a valley. hard line between rocks (talus) and sediment. slope with sediment and talus.
00:54:44.567-took sample 079, ~10cm x 30cm block of talus/ rock not in place with ROV grab. Saw Crinoid, Cucumbers, crown jelly. Some patches of sediment within talus slopes. Saw Shrimps, brittle stars, coral whip, acorn worms, polychaete worm, stalked sponge. some large in place pillows within sediment and talus. pillow cliff. went from sedimented valley structure to large pieces of pillow. smaller valley of sediment, into area with smaller pieces of rocks.
01:39:12.692-took sample 080, ~10 x 20cm, round piece of rock, FeMn crust with ROV grab. large pieces of broken pillows. Saw squat lobsters, brittle stars, Cucumber, Fish, dying crinoid, Sponges. bottom of massive wall.
01:56:46.674- lost USBL, moving laterally. Saw stalked crinoids, coral whips, snake star on something dead, Sponge, brittle star, sea spider.
02:23:19.238-took sample 081, ~10cm block of rock broken off, FeMn coated with ROV grab. Went up pillow wall. Saw long coral whip, brittle stars, squat lobsters, Crinoids, stalked sponges, Cucumbers, massive piece of lava, sponges, fish, Sea star, field of broken pillows and sediment.
02:59:17.686- waypoint 3. top of slope more crusty broken pillows; some intact and less sediment. Saw sponges, sea stars, shrimp, flat pillows, squat lobster, brittle stars.
03:32:45.594-took sample 082, crusted pillow piece, ~20x15cm, was hard to get with ROV grab. hummocky broken pillow pieces, varying in sizes. sediment cover. transition from sediment to broken pillows and bud tube area. Saw corals, Sea stars, stalked crinoids, stalked sponge, cucumbers, sea anemone. larger intact botryoidal pillow flows; some fresher with striation textures.

03:57:35.805- was still in area of broken pillow lavas with small breakthrough buds. Saw glass sponge, bamboo coral, stalked sponge, stalked crinoid, sea star, sponge, crinoid.
04:04:09.232- transition from larger broken pillows into high sediment cover on flat pillows. Saw Sea urchins, broken pillow and occasional big pillow ball on sediment, cucumbers, sponge, sea star, stalked sponge.
04:12:45.938- entered area of a higher sediment cover (almost 100%). Saw sea urchin.
04:17:36.486- transition from sediments to talus breccia. Saw crinoids, sea anemone, cucumbers, shrimp, sea star.
04:40:36.633- transition from flat pillows to broken talus. Saw sponges, worm, sea stars, cucumber, jellies, fish.
04:50:10.802- transition into pillows as we go up slope and then back to talus. Saw cucumbers, sea stars, shrimps, jelly, fishes, crinoids, sponge, sea urchin. transition into more intact and larger pillow pieces. layered flow and broken tubes. transitioned into talus and smaller broken pillows. flow outcrop, tube faces, textured pillows. smaller chunks of broken pillows can still see textures on faces.
05:18:15.686- outcrop wall of pillows. talus outcrop on slope. Saw cucumber, jelly, sea star.
05:31:28.521-took sample 083, Bud of pillow lava flow, about 300 m to the east of way point 4, with ROV grab. outcrop of tube pillow lavas covered in break out buds. Saw sponge, cucumbers, sea stars, sea spider, jellies. transition back to sediment and sporadic bulbous pillow outcrops.
05:42:24.144- outcrop of various sized tubes with break out buds and vomiting lava tubes. Saw jellies, sponges, cucumbers, fishes, occasional blocks of pillows among sediment cover, block rounded thing in the sediment (cucumber?), crinoid, large pillows in sediment, still with breakout buds and fractured,
06:17:49.059- waypoint 4. in place but broken pillows with less sediment. Saw sea stars, sponges.
06:36:16.371- large pillows with sediment cover. Saw sponges, crinoids, sea stars, coral, polychaete worm, fish, brittle stars, ctenophore, sea anemones, cucumbers, shrimps, jelly.
07:28:42.228- still sparse pillows, mostly sediment. Saw cucumbers, sea stars, crinoids, jellies, corals, worms, shrimp, squat lobster, sea anemones, sponges, fishes, copepod,
08:45:50.866- waypoint 5. Saw xenos, shrimps, copepod, cucumbers, sponge, worm, fish, a few pillows.
09:25:37.042-took sample 084, pillow surface fragment with ROV grab. Pillows (sparse with lots of sediment). Saw cucumbers, shrimps, sea stars, sea anemones, dumbo octopus, fishes, jelly, crinoid, sponge, sparse pillows (mostly sediment), pillows & blocks (abundant, less sediment than previous). Lots of pillows, sparse sediment.
10:32:38.692-took sample 085, pillow fragment from large, dense coverage pillow outcrop, covered with bacteria with ROV grab. Saw sea stars, sponges, fish, crinoids, shrimps, cucumber.
10:52:47.172- went up steep pillow ridges. Saw fish, shrimps, sponges, sea star, squat lobster.

11:27:41.478-took sample 086, ~20cm block broken off piece, FeMn coat, sedimented with ROV grab. went up ridge with pillows. Saw crinoids, sea stars, corals, sponges, cucumber, squat lobster.
12:00:39.705- waypoint 6. Saw Cucumber, brittle star.
12:08:35.793-took sample 087, ~12 x 40cm block broken, FeMn crust with ROV grab. Saw brittle stars. slope not as steep, on top of ridge. Went backwards down ridge. more sediment with few larger pieces of rock. Saw sea stars, sponges, corals, cucumbers, shrimps, fishes, went down talus slope. saw crinoids, sea anemone, sea urchin, coral whips, stalked sponges, stalked crinoid with snake star associates. continued up talus slope.
13:41:08.285- moved down from talus slope to highly sedimented area. Saw fish, sponges, cucumber, crinoid.
13:58:21.165-took sample 088, ~10x30cm block, rock appears to not be in place with ROV grab. Saw squat lobsters, polychaete worm, fish, cucumber, sponges.
14:15:59.967- went down talus slope. Saw sea stars, crinoids, cucumbers, sea anemones, big blocks of pillow lava, sea anemones, polychaete worm, sponges, sediment with nuggets. headed back up slope; transition from sediment to rounded talus.
15:08:49.394- waypoint 7. Saw sea stars, cucumber, crinoids, dead sponge, black flat shoe. pillow wall with breakout buds; bubble texture. small pillow blocks. possible FeMn pavement and crusted pillows.
15:39:46.256-took sample 089, crusted talus piece, ~30cm with ROV grab. FeMn crusted pillows. Saw corals, crinoids, sponges, sea stars, sea anemones, fish, sea urchin, cucumbers, FeMn nuggets and sediment.
16:08:13.595-took sample 090, scoop of FeMn nodules and sediment, with scoop. round crusted pillow pieces in sediment. Saw sea stars, cucumber, crinoid.
16:25:59.786-took sample 091, ~20cm piece of crusted pillow with ROV grab. Saw squat lobster, cucumber.
16:28:47.645- Off bottom.

Sample and Terrain Maps





Sample Photographs
Dive: J2-1567

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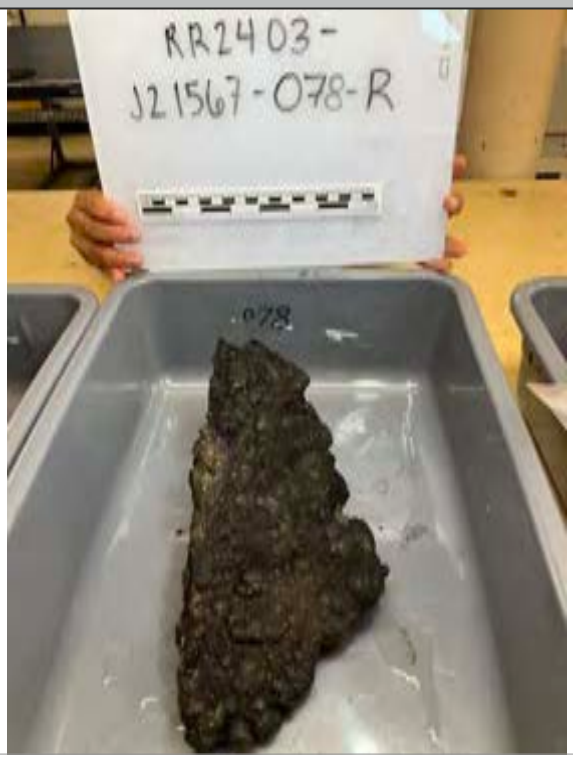

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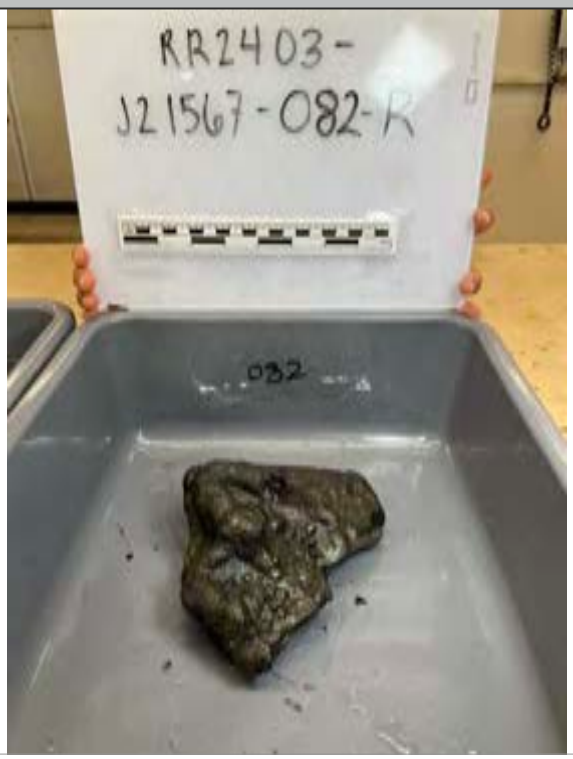

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RR2403-J21567-086R IGSN: 10.58052/URI00039U

RR2403-J21567-087R IGSN: 10.58052/URI00039V

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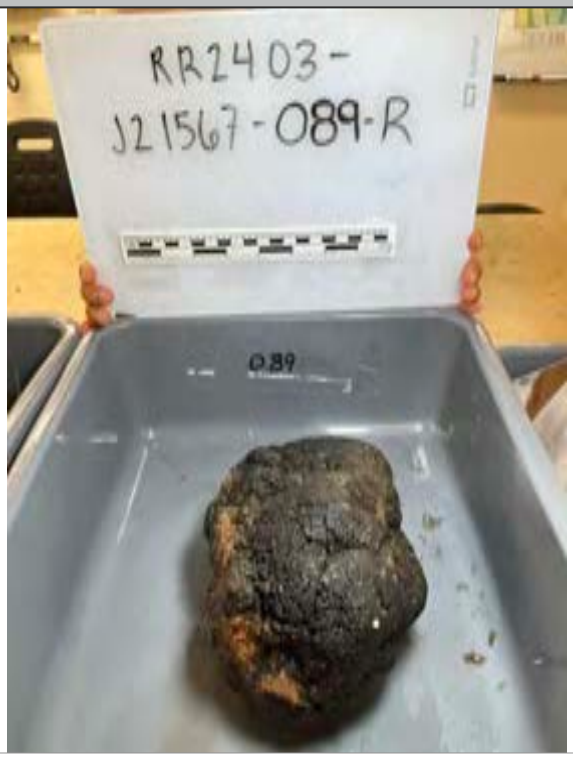


RR2403-J21567-090S IGSN: 10.58052/URI00039Y

RR2403-J21567-091R IGSN: 10.58052/URI00039Z

Dive J21568 Summary Report
Date: 4/13/24 to 4/14/24
Site Description: Paleo Ridge Axis, Mathematician Ridge
Physiographic Feature: Spreading center
Physiographic Feature Name: Mathematician Ridge

Launch Location:	17.73864°N, 110.95308°W
Launch Depth:	2619 m
In Water:	2024-04-12T23:14:48.585Z
On Bottom:	2024-04-13T01:03:08.745Z
Off Bottom:	2024-04-13T23:48:42.443Z
On Deck:	

Dive Map:

WATCH END SUMMARIES:

4-8: Submersion of Jason occurred at 15.15 PM (local) and bottom was reached at 17.56 PM at a depth of 2539 m near wp1 from which traverse initiated in direction NNW. Not far from wp1 sample No.92 was taken at 2531 m from a pillow lava. As the slope became steeper, less whitish sediment was observed between pillow lava lobes (sample 93, 2502 m). Later part was dominated by views of a solid wall of pillow lavas. 930 m before wp2, the watch was handed over.

8-12: We began watch to the north of wpt 1 near the base of a pillar of pillows, which we decided not to summit to make progress northward along the axial transect. First couple of hours were spent transiting up and down hills of pillows with modest exposure at the summits and extensive talus and spans of sediment between hills. The morphology of pillows changed to hackly or jumbled sheet flows where we took sample #95 about 100 m north of wpt 2. Extensive exposure of jumbled sheet flow mounds along the base of the "volcano-like" feature identified by wpt 3 changed to beautiful sheet flows at the southern edge of the top of the feature (sample #96) at the end of watch.

12-4: We began watch 400 m S of wpt 3 on top of a feature full of nice, glassy sheet flows that transitioned to pillows shortly after. Sample #97 was taken at 7:39 from a pillow at wpt. 3 and it looks gassy. Morphology then changed to a talus slope that transitioned into a 30 m tall pillow wall (8:14 end). Along this wall, we observed abundant life including large sponges, corals, and crinoids. Sample #98 was taken at 8:38 480 m N of wpt 3 from a pillow tube at the very top of the 30 m wall. Sample 100 was taken at 10:43 off a pillow 295 m S of wpt 4, where we ended watch.

4-8: Picked up watch at 2496 m depth before wp4 (small summit along ridge). Observed nice pillow lavas with whitish sediment between lobes. Sample 101 was broken off from a pillow lava crust (presumably glassy) at 2474 m. From wp4 onward, first talus deposits (subangular to subrounded gravel and blocks of pillow-lava, clast-supported with interstices filled with whitish sediment) were observable. Then a steep pillow-lava wall (sample 102) was followed by less steep terrain with nice lava lobes (sample 103 at 2563 m). Finally, sample 104 was obtained from pillow at 2590 m. Sponges, brittle star, sea urchins, etc., similar to previous dives.

8-12: Our watch began about 800m south of wpt 5, which quickly transitioned to talus ramp. Again, we spent a good portion of the early watch transiting over small pillow hills with talus and sediments along the edges. Nothing too remarkable during the dive with only 2 samples. We finished the dive about 800 m south of wpt 6.

12-4: Watch started in a pile of talus 750 m S of wpt 6. For a long time, talus slopes alternated with sparse pillow flows. At 20:37 we saw another large dumbo octopus but didn't get any good footage because it went right under the vehicle. Sample #107 was taken at 21:27 700 m N of wpt 6 from a pillow feature in an otherwise heavily sedimented field. An issue with navigation stalled us for a little while the Jason team troubleshot it. Problem solved ~21:57. Sample #108 was taken at 22:00 1036 m S of wpt 7 from a pillow. We then deviated slightly from the path and started uo a ridg E of wpt 7 instead of going straight there through a small valley which I infer to be heavily sedimented.

4-8: Picked up watch between wp6 and wp7 at a pillow-lava flow field. Made several efforts to collect a sample and finally succeeded. Sample 109 was a small knob (glassy interior) that we broke off from a larger pillow at 2499 m depth, ca 760 m from wp7. At 16.45, Jason's ascent to the surface initiated.

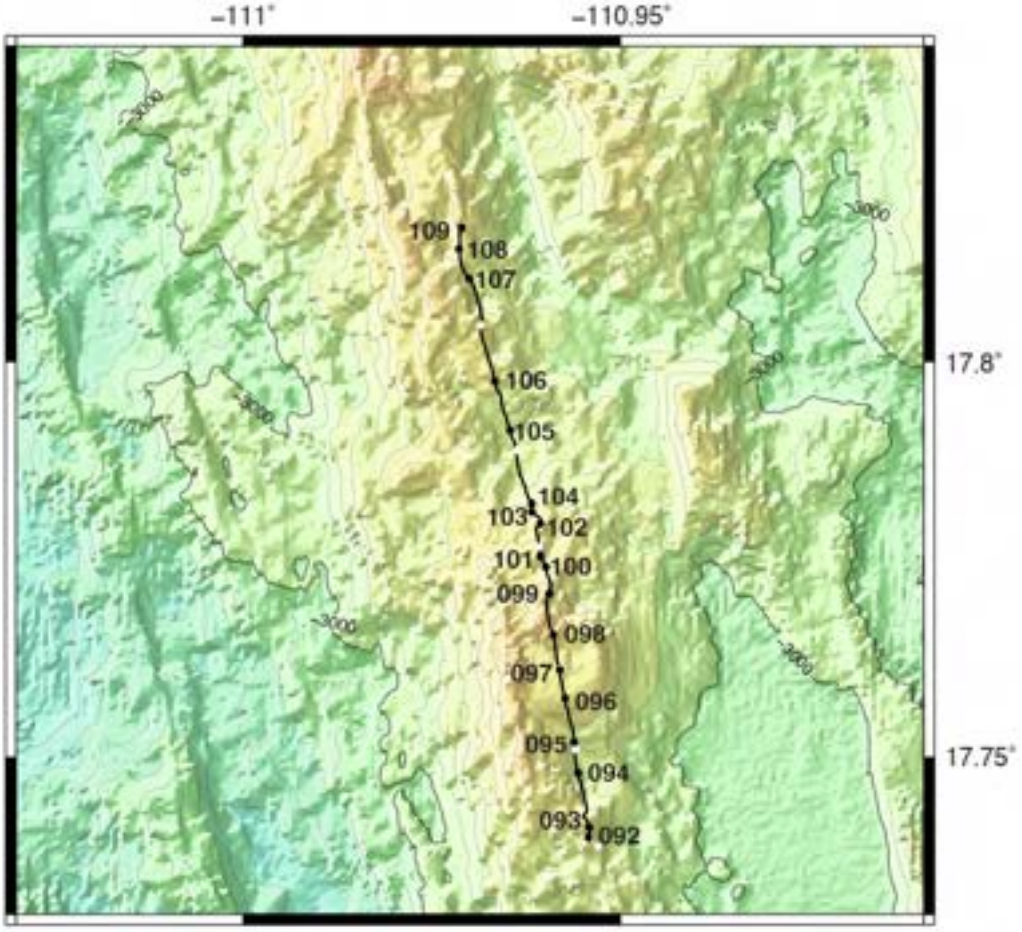
SEALOG SUMMARY

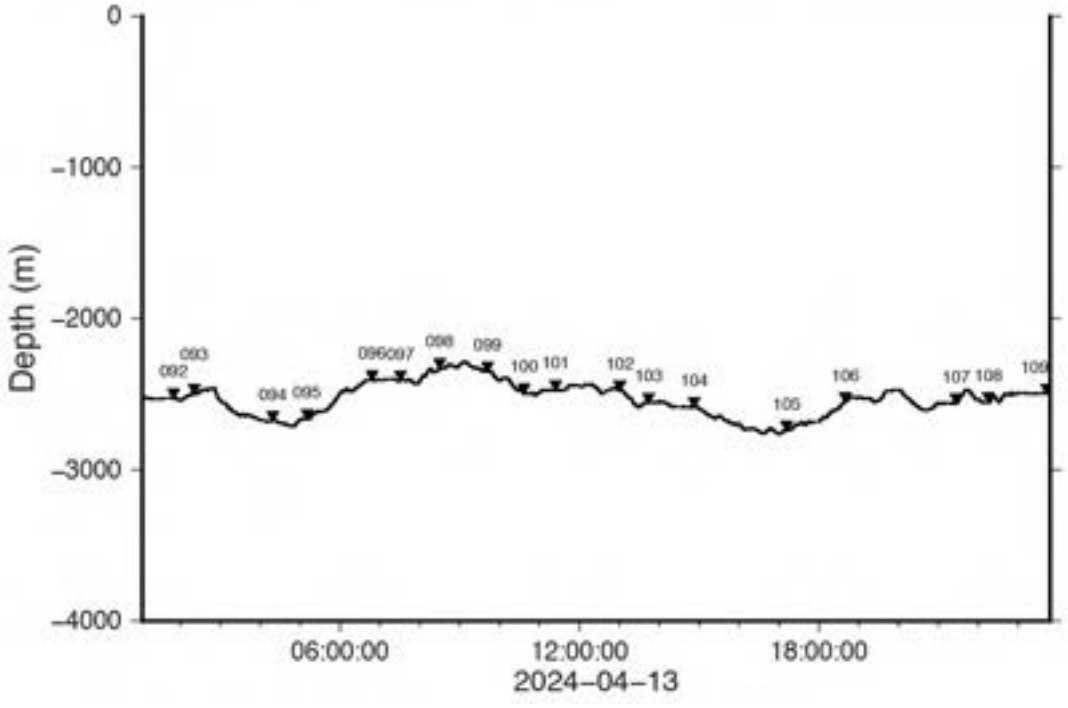
Date: 2024-04-012--2024-04-013, times in UTC
23:14:48.585- Jason in water. Saw unidentified gelatinous organism, ctenophores, Cucumber, Shrimp, Shrimp, crown jelly.
01:03:08.745- On bottom. Waypoint 1. pillow tubes on bottom. Saw sponges, coral whips, coral with snake star associates, Crinoids, Cucumbers, Sea stars, stalk crinoid with snake star associates.
01:49:53.377- took sample 092, ~15cm x 40cm fragment of pillow, FeMn crust with ROV grab. Saw coral whips, sponges (some dead), brittle stars, cucumbers, dead stalk of something, crinoids, squat lobsters, Sea anemones, ridge with in place pillows, some talus on ridge,
02:20:58.479-took sample 093, ~10x15cm block of talus/rock not in place with ROV grab. Saw sponges, cucumbers, sea anemones, mushroom corals, coral whips, corals, stalk of something with snake star associates, squat lobster, dead sponge,
02:45:08.460-large pillow wall. Saw dead sponges, sponges, cucumbers, talus slope, stalked sponges, sea stars, fishes, coral, squat lobsters, UFO looking jelly, dumbo octopus, talus, crinoid shrub, intact pillows.
04:18:56.417-took sample 094, crusted in place pillow, ~30 cm, with ROV grab. tube pillow flows with break out buds. smaller bulbous pillow pieces; still with breakout buds. transition from pillow pieces to sediment. possible bio interaction leaving depressions in sediment. Saw cucumbers, sea urchin, sea stars, sponges, squat lobster, jelly. pillow wall. talus and sediment up slope. different, hackley textured lava flow.
05:10:29.332-took sample 095, 10x20cm hackle-y pillow piece, 100 meters past point 2, with ROV grab.
05:11:58.367-Waypoint 2. pillow wall, sediment, and talus as we traverse down slope. flat very steep flow wall. Saw cucumber. Lobate lava flow on top of a jumbled lava flow, Sheet flows covered by a thin sediment layer. Saw glass sponges, sea anemone, sea stars, corals, sea urchin, crinoids, large glass sponge; shrimp inside, FeMn crusted talus and sediment, unidentified possibly dead animal (fish like), pleurobranch.
06:12:20.858- gradual downslope of broken pillows and sediments. Saw sponges, Cucumbers, cardboard box, sea star, shrimps, crinoids.
06:48:14.434- took sample 096, 3 smaller pieces, sheet flow, fragile, with ROV grab. Saw cucumbers, sea stars, sponges, crinoids, shrimp, sea anemone, corals.
07:13:18.985- part sheet flow, part distinct pillows w/ lots of sediment. Saw sponges, sea stars, sea anemones, corals, crinoids, shrimp.
07:30:54.680- took sample 097, pillow piece, with ROV grab. Saw pillows.
07:40:11.444-Waypoint 3. Saw corals, sponges, cucumbers, shrimps, sea stars, sea anemone, crinoid.
08:00:47.245-pillows and tubes.

08:30:07.415- took sample 098, pillow surface pieces (2) with ROV grab. Saw sponges, cucumbers, sea stars, corals, fishes, sea anemones, crinoids, shrimps, jelly.
09:42:07.161- took sample 099, pillow fragment, with ROV grab. Saw sea urchin, crinoids, sponges, sea stars, fishes, shrimps, corals, sea anemone, cucumber.
10:36:43.064- took sample 100, pillow fragment, with ROV grab. Saw sea anemones, squat lobster, brittle stars, sponges, coral whip snake star associate, cucumber.
10:54:49.556- there was a line of sediment with nodules and then a slope of talus and pillows. Saw sponges.
10:58:39.976- pillow tubes. Saw sponges cucumbers, sea anemone, shrimps.
11:24:12.381- took sample 101, broken pieces of pillow-large piece and smaller pieces, with ROV grab. Saw cucumber.
11:40:51.093- pillow tubes up ridge. Saw fish, crinoids, cucumbers, sponges, sea stars, squat lobster, corals.
12:20:52.535-pillows with some sediment in between. Saw sponges, dead sponge.
12:19:37.104-Waypoint 4. edge of ridge, steep drop off. Saw brittle stars, squat lobster, a lot of sponges (some with brittle star associates) on steep wall.
12:26:59.850-transitioned from pillow wall to talus slope. Saw cucumbers, sponges, corals, sea star, fish, crinoid. large pillow flow wall.
13:00:47.226- took sample 102, ~10cm block of talus/ rock not in place, with ROV grab. Saw squat lobster, sponges (some dead), brittle stars, dead stalk of something, sponges with brittle star associates, corals, mushroom coral,
13:11:22.085-transitioned from pillow wall to talus slope. Saw cucumbers.
13:29:28.106-bottom of talus slope transitioned into highly sedimented area. some pillows visible, but mostly nodules. pillows visible at sediment interface. Saw cucumbers, squat lobster, shrimp, coral.
13:43:55.491- took sample 103, broken off piece of rock, ~10cm block; may or may not have been in place, with ROV grab. Saw sponge, crinoid, coral.
14:03:51.400-talus slope. pillows at bottom of slope, flew laterally across. Saw sea stars.
14:20:42.308-large pillows. Saw crinoids, squat lobsters, sponge, coral, shrimps.
14:52:41.995- took sample 104, large block of broken pillow more than 20cm, mud, FeMn crust, with ROV grab.
14:59:03.386-broken pillow slope. Saw sea stars, squat lobster, cucumber, coral.
15:23:59.314-transition from talus to sediment. sediment to tubular pillows; breakout buds. Saw sponges, cucumbers, fish, sea stars, sea spider.
15:49:41.475-broken sediment covered pillows. Saw cucumbers, sea stars, sponge, shrimps, sea urchin, larger pieces of broken lavas; break out buds, fish.
16:29:40.539-Waypoint 5. Saw fish, sea urchin, sea star.
16:37:52.917-transition from sediments to talus. Saw fish. knobby broken pillow cover; up slope. Saw sea stars, sponges, crinoid.
16:57:18.968-transition from talus to sediment with small nuggets. small knobby broken pillow pieces. Saw sponges, cucumbers, sea stars, sea urchin, coral, sea urchin. larger fractured pillows; up slope.

17:11:38.627- took sample 105, crusted pillow piece taken from outcrop, 15cm long, with ROV grab. Saw cucumbers, sponges, rounded pillow pieces, corals, shrimp, sea urchin, sea anemone.
7:43:56.965-flattened pillow flows transitioned into broken pillow pieces. Saw sea star, sea anemone, cucumber.
18:00:23.928-small rounded broken pillows. Saw sea star, coral, fish, sponge.
18:04:18.311-transition from rounded pillows to angular talus. Saw sea anemone, sea urchin, cucumbers, fish, sediment, talus, corals, sponges, crinoid.
18:22:34.141-transition into sedimented area.
18:22:52.474-back to talus. Saw cucumbers, sponges, sea stars, corals. flat lava flows, talus on top. flat and in place pillows.
18:39:54.144- took sample 106, crusted pillow, ~15 cm, 800 m south from way point 6, with ROV grab. Saw unidentified stalked venus fly trap looking animal, corals, crinoids, sponges, cucumbers, sea stars, worm, xenos.
19:09:30.296-pillows, abundant sediment. Saw sponges, corals, sea stars.
19:24:44.203-sparse pillows, abundant sediment.
19:26:54.96- pillows becoming more abundant. Saw sea stars, sponges, brittle stars, sponges, crinoids, corals, fishes, sea anemones, cucumber, shrimps, worm, pillows, talus.
20:36:21.793- Saw dumbo octopus, shrimps, sponges, sea stars, corals, crinoids, fish.
20:54:00.006-talus w/ some pillows and sediment. Saw sponges, cucumber, sea stars, shrimps, fish, squat lobsters, coral, sea anemone, crinoid.
21:26:24.054- took sample 107, small pillow piece, loose on surface of pillow lobes with ROV grab. Saw corals, sea stars, crinoids, shrimps, sponges, fishes, cucumbers, sea urchins.
22:14:50.67- took sample 108, pillow chunk, with ROV grab. Saw Sea anemone, Sea stars, Sponge.
22:19:05.934- Talus w/ pillows & tubes intact. Saw sea stars, cucumbers, corals.
23:42:30.437- took sample 109, ~10cmx20cm broken off piece of pillow, with ROV grab. Saw squat lobsters, Shrimps, Sponges, Sea stars, corals, cucumbers, fish.
23:48:42.443- Off bottom. Saw long orange fish, ctenophores, fish, gelatinous organism, shrimps.

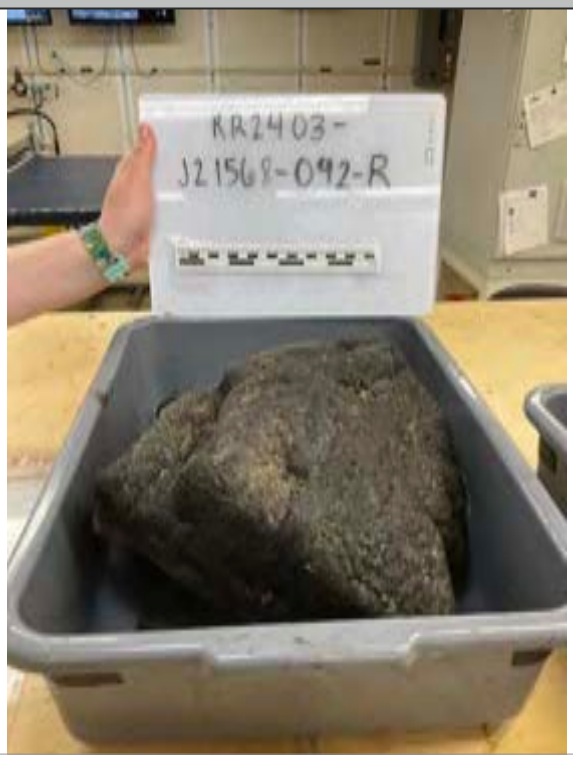
Sample and Terrain Maps





Sample Photographs
Dive: J2-1568

RR2403-J21568-092R IGSN: 10.58052/URI0003A0



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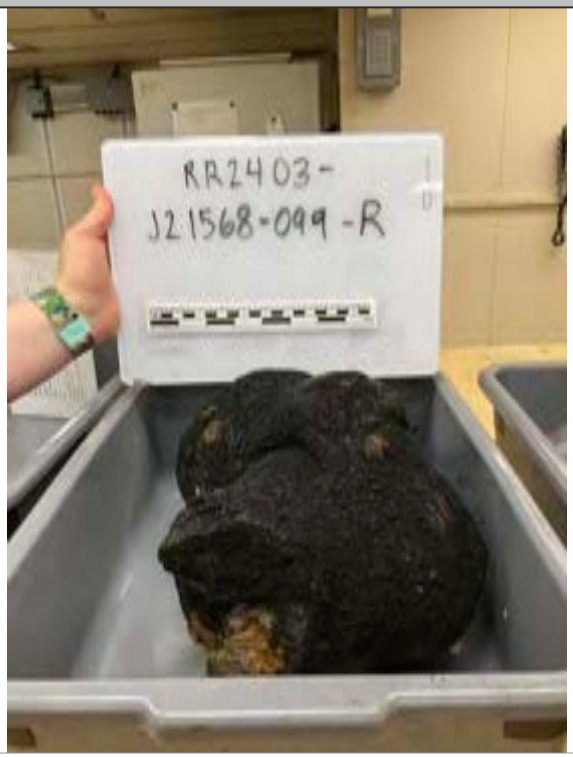

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RR2403-J21568-104R IGSN: 10.58052/URI0003AC

RR2403-J21568-105R IGSN: 10.58052/URI0003AD

RR2403-J21568-106R IGSN: 10.58052/URI0003AE

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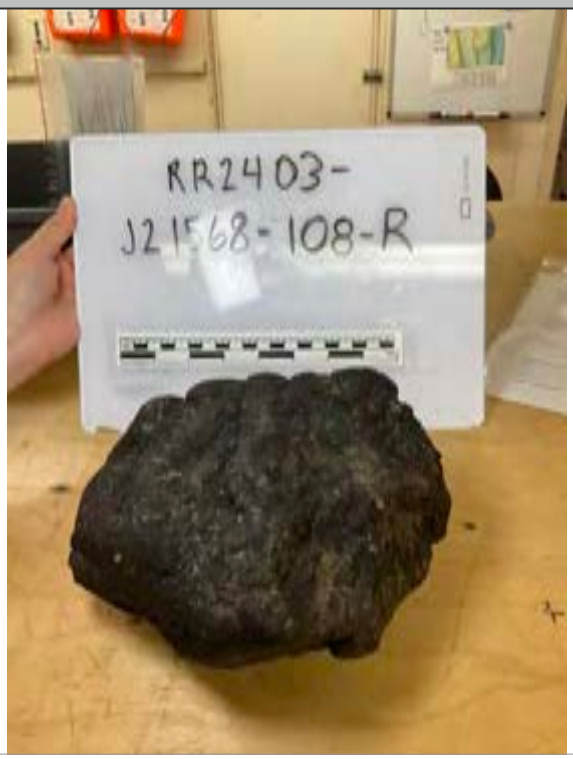
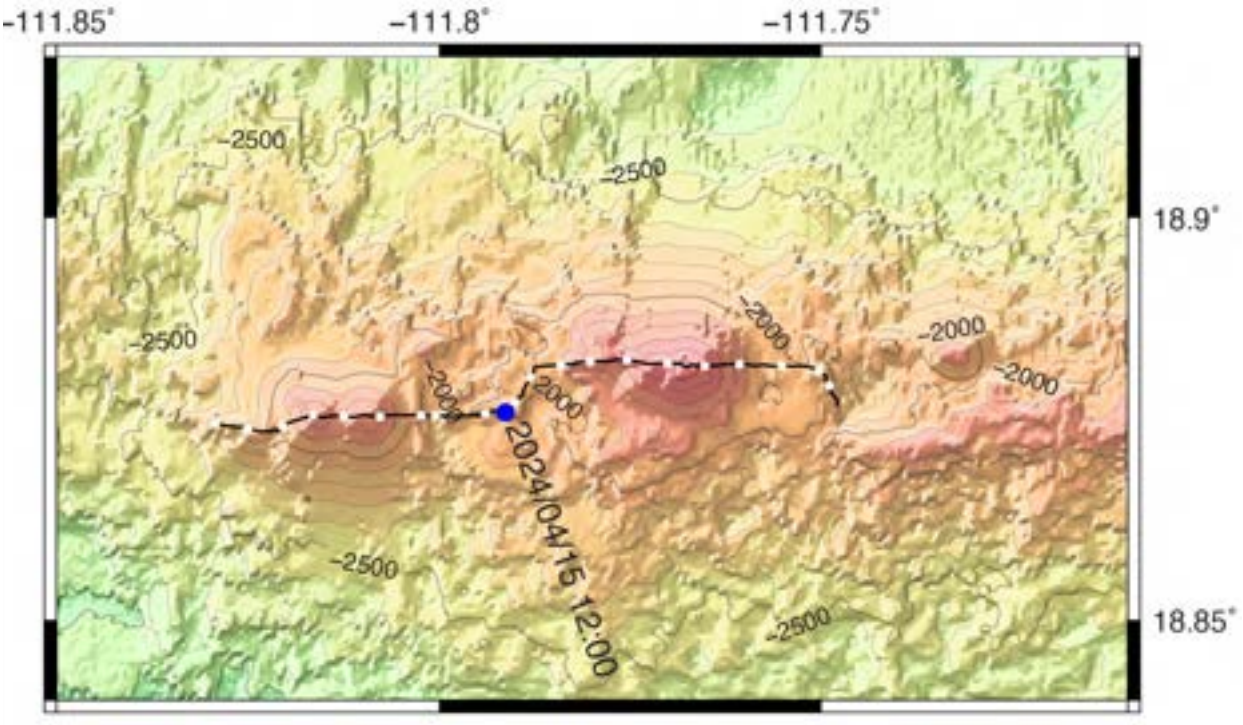
	

RR2403-J21568-109R IGSN: 10.58052/URI0003AH	
	

Dive J21569 Summary Report
Date: 4/14/24 to 4/15/24
Site Description: E-W trending seamount, SSE of Roca Partida Island
Physiographic Feature: Seamount or seamount province
Physiographic Feature Name: Unnamed

Launch Location:	18.87418°N, 111.82953°W
Launch Depth:	2163 m
In Water:	2024-04-15T01:13:26.099Z
On Bottom:	2024-04-15T02:47:49.197Z
Off Bottom:	2024-04-16T00:00:26.597Z
On Deck:	2024-04-16T01:22:59.100Z

Dive Map:



WATCH END SUMMARIES:
4-8: Submersion of Jason occurred at 18.15 PM (local) and bottom was reached at 19.40 PM at a depth of 2138 m near wp1. Not far, sample No. 110 was taken from a pillow lava (glassy crust of hollow pillow).
8-12: We began our watch east of wpt 1 on a narrow ridge or "tail" trending E-W from the western edge of the double-peaked cones. A sheet flow sample was taken and the remainder of the tail up to wpt 2 was composed of broken medium-sized pillows, tubes, and an occasional sheet flow. The seafloor transitioned to broken pillow talus as we began the upslope track toward wpt 3. On the way to wpt 3 we observed an odd layer of "pavement" covering the sediment. A sample was taken and may likely be the remnants

of a pyroclastic flow. This pavement was observed over extensive portions of the dive track. Mostly talus on the way to the top of wpt 3 where we took a sample of broken pillows.
12-4: We began our watch 430 m west of wpt 4 surrounded by beautiful pillows with lots of visible texture on the outer layer, making me think there was little Fe-Mn crust (this assumption was proved wrong upon sample recovery). These pillows quickly transitioned into broken pillow talus as we ascended to wpt 4. Sample #114 was taken at 7:41 upon reaching wpt 4. In this area, the surface looks rubbly, consisting of a lot of pillow breccia. Liz believes some of the larger boulders could be glutonate bombs. Sample #115 was collected at 8:00 160 m E of wpt. 4 from a large, in-place pillow downslope between wpts 4 and 5. As we continued downslope, the landscape was dominated by sheet flows with black particles, possibly scoria. We bumped Jason into the bottom to see if it was scoopable, and it was solid. We sampled (#116) a piece of the broken sheet flow at 8:49 from the top of a pillow wall. Sample #117 was taken at 8:56 from a pillow amidst all the sheet flows just before wpt 5. It seems as though the landscape was made of a few step-like terraces of pillows (steep) and broken sheet flows on top (flat). Sample #118 was collected at 9:44 from the rim of a pillow 95 m E of wpt 5 near the low point between peaks. We ended watch between wpts 5 and 6 as Jason started to climb up the ridge.
4-8: Picked up watch at 2041 m depth between wp5 and wp6 and continued climbing ridge in direction E. Stretch of talus consisting of subangular gravel and blocks was followed by patches of coherent young pillow lavas from which sample No. 119 (pillow crust, presumably glassy, 382 m from wp6) was obtained.
Again, talus deposits were followed by a stretch of lava flows (sample No. 120=crust of pillow,1965 m depth, 40 m from wp6).
At wp6 the direction of navigation changed toward the NE and the next sample (No.121) consisted of a pillow fragment from a talus that included coarse ash and lapilli.
Area of sloping terrain (maybe 10-20 deg.), consisting of layers of bedded sediment. Friable lapilli layer (several dm-thick) was topped by hard layer (5-10 cm-tick) forming a “pavement”. Took sample No. 122 from the hard layer (cemented tuff layer?).
Then, we observed a section of talus-scree consisting of blocks (sample No.123, 253 m from wp7, at depth of 1937 m); more whitish ooze covering thin hardened tuff and interspersed pillow lavas was observable, when the terrain became flatter.
At wp7 we changed the direction of navigation from NE to E and traversed a pillow lava flow field, where sample No. 124 (crust of pillow) was taken at a depth of 1932 m, and still 842 m before reaching wp8.
8-12: We began our dive at wpt 7 and started heading up a small ridge on the way to the peak of Pythagoras seamount. Mostly broken pillows with “tree root” looking lava tubes and occasional flows (note similar to tail/ridge between wpts 1 & 2. The small peak on the west flank was mostly pillow cross-sections near the top with relatively little talus. More pavement was observed an top of this peak. We took a sediment core in a small crater and sampled the summit at wypt 9 in a region with little signs of pillows and very knobby, broken rocks.

12-4: We began watch a little ways past wpt 9. Sample #128 was taken 350 m E of wpt 9 from a group of pillow lavas. Right after sampling, we descended into a talus slope that then transitioned to pavement ~ 19:35. The flat region between wpts. 9 and 10 was heavily sedimented. Sample #129 was taken at 20:48 and is a large chunk of pillow from ~ 634 m W of wpt 4 and is likely glassy. Sample #130 was taken at 22:29 at wpt 10 from a pillow lava.
4-8: At 1919 m depth we passed wp10, area consisting of "nice" pillow lavas, this landscape continued until 17.00 (time of initiation of ascent from depth of 2060 m).

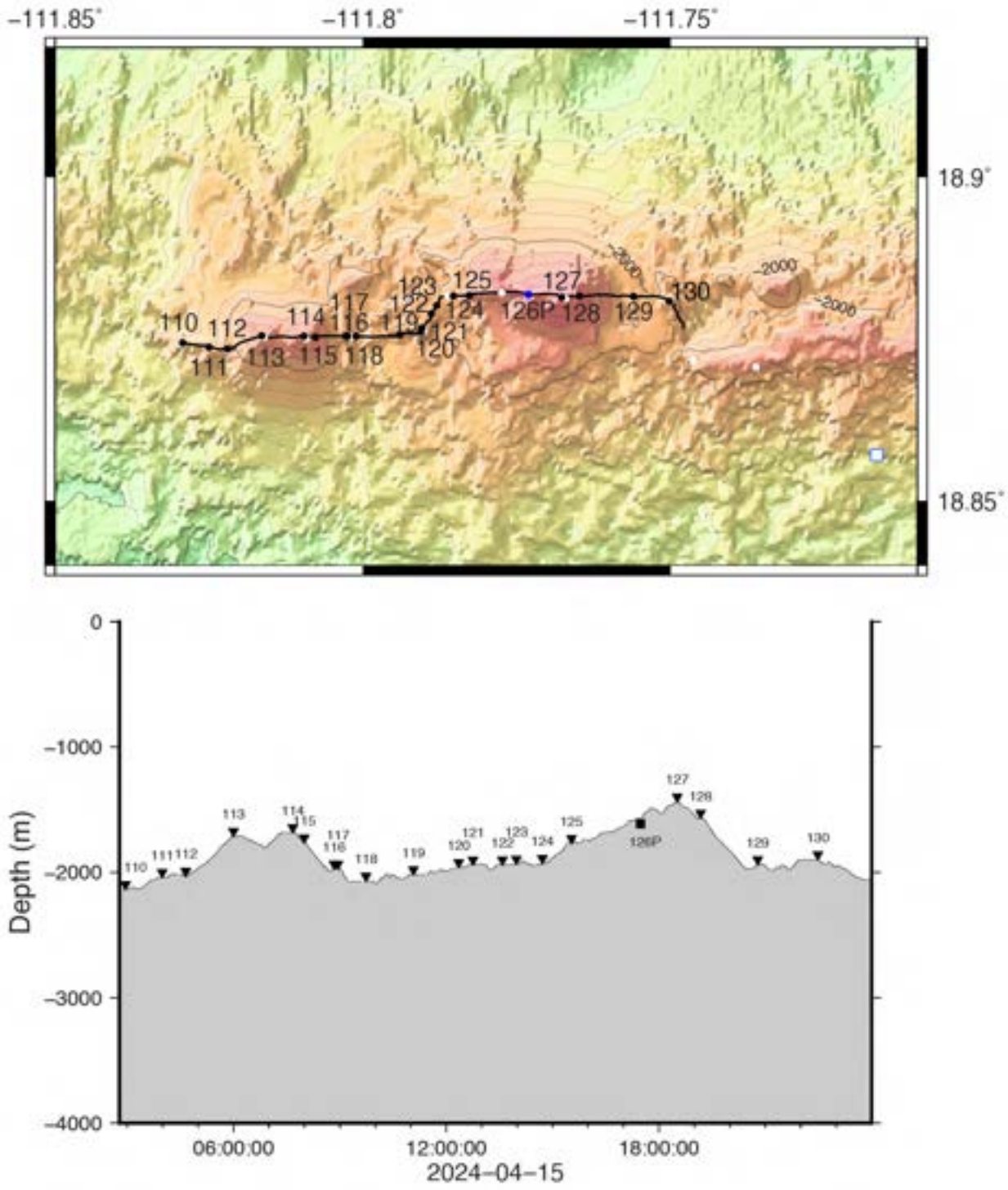
SEALOG SUMMARY:
Date: 2024-04-015--2024-04-016, times in UTC
01:13:26.099- Jason in water. Saw ctenophores.
02:47:49.197- On bottom. Waypoint 1. in place pillow flows. Saw bamboo coral, sponge.
02:57:09.444-Took sample 110, Piece of lava sheet flow surface, Around 30cm with ROV grab. sheet flows, pillows, large broken pillow pieces., corals, crinoids, tunicates, cucumber, sponges.
03:11:16.211-tube lava flows. Saw sponge and corals.
03:28:00.349-larger pieces of broken pillows. Saw fish, sponge, corals, cucumber.
03:37:48.227-massive pillows layered.
03:40:44.235-outcrop of layered sheet flows; broken pillows; and intact large pillows. Saw crinoid, coral, barnacles, shrimp, cucumber, tunicates, sponge, bacterial mat.
03:54:32.739-large intact pillows. Saw corals, cucumber, s a star, large tube lava flows.
03:59:22.112- Took sample 111, Piece of lava surface ~40 cm, little wrinkly, 325 m to point 2, with ROV grab. Saw tunicates, sponge, fish, cucumber.
04:09:54.790-long tube lava flows. Saw jelly, sea anemone, corals, crinoid, lots of break out pillows (looks like tubes are vomiting lava), sponge, cucumber, fish.
04:24:28.465-pillow cliff and low topography; wavy and blocky pillow wall on down slope. Saw fish, sponge, sea urchin, coral, crinoid, pillow and talus wall.
04:34:59.356- Waypoint 2.
04:35:21.724-transition into volcanoclastic sediment.
04:39:20.505- Took sample 112, Pavement crust piece, ~20 cm long, thin, with ROV grab.
04:43:09.386-pillow wall.
4:47:25.935-back to weird unidentified flat pavement on top of sediment.
04:51:53.869-transition back into broken pillow slope. Saw cucumber and sponge.
04:59:26.289-pavement crust on top of sediment. Saw crustacean, lumpy pillows, sponge, broken pillow/ talus covering slope, cucumbers, large pillow chunks, corals, pavement, talus and larger broken pillows, small patch of pavement, stalked sponge.
05:26:52.235-pillow blocks. Saw corals, cucumbers, broken pillows among talus, sponge, broken pillows among talus, shrimp, fish, sea anemone, crinoid, broken pillows at top of summit.
05:59:57.819- Took sample 113, blocky pillow, ~20 cm, with ROV grab.

06:08:32.622- Waypoint 3. talus down slope. Saw corals, sponge, crinoid, cucumbers, sea anemone, fish, large bumpy pillow pieces, larger broken pillow blocks, tube pillows, sediment patch in talus.
06:56:39.204- Talus & lots of sediment; some whole pillows. Saw cucumber, corals, sea anemones, shrimps, crinoid, sea stars, fishes, siphonophore.
07:24:38.665- Waypoint 4. talus w/ large agglutinate boulders.
07:40:18.363- Took sample 114, 2 tiny pieces of large agglutinate boulder, with ROV grab. Saw sea stars, shrimps, corals.
07:59:48.498- Took sample 115, piece of large pillow/agglutinate block on talus slope, with ROV grab. Talus w/ some sheet flow like patches. Saw corals, fishes, cucumbers, sea stars, squat lobster, crinoid, sponges. Abundant sediment, some lava blocks. sheets of lava with a lot of sediment. Tephra.
08:50:08.382- Took sample 116, slab of very thin, broken up sheet flow, with ROV grab. Saw sponge growing on top of anemone, pillows.
08:56:15.224- Waypoint 5.
08:56:37.517- Took sample 117, pillow fragment, with ROV grab.
08:59:05.651- Sheet flows. Saw coral.
09:00:32.212- pillow mound on top of sheet flow.
09:02:39.245- abyss.
09:04:55.805- Pillows.
09:06:23.408- Talus w/ some pillows. Saw coral, cucumber, sea star, pillows and tubes, shrimp.
09:12:51.258- Sheet flows w/ abundant sediment. Saw tunicates, shrimps, crinoid, dead sponge, sea stars, shrimps.
09:44:14.810- Took sample 118, pillow surface fragment, with ROV grab.
09:56:19.199- Moved through abyss.
09:58:23.257-Pillows. Saw sea stars, fishes, cucumbers, sediment.
10:03:26.499-Pillows & tubes on steep slope. Saw fish, shrimps, sponges, corals, sea anemone, sea star, tunicates, sheet flows.
10:35:39.182-Talus. Saw corals, cucumbers, fish, sponges, shrimps, sea anemone.
10:48:59.612-Pillows. Saw cucumbers, corals, squat lobster.
11:04:28.881- Took sample 119, broken piece pieces of pillow, looks glassy; with ROV grab. Saw sponges, shrimps, tunicates, sea star, crinoids, cucumbers, coral, sea anemone, squat lobsters.
11:46:35.343- Talus. Saw shrimps, crinoid.
11:49:11.832- went into area with big pillows (in place). Saw sponge, shrimp, corals.
11:56:00.960- Talus. Saw cucumbers, corals, sponge, polychaete worm, squat lobster, fish, brittle stars, shrimps.
12:09:00.760- light and dark colored sediments. Saw cucumber.
12:09:40.860- large pillows (in place). Saw tunicates, cucumber.
12:20:59.548- Took sample 120, ~25cm chunk of rock (not in place) with ROV grab. Saw cucumbers, corals, shrimps, sponge, sea stars, polychaete worm, dead stalk of something. Waypoint 6.
12:45:23.152- Took sample 121, broken piece of pillow ~10cm, with ROV grab.

13:09:09.510- steep pillow wall. Saw coral, sponge, sea star.
13:15:25.985- dark colored sediment. Saw tunicates, coral with snake star associates, sea star.
13:17:53.914- massive pillow wall. Saw crinoid, shrimps, fish, sea star.
13:35:10.396- Took sample 122, ~30cm broken sheet flow piece with ROV grab. Saw sea stars, shrimp, fish.
13:43:51.265-light and dark colored sediment. Saw sea stars, shrimps, crinoid, cucumbers, sponge.
13:58:41.609- Took sample 123, ~25cm round piece of rock (flat) with botryoidal texture, with ROV grab. Saw coral with snake star associates, shrimps, cucumber, sea star.
14:05:11.476- large in place pillow flows with some breccia. Saw crinoid, corals, shrimps, sponge, sea star, fshes.
14:26:39.862- Sediment.
14:30:22.222- Sheet flows. Saw sponge, sea star.
14:32:29.842- sediment and then large in place pillows. Saw cucumber, sponge.
14:36:28.569- Waypoint 7. Saw shrimp, cucumber. sediment (light and dark), little rocks.
14:39:46.793- pillow flows visible up a slope. Saw cucumbers, shrimps, corals.
14:42:39.177- Took sample 124, ~20cm triangle flat of pillow (doesn't look in place), with ROV grab. Saw crinoids.
14:47:06.111- large pillow flow on slope. Saw crinoid, cucumber, sea star.
14:54:07.359- Talus. Saw crinoids, corals, barnacles.
15:04:04.883- flat flows up slope; talus and small pillow blocks. Saw corals, sea anemones, hackle-y flow, barnacles, tunicates, sponge, breakout tube with large vesicles, shrimps.
15:32:03.631- Took sample 125, ~10 cm rind of pillow tube, with ROV grab. Lava tubes Saw corals, barnacles, sea stars, crinoid.
15:52:14.093- lava tubes. Saw sponge, shrimp.
16:02:34.858- pillow blocks and breakout tubes. Saw corals, shrimps, sponges, cucumber.
16:28:08.158- exposed pillow faces downhill a cliff. Saw corals, crinoids, cucumber, sea anemone, transition from pillows into talus, pavement, fish, coral shrimp, pillow tubes. talus and unidentified cemented layer of volcanic sediments. Mostly (pyroclastic) pavement.
16:48:27.284- Waypoint 8. Saw stalked sponge, corals, fish, large broken pillow pieces, sea stars, talus, shrimps, sponges, fish, cucumbers.
17:06:57.409- layered pillow wall; headed up slope. Saw corals, sponges, shrimps.
17:13:35.352- broken pillow pieces. Saw sponges, sea anemone, corals, cucumber, coral, sea stars.
17:28:43.667- Took sample 126, sandy sediment in crater between waypoint 8 and 9, with pushcore. rounded pillow pieces. Saw shrimp, in place lava tubes (up hill), corals.
17:36:56.181- varying size pillow blocks on talus. Saw corals, fishes, crinoid, sea anemones, sea star.

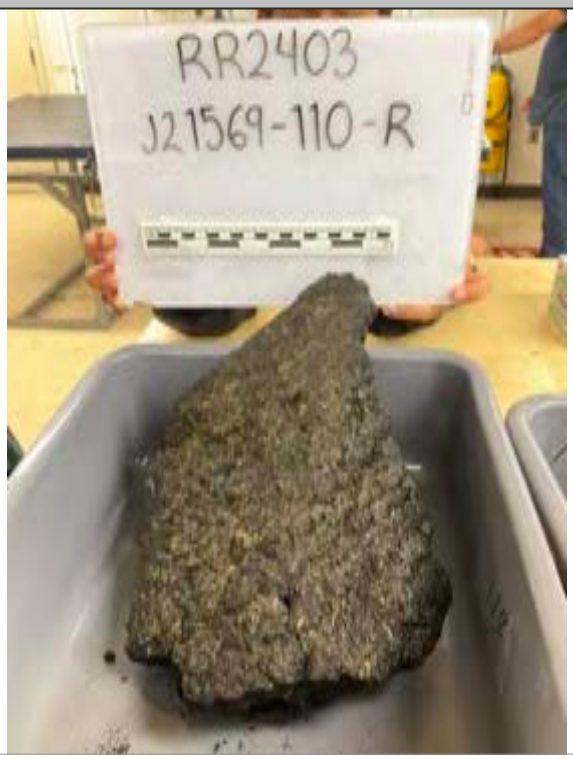
17:49:02.986- Sheet flows (thin and broken). Broken lobate flows. Saw fish, sea stars, coral.
17:56:54.570- pillow face wall; down slope. Saw sponge, fishes, sea star, corals, sea anemone, cucumbers, shrimps, talus, textured broken pillows.
18:29:42.681- Waypoint 9. on summit of dive; talus.
18:30:59.011- Took sample 127, Talus from summit, ~20cm, at waypoint 9 with ROV grab. Saw corals, fishes, cucumber.
18:50:07.074-fractured pillow wall. Saw fishes, corals, sea stars, sponges,
19:10:32.503- Took sample 128, pillow fragment, with ROV grab. Saw corals, sea stars, crinoids, fishes, cucumbers, sponges, shrimps.
19:35:19.603-Talus.
19:35:36.181-pavement-like sediment. Saw fish, corals, sea stars, cucumber, crinoid, sponge, shrimps.
20:06:23.921-Talus (dense coverage, minimal sediment). Saw corals, sea stars, cucumber, sea anemone, shrimps, crinoid.
20:26:31.860-Sediment (pavement/sheet flow). Saw sea stars, sponges, xenophyophore, cucumbers, tunicates, shrimps, corals, sea anemone.
20:47:20.162- Took sample 129, big pillow w/ corals, with ROV grab. Saw sponge, cucumber, corals, sponge.
21:03:55.883-Sheet flows. Saw sea star, corals, sponge.
21:12:53.621-Pillows. Saw corals, shrimps, sea anemones, fishes, sponges, sea stars.
21:59:28.542- 60m of waypoint 10. Saw crinoids, corals, shrimps, cucumber, sea anemones, squat lobster.
22:28:57.992- Took sample 130, pillow fragment with ROV grab. Saw larvacean, sponge, corals, shrimps, crinoids, cucumbers, sea stars, jelly, sponges, barnacles on pillows, tunicates, sea anemone.
23:00:30.666-went up talus slope, some large pillows (in place). Saw cucumbers, corals, tunicates, shrimps, brisingid. large pillow flows; steep cliff. went in midwater briefly and back to bottom.
23:07:07.180-large in place pillow wall. Saw coral with snake star associate, large blocks of broken pillows, cucumbers, corals, jelly, sea anemones, stalked sponge, sponges, dead sponge, crinoid, tunicates, sea stars.
23:46:28.428-steep slope with in place pillows. Saw corals, cucumber, crinoid, tunicates, shrimps.
00:00:26.597- Off bottom. Saw ctenophore, jelly, a lot of fish.

Sample and Terrain Maps



Sample Photographs
Dive: J2-1569

RR2403-J21569-110R IGSN: 10.58052/URI0003AI



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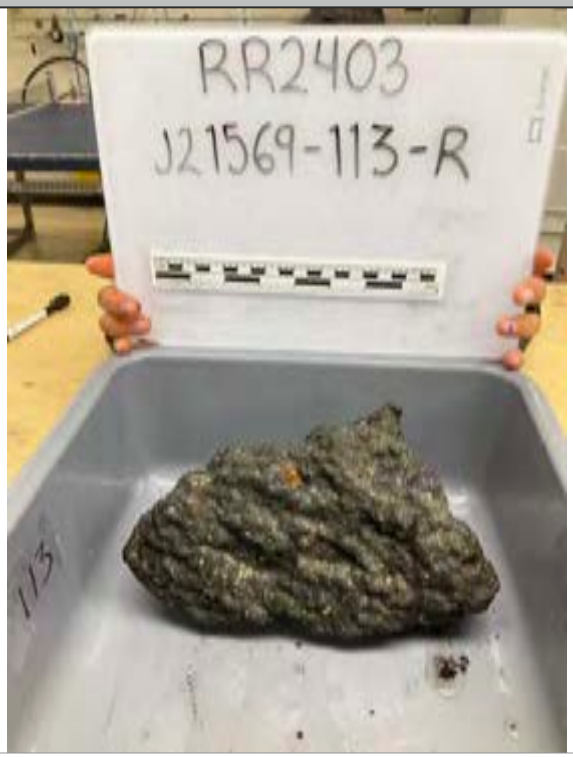

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RR2403-J21569-116R IGSN: 10.58052/URI0003AO

RR2403-J21569-117R 10.58052/URI0003AP

RR2403-J21569-118R IGSN: 10.58052/URI0003AQ

RR2403-J21569-119R IGSN: 10.58052/URI0003AR

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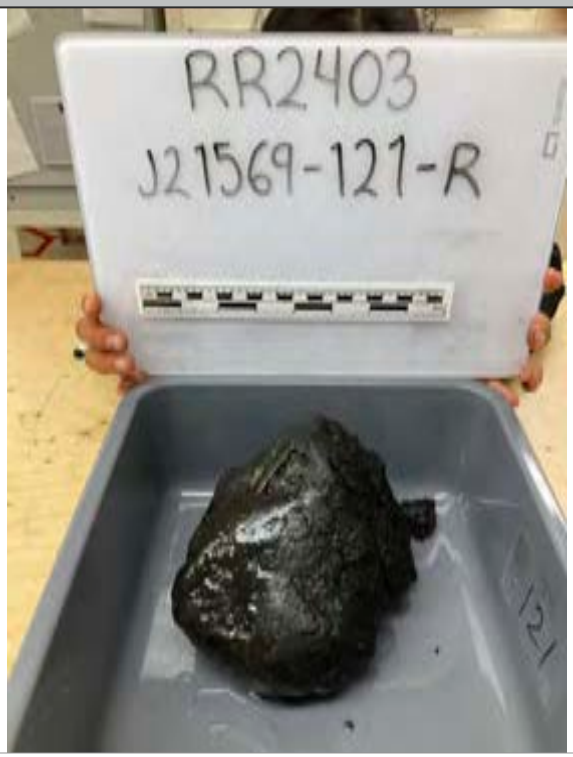
RR2403-J21569-121R IGSN: 10.58052/URI0003AT



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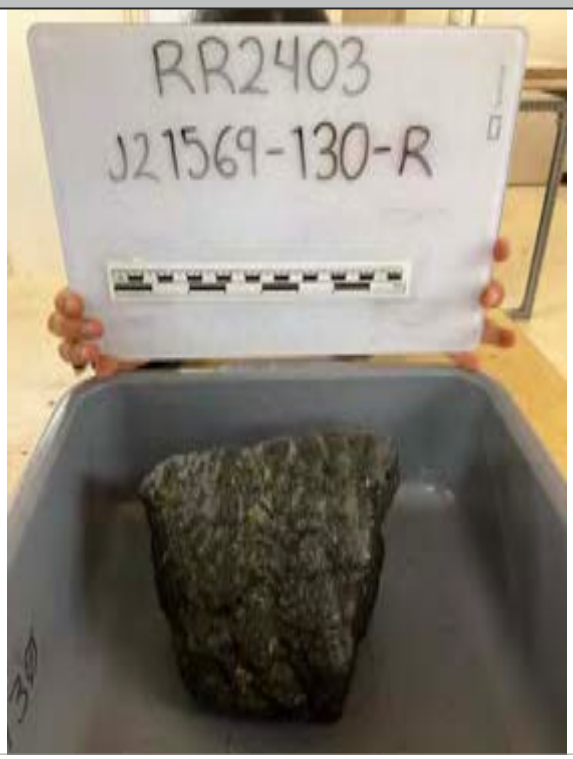
RR2403-J21569-130R IGSN: 10.58052/URI0003B2

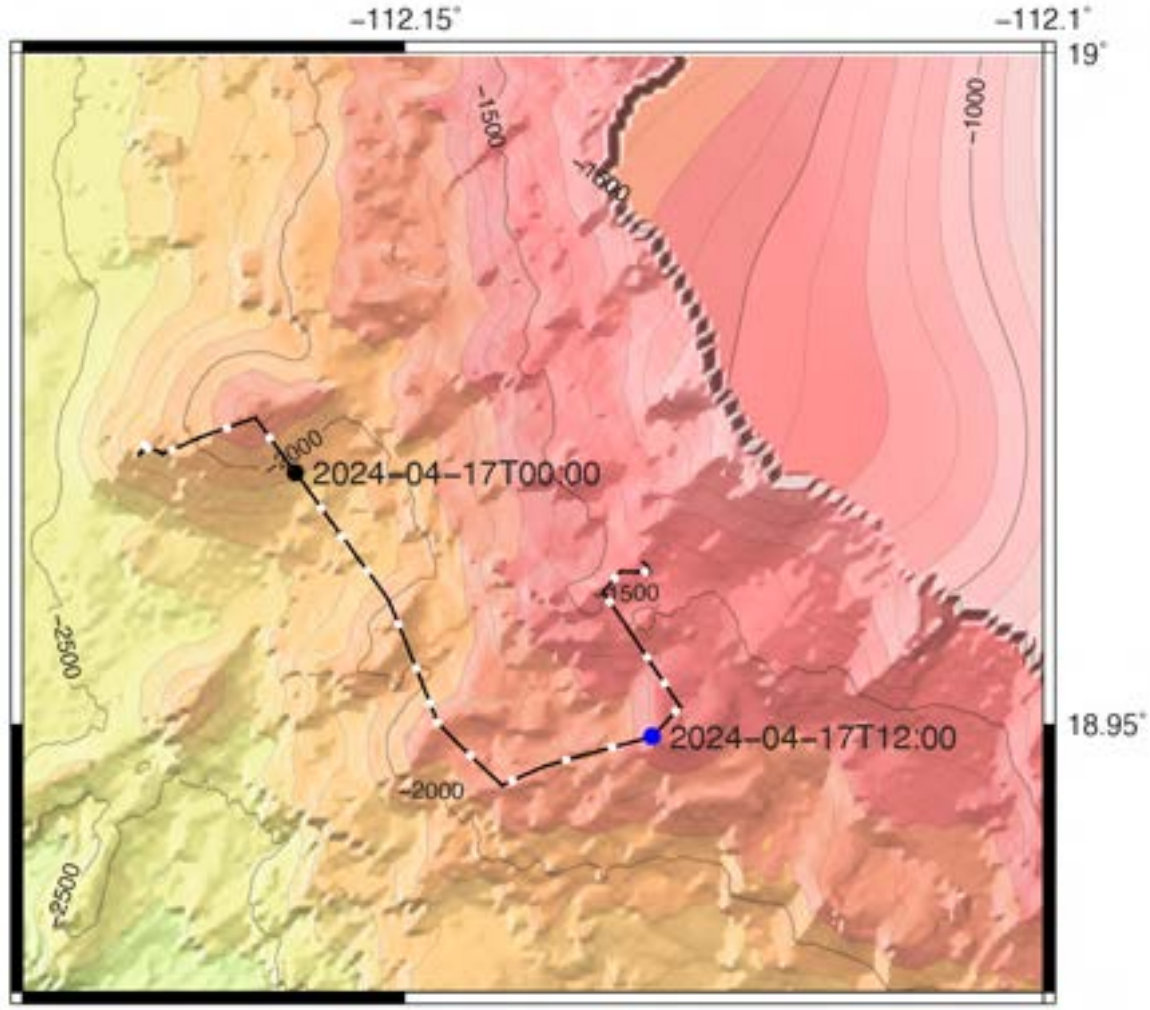


Dive J21570 Summary Report
Date: 4/16/2024 – 4/17/2024
Site Description: Volcanic cones on the SW flank of Roca Partida Island
Physiographic Feature: seamount or seamount province
Physiographic Feature Name: Roca Partida Island

Launch Location:	18.97102°N, 112.17037°W
Launch Depth:	2101 m
In Water:	2024-04-16T18:15:36.662Z
On Bottom:	2024-04-16T19:42:22.869Z
Off Bottom:	2024-04-17T17:15:56.554Z
On Deck:	2024-04-17T18:26:19.071Z

Dive Notes: USBL was not functional for this dive. Navigation is ship's GPS.

Dive Map



WATCH END SUMMARIES:

12-4: We began our watch in blue water where we had to pause for a moment after a large biofilm (maybe a deepstaria jellyfish) was noticed in the undercarriage and flowing of the starboard side of Jason. It went through the thrusters and we continued to the bottom, which we reached at 19:42 and immediately lost navigation. Navigation did not return during this watch, so all sample locations have an error on the order of 50-100 m. The bottom appeared to have rubbly pillows (?)/ lava bombs intermixed with sheet flows of what we assume to be hyaloclastites. Pillow walls with sheet flows on top were observed as they were on the last dive. Sample #131 was taken off a pillow at wpt 1 at 20:00 and put into a bio box. We then paused for a while to try and troubleshoot the navigation issues. During this time, we moved Jason ~72 m at a 45 degree angle. There was then a stark change from pillows to a heavily sedimented area ~21:00. As we continued our climb to wpt 2, we observed another shift to more rubbly/ hackly stuff, suggesting the lava may be more vesicular and gas-rich in this area. A different eruptive style may also be at play in this area. Sample #132, a piece from the top of a pillow amongst a field of sheet flows, was collected 517 m W of wpt 2. Sample #133 was collected at 21:58 off of a blown out pillow 280 m W of wpt 2. This region was otherwise heavily sedimented and has thick (~30 cm) sheet flows. These sheet flows are on top of chunks of lava in some cases. Sample #134 was collected at 22:29 at the top of the first cone from a large blocky lava bomb (?) approximately at wpt 2. As we ascended the first cone, it was clear that the lava bombs were getting larger. We ended watch beginning our descent to the saddle in between wpts. 2 and 3 which was dominated by fragmental material.

4-8: Picked up watch shortly after wp2 at 1830 m depth and continued descending the small cone in direction SE. First, we saw pillow lavas surrounded by patches of calcareous ooze. Then, talus consisting of subangular gravel and blocks, dominated most part of the descent, further down calcareous ooze increased. Saw a pillow (mega-block of ca. 3 m in diameter at 1994 m depth) lying on the sediment. At 2206 m we reached the deepest point between wp2 and wp3. Areas exposing talus were followed by pillow lavas surrounded by whitish sediment and larger stretches of sediment only. At 2185 m, still 825 m from wp3, sample No. 135 was obtained from pillow lava, shortly before handing over the watch.

8-12: We began watch between wpts 2 & 3 in a flat sedimented region with no USBL. And proceeded upward along a section of large pillow cross-sections with columnar jointing in the pillows. Pyroclastics flows were present at the top of wpt 3 with basalt pillows. Encountered mostly sediments between wpts 3 & 4 with episodic shelves of pillows and pyroclastic flows. Observed some ripples in the sedimented valleys with moslty talus on the slope up to wpt 4 with occasional outcrop of draping pillows with tubes.

12-4: We began watch at wpt 4 and promptly started descending to wpt 5. Thick sediment sheets persisted on our way down the slope with some interspersed pillow flows. Sample #141 was taken at 7:37 ~145 m SE of wpt 4 and is a large piece of pillow. The flat region between wpts 4 and 5 is heavily sedimented with lots of current ripples and sparse, large pillows. Around 7:59 we saw more sheet flows that were broken up

with visible layering. These sheets were up to 70 cm thick. Sample #142 was collected from a lava pillow at 8:45 ~150 m NW of wpt 5. It is a section of columnar jointing. Sample #143 is a large piece of pillow taken at 9:34 from 340 m NE of wpt 5. As we climbed the ridge towards wpt 6, the morphology changed between pillow flows and talus. Sample #144 is a piece of the outer rim of a pillow sampled at wpt 6 at 10:20. Morphology around wpt 6 is dominated by pillows, both whole and fragmented, and the pillows give way to fragmented chunks of lava right at the summit.
4-8: Picked up watch at 1746 m depth between wp6 and wp7. First, whitish ooze with frequent brittle stars dominated, followed by talus deposits (sample No. 145, 1694 m depth, subangular block) forming the lower slope of small “donut”-shaped construct, which we ascended in direction ENE. Upper section of “donut” slope, before the plateau, consisted of coherent pillow lavas (crust of pillow = sample 146). On plateau, corals became more abundant, as well as other creatures. At wp 7, we slightly changed direction of navigation toward the NE. Interior of “donut” plateau is covered by whitish ooze.
Around wp8, still plenty of sediment, but also scattered boulders of lava (sample 147, 1587 m depth). At wp8 we changed direction toward NW on gently upward-sloping terrain with long stretches of sediment, before reaching outer slope (descent) of “donut”. This flank of the “donut” is characterized by pillow lava flows (sample 148, 1594 m depth). Near the base, at the break in slope, whitish sediment became predominant, and fauna (corals, sponges, fish) also more frequent (photo-safari).
8-12: We began watch west of wpt 8 on the way to wpt 9, where we observed sedimented pillows and some pyroclastic flows with stretches of occasional pillow tubes. Heading up the ridge to wpt 9 was mostly broken sheets of pyroclastic flow that transitioned to pillow talus and finally into a pillow cross-section at the end of the watch.

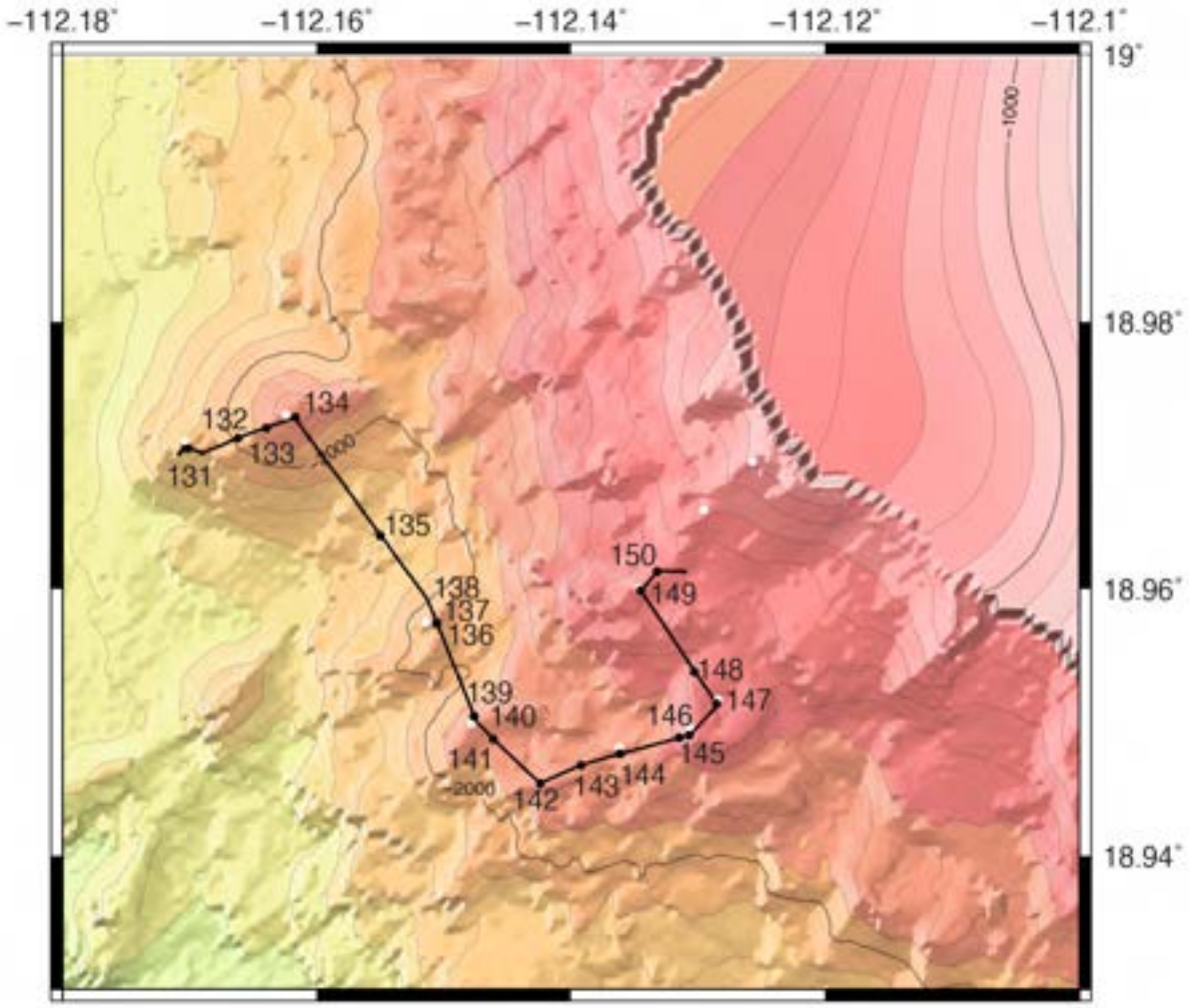
SEALOG SUMMARY
Date: 2024-04-16 – 2024-04-17, times in UTC
18:15:36.662- Jason in water. Saw pilot fish, jellies, shrimps.
19:10:41.268- Jason on bottom. At waypoint 1. Saw pillows, talus, barnacles, sheet flows, sediment, shrimps, tunicates, sea star, corals.
20:03:28.213- Collected sample 13, pillow surface fragment, ROV grab. Saw talus, shrimps, pillows, cucumbers, crinoid, sea stars, sponges, sheet flows, corals, wire coral, cthenophore, large pillows.
20:49:56.994- Platy sediment fields. Saw corals, cucumbers, fishes, abundant sea stars, talus, large pillows, shrimps.
21:12:19.156- Talus with moderate sedimentation. Saw shrimps, sea stars, sponges, corals, glass sponge, crinoid, large orange sea stars, sediment slabs, large pillows.
21:26:36.433- Collected sample 132, pillow surface fragment from large, lone pillow on slabby sediment, ROV grab. Saw sediment, talus, pillows, shrimps, crinoids, corals, abundant sea stars, cucumbers, squat lobster, sea urchins, large xenophyophore.
21:52:39.363- Pillow cliff and sediment sheets with lava flows and pillows on top. Saw pillows, talus, lava tubes, corals, sea anemone.

21:57:04.824- Collected sample 133, pillow surface fragment, ROV grab. Saw shrimp, corals, sea star, fishes, cucumbers, talus, platy sediment, crinoids, platy consolidated volcaniclastic sediment layers, squat lobsters, platy sediment, talus, large pillows, sea anemones, polykete worm.
22:27:48.564- Sample 134 collected, pillow fragment, ROV grab. Saw corals, crinoids, sea stars, talus, shrimps, cucumbers, small sea stars, brittle stars, sediment slope, large pillows on side of sediment, fish.
23:15:34.447- Varying sized bocks on talus slope. Saw cucumbers, shrimps, brittle stars, talus, jelly, boulder, fishes, stalked sponge, dark and light colored sediment, corals.
00:01:25.226- Sheets of dark sediment on top of white sediment with talus and lava blocks. Saw sea stars, cucumbers, corals, fishes, shrimps, xenophyophore, shrimps, sediment, tiny sponge, brittle stars, large flows, sediment and some pillows interspersed, pillow slope, stalked sponge, jelly.
01:05:44.563- Went down pillow slope. Saw pillow tubes, fishes, pillow mounds, shrimps, a local low sediment plain, brittle stars, pillow blocks, cucumber, sea star, track of organism in sediment.
01:48:53.29- Went up pillow slope. Saw sediment with a greenish tinge, squat lobster, shrimps, sponge.
02:10:51.904- Sample 135 collected, ~15cm block; FeMn crust, ROV grab. Saw sea star, shrimp, sediment plain, brittle stars, mushroom coral, fish, sea urchin, ctenophore, sediment, blocks sporadically within pillows.
02:34:12.102- Approached pillow slope. Saw cucumber, brittle stars, sediment plain, mounds in sediment, cucumbers, possibly dead cucumber, sea pig cucumber, shrimps, sea urchin, trash (can), high sediment cover with some talus, fishes, crinoid, Spanish dancer.
03:10:04.773- Larger grained sediment cover. Saw sea urchin, cucumbers, thick deposit of volcanoclastic sediment, sponge, sediment chunks increased as we went up slope, large pieces of volcanoclastic scoria, layers in volcanoclastic deposits, scoria pieces getting larger ae we traversed up slope, shrimps, sea anemone, thin layered flows with textured faces and large pillows, columnar jointing.
03:55:35.140- Sample 136 collected, columnar basalt, ROV grab. Saw cemented volcanoclastic deposit, talus, crinoid.
04:07:52.823- Sample 137 collected, ~10 cm volcanoclastic sediment piece, ROV grab. Saw shrimp.
04:11:11.329- Sample 138 collected, ~15 cm pillow piece from top of high point (waypoint 3), taken from same area as sample 137, ROV grab. Headed down slope, saw pillow faces and broken pieces, sediment, coral, sea stars, crinoid, fish, possible trident fish, sand castle structure in sediment, thick patches of volcanoclastic crust on sediment, layered volcanoclastic deposits, ripples in sediment, stalked sponges, broken pillow wall, talus slope, larger pillow pieces, crinoid tree, cucumber, pillow outcrop.
05:22:50.240- Strips of black sediment in lighter sediment. Saw halosaur fish, shrimps, foraminifera, fishes, volcanoclastic sediment patches and pillows headed uphill, stalked sponges, talus, squat lobster, barnacles on dead coral stalk, broken pillow pieces on

sediment, cucumber, pavement and talus, heavy talus cover, pillow wall; broken and fractured pieces, crinoid.
06:03:43.651- Transition from pillows to thick volcanoclastic deposits. Saw shrimps, sponges, broken pieces of volcanoclastic pavement, massive tephra deposit, corals, stalked sponge, crinoid, pillow tubes.
06:23:55.224- Sample 139 collected, crust of pillows, ROV grab. Saw sea anemone.
06:33:50.348- Sample 140 collected, ~20 cm pillow piece, ROV grab. Saw many crinoids, corals, talus, fish, passed waypoint 4, large pillow flows, cucumbers, sea anemone, talus, pillows, sediment sheets, sponges, crinoid wrapped around coral, sediment.
07:10:44.080- Pillow with green algal mat. Saw sea stars, sea anemone, corals, shrimps, sediment sheets, platy sheets of sediment & pillows & talus blocks, light colored with ripple-like pattern.
07:35:43.773- Collected sample 141, pillow fragment, ROV grab. Saw lots of brittle sea stars, fishes, individual pillows, sediment, shrimps, sponges, xenophora, sediment with ripples in finer sediment and coarser linear patches, squat lobster, platy sediment sheet fragments, corals.
08:00:53.420- Thick sediment sheet fragments, clear bedding, at steep angles on slope. Saw cucumbers, sea anemones, corals, sponges, light sediment with ripples & lots of sea stars (brittles), xenophyophore, talus, pieces of volcanoclastic sediment, crinoids, squat lobster, shrimps, volcanoclastic sediment sheets, pillow tubes, shrimps, crinoids on stalk, xenophyophore, cucumbers, corals, sea stars.
08:40:09.269- Sample 142 collected, pillow fragment, ROV grab. Saw shrimps, pillows, corals, crinoids, fishes, sponges, sediment, cucumbers, talus, sediment, xenophyophore, sea stars, rusted pipe with xenophyophore growing in it, sea anemone.
09:32:26.000- Collected sample 143, pillow fragment, ROV grab. Saw shrimps, sponges, fishes, corals, pillows, cucumbers, sea stars, talus, ripple marks in sediment, xenophyophore, sea anemone, very tall coral.
10:18:57.011- Collected sample 144, pillow piece, ROV grab. Saw sponges, shrimps, talus, fishes, cucumbers, corals, sea stars, bottom of pillow slope, sediment plain, brittle stars.
11:12:04.274- Made it to talus slope. Saw sediment transition into pillow blocks, fishes, dark and light colored sediment, cucumbers, sea anemone, brittle stars.
11:30:24.972- Sample 145 collected, ~10cm x 20cm piece of talus, ROV grab. Saw stalked sponge, cucumbers, fishes, sea stars, shrimps, corals, jelly.
12:12:31.809- Sample 146 collected, pillow block, ROV grab. Saw sea anemone, pillow wall, corals with snake stars, shrimps, corals, sediment plain, fish, brittle stars, broken flow blocks, sponge, mushroom corals, talus slope, cucumbers, broken pillows, worm.
13:17:54.437- Collected sample 147, ~40cm triangular block of talus, ROV grab. Passed waypoint 8. Saw corals with snake stars, sea anemones, cucumbers, talus slope, shrimps, sea stars, mushroom corals, dead sponges, sparse pillow flows within sediment, brittle stars, fully sedimented area, fishes, squat lobster, large pillows.
14:18:45.253- Sample 148 collected, flat ~10cm piece of pillow, ROV grab. Saw talus slope, cucumbers, sea anemone, mushroom coral, sea stars, in place pillows, sediment

plain, tripod fish, other fishes, brittle stars, shrimps, corals with snake stars, squat lobsters, pillow slope, corals, crinoids, dead sponges.
14:57:05.574- Sediment patch. Saw many sea stars, fishes, trash (straw), brittle stars, shrimps, biologically made circles in sediment, transition into pillow outcrop, corals, volcanoclastic crust patches, pillows, halosaurs, volcanoclastic coarse grain layer on top of marine sediments, larger grained volcanoclastic sediment, sponges.
15:57:04.144- Thick and fractured volcanoclastic layer. Saw dead glass sponge, corals, talus looking pieces of volcaniclastics, sea stars, fishes, shrimps, sea anemone, pillows on slope, talus, coffee tin, pillow wall with exposed tube faces, cucumbers, squat lobsters, sponges, intact lava tubes, fractured and broken pillows, coral garden.
16:33:51.664- Sample 149 collected, ~10 cm pillow chunk, ROV grab. Saw many corals, talus, sponges, lobate flows interlaying talus, patches of volcanoclastic pavement, glass sponge, sea stars, tephra.
17:10:32.896- Sample 150 collected, ~20 cm volcanoclastic chunk, bio on it, ROV grab. Saw glass sponge.
17:15:56.554- Jason off bottom. Saw squid, pilot fish, and a shark.

Sample and Terrain Maps



Navigation issues prevented the terrain map from being made during the cruise.

Sample Photographs
Dive: J2-1570

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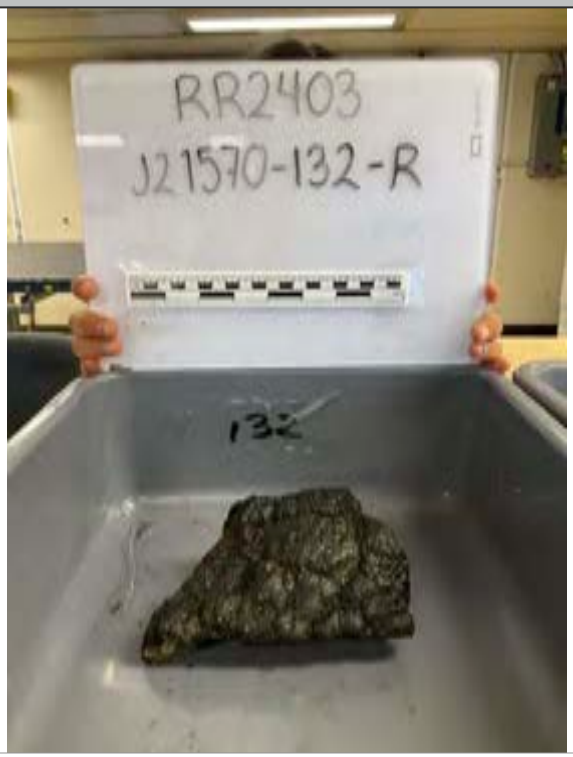
RR2403-J21570-132R IGSN: 10.58052/URI0003B4	
	

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RR2403-J21570-135R IGSN: 10.58052/URI0003B7

RR2403-J21570-136R IGSN: 10.58052/URI0003B8

RR2403-J21570-137R IGSN: 10.58052/URI0003B9

RR2403-J21570-138R IGSN: 10.58052/URI0003BA

RR2403-J21570-139R IGSN: 10.58052/URI0003BB

RR2403-J21570-140R IGSN: 10.58052/URI0003BC

RR2403-J21570-141R IGSN: 10.58052/URI0003BD

RR2403-J21570-142R IGSN: 10.58052/URI0003BE

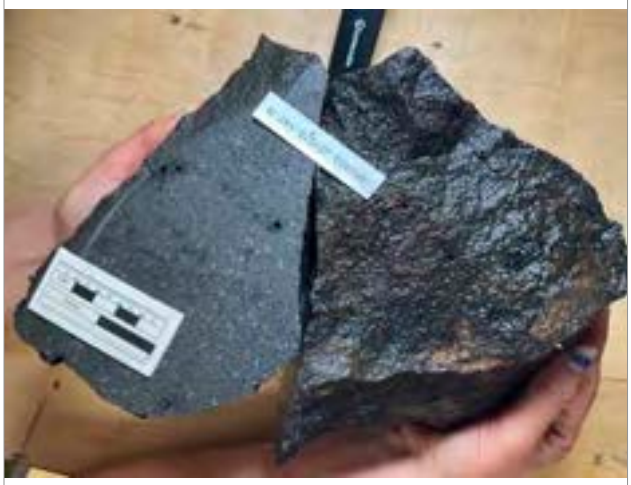
RR2403-J21570-143R IGSN: 10.58052/URI0003BF

RR2403-J21570-144R IGSN: 10.58052/URI0003BG

RR2403-J21570-145R IGSN: 10.58052/URI0003BH

RR2403-J21570-146R IGSN: 10.58052/URI0003BI

RR2403-J21570-147R IGSN: 10.58052/URI0003BJ



RR2403-J21570-148R IGSN: 10.58052/URI0003BK

RR2403-J21570-149R IGSN: 10.58052/URI0003BL

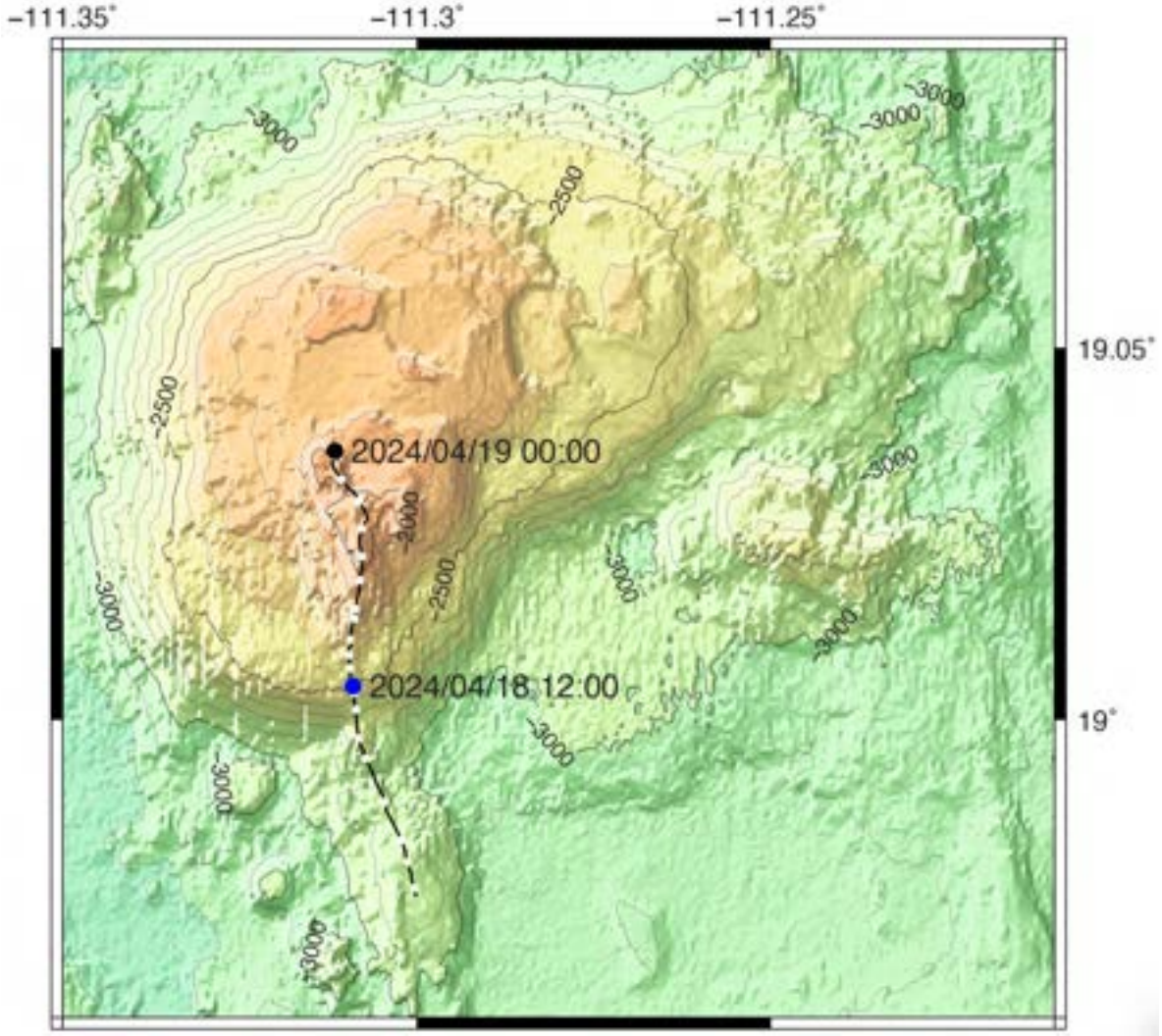
RR2403-J21570-150R IGSN: 10.58052/URI0003BM

Dive J21571 Summary Report
Date: 4/18/2024-4/19/2024
Site Description: Unnamed “Salicrup” Seamount
Physiographic Feature: Seamount or seamount province
Physiographic Feature Name: Unnamed

Launch Location:	18.976423°N, 111.30026°W
Launch Depth:	2857 m
In Water:	2024-04-18T01:32:34.388Z
On Bottom:	2024-04-18T03:33:44.873Z
Off Bottom:	2024-04-19T00:01:00.000Z
On Deck:	2024-04-19T01:21:06.361Z

Dive Notes: USBL returned to function on this dive.

Dive Map



WATCH END SUMMARIES

8-12: We began our watch in blue water and set down on bottom after 30 minutes. We started on a 200-m-high, N-S trending ridge just to the south of Salicrup Seamount. The top of the ridge was covered with sediment with no rock outcrop in sight for the first hour of the dive, but an occasional pile of heavily encrusted pillows would occasionally appear. Some large sea cucumbers with large tails (P. longicauda) were abundant as well as numerous swimming annelids. We began to see pillows just past wpt 2 with draping pyroclastic flows. More abundant pillow mounds (unable to sample) at the end of watch.

12-4: We started our watch ~255 m before wpt 3 and immediately took Sample #151 (6:55), which appeared to be a chunk of volcaniclastic material. There are pillows in the area, but they are extrememly coated in Fe-Mn crust and are nearly impossible to sample. Sample #152 was taken at 7:14 118 m S of wpt 3 and consists of a few pieces of a pillow (mostly Fe-Mn crust). Between wpts 3 and 4, there are tiny sediment steps where the tops look like sheet flows and the bottoms are undercut, tan in color, ragged, and layered horizontally. Around 8:10 we climbed a 80 m tall pillow wall that was coated in Fe-Mn crust. Sample #153 was taken at 8:31 off a pillow on top of the wall 300 m S of wpt 4. We went to sample what looked to be an old pillow tube at 8:41, but turned out to be a dead sponge. Sample #154 was taken at 8:46 250 m S of wpt 4 and is a large pillow chunk. We ended watch just North of wpt 4.

4-8: Picked up watch between wp4 and wp5 at 2555 m depth. Here, the seafloor is characterized by solid pillow lava flows with an “old” (thick Mn-coating) appearance, if compared to several previous dives. Due to the roundness of the pillows and their hardness, samples were difficult to obtain while navigating up the slope in direction N. A small sample (No. 155) was taken at 2541 m and seemed quite altered. Between pillow lavas were areas of loose to indurated gravel and sand (unsorted) that looked like debris flows, and filled areas between protruding pillow lavas (hence, the sheets of debris flow deposits must be stratigraphically above the pillow lavas). Here and there, occasional scoria fragments were observed lying on the lavas and sediments. At 2420 m depth and 204 m from wp5, sample 156 was taken from the crust of a pillow. At 2411 m depth and 180 m from wp5, a larger sample (No.157) was obtained. Finally, 72 m after wp6, another crust of a pillow (No. 158) was sampled at 2318 m depth.

8-12: We resumed our watch just past wpt 5 and headed up a small N-S trending ridge on top of the main volcano. We observed nice draping pillows with extensive Mn-encrustation. Oddly, the “talus” was also blanketed in Mn-crust so it made it difficult to even find loose rock samples. Akel and Corey were finally able to grab 3 nice rock samples of “udder buds” hanging down from larger pillows. Near the top of wpt 6, some looser talus blocks were on the sediment with more draping pillows and some collapsed pillows and more lobate pillows near the summit of wpt 6.

12-4: We started 360 m N of wpt 6. Sample #162 was taken at 19:05 360 m N of wpt 6. After sampling, we descended down a pillow wall between wpts 6 and 7. Sample # 163 was a taken at 19:38 470 m S of wpt 7 from a pillow. Sample #164 was taken at 20:25 40 m S of wpt 7. In between these samples, the morphology consisted of heavily sedimented areas and sparse groupings of pillows. As we passed wpt 7, we traveld

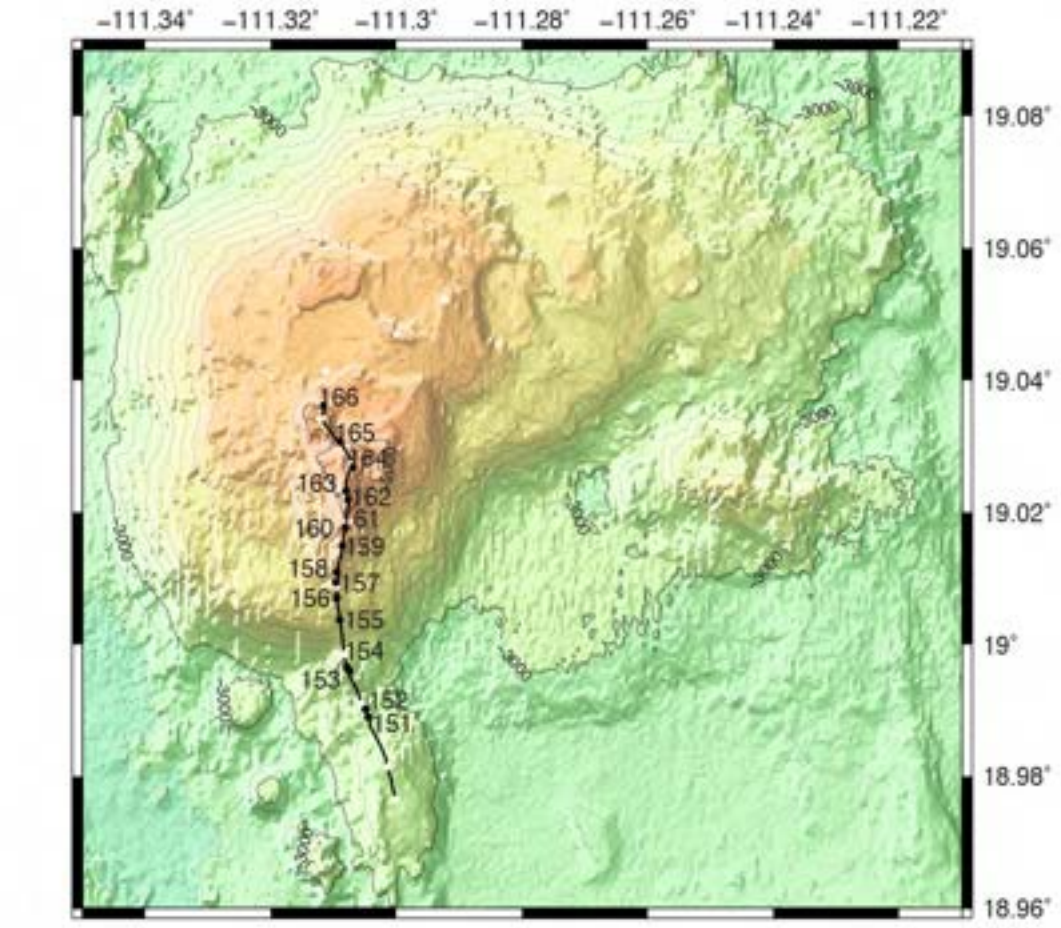
over Fe-Mn coated talus and climbed another pillow wall ~50 m tall. Sample #165 was collected at 21:00 ~500 m SE of wpt 8. We ended watch just after wpt 8.
4-8: Picked up watch shortly after wp8 at 1981 m. We descended over pillow lavas and took sample No.166 (outer shell of pillow, presumably glassy) at a depth of 2010 m. At 17.00, ascent to surface of ROV initiated.

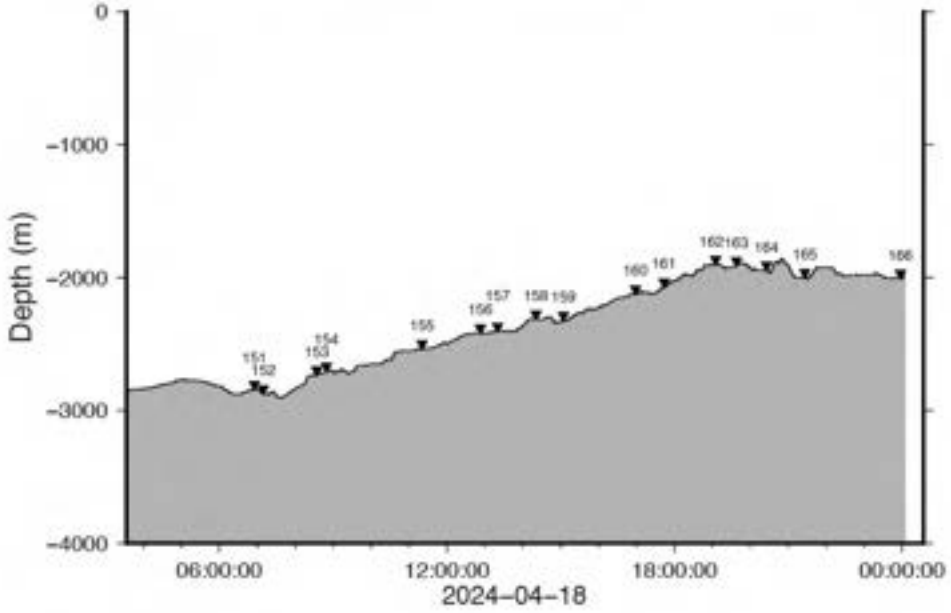
SEALOG SUMMARY
Date: 2024-04-018--2024-04-019, times in UTC
01:30:28.169- Jason off deck.
01:32:34.388- Jason in water. Saw fishes, a lot of jellies.
03:33:44.873- On bottom.
03:34:07.904- Waypoint 1. Sediments. Saw cucumber, sea urchins, dumbo octopus, shrimps, crinoid.
04:19:06.114-sediment slope with large pillow. Saw sea urchins, cucumbers, jelly, circle holes in sediment, chimaera, coral.
04:50:00.184-mound of pillows with sediments. Saw sea stars, cucumber, crinoid. Waypoint 2.
04:54:19.416-The volcanoclastic sediment looks brownish covering the lower parts of the pillows.
04:58:56.403-old, well embedded, crusty pillow outcrop. Saw crab, sea star, sponge, crinoid, cucumbers.
05:24:55.365-Sediment. Saw sea stars, worms, cucumber, crustaceans, shrimp, sea anemone, sea pens, sea urchin.
05:49:51.991-small, cemented pillow outcrops, mostly sediment. Saw crinoid.
05:59:06.161-botryoidal pillow outcrop. Saw cucumbers, crinoid, crab with anemone as shell.
06:36:29.459-botryoidal pillow mound. Saw sea urchins, crinoids, cucumber, fish.
06:55:36.287-took sample 151, pillow fragment (2 pieces) with ROV grab. Saw sponge, coral, sea star.
07:04:53.829-sparse pillows on sediment, very knobby, appear to have thick Mn-oxide. Saw cucumber, sea urchins, shrimp.
07:09:51.535- took sample 152, small fragment of large, lone pillow (4 or 5 pieces) with ROV grab.
07:19:25.344-Sediment.
07:19:34.069-knobby pillow patch, thick Mn-oxide, old. Saw sea stars, sponges, cucumbers, xenophyophores.
07:26:38.275- Waypoint 3. Saw fishes, lots of small tubes, sea stars, sponges, sea urchin, crinoids, shrimp, xenos, coral, sediment.
07:44:40.158- tan colored sediment cliff. Saw sea stars, sediment sheets, fishes, shrimps, cucumbers, worms, pillows, sponge, coral, sea anemone, xenos.
08:03:31.662- Pillows (sparse). Saw sea stars, cucumber, fish, corals, sponges, shrimp, sea spider, crinoids, sea anemone, squat lobster, poop trails.
08:34:00.460- took sample 153, pillow fragment ROV grab. Saw spongse, fish, sea anemone, sea stars, shrimp, xenos,

08:49:24.050- took sample 154, pillow fragment (large), ROV grab. Saw coral, sea stars, sponge, cucumber, sea anemone, shrimp, fish, xenos.
09:09:52.037- Waypoint 4. Pillows & sediment. Saw sponge, coral, worms, sea stars, sponge, cucumbers, sea urchin, sea anemone, shrimp, fish.
09:36:00.924- pillow wall. Saw fish, shrimp, sea stars, squat lobsters, sponges, xenos, corals, cucumber, sea urchin,.
10:18:47.503- Sediment. Saw shrimps, sea stars, sponges, crustacean, cucumbers, fishes, talus, squat lobsters, sea urchin, crinoid, acorn worm, polychaete worm, brittle stars, corals.
11:20:42.593- took sample 155, ~20x15 cm chunk not in place; ROV grab. Saw coral, sea star, sponges, squat lobsters, shrimps, crinoid, cucumbers.
11:39:19.562- massive pillow wall. Saw dead sponge, sponges, cucumber.
11:49:37.504- another steep pillow wall. Saw cucumber, sponge, shrimps, polychaete worm.
11:58:02.598- in midwater.
12:01:13.620- went into sedimented area. Saw cucumber. Pillows visible. Saw brittle stars, shrimp, squat lobster, large pillow flows, crinoid, dark and light colored sediment.
12:19:12.573- slope with some pillows visible. Saw sponges, acorn worm, squat lobsters, dark and light colored sediment within the sparse pillow outcrops, corals, shrimps, squat lobster, crinoids, sea anemone, cucumber, polychaete worm.
12:52:56.303- took sample 156, broken pieces of pillow rind; ROV grab. Saw crinoids, shrimps, sponges, large bulbous pillows.
13:20:16.406- took sample 157, broken piece of flow ~30cm flat; ROV grab. Saw squat lobsters, coral, sea stars, sponges, dark and light colored sediment, pillow slope, crinoids, sponges.
13:58:40.880- Waypoint 5. Saw sponge, shrimp, bamboo whip, squat lobster.
14:20:50.492- took sample 158, pieces of broken pillow; ROV grab. Saw shrimp, cucumbers, squat lobster, massive pillow wall, corals, crinoids, acorn worm, sponges, brisingids, coral with snake star associates, sponge garden, massive pillow wall, squat lobster, tunicates, dumbo octopus, shrimp. slope of pillow with thick Mn crust.
15:04:30.604- took sample 159, very thick FeMn crust, in box 8, 240 m from waypoint 5 ROV grab. odd groove patterns in sediment. botryoidal flows. volcanoclastic sediment layer. Saw fish, sponges, cucumbers, crinoid, coral, tunicates, squat lobsters.
15:27:35.985- slope of thick FeMn crusted pillows and sediment; botryoidal. Saw coral, tunicates, sponge, cucumbers, botryoidal pillow wall, acorn worms.
15:46:02.225- FeMn pavement layer on top of sediment. Saw corals, cucumber, crinoids, acorn worm, cucumbers, small pillow chunks, heavily crusted, sponge, shrimp, smaller botryoidal knobs (FeMn), tunicates.
16:17:59.725- welded botryoidal pillows. Saw cucumbers, tunicates, crinoid, corals, shrimps, talus, fish, sponges, steep botryodial pillow wall, Lava tube field.
16:58:31.215- took sample 160, Mn crust ~30cm large, 1 piece, 400 m away to P6 ROV grab. Saw cucumbers, sponges, talus, sea anemone, tunicates, sponge, mushroom coral, corals, pillows, thin tube lava slope(botryoidal), larger intact crusted pillows, possible water logged pumice.

17:43:30.446- took sample 161, large ~40 cm crusted pillow bud, ROV grab. Saw crinoid, sponges, corals.
17:59:10.553- Waypoint 6. FeMn pavement talus. Sea anemone, cucumber, spongse, corals, barnacles crinoids, fishes.
18:32:20.163- FeMn crusted and sediment covered pillow outcrop. Saw tunicates, corals, sponges, pillow wall, cucumbers.
19:05:05.088- took sample 162, pillow fragment ROV grab. Saw corals, sea stars, xenos, fishes, sponges, cucumbers, crinoid, tunicates.
19:37:56.953- took sample 163, pillow chunk ROV grab. Saw sponges, squat lobster, corals, crinoids, sea stars, cucumbers, fishes, shrimps, ctenophore, tunicates.
20:25:24.814- took sample 164, pillow fragment ROV grab. Waypoint 7. Saw corals, fishes, sponges, corals, sea stars, cucumbers, sea anemones, pillows w/ sediment, barnacles, crinoid, talus.
21:09:20.646- Sediment. Saw xenos, fishes, squat lobster, coral.
21:26:12.064- took sample 165, huge pillow fragment ROV grab. Sediment. Saw xenos, sea stars, cucumbers, fishes, shrimps, corals, sea anemones, crinoid, sponges, shrimp.
21:52:40.200- Pillows w/ abundant sediment. Saw corals, shrimps, sea stars, squat lobster, sponges.
22:12:59.977- abyss. Saw sponges, fish, corals, crinoid, sea star, shrimp, sea anemone.
22:32:33.684- Waypoint 8. Saw cucumbers, sea stars, shrimps, corals, shrimps, squat lobster, sponges, sea anemones.
23:02:13.609- large pillow wall. Saw sponges, crinoids, cucumbers, tunicates, corals, squat lobsters, barnacles, corals with snake star associates, acorn worm, mushroom corals, shrimps, sea star.
23:57:15.210- took sample 167, tiny pieces of broken rock ROV grab.
00:01:00.000- Off bottom. off bottom not showing on sealog; manually entering estimated time. Saw shrimps, multiple small jellies, several, narrow and sleek fish, fishes, ctenophore, school of small fish.
01:21:06.361- Jason on deck.

Sample and Terrain Maps





Sample Photographs
Dive: J2-1571

RR2403-J21571-151R IGSN: 10.58052/URI0003BN

RR2403-J21571-152R IGSN: 10.58052/URI0003BO

RR2403-J21571-153R IGSN: 10.58052/URI0003BP

RR2403-J21571-154R IGSN: 10.58052/URI0003BQ

RR2403-J21571-155R IGSN: 10.58052/URI0003BR

RR2403-J21571-156R IGSN: 10.58052/URI0003BS

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RR2403-J21571-163R IGSN: 10.58052/URI0003BZ

RR2403-J21571-164R IGSN: 10.58052/URI0003C0

RR2403-J21571-165R IGSN: 10.58052/URI0003C1

RR2403-J21571-166R IGSN: 10.58052/URI0003C2

Dive J21572 Summary Report
Date: 4/19/24 to 4/20/24
Site Description: San Benedicto southern ridge “Rebecca Ridge”
Physiographic Feature: seamount or seamount province
Physiographic Feature Name: San Benedicto Island

Launch Location:	19.078814°N, 110.761°W
Launch Depth:	2587 m
In Water:	2024-04-19T19:19:05.292Z
On Bottom:	2024-04-19T21:00:41.296Z
Off Bottom:	2024-04-20T19:08:08.594Z
On Deck:	2024-04-20T20:16:11.252Z

Dive Map

WATCH END SUMMARIES

12-4: We began with launch and blue water and were on bottom at 21:00 ~30 m west of wpt 1. We then transited to wpt 1 over a heavily sedimented bottom with scattered rocks. These chunks had more ragged shapes and look like they'd be more vesicular (maybe pieces of float). The sediment also had a gray tinge to it and is possibly ash fallout from the eruption of Barcena in the 1950s. Sample #167 was collected from the edge of a pillow flow 120 m NE of wpt 1 at 21:40. Pillows became more abundant as we moved up the ridge. Sample #168, a piece of gray pumice, was collected off the seafloor 325 m NE of wpt 1. All of the "float" we observed is pumice as well. We began to sample #169, but changed watches in the middle.

4-8: Picked up watch between wp1 and wp2 at 2535 m depth. Here, the seafloor is characterized by pillow lava and patches of whitish sediment littered by occasional blocks of grey pumice (Bárcena eruption?). One such block was sampled (no. 169). Continued ascending ridge toward the NE and took several pillow-lava samples (No. 170 at 2526 m; No. 171 at 2431 m, 160 m from wp2). The area around wp2 consisted mostly of whitish sediment with scattered pumice blocks. Later on, pillow lavas resumed and samples 172 (pillow-crust, 2332 m depth, 585 m from wp3) and 173 (pillow-crust, 2265 m depth, 230 m from wp3) were taken.

8-12: We began watch just down-slope of wpt3 and headed up the western side of "Becky Ridge" primarily in sediments with some pillow cross-sections. Most of the watch alternated between variable stretches of sediment and low-relief (~10-m-high) pillow ridges. Some of the pillow had draping pillows with nice extrusion striations. We ended the watch along a 50-m-high wall of pillows with collapsed pillows at the summit.

12-4: We started watch on a large pillow wall 234 m S of wpt 4. Sample #176 was taken at 7:19 60 m from wpt 4 off a large pillow mound (1999 mbsl). The saddle between wpts 4 and 5 is heavily sedimented but has lots of pillow lavas. Morphology switches to pillow talus as we begin climbing towards wpt 5. Sample #177 was taken at 8:42 160 m SW from wpt 5 at 1860 mbsl. Sample #178 was collected at 9:30 210 m E of wpt 5 off a group of pillows and tubes. As we continued towards wpt 6, we obsereved alternating pillows flows and talus slopes. Sample #179 was taken from the top of a pillow wall 430 m from wpt 6 at 10:31 (1709 mbsl).

4-8: Picked up watch 200 m before reaching wp6 at 1696 m depth. Mostly exposures of pillow lavas were observed. At wp6, we took a turn of direction from NE to N and continued following the ridge. Shortly after (36 m) wp6, at 1609 m, we took sample No. 180 (crust of pillow). Much later, but still between wp6 and wp7 (465 m before wp7), another pillow sample (No. 181) was taken at 1626 m.

8-12: We resumed watch about 200 m south of wpt 7 in a region of broken pillows. Most of the watch was spent going up and down slopes of pillow ridges with sediment in the valley floors, cross-section exposures near the base, draping pillows near the top, and collapsed and trap door pillows at the local summits. Occasional pyroclastic flows and pumice chunks were observed as well. We sampled the outer rind of a collapsed pillow at the shallowest portion of this dive at ~1500 mbsl.

12-4: We started watch a little ways S of wpt 9. Sample #186 was taken at 19:06 from a pillow lava 55 m S of wpt 9 at 1734 mbsl. We were off bottom at 19:07.

SEALOG SUMMARY

Date: 2024-04-019--2024-04-020, times in UTC

19:19:05.292- Jason in water. Saw Ctenophore, jellies, fishes, shrimp

21:00:41.296- On bottom.

21:00:58.423- Waypoint 1. Sediment. Saw cucumbers, sea stars, corals, urchin, sponges, shrimp, worm.

21:19:26.611-Pillows covered with sediment - maybe some is volcanic ash? Saw sea star, sea anemone, coral, shrimps, squat lobsters,

21:40:16.994- took sample 167, pillow surface fragment with ROV grab.

21:43:19.315-traveling through abyss. Saw fish, hydroid, cucumbers, sea anemone, crinoids, sea stars, sponges, shrimp, coral, sea urchin.

21:59:30.389-Sediment w/ sparse large blocks.

22:02:04.987- took sample 168, large block (float) of light & very friable material with ROV grab. Saw cucumbers, sea urchins, shrimps, sea stars, crinoids, xenos, sponges, corals, fishes, multiple brittle stars, talus, sea spider, squat lobsters, dead sponge.

23:09:34.567- took sample 169, ~10cm chunk of rock, sedimented with ROV grab. Saw pumice blocks, sea stars, shrimp, sponges cucumbers, corals.

23:49:34.753- took sample 170, chunk of rock, with ROV grab. pillow flow. Saw dead coral, acorn worm, starfish, sea stars, cucumbers, corals, brittle stars, sponge, sea urchins. on talus slope with abundant sediment. Saw crinoid. occasional large pumice blocks.

00:28:33.014- took sample 171, ~40cm broken piece of flow with ROV grab. Saw sponge, brittle stars.

00:35:45.834- local high of ridge; heavily sedimented, very little pillows visible. Saw cucumbers, sponges, crinoid with snake star associate, shrimp, coral.

00:45:25.384- went up slope, pillows visible and sedimented. Saw cucumbers, coral, sea star, sea anemone, squat lobster.

00:50:48.378- massive pillow wall. Saw dead sponge, corals, squat lobsters, sponge, starfish, cucumbers, shrimps.

01:09:42.043- took sample 172, broken pieces of pillow rind with ROV grab. Waypoint 2. Saw stalked crinoids, cucumbers, brittle stars, sea anemone, cucumbers, talus on slope with sediment, coral.

01:20:54.193- massive pillow wall. Saw cucumber, shrimp, sponge, sea star.

01:25:49.739- valley, other side of ridge has more broken and angular pieces. Went into semi-midwater position. Saw fish. Went close to bottom. Saw coral cucumber, fish.

1:36:55.638- top of local high. Saw fish, cucumbers, sea anemone, sponges, shrimp, squat lobster.

02:07:56.352- midwater. Saw cucumber, fish, crinoid,

02:09:26.295- back towards bottom; pillow slope. Saw acorn worm, cucumbers, shrimps,

02:25:40.293- transition from pillows to sediment. Saw cucumbers, sea urchin, sea stars, sea anemone, squat lobster, fish.

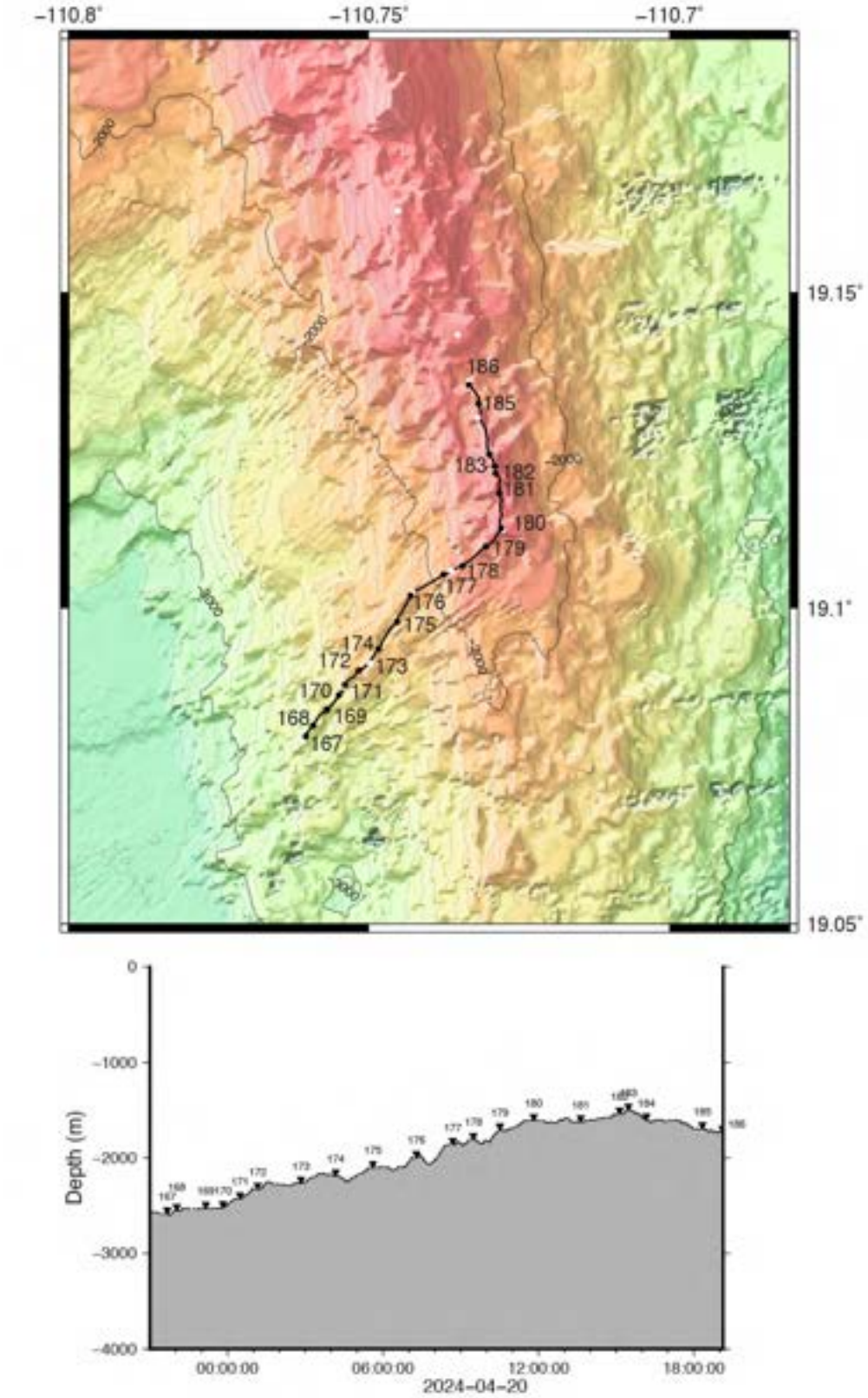
2:35:03.957- transition from sediment to pillows. Saw corals, cucumber.

02:50:00.299- took sample 173, broken piece of rock ~40cm with ROV grab. Saw sponge, fish, coral, sea anemone.
02:58:23.497- sediment with small pillow pebbles on top. Saw sea stars, coral.
03:01:02.361- small rounded broken pillow pieces. Saw sponge, opened face tubes (pillow wall, up slope), sea anemone, corals, shrimp, cucumbers, fish.
03:23:02.590- transition from sediment to talus and pillow flows. Saw cucumbers, tunicates, pillow wall, coral, crinoid, jelly. Top of pillow mound, flat cracked flows.
03:34:12.621- Waypoint 3. occasional pumice pieces in between pillow lavas. Saw sea stars, cucumbers.
03:47:34.437- occasional pillow pieces on sediment. Saw cucumbers, sea stars, sea pen, coral.
04:02:54.718- sediment covered pillows. Saw cucumber, sponge, worm, squat lobster, big lineated texture pillow covered by sediment (volcanic ash).
04:10:02.664- took sample 174, 25 cm broken pillow shell with ROV grab. Saw jelly, sponge.
04:14:25.551- thin tube flows. Saw cucumber, shrimp, unidentified object, jelly, cucumbers.
04:25:36.765- lobate flows stretching downhill.
04:27:10.989- volcanoclastic flow layers. Saw cucumber, sea stars.
04:29:40.386- pillow wall with lava tubes flowing downhill. Saw sea urchin.
04:33:29.152- drippy looking pillows with break out buds.
04:36:56.685- in low area, sediment cover and fractured pillows. Saw cucumbers, sponge.
04:43:03.556- Lobate flows, opened face pillow wall.
04:50:59.999- sediment cover.
04:56:04.045- broken pillow pieces.
04:58:25.847- thin pillow tubes flowing down. Saw cucumber.
05:00:19.797- flat flows and sediment. Saw cucumbers, sponge, sea stars,
05:07:28.269- Sediment. Saw cucumbers, pumice pieces, squat lobster, fish sea star.
05:18:35.355- Lava tubes on steep slope with moderate sediment coating. Saw sponge, fish, shrimp.
05:22:32.966- pillow wall. Saw cucumbers, sea stars, tin can, crinoid, fish, squat lobster, sponge.
05:36:39.380- took sample 175, ~25 cm by 30 cm pillow crust with ROV grab.
05:53:13.757- fractured pillows on sediment. Saw cucumber, sponges, sea anemone, brittle stars.
06:08:43.301- Sediment. circle depressions in sediment.
06:10:51.221- fractured pillows covered in sediment. Saw cucumbers, sea anemones, sea stars, shrimps, fishes, jelly, crinoid, sponges, corals.
07:17:27.963- took sample 176, pillow fragment with ROV grab.
07:23:42.086- Waypoint 4.
07:27:49.373- Pillows w/ thick sediment. Saw coral.
07:29:36.828- Pillows, very little sediment. Saw sponges, shrimps, cucumbers, sea stars, squat lobster, fishes, coral, xenos, jelly, crabs.

07:53:10.712- Pillows and abundant sediment. Saw cucumbers, sponges, sea stars, shrimps, jelly, crab, fishes, squat lobster, talus, coral.
08:20:07.388- Pillows. Saw cucumbers, shrimps, sea anemones, sponges, fish, corals, brittle stars, crinoid, sea stars.
08:41:40.233- took sample 177, pillow fragment with ROV grab.
08:56:33.657- Waypoint 5.
09:05:36.339- Talus and sediment. Saw brittle stars, crab, coral.
09:06:52.601- Pillows & sediment. Saw corals, shrimps, cucumbers, sponges, crab, fish, crinoids, sea stars, sea anemones.
09:29:27.326- took sample 178, pillow chunk with ROV grab.
09:41:44.120- Talus w/ some whole pillows. Saw fish, cucumber, sea star, crinoid, coral, shrimp.
09:44:15.645- Pillows. Saw shrimps, corals, sea stars.
09:47:08.682- Sediment w/ some pillows.
09:48:04.117- pillow mound. Saw shrimp, cucumber, crab.
09:50:25.086- Sediment. Saw fish, cucumbers, sponges, shrimps, corals.
09:53:11.181- Talus. Saw cucumber, sea anemone, coral,
09:54:24.155-Pillows. Saw, corals, cucumbers, sponge, shrimps, sea stars, sea anemones, fish.
10:18:24.403-Talus. Saw sponge, cucumbers, corals, shrimp, sea star.
10:22:46.290- Pillows. Saw sea stars, cucumbers, corals, sponges, shrimps, sea anemone.
10:30:52.477- took sample 179, pillow fragment with ROV grab. Saw corals, sea stars, fishes, shrimp, sediment, sponge, cucumbers, corals with snake star associates, sea anemone.
10:59:48.957-massive pillow wall. Saw cucumber, sea anemone.
11:01:22.508-local high of pillow wall. Saw corals, sea pen, corals with snake star associates, sea stars, shrimps, cucumbers, jelly.
11:48:55.478- took sample 180, ~20cm triangular flat piece of broken pillow rind, triangular with ROV grab. Saw sea spider.
11:52:03.128- Waypoint 6. Saw cucumber, coral.
11:58:08.037- heavy sediment cover, pillows still visible. Saw dead sponge.
12:00:53.684- pillow slope. Saw corals, sea stars.
12:19:38.028- midwater.
12:21:50.000- back towards pillows. Saw sea stars, sea anemones, crinoids, coral, cucumbers, sponge.
12:54:42.531- midwater. Saw sea anemone, corals, cucumbers, brittle stars, squat lobsters, crinoids, cup corals, sea stars, sponge, fishes, jelly, shrimps.
13:37:51.946- took sample 181, triangular piece of broken pillow rind, 2 pieces, with ROV grab. Fishes, sea anemones, shrimp, crinoids, cucumber, squat lobster.
13:56:27.716- breccia. Saw cucumbers, squat lobsters, shrimps, sea anemones, squat lobsters, corals with snake star associates, cucumbers, corals, bat fish, crinoid, sea stars.
14:49:40.147- sedimented area with some pillows. Saw squat lobster, shrimps.

14:51:09.979- pillow slope. Saw fish, sea anemones, cucumbers, sponge, sea stars, crinoids.
15:00:43.529- heavy pillow cover. Saw cucumber.
15:08:08.373- took sample 182, pillow crust piece, 1542m depth with ROV grab. Saw sponges, corals, sea stars, fish, cucumber, shrimp, crinoid.
15:10:45.526- Waypoint 7.
15:19:41.490- droopy looking pillows headed up slope. Saw corals, crinoids, sea star, shrimp.
15:28:25.008- took sample 183, 4 pieces pillow shell with ROV grab. Saw corals.
15:37:32.148-went around-down hill of mound of pillows. Saw corals, sea anemones, crinoid, cucumber, sponges.
15:47:03.942-large fractured pillow among smaller broken bits. Saw corals, cucumbers, crinoids, tunicates, shrimps.
15:53:10.927-Talus. Saw cucumber, corals, sponge, sea anemones, crinoid.
16:00:22.769-lobate fractured pillows. Saw sediment, fish.
16:07:48.274-large pillow pieces and lava tubes. Saw cucumber.
16:10:15.573- took sample 184, pillow crust with ROV grab. Saw cucumbers, corals, fish, coral.
16:19:40.601-lightly sedimented fractured pillows. Saw crinoids, cucumber.
16:21:41.628-inter-layered lava tubes. Saw sea stars.
16:24:27.536-broken sheet flows with small pillows around. Saw cucumbers, coral, sea stars, sea anemone.
16:35:51.155-fractured pillows. Sea star, cucumbers.
16:40:29.136-flat, fractured pillow tops. Saw cucumbers, fishes, sea stars, sponge, barnacles, talus.
17:27:53.626- Waypoint 8. flattened pillow tubes. Saw coral.
17:31:48.451-pillow wall. Saw corals, sea anemone, sponges, crinoid.
17:39:00.645-large rounded pillows. Saw corals, sea star, cucumber, sponges, sea anemones, sea star.
18:19:53.657- took sample 185, ~20 cm pillow crust, 1697m, with ROV grab. broken pillow wall. Saw sea anemone, sea star.
18:33:23.819-small bulbous pillows on sediment. Saw fish, corals, cucumber, sponge, sea stars, shrimps, crinoid, sea anemone.
19:06:14.232- took sample 186, pillow fragment with ROV grab. Saw sea star, shrimp.
19:08:08.594- Off bottom. Saw jellies, shrimps, worm, fishes.

Sample and Terrain Maps

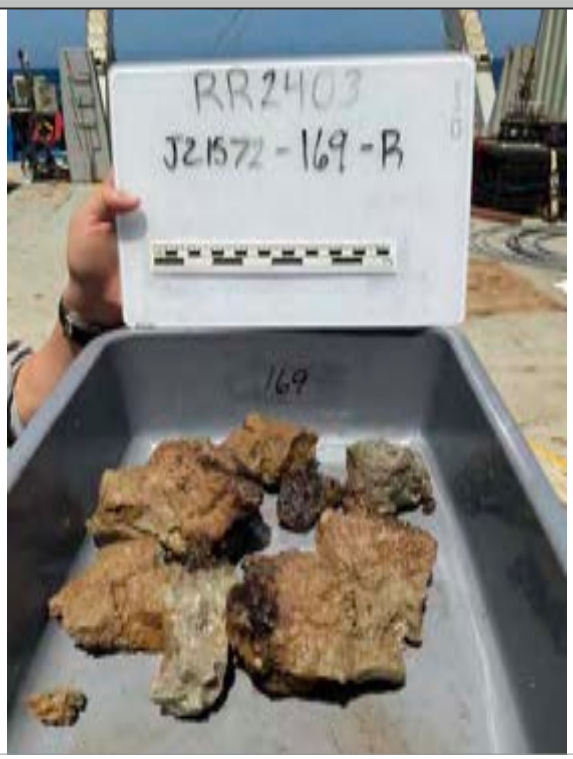


Sample Photographs
Dive: J2-1572

RR2403-J21572-167R IGSN: 10.58052/URI0003C3	
	

RR2403-J21572-168R IGSN: 10.58052/URI0003C4	
	

RR2403-J21572-169R IGSN: 10.58052/URI0003C5



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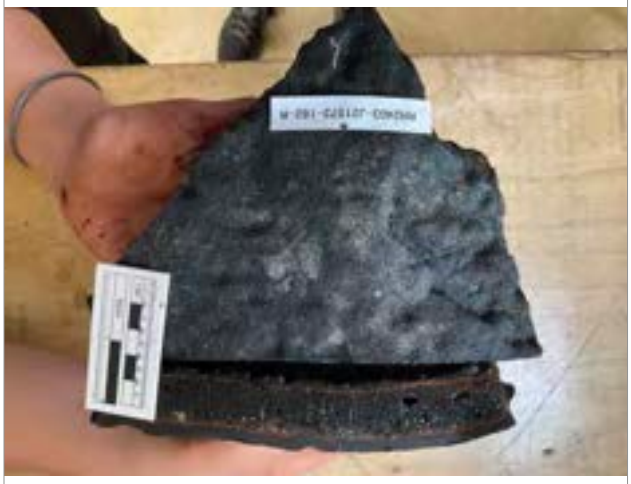


RR2403-J21572-183R IGSN: 10.58052/URI0003CJ

RR2403-J21572-184R IGSN: 10.58052/URI0003CK

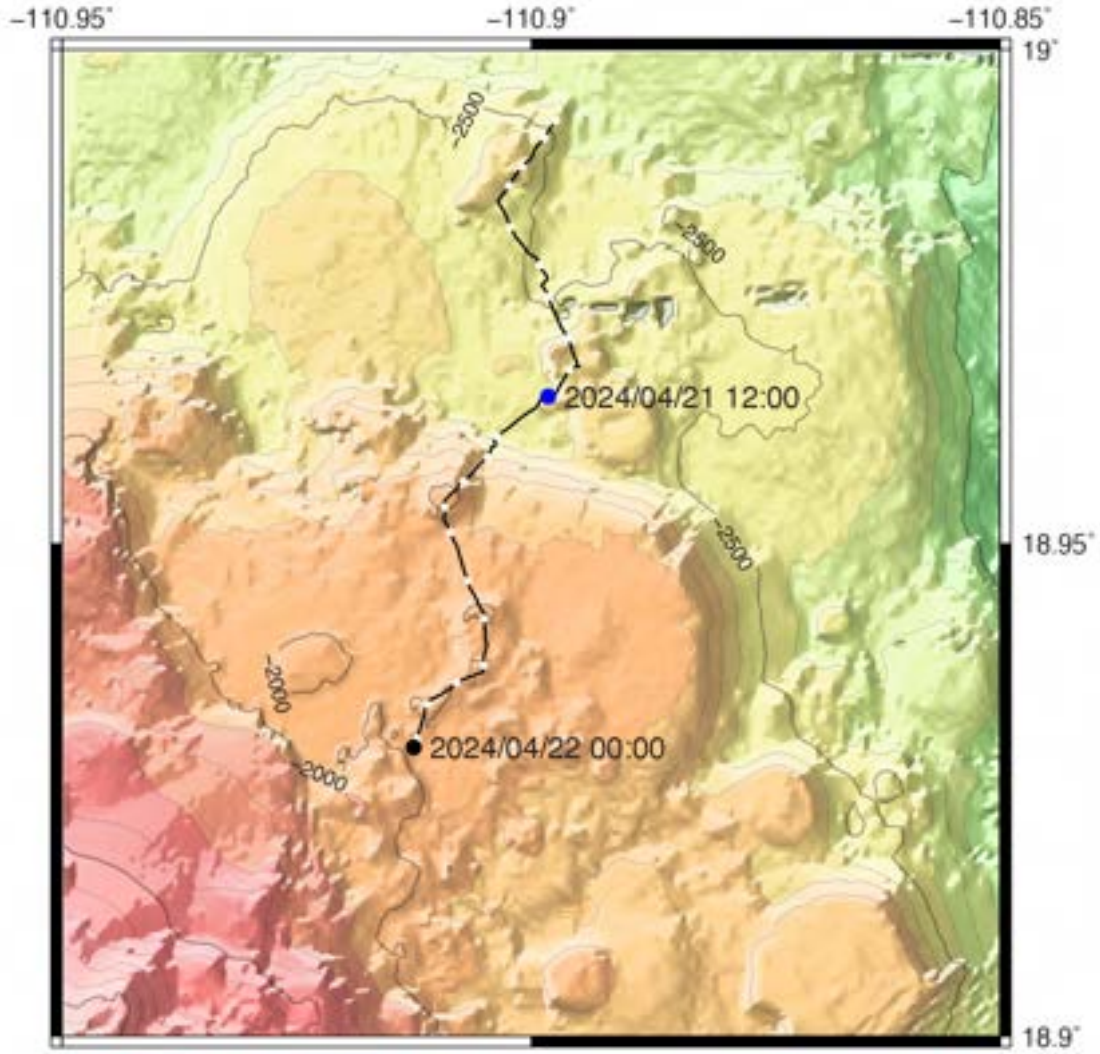
RR2403-J21572-185R IGSN: 10.58052/URI0003CL

RR2403-J21572-186R IGSN: 10.58052/URI0003CM

Dive J21573 Summary Report
Date: 04/21/2024 – 04/22/2024
Site Description: Socorro Island NW Corner, “Mingo Mounds”
Physiographic Feature: seamount or seamount province
Physiographic Feature Name: Socorro Island

Launch Location:	18.99307°N, 110.89734°W
Launch Depth:	2534 m
In Water:	2024-04-21T01:06:39.932Z
On Bottom:	2024-04-21T02:50:52.319Z
Off Bottom:	2024-04-22T00:04:37.585Z
On Deck:	2024-04-24T06:22:05.395Z

Dive Map



WATCH END SUMMARIES

8-12: We began the dive just as we reached bottom in pillows and talus and transitioned into large draping pillows up the slope. Some evidence of volcaniclastic flows between the pillows. Lobate pillows and extensive regions of collapse suggest small lava lakes? at the top of local peaks. Some interesting pillow tubes that look deflated emanating from the lakes. Head down a major slope that was comprised mostly of talus with sediment on the valley floor. Mostly volcaniclastics and clusters of pillows after wpt 32.

12-4: Watch started 295 m SE of wpt 2 descending into the valley between wpts 2 and 3. This area was heavily sedimented with sparse pillow lavas and other pieces of what appears to be more pumice. At 6:59, we observed a new feature that appeared to be sheet flows that looked upheaved in the center. Sample #191 was pulled off a pillow by yours truly, Rebecca, at 7:37 440 m N of wpt 3 in a low-lying area. Sample #192 was collected at 8:09 from the top of a pillow (outer rim) 215 m N of wpt 3. This area has a lot of large pillows, the biggest we have seen this cruise, but they are all cracked, broken, and craggy (maybe large lava bombs, or represent a different mor explosive type of volcanism?). As we continued on, we came across a field of large collapsed sheet flows. The holes were a few meters in diameter. Sample #193 was collected from the edge of one of these collapsed sheet flows at 8:26 125 m N of wpt 3. At 8:34 we came across a region that appeared to be faulted sheet flows. At 8:40, we climbed to the top of a feature that appeared to be one of the large sheet flows pre-collapse just N of wpt 3. As we start to climb up to wpt 4, we encountered more talus flows with sparse in situ pillows. Sample #194 was collected at 9:45 from a pillow 460 m NW of wpt 4 as we continued upslope. As we continued upslope, there were a few large pillow walls. Sample #195, a pillow rim, was collected at 10:37 at wpt 4 from one of these walls.

4-8: Picked up watch just after having passed wp4. Soon, sample no. 196 was obtained at 2334 m depth from the crust of a pillow. We traversed relatively flat terrain (several hundred m) consisting of pillow lavas, with less sediment cover than expected. Arrived at a steep slope, initially whitish sediment predominated, then talus (gravel and blocks) sections and pillow lavas alternated. Sample No. 197 was taken from the crust of a pillow lava at 2393 m. Took few photos of marine life forms, including lilac “acorn” worm. Handed over watch ca. 550 m before having reached wp5.

8-12: We began our watch just below the peak at wpt 5 where we observed pyroclastic flows and large displaced blocks of pillows. Moved up a nose or promontory of pillow basalts with debris chutes on either side that quickly transitioned to sedimented volcaniclastic flows at the top of a small local high at the northern edge of the larger pancake volcano. We transited across the “flat” portion of the seamount and were surprised to see outrcops of sheet flows and jumbled flows with major fissures exposing 3-4 vertical meters of road cut that exhibit columnar jointing. We finished the dive at wpt 6 on top of a mound of draping pillows.

12-4: We began watch at wpt 6 where we collected Sample # 202 at 18:54 from the rim of pillow lava. Around 19:20 we encountered a few large sea urchins >20 cm in diameter. More hackled sheet flows were observed at 19:42. Sample #203 was collected at 19:51 from a pillow off a pillow wall 150 m N of wpt 7. Pillows continued as we descended into the saddle between wpts 7 and 8. Sample #204 was collected off a

pillow tube on a pillow wall at 21:03 392 m NE of wpt 8. At this point, the cable got hooked on the pillow wall we had just sampled, so we decided to shoot across the saddle in mid-water instead of traversing down to the bottom and back up. On top of the ridge heading to wpt 8, we observed lots of large coral and other fauna. Sample #208 was taken from a manatee-shaped pillow lava at 21:53 at wpt 8. We concluded our watch a little ways SW of wpt 8.
4-8: Picked up watch between wp8 and wp9 at 2021 m depth. Samples No.206 and No. 207 were obtained from pillow lava flows, before ascent at 17.00.

SEALOG SUMMARY
Date: 2024-04-021--2024-04-022, times in UTC
01:06:39.932- Jason in water. Saw jelly, tunicates, fishes.
02:50:52.319- On bottom. Saw coral, mostly broken pillows, sponge.
02:53:36.022- Waypoint 1. draping tubes. Saw sea anemone, sponge, sea stars, crinoid, shrimps, squat lobster, annelid.
03:10:30.654-Pyroclastic flow. Saw crinoid, cucumber, sponge.
03:23:44.513-took sample 187, Pillow basalt with ROV grab.
03:35:56.854-Talus. Saw sponge, coral, crinoid, sponge.
03:53:51.520-local high. Saw sponges, fish, cucumber, crinoids, pumice chunks occasionally, corals, sea stars.
04:12:13.844-Pillows. Saw sea anemones, sponges, corals, pumice, volcaniclastics, crinoid, fish.
04:23:36.354-Sediment.
04:24:38.102-Pillows. Saw fish, sponges, sea anemone, sea stars, corals, cucumber.
04:27:26.890- took sample 188, first piece broke into multiple pieces, ROV grab.
04:39:56.175-Lobate flows.
04:40:59.789-Sheet flows. Saw shrimp, coral.
04:43:40.105-Pillows, Lobate flows, Talus. Saw corals, squat lobster, volcaniclastics, slime star.
04:48:39.249-cross-section cliff. Saw fish, corals, cucumber, sponge, crinoid, sea star.
04:53:04.880-draping pillows. Lobate flows. Saw cucumber, corals, sponge, fish.
04:57:17.128-volcaniclastics, Lobate flows, Sediment.
05:03:24.845-Pillows. Saw cucumbers, sponge, corals, squat lobster, crinoid.
05:20:11.745- took sample 189, pillow knob in box 7, ROV grab.
05:28:55.346-Sediment.
05:29:16.200-Pillows. Saw sponges, acorn worm, coral, cucumbers, fish.
05:37:47.433-Talus. Saw corals, sea anemones, fishes, crinoid, sea stars, cucumbers, sponge,
05:55:34.133-Sediment. Saw crinoid, corals, cucumbers, sea anemone.
06:07:30.976-Pillows. Saw cucumbers, crinoid.
06:15:41.255-volcaniclastics. Saw cucumbers, corals, tephra, sediment, pillows, fishes, sea stars, shrimps, amphipod, sea anemone, pumice, sponge. 06:12:58.316- took sample 190, box 6 basalt knob, ROV grab.
06:29:27.351- Waypoint 2.

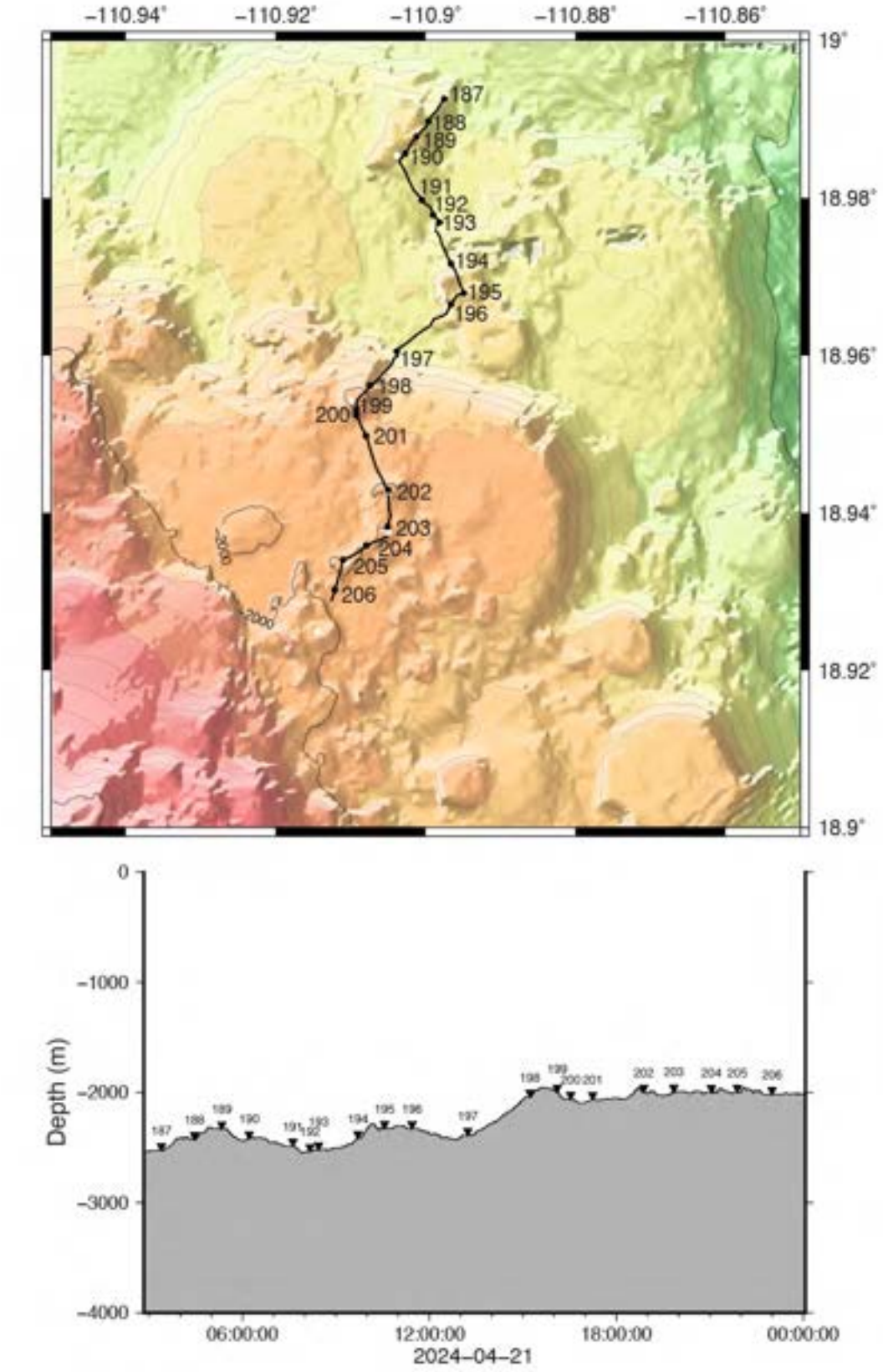
06:58:39.781-lava cliff/pit. Saw sea star, cucumber, octopus, crinoid, cucumber, crinoids.
07:01:20.360-platy sediment sheets. Saw cucumbers, fishes, shrimps, sea urchins, sea stars, coral.
07:25:30.429-Pillows & sediment. Saw crinoid, tunicates, sea stars, sponges, sea anemones, fish, sea urchin, crinoids, shrimps, cucumber.
07:37:05.138- took sample 191, pillow piece, ROV grab.
07:55:15.732-Pillows. Saw cucumber, shrimp, coral, sea urchin.
07:57:17.724-Sediment. Saw sea anemones, sea urchin, sea star.
07:59:10.151-Pillows. Saw cucumbers, sea stars, sponges, sea anemone, corals, sea urchin, fish.
08:09:50.097- took sample 192, pillow surface fragment, ROV grab.
08:21:43.451-tumulus like mound, sheet-like, with pillows around. Saw sea anemone, cucumbers.
08:24:47.469-sheet flow mound. Saw shrimp.
08:26:28.823- took sample 193, sheet flow fragment from breached edge, ROV grab.
08:27:49.921- large sheet flow expanse. Saw cucumber.
08:29:14.591- sparse pillows w/ abundant sediment.
08:30:38.682- sheet flow w/ collapsed roof. Saw cucumber, sea urchin.
08:33:24.967- sheet flow canyon, steep wall. Saw sea star, sponge,
08:34:48.436- faulted wall of sheet lava. Saw sponges, sea star, shrimp.
08:39:22.209- Sheet flows, large sheet flow mounds, sediment covered. Saw sea stars, sea urchin, shrimp, cucumber.
08:42:44.000- Waypoint 3.
08:46:23.161- pillow mound. Saw sea urchins, copepod, cucumbers, sponges, sea stars, shrimps, corals, acorn worm.
09:02:13.474- Sediment. Saw sea stars, xenos, crinoid, sea urchins, sea anemone, cucumbers, fishes, sea star, shrimps.
09:16:27.384- Talus w/ abundant sediment. Saw cucumbers, sea stars, sea anemone, sponge.
09:23:12.876- Sediment. Saw corals, sea stars, shrimp, sea urchin, sponge.
09:26:27.186- Pillows w/ abundant sediment. Saw crinoids, corals, cucumbers, sponges, fish, talus, sea star.
09:42:11.859- took sample 194, pillow fragment, ROV grab. Saw coral, sponges, sea anemone.
09:52:54.085-Pillows (steep slope, long tubes, all lava). Saw sea stars, cucumbers, corals, sponges, crinoid.
10:02:35.207-Talus.
10:03:08.297-Pillows. Saw sea stars, shrimp, cucumber, coral, squat lobster, sponges, fish, sea urchin,
10:14:10.306-Pillows (long tubes on steep wall). Saw fish sea stars, worm, talus, corals, crinoid, shrimp, sea anemone, sponge, cucumber.
10:29:44.066- Waypoint 4. Saw corals, fishes.

10:33:44.022- took sample 195, pillow surface fragment, ROV grab. Saw fishes, sea star, shrimps, corals, sea anemones, cucumbers, sponges, squat lobster.
11:26:25.241- took sample 196, large piece found below pillow; box 17, ROV grab. Saw shrimps, corals, sponges, cucumbers, fishes, crinoids, sea urchin, sea star.
12:15:53.304- went down pillow slope. Saw sea urchin, crinoid, sponge.
12:18:37.897- entered midwater.
12:20:12.377- back towards bottoms; pillows visible. Saw cucumbers, fish, sea star, sea urchins, shrimp.
12:53:52.557- bottom of slope before WP 5; heavily sedimented. Saw cucumbers, sea star.
12:55:41.430- small bits of talus within sediment. Saw brittle stars, cucumbers, sea anemone.
13:00:55.193- Pillows (long tubes). Saw cucumbers, large pillows visible within sediment, acorn worm, squat lobster.
13:13:53.172- took sample 197, small piece of broken pillow (~10cm block); box 11, ROV grab. Sediment. Saw brittle stars, fish.
13:26:47.897- pillows visible.
13:28:26.239- talus visible within sediment. Saw cucumber, sea urchins.
13:37:24.163- pillows visible in sediment. Cucumbers, sponge, fish, sea stars, stalk of something, sea urchin, squat lobster, brittle stars.
14:01:04.591- more pillows visible within the sediment. Saw cucumber, squat lobsters.
14:06:32.498- heavily sedimented area. Saw brittle stars, cucumbers, shrimps, sea stars, sea anemone.
14:24:19.249- larger blocks within sediment. Saw cucumber, acorn worms, crinoid, pumice block, starfish.
14:42:38.102- talus covered in sediment. Saw cucumbers, shrimps, fish, sea star.
14:53:11.470- volcaniclastic deposits. Saw fish, cucumbers, Talus.
14:59:04.647- Pillows (cross section). Saw sea star, fish, cucumber.
15:13:30.691- took sample 198, broken pillow chunk~15cm, box 13, ROV grab. Saw sea star.
15:18:55.327- broken pillows on uphill. Saw sea anemone, corals, tunicates, crinoid, cucumber.
15:24:55.495- abrupt transition from pillow mound to sediment. Saw corals, fishes, Crustacean, sea stars, volcaniclastics, sea urchin, cucumber, shrimp.
16:05:59.599- took sample 199, 2 pieces of small <10 cm pillow crust piece, box 12, ROV grab.
16:07:53.743- Waypoint 5.
16:10:04.228- draped pillows. Saw cucumbers, sponge, sea star, shrimp.
16:31:55.763- took sample 200, large piece of lava tube bud, box 16, ROV grab.
16:39:27.080- volcaniclastics and sediment cover. Saw sea star, jellies, fish.
16:55:39.531- ripple marks in sediment. Saw sea stars.
16:56:29.900- cracked sheet flow.
16:59:45.940- trench between faulted sheet flow outcrops. columnar jointing.
17:02:05.797- bulbous fractured pillows. Saw fishes.

17:07:44.094- Sediment. Saw sea stars.
17:10:36.364- Jumbled lava flow. Saw corals, crinoids, cucumber.
17:14:17.845- took sample 201, Jumbled sheet lava sample taken on the pancake flow, 525 m from waypoint 5 (basket 15), ROV grab.
17:20:02.032- massive mounds of jumbled sheet flow with large faults separating them. Saw cucumbers, sea stars.
17:22:58.054- sediment cover and some fractured pillows. Saw squat lobster, cucumber, coral, sea urchin.
17:30:15.290-fractured pillow outcrop. Saw many brittle stars on sediment, stalked sponge, sea urchin, fishes, sponges, xenophyophore.
17:48:10.852-Sediment. Saw shrimp, sea urchins, crinoid, acorn worm, shrimp, sponge, squat lobster, sea urchin, coral, sea anemone.
17:59:43.772-sheet-y textured pillow.
18:00:19.692-Sediment. Saw many brittle stars on sediment, cucumber, shrimp.
18:04:52.844-fractured pillow pieces. Saw crinoid, sponge, sea urchins, fish, cucumber.
18:23:58.576-pillow outcrop. Saw coral, sponge, Sea anemone, cucumber.
18:32:40.881-draped pillows on slope. Saw crinoid.
18:35:07.270-bulbous pillows and lobate flows. Saw crinoid, corals.
18:39:07.955-pillow slope. Saw sponge, coral.
18:44:42.644-Sediment.
18:52:56.337- took sample 202, pillow fragment, ROV grab.
18:55:21.418- Waypoint 6.
18:55:48.742-sparse pillows in abundant sediment. Saw cucumber, corals, shrimp.
18:58:31.641-Pillows. Saw shrimps, cucumbers, sea star, fish, crinoid, coral, sponge, crab.
19:06:58.395-Sediment. Saw sea star.
19:07:38.334-Pillows. Saw corals, cucumber, sea stars, tunicates.
19:11:19.178-sparse pillows, abundant sediment. Saw sea anemone, cucumbers, corals, sponge, sea stars, shrimp, fish, crabs, sea urchin.
19:26:05.620-Sediment. Saw Crustacean, Sea urchins, crab.
19:27:40.391-Pillows. Saw shrimp, sponge, fish.
19:29:21.092-Sediment. Saw fishes, sea urchin, sea star, shrimp, cucumber, xeno.
19:35:54.480-Pillows. Saw fish, sponges, sea stars, corals, cucumbers, sea anemone.
19:42:28.948-Sheet flows. Saw cucumber, sponge.
19:43:23.807-Pillows w/ abundant sediment. Saw sea star.
19:44:17.697-pillows w/ minor sediment. Saw tunicates, sponges, sea star, coral.
19:46:07.319-Talus. Saw cucumber, dead sponge.
19:48:17.554-wall of pillows. Saw cucumber.
19:50:32.999- took sample 203, pillow fragment, ROV grab. Saw shrimp, corals, crinoid, sponge, cucumbers.
19:59:19.642-Pillows w/ abundant sediment. Saw crinoids, cucumbers, squat lobster, sea stars, shrimps, corals.
20:08:04.016- Waypoint 7. Saw corals, sponges, shrimps, fish.
20:13:30.337-sparse pillows, abundant sediment. Saw cucumber, coral.

20:14:07.415-Pillows. Shrimp, sponge.
20:15:07.630- pillows, abundant sediment. Saw fish, sea anemone, cucumber, coral, sea star, cucumber, crab, shrimp, fish.
20:24:19.789- Pillows. Saw cucumber, shrimps, crinoid, cucumbers.
20:27:31.713- Pillows w/ abundant sediment. Saw sea stars, shrimps, cucumbers, fishes, corals.
20:34:33.940- Pillows w/ minimal sediment. Saw cucumbers.
20:37:53.843- Pillows w/ abundant sediment. Saw corals, cucumbers, crinoid, sea stars, sponges, shrimp, Crustacean.
21:03:00.147- took sample 204, pillow fragment, ROV grab.
21:05:42.076- steep wall of pillows. Saw tunicates, shrimps, corals, sponge.
21:12:24.367- abyss.
21:13:51.649- Talus. Saw coral.
21:25:59.479- Pillows w/ abundant sediment. Saw sponges, cucumbers, sea stars, shrimps, fishes, crab.
21:46:16.460- Waypoint 8. Saw sponge.
21:52:55.825- took sample 205, pillow fragment; fell into spot 2, smaller sample, ROV grab.
21:58:54.102- Sediment and talus. Saw cucumbers, sea star, shrimps, jelly.
22:02:23.978- Pillows. Saw corals, sea stars, cucumbers, crinoids, sponge, jelly, talus.
22:41:47.305-abyss.
22:42:18.583-Sediment next to pillows. Saw sea star, shrimp, jelly, sponge, cucumber.
22:48:45.828-Pillows. Saw sponges, corals, cucumbers, shrimp, squat lobster.
22:59:49.186- took sample 206, flat broken pieces of pillow; box 20, ROV grab. Saw Sponges, fishes, shrimp, sea stars, sea anemone.
23:32:19.893-sediment with some pillows visible. Saw coral, sponges.
23:34:02.662-ripples in sediment from wave action. Saw shrimp, cucumbers.
23:35:20.694-back into pillows. Saw squat lobsters, corals, shrimps, tunicates, cucumbers, sponges.
23:53:02.384-sedimented area; ripples in sediment. Saw brittle stars, Cucumber, shrimp.
00:04:37.585-Off bottom.

Sample and Terrain Maps



Sample Photographs
Dive: J2-1573

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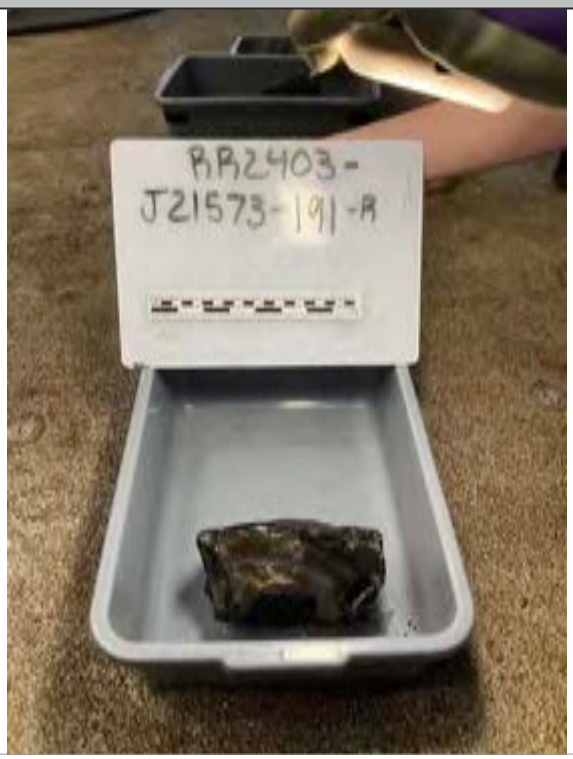

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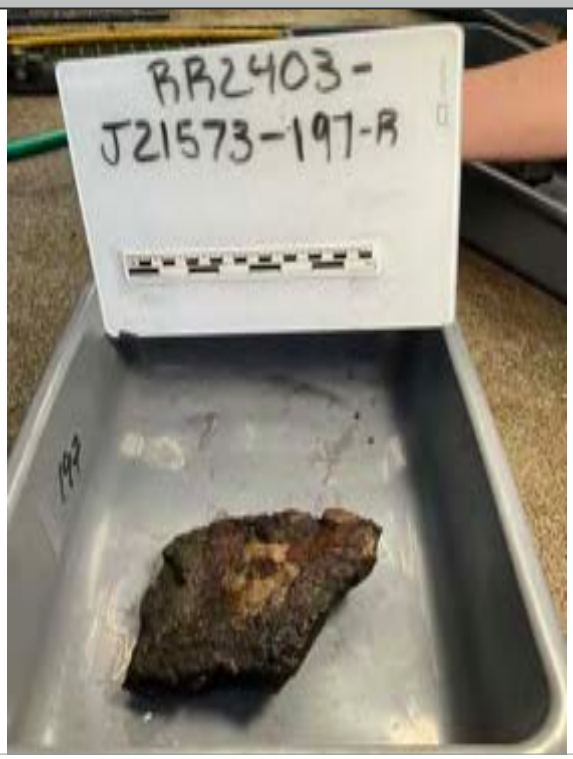

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RR2403-J21573-201R IGSN: 10.58052/URI0003D1

RR2403-J21573-202R IGSN: 10.58052/URI0003D2

RR2403-J21573-203R IGSN: 10.58052/URI0003D3

RR2403-J21573-204R IGSN: 10.58052/URI0003D4

RR2403-J21573-205R IGSN: 10.58052/URI0003D5

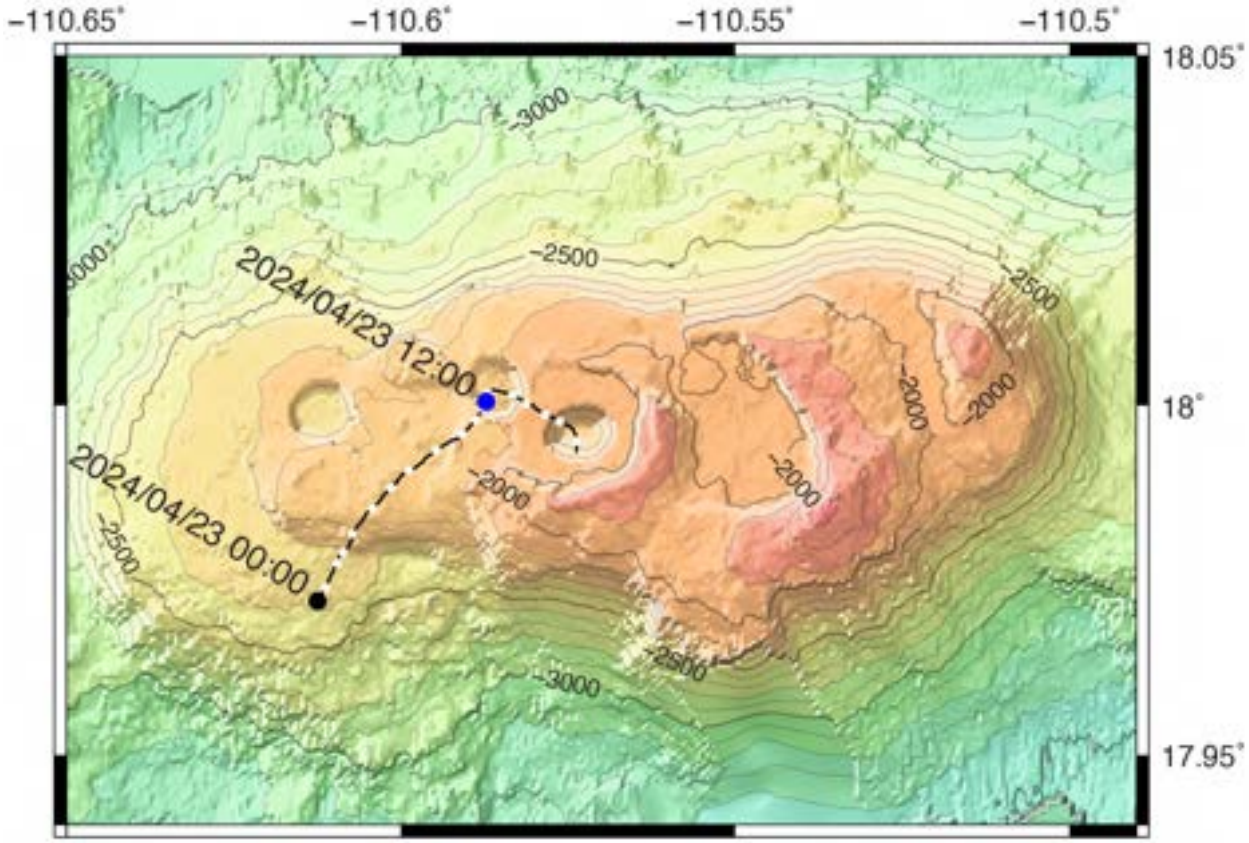
RR2403-J21573-206R IGSN: 10.58052/URI0003D6

RR2403-J21573-207R IGSN: 10.58052/URI0003D7	
	

Dive J2-1574 Summary Report
Date: 04/22/2024 – 04/23/2024
Site Description: Flanks and nested craters of Clairaut Seamount, on E flank of Mathematician Ridge
Physiographic Feature: seamount or seamount province
Physiographic Feature Name: Clairaut Seamount

Launch Location:	18.198°N, 111.017°W
Launch Depth:	3461 m
In Water:	2024-04-22T22:12:37.802Z
On Bottom:	2024-04-22T23:47:40.306Z
Off Bottom:	2024-04-23T18:48:39.180Z
On Deck:	2024-04-23T20:10:54.870Z

Dive Map



WATCH END SUMMARIES

12-4 PM: A hose on the. Jason crane burst during launch and needed repairing, so launch was delayed. On the second launch attempt, there was more hydraulic fluid leaking from the crane and Jason was put back on deck. Jason was finally in water at 22:12 and we had blue water for the remainder of our watch.

4-8 PM: Jason arrived at sea-bottom at 16.48 PM at 2373 m (wp1) on surface of "pancake"-shaped feature and navigated in direction NE across ± even terrain. Pillow lavas (sample No. 208) had an "older" appearance (Mn-coating) and protruded between areas of whitish sediment frequently holding numerous up to 5 cm-sized nodules (scoop-sample No. 209 at 2363 m, 500 m from wp2). Saw a dumbo octopus and sea-mouse (worm with iridescent spines). Saw occasional pumice blocks (< 1 m in diam.) on surface of pillow lavas. Some sediment areas had a dense accumulation of Mn-nodules. Sample 210 was taken at the base of the steep slope upward.

8-12: We began our watch just past wpt 2 in heavily encrusted talus at the base of the second volcanic plateau. Heading up the slope terraces of pillows and sediment define the edge of the plateau with extensive occurrence of nodules on the flat-sedimented sections. Sheet flows were observed at the top of the plateau in a region of fewer nodules, and the pillows seemed to have less Mn-coating. We ended our watch near between wpt 4 and 5 where we observed pillow outcrops of possibly different ages.

12-4 AM: We began watch a little ways NE of wpt 4 on top of some pillow lobes that appeared to be heavily encrusted with Fe-Mn crust. Between the pillow lobes were large fields of Mn Nodules. This landscape gave way to a region of sheet flows and Mn nodules. Sample #215 was a rounded cobble taken off the top of a pillow lobe at 7:33 425 m NE of wpt 4. Promptly after sampling, we started climbing a pillow wall to wpt 5 (8:28). Sample #216 was collected at 8:38 from a large pillow off the wall 44 m SW of wpt 5. Sample #217 was collected near the rim of the first crater at 10:20 ~530 m NE of wpt 5 and may be a sheet flow. We ended watch beginning our descent into the crater (center is wpt 6) at 10:25.

4-8 AM: Picked up watch just after having passed wp5, at the initial descent into crater. Plenty of talus deposits, but also pillow lavas (sample 218 was taken half-way down). When reaching the crater floor, we navigated across patches of flat sandy-gravelly sediment. Took pumice sample No. 219 lying on top of pillow lavas near the center of the crater, at 2198 m, 150 m from wp6. Sample 220 stems from pillow lava, also near center of crater. At wp6 we made a sharp turn from NE to SE, traversed talus deposits and whitish sediment patches. Lava sample 221 (brittle, glassy?) was obtained at the base of inner crater wall, where we also observed a massive lava wall that had no pillow structures (sample 222). More stretches of coarse talus followed.

8-12: We began our watch on the crater wall between wpts 6 & 7 in broken talus with chunks of more massive flows. Top of crater was covered in Mn pavement or volcaniclastic flows. We observed mostly pillows with biology-related sediment mounds (ant hills) between the 2 craters. Heading into the deep crater of wpt 8 we observed in-place outcrops of mostly pillows with some more massive flow units intermingled in the upper 50 meters of the crater wall and then talus all the way to the sedimented crater floor with numerous small trident/tripod fish. Due to time constraints, we decided to

redirect form wpt 8 and head south toward the southern edge of the crater. We only made it partway up the talus-covered southern wall before we had to leave bottom.
12-4 PM: Off bottom at 18:50 while exiting the south side of the crater with wpt 8 in the center.

SEALOG SUMMARY

Date: 2024-04-022--2024-04-023, times in UTC
22:12:37.802- Jason in water. Saw several siphonophores, Tunicates, Jellies, fishes, shrimps, worm.
23:47:40.306- On bottom. Waypoint 1. Saw sponges, stalk of something.
23:51:14.385- mostly sediment, some pillows visible, nodules in sediment.
23:53:43.939- went up pillow slope, a lot of sediment in space in between pillows, no nodules in sediment. Saw sponge, stalk of something and coral attached, acorn worm, sponges, tunicates, coral.
23:55:12.547- doppler reset
23:55:17.489- saw sponge, stalk of something, acorn worm, sponge, tunicate, coral, glass sponge
23:59:37.547- pillows. Saw crustacean, cucumbers, crinoid, tunicate, cucumber, sponge, sea star
00:04:55.270- sample 208, small pillow bulb
00:07:14.564- saw lots of tunicates, sponge, many glass sponges, coral, crinoid, cucumber, wire coral
00:10:14.829- FerroManganese. Saw sponges, sea star, crinoid, siphonophore, corals (one taller than Jason), cucumbers
00:49:28.568- saw squat lobsters, small dumbo octopus,
00:53:52.472- Sample 209, FeMn nodules in sediment; in box 16
01:02:50.297- saw cucumbers, sea urchin, sea anemone, crinoid
01:05:35.628- flat ropey texture in flow, some pillows visible, less sediment, still areas of FeMn nodules. Saw sponge, cucumbers, sea urchin (potentially), Sea anemone (upside down)
01:19:46.658- pillow lavas tubes and sediment. Saw sponges, Corals (stalk of something), Sea anemone, Sponge, Sea urchin, Fishes, cucumbers, crinoids
01:36:05.422- mini FeMn nodules. Saw squat lobster, corals, shrimp, sponges, cucumbers, fish, sea urchin, sea anemone, sponge with crinoid associate, Sponge cocktail, dead sponge, fish
02:02:09.073- Waypoint 2. Saw corals, sponges (live and dead), cucumbers, basket star, crinoid, squat lobsters
02:29:42.025- transition from sediment and nodules to bulbous pillows. Saw Sea anemone, dead sponge, sea star, cucumbers, squat lobster, golden spiky creature (sea mouse?), unknown spiky sparkly organism, sea anemone, sponge (dead and alive), sea star, polychaete worm
02:53:12.036- Sample 210, crusted pillow, ~20 cm, placed in basket 5
03:01:41.604- saw cucumbers

03:03:25.708- FeMn crusted talus pieces, headed up slope, talus. Saw sponge (dead), shrimp
03:07:01.115- FeMn crusted pillow wall
03:08:25.401- FerroManganese pavement, nodules. Saw glass sponge, tunicate, cucumbers, sponge, fish (halosaur), crinoid, squat lobster, stalked sponge,
03:24:33.394- transition between FeMn nodules and talus field. Saw sponge, cucumber.
03:27:07.391- larger pillows
03:28:30.341- FerroManganese pavement. Saw halosaur fish,
03:30:30.213- botryodial pillows and ferromanganese pavement. Saw cucumbers, sponges, stalked sponge, corals, crinoid
03:34:46.279- pillows, some flat crusted. Saw coral, sponges, tunicate, squat lobster, dumbo octopus
03:53:16.723- sample 211, crusted bulbous pillow, ~15 cm, placed in box 7
03:55:41.786- FeMn nodules among crusted pillows. Saw sponge
04:00:47.799- botryodial pillows. Saw corals (including bubble gum and one very tall), cucumbers, sponges
04:12:51.718- Botryoidal lava with Fe-Mn nuggets and sediments. Saw coral, tunicate,
04:16:00.193- sediment cover with small FeMn nodules. Saw fish, sponge, cucumbers, coral, crinoid
04:18:27.199- botryodial pillow flow with sediment on either side
04:18:44.103- pillow lava ridge. Saw cucumber, corals, sponges, fish, tunicate, crinoids, stalked sponge, shrimp
04:36:00.996- Sample 212, FeMn crusted pillow bud, ~10 cm, placed in box 6, 35 meters from 3
04:40:11.584- Waypoint 3
04:40:41.049- sediment. Saw fish
04:43:55.717- FeMn sediment. Saw fish (including trident)
04:47:30.538- botryodial crusted pillows and FeMn pavement
04:48:25.394- sediment. Saw coral.
04:52:56.221- FerroManganese nodules. Saw stalked sponge
04:54:37.929- FerroManganese pavement
04:54:52.955- pillows, botryodial crusted
04:56:20.147- sediment
04:56:29.031- FeMn crusted volcanoclastic flows?
04:56:59.128- broken pillow pieces
04:58:20.287- lava tubes with break out flows. Saw coral, sponge
05:04:15.182- possibly fresher flows? textured pillows. Saw cucumber, shrimp, corals
05:17:03.99- FeMn crusted pillows; nodules; and sediment. Saw cucumbers, stalked sponge
05:22:09.901- FeMn pavement
05:23:46.166- sheet flows
05:33:57.238- sample 213, 3 pieces of possible sheet flow, in box 8
05:37:46.981- FeMn crusted flows; possibly all sheet flows or volcanoclastic sediment; pillows as well. Saw shrimp, fish

05:41:10.747- bulbous pillows. Saw crinloids, coral (very tall),
05:50:38.560- broken pillows. Saw crinoid
05:53:58.056- FerroManganese nodules. Saw halosaur fish, cucumbers, sponge, stalked sponge, crinoid
06:02:15.927- botryoidal pillows and FeMn nodules
06:03:50.493- talus. Saw jelly, crinoid
06:13:29.729- FeMn crusted talus slope. Saw cucumber
06:31:24.957- sample 214, crusted pillow piece, ~15cm, placed in box 3, 100m to waypoint 4
06:37:42.082- talus slope. Saw sea urchin, sponge
06:39:19.765- large pillow; possibly crusted sheet flow. Saw stalked sponge

06:42:58.611- waypoint 4. Saw mushroom coral
06:43:55.003- FerroManganese pavement
06:45:18.45- pillows, younger looking lava flows. Saw jelly, sponges, Sea anemone, fish, cucumber, sea star
06:57:06.035- FerroManganese nodules. Saw cucumbers, coral,
07:09:14.466- FerroManganese nodule field. Saw cucumber, acorn worm, sponge, tunicate,
07:11:53.865- pillows, older looking again. Saw venus fly trap coral
07:14:25.301- Sheet flows w/ some pillows,
07:14:48.714- FerroManganese nodules
07:15:47.874- FerroManganese nodules & pillows. Saw coral, sea anemone (soft coral), fish, coral, sponges
07:20:55.617- mostly sheet w/ some pillows on top. Saw coral, shrimp
07:21:59.433- FerroManganese nodules. Saw fish
07:22:42.415- pillows. Saw many tunicates, shrimp
07:23:30.921- FerroManganese nodule field
07:24:05.598- Sheet flows mostly interspersed w/ nodules. Saw sea anemone,
07:25:45.804- pillows, low lying surrounded by Mn nodules
07:32:57.534- Sample 215, ? pillow piece or Mn nodule?
07:33:57.199- Saw cucumber, shrimp
07:34:48.994- low pillows w/ sheet flow beneath
07:35:38.962- sheet flow ridge surrounded by Mn nodule fields. Saw sea star, sponges, cucumber
07:38:53.046- sheet flows & Mn nodules. Saw many cucumbers, fish, sea anemone,
07:41:37.607- FerroManganese nodule field. Saw crinoid, cucumber
07:43:22.804- sheet flows w/ some pillows on top. Saw cucumber, coral, sea anemone, sea star, tunicate, sponge, fish
07:47:57.963- FerroManganese nodule field. Saw cucumbers, sea star
07:50:14.436- sheet flows. Saw fish,
07:47:57.963- FerroManganese nodule field. Saw cucumbers, sea star
07:50:14.436- Sheet flows. Saw xenos (?), cucumbers, sea stars, sponges, sea urchin, crinoid

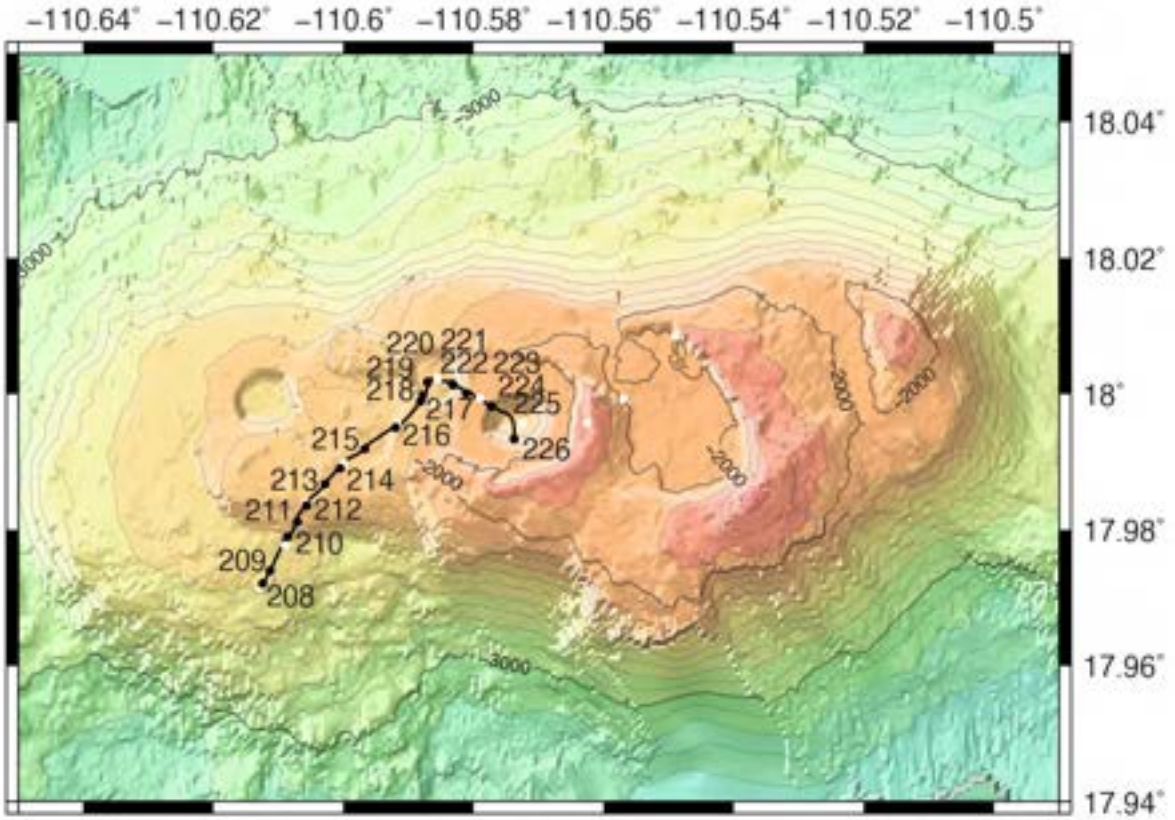
07:54:54.071- FerroManganese nodule field. Saw crinoid, sea stars (many), cucumber
07:57:21.650- sheet flows w/ some pillows on top. Saw coral, sponges, cucumber, fish, sea star, crinoid
08:02:35.080- pillows. Saw sea stars (lots), sponges, cucumbers, crinoid, shrimp, anemone, coral
08:13:10.909- Sheet flows w/ some ropy tubes. Saw sea stars, cucumber
08:15:47.959- FerroManganese nodule field. Saw cucumbers, shrimps, xenos (?), sea star, fish, sea anemone
08:24:42.812- sheet flows. Saw cucumber
08:24:59.265- FerroManganese nodule field. Saw cucumber, coral
08:26:10.871- talus. Saw worm, sea star, shrimps, corals, cucumber, sponge,
08:34:40.425- pillows w/ talus. Saw sea star, tunicate,
08:36:59.249- Sample 216, pillow fragment
08:40:56.409- talus. Saw sponge
08:41:20.521- Waypoint 5. Saw corals, fish, crinoid, shrimp, sponge, cucumber
08:45:20.507- talus. Saw sea star
08:46:05.261- pillows. Saw sponge w/ sea stars, corals, Crustacean (anthropod?), fish, sponge, sea star, tunicate, limpets
09:00:24.199- talus w/ some pillows. Saw worm, sea star, cucumber
09:04:47.332- FerroManganese nodule field. Saw sea star.
09:05:36.205- pillows
09:06:03.211- FerroManganese. Saw sponge
09:06:35.878- pillows
09:07:09.666- FerroManganese. Saw cucumber, coral
09:09:18.589- pillows. Saw cucumber
09:10:41.303- sheet flows. Saw coral.
09:11:02.943- Pillows. Saw cucumber
09:11:36.318- Sheet flows. Saw corals, shrimp, cucumbers, fish, sea stars, sponge
09:18:40.610- FerroManganese. Saw cucumber
09:20:36.951- Pillows & sediment. Saw sponge, sea anemone
09:22:49.982- Pillows. Saw cucumber, many sea stars
09:27:17.644- Sheet flows w/ Mn nodules. Saw corals, sea stars, shrimps,
09:36:37.906- FerroManganese nodule fields.
09:37:05.687- Pillows. Saw shrimps, sponge, cucumbers, sea stars, corals, acorn worm, sea anemone
09:55:50.613- failed attempt for sample 217; saw crustacean, sea star, cucumber, coral, shrimp,
10:07:22.515- sheet flows
10:07:29.417- sediment & Mn nodules. Saw sea stars (lots)
10:08:52.352- Pillows
10:09:43.939- sheet flows & sediment. Saw sponge
10:10:33.834- Pillows.
10:11:55.129- Sheet flows & Mn nodules. Saw sea stars, cucumber, sea anemone, sponge (dead)

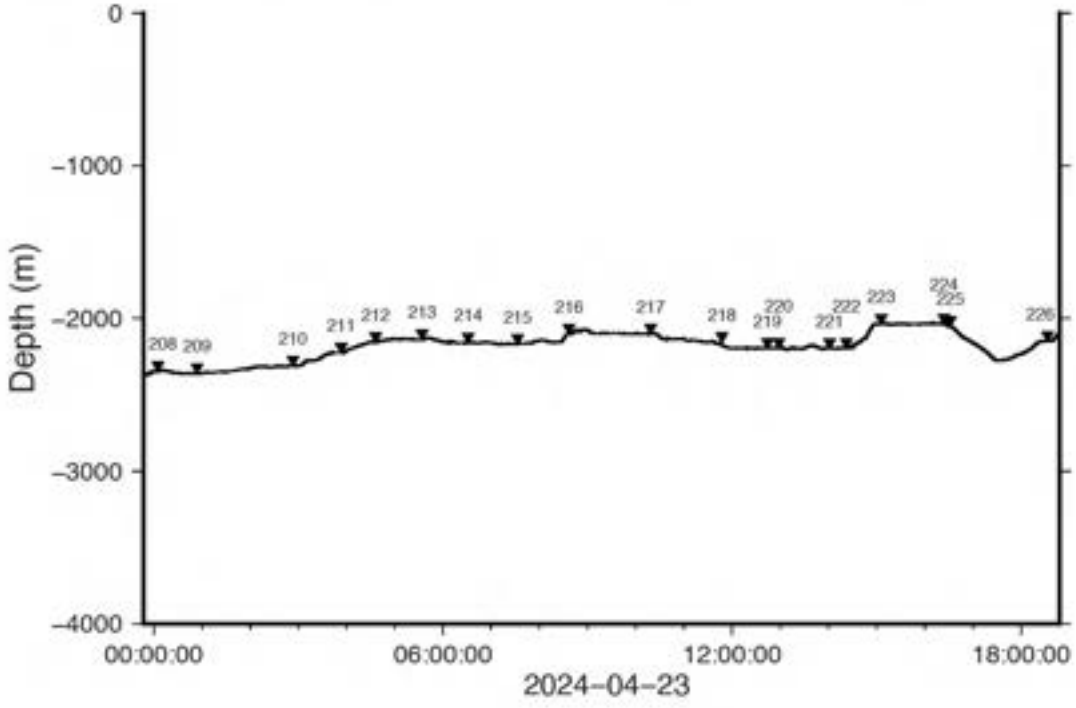
10:17:20.510- Pillows.
10:18:36.924- Sample 217, sheet flow fragment at edge of crater
10:23:17.252- Sheet flows.
10:25:23.748- over edge of crater
10:26:12.063- talus
10:26:56.020- Pillows. Saw shrimp
10:28:25.782- talus. Saw cucumber
10:32:41.468- Sheet flows. Saw sea stars, xeno, cucumber,
10:42:31.523- failed attempt at sample 218. Saw squat lobster
11:01:55.255- wall of in place rocks, with talus underneath. Saw fish.
11:04:33.467- Talus. Saw cucumbers, sea star, fish, squat lobster
11:27:01.684- Talus with some in place flow. Saw cucumbers.
11:34:12.522- Sample 218, ~15cm block of rock; box 10
11:40:17.991- flat shell-looking organism, fish
11:47:26.688- going down slope crater
11:47:41.955- Talus. Saw cucumbers, sea stars, squat lobster,
11:55:11.685- FerroManganese, bottom of slope inside crater, full of FeMn nodules. Saw cucumbers
11:59:33.211- some pillow flows visible within nodules. Saw shrimp, fishes, cucumbers, sea anemones
12:13:56.394- lower depression within crater. Saw shrimp, sea star, cucumbers,
12:44:06.945- Sample 219, pieces of pumice; box 9
12:53:30.776- saw squat lobster
12:58:14.884- Sample 220, pillow fragment; box 11
13:08:27.749- FerroManganese nodule plain
13:12:00.112- breccia
13:13:08.181- Pillows, some in place pillows and talus
13:13:56.555- Pillows, massive pillow wall
13:17:12.586- Waypoint 6. Saw sea stars (brittle stars), sea mouse, cucumber, fish
13:31:41.902- Talus. Saw sea stars, shrimps, cucumbers, squat lobster, acorn worm
13:56:07.081- Sediment with some pillows visible
13:57:05.531- flows with a lot of sediment cover. Saw sponge
14:01:27.749- Sample 221, block of pillow; box 12
14:10:30.928- saw squat lobster
14:12:14.500- went up slope of crater. Saw shrimps, sponge, squat lobster
14:22:20.284- Sample 222, loose chunk of rock; box 13; another piece of broken off rock; actually in box 14
14:25:28.875- Saw squat lobster
14:29:13.592- Talus. Saw cucumbers, sponges, shrimp
14:37:56.180- huge lava block. Saw sea star,
14:42:06.179- Pillows, some in place near talus. Saw sponge, cucumber, crinoids, fish, sea star, jelly (ctenophore)
14:49:12.218- Pillows, massive wall. Saw fish, cucumbers
14:51:31.221- Talus. Saw crinoids, shrimps, squat lobster, sea anemone, cucumber

14:54:56.919- Pillows, massive pillow wall. Saw coral, sea stars, cucumber,
14:59:54.506- striations on lava flow. Saw cucumbers sponge, fish
15:02:12.365- Sheet flows with ropy texture
15:05:52.973- Sample 223, 2 pieces of possible sheet flow, in box 13
15:12:05.749- FeMn coated volcanoclastics. Saw cucumber, fishes (halosaur), sea star
15:25:02.208- Sediment, possibly biology influenced circles in sediment; no FeMn nodules. Saw cucumbers, fish
15:30:43.226- small rock pieces with FeMn crust and nodules/ Saw stalk sponge,
15:33:02.626- Sediment, circles in sediment of absent FeMn nodules. Saw shrimp,
15:39:14.181- Pillows, small rounded pieces. Saw fish, cucumbers
15:47:59.375- FerroManganese pavement
15:49:05.108- Waypoint 7. Saw cucumber
15:50:02.321- Pillows. Saw fish, sea stars (brittle & purple slime), halosaur fish, shrimp
15:54:53.257- Pillows, larger. Saw cucumbers (including Spanish dancer), stalked sponge,
15:59:18.351- FerroManganese sediment; nodules; and pavement. Saw sea star, sponge, cucumber, squat lobster, Sea anemone, fish, coral, Sea urchin
16:14:00.644- Pillows, crusted. Saw cucumbers, crinoid (stalked)
16:21:20.402- Pillows, bulbous flows
16:23:47.714- Sample 224, broken pillow piece,~30cm, placed in box 20
16:26:25.714- Talus, entered crater on the way to waypoint 8; fractured pillow and talus wall. Saw cucumbers, sponge
16:31:45.234- sample 225, talus piece from start of crater, placed in box 15
16:33:39.478- down cliff (~250 m after point 7)going into crater of point 8
16:34:00.300- Saw cucumbers (including Spanish dancer)
16:37:57.264- Talus. Saw cucumber
16:42:23.743- Pillows, large, blocky. Saw cucumbers
16:43:40.798- Talus. Saw cucumber
16:47:27.436- Pillows, large blocks. Saw cucumbers (including Spanish dancer), shrimp, jelly, sponge (stalked)
17:00:01.360- Talus. Saw cucumbers (including Spanish dancer), shrimp, Sea anemone, sea stars, fish (eel)
17:20:14.227- Sediment, higher cover in between talus. Saw cucumbers (including Spanish dancer), fish (including halosaur), Sea anemone
17:28:42.209- Sediment at bottom of crater. Saw cucumbers (including Spanish dancer), Sea anemone, shrimp
17:37:15.145- Talus.
17:39:11.548- Tephra, volcanoclastic deposit. Saw fish, sponge
17:42:37.436- Pillows, large block. Saw long jelly, fish, cucumber, squat lobster
17:48:41.981- Talus. Saw slime star, shrimp, fish (small trident)
17:50:57.599- Pillows, larger more massive pillow blocks exiting the crater; headed up slope. Saw fish
17:53:14.281- Talus. Saw jellies, cucumber, squat lobster, slime star, crinoid, shrimp, cucumber (Spanish dancer),

18:04:20.022- Sediment, higher sediment cover between talus blocks. Saw sea star, cucumber (Spanish dancer), sponge (stalked)
18:14:52.393- Talus. Saw fishes (including halosaur), sea anemones, sea stars (many, small), sponge (stalked), shrimp
18:32:56.694- Sample 226, talus piece on crater slope, bio box 22
18:40:30.366- Talus, various sized talus blocks.
T18:48:39.180- Jason off bottom. Saw jellies, siphonophores, shrimp, tunicate

Sample and Terrain Maps

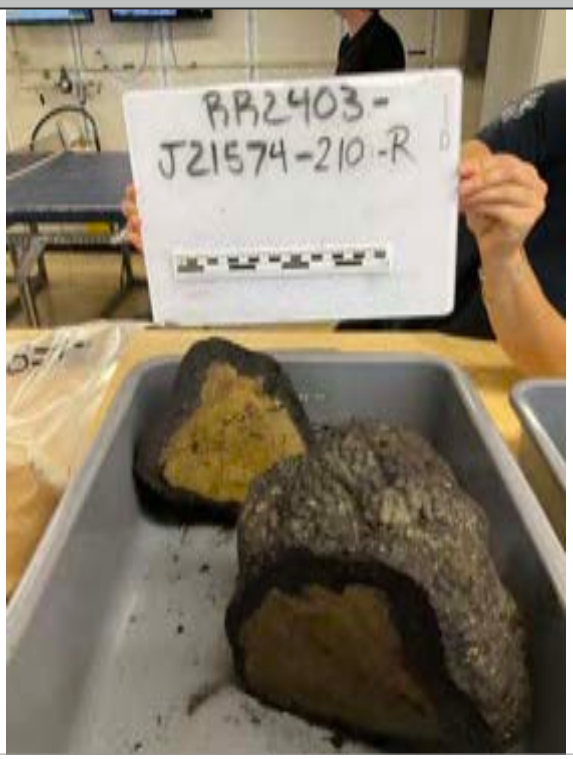




Sample Photographs
Dive: J2-1574

RR2403-J21574-208R IGSN: 10.58052/URI0003D8	
	
RR2403-J21574-209S IGSN: 10.58052/URI0003D9	
	

RR2403-J21574-210R IGSN: 10.58052/URI0003DA



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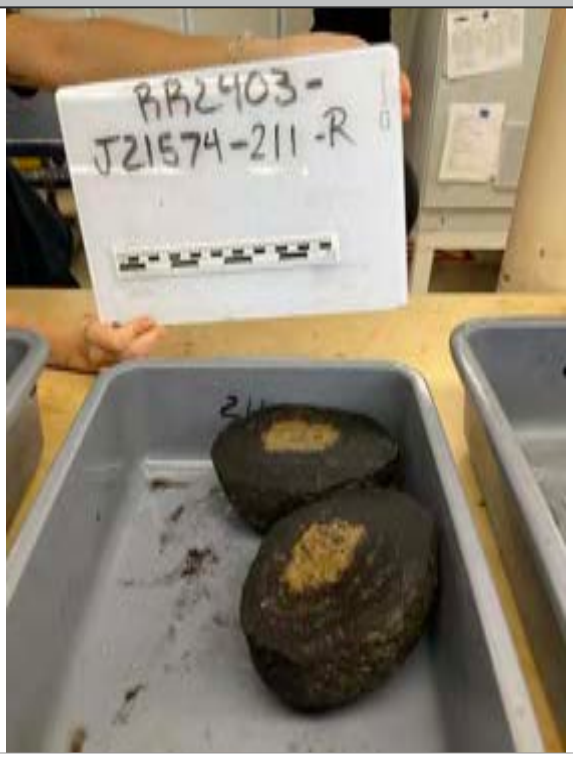

RR2403-J21574-212R IGSN: 10.58052/URI0003DC

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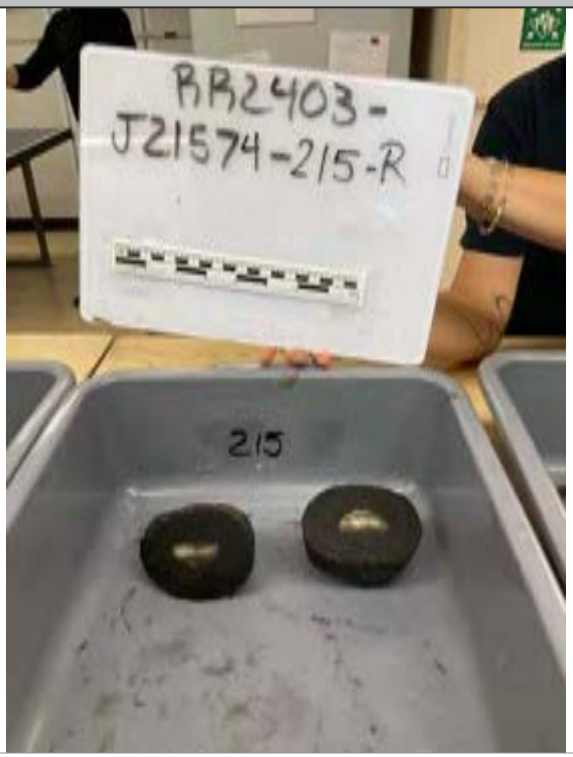
RR2403-J21574-214R IGSN: 10.58052/URI0003DE

RR2403-J21574-215R IGSN: 10.58052/URI0003DF

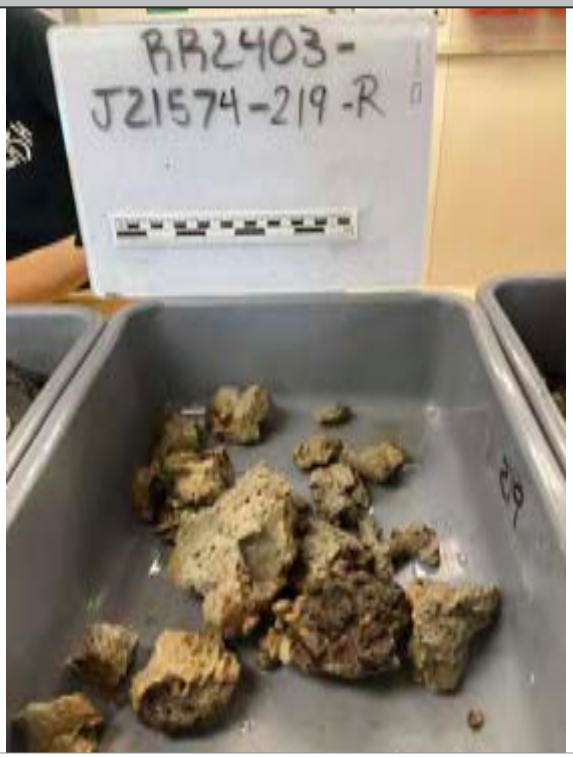


RR2403-J21574-216R IGSN: 10.58052/URI0003DG

RR2403-J21574-217R IGSN: 10.58052/URI0003DH

RR2403-J21574-218R IGSN: 10.58052/URI0003DI

RR2403-J21574-219R IGSN: 10.58052/URI0003DJ



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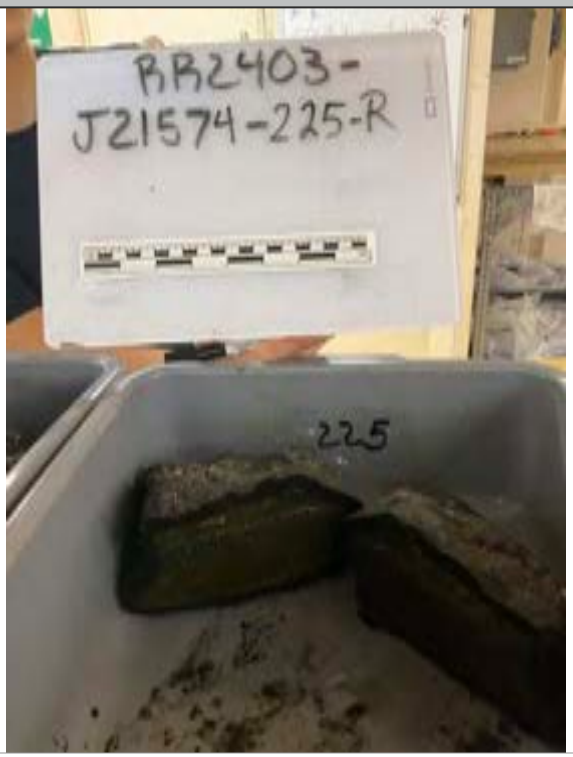
RR2403-J21574-221R IGSN: 10.58052/URI0003DL

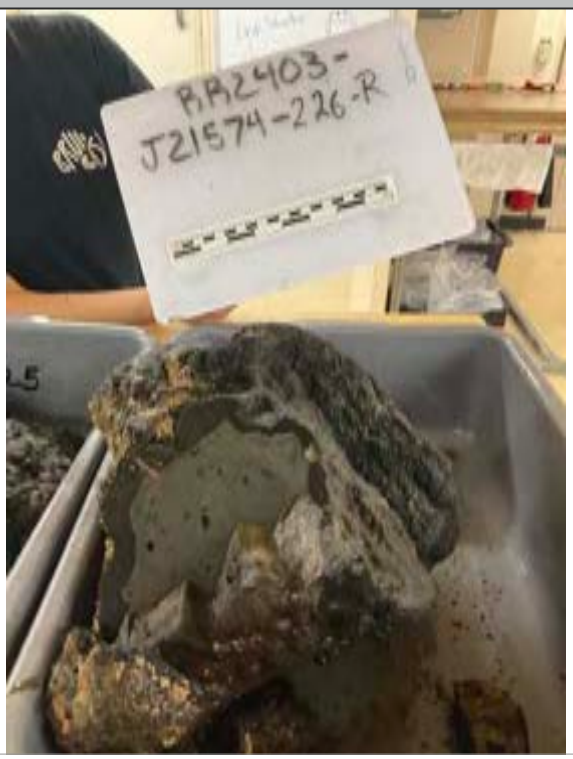
RR2403-J21574-222R IGSN: 10.58052/URI0003DM

RR2403-J21574-223R IGSN: 10.58052/URI0003DN

RR2403-J21574-224R IGSN: 10.58052/URI0003DO

RR2403-J21574-225R IGSN: 10.58052/URI0003DP



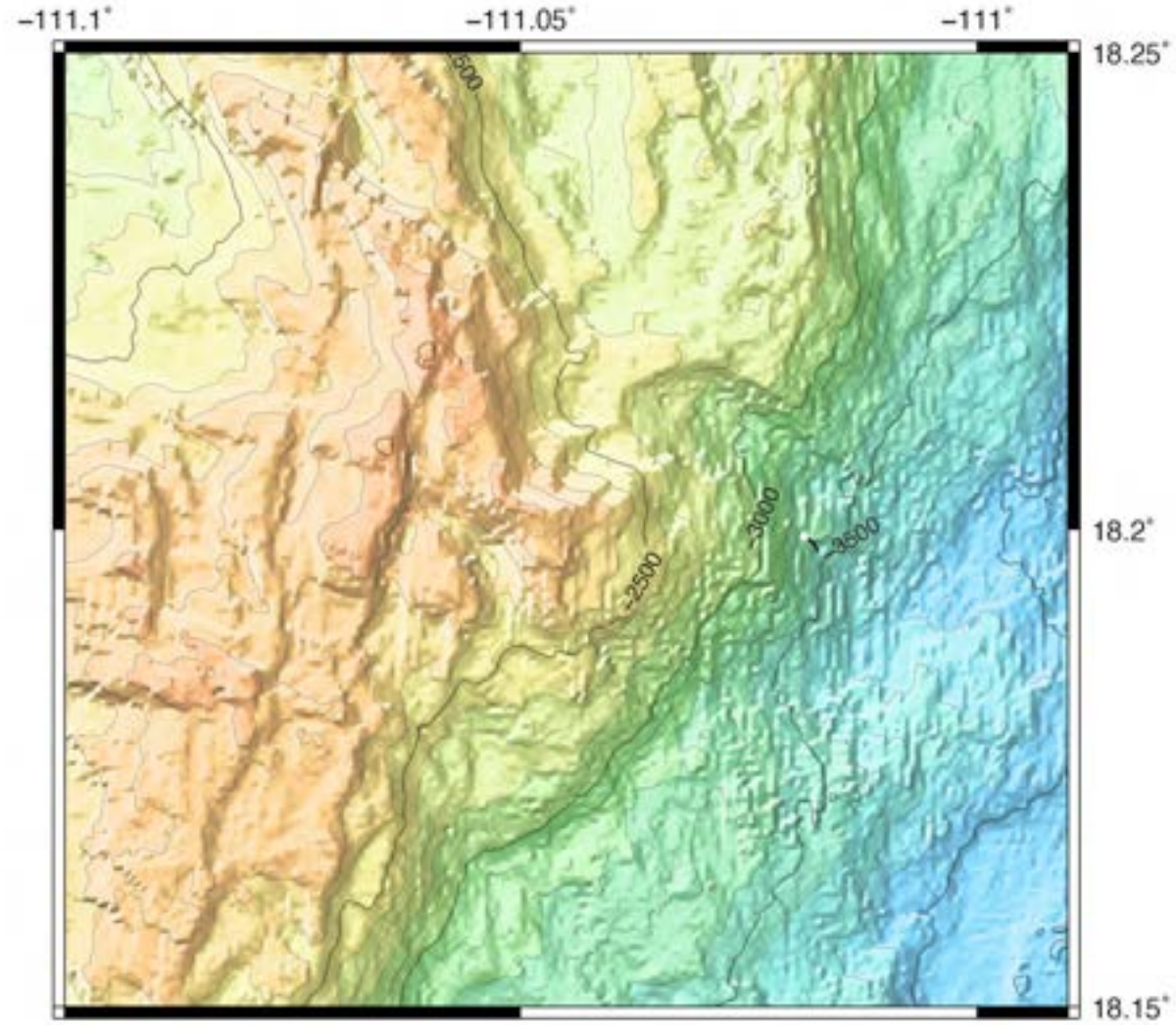
RR2403-J21574-226R IGSN: 10.58052/URI0003DQ	
	

Dive J2-1575 Summary Report
Date: 04/23/2024
Site Description: Weird Transform Feature Massif
Physiographic Feature: Axial valley
Physiographic Feature Name: Mathematician Ridge

Launch Location:	18.198°N, 111.017°W
Launch Depth:	3461 m
In Water:	2024-04-24T01:04:13.051Z
On Bottom:	2024-04-24T03:12:46.248Z
Off Bottom:	2024-04-24T04:13:51.242Z
On Deck:	2024-04-24T06:22:05.395Z

Dive Notes: Dive cut short due to presumed thruster oil leak.

Dive Map



WATCH END SUMMARIES

8-12: We reached bottom at 3:15Z in a heavily sedimented region with numerous xenophyophores and sea cucumbers. We continued upslope for about 100 meters before the pilots observed one of the thruster oil reservoirs was empty or near empty. Dive was aborted.

SEALOG SUMMARY

Date: 2024-04-024--2024-04-024, times in UTC
01:04:13.051- Jason in water. Saw ctenophores, fishes.
03:12:46.248- On bottom.
03:13:09.406- Sediment. Saw cucumbers, brittle star, sea stars, shrimp, xenophyophore, sea anemone, sea urchins, bivalve.
03:35:24.157- Sediment. Saw jelly, cucumber, sea star, cucumber, xeno, annelid, fish, sponge, sea pen.
03:47:31.149- Sediment. Saw cucumbers, sea star, xeno, sponge, crinoid, shrimp, fish, acorn worm, halosaur.
04:02:53.926- Sediment. Saw shrimp, fish, cucumber, squat lobster, a couple cylinder jellies.
04:13:51.242- Off bottom. Aborting dive.

Sample and Terrain Maps

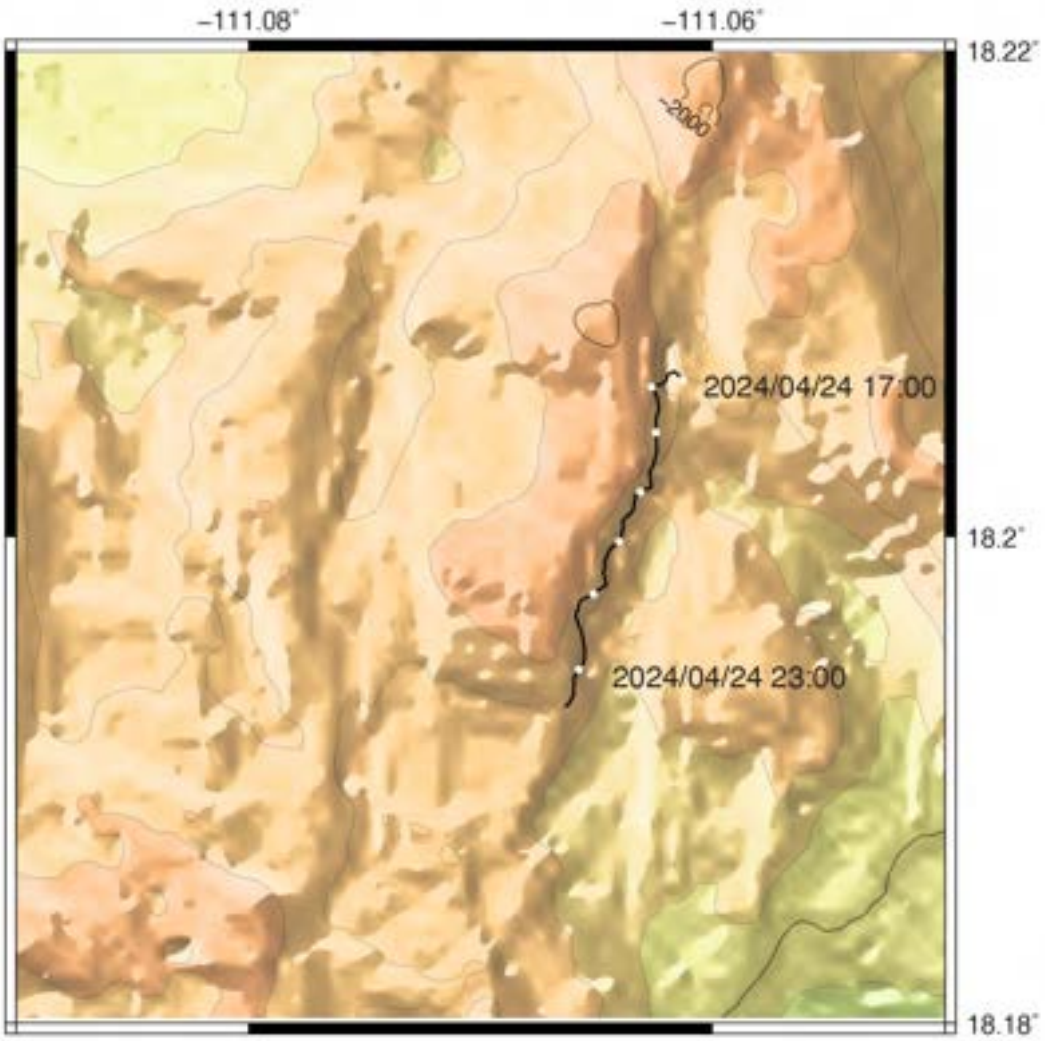
No Samples Obtained

Dive J2-1576 Summary Report
Date: 04/24/2024
Site Description: Weird Transform Feature Massif (upper faults)
Physiographic Feature:
Physiographic Feature Name:

Launch Location:	18.20688°N, 111.06186°W
Launch Depth:	2243 m
In Water:	2024-04-24T15:20:07.704Z
On Bottom:	2024-04-24T23:59:08.782Z
Off Bottom:	2024-04-24T23:59:08.782Z
On Deck:	2024-04-25T01:26:01.379Z

Dive Notes: Short dive to allow for survey time before departure to Manzanillo.

Dive Map



WATCH END SUMMARIES

8-12: We reached bottom SE of wpt 1 at 16:49Z in a region blanketed with polymetallic nodules near the base of a steep scarp to the west. We headed up the slope in a region of heavily encrusted talus ramp that transitioned into a near-vertical scarp of what appeared to be welded talus flows. As we moved from the steep scarp to the more gently sloping summit, extensive swath of Mn pavement covered most of the seafloor with an occasional outcrop of heavily encrusted pillow tubes. We then returned to the scarp to lateral along the wall to the south to image the “stratigraphy” of the various drifts of welded talus.

12-4 PM: We started watch by grabbing Sample #229 (chunk of pillow/ may be talus) at 19:06 220m SE of wpt 2 from a ridge. We continued to traverse up and down the fault scarp as we traversed south towards wpt 3. Sample #230 (chunk of pillow/ may be talus) was collected at 19:36 350m SE of wpt 2. At 19:47, we came across an almost featureless vertical wall with vertically oriented inverted channels that we believe may be a set of faults oriented perpendicular to the main fault scarp we were traversing between wpts 2 and 3. Sample #231 consists of 3 pieces of rock collected from inside one of the inverted channels (perpendicular faults?) at 20:05 450 m S of wpt 2. At 20:38, the talus slope we were observing began to look more loose/ active with fine sediment visible within the gaps. At 20:44 we observed what looked to be the first in-place pillow structures of the dive. A sample (#232) was collected from the pillow wall 650 m S of wpt 2. A second sample (#233) was collected a little ways farther S (610 m N of wpt 3) off a pillow wall at 21:34. We continued observing intermittent pillow walls with debris slides in between them for the remainder of our watch. We ended ~245 m N of wpt 3.

4-8 PM: Picked up watch at 2204 m between wp2 and wp3, when diving laterally down NNE-SSW oriented steep fault escarpment, consisting mostly of talus deposits (quite consolidated and coated with Mn-oxides). Few sections of coherent pillow lavas cut by obliquely-oriented faults were also visible, also few stretches of unconsolidated and loose talus (sub-rounded to sub-angular gravel and blocks, clast-supported with interstices filled by finer sediment). After wp3, we made a sharp turn toward the WNW and started ascending. At a stretch of loose talus at 2205 m, we collected several blocks (samples 234, 235, 236, and 237), before lifting Jason.

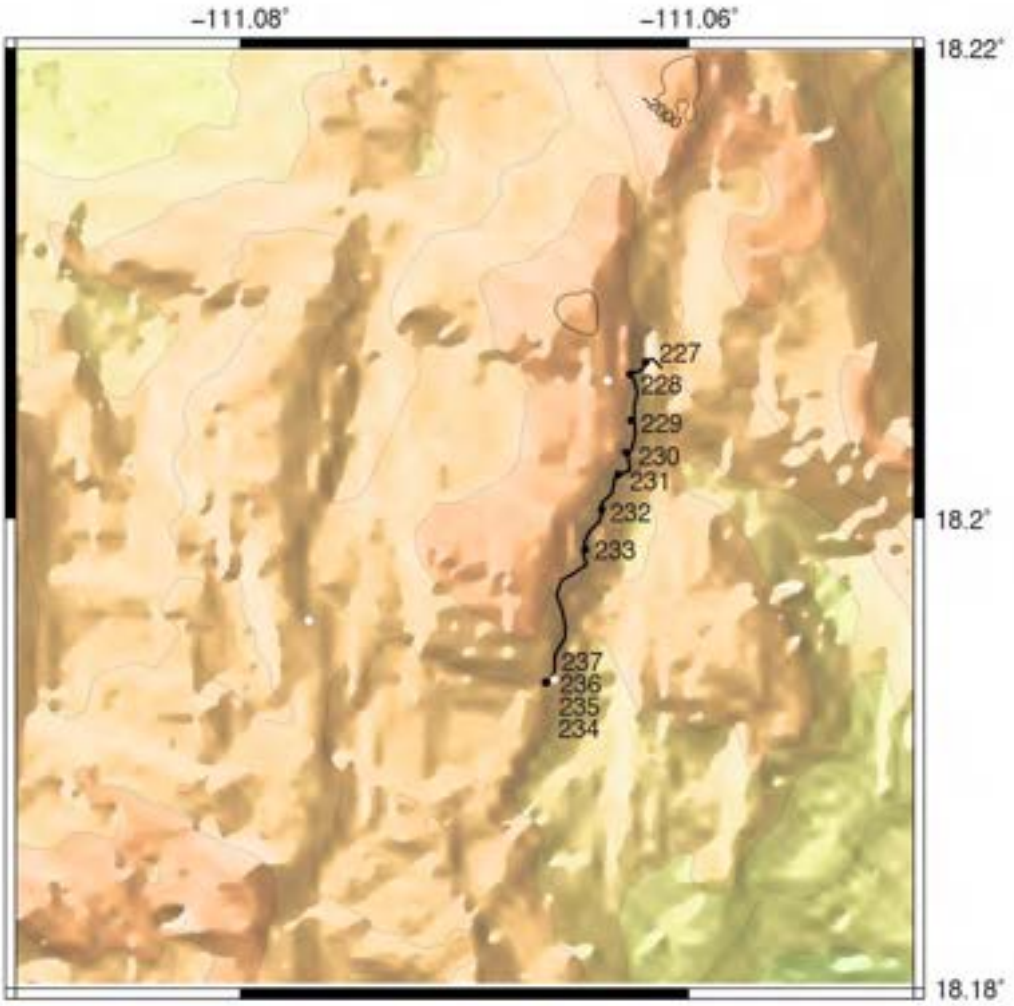
SEALOG SUMMARY

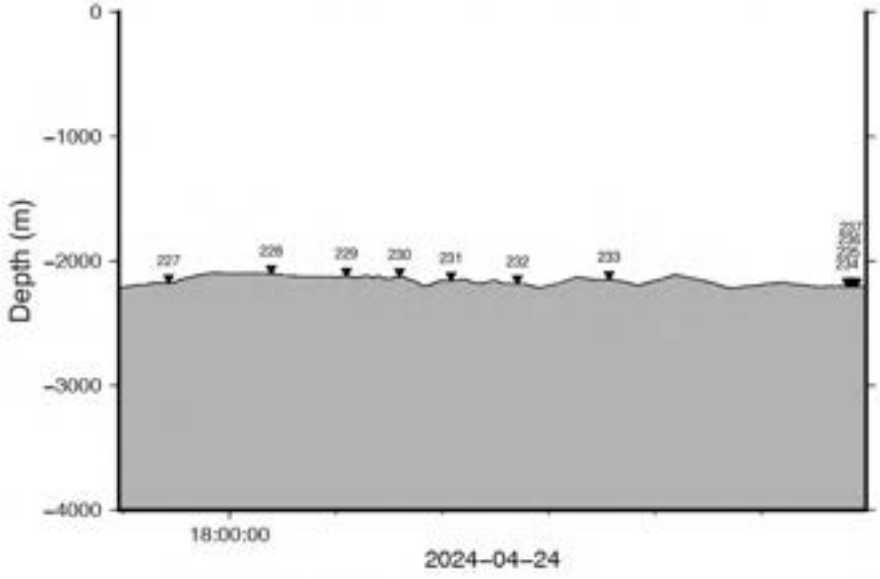
Date: 2024-04-024--2024-04-025, times in UTC
15:20:07.704- Jason in water. Saw jelly.
16:48:39.047- On bottom. Saw cucumbers.
17:00:30.791-FeMn coated talus and sediment. Saw cucumbers, small nodules, fishes, sea star.

17:17:27.504-massive crust wall with some FeMn coating. Saw sea star, squat lobster, crinoid, coral.
17:25:44.656- took Sample 227, ~10 cm FeMn crusted rock, in box 8 with ROV grab.
17:28:24.089-botryoidal textures on wall. Saw cucumber, coral, sponge.
17:31:27.682-solidified talus; breccia wall. Saw fish, cucumbers, crinoid, piece of wood with parent squat lobsters and baby squat lobsters, coral.
17:41:41.749- Waypoint 1.
17:43:23.684-pavement. Saw cucumber, fish.
17:52:11.395-FeMn welded talus. Saw fishes, sponge.
18:19:56.172-brecciated talus and pavement layer.
18:23:31.532- took Sample 228, ~15 cm crusted talus piece, in box 7 with ROV grab.
18:26:41.455-pavement. Saw cucumber.
18:30:08.234-large fracture; possible fault; in breccia. Saw cucumber.
18:36:21.675-layers in unit; possible flow layers or perhaps just uplifted crustal layers. Saw sea stars, coral, sea anemone, crinoid.
19:03:50.480-Mn crusted pillow ridge. Saw tunicates, sponge, cucumbers, sea anemone.
19:05:57.040- took Sample 229, piece from Mn coated pillow ridge with ROV grab.
19:11:49.070-Mn coated talus, almost vertical. Saw shrimp, sea star, sponges, cucumbers, coral.
19:15:44.701-canyon in Mn cemented talus. Saw sponge, cucumber, sea star, coral.
19:18:59.933-cliff in cemented talus. Saw sponges, Crustacean, Sea anemone, cucumber, corals, shrimp.
19:30:27.350-cliff in cemented talus. Fish, cucumbers.
19:32:09.892-pillow fragment ridge. Saw sponges, tunicate, crustacean.
19:35:53.196- took Sample 230, pillow piece, Mn crusted with ROV grab.
19:41:30.131-cemented talus cliff. Saw corals, sponge, cucumber, fish, crinoid, shrimp.
19:46:52.100-steep cliff of fine talus.
19:49:21.519-steep cemented wall of talus.
19:51:33.881-near vertical channel w/ pillow ridges in cemented talus cliff. Saw squat lobster.
19:57:32.109-channels as traces of faults that we are cross-cutting? Saw cucumber.
19:58:16.866-cemented fault breccia wall w/ channels. Saw cucumber, sponge, squat lobster.
20:04:53.333- took Sample 231, loose fragment, Mn coated, next to fault channel along elevated margin (3 pieces) with ROV grab.
20:07:41.668-deep fault channel in steep cemented talus cliff. Saw shrimp, corals, cucumbers, crinoid, fish, sea stars.
20:25:49.472-skinny linear rock fragment feature in talus slope. Saw cucumber, crinoid, coral.
20:28:21.823-less cemented, fine sediment underneath. Saw cucumbers, coral.
20:33:21.655-cemented talus cliff.
20:34:05.510-pillows w/in cemented talus fragment cliff.

20:35:21.858-pillows appear possibly in place in this area (heavily Mn coated). Saw sponge, coral, polychaete worm, sea anemone.
20:42:22.350- took Sample 232, pillow fragment, Mn coated, wall of apparently in place pillows with ROV grab.
20:50:09.541-pillow ridge in talus cliff. Saw jelly, cucumbers, coral, sponge, sea star. Talus w/ patches of cemented sediment.
21:03:09.490- pillow wall. Saw corals, sponges.
21:08:36.926-Talus. Saw sponges, corals, cucumbers, sea anemone, fishes, shrimp.
21:25:12.187-pillow wall. Saw cucumbers, squat lobster, sea star, corals, sponges, fish.
21:34:03.725- took Sample 233, pillow fragment with ROV grab.
22:04:43.654-wall of pillow fragments. Saw corals, cucumber, sponge, sea anemones, sea star.
22:10:56.147-Talus. Saw shrimps, corals, sea anemones, siphonophore, sponges, shrimp, fish, squat lobster, sea stars, cucumbers, jelly.
22:57:00.440-fault channels. Saw cucumbers, sponge, sea star, coral, sponge, squat lobster.
23:03:58.581- massive wall, FeMn crust coated (botryoidal texture). Saw squat lobsters.
23:08:07.506-talus channel. Saw fish, cucumber, squat lobster, sponge.
23:10:28.367-fault channels. Saw fishes, corals, cucumbers, sponge, shrimps, squat lobster, sea stars, sponges.
23:35:12.936-fault channels. Saw protists, corals, sponge, squat lobsters, brittle stars, shrimp, mushroom coral, sea spider.
23:44:54.877-fault channel. Saw squat lobsters.
23:48:14.949- took Sample 234, block of talus; box 9 with ROV grab.
23:50:06.610- took Sample 235, talus further up from 234; box 2 with ROV grab.
23:51:38.236- took Sample 236, block of talus further up from 235; box 10 with ROV grab.
23:53:36.839- took Sample 237, block of talus slightly lower that 236; box 10 with ROV grab.
23:59:02.879- Waypoint 3.
23:59:08.782- Off bottom. Saw jellies, tunicates, ctenophores, fishes.

Sample and Terrain Maps





Sample Photographs
Dive: J2-1576

RR2403-J21576-227R IGSN: 10.58052/URI0003DR

RR2403-J21576-228R IGSN: 10.58052/URI0003DS

RR2403-J21576-229R IGSN: 10.58052/URI0003DT

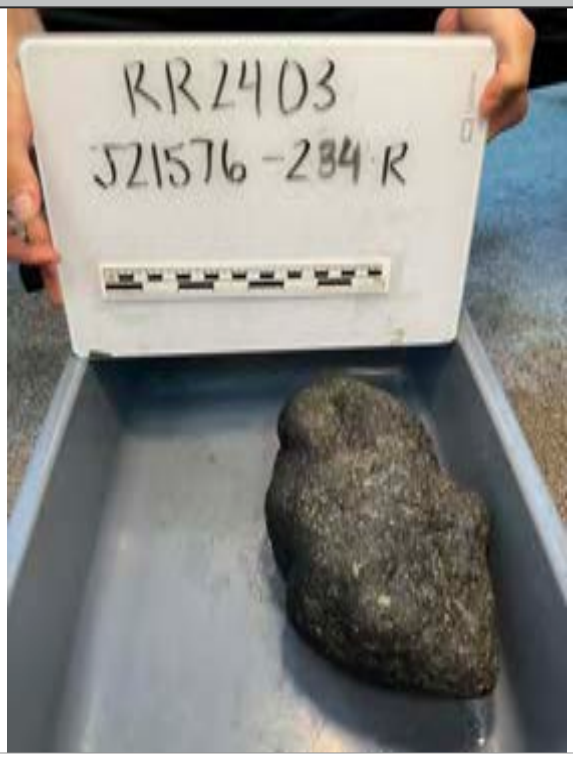
RR2403-J21576-230R IGSN: 10.58052/URI0003DU

RR2403-J21576-231R IGSN: 10.58052/URI0003DV

RR2403-J21576-232R IGSN: 10.58052/URI0003DW

RR2403-J21576-233R IGSN: 10.58052/URI0003DX

RR2403-J21576-234R IGSN: 10.58052/URI0003DY



RR2403-J21576-235R IGSN: 10.58052/URI0003DZ

RR2403-J21576-236R IGSN: 10.58052/URI0003E0

RR2403-J21576-237R IGSN: 10.58052/URI0003E1	
	

RR2403 Sample Descriptions

Sample Name	IGSN	Date/Time Stamp	Dive #	Latitude	Longitude	Depth (m)	Sample Type	Phys. Feature	Feature Name	Rock Type	Weathering	Vesicles (%)	OL (%)	PLAG (%)	PX (%)	FeMn	Glass
RR2403-J21563-001-R	10.58052/URI00036N	2024-04-03T22:02:37.198Z	J21563	18.338433	-114.56574	2072.95	ROV grab	seamount or seamount province	Clarion Island	Vesicular basalt	Light	30	5	3		x	x
RR2403-J21563-002-R	10.58052/URI00036O	2024-04-03T22:48:29.624Z	J21563	18.338649	-114.56908	1979.5	ROV grab	seamount or seamount province	Clarion Island	Vesicular basalt	Light	20	5	trace	3	x	x
RR2403-J21563-003-R	10.58052/URI00036P	2024-04-03T22:59:13.706Z	J21563	18.338568	-114.56936	1963.65	ROV grab	seamount or seamount province	Clarion Island	Vesicular basalt	Moderate	20	5			x	x
RR2403-J21563-004-R	10.58052/URI00036Q	2024-04-03T23:13:56.412Z	J21563	18.338497	-114.56962	1959.69	ROV grab	seamount or seamount province	Clarion Island	Vesicular basalt	Moderate	30	1			x	x
RR2403-J21563-005-R	10.58052/URI00036R	2024-04-03T23:57:49.210Z	J21563	18.340968	-114.56791	1950.43	ROV grab	seamount or seamount province	Clarion Island	Vesicular basalt	Moderate					x	x
RR2403-J21563-006-R	10.58052/URI00036S	2024-04-04T01:05:15.900Z	J21563	18.34432	-114.56663	1807.23	ROV grab	seamount or seamount province	Clarion Island	Vesicular basalt	Moderate	20-30		<1	<1	x	x
RR2403-J21563-007-R	10.58052/URI00036T	2024-04-04T01:36:18.491Z	J21563	18.345562	-114.56598	1704.27	ROV grab	seamount or seamount province	Clarion Island	Vesicular basalt	Light	20-30	2	5	<1		x
RR2403-J21563-008-R	10.58052/URI00036U	2024-04-04T03:19:44.790Z	J21563	18.350844	-114.56362	1485.02	ROV grab	seamount or seamount province	Clarion Island	Vesicular basalt	Light	30	3	1		x	
RR2403-J21563-009-R	10.58052/URI00036V	2024-04-04T04:17:27.380Z	J21563	18.353235	-114.56129	1440.04	ROV grab	seamount or seamount province	Clarion Island	Vesicular basalt	Moderate	20	2	1	2	x	
RR2403-J21563-010-R	10.58052/URI00036W	2024-04-04T06:00:35.779Z	J21563	18.360252	-114.56427	1626.58	ROV grab	seamount or seamount province	Clarion Island	Vesicular basalt	Light	30	3	2		x	x
RR2403-J21563-011-R	10.58052/URI00036X	2024-04-04T07:26:58.726Z	J21563	18.365678	-114.56482	1729.25	ROV grab	seamount or seamount province	Clarion Island	Vesicular basalt	Moderate	40	trace	trace		x	x
RR2403-J21563-012-R	10.58052/URI00036Y	2024-04-04T07:47:31.400Z	J21563	18.366532	-114.56381	1760.84	ROV grab	seamount or seamount province	Clarion Island	Vesicular basalt	Moderate	40				x	x
RR2403-J21563-013-R	10.58052/URI00036Z	2024-04-04T08:42:03.063Z	J21563	18.368553	-114.56329	1782.29	ROV grab	seamount or seamount province	Clarion Island	Vesicular basalt	Light	40	<1			x	x
RR2403-J21563-014-R	10.58052/URI00037A	2024-04-04T09:40:06.829Z	J21563	18.373417	-114.56309	1741.43	ROV grab	seamount or seamount province	Clarion Island	Vesicular basalt	Fresh	40	3	trace		x	x
RR2403-J21563-015-R	10.58052/URI00037B	2024-04-04T12:41:23.073Z	J21563	18.388065	-114.56958	1890.4	ROV grab	seamount or seamount province	Clarion Island	Vesicular basalt	Fresh	30	10	trace			x
RR2403-J21563-016-R	10.58052/URI00037C	2024-04-04T13:28:31.066Z	J21563	18.389781	-114.56944	1804.51	ROV grab	seamount or seamount province	Clarion Island	Vesicular basalt	Light	40	trace	trace		x	x
RR2403-J21563-017-R	10.58052/URI00037D	2024-04-04T14:26:14.982Z	J21563	18.392801	-114.5711	1698.24	ROV grab	seamount or seamount province	Clarion Island	Vesicular basalt	Moderate	30	3	3		x	x
RR2403-J21563-018-R	10.58052/URI00037E	2024-04-04T15:54:40.019Z	J21563	18.399087	-114.57154	1376.23	ROV grab	seamount or seamount province	Clarion Island	Vesicular basalt	Moderate	20	5	5		x	x
RR2403-J21563-019-R	10.58052/URI00037F	2024-04-04T17:32:45.733Z	J21563	18.404766	-114.56913	1505.41	ROV grab	seamount or seamount province	Clarion Island	Vesicular basalt	Light	30	5			x	x
RR2403-J21564-020-S	10.58052/URI00037G	2024-04-05T20:19:31.350Z	J21564	18.205918	-113.90351	2252.09	Scoop	seamount or seamount province		Sediment						x	
RR2403-J21564-021-R	10.58052/URI00037H	2024-04-05T20:33:24.478Z	J21564	18.205916	-113.90343	2245.81	ROV grab	seamount or seamount province		Vesicular basalt	Moderate	30	trace	trace	trace	x	x
RR2403-J21564-022-R	10.58052/URI00037I	2024-04-05T20:45:41.096Z	J21564	18.205948	-113.90288	2226.13	ROV grab	seamount or seamount province		Vesicular basalt	Light	20-30	5		<1	x	
RR2403-J21564-023-R	10.58052/URI00037J	2024-04-05T21:38:06.013Z	J21564	18.206682	-113.89822	2124.85	ROV grab	seamount or seamount province		Vesicular basalt	Heavy	30	trace	trace	trace	x	x
RR2403-J21564-024-R	10.58052/URI00037K	2024-04-05T23:55:49.158Z	J21564	18.210854	-113.89016	1834.58	ROV grab	seamount or seamount province		Vesicular basalt	Light	20	2	1		x	x
RR2403-J21564-025-R	10.58052/URI00037L	2024-04-06T00:52:53.085Z	J21564	18.211417	-113.88666	1691.69	ROV grab	seamount or seamount province		Vesicular basalt	Moderate	30	1	1	3	x	x
RR2403-J21564-026-S	10.58052/URI00037M	2024-04-06T01:44:25.248Z	J21564	18.211789	-113.885	1641.54	Scoop	seamount or seamount province		Sediment						x	
RR2403-J21564-027-R	10.58052/URI00037N	2024-04-06T03:53:45.912Z	J21564	18.212545	-113.87563	1673.55	ROV grab	seamount or seamount province		Vesicular basalt	Moderate	30	2	<1	2	x	x
RR2403-J21564-028-P	10.58052/URI00037O	2024-04-06T04:53:53.302Z	J21564	18.213242	-113.87081	1791.65	Push core	seamount or seamount province		Sediment							
RR2403-J21564-029-R	10.58052/URI00037P	2024-04-06T06:14:31.588Z	J21564	18.214752	-113.86453	1502.55	ROV grab	seamount or seamount province		Vesicular basalt	Moderate	30	<1	1	2	x	x
RR2403-J21564-030-R	10.58052/URI00037Q	2024-04-06T07:52:04.971Z	J21564	18.216715	-113.85565	1411.95	ROV grab	seamount or seamount province		Vesicular basalt	Moderate	20				x	x
RR2403-J21564-031-R	10.58052/URI00037R	2024-04-06T08:33:40.231Z	J21564	18.218532	-113.85133	1601.67	ROV grab	seamount or seamount province		Vesicular basalt	Fresh	10				x	
RR2403-J21564-032-R	10.58052/URI00037S	2024-04-06T09:27:35.930Z	J21564	18.220384	-113.84437	1158.37	ROV grab	seamount or seamount province		Vesicular basalt	Moderate	30				x	
RR2403-J21564-033-S	10.58052/URI00037T	2024-04-06T10:48:27.569Z	J21564	18.215594	-113.83751	1328.81	Scoop	seamount or seamount province		Sediment						x	
RR2403-J21564-034-R	10.58052/URI00037U	2024-04-06T11:51:11.044Z	J21564	18.214792	-113.83644	1304.33	ROV grab	seamount or seamount province		Vesicular basalt	Light	15	<2	<1			
RR2403-J21564-035-R	10.58052/URI00037V	2024-04-06T13:09:37.543Z	J21564	18.215659	-113.83236	1381.16	ROV grab	seamount or seamount province		Vesicular basalt	Heavy	30				x	x
RR2403-J21564-036-R	10.58052/URI00037W	2024-04-06T13:45:01.004Z	J21564	18.216138	-113.83177	1392.87	ROV grab	seamount or seamount province		Vesicular basalt	Light	30	trace	trace	trace	x	x
RR2403-J21564-037-R	10.58052/URI00037X	2024-04-06T14:21:41.031Z	J21564	18.217086	-113.83096	1390.63	ROV grab	seamount or seamount province		Vesicular basalt	Moderate	20	5	<1		x	x
RR2403-J21564-038-R	10.58052/URI00037Y	2024-04-06T15:20:11.326Z	J21564	18.218379	-113.82766	1319.38	ROV grab	seamount or seamount province		Vesicular basalt	Light	20	5			x	
RR2403-J21564-039-R	10.58052/URI00037Z	2024-04-06T16:17:27.922Z	J21564	18.220244	-113.82388	1317.13	ROV grab	seamount or seamount province		Vesicular basalt	Light	30	2		2	x	x
RR2403-J21564-040-R	10.58052/URI00038A	2024-04-06T17:06:54.603Z	J21564	18.222354	-113.82041	1376.54	ROV grab	seamount or seamount province		Vesicular basalt	Light	15				x	x
RR2403-J21565-041-R	10.58052/URI00038B	2024-04-07T02:20:25.401Z	J21565	18.024261	-113.38849	3255.15	ROV grab	seamount or seamount province		Basalt	Moderate	10		trace		x	x
RR2403-J21565-042-R	10.58052/URI00038C	2024-04-07T02:33:16.455Z	J21565	18.024556	-113.38831	3253.33	ROV grab	seamount or seamount province		Basalt	Moderate	5		trace		x	
RR2403-J21565-043-S	10.58052/URI00038D	2024-04-07T02:58:28.118Z	J21565	18.02583	-113.38792	3216.78	Scoop	seamount or seamount province		Manganese nodules						x	
RR2403-J21565-044-R	10.58052/URI00038E	2024-04-07T03:27:39.639Z	J21565	18.027119	-113.38729	3204.79	ROV grab	seamount or seamount province		Ferromanganese oxide crust						x	x
RR2403-J21565-045-R	10.58052/URI00038F	2024-04-07T06:11:22.194Z	J21565	18.03637	-113.38256	2916.73	ROV grab	seamount or seamount province		Ferromanganese oxide crust						x	x
RR2403-J21565-046-R	10.58052/URI00038G	2024-04-07T08:17:03.541Z	J21565	18.042327	-113.37829	2792.05	ROV grab	seamount or seamount province		Basalt	Very Heavy	50				x	
RR2403-J21565-047-R	10.58052/URI00038H	2024-04-07T08:41:24.995Z	J21565	18.044155	-113.37751	2693.84	ROV grab	seamount or seamount province		Manganese nodule	Light					x	x
RR2403-J21565-048-R	10.58052/URI00038I	2024-04-07T09:42:10.222Z	J21565	18.049075	-113.37489	2761.58	ROV grab	seamount or seamount province		Basalt	Light					x	
RR2403-J21565-049-R	10.58052/URI00038J	2024-04-07T11:23:29.400Z	J21565	18.057965	-113.36933	2921.51	ROV grab	seamount or seamount province		Basalt	Heavy					x	
RR2403-J21565-050-R	10.58052/URI00038K	2024-04-07T13:09:10.398Z	J21565	18.063785	-113.36759	3028.16	ROV grab	seamount or seamount province		Ferromanganese oxide crust	Light					x	
RR2403-J21565-051-R	10.58052/URI00038L	2024-04-07T13:49:50.592Z	J21565	18.063925	-113.36521	3025.35	ROV grab	seamount or seamount province		Heavily weathered basalt	Very Heavy	20				x	
RR2403-J21565-052-R	10.58052/URI00038M	2024-04-07T14:28:11.311Z	J21565	18.063701	-113.36272	2999.43	ROV grab	seamount or seamount province		Basalt	Light	0.5				x	x
RR2403-J21565-053-R	10.58052/URI00038N	2024-04-07T14:59:49.837Z	J21565	18.063594	-113.36206	2947.32	ROV grab	seamount or seamount province		Basalt	Light					x	
RR2403-J21565-054-R	10.58052/URI00038O	2024-04-07T21:17:08.546Z	J21565	18.059036	-113.3241	3341.3	ROV grab	seamount or seamount province		Hyaloclastite	Very Heavy	5				x	x
RR2403-J21566-055-R	10.58052/URI00038P	2024-04-09T03:27:09.164Z	J21566	18.163866	-111.8929	2866.06	ROV grab	seamount or seamount province		Basalt	Light	10		2	2		x
RR2403-J21566-056-R	10.58052/URI00038Q	2024-04-09T04:01:42.395Z	J21566	18.165318	-111.89205	2806.53	ROV grab	seamount or seamount province		Basalt	Moderate	5	trace	1	1	x	x
RR2403-J21566-057-R	10.58052/URI00038R	2024-04-09T07:17:25.171Z	J21566	18.179435	-111.88627	2566.45	ROV grab	seamount or seamount province		Basalt	Moderate	10		5			x
RR2403-J21566-058-R	10.58052/URI00038S	2024-04-09T08:05:29.906Z	J21566	18.182531	-111.88546	2503.6	ROV grab	seamount or seamount province		Basalt	Moderate	15		5		x	x
RR2403-J21566-059-R	10.58052/URI00038T	2024-04-09T09:15:43.885Z	J21566	18.18585	-111.88386	2392.39	ROV grab	seamount or seamount province		Basalt	Light	10	trace	2	1		x
RR2403-J21566-060-R	10.58052/URI00038U	2024-04-09T10:21:55.214Z	J21566	18.187834	-111.8832	2280.32	ROV grab	seamount or seamount province		Vesicular basalt	Light	10	1	1	1		x
RR2403-J21566-061-R	10.58052/URI00038V	2024-04-09T11:23:03.552Z	J21566	18.191201	-111.88201	2233.32	ROV grab	seamount or seamount province		Vesicular basalt	Light	10	<1		<1		x
RR2403-J21566-062-R	10.58052/URI00038W	2024-04-09T12:02:21.037Z	J21566	18.193539	-111.88112	2239.65	ROV grab	seamount or seamount province		Vesicular basalt	Moderate	15	trace	3	3		x
RR2403-J21566-063-R	10.58052/URI00038X	2024-04-09T13:03:43.899Z	J21566	18.197293	-111.88013	2236.82	ROV grab	seamount or seamount province		Basalt	Moderate	10					x
RR2403-J21566-064-R	10.58052/URI00038Y	2024-04-09T13:52:43.855Z	J21566	18.19926	-111.87859	2079.48	ROV grab	seamount or seamount province		Vesicular basalt	Moderate	20					x
RR2403-J21566-065-R	10.58052/URI00038Z	2024-04-09T14:47:47.338Z	J21566	18.202392	-111.87757	2059.67	ROV grab	seamount or seamount province		Glassy basalt	Light	2				x	x
RR2403-J21566-066-S	10.58052/URI00039A	2024-04-09T15:00:43.330Z	J21566	18.202536	-111.87739	2061.22	Scoop	seamount or seamount province		Sediment with volcaniclastics							
RR2403-J21566-067-R	10.58052/URI00039B	2024-04-09T15:39:30.306Z	J21566	18.204265	-111.87572	1979.42	ROV grab	seamount or seamount province		Vesicular basalt	Fresh	20-30	1	2	1		x
RR2403-J21566-068-R	10.58052/URI00039C	2024-04-09T16:46:03.035Z	J21566	18.20799	-111.87083	1870.01	ROV grab	seamount or seamount province		Basalt	Light	5					x
RR2403-J21566-069-R	10.58052/URI00039D	2024-04-09T18:02:30.795Z	J21566	18.2118	-111.86527	1706.47	ROV grab	seamount or seamount province		Vesicular basalt	Moderate	40		5			x
RR2403-J21566-070-R	10.58052/URI00039E	2024-04-09T19:48:42.774Z	J21566	18.213028	-111.85753	1901.27	ROV grab	seamount or seamount province		Vesicular basalt	Moderate	20					x
RR2403-J21566-071-R	10.58052/URI00039F	2024-04-09T20:28:17.967Z	J21566	18.213192	-111.85342	1942.77	ROV grab	seamount or seamount province		Vesicular basalt	Light	15					x
RR2403-J21566-072-R	10.58052/URI00039G	2024-04-09T21:04:08.230Z	J21566	18.213294	-111.85035	1900.6	ROV grab	seamount or seamount province		Vesicular basalt	Light	10	trace	5			x
RR2403-J21566-073-R	10.58052/URI00039H	2024-04-09T21:22:58.199Z	J21566	18.213476	-111.84894	1878.55	ROV grab	seamount or seamount province		Vesicular basalt	Light	40		5			x
RR2403-J21566-074-R	10.58052/URI00039I	2024-04-09T22:20:36.239Z	J21566	18.214197	-111.84418	1771.31	ROV grab	seamount or seamount province		Vesicular basalt	Light	40		7			x
RR2403-J21566-075-R	10.58052/URI00039J	2024-04-09T23:47:26.412Z	J21566	18.219972	-111.83922	1835.68	ROV grab	seamount or seamount province		Vesicular basalt	Light	40		5			x
RR2403-J21567-076-R	10.58052/URI00039K	2024-04-11T23:16:19.018Z	J21567	17.6340407	-111.01202	3392.484	ROV grab	axial valley	Mathematician Ridge	Microvesicular basalt	Light	15				x	x

Sample Name	IGSN	Date/Time Stamp	Dive #	Latitude	Longitude	Depth (m)	Sample Type	Phys. Feature	Feature Name	Rock Type	Weathering	Vesicles (%)	OL (%)	PLAG (%)	PX (%)	FeMn	Glass
RR2403-J21567-077-R	10.58052/URI00039L	2024-04-11T23:56:10.140Z	J21567	17.6353824	-111.01343	3278.711	ROV grab	axial valley	Mathematician Ridge	Vesicular basalt	Light	10-15				x	
RR2403-J21567-078-R	10.58052/URI00039M	2024-04-12T00:10:11.164Z	J21567	17.6354266	-111.01366	3252.318	ROV grab	axial valley	Mathematician Ridge	Breccia of vesicular basalt clasts	Light					x	
RR2403-J21567-079-R	10.58052/URI00039N	2024-04-12T00:54:44.567Z	J21567	17.6370434	-111.01499	3173.114	ROV grab	axial valley	Mathematician Ridge	Basalt	Moderate	5				x	
RR2403-J21567-080-R	10.58052/URI00039O	2024-04-12T01:39:12.692Z	J21567	17.6383161	-111.01626	3069.013	ROV grab	axial valley	Mathematician Ridge	Vesicular basalt	Light	10				x	
RR2403-J21567-081-R	10.58052/URI00039P	2024-04-12T02:23:19.238Z	J21567	17.6387308	-111.01704	2989.435	ROV grab	axial valley	Mathematician Ridge	Vesicular basalt	Moderate	5	1			x	x
RR2403-J21567-082-R	10.58052/URI00039Q	2024-04-12T03:32:45.594Z	J21567	17.6387194	-111.01851	2879.786	ROV grab	axial valley	Mathematician Ridge	Vesicular basalt	Moderate					x	
RR2403-J21567-083-R	10.58052/URI00039R	2024-04-12T05:31:28.521Z	J21567	17.6384401	-111.02653	2832.002	ROV grab	axial valley	Mathematician Ridge	Glassy basalt pillow tube	Moderate		1	3		x	x
RR2403-J21567-084-R	10.58052/URI00039S	2024-04-12T09:25:37.042Z	J21567	17.635688	-111.04277	2778.989	ROV grab	axial valley	Mathematician Ridge	Vesicular basalt	Moderate	5		3	2	x	x
RR2403-J21567-085-R	10.58052/URI00039T	2024-04-12T10:32:38.692Z	J21567	17.6355488	-111.04732	2746.919	ROV grab	axial valley	Mathematician Ridge	Basalt	Light	8				x	
RR2403-J21567-086-R	10.58052/URI00039U	2024-04-12T11:27:41.478Z	J21567	17.6353971	-111.04925	2593.395	ROV grab	axial valley	Mathematician Ridge	Vesicular basalt	Moderate	10				x	
RR2403-J21567-087-R	10.58052/URI00039V	2024-04-12T12:08:35.793Z	J21567	17.6351111	-111.05061	2492.328	ROV grab	axial valley	Mathematician Ridge	Basalt	Moderate	5				x	
RR2403-J21567-088-R	10.58052/URI00039W	2024-04-12T13:58:21.165Z	J21567	17.6342727	-111.05821	2693.995	ROV grab	axial valley	Mathematician Ridge	Basalt	Light	3		1		x	
RR2403-J21567-089-R	10.58052/URI00039X	2024-04-12T15:39:46.256Z	J21567	17.6340402	-111.06243	2807.373	ROV grab	axial valley	Mathematician Ridge	Vesicular basalt	Moderate	10		5	3	x	
RR2403-J21567-090-S	10.58052/URI00039Y	2024-04-12T16:08:13.595Z	J21567	17.6334167	-111.06404	2866.359	Scoop	axial valley	Mathematician Ridge	Manganese nodules						x	
RR2403-J21567-091-R	10.58052/URI00039Z	2024-04-12T16:25:59.786Z	J21567	17.6327241	-111.06476	2833.835	ROV grab	axial valley	Mathematician Ridge	Very heavily weathered basalt	Very Heavy					x	
RR2403-J21568-092-R	10.58052/URI0003A0	2024-04-13T01:49:53.377Z	J21568	17.7397916	-110.95434	2527.884	ROV grab	ridge crest	Mathematician Ridge	Basalt	Moderate	3	7			x	x
RR2403-J21568-093-R	10.58052/URI0003A1	2024-04-13T02:20:58.479Z	J21568	17.7410126	-110.95423	2498.468	ROV grab	ridge crest	Mathematician Ridge	Basalt	Light					x	x
RR2403-J21568-094-R	10.58052/URI0003A2	2024-04-13T04:18:56.417Z	J21568	17.7479135	-110.95567	2677.642	ROV grab	ridge crest	Mathematician Ridge	Vesicular basalt	Light	10				x	x
RR2403-J21568-095-R	10.58052/URI0003A3	2024-04-13T05:10:29.332Z	J21568	17.7518213	-110.95624	2665.759	ROV grab	ridge crest	Mathematician Ridge	Glassy basalt	Light					x	x
RR2403-J21568-096-R	10.58052/URI0003A4	2024-04-13T06:48:14.434Z	J21568	17.757374	-110.95745	2408.558	ROV grab	ridge crest	Mathematician Ridge	Glassy basalt	Light					x	x
RR2403-J21568-097-R	10.58052/URI0003A5	2024-04-13T07:30:54.680Z	J21568	17.7609995	-110.95806	2411.095	ROV grab	ridge crest	Mathematician Ridge	Basalt	Light	7				x	x
RR2403-J21568-098-R	10.58052/URI0003A6	2024-04-13T08:30:07.415Z	J21568	17.7654736	-110.95898	2328.734	ROV grab	ridge crest	Mathematician Ridge	Vesicular basalt	Light						x
RR2403-J21568-099-R	10.58052/URI0003A7	2024-04-13T09:42:07.161Z	J21568	17.7706438	-110.95948	2351.797	ROV grab	ridge crest	Mathematician Ridge	Vesicular basalt	Light	10				x	x
RR2403-J21568-100-R	10.58052/URI0003A8	2024-04-13T10:36:43.064Z	J21568	17.7740429	-110.95998	2494.968	ROV grab	ridge crest	Mathematician Ridge	Vesicular basalt	Light	10				x	x
RR2403-J21568-101-R	10.58052/URI0003A9	2024-04-13T11:24:12.381Z	J21568	17.7753801	-110.96068	2473.572	ROV grab	ridge crest	Mathematician Ridge	Glassy basalt	Moderate						x
RR2403-J21568-102-R	10.58052/URI0003AA	2024-04-13T13:00:47.226Z	J21568	17.7795227	-110.96068	2476.608	ROV grab	ridge crest	Mathematician Ridge	Basalt	Moderate	5				x	x
RR2403-J21568-103-R	10.58052/URI0003AB	2024-04-13T13:43:55.491Z	J21568	17.7809777	-110.96185	2559.406	ROV grab	ridge crest	Mathematician Ridge	Basalt	Moderate	5	1	1	1	x	
RR2403-J21568-104-R	10.58052/URI0003AC	2024-04-13T14:52:41.995Z	J21568	17.7820459	-110.9618	2586.92	ROV grab	ridge crest	Mathematician Ridge	Basalt	Light	5	1	<1	1	x	
RR2403-J21568-105-R	10.58052/URI0003AD	2024-04-13T17:11:38.627Z	J21568	17.7913385	-110.96466	2741.067	ROV grab	ridge crest	Mathematician Ridge	Basalt	Moderate	10	2	3	4	x	
RR2403-J21568-106-R	10.58052/URI0003AE	2024-04-13T18:39:54.144Z	J21568	17.7976084	-110.96672	2552.99	ROV grab	ridge crest	Mathematician Ridge	Vesicular basalt	Light	10-15	2	5	trace	x	
RR2403-J21568-107-R	10.58052/URI0003AF	2024-04-13T21:26:24.054Z	J21568	17.8105659	-110.97008	2562.515	ROV grab	ridge crest	Mathematician Ridge	Basalt	Light	10	3	5	1	x	x
RR2403-J21568-108-R	10.58052/URI0003AG	2024-04-13T22:14:50.674Z	J21568	17.8143279	-110.97142	2554.435	ROV grab	ridge crest	Mathematician Ridge	Basalt	Light	15	5	5	2	x	x
RR2403-J21568-109-R	10.58052/URI0003AH	2024-04-13T23:42:30.437Z	J21568	17.8169849	-110.97108	2496.257	ROV grab	ridge crest	Mathematician Ridge	Basalt	Light	10	5	3		x	x
RR2403-J21569-110-R	10.58052/URI0003AI	2024-04-15T02:57:09.444Z	J21569	18.8743588	-111.8293	2138.43	ROV grab	seamount or seamount province		Vesicular basalt	Light	30		10		x	x
RR2403-J21569-111-R	10.58052/URI0003AJ	2024-04-15T03:59:22.112Z	J21569	18.8737191	-111.82503	2039.888	ROV grab	seamount or seamount province		Vesicular basalt	Light	40	trace	5		x	x
RR2403-J21569-112-R	10.58052/URI0003AK	2024-04-15T04:39:20.505Z	J21569	18.873411	-111.82204	2030.476	ROV grab	seamount or seamount province		Volcaniclastic sediment	Heavy					x	x
RR2403-J21569-113-R	10.58052/URI0003AL	2024-04-15T05:59:57.819Z	J21569	18.8754688	-111.81642	1712.671	ROV grab	seamount or seamount province		Vesicular basalt	Moderate	40		7		x	x
RR2403-J21569-114-R	10.58052/URI0003AM	2024-04-15T07:40:18.363Z	J21569	18.8754147	-111.80955	1682.876	ROV grab	seamount or seamount province		Vesicular basalt	Heavy	20		5		x	x
RR2403-J21569-115-R	10.58052/URI0003AN	2024-04-15T07:59:48.498Z	J21569	18.8752459	-111.80775	1764.5	ROV grab	seamount or seamount province		Vesicular basalt	Moderate	45		10		x	x
RR2403-J21569-116-R	10.58052/URI0003AO	2024-04-15T08:50:08.382Z	J21569	18.875401	-111.80285	1973.066	ROV grab	seamount or seamount province		Ferromanganese oxide crust						x	
RR2403-J21569-117-R	10.58052/URI0003AP	2024-04-15T08:56:37.517Z	J21569	18.8754009	-111.80248	1974.035	ROV grab	seamount or seamount province		Vesicular basalt	Moderate	60	2	5		x	x
RR2403-J21569-118-R	10.58052/URI0003AQ	2024-04-15T09:44:14.810Z	J21569	18.8754056	-111.80108	2070.876	ROV grab	seamount or seamount province		Vesicular basalt	Light					x	x
RR2403-J21569-119-R	10.58052/URI0003AR	2024-04-15T11:04:28.881Z	J21569	18.8756167	-111.79396	2018.333	ROV grab	seamount or seamount province		Vesicular basalt	Light	60				x	x
RR2403-J21569-120-R	10.58052/URI0003AS	2024-04-15T12:20:59.548Z	J21569	18.8760687	-111.79058	1962.058	ROV grab	seamount or seamount province		Vesicular basalt	Moderate	50	trace	3		x	x
RR2403-J21569-121-R	10.58052/URI0003AT	2024-04-15T12:45:23.152Z	J21569	18.876657	-111.79047	1940.887	ROV grab	seamount or seamount province		Vesicular basalt	Moderate	80	trace			x	x
RR2403-J21569-122-R	10.58052/URI0003AU	2024-04-15T13:35:10.396Z	J21569	18.8788667	-111.78887	1940.077	ROV grab	seamount or seamount province		Volcaniclastic sediment						x	
RR2403-J21569-123-R	10.58052/URI0003AV	2024-04-15T13:58:41.609Z	J21569	18.880124	-111.78801	1933.759	ROV grab	seamount or seamount province		Vesicular basalt	Moderate	60				x	x
RR2403-J21569-124-R	10.58052/URI0003AW	2024-04-15T14:42:39.177Z	J21569	18.8816006	-111.78532	1929.383	ROV grab	seamount or seamount province		Vesicular basalt	Light	40				x	x
RR2403-J21569-125-R	10.58052/URI0003AX	2024-04-15T15:32:03.631Z	J21569	18.8817317	-111.78272	1769.316	ROV grab	seamount or seamount province		Highly vesicular basalt	Moderate	60-70		trace		x	x
RR2403-J21569-126-P	10.58052/URI0003AY	2024-04-15T17:28:43.667Z	J21569	18.8818731	-111.77313	1572.863	Push core	seamount or seamount province		Sediment							
RR2403-J21569-127-R	10.58052/URI0003AZ	2024-04-15T18:30:59.011Z	J21569	18.8813679	-111.76776	1437.166	ROV grab	seamount or seamount province		Vesicular basalt	Light	30				x	x
RR2403-J21569-128-R	10.58052/URI0003B0	2024-04-15T19:10:32.503Z	J21569	18.8815978	-111.7649	1567.33	ROV grab	seamount or seamount province		Vesicular basalt	Heavy	60		1		x	x
RR2403-J21569-129-R	10.58052/URI0003B1	2024-04-15T20:47:20.162Z	J21569	18.881531	-111.7561	1937.668	ROV grab	seamount or seamount province		Vesicular pillow basalt	Light	10	2	5	2	x	x
RR2403-J21569-130-R	10.58052/URI0003B2	2024-04-15T22:28:57.992Z	J21569	18.8807997	-111.75024	1898.41	ROV grab	seamount or seamount province		Vesicular basalt	Moderate	15	1	5	2	x	x
RR2403-J21570-131-R	10.58052/URI0003B3	2024-04-16T20:03:28.213Z	J21570	18.97051667	-112.17013	2099.39	ROV grab	seamount or seamount province	Roca Partida Island	Vesicular basalt	Moderate	80				x	x
RR2403-J21570-132-R	10.58052/URI0003B4	2024-04-16T21:26:36.433Z	J21570	18.97128	-112.16621	1992.14	ROV grab	seamount or seamount province	Roca Partida Island	Vesicular basalt	Light	50				x	x
RR2403-J21570-133-R	10.58052/URI0003B5	2024-04-16T21:57:04.824Z	J21570	18.97203333	-112.16399	1879.38	ROV grab	seamount or seamount province	Roca Partida Island	Vesicular basalt	Heavy	80				x	x
RR2403-J21570-134-R	10.58052/URI0003B6	2024-04-16T22:27:48.564Z	J21570	18.97282833	-112.16168	1759.54	ROV grab	seamount or seamount province	Roca Partida Island	Vesicular basalt	Light	40				x	
RR2403-J21570-135-R	10.58052/URI0003B7	2024-04-17T02:10:51.904Z	J21570	18.96397333	-112.15499	2184.96	ROV grab	seamount or seamount province	Roca Partida Island	Porphyritic basalt	Light	5		15		x	x
RR2403-J21570-136-R	10.58052/URI0003B8	2024-04-17T03:55:35.140Z	J21570	18.95741	-112.15053	1897.2	ROV grab	seamount or seamount province	Roca Partida Island	Vesicular basalt	Light	40		1			
RR2403-J21570-137-R	10.58052/URI0003B9	2024-04-17T04:07:52.823Z	J21570	18.95740667	-112.15055	1885.6	ROV grab	seamount or seamount province	Roca Partida Island	Hyaloclastite	Heavy					x	
RR2403-J21570-138-R	10.58052/URI0003BA	2024-04-17T04:11:11.329Z	J21570	18.95743	-112.15056	1883.93	ROV grab	seamount or seamount province	Roca Partida Island	Hyaloclastite	Heavy					x	
RR2403-J21570-139-R	10.58052/URI0003BB	2024-04-17T06:23:55.224Z	J21570	18.95048	-112.14764	1843.63	ROV grab	seamount or seamount province	Roca Partida Island	Vesicular basalt	Moderate	20		<1		x	x
RR2403-J21570-140-R	10.58052/URI0003BC	2024-04-17T06:33:50.348Z	J21570	18.95040167	-112.14761	1837.79	ROV grab	seamount or seamount province	Roca Partida Island	Vesicular basalt	Moderate	30		<1		x	x
RR2403-J21570-141-R	10.58052/URI0003BD	2024-04-17T07:35:43.773Z	J21570	18.94874	-112.14611	1879.95	ROV grab	seamount or seamount province	Roca Partida Island	Vesicular basalt	Moderate	30	trace	1		x	x
RR2403-J21570-142-R	10.58052/URI0003BE	2024-04-17T08:41:26.727Z	J21570	18.94541667	-112.14241	1858.89	ROV grab	seamount or seamount province	Roca Partida Island	Vesicular basalt	Moderate	10		1		x	x
RR2403-J21570-143-R	10.58052/URI0003BF	2024-04-17T09:32:26.000Z	J21570	18.94676833	-112.13921	1806.77	ROV grab	seamount or seamount province	Roca Partida Island	Vesicular basalt	Moderate	10		1		x	x
RR2403-J21570-144-R	10.58052/URI0003BG	2024-04-17T10:18:57.011Z	J21570	18.94762	-112.13617	1726.22	ROV grab	seamount or seamount province	Roca Partida Island	Vesicular basalt	Moderate	10		2		x	x
RR2403-J21570-145-R	10.58052/URI0003BH	2024-04-17T11:30:24.972Z	J21570	18.94883667	-112.13148	1694.82	ROV grab	seamount or seamount province	Roca Partida Island	Vesicular basalt	Light	10		2		x	x
RR2403-J21570-146-R	10.58052/URI0003BI	2024-04-17T12:12:31.809Z	J21570	18.94902167	-112.13067	1615.05	ROV grab	seamount or seamount province	Roca Partida Island	Vesicular basalt	Moderate	5		2		x	x
RR2403-J21570-147-R	10.58052/URI0003BJ	2024-04-17T13:17:54.437Z	J21570	18.95137833	-112.12853	1586.99	ROV grab	seamount or seamount province	Roca Partida Island	Vesicular basalt	Moderate	50				x	x
RR2403-J21570-148-R	10.58052/URI0003BK	2024-04-17T14:18:45.253Z	J21570	18.95378667	-112.13026	1594.8	ROV grab	seamount or seamount province	Roca Partida Island	Vesicular basalt	Light	5	<1	5		x	
RR2403-J21570-149-R	10.58052/URI0003BL	2024-04-17T16:33:51.664Z	J21570	18.95984333	-112.13452	1410.32	ROV grab	seamount or seamount province	Roca Partida Island	Vesicular basalt	Light	20-30					x
RR2403-J21570-150-R	10.58052/URI0003BM	2024-04-17T17:10:32.896Z	J21570	18.96132	-112.1332	1433.06	ROV grab	seamount or seamount province	Roca Partida Island	Volcaniclastic sediment	Heavy					x	
RR2403-J21571-151-R	10.58052/URI0003BN	2024-04-18T06:55:36.287Z	J21571	18.9889395	-111.30451	2845.373	ROV grab	seamount or seamount province		Volcaniclastic sediment	Moderate						
RR2403-J21571-152-R	10.58052/URI0003BO	2024-04-18T07:09:51.535Z	J21571	18.9901554	-111.30493	2877.398	ROV grab	seamount or seamount province		Ferromanganese oxide crust						x	
RR2403-J21571-153-R	10.58052/URI0003BP	2024-04-18T08:34:00.460Z	J21571	18.9959229	-111.30752	2736.775	ROV grab	seamount or seamount province		Ferromanganese oxide crust						x	

Sample Name	IGSN	Date/Time Stamp	Dive #	Latitude	Longitude	Depth (m)	Sample Type	Phys. Feature	Feature Name	Rock Type	Weathering	Vesicles (%)	OL (%)	PLAG (%)	PX (%)	FeMn	Glass
RR2403-J21571-154-R	10.58052/URI0003BQ	2024-04-18T08:49:24.050Z	J21571	18.9965411	-111.30796	2707.849	ROV grab	seamount or seamount province		Basalt	Heavy			1	1	x	x
RR2403-J21571-155-R	10.58052/URI0003BR	2024-04-18T11:20:42.593Z	J21571	19.0036536	-111.30903	2537.927	ROV grab	seamount or seamount province		Basaltic scoria	Light	60				x	x
RR2403-J21571-156-R	10.58052/URI0003BS	2024-04-18T12:52:56.303Z	J21571	19.0068859	-111.30954	2418.784	ROV grab	seamount or seamount province		Volcaniclastic sediment						x	
RR2403-J21571-157-R	10.58052/URI0003BT	2024-04-18T13:20:16.406Z	J21571	19.0070942	-111.30953	2408.124	ROV grab	seamount or seamount province		Volcaniclastic sediment	Very heavy						
RR2403-J21571-158-R	10.58052/URI0003BU	2024-04-18T14:20:50.492Z	J21571	19.0093822	-111.30967	2314.691	ROV grab	seamount or seamount province		Reticulitic basalt	Light	90				x	x
RR2403-J21571-159-R	10.58052/URI0003BV	2024-04-18T15:04:30.604Z	J21571	19.0108806	-111.30952	2324.645	ROV grab	seamount or seamount province		Basalt	Very heavy					x	x
RR2403-J21571-160-R	10.58052/URI0003BW	2024-04-18T16:58:31.215Z	J21571	19.0149067	-111.30867	2126.427	ROV grab	seamount or seamount province		Basalt	Very heavy	5	1	1		x	x
RR2403-J21571-161-R	10.58052/URI0003BX	2024-04-18T17:43:30.446Z	J21571	19.017628	-111.30814	2073.91	ROV grab	seamount or seamount province		Basalt	Heavy	3	1	1		x	x
RR2403-J21571-162-R	10.58052/URI0003BY	2024-04-18T19:05:05.088Z	J21571	19.0219216	-111.30772	1904.085	ROV grab	seamount or seamount province		Volcaniclastic sediment	Heavy					x	x
RR2403-J21571-163-R	10.58052/URI0003BZ	2024-04-18T19:37:56.953Z	J21571	19.0231987	-111.30802	1912.842	ROV grab	seamount or seamount province		Basalt	Heavy			1	trace	x	x
RR2403-J21571-164-R	10.58052/URI0003C0	2024-04-18T20:25:24.814Z	J21571	19.0268353	-111.30693	1946.616	ROV grab	seamount or seamount province		Basalt	Heavy		1	1		x	
RR2403-J21571-165-R	10.58052/URI0003C1	2024-04-18T21:26:12.064Z	J21571	19.0306798	-111.30897	2001.744	ROV grab	seamount or seamount province		Basalt	Heavy			trace		x	x
RR2403-J21571-166-R	10.58052/URI0003C2	2024-04-18T23:57:15.210Z	J21571	19.0361267	-111.31157	2007.105	ROV grab	seamount or seamount province		Vesicular basalt	Heavy	10-20				x	
RR2403-J21572-167-R	10.58052/URI0003C3	2024-04-19T21:40:16.994Z	J21572	19.0797279	-110.76048	2585.336	ROV grab	seamount or seamount province		Basalt	Moderate	10	1	1		x	x
RR2403-J21572-168-R	10.58052/URI0003C4	2024-04-19T22:02:04.987Z	J21572	19.0813681	-110.75932	2551.865	ROV grab	seamount or seamount province	San Benedicto Island	Pumice	Moderate	30					x
RR2403-J21572-169-R	10.58052/URI0003C5	2024-04-19T23:09:34.567Z	J21572	19.0838826	-110.757	2527.634	ROV grab	seamount or seamount province	San Benedicto Island	Pumice	Moderate	40					x
RR2403-J21572-170-R	10.58052/URI0003C6	2024-04-19T23:49:34.753Z	J21572	19.0839895	-110.75704	2522.783	ROV grab	seamount or seamount province	San Benedicto Island	Pumice	Moderate	30		1	1	x	
RR2403-J21572-171-R	10.58052/URI0003C7	2024-04-20T00:28:33.014Z	J21572	19.0862295	-110.75504	2428.55	ROV grab	seamount or seamount province	San Benedicto Island	Basalt	Moderate	10	5	5		x	x
RR2403-J21572-172-R	10.58052/URI0003C8	2024-04-20T01:09:42.043Z	J21572	19.0878681	-110.75404	2328.178	ROV grab	seamount or seamount province	San Benedicto Island	Vitrophyric basalt	Heavy	10				x	x
RR2403-J21572-173-R	10.58052/URI0003C9	2024-04-20T02:50:00.299Z	J21572	19.0901383	-110.75168	2263.827	ROV grab	seamount or seamount province	San Benedicto Island	Basalt	Moderate	10	5	2		x	x
RR2403-J21572-174-R	10.58052/URI0003CA	2024-04-20T04:10:02.664Z	J21572	19.093507	-110.74841	2188.088	ROV grab	seamount or seamount province	San Benedicto Island	Basalt	Light	10	2	5		x	x
RR2403-J21572-175-R	10.58052/URI0003CB	2024-04-20T05:36:39.380Z	J21572	19.0978322	-110.74535	2101.593	ROV grab	seamount or seamount province	San Benedicto Island	Basalt	Light	10	5	3		x	
RR2403-J21572-176-R	10.58052/URI0003CC	2024-04-20T07:17:27.963Z	J21572	19.1020094	-110.74309	1995.641	ROV grab	seamount or seamount province	San Benedicto Island	Basalt	Light	5	5	5		x	
RR2403-J21572-177-R	10.58052/URI0003CD	2024-04-20T08:41:40.233Z	J21572	19.1052644	-110.73761	1858.235	ROV grab	seamount or seamount province	San Benedicto Island	Basalt	Moderate	15	5	2		x	
RR2403-J21572-178-R	10.58052/URI0003CE	2024-04-20T09:29:27.326Z	J21572	19.1066696	-110.73444	1807.611	ROV grab	seamount or seamount province	San Benedicto Island	Basalt	Moderate	60		trace		x	x
RR2403-J21572-179-R	10.58052/URI0003CF	2024-04-20T10:30:52.477Z	J21572	19.1096893	-110.73058	1706.026	ROV grab	seamount or seamount province	San Benedicto Island	Basalt	Moderate	30	7			x	x
RR2403-J21572-180-R	10.58052/URI0003CG	2024-04-20T11:48:55.478Z	J21572	19.1126556	-110.72804	1607.412	ROV grab	seamount or seamount province	San Benedicto Island	Basalt	Moderate	15	2	2		x	x
RR2403-J21572-181-R	10.58052/URI0003CH	2024-04-20T13:37:51.946Z	J21572	19.1181417	-110.72831	1623.988	ROV grab	seamount or seamount province	San Benedicto Island	Basalt	Moderate	15				x	x
RR2403-J21572-182-R	10.58052/URI0003CI	2024-04-20T15:08:08.373Z	J21572	19.1212892	-110.72894	1540.108	ROV grab	seamount or seamount province	San Benedicto Island	Basalt	Moderate	15	trace	5		x	x
RR2403-J21572-183-R	10.58052/URI0003CJ	2024-04-20T15:28:25.008Z	J21572	19.1223596	-110.72905	1499.691	ROV grab	seamount or seamount province	San Benedicto Island	Basalt	Moderate	30	5			x	x
RR2403-J21572-184-R	10.58052/URI0003CK	2024-04-20T16:10:15.573Z	J21572	19.12426	-110.72997	1602.365	ROV grab	seamount or seamount province	San Benedicto Island	Basalt	Moderate	30	5	2		x	x
RR2403-J21572-185-R	10.58052/URI0003CL	2024-04-20T18:19:53.657Z	J21572	19.1323443	-110.73178	1695.168	ROV grab	seamount or seamount province	San Benedicto Island	Vesicular basalt	Moderate	40				x	x
RR2403-J21572-186-R	10.58052/URI0003CM	2024-04-20T19:06:14.232Z	J21572	19.1353116	-110.73337	1731.201	ROV grab	seamount or seamount province	San Benedicto Island	Basalt	Moderate	10	5	3		x	
RR2403-J21573-187-R	10.58052/URI0003CN	2024-04-21T03:23:44.513Z	J21573	18.9925886	-110.8974939	2526.37	ROV grab	seamount or seamount province	Socorro Island	Basalt	Light	10	2	5		x	x
RR2403-J21573-188-R	10.58052/URI0003CO	2024-04-21T04:27:26.890Z	J21573	18.98971398	-110.8996506	2427.334	ROV grab	seamount or seamount province	Socorro Island	Basalt	Light	25		5		x	x
RR2403-J21573-189-R	10.58052/URI0003CP	2024-04-21T05:20:11.745Z	J21573	18.9877453	-110.9012465	2332.278	ROV grab	seamount or seamount province	Socorro Island	Glassy basalt	Light	10	trace				x
RR2403-J21573-190-R	10.58052/URI0003CQ	2024-04-21T06:12:58.316Z	J21573	18.98562122	-110.9026919	2420.605	ROV grab	seamount or seamount province	Socorro Island	Basalt	Moderate	10		3			x
RR2403-J21573-191-R	10.58052/URI0003CR	2024-04-21T07:37:05.138Z	J21573	18.979705	-110.9005114	2486.028	ROV grab	seamount or seamount province	Socorro Island	Basalt	Light	1		1		x	x
RR2403-J21573-192-R	10.58052/URI0003CS	2024-04-21T08:09:50.097Z	J21573	18.9778425	-110.8990097	2536.45	ROV grab	seamount or seamount province	Socorro Island	Glassy basalt	Light	10	2	3			x
RR2403-J21573-193-R	10.58052/URI0003CT	2024-04-21T08:26:28.823Z	J21573	18.9768505	-110.8981872	2520.162	ROV grab	seamount or seamount province	Socorro Island	Microvesicular basalt	Fresh	30		3			x
RR2403-J21573-194-R	10.58052/URI0003CU	2024-04-21T09:42:11.859Z	J21573	18.97164371	-110.8966425	2417.535	ROV grab	seamount or seamount province	Socorro Island	Basalt	Moderate	15	2	3			x
RR2403-J21573-195-R	10.58052/URI0003CV	2024-04-21T10:33:44.022Z	J21573	18.9678931	-110.8949031	2325.966	ROV grab	seamount or seamount province	Socorro Island	Microvesicular basalt	Light	25	3		2	x	x
RR2403-J21573-196-R	10.58052/URI0003CW	2024-04-21T11:26:25.241Z	J21573	18.966451	-110.8966229	2330.362	ROV grab	seamount or seamount province	Socorro Island	Glassy basalt	Light	15					x
RR2403-J21573-197-R	10.58052/URI0003CX	2024-04-21T13:13:53.172Z	J21573	18.9604638	-110.9038536	2389.625	ROV grab	seamount or seamount province	Socorro Island	Basalt	Light		5	1			x
RR2403-J21573-198-R	10.58052/URI0003CY	2024-04-21T15:13:30.691Z	J21573	18.9561321	-110.9074335	2041.909	ROV grab	seamount or seamount province	Socorro Island	Vesicular basalt	Light	30-40	2	10			x
RR2403-J21573-199-R	10.58052/URI0003CZ	2024-04-21T16:05:59.596Z	J21573	18.9530116	-110.9092506	1997.633	ROV grab	seamount or seamount province	Socorro Island	Vesicular basalt	Moderate	10	5	1		x	x
RR2403-J21573-200-R	10.58052/URI0003D0	2024-04-21T16:31:55.763Z	J21573	18.9523902	-110.9092643	2061.278	ROV grab	seamount or seamount province	Socorro Island	Basalt	Moderate					x	x
RR2403-J21573-201-R	10.58052/URI0003D1	2024-04-21T17:14:17.845Z	J21573	18.9497347	-110.9079632	2063.938	ROV grab	seamount or seamount province	Socorro Island	Glassy basalt	Moderate	5	3	3		x	x
RR2403-J21573-202-R	10.58052/URI0003D2	2024-04-21T18:52:56.337Z	J21573	18.9428799	-110.9049997	1997.275	ROV grab	seamount or seamount province	Socorro Island	Basalt	Moderate	15	2	2		x	x
RR2403-J21573-203-R	10.58052/URI0003D3	2024-04-21T19:50:32.999Z	J21573	18.9382365	-110.9050528	1996.851	ROV grab	seamount or seamount province	Socorro Island	Vesicular basalt	Light		1	3	1		x
RR2403-J21573-204-R	10.58052/URI0003D4	2024-04-21T21:03:00.147Z	J21573	18.93584458	-110.9078826	2001.58	ROV grab	seamount or seamount province	Socorro Island	Basalt	Light	5	1	1		x	x
RR2403-J21573-205-R	10.58052/URI0003D5	2024-04-21T21:52:55.825Z	J21573	18.9340132	-110.9110311	1997.96	ROV grab	seamount or seamount province	Socorro Island	Basalt	Moderate	3	7				x
RR2403-J21573-206-R	10.58052/URI0003D6	2024-04-21T22:59:49.186Z	J21573	18.9302222	-110.9121436	2017.508	ROV grab	seamount or seamount province	Socorro Island	Basalt	Light	3	7	5		x	x
RR2403-J21573-207-R	10.58052/URI0003D7	2024-04-22T00:03:37.590Z	J21573	18.92926	-110.91251	2016.14	ROV grab	seamount or seamount province	Socorro Island	Basalt	Moderate	3	5			x	x
RR2403-J21574-208-R	10.58052/URI0003D8	2024-04-23T00:04:55.270Z	J21574	17.97208081	-110.6124584	2347.041	ROV grab	seamount or seamount province	Clairaut Seamount	Basalt	Heavy					x	x
RR2403-J21574-209-S	10.58052/URI0003D9	2024-04-23T00:53:52.472Z	J21574	17.9739179	-110.6112986	2360.922	ROV grab	seamount or seamount province	Clairaut Seamount	Mn nodules and mud						x	
RR2403-J21574-210-R	10.58052/URI0003DA	2024-04-23T02:53:12.036Z	J21574	17.9789545	-110.6085797	2312.082	ROV grab	seamount or seamount province	Clairaut Seamount	Altered basalt	Very heavy					x	
RR2403-J21574-211-R	10.58052/URI0003DB	2024-04-23T03:53:16.723Z	J21574	17.981061	-110.6071261	2225.652	ROV grab	seamount or seamount province	Clairaut Seamount	Altered basalt	Very heavy	3				x	
RR2403-J21574-212-R	10.58052/URI0003DC	2024-04-23T04:36:00.996Z	J21574	17.9835907	-110.6056765	2155.983	ROV grab	seamount or seamount province	Clairaut Seamount	Basalt	Very heavy	5				x	
RR2403-J21574-213-R	10.58052/URI0003DD	2024-04-23T05:33:57.238Z	J21574	17.9867226	-110.602859	2137.563	ROV grab	seamount or seamount province	Clairaut Seamount	Basaltic glass						x	x
RR2403-J21574-214-R	10.58052/URI0003DE	2024-04-23T06:31:24.957Z	J21574	17.98897908	-110.600502	2160.623	ROV grab	seamount or seamount province	Clairaut Seamount	Basalt	Very heavy					x	x
RR2403-J21574-215-R	10.58052/URI0003DF	2024-04-23T07:32:57.534Z	J21574	17.99188489	-110.596731	2168.042	ROV grab	seamount or seamount province	Clairaut Seamount	Altered basalt	Heavy					x	x
RR2403-J21574-216-R	10.58052/URI0003DG	2024-04-23T08:36:59.249Z	J21574	17.9950861	-110.5919649	2102.793	ROV grab	seamount or seamount province	Clairaut Seamount	Altered basalt	Very heavy		2	2	2		
RR2403-J21574-217-R	10.58052/URI0003DH	2024-04-23T10:18:36.924Z	J21574	17.9988381	-110.5881693	2101.528	ROV grab	seamount or seamount province	Clairaut Seamount	Basalt	Very heavy					x	
RR2403-J21574-218-R	10.58052/URI0003DI	2024-04-23T11:47:23.479Z	J21574	17.9997672	-110.587767	2155.801	ROV grab	seamount or seamount province	Clairaut Seamount	Basalt	Heavy					x	
RR2403-J21574-219-R	10.58052/URI0003DJ	2024-04-23T12:44:06.945Z	J21574	18.0017109	-110.587062	2194.846	ROV grab	seamount or seamount province	Clairaut Seamount	Pumice	Light	95				x	
RR2403-J21574-220-R	10.58052/URI0003DK	2024-04-23T12:58:14.884Z	J21574	18.001767	-110.5870105	2195.285	ROV grab	seamount or seamount province	Clairaut Seamount	Vesicular basalt	Heavy	30					
RR2403-J21574-221-R	10.58052/URI0003DL	2024-04-23T14:01:27.749Z	J21574	18.001467	-110.583235	2196.347	ROV grab	seamount or seamount province	Clairaut Seamount	Vesicular basalt	Moderate	15				x	x
RR2403-J21574-222-R	10.58052/URI0003DM	2024-04-23T14:22:20.284Z	J21574	18.0012816	-110.5831102	2194.881	ROV grab	seamount or seamount province	Clairaut Seamount	Vesicular basalt	Moderate					x	x
RR2403-J21574-223-R	10.58052/URI0003DN	2024-04-23T15:05:52.973Z	J21574	18.0000794	-110.5811502	2038.526	ROV grab	seamount or seamount province	Clairaut Seamount	Altered volcaniclastic deposit	Very heavy					x	x
RR2403-J21574-224-R	10.58052/URI0003DO	2024-04-23T16:23:47.714Z	J21574	17.9982348	-110.5773027	2035.509	ROV grab	seamount or seamount province	Clairaut Seamount	Basalt	Heavy	15				x	
RR2403-J21574-225-R	10.58052/URI0003DP	2024-04-23T16:31:45.234Z	J21574	17.99812799	-110.5772477	2051.792	ROV grab	seamount or seamount province	Clairaut Seamount	Volcaniclastic sediment	Heavy					x	
RR2403-J21574-226-R	10.58052/URI0003DQ	2024-04-23T18:32:56.694Z	J21574	17.99336	-110.5737308	2148.896	ROV grab	seamount or seamount province	Clairaut Seamount	Basalt	Moderate						
RR2403-J21576-227-R	10.58052/URI0003DR	2024-04-24T17:25:44.656Z	J21576	18.2066579	-111.06194	2176.796	ROV grab	axial valley	Mathematician Ridge	Vesicular basalt	Light	15				x	
RR2403-J21576-228-R	10.58052/URI0003DS	2024-04-24T18:23:31.532Z	J21576	18.206153	-111.06262	2102.444	ROV grab	axial valley	Mathematician Ridge	Basalt	Moderate	5	2	5	1	x	
RR2403-J21576-229-R	10.58052/URI0003DT	2024-04-24T19:05:57.040Z	J21576	18.204172	-111.06259	2123.644	ROV grab	axial valley	Mathematician Ridge	Basalt	Light					x	x
RR2403-J21576-230-R	10.58052/URI0003DU	2024-04-24T19:35:53.196Z	J21576	18.2028222	-111.06281	2126.941	ROV grab	axial valley	Mathematician Ridge	Basalt	Heavy	7				x	

Sample Name	IGSN	Date/Time Stamp	Dive #	Latitude	Longitude	Depth (m)	Sample Type	Phys. Feature	Feature Name	Rock Type	Weathering	Vesicles (%)	OL (%)	PLAG (%)	PX (%)	FeMn	Glass
RR2403-J21576-231-R	10.58052/URI0003DV	2024-04-24T20:04:53.333Z	J21576	18.2018822	-111.06316	2157.845	ROV grab	axial valley	Mathematician Ridge	Basalt		7				x	
RR2403-J21576-232-R	10.58052/URI0003DW	2024-04-24T20:42:22.350Z	J21576	18.2003863	-111.0639	2182.614	ROV grab	axial valley	Mathematician Ridge	Basalt	Light	2				x	
RR2403-J21576-233-R	10.58052/URI0003DX	2024-04-24T21:34:03.725Z	J21576	18.1986982	-111.06463	2149.333	ROV grab	axial valley	Mathematician Ridge	Basalt	Heavy	<1		<1		x	x
RR2403-J21576-234-R	10.58052/URI0003DY	2024-04-24T23:48:14.949Z	J21576	18.1930253	-111.06638	2205.353	ROV grab	axial valley	Mathematician Ridge	Basalt	Heavy					x	
RR2403-J21576-235-R	10.58052/URI0003DZ	2024-04-24T23:50:06.610Z	J21576	18.1930232	-111.06638	2205.359	ROV grab	axial valley	Mathematician Ridge	Basalt	Heavy	5	1	1		x	
RR2403-J21576-236-R	10.58052/URI0003E0	2024-04-24T23:51:38.236Z	J21576	18.1930295	-111.06638	2205.372	ROV grab	axial valley	Mathematician Ridge	Basalt	Heavy	5	2	2		x	
RR2403-J21576-237-R	10.58052/URI0003E1	2024-04-24T23:53:36.839Z	J21576	18.1930266	-111.06637	2205.421	ROV grab	axial valley	Mathematician Ridge	Basalt	Heavy	7	7			x	

RR2403 Subsamples GL=glass, R=cut rock piece, C=crust, N=nodule

Sample Name	Bucket #	Sample Type	Widom	Lippitt	Siebe	Chakraborty
RR2403-J21563-001-R	1	ROV grab	R (5 cm3 and 3 cm3)	GL (1 g)		
RR2403-J21563-002-R	1	ROV grab		GL (1 g)	R (17x11x21 cm3)	
RR2403-J21563-003-R	2	ROV grab		GL (1 g)	R (6x5x4 cm3)	GL (<5 g)
RR2403-J21563-004-R	2	ROV grab		GL (1 g)		
RR2403-J21563-005-R	1	ROV grab		GL (1 g)		GL (<5 g)
RR2403-J21563-006-R	1	ROV grab		GL (1 g)		
RR2403-J21563-007-R	2	ROV grab	R (4 cm 3 and 6x4x4 cm3)	GL (1 g)	R (10x9x3 cm3)	
RR2403-J21563-008-R	1	ROV grab				
RR2403-J21563-009-R	2	ROV grab				
RR2403-J21563-010-R	2	ROV grab		GL (1 g)		
RR2403-J21563-011-R	3	ROV grab		GL (1 g)		
RR2403-J21563-012-R	3	ROV grab		GL (1 g)		
RR2403-J21563-013-R	3	ROV grab	R+C (3 pieces - 30 g, 200 g, 20g)	GL (1 g)	R (8x7x1 cm3)	
RR2403-J21563-014-R	4	ROV grab		GL (1 g)		
RR2403-J21563-015-R	4	ROV grab	R (30 g and 4x4x6 cm3)	GL (1 g)	R (16x4x4 cm3)	
RR2403-J21563-016-R	3	ROV grab		GL (1 g)		
RR2403-J21563-017-R	2	ROV grab		GL (1 g)		
RR2403-J21563-018-R	3	ROV grab	R (3 pieces - 4cm 3, 300g, 50 g)	GL (1 g)		
RR2403-J21563-019-R	4	ROV grab		GL (1 g)		
RR2403-J21564-020-S	14	scoop				
RR2403-J21564-021-R	12	ROV grab	R (140x40x40 mm3)	GL (1 g)		
RR2403-J21564-022-R	12	ROV grab	R (85x40x50 mm3)			
RR2403-J21564-023-R	9	ROV grab	R (80x25x25 mm3)	GL (1 g)	R (3 pieces - <13x10x5 cm3)	
RR2403-J21564-024-R (1/2)	9	ROV grab		GL (1 g)		GL (40x50 g)
RR2403-J21564-024-R (2/2)	9					
RR2403-J21564-025-R	12	ROV grab	R (50x35x40 mm3)	GL (1 g)		
RR2403-J21564-026-S	14	scoop				
RR2403-J21564-027-R	11	ROV grab	R (85x70x30 mm3)	GL (1 g)		
RR2403-J21564-028-P	currently in fridge	push core				
RR2403-J21564-029-R	7	ROV grab	R (80x40x70 mm3)	GL (1 g)		
RR2403-J21564-030-R	10	ROV grab		GL (1 g)		
RR2403-J21564-031-R	13	ROV grab			R (17x10x5 cm3)	
RR2403-J21564-032-R	12	ROV grab	R (110x40x20 mm3)			
RR2403-J21564-033-S	14	scoop				
RR2403-J21564-034-R (1/2)	8	ROV grab	R (70x50x50 mm3)			
RR2403-J21564-034-R (2/2)	8					
RR2403-J21564-035-R	6	ROV grab		GL (1 g)	R (12x10x4 cm3)	
RR2403-J21564-036-R (1/3)	10	ROV grab		GL (1 g)		GL (40-50 g)
RR2403-J21564-036-R (2/3)	11					
RR2403-J21564-036-R (3/3)	10					
RR2403-J21564-037-R (1/3)	5	ROV grab	R (80x60x40 mm3)	GL (1 g)		
RR2403-J21564-037-R (2/3)	6					
RR2403-J21564-037-R (3/3)	5					
RR2403-J21564-038-R	12	ROV grab				
RR2403-J21564-039-R	7	ROV grab		GL (1 g)		
RR2403-J21564-040-R	11	ROV grab	R (90x40x50 mm3)	GL (1 g)		
RR2403-J21565-041-R	17	ROV grab		GL (1 g)		GL, C (40-50 g)
RR2403-J21565-042-R	16	ROV grab	R (50x50x40 mm3)		R (10x10x5 cm3)	
RR2403-J21565-043-S	17	scoop			N (3)	
RR2403-J21565-044-R	16	ROV grab		GL - URI		
RR2403-J21565-045-R	17	ROV grab	C (100x50x20 mm3)	GL - URI		
RR2403-J21565-046-R	15	ROV grab		GL - URI		
RR2403-J21565-047-R	15	ROV grab		GL - URI		
RR2403-J21565-048-R	15	ROV grab	R (50x50x40 mm3)		R (15x10x5 cm3)	
RR2403-J21565-049-R	15	ROV grab	R (110x80x20 mm3)		R (10x5x6 cm3)	
RR2403-J21565-050-R	13	ROV grab			R (8x10x12 cm3)	

RR2403 Subsamples			GL=glass, R=cut rock piece, C=crust, N=nodule			
Sample Name	**Bucket #**	**Sample Type**	**Widom**	**Lippitt**	**Siebe**	**Chakraborty**
RR2403-J21565-051-R	13	ROV grab				
RR2403-J21565-052-R	16	ROV grab	R (50x40x40 mm3)	GL (1 g)		GL (40-50 g)
RR2403-J21565-053-R	15	ROV grab			R (10x5x8 cm3)	
RR2403-J21565-054-R	13	ROV grab		GL - URI		
RR2403-J21566-055-R	18	ROV grab		GL (1 g)		GL, R (40-60 g)
RR2403-J21566-056-R	22	ROV grab	R (8x7x3 cm3)	GL (1 g)	R (5x4x3 cm3)	
RR2403-J21566-057-R	22	ROV grab	R (10x15x10 cm3)	GL (1 g)	R (10x15x20 cm3)	
RR2403-J21566-058-R (big chunks)	21	ROV grab	R (9x6x3 cm3)	GL (1 g)		
RR2403-J21566-058-R (1/2 and 2/2)	20					
RR2403-J21566-059-R	18	ROV grab		GL (1 g)		GL, R (60-80 g)
RR2403-J21566-060-R	20	ROV grab		GL (1 g)		
RR2403-J21566-061-R	18	ROV grab		GL (1 g)		
RR2403-J21566-062-R	20	ROV grab		GL (1 g)		
RR2403-J21566-063-R	19	ROV grab		GL (1 g)		
RR2403-J21566-064-R	18	ROV grab		GL (1 g)		
RR2403-J21566-065-R	18	ROV grab	R (70x80x20 mm3)	GL (1 g)		GL (10-30 g)
RR2403-J21566-066-S	18	Scoop				
RR2403-J21566-067-R	22	ROV grab	R (10x6x3 cm3)	GL (1 g)		GL (80-100 g)
RR2403-J21566-068-R	19	ROV grab		GL (1 g)		GL (50-60 g)
RR2403-J21566-069-R	23	ROV grab	R (12x6x2 cm3)	GL (1 g)	R (10x4x3 cm3)	
RR2403-J21566-070-R	18	ROV grab		GL (1 g)		
RR2403-J21566-071-R	23	ROV grab	R (6x6x4 cm3)	GL (1 g)		
RR2403-J21566-072-R	18	ROV grab		GL (1 g)		
RR2403-J21566-073-R	23	ROV grab	R (13x5x4 cm3)	GL (1 g)	R (6x7x5 cm3)	
RR2403-J21566-074-R	23	ROV grab	R (7x4x3 cm3)	GL (1 g)	R (10x4x4 cm3)	
RR2403-J21566-075-R	23	ROV grab	R (12x7x5 cm3)	GL (1 g)		
RR2403-J21567-076-R	25	ROV grab	GL (1g)	GL (1 g)		
RR2403-J21567-077-R	24	ROV grab				
RR2403-J21567-078-R	23	ROV grab		GL - URI		
RR2403-J21567-079-R	24	ROV grab			R (7.5x4x3 cm3)	
RR2403-J21567-080-R	23	ROV grab				
RR2403-J21567-081-R	23	ROV grab	R (60x45x30 mm3)	GL (1 g)	R (2x1x8 cm3)	
RR2403-J21567-082-R	24	ROV grab				
RR2403-J21567-083-R	25	ROV grab	R (80x70x70 mm3)	GL (1 g)		GL (40-50 g)
RR2403-J21567-084-R	24	ROV grab	R, GL (140x50x40 mm3)	GL (1 g)		GL (50-60 g)
RR2403-J21567-085-R	25	ROV grab			R (6.5x4x5 cm3)	
RR2403-J21567-086-R	25	ROV grab				
RR2403-J21567-087-R	26	ROV grab	R (70x30x45 mm3)			
RR2403-J21567-088-R	26	ROV grab		GL (1 g)		
RR2403-J21567-089-R	25	ROV grab				
RR2403-J21567-090-S	25	Scoop				
RR2403-J21567-091-R	26	ROV grab				
RR2403-J21568-092-R	30	ROV grab	R (10x5x5 cm3)	GL (1 g)		
RR2403-J21568-093-R	27	ROV grab		GL (1 g)		
RR2403-J21568-094-R	27	ROV grab		GL (1 g)		
RR2403-J21568-095-R	27	ROV grab	R (5x10x3 cm3)	GL (1 g)	R (10x3x5 cm3 and 6x3x4 cm3)	
RR2403-J21568-096-R	28	ROV grab	GL (100-150 g)	GL (1 g)	R (12x4x7 cm3 and 7x7x1 cm3	GL (80-100g)
RR2403-J21568-097-R	27	ROV grab	R (6x8x2 cm3)	GL (1 g)		
RR2403-J21568-098-R	28	ROV grab	R (3x3x3 cm3)	GL (1 g)		
RR2403-J21568-099-R	28	ROV grab		GL (1 g)		
RR2403-J21568-100-R	28	ROV grab		GL (1 g)		
RR2403-J21568-101-R	29	ROV grab	GL (100-120 g)	GL (1 g)		GL (80-100 g)
RR2403-J21568-102-R	28	ROV grab		GL (1 g)		
RR2403-J21568-103-R	29	ROV grab		GL (1 g)		
RR2403-J21568-104-R (bag 1/1)	30	ROV grab	R (5x6x3 cm3)	GL (1 g)	R (10x7x1 cm3)	

RR2403 Subsamples GL=glass, R=cut rock piece, C=crust, N=nodule

Sample Name	Bucket #	Sample Type	Widom	Lippitt	Siebe	Chakraborty
RR2403-J21568-104-R (big chunks)	31	ROV grab				
RR2403-J21568-105-R	29	ROV grab		GL (1 g)	R (11x9x1 cm3)	
RR2403-J21568-106-R	27	ROV grab		GL (1 g)		
RR2403-J21568-107-R	27	ROV grab	R (10x8x3 cm3)	GL (1 g)		GL (20-30 g)
RR2403-J21568-108-R	29	ROV grab		GL (1 g)		
RR2403-J21568-109-R	29	ROV grab	R (11x8x5 cm3)	GL (1 g)	R (10x8x1 cm3)	GL (20-30 g)
RR2403-J21569-110-R	45	ROV grab				
RR2403-J21569-111-R	48	ROV grab	R (4x5x4 cm3)			
RR2403-J21569-112-R	32	ROV grab				
RR2403-J21569-113-R	32	ROV grab	R (5x4x3 cm3)			
RR2403-J21569-114-R	30	ROV grab				
RR2403-J21569-115-R	32	ROV grab			R (6x5x9 cm3)	
RR2403-J21569-116-R	30	ROV grab				
RR2403-J21569-117-R	32	ROV grab	R (12x6x4 cm3)			
RR2403-J21569-118-R	55	ROV grab	R (8x5x5 cm3)		R (12x6x7 cm3)	
RR2403-J21569-119-R	32	ROV grab	GL (2 g)	GL (1g)		
RR2403-J21569-120-R	45	ROV grab			R (14x8x5 cm3)	
RR2403-J21569-121-R	30	ROV grab				
RR2403-J21569-122-R	44	ROV grab			R (6x16x5 cm3)	
RR2403-J21569-123-R	52	ROV grab				
RR2403-J21569-124-R	47	ROV grab	GL (2 g)	GL (1g)		
RR2403-J21569-125-R	32	ROV grab	R (6x5x4 cm3)		R (9x7x5 cm3)	
RR2403-J21569-126-P	currently in fridge	Push core				
RR2403-J21569-127-R	46	ROV grab				
RR2403-J21569-128-R	44	ROV grab				
RR2403-J21569-129-R (bag 1/2 and 2/2)	45	ROV grab		GL (1 g)		
RR2403-J21569-130-R	44	ROV grab				
RR2403-J21570-131-R	46	ROV grab		GL (1 g)		
RR2403-J21570-132-R	46	ROV grab	GL (2 g)	GL (1 g)	R (5x5x6 cm3)	GL, R (30-40 g)
RR2403-J21570-133-R	46	ROV grab		GL (1 g)		
RR2403-J21570-134-R	50	ROV grab	R (5x5x3 cm3)		R (9x3x7 cm3)	
RR2403-J21570-135-R	48	ROV grab	R (10x5x2 cm3 and 5x3x1 cm3)	GL (1 g)	R (11x5x6 cm3 and 1x13x5)	
RR2403-J21570-136-R	48	ROV grab	R (50x50x40 mm3)			
RR2403-J21570-137-R	48	ROV grab				
RR2403-J21570-138-R	53	ROV grab				
RR2403-J21570-139-R	44	ROV grab	R (40x40x45 mm3)	GL (1 g)		
RR2403-J21570-140-R	44	ROV grab		GL (1 g)		
RR2403-J21570-141-R	Box 1	ROV grab	R (80x60x30 mm3)	GL (1 g)		
RR2403-J21570-142-R	42	ROV grab		GL (1 g)		
RR2403-J21570-143-R	Box 1	ROV grab	R (80x40x30 mm3), GL, C ((4x3x0.5 cm3)	GL (1 g)		
RR2403-J21570-144-R	49	ROV grab		GL (1 g)		
RR2403-J21570-145-R	49	ROV grab	R (100x50x35 mm3)	GL (1 g)		
RR2403-J21570-146-R	47	ROV grab		GL (1 g)		
RR2403-J21570-147-R (bag 1/4)	56	ROV grab	R (65x45x35 mm3)	GL (1 g)		
RR2403-J21570-147-R (bag 2/4)	57					
RR2403-J21570-147-R (bag 3/4)	54					
RR2403-J21570-147-R (bag 4/4)	55					
RR2403-J21570-148-R	46	ROV grab			R (7x6x5 cm3)	
RR2403-J21570-149-R	49	ROV grab	R (60x60x45 mm3), GL (0.5 g)	GL (1 g)		GL (30-40 g
RR2403-J21570-150-R	47	ROV grab			R (11x6x5 cm3)	
RR2403-J21571-151-R	45	ROV grab				
RR2403-J21571-152-R	45	ROV grab				
RR2403-J21571-153-R	45	ROV grab				
RR2403-J21571-154-R	51	ROV grab	R (6 cm3)	GL (1 g)		GL (20-30 g)
RR2403-J21571-155-R	Box 1 - package separately to ship	ROV grab		GL (1 g)	R (8x6x7 cm3)	

RR2403 Subsamples			GL=glass, R=cut rock piece, C=crust, N=nodule			
Sample Name	**Bucket #**	**Sample Type**	**Widom**	**Lippitt**	**Siebe**	**Chakraborty**
RR2403-J21571-156-R	43	ROV grab				
RR2403-J21571-157-R	49	ROV grab				
RR2403-J21571-158-R	Box 1 - package separately to ship	ROV grab	R (5 cm3)		R (4x3x3 cm3)	
RR2403-J21571-159-R	53	ROV grab		GL (1 g)		
RR2403-J21571-160-R	52	ROV grab		GL (1 g)	R (15x8x3 cm3)	
RR2403-J21571-161-R	47	ROV grab	R (8 cm3)	GL (1 g)	R (13.5x11.5 cm)	
RR2403-J21571-162-R	45	ROV grab				
RR2403-J21571-163-R	43	ROV grab	R (6 cm3)	GL (1 g)		
RR2403-J21571-164-R	46	ROV grab	R (6 cm3)	GL (1 g)		GL (30-40 g)
RR2403-J21571-165-R	50	ROV grab	R (10x2x1 cm3)	GL (1 g)		
RR2403-J21571-166-R	46	ROV grab				
RR2403-J21572-167-R	41	ROV grab	R (10cm3)	GL (1 g)		
RR2403-J21572-168-R	40	ROV grab			R (16x14x6 cm)	
RR2403-J21572-169-R	43	ROV grab			R (3pcs., 5x8x6 cm)	
RR2403-J21572-170-R	39	ROV grab				
RR2403-J21572-171-R	57	ROV grab		GL (1 g)		
RR2403-J21572-172-R	39	ROV grab	R (5 cm3)	GL (1 g)		GL+C (60-70 g)
RR2403-J21572-173-R (bag 1/2)	Box 1 (transit)	ROV grab	R (100x50x20 mm)			
RR2403-J21572-173-R (bag 2/2)	50					
RR2403-J21572-174-R	43	ROV grab	R (2 cm3)	GL (1 g)		
RR2403-J21572-175-R	Box 1 (transit)	ROV grab				
RR2403-J21572-176-R	41	ROV grab			R (8x4x2 cm)	
RR2403-J21572-177-R	44	ROV grab	R (75x70x35 mm)			
RR2403-J21572-178-R	42	ROV grab		GL (1 g)		
RR2403-J21572-179-R	42	ROV grab		GL (1 g)		
RR2403-J21572-180-R	40	ROV grab		GL (1 g)		
RR2403-J21572-181-R	36	ROV grab	R (20 cm3)	GL (1 g)		
RR2403-J21572-182-R	40	ROV grab		GL (1 g)		
RR2403-J21572-183-R	43	ROV grab		GL (1 g)		
RR2403-J21572-184-R	35	ROV grab	R (80x45x30 mm)	GL (1 g)		
RR2403-J21572-185-R	35	ROV grab	R (5 cm3)	GL (1 g)		
RR2403-J21572-186-R	42	ROV grab	R (75x35x30 mm)		R (12x6x2 cm)	
RR2403-J21573-187-R	39	ROV grab	R (2 pcs., 50x40x30 mm; 60x30x5 mm)	GL (1 g)		
RR2403-J21573-188-R	35	ROV grab	GL (80x30x40 mm)	GL (1 g)		
RR2403-J21573-189-R	36	ROV grab	GL (40x40x5 mm)	GL (1 g)		GL (40-50 g)
RR2403-J21573-190-R	38	ROV grab	GL (40x30x10 mm)	GL (1 g)		
RR2403-J21573-191-R	35	ROV grab	R (2 pcs., 20x50x40 mm; 40x40x5 mm)	GL (1 g)		
RR2403-J21573-192-R	36	ROV grab	GL (40x30x10 mm)	GL (1 g)	R (2 pcs. 6x6x10 cm)	
RR2403-J21573-193-R	33	ROV grab	GL (35x30x10 mm)	GL (1 g)	R (10x9x7 cm)	
RR2403-J21573-194-R	38	ROV grab	R (80x40x30)	GL (1 g)		
RR2403-J21573-195-R	35	ROV grab	GL (60x20x10 mm)	GL (1 g)	R (12x5x3 cm)	
RR2403-J21573-196-R	37	ROV grab	GL (80x30x10)	GL (1 g)		GL (50-60 g)
RR2403-J21573-197-R	34	ROV grab				
RR2403-J21573-198-R	37	ROV grab	R (80x40x30 mm)			
RR2403-J21573-199-R	40	ROV grab	GL (40x30x15 mm)	GL (1 g)		
RR2403-J21573-200-R (bag of glass)	34	ROV grab		GL (1 g)		
RR2403-J21573-200-R	own bucket	ROV grab				
RR2403-J21573-201-R	43	ROV grab	R (85x60x35 mm)	GL (1 g)	R (9x4x6 cm)	
RR2403-J21573-202-R	34	ROV grab		GL (1 g)	R (8x8x6 cm)	
RR2403-J21573-203-R	42	ROV grab	R (85x60x40 mm)			
RR2403-J21573-204-R	39	ROV grab		GL (1 g)		
RR2403-J21573-205-R	36	ROV grab	R (60x50x40 mm)			
RR2403-J21573-206-R	Box 1 (transit)	ROV grab			R (8x8x4 cm)	
RR2403-J21573-207-R	39	ROV grab		GL (1 g)		
RR2403-J21574-208-R	42	ROV grab				

RR2403 Subsamples			GL=glass, R=cut rock piece, C=crust, N=nodule			
Sample Name	**Bucket #**	**Sample Type**	**Widom**	**Lippitt**	**Siebe**	**Chakraborty**
RR2403-J21574-209-R (mud+nodules)	37	ROV grab				
RR2403-J21574-210-R	36	ROV grab				
RR2403-J21574-211-R	41	ROV grab				
RR2403-J21574-212-R	42	ROV grab				
RR2403-J21574-213-R	44	ROV grab	GL (30x20x10 mm)	GL (1 g)		GL (30-40 g)
RR2403-J21574-214-R	43	ROV grab				
RR2403-J21574-215-R	33	ROV grab			R (8x6x4 cm)	
RR2403-J21574-216-R	41	ROV grab			R (24x4x8 cm)	
RR2403-J21574-217-R	38	ROV grab				
RR2403-J21574-218-R	41	ROV grab				
RR2403-J21574-219-R	37	ROV grab				
RR2403-J21574-220-R	50	ROV grab				
RR2403-J21574-221-R	48	ROV grab				
RR2403-J21574-222-R	40	ROV grab	GL (70x60x10 mm)			
RR2403-J21574-223-R	56	ROV grab				
RR2403-J21574-224-R	Box 1 (transit)	ROV grab				
RR2403-J21574-225-R	36	ROV grab				
RR2403-J21574-226-R	54	ROV grab				
RR2403-J21576-227-R	33	ROV grab				
RR2403-J21576-228-R	33	ROV grab				
RR2403-J21576-229-R	34	ROV grab				
RR2403-J21576-230-R	35	ROV grab				
RR2403-J21576-231-R	33	ROV grab				
RR2403-J21576-232-R	34	ROV grab				
RR2403-J21576-233-R	33	ROV grab				
RR2403-J21576-234-R	33	ROV grab				
RR2403-J21576-235-R	33	ROV grab				
RR2403-J21576-236-R	34	ROV grab				
RR2403-J21576-237-R	34	ROV grab				