Axial 2024 Cruise Report

Axial Seamount, Juan de Fuca Ridge

AT50-26

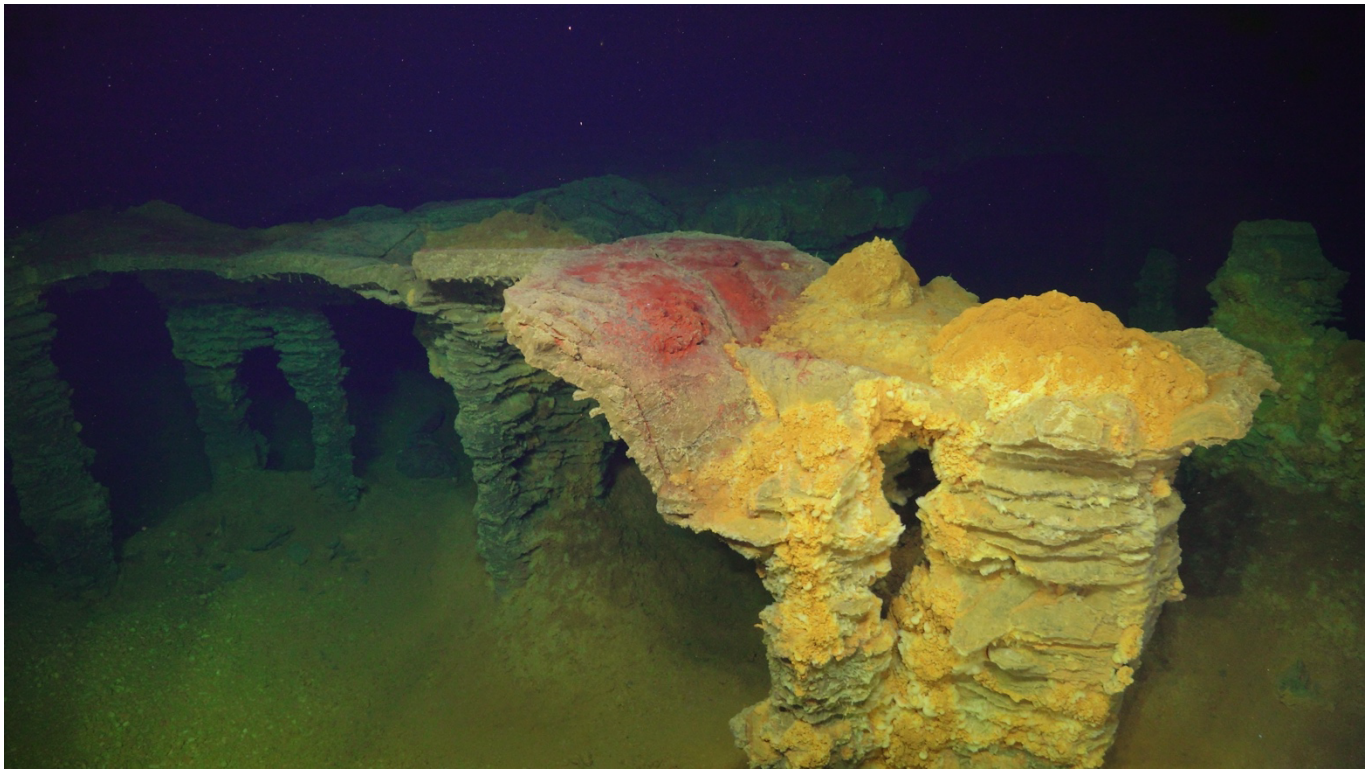
R/V Atlantis

June 21 to July 2, 2024

Astoria, OR to Astoria, OR

ROV *Jason* Dive J2-1579 (n=1)
AUV *Sentry* Dives 730 – 733 (n=4)

Chief Scientist: Bill Chadwick
R/V Atlantis Captain: Derek Bergeron
ROV *Jason* Expedition Leader: Akel Kevis-Sterling
AUV *Sentry* Expedition Leader: Zac Berkowitz
Cruise Report prepared by: Bill Chadwick



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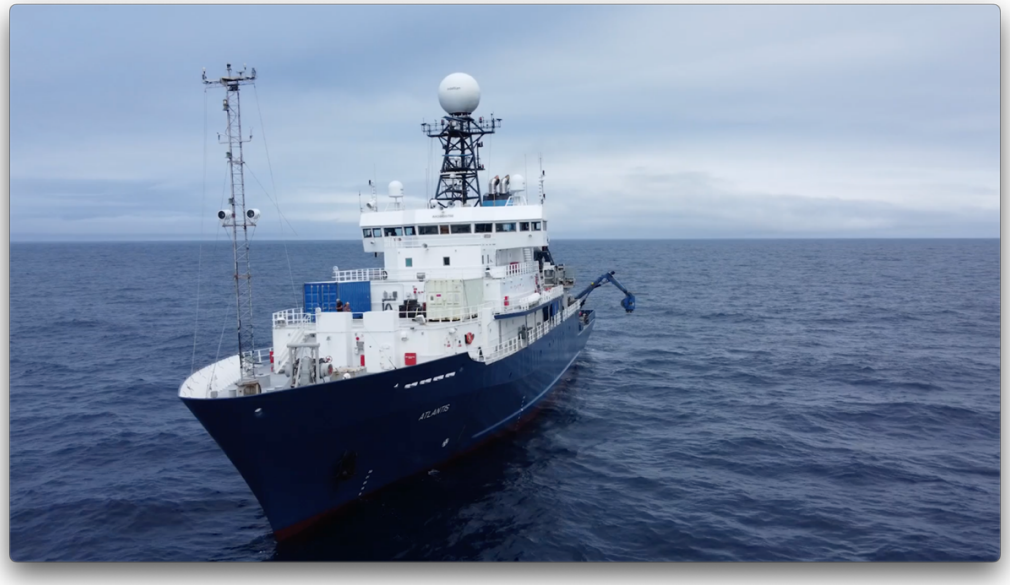
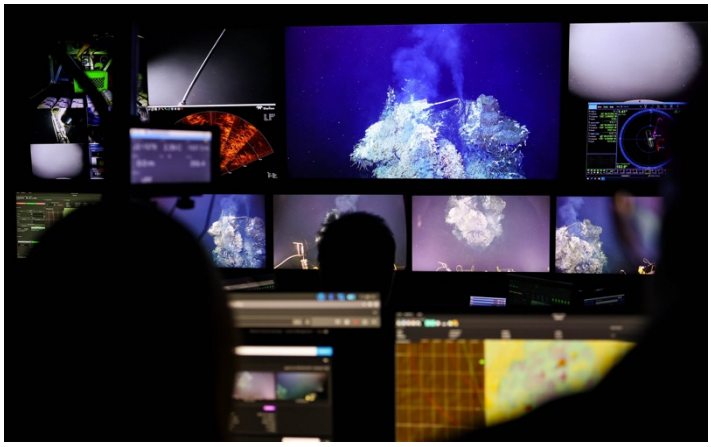


Photo by Marley Parker

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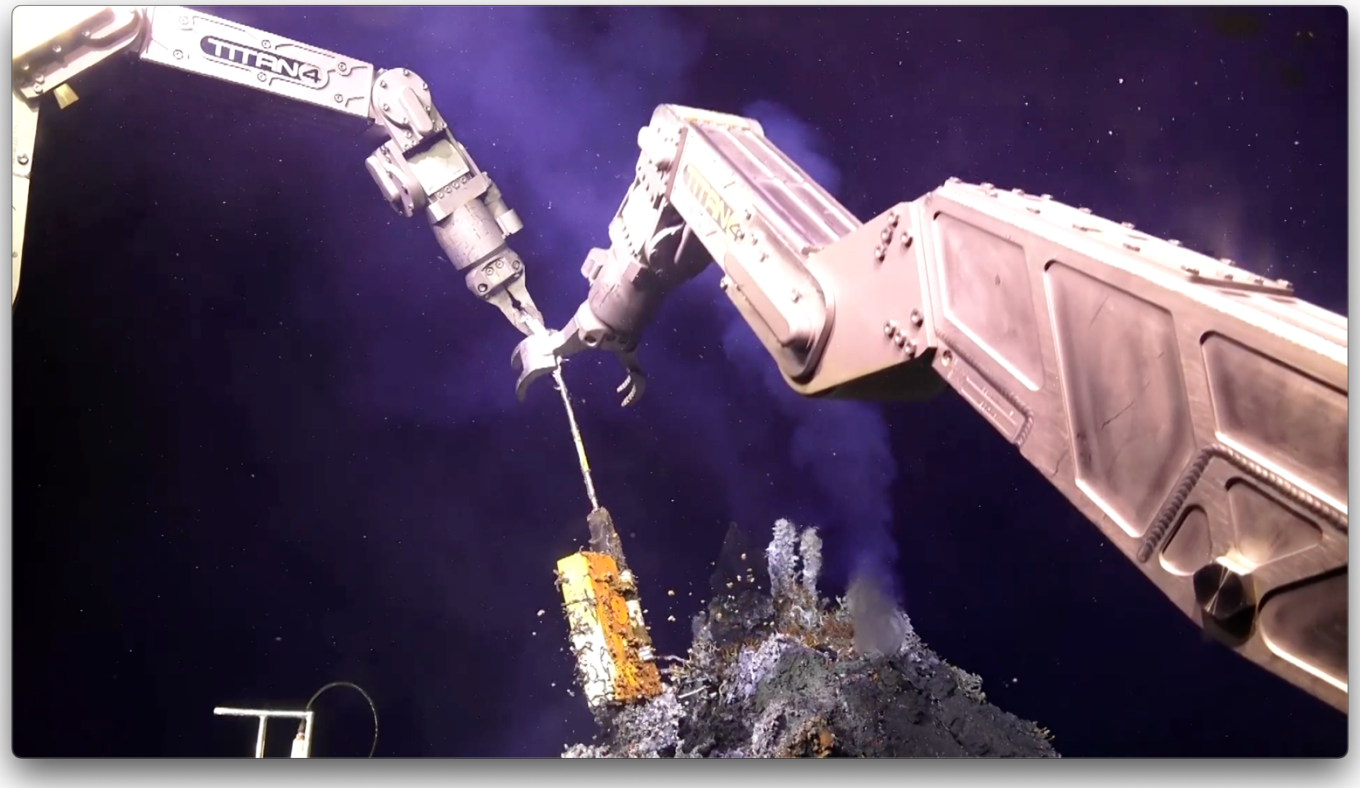
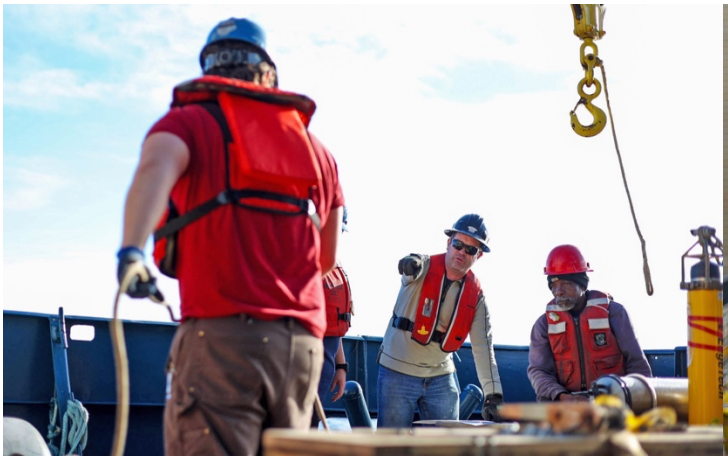


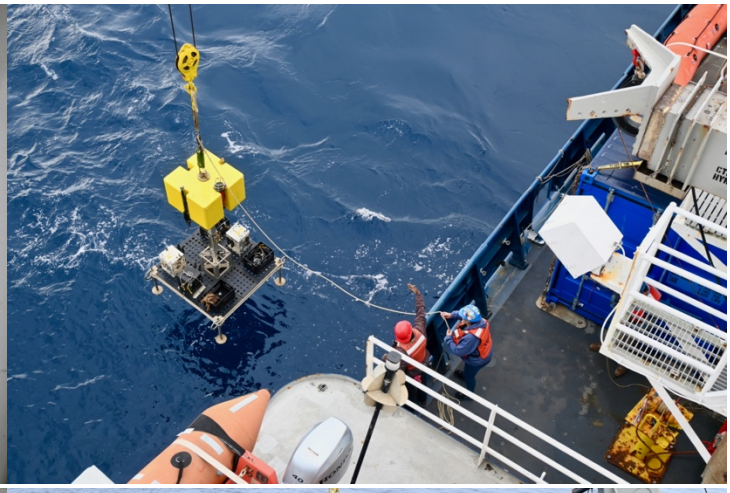
ROV Jason frame grabs, ASHES Vent Field

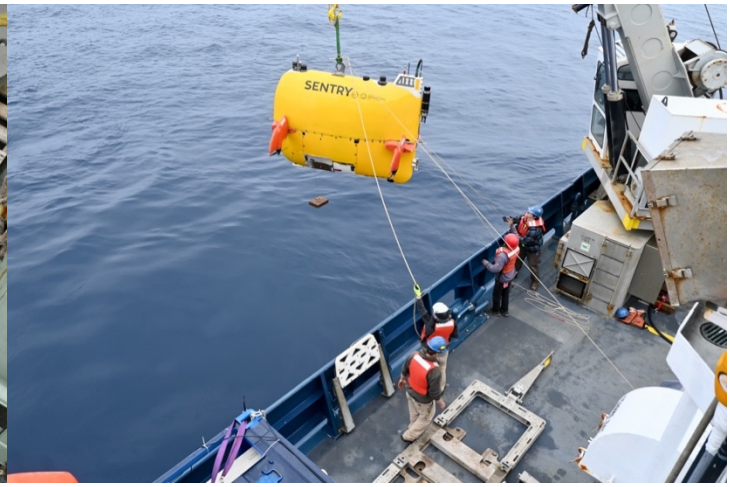






Photos by Marley Parker


Photos by Dave Caress

Photos by Dave Caress

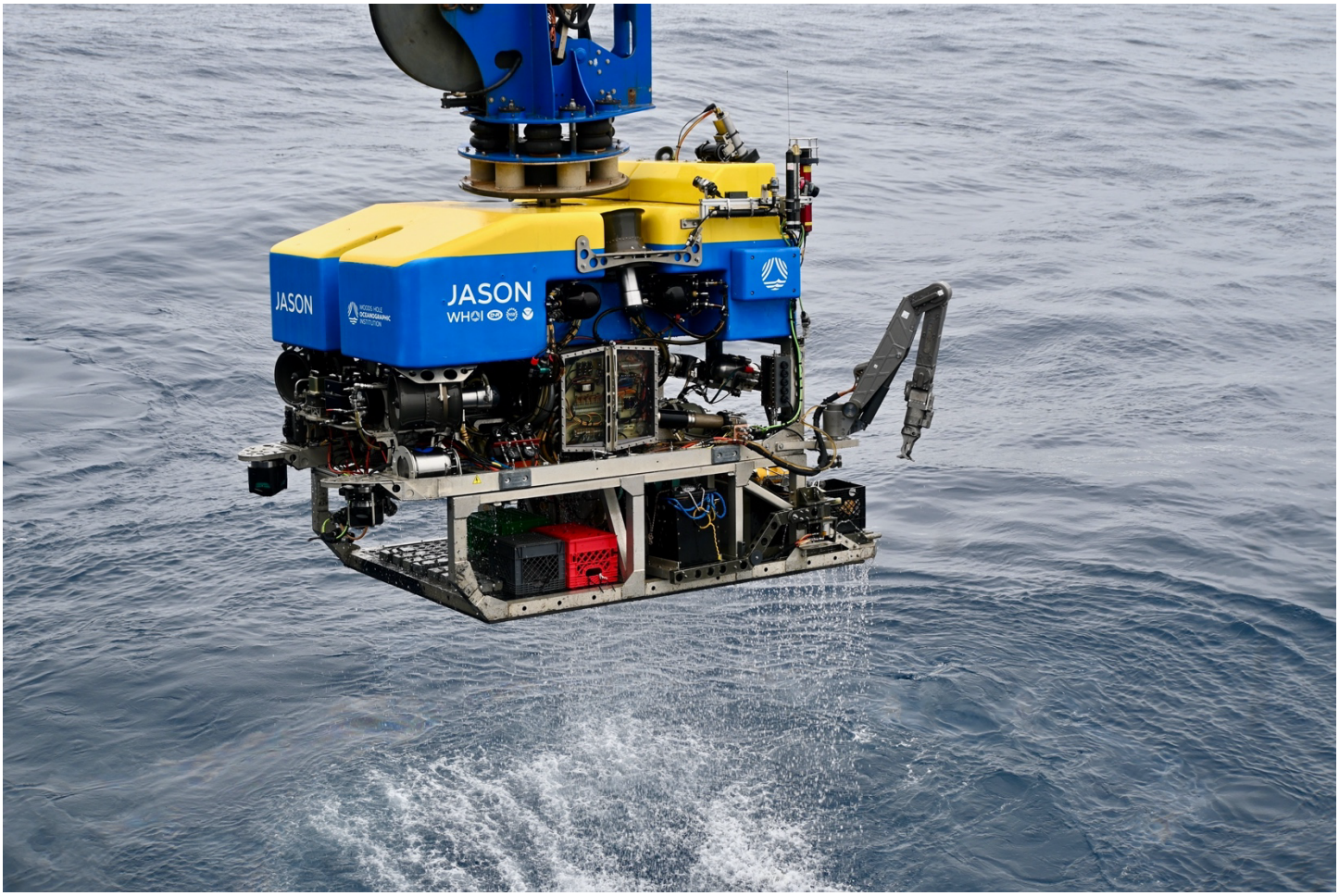
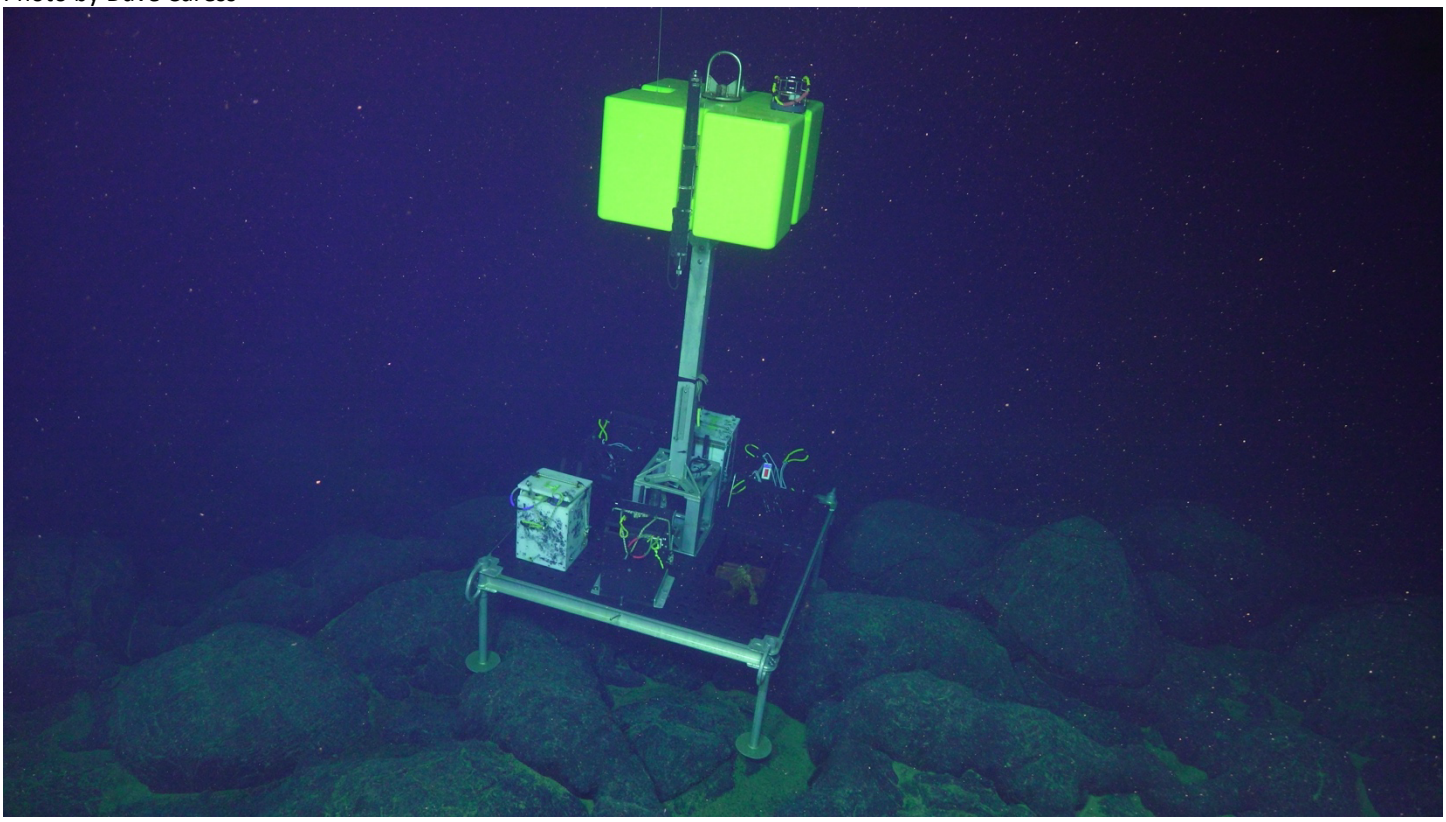


Photo by Dave Caress


ROV Jason frame grab

1 - Axial 2024 Cruise Summary

Bill Chadwick, Chief Scientist

The main geodesy objectives of our Axial 2024 cruise were similar to our recent cruises to Axial: conducting a campaign-style mobile pressure recorder (MPR) survey with ROV *Jason* at our array of seafloor benchmarks in the caldera, and turning around continuously-recording bottom pressure recorder (BPR) moorings and stand-alone Mini-BPR instruments deployed on the MPR benchmarks. These pressure measurements are used to document the vertical movements of the seafloor in space and time due to volcanic inflation since Axial Seamount's last eruption in April 2015. In addition, this year we planned to deploy 6 new seafloor benchmarks to expand our MPR monitoring array into the northern half of the caldera, and we planned to turn-around temperature probes at several hydrothermal vent sites to continue long time-series.

Complementary to the pressure measurements, we also planned to collect repeat bathymetry with AUV *Sentry* over the summit of the volcano. This also documents vertical movements of the seafloor, but over a much larger area, although at a lower resolution than the pressure measurements. An important goal of the AUV *Sentry* dives this year was implementing Terrain Relative Navigation (TRN) software during all the dives for the first time. TRN allows the AUV to self-navigate by comparing incoming sonar data to a pre-existing bathymetric map, which greatly reduces the navigation mis-match with previous surveys. Using TRN should improve our ability to repeat the AUV bathymetric survey lines with better fidelity, which will reduce errors when looking for depth changes from year to year.

However, the cruise plan was seriously impacted by an equipment failure that became apparent soon after we arrived at Axial Seamount after a ~1-day transit from Astoria. The brake pad on the ROV *Jason* winch was found to have a major tear in it. After assessing the situation and consultation from NDSF shore-support, it was determined that we needed to return to Astoria to get a spare brake pad (to be shipped from WHOI) and then spend a day in port to install, test, and carefully align it. While this was being decided, we deployed 2 of the new benchmarks, 1 BPR mooring that we came out with, and recovered 3 BPR moorings that we planned to turn-around at sea later in the cruise, and then we headed back to Astoria only 11 hours after arriving at Axial. Starting our 11-day cruise by losing 3-days right off the bat was a stunning setback and we had to completely re-think the plan for the cruise.

We returned to Axial after those 3 lost days focused and determined to make the best use of the time that remained, and I feel like we did exactly that. We were able to put AUV *Sentry* and ROV *Jason* in the water as soon as we returned to the work site, and *Jason* stayed down for the entire rest of the cruise - one long, "monster dive" (J2-1579), lasting 5.5 days - I think the 2nd longest *Jason* dive ever, and the longest with *Jason* in single-body mode, from what I've heard. *Jason* didn't come back up until it was time to go. During that long dive we were able to accomplished most of our science goals in terms of our MPR pressure measurements:

• We were able to make 2 repeat pressure measurements at all our 13 pre-existing seafloor benchmarks, covering the southern and central caldera, one of our highest priorities. The main casualty of the reduced time was getting only 2 repeat measurements at each benchmark instead of the 3 we had hoped for, which compromises our errors and repeatability slightly, but getting 2 is still MUCH better than only 1 occupation.

• We were able to deploy the 6 new seafloor benchmarks to expand our MPR array into the northern half of the caldera, and we made 2 repeat pressure measurements at all of those, while tying them into the rest of the array.

• Along the way, we were also able to turn-around 5 of the 9 temperature probes at hydrothermal vents that we had planned (Guangyu Xu and Dax Soule came out with us to help with that effort). Deb Kelley was able to help turn-around the other 4 temperature probes when she came out in August for the OOI-RCA O&M cruise.

On the AUV *Sentry* front, we lost one dive (730) due to the DVL sonar failing on the first lowering, but the spare was installed and it performed well for the remainder of the cruise. In the end, we were able to get useful data from 3 of our planned 7 *Sentry* dives to collect repeat bathymetry (731, 732, 733). In this context, losing dives meant that we were not able to re-occupy many of our repeat bathymetry lines, but we did get the highest priority areas covered (in the caldera and selected radial lines that cross the summit and extend to the SE). On a positive note, the Terrain Relative Navigation (TRN) software that we have worked to integrate into the *Sentry* control system performed very well during all the dives, so the repeat bathymetry from this year will be a quantum improvement from previous surveys.

All of these accomplishments are important because we think that Axial is likely erupt again in the next year or 2 (based on the build-up we're seeing in the inflation and seismicity data from the OOI-RCA), and these could be our last "pre-eruption" observations. If so, the expanded benchmark network we have installed with *Jason* and the latest *Sentry* surveys will give us a much improved baseline for the large deflation that we expect to occur during the next eruption.

In short, I feel proud of what we were able to accomplish, despite the early setback and loss of dive days. I'm grateful to everyone who contributed to our success: the *Jason* & *Sentry* teams, the *R/V Atlantis* crew, and the on-shore support at WHOI-NSDF and at NSF. All much appreciated by the hard-working science party. I want to add a "shout out" to Kevin Kavanagh for getting the Jason winch replacement parts to Astoria as soon as possible. That really helped "limit the damage" in terms of lost time. Another huge appreciation goes to Matt Heintz and Akel Kevis-Stirling (the *Jason* Expedition Leader) and the rest of the at-sea *Jason* team for executing the winch repair quickly and having *Jason* ready to dive as soon as we returned to Axial. And then operating *Jason* with no other problems or delays for the rest of the cruise. That really "saved our bacon", because any other loss of time would have really hurt. We were also very lucky with the weather, which was favorable for the rest of the cruise (another minor miracle in the NE Pacific!). As always, we are grateful to UNOLS and the National Science Foundation for supporting this research and for helping make this year's research cruise a success. This is the first of 3 cruises that are funded by NSF award OCE-2226488 to PI's Chadwick, Beeson, Nooner, and Caress.

This year our outreach and education efforts were accomplished by having freelance videographer Marley Parker join us at sea. She wrote a story, documented the at-sea operations photographically, and put together a video that described our work during the cruise that was posted to the WHOI NDSF website.

Cruise data availability:
The underway ship data from AT50-26 (and this cruise report) are available online at the R2R website:
https://www.rvdata.us/search/cruise/AT50-26
The AT50-26 cruise has been given this DOI: 10.7284/910640

Other science data from the cruise will be archived at the Marine Geoscience Data System website:
https://www.marine-geo.org/index.php

2 – Science Participants

Science Party	**Affiliation**	**Expertise**
Bill Chadwick	Oregon State Univ.	Geology/geophysics
Jeff Beeson	Oregon State Univ.	Geology/geophysics
Scott Nooner	UNCW	Geology/geophysics
Dave Caress	MBARI	AUV mapping
Haley Cabaniss	College of Charleston	Geology/geophysics
Susan Merle	Oregon State Univ.	Data management
Jonathan Whitefield	Oregon State Univ.	mooring tech
Cole Grasse	MBARI	AUV engineer
Valentine Puzenat	IPGP, Paris	PhD grad student
Susie Adams	UNCW	MS grad student
Kendal Ward	UNCW	MS grad student
Morgan Trotter	UNCW	MS grad student
Ava Stewart	College of Charleston	undergraduate
Mia Bowersox	College of Charleston	undergraduate
Kendal Hobbs	Oregon State Univ.	undergraduate
Guangyu Xu	Univ. of Washington	Temp probes
Dax Soule	Queens College	Temp probes
Hikari Oshiro	Rutgers Univ.	undergraduate
Marley Parker	Freelance journalist	Videographer
AUV *Sentry* Team		
Zac Berkowitz	AUV *Sentry* group	Expedition Leader
Tim Joyce	AUV *Sentry* group	Sentry
Chris Thierauf	AUV *Sentry* group	Sentry
Renee Gruner-Mitchell	AUV *Sentry* group	Sentry
Rosemary Loer	AUV *Sentry* group	Sentry
ROV *Jason* Team		
Akel Kevis-Stirling	ROV *Jason* group	Expedition Leader
Ronnie Whims	ROV *Jason* group	Jason
Adam Ensminger	ROV *Jason* group	Jason
Fred Denton	ROV *Jason* group	Jason
Tito Collasius	ROV *Jason* group	Jason
Isaac Vandor	ROV *Jason* group	Jason
Korey Verhein	ROV *Jason* group	Jason
Sarah Sergent	ROV *Jason* group	Jason
Jeremy Paulus	ROV *Jason* group	Jason
Scott McCue	ROV *Jason* group	Jason – Data Manager
WHOI Marine Techs / SSSGs		
Mike "TR" Temper-Rasmussen	WHOI	Marine Tech.
Allison Heater	WHOI	Marine Tech.

3 – Operations Log

date UTC	time UTC	date local	time local	Axial2024 - AT50-26 Operations Log
6/21/2024	17:00	6/21/2024	10:00	**Ship departs Astoria for Axial Seamount** - multibeam survey during transit
6/22/2024	14:00	6/22/2024	07:00	**Ship arrives at Axial Seamount**
6/22/2024	15:55	6/22/2024	08:55	Deploy BPR-South2 mooring
6/22/2024	17:00	6/22/2024	10:00	Release and recover BPR-North mooring
6/22/2024	19:00	6/22/2024	12:00	Release and recover BPR-West mooring
				(No Sentry dive due to marginal weather. No Jason dive due to Jason winch failure. Postponed Jason elevator deployment)
6/22/2024	21:00	6/22/2024	14:00	Deploy Benchmark AX-506
6/22/2024	22:30	6/22/2024	15:30	Deploy Benchmark AX-505
6/22/2024	23:20	6/22/2024	16:20	Disabled acoustic release on BPR-South2
6/23/2024	00:00	6/22/2024	17:00	Release and recover BPR-East mooring
6/23/2024	01:00	6/22/2024	18:00	**Depart Axial for transit back to port in Astoria to get replacement brake pad for Jason winch** - multibeam survey during transit
6/23/2024	23:00	6/23/2024	16:00	**Ship arrives in Astoria.** Begin Jason winch repairs in port.
6/25/2024	01:00	6/24/2024	18:00	**Ship departs Astoria for return transit to Axial** - multibeam survey during transit
6/25/2024	22:00	6/25/2024	15:00	**Ship arrives back at Axial Seamount**
6/25/2024	23:30	6/25/2024	16:30	Jason elevator deployed - #1
6/26/2024	01:00	6/25/2024	18:00	**Sentry AUV deployed for dive 730**
6/26/2024	04:00	6/25/2024	21:00	**Sentry dive 730 aborted** due to problems with DVL
6/26/2024	05:00	6/25/2024	22:00	Sentry recovered
6/26/2024	06:00	6/25/2024	23:00	Deploy BPR-North2 mooring
6/26/2024	06:30	6/25/2024	23:30	Deploy BPR-North1 mooring
6/26/2024	07:30	6/26/2024	00:30	Deploy BPR-South1 mooring
6/26/2024	09:00	6/26/2024	02:00	**Jason ROV deployed for dive J2-1579** - first and only dive of this cruise (5.5 days)
6/27/2024	05:00	6/26/2024	22:00	Jason elevator released - #1
6/27/2024	06:30	6/26/2024	23:30	Jason elevator on deck - #1
6/27/2024	07:45	6/27/2024	00:45	**Sentry deployed for dive 731**
6/28/2024	05:00	6/27/2024	22:00	Jason elevator deployed - #2
6/28/2024	04:00	6/27/2024	21:00	**Sentry recovered - end of dive 731**
6/28/2024	06:30	6/27/2024	23:30	Jason elevator deployed - #2
6/28/2024	08:30	6/28/2024	01:30	Jason elevator released - #2
6/28/2024	10:00	6/28/2024	03:00	Jason elevator on deck - #2
6/28/2024	18:30	6/28/2024	11:30	**Sentry deployed for dive 732**
6/29/2024	01:00	6/28/2024	18:00	Jason releases pair of glass balls from benchmark
6/29/2024	02:00	6/28/2024	19:00	Ship recovers glass balls from benchmark

6/29/2024	12:30	6/29/2024	05:30	**Sentry recovered - end of dive 732**
6/29/2024	21:00	6/29/2024	14:00	Jason elevator deployed - #3
6/30/2024	00:00	6/29/2024	17:00	Deploy Benchmark AX-501
6/30/2024	02:00	6/29/2024	19:00	Jason releases pair of glass balls from benchmark
6/30/2024	02:30	6/29/2024	19:30	Ship recovers glass balls from benchmark
6/30/2024	03:00	6/29/2024	20:00	**Sentry deployed for dive 733**
6/30/2024	07:00	6/30/2024	00:00	Deploy Benchmark AX-502
6/30/2024	11:00	6/30/2024	04:00	Deploy Benchmark AX-504
6/30/2024	13:00	6/30/2024	06:00	Jason releases pair of glass balls from benchmark
6/30/2024	14:00	6/30/2024	07:00	Ship recovers glass balls from benchmark
6/30/2024	16:00	6/30/2024	9:00	Deploy Benchmark AX-503
6/30/2024	18:00	6/30/2024	11:00	Jason releases pair of glass balls from benchmark
6/30/2024	19:00	6/30/2024	12:00	Ship recovers glass balls from benchmark
6/30/2024	21:00	6/30/2024	14:00	**Sentry recovered - end of dive 733** - Last dive
6/30/2024	23:00	6/30/2024	16:00	Jason releases pair of glass balls from benchmark
7/1/2024	00:00	6/30/2024	17:00	Ship recovers glass balls from benchmark
7/1/2024	02:00	6/30/2024	19:00	Jason releases pair of glass balls from benchmark
7/1/2024	03:00	6/30/2024	20:00	Ship recovers glass balls from benchmark
7/1/2024	13:00	7/1/2024	06:00	Jason elevator released - #3
7/1/2024	14:00	7/1/2024	07:00	Jason elevator on deck - #3
7/1/2024	19:00	7/1/2024	12:00	**Jason recovered - end of dive J2-1579**
				Ship departs for Astoria
7/2/2024	19:00	7/2/2024	12:00	**Ship arrives in Astoria. End of cruise.**

4 – Discipline Summaries

4.1 - Pressure Measurements to Monitor Volcanic Deformation at Axial Seamount

Bill Chadwick, Camille Sullivan, Scott Nooner, and Jeff Beeson

Since 2000, we have made ROV-based campaign-style pressure measurements with a "mobile pressure recorder" (MPR) on seafloor benchmarks at Axial Seamount to monitor vertical movements of the seafloor due to volcanic inflation and deflation caused by magma movements beneath the volcano. This has been our main method for eliminating the problem of long-term drift with continuously-recording bottom pressure recorders (BPRs), because our MPR surveys precisely measure the *relative* depths of our benchmarks over a short period of time (several days), *relative* to a reference site. The drift of co-located BPRs can then be constrained by the MPR data. Since 2013, we have had 10 seafloor benchmarks in the MPR array, which covered the southern half of the caldera, with a reference site located ~10 km south of the caldera center (AX-105), and assumed to be outside the area of deformation. We added 4 additional benchmarks in 2022 (AX-401 to 404), located across the western and eastern caldera walls (one on the rim and one on the floor on both sides), in order to document any vertical motion across the caldera faults associated with seismicity (and co-located with an NSF-funded horizontal acoustic ranging experiment deployed by William Wilcock and Dana Manalang using Sonardyne Fetch transponders). This year (2024), we added 6 additional new benchmarks (AX-501 to 506), to better constrain the location of the center of uplift (and subsidence) near the center of the caldera and to better document deformation in the northern half of the caldera. Expanding the MPR array will also allow us to better compare the pressure monitoring results with the AUV repeat bathymetry results. A map of all of the MPR benchmarks that are currently deployed is in **Figure 4.1.2**, below.

In addition to the MPR surveys, we have deployed various kinds of continuously-recording bottom pressure recorders (BPRs) throughout the caldera. We are currently using 3 kinds of BPRs: (1) Moored BPRs that are battery-powered and record internally for ~2 years at a time (4 of these were deployed in 2024). (2) Four others are OOI BPR/Tilt (BOTPT) instruments that are connected to the OOI Regional Cabled Array and transmit data to shore in real-time. Each of these are near one of our MPR benchmarks. (3) In addition, we own 16 "Mini-BPRs" (aka "TG11's" built by Scripps) that are deployed and recovered by ROV on many of the MPR benchmarks (in 2024, we recovered 10 of these, turned them around at sea, and deployed a total of 15; 1 was sidelined for needed maintenance). The overall aim is to have both campaign-style and continuous pressure measurements at all (or most) of our pressure monitoring sites (the array of 20 seafloor benchmarks). This section summarizes this year's MPR & BPR operations and preliminary results.

The MPR Survey

The MPR measurements provide a precise depth for each benchmark *relative* to a reference site. In the past we have used the southern-most benchmark, AX-105, as the reference site, but this year we used the OOI-BPR at MJ03F (caldera center), near MPR benchmark AX-101, as the reference. We made this change because our MPR measurements have shown that the OOI-BPR at MJ03F has nearly zero drift, so it can be used as an alternative reference site (because we know how much AX-101 is moving vertically from the OOI-BPR data at MJ03F). The caldera center is also where the Scripps SCPR instrument (self-calibrating pressure recorder) has been tested and deployed since July 2018, and it provides and independent reference (the SCPR is currently funded to stay deployed on the OOI-RCA until the summer of 2027 under NSF award OCE-2521019, but it could be extended). Also, not having to visit benchmark AX-105 during an MPR survey saves us a lot of time, because it is a 15-hour round-trip between benchmarks AX-104 and AX-105 when ROV *Jason* is operating in single-body mode (without Medea) when it has a more limited transit speed. This increased time-efficiency allowed us to expand the network of benchmarks into the northern half of the caldera this year. However, we have discovered that using the OOI-BPR at the caldera center can have its own complications and introduced some new sources of error (described below).

The previous MPR survey in 2022 started during Jason dive J2-1430 on June 23 at 12:56 and ended on Jason dive J2-1432 on July 1 at 01:26 (all times UTC). This year (2024), the MPR survey was made during our one long ("monster") 5.5-day *Jason* dive: J2-1579. The MPR survey started at 13:20 on June 26 and ended at 13:12 on July 1. Due to the 3 days of

time that we lost at the start of the cruise due to the *Jason* winch failure, we only had time to make 2 MPR measurements at each benchmark (instead of the planned 3), but we were able to deploy 6 new benchmarks and make repeated measurements at all of them. Removing the tides from the 2024 MPR survey data was unfortunately a bit complicated this year, because we had already recovered the moored BPRs and we recovered the Mini-BPRs during the MPR survey. We were relying on using data from the OOI BPRs, but the time-series was interrupted for ~1.5 days during the MPR survey due to an system-wide outage between ~00:45 on June 27 and ~17:30 on June 28. Here's Scott's description of how he dealt with that: "I spliced in a section of predicted tides into the OOI-BPR data, however the predicted tides didn't have the exact same amplitude variation as the measured tides (different by several centimeters). I changed the amplitude and added a slight slope to make it optimally match the observed tides and to make sure there was a smooth transition from one to the other. This worked well and resulted in a lower data repeatability (±0.8 cm now vs ±1.6 cm using only the predicted tides)." **Lesson: we need to be sure we have a reliable BPR record during the entire duration of future MPR surveys to facilitate tide removal.**

To use benchmark AX-101 as a reference, we have to determine the depth change at AX-101 between our 2022 and 2024 MPR surveys. To get that number, we averaged the single-station data from OOI-BPR-MJ03F for 5 days to get one depth before our MPR survey in 2022 and another depth after our MPR survey in 2024. Of course, this is slightly complicated by the fact that each MPR survey takes several days to complete and the OOI-BPR-MJ03F data are varying during both of those time intervals, making it hard to pick a single reference depth for each year. Furthermore, there were data outages at OOI-BPR-MJ03F during parts of **both** MPR surveys in 2022 and 2024. Nevertheless, our best estimate is that there was a depth change at AX-101 between the 2022 and 2024 MPR surveys of **11.5 cm**. Using that number as a reference for the "real" change at benchmark AX-101, the depth changes at all the other benchmarks between the 2022 and 2024 MPR surveys can be calculated *relative* to AX-101, and are shown in the table below.

The repeatability of our MPR measurements in 2024 was ± 0.8 cm. However, we also need to consider the uncertainty in the depth determination of the reference benchmark (AX-101), which we estimate at ± 2.0 cm. This is new, as in previous years we assumed the uncertainty of the reference benchmark was zero (when it was AX-105).

Table 4.1.1 - Depth changes from June 2022-June 2024 at MPR benchmarks. Uncertainty = ± 2.0 cm.

BENCHMARK NAME	Depth change (cm) using data from OOI-BPR-MJ03F as a reference for AX-101
AX-101 Caldera Center	11.5
AX-104 Bag City	2.2
AX-105 Pillow Mound*	n/a
AX-106 Ashes	6.3
AX-302 Trevi	4.9
AX-303 Marker 33 site	5.6
AX-307 Magnesia West	9.8
AX-308 South1	7.5
AX-309 RSN-PN	4.5
AX-310 Intern. District	5.9
AX-401 East Rim	6.0
AX-402 East Floor	6.3
AX-403 West Floor	6.0
AX-404 West Rim	5.6

* previous reference benchmark, AX-105, was not visited in 2024.

The 2022-2024 MPR results show uplift (inflation) at all benchmarks, consistent with previous results. Note that there are no significant vertical motion offsets between the benchmark pairs that cross the western and eastern caldera faults

(AX-404 and 403, and AX-401 and 402, respectively). As in previous years, each measurement was made by placing the MPR on top of a benchmark and recording for 20 minutes. Data were recorded on a laptop PC in the *Jason* control van. The two Paros pressure gauges that we have used in the past (s/n 43535 and 62201) were used in the MPR this year.

Table 4.1.2 - Cement MPR Benchmark Locations, including the 6 new benchmarks added this year.

AXIAL CEMENT BENCHMARK NAMES	LAT	LON	Depth	LAT DEG	LAT MIN	LON DEG	LON MIN
Southern Caldera loop							
AX-101 Caldera Center	45.95520	-130.00987	1532	45	57.312	-130	0.592
AX-104 Bag City	45.91617	-129.98950	1534	45	54.970	-129	59.370
AX-105 Pillow Mound	45.86317	-130.00376	1718	45	51.790	-130	0.225
AX-106 Ashes	45.93445	-130.01160	1542	45	56.067	-130	0.696
AX-302 Trevi	45.94642	-129.98378	1522	45	56.785	-129	59.027
AX-303 Marker 33 site	45.93346	-129.98225	1516	45	56.008	-129	58.935
AX-307 Magnesia West	45.94535	-130.00906	1544	45	56.721	-130	0.544
AX-308 BPR-South1	45.93160	-129.99880	1533	45	55.896	-129	59.928
AX-309 RSN-PN	45.93835	-129.97208	1527	45	56.301	-129	58.325
AX-310 Intern. District	45.92580	-129.97787	1531	45	55.548	-129	58.672
Central Caldera crossline							
AX-401 East Rim	45.96271	-129.99111	1475	45	57.763	-129	59.466
AX-402 East Floor	45.96263	-129.99159	1522	45	57.758	-129	59.495
AX-403 West Floor	45.94783	-130.02570	1556	45	56.869	-130	01.542
AX-404 West Rim	45.94709	-130.02677	1399	45	56.825	-130	01.606
AX-505 West of center	45.95210	-130.01769	1550	45	57.126	-130	01.061
AX-506 East of center	45.95633	-129.99655	1530	45	57.380	-129	59.793
Northern Caldera loop							
AX-501 NW of center	45.96089	-130.02113	1560	45	57.654	-130	01.268
AX-502 North-1	45.96693	-130.01404	1532	45	58.016	-130	00.842
AX-503 North-2	45.97524	-130.01739	1577	45	58.514	-130	01.043
AX-504 NE of center	45.96275	-130.00421	1532	45	57.765	-130	00.253

OOI Regional Cabled Array BPR drift

The results from the MPR surveys allow us to constrain the drift rates of the OOI Regional Cabled Array bottom pressure/tilt instruments (BOTPTs), which all have MPR benchmarks located nearby. This is the fifth time we have been able to do this since the original three BOTPT instruments were powered up in September 2014 (although only the fourth time for the BOTPT instrument that was deployed at ASHES in August 2017, MJ03B). Using the nine-year record from 2015-2024 provides a good signal-to-noise ratio with which to constrain these drift rates. The calculated drift rates are all less than ±0.7 cm/yr for the 2015-2024 time period (far right column in the table below). These are a bit higher than the drift rates calculated for 2015-2022, perhaps because of using AX-101 as the reference benchmark for the MPR survey. As before, we consider the drift for these OOI-BPRs "essentially zero", considering the errors. The drift calculations over shorter time periods are less precise, because there is more error in picking a single depth from the BPR data at the beginning and end of each time interval, which are overprinted with non-tidal oceanographic effects. For example, in the table below, the calculated drift rates from 2017-2018 are the highest, because that is also the shortest time interval (just 1 year), with the highest error and worst signal to noise. The bottom line is that we conclude

again that no drift corrections need to be made to the OOI-BPR data from the BOTPT instruments on the cabled observatory inside the summit caldera, because their drift rates are very low, and essentially zero.

Table 4.1.3 – Apparent Drift Rates of OOI-BPRs Determined by Comparing with MPR Surveys: 2015-2024

BOTPT Name & Location & Nearest MPR benchmark	Drift rate 2015-2017 (cm/yr)	Drift rate 2017-2018 (cm/yr)	Drift rate 2018-2020 (cm/yr)	Drift rate 2020-2022 (cm/yr)	Drift rate 2015-2022 (cm/yr)	**Drift rate 2015-2024 (cm/yr)**
BOTPT-A301-MJ03F Central Caldera (AX-101)	-0.682	+3.376	-1.635	+0.167	+0.190	**+0.316**
BOTPT-A302-MJ03E Eastern Caldera (AX-309)	-0.839	+6.023	-1.372	-0.224	+0.263	**+0.373**
BOTPT-A303-MJ03D International District (AX-310)	-0.892	+3.011	-1.538	-0.559	-0.234	**-0.169**
BOTPT-A304-MJ03B ASHES (AX-106)	n/a	+2.099	-2.521	-0.559	-0.264	**-0.668***

* The drift rate for the OOI-BPR at ASHES in the right-most column is calculated from August 2017-June 2024

Autonomous BPR moorings

In June 2024, we recovered the three autonomous BPR moorings that were deployed in June 2022 (BPR-North, West, and East). All the moored BPRs were built by NOAA/PMEL and record pressure every 15 seconds in psi, which we convert to an approximate depth by multiplying by 0.670 m/psi. Below, is a first-look summary of the data from each moored BPR (in red), compared with the OOI-BPR-MJ03F record (in blue). We usually use these moored instruments to extend the footprint of our pressure measurements, hoping to capture short-term signals associated with the next eruption at Axial, rather than having them near an MPR benchmark where their long-term drift can be constrained (but in 2024, we use one of the four moored BPRs to serve this function).

This year, the clock drift for the recovered moored-BPRs was not recorded, unfortunately. We use these clock corrections to optimally align the pressure data with predicted tides during data processing. Fortunately, two of the three moored-BPR records look reasonable without any clock correction (suggesting the clock drift was modest for BPR-West & BPR-East). However, the third instrument (BPR-North) apparently had the clock incorrectly set in June 2022, because its data were clearly mis-aligned with predicted tides during initial processing. We used the recorded release time in June 2024 to estimate a clock correction of 2h:40m for this instrument (because the time the instrument left the seafloor is clear in the pressure data), and amazingly applying this time-correction seems to work to properly align the record with the predicted tides. **Lesson: we need to be careful to record clock drift for all the BPRs.**

In June 2022, BPR-North (s/n 51185) and BPR-West (s/n 107673) were deployed near each other in the northern caldera floor as an experiment, since the latter had been deployed twice on the western caldera rim and had recorded what appeared to be anomalously high negative drift (or perhaps subsidence into the caldera rim sediments?). Deploying BPR-West next to BPR-North (which has behaved reasonably) and on bare lava in the northern caldera floor would help us assess what was happening. Below is a summary of the moored-BPR records for 2022-2024. The de-tided data are shown in **Figure 4.1.1,** and their deployment locations are shown in **Figure 4.1.2**.

BPR-North (Paros s/n 51185) again was the "best behaved" of the 3 moored BPRs, with a record that looks similar to the one recorded by the OOI-BPR at MJ03F (at the center of the caldera). It shows an apparent uplift of ~8 cm (with unconstrained drift), which is reasonable when compared to the uplift of ~11.5 cm observed at MJ03F. This was the instrument that required the 2h:40m clock correction. Its acoustic release also indicated a tilt >45° on the seafloor after deployment in 2022, but it released without any problem. So it appears to be functioning well.

BPR-West (Paros s/n 107673) once again showed a strong deflationary or subsidence signal, despite being co-located with BPR-North on bare rock in the northern caldera floor. It shows an apparent subsidence of ~46 cm, which implies a total negative drift of ~-54 cm, when compared to the BPR-North uplift! This clarifies that the moored BPR instruments are OK to deploy in heavy sediment on the caldera rims, but shows that this instrument has anomalously high drift.

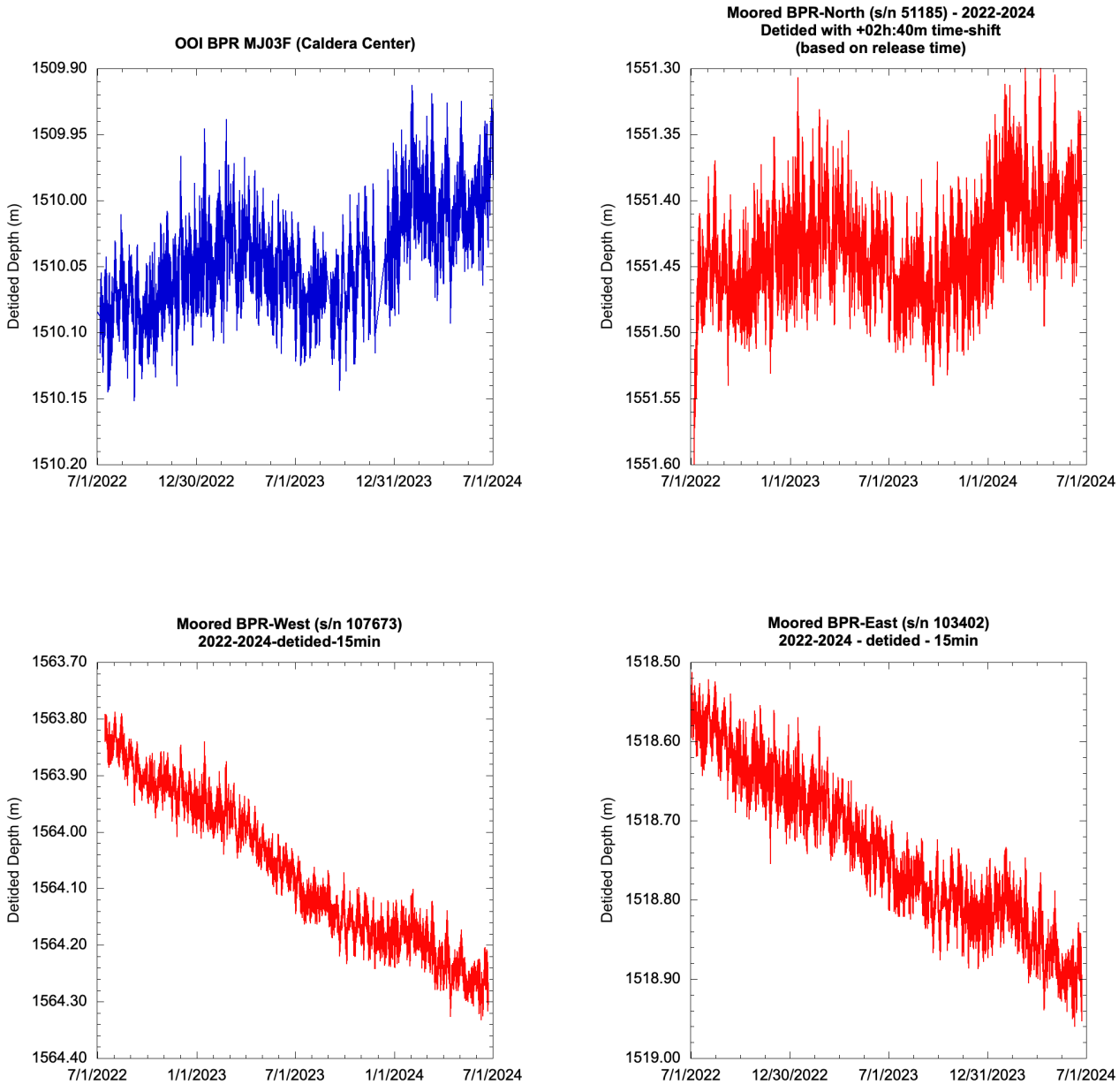


Figure 4.1.1 – Plots of Moored BPR data (in red) compared to the OOI cabled BPR at the Caldera Center (MJ03F, in blue) that is known to have low drift and shows ~11.5 cm of uplift at the Caldera Center. All plots from 7/1/2022 to 7/1/2024.

BPR-East (Paros s/n 103402, formerly "BPR-Center") was deployed several km to the east of the caldera. It too measured strong apparent deflation or subsidence, amounting to ~33 cm, between 2022-2024. The same instrument in the same location showed a similar deflation/subsidence in 2020-2022. However, before that, it was deployed repeatedly near the center of the caldera and did not behave that way, so it's unclear what is going on. For now, we have to assume that this instrument is also displaying anomalously high negative drift.

These three moored-BPRs were turned-around at sea and re-deployed (after being re-named), and a fourth moored-BPR was deployed (after being checked out in Seattle after our 2022 cruise; this is the one that is only rated to 1600 m depth). The four moored-BPRs were deployed as shown in the map below at right, with two in the northern caldera, one in SE of the caldera center (to fill a noticeable gap in coverage in our seafloor benchmark array), and one near MPR benchmark AX-104 (because we were short one mini-BPR to co-locate with that benchmark).

The Latitude/Longitude locations of the BPR Moorings recovered and deployed in June 2022 are presented in the Mooring Operations summary.

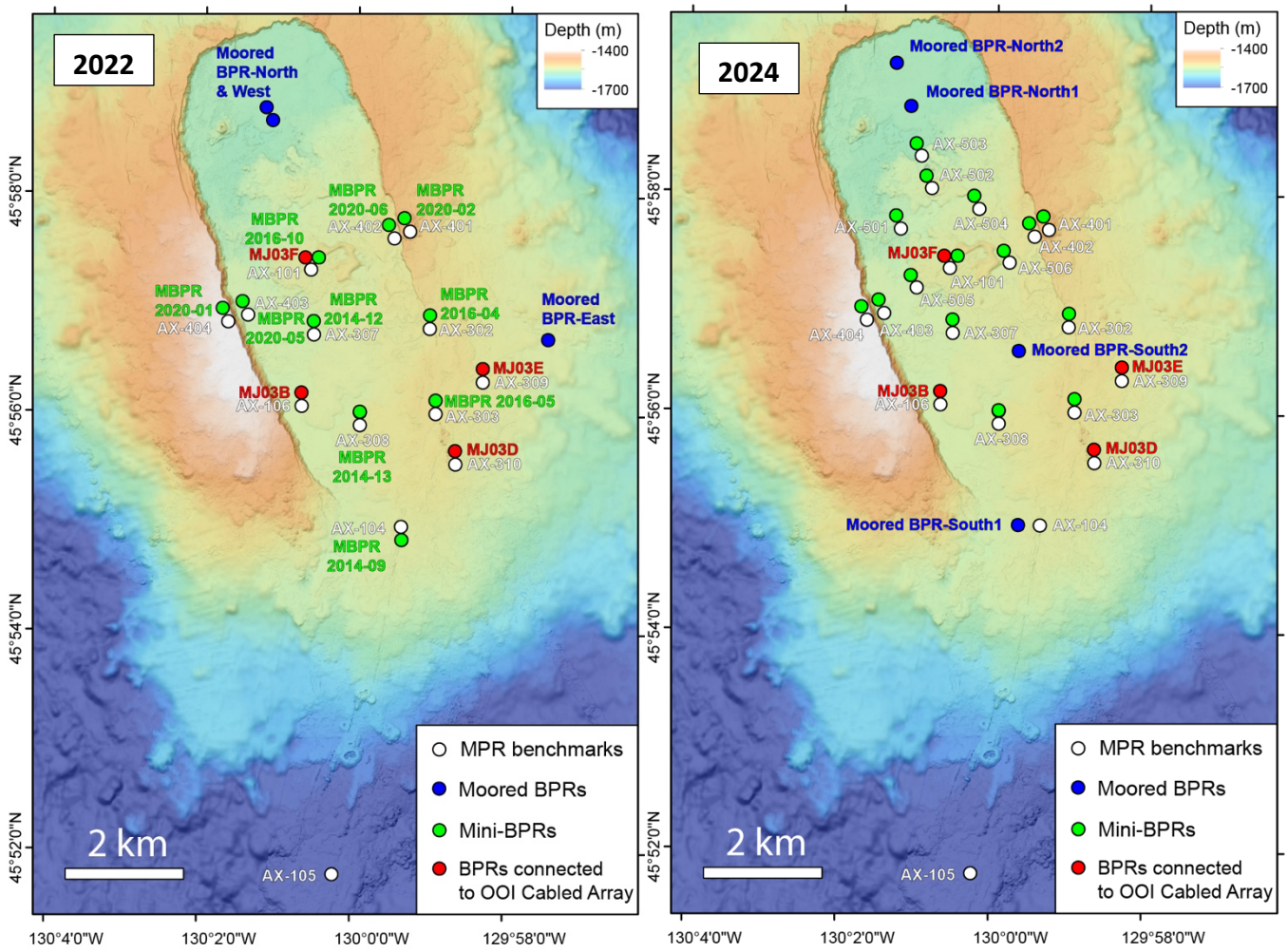


Figure 4.1.2 - Maps showing MPR benchmarks (white dots) and various types of BPRs (after the 2022 cruise on the left and after the 2024 cruise on the right).

Mini-BPRs (TG11s)

During our one long ("monster") *Jason* dive J2-1579 (with the help of the *Jason* elevator), we recovered 10 Mini-BPRs that were deployed on MPR benchmarks in 2022, and after turning most of them around on the ship, we deployed 15 (see tables below). They were deployed with small tripods on their undersides to make them stable and they weigh ~5 pounds in water. For the recovered Mini-BPRs, **Table 4.1.4** below lists the dates & times that the individual Mini-BPRs were deployed on and recovered from the MPR benchmarks. The 4th column is the clock drift during the deployment, and the 5th column is the apparent Paros sensor drift (cm/yr) which was calculated by comparing the Mini-BPR data with the MPR survey results.

Table 4.1.4 - MINI-BPRs RECOVERED in 2024 (date/times are when instrument was on the benchmark)

Inst. ID Paros s/n	Benchmark	Deploy date/time/JD	Recover date/time/JD	Clock drift during depl. (seconds) and clock drift rate (sec/day)	Apparent Paros inst. drift (cm/yr)
2014-09 127331	AX-104	06/21/2022 15:25 (JD=172)	06/27/2024 21:56 (JD=179)	138 sec 0.187 sec/day	+2.179 cm/yr
2014-13 132674	AX-308	06/22/2022 10:33 (JD=173)	06/28/2024 00:19 (JD=180)	43 sec 0.058 sec/day	-5.646 cm/yr
2014-12* 132673	AX-307	06/22/2022 16:13 (JD=173)	06/26/2024 15:58 (JD=178)	-56 sec -0.071 sec/day	-8.442 cm/yr
2016-10 137990	AX-101	06/22/2022 21:06 (JD=173)	06/26/2024 00:27 (JD=178)	297 sec 0.404 sec/day	+4.966 cm/yr
2016-04** 137988	AX-302	06/24/2022 09:33 (JD=175)	06/27/2024 14:33 (JD=179)	62 sec ** 0.053 sec/day	n/a **
2016-05† 137989	AX-303	06/24/2022 05:14 (JD=175)	06/27/2024 18:13 (JD=179)	n/a †	n/a †
2020-05†† 140962	AX-403	06/29/2022 21:08 (JD=180)	06/26/2024 18:03 (JD=178)	515 sec 0.706 sec/day	-1.003 cm/yr
2020-01* 140958	AX-404	06/30/2022 00:11 (JD=181)	06/26/2024 19:20 (JD=178)	418 sec 0.574 sec/day	-1.255 cm/yr
2020-02 140959	AX-401	06/30/2022 06:05 (JD=181)	06/27/2024 03:48 (JD=179)	78 sec 0.107 sec/day	-3.008 cm/yr
2020-06* 140963	AX-402	06/30/2022 08:48 (JD=181)	06/27/2024 03:05 (JD=179)	156 sec 0.214 sec/day	-1.304 cm/yr

* Clock-drift for these instruments was determined by cross-correlation, because it wasn't recorded before the instruments were turned off on recovery.

** Instrument **2016-04** did not record data after mid-November 2022, apparently due to a dead battery.

† Instrument **2016-05** did not record valid data during the 2022-2024 deployment, so it is not included in the data analysis. It recorded significantly higher apparent pressures than the other instruments (up to 300,000 kPa).

†† Instrument **2020-05** recorded data for the entire deployment, but after about Oct 2023 the noise in the data and the maximum amplitude recorded began to increase for an unknown reason.

Note that in the table above, some of the Mini-BPR clock-drift values were measured directly (comparing the CPU clock time on recovery to UTC time), but four of the Mini-BPRs were stopped before this clock-drift could be recorded (the ones with an * after the ID name in the left column above). For these four, the clock-drift was determined by cross-correlation with predicted tides.

The Mini-BPRs report pressures in kPa every 100 seconds (1 min 40 sec). The pressure was converted from kPa to psi using 1kPa = 0.14503773800722 psi and then to depth in meters using 1 psi = 0.670 meters. During data processing, clock drift determined for each instrument was used to correct the dates/times in the recorded data. Then all the Mini-BPR data were de-tided by subtracting predicted tides provided by Rick Thomson at the Institute of Ocean Sciences in Sydney, BC, based on the first year of OOI BPR data from instrument BOTPT-A301-MJ03F on the OOI Cabled Array (located at 45.954850° -130.008753°, at the Central Caldera). Plots of the data are shown on the following pages. Several instruments had problems, as noted in the footnotes below **Table 4.1.4** above. Unfortunately, all these were re-deployed (see **Table 4.1.5**). No data plot is shown below for Mini-BPR **2016-05**, since it did not record valid data.

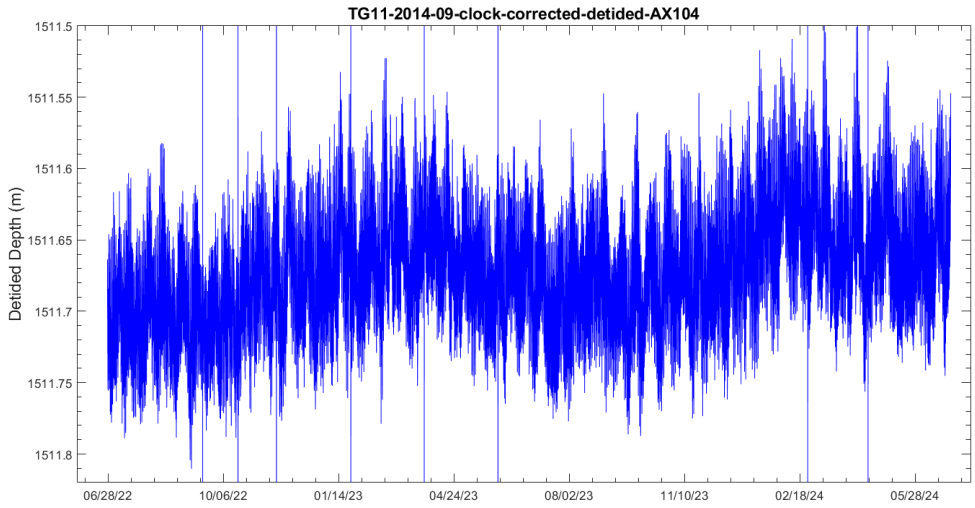


Figure 4.1.4 – Clock-corrected and detided Mini-BPR data from instrument **2014-09** at benchmark **AX-104**.

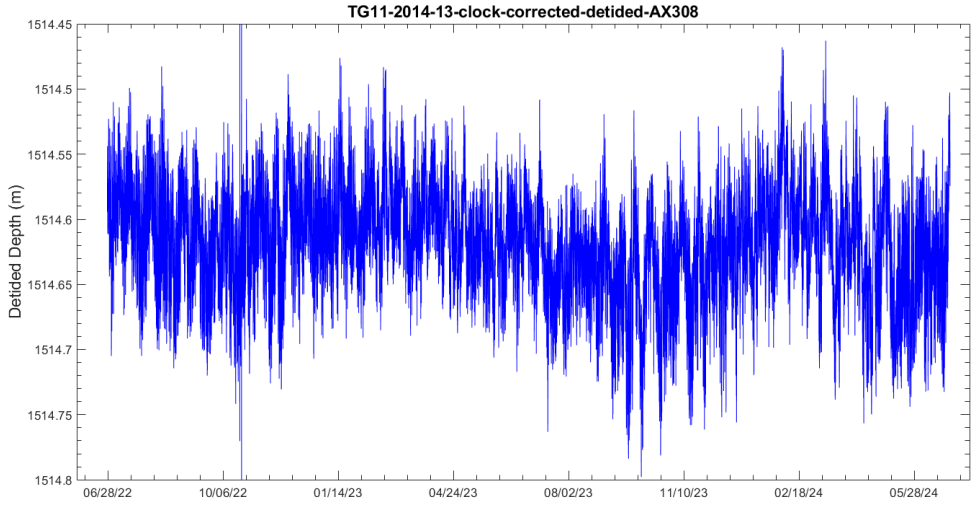


Figure 4.1.5 – Clock-corrected and detided Mini-BPR data from instrument **2014-13** at benchmark **AX-308**.

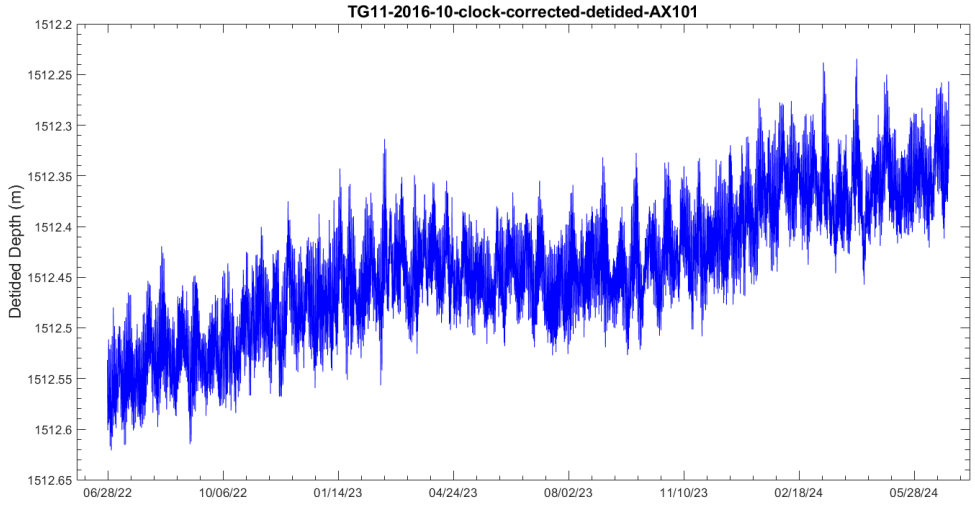


Figure 4.1.6 – Clock-corrected and detided Mini-BPR data from instrument **2016-10** at benchmark **AX-101**.

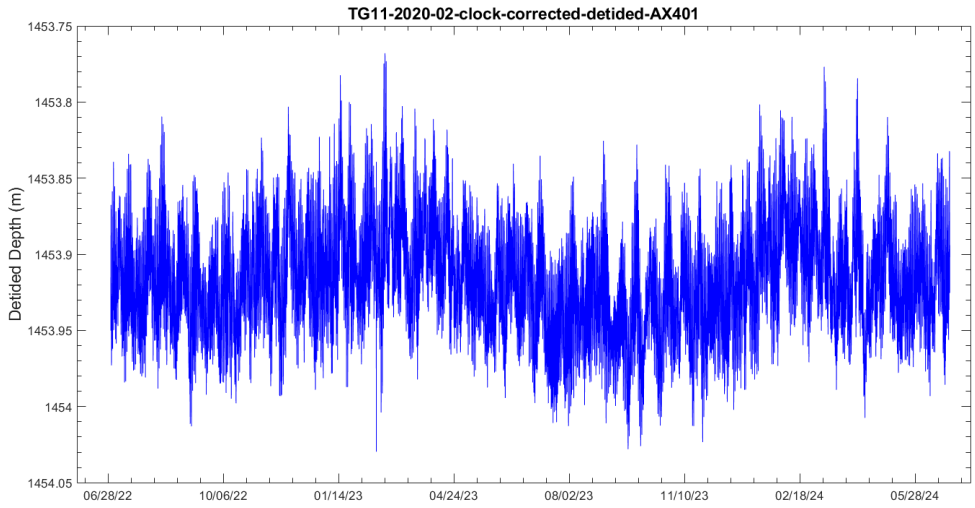


Figure 4.1.7 – Clock-corrected and detided Mini-BPR data from instrument **2020-02** at benchmark **AX-401**.

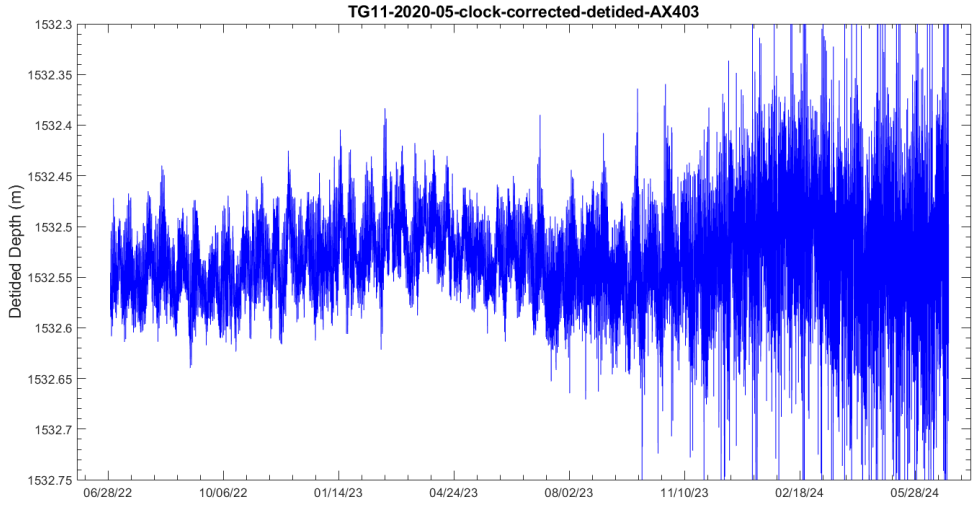


Figure 4.1.8 – Clock-corrected and detided Mini-BPR data from instrument **2020-05** at benchmark **AX-403**. The noise and/or maximum amplitude recorded increased with time after about October 2023. It is not known why.

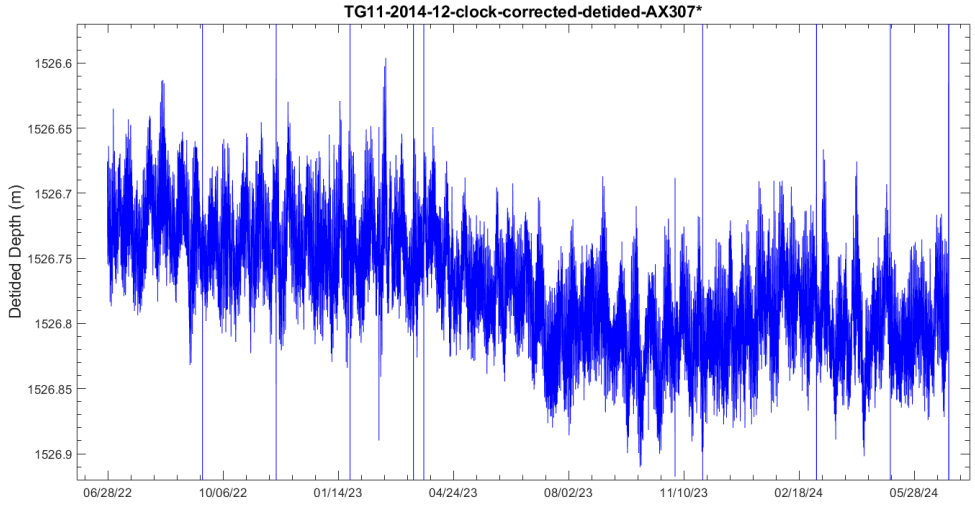


Figure 4.1.9 – Clock-corrected and detided Mini-BPR data from instrument **2014-12** at benchmark **AX-307**.

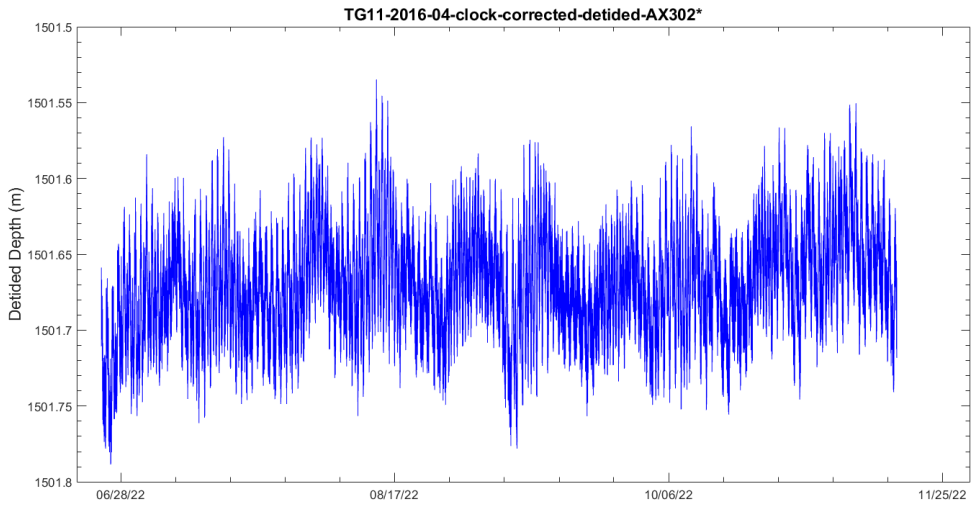


Figure 4.1.10 – Clock-corrected and detided Mini-BPR data from instrument **2016-04** at benchmark **AX-302**. This instrument only recorded to November 2022, apparently due to the battery dying prematurely.

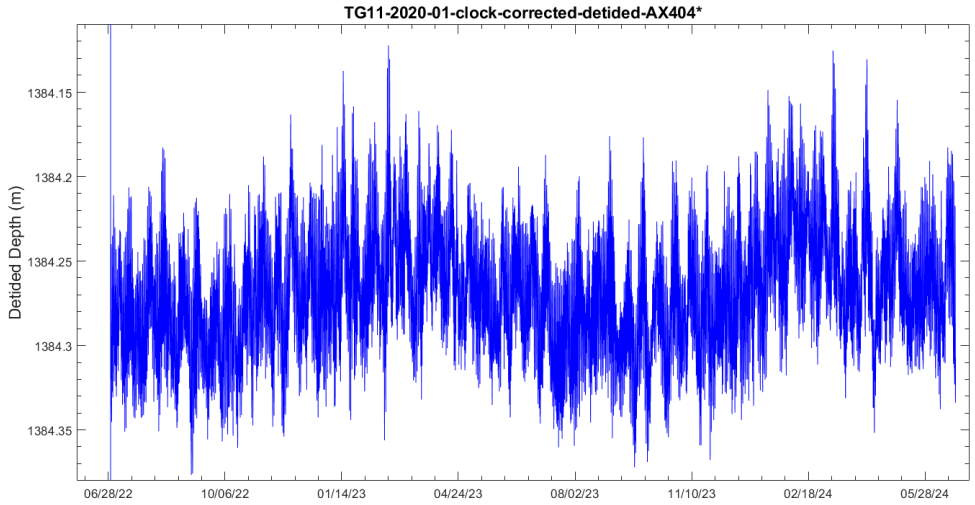


Figure 4.1.11 – Clock-corrected and detided Mini-BPR data from instrument **2020-01** at benchmark **AX-404**.

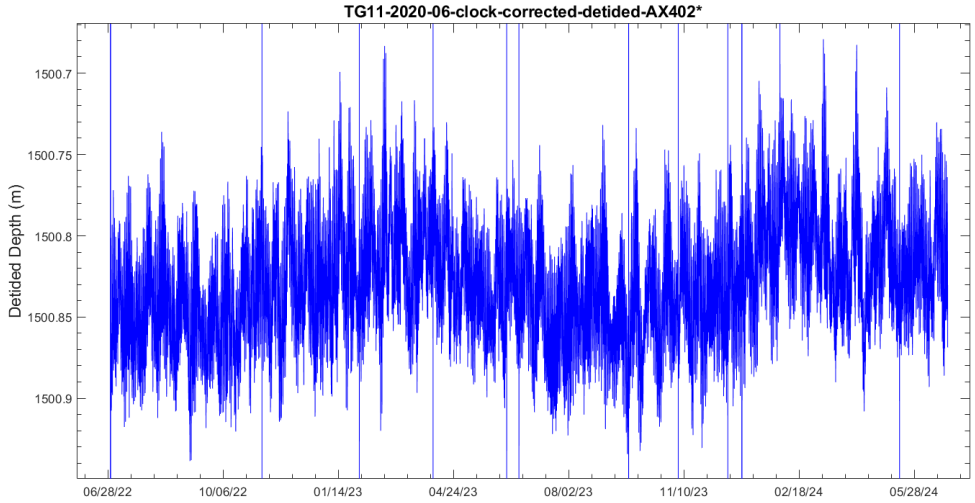


Figure 4.1.12 – Clock-corrected and detided Mini-BPR data from instrument **2020-06** at benchmark **AX-402**.

Mini-BPR deployments in 2024

The table below shows where Mini-BPRs were deployed in 2024 during *Jason* dive J2-1579. We currently own 16 Mini-BPRs. We deployed 15 Mini-BPRs at MPR benchmarks in 2024; Mini-BPR 2020-07 appears to need repairs, so it was not deployed. This includes all the MPR benchmarks, except AX-104 (where we deployed a moored BPR instead), and the benchmarks near 3 of the 4 OOI-BPRs (AX-106, AX-309, and AX-310). We still place a Mini-BPR at benchmark AX-101, near the OOI-BPR-MJ03F, for redundancy (the OOI-BPRs stop recording if there is a power interruption). Our old reference site AX-105 does not currently have a Mini-BPR on it, because we are now using AX-101 as the MPR-survey reference site. Unfortunately, 2016-04, 2016-05, and 2020-05 all had problems during the last deployment, but were redeployed before we knew about them.

Table 4.1.5 - MINI-BPRs (TG11's) DEPLOYED in 2024
(date/times are when instrument was placed on the benchmark)

Inst. ID	Paros S/N	Benchmark	Depth (m)	Deploy date	Deploy time	Julian day
2016-02	137987	AX-101	1532	06/27/2024	0:30	179
2020-05††	140962	AX-302	1522	06/29/2024	1:05	181
2020-06	140963	AX-303	1516	06/29/2024	4:36	181
2020-02	140959	AX-307	1544	06/28/2024	8:45	180
2016-10	137990	AX-308	1533	06/29/2024	14:38	181
2020-08	140965	AX-401	1470	06/27/2024	3:50	179
2020-03	140960	AX-402	1517	06/27/2024	3:06	179
2020-04	140961	AX-403	1549	06/26/2024	18:06	178
2014-08	127329	AX-404	1399	06/26/2024	19:24	178
2016-05†	137989	AX-501	1560	06/30/2024	3:35	182
2014-13	132674	AX-502	1532	06/30/2024	23:33	182
2016-04*	137988	AX-503	1577	06/30/2024	18:29	182
2014-09	127331	AX-504	1532	07/01/2024	2:55	183
2020-01	140958	AX-505	1550	06/28/2024	10:40	180
2014-12	132673	AX-506	1530	06/28/2024	21:15	180

* Note: instrument **2016-04** did not record data after mid-November 2022, apparently due to a dead battery. So it is not known how well it will function in this deployment. It was re-deployed at MPR benchmark **AX-503** in June 2024.

† Note: instrument **2016-05** did not record valid data during the 2022-2024 deployment. It recorded significantly higher apparent pressures than the other instruments (up to 300,000 kPa). So it is not known how well it will function in this deployment. It was re-deployed at MPR benchmark **AX-501** in June 2024.

†† Instrument **2020-05** recorded data for the entire deployment, but after about Oct 2023 the noise in the data and the maximum amplitude recorded began to increase for an unknown reason. So it is not known how well it will function in this deployment. It was re-deployed at MPR benchmark **AX-302** in June 2024.

Overall Results of the Pressure Measurements

The pressure data from 2022-2024 show that by June 2024 Axial Seamount had re-inflated to ~ 93% of the total amount of deflation that occurred during the 2015 eruption (2.27 m of post-eruption re-inflation compared to 2.44 m of co-eruption deflation). Notably, the rate of re-inflation since the beginning of 2024 had increased substantially to 20-25 cm/yr by summer of 2024, after approaching zero in summer of 2023, suggesting that the magma supply rate to Axial had also increased substantially. In addition, the rate of seismicity had also increased substantially (http://axial.ocean.washington.edu/). Because of this, we made a new eruption forecast that Axial would likely erupt again before the end of 2025 (https://www.pmel.noaa.gov/eoi/axial_blog.html). We'll see if that happens, or if Axial has other unexpected changes in store…

4.2 Hydrothermal Vent Temperature Recorders

Bill Chadwick, Guangyu Xu, and Dax Soule

RECOVERIES

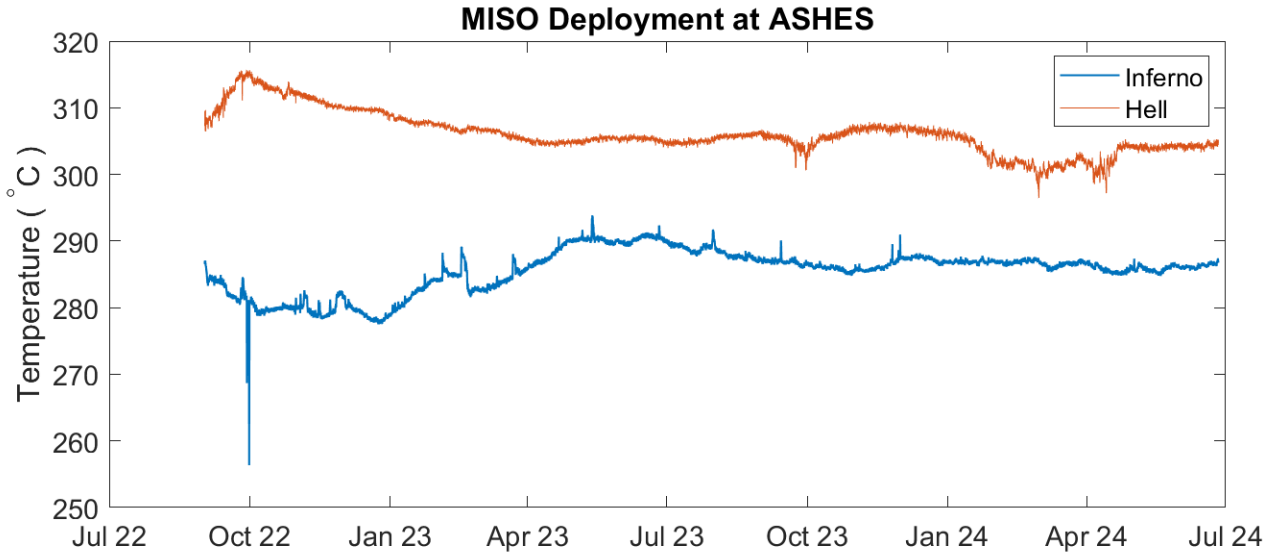
During this year's ROV *Jason* dive J2-1579, we recovered HOBO-style (aka MISO) high-temperature probes which had been deployed since summer of 2022 at Inferno, Hell, and Virgin vents in the ASHES vent field, from the base of El Guapo chimney in the International District vent field, and from Trevi vent along the east caldera wall before running out of time. The UW OOI-RCA team kindly recovered additional temperature probes during their O&M (VISIONS) cruise in August 2024 from Casper & Vixen vents in the Coquille vent field and Diva vent in the International District. Three of the probes were the new models (the ones at Inferno, Hell, and El Guapo), and the rest were old models.

Table 4.2.1 – HOBO temperature probes recovered in 2024.

Vent/Marker	**Probe ID**	**Dive deployed**	**Dive recovered**	**Comments**
Diva / Mkr 232	HOBO 130	J2-1431	(UW)	Repositioned several times to make sure probe tip was in the flow during deployment, but unfortunately the probe had fallen out when recovered and the record was flat-line (no data).
Vixen / Mkr218	MISO 102	J2-1431	J2-1667 (UW)	In Vixen vent
Casper / Mkr128	MISO 129	J2-1431	J2-1667 (UW)	Deployed "as securely as possible"
Trevi / Mkr156	MISO 101	R-2244	J2-1579	Deployed by UW-OOI on 31-Aug-2022 with ROPOS
El Guapo / Mkr 295 AT BASE (aka Pagoda)	MISO 2017-006	R-2246	J2-1579	Deployed by UW-OOI on 31-Aug-2022 with ROPOS. New-style logger borrowed from Dan Fornari.
Castle / Mkr 278	MISO 103	R-2246	**not recovered in 2024**	Deployed by UW-OOI on 31-Aug-2022 with ROPOS
Hell (ASHES)	MISO 2017-019	R-2249	J2-1579	Deployed by UW-OOI on 1-Sep-2022 with ROPOS. New-style logger borrowed from Dan Fornari.
Inferno (ASHES)	MISO 2017-002	R-2249	J2-1579	Deployed by UW-OOI on 1-Sep-2022 with ROPOS. New-style logger borrowed from Guangyu Xu.
Virgin (ASHES)	HOBO 153	R-2249	J2-1579	Deployed by UW-OOI on 1-Sep-2022 with ROPOS

Note the temperature probe deployed at Castle vent in 2022 was not recovered this year. From these new data we have updated long-term plots from the high-temperature vents. In each plot, the excursions to lower temperature should be ignored, because they are largely due to the probes being unstable in or falling out of the vents. The two colors in parts of the plots are from probes with two independent temperature sensors. Note there are also temperature probes at Diva vent and Escargot vent that are connected to the OOI-RCA.

Figure 4.2.1 - The plots below show data from the new-generation MISO temperature loggers that were deployed at Inferno, Hell, and El Guapo (Pagoda vent at the base). These plots were provided by Guangyu Xu.



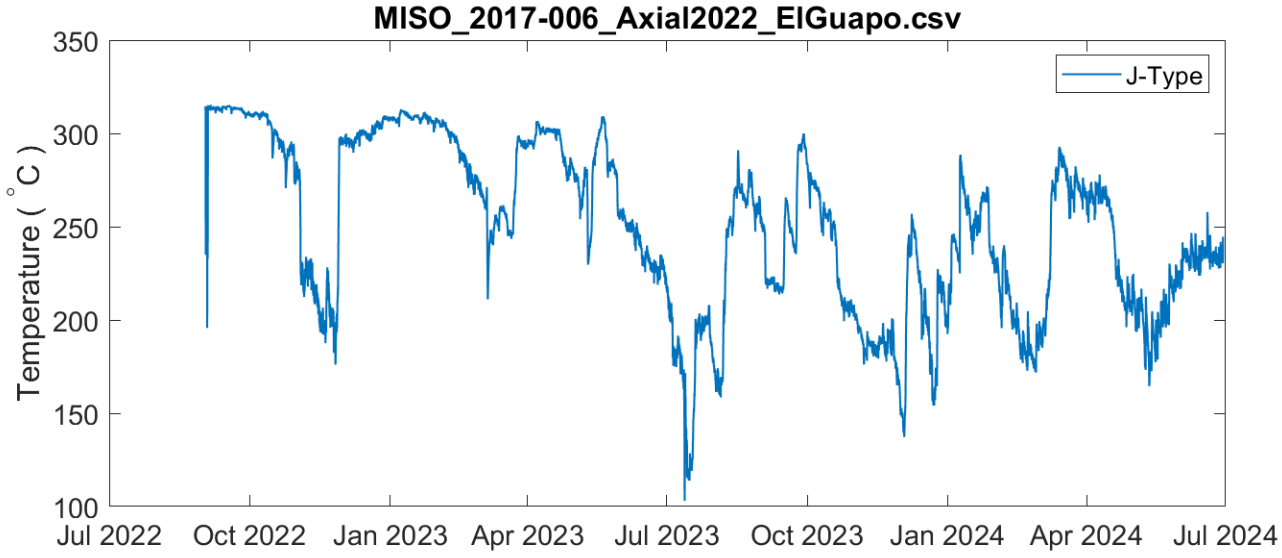
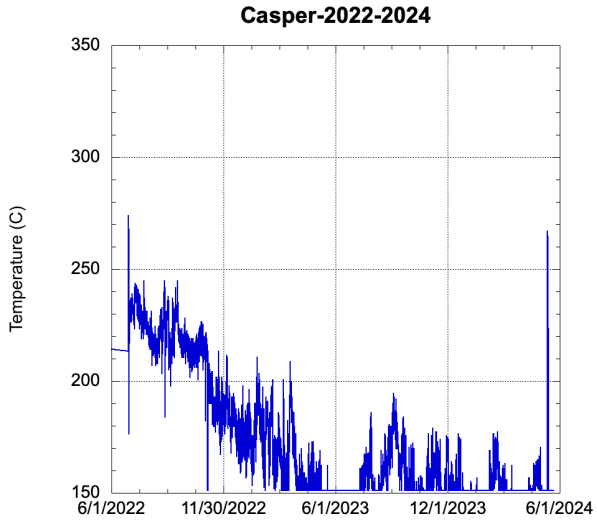
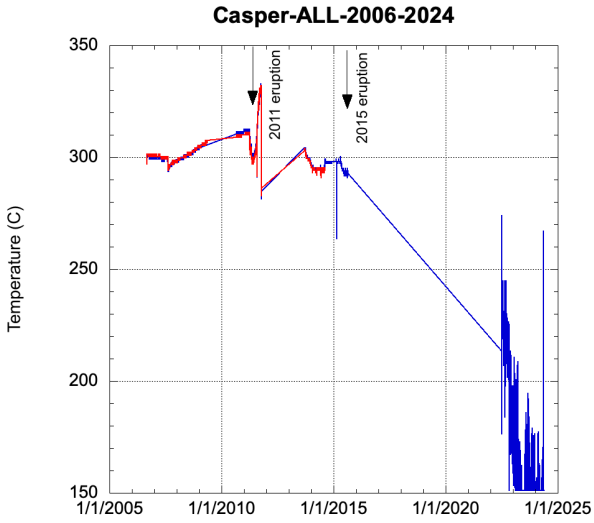
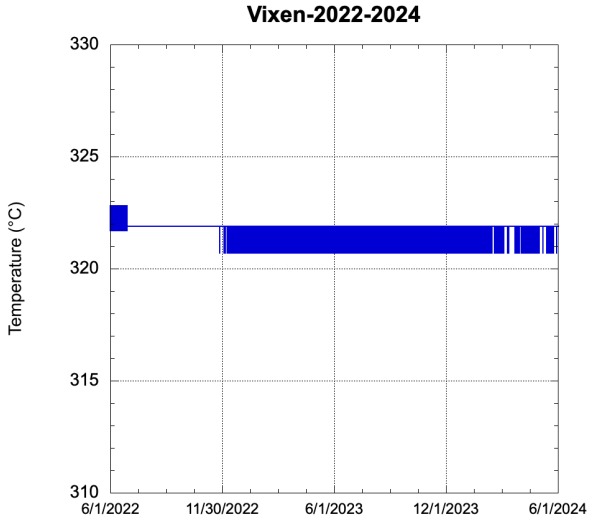
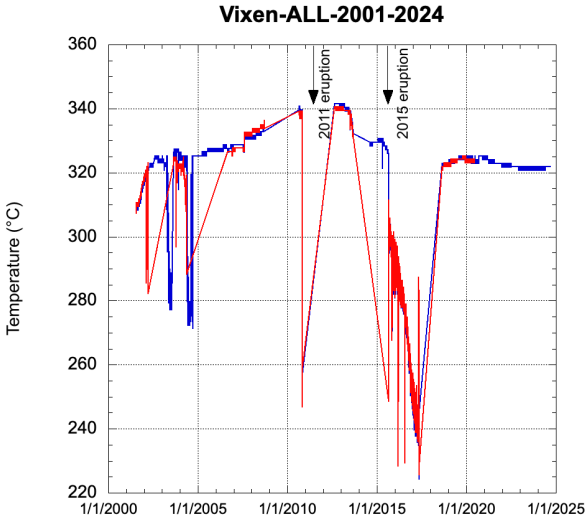


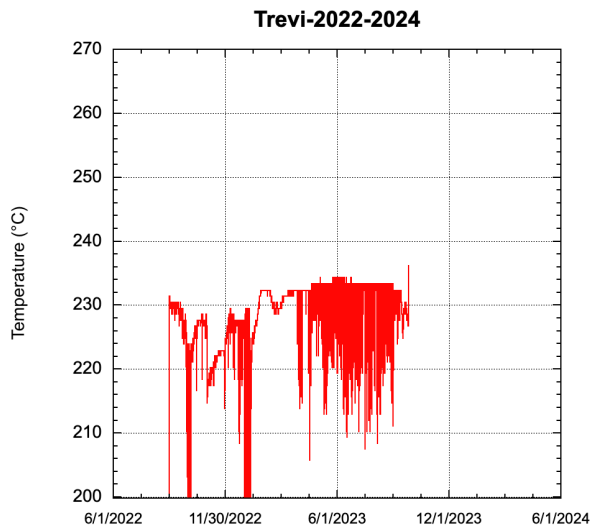
Figure 4.2.2 – The next set of plots show the temperature records from the last deployment (2022-2024) on the left, and the long-term records on the right for Casper, Vixen, Trevi, and Virgin vents, from the older-style temperature probes.

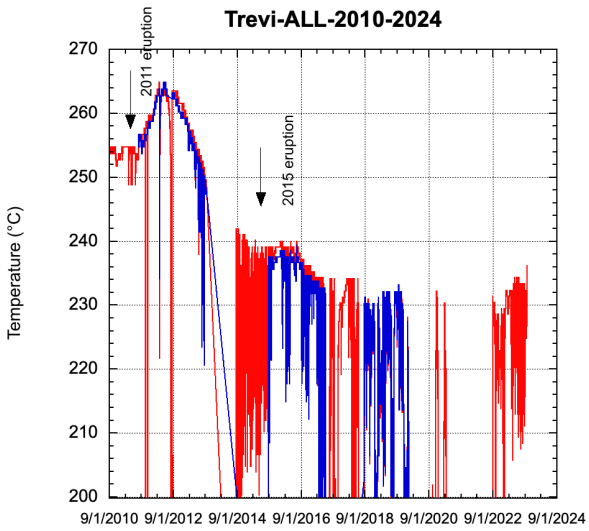

Casper-2022-2024
Temperature (C)
350
300
250
200
150
6/1/2022
11/30/2022
6/1/2023
12/1/2023
6/1/2024

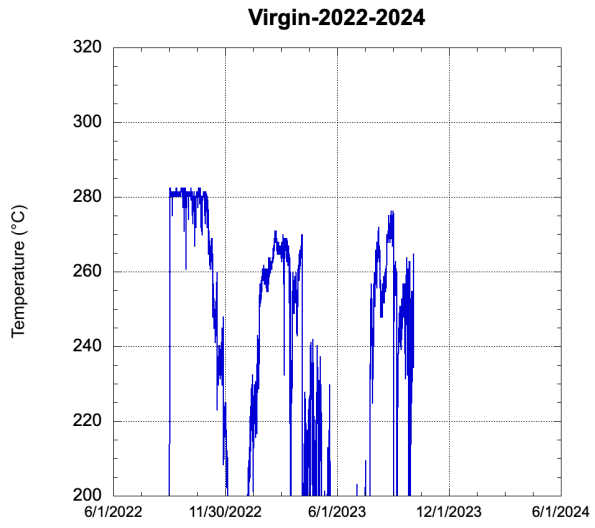

Casper-ALL-2006-2024
Temperature (C)
2011 eruption
2015 eruption
350
300
250
200
150
1/1/2005
1/1/2010
1/1/2015
1/1/2020
1/1/2025

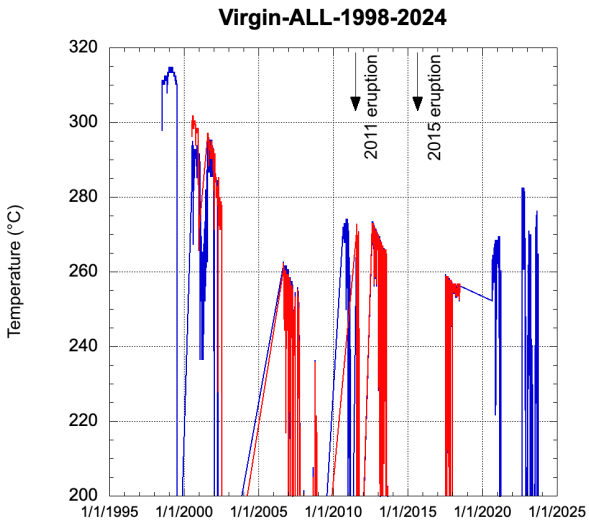

Vixen-2022-2024
Temperature (°C)
330
325
320
315
310
6/1/2022
11/30/2022
6/1/2023
12/1/2023
6/1/2024


Vixen-ALL-2001-2024
Temperature (°C)
2011 eruption
2015 eruption
360
340
320
300
280
260
240
220
1/1/2000
1/1/2005
1/1/2010
1/1/2015
1/1/2020
1/1/2025









Observations:

• Vixen was the most stable temperature record during 2022-2024 among the HOBO probes. The rest are relatively noisy and unstable. However, all three records from the new MISO probes are relatively good.

• In general, we are trying to move from using the “old-style” HOBO/MISO temperature probes, to the new-generation probes, because they have better resolution. However, the deployments/recoveries during the 2024 cruises revealed some potential issues with the new loggers. First, they appear to be a more fragile than the old ones. For example, all 3 of the new MISO probes that were recovered in 2024 required repair after recovery, because the connectors on the loggers (between the probe and the logger housing) were crushed. According to the manufacturer, this was likely due to the 'bell cap' that holds the probe to the logger housing being screwed down too tightly. They suggest only fastening the bell cap just tight enough so that the probe does not fall off.

Second, and more critically, Dax Soule and Guangyu Xu discovered a rather disturbing issue with the new loggers during pre-deployment testing on the ship, when several of them stopped logging on their own after reporting a 'battery reset' error. This issue has been reported to the manufacturer but they have not been able to reproduce it, so it remains a bit of a mystery. On the other hand, the 2-year records from Inferno, Hell, and Pagoda vents were all good. Because of this uncertainty, we are not yet confident that the new loggers are reliable enough to completely replace the old-style loggers. We will know more after the current set of temperature probes that were deployed in 2024 (see below) are recovered.

DEPLOYMENTS

On our Axial2024 cruise we deployed new-generation MISO temperature probes (purchased by Guangyu Xu and Dax Soule with NSF funding) at Trevi, Virgin, Inferno, and Hell vents. An additional MISO probe was deployed at Pagoda vent, at the base of El Guapo chimney, on our cruise and was later recovered by UW in August, so its data could be evaluated. The OOI-RCA team also kindly deployed additional probes in August at the top of El Guapo, at Tiny Towers, and at Vixen vents. An additional UW MISO probe was deployed at Mushroom vent. No MISO temperature probes were deployed at Casper vent or at Diva vent in 2024 (although there is an OOI-RCA temperature-and-resistivity probe there).

Table 4.2.2 – MISO temperature probe deployments in 2024.

Vent / Marker	Instrument	Dive Deployed	Dive Recovered	Comments
Diva / Mkr 232	(none)	n/a		OOI-RCA resistivity/temp probe is in the vent
Mushroom	(UW HOBO)	J2-16XX (UW)		Logger owned by UW deployed during OOI-RCA cruise in 2024. Into vent "in front of Mushroom"
Vixen / Mkr218	MISO 2023-012	J2-1667 (UW)		
Casper / Mkr128	(none)	n/a		none deployed in 2024
Tiny Towers	MISO 2017-002	J2-1662 (UW)		
El Guapo (top)	MISO 2023-009	J2-1662 (UW)		
El Guapo (base) = Pagoda, Mkr 295	MISO 2023-001 deployed in June, recovered in August and not replaced, so now there is (none)	J2-1579	J2-1662 (UW)	MISO 2023-001 was deployed in June, and then recovered in August by UW, so the data could be evaluated. It was not replaced, so there is no probe at Pagoda vent now. Another probe (MISO 2023-009) was deployed at the top of El Guapo instead in August by UW.
Inferno	MISO 2023-005	J2-1579		
Hell	MISO 2023-002	J2-1579		
Virgin	MISO 2023-007	J2-1579		
Trevi	MISO 2023-010	J2-1579		
Castle / Mkr 278	MISO 103	R-2246	not recovered in 2024	Deployed by UW-OOI on 31-Aug-2022 with ROPOS. Not seen by UW in 2024

4.3 – AUV *Sentry* Operations

Bill Chadwick, Dave Caress, Scott Nooner, and Jeff Beeson

Purpose:

The primary goal of the AUV *Sentry* surveys was to collect multibeam sonar data along tracklines inside and outside the caldera that will be compared to past and future surveys to document depth changes due to volcanic deformation. These repeat bathymetric surveys are used to augment and expand the deformation monitoring at Axial Seamount conducted by the seafloor pressure measurements. The pressure data have a higher vertical resolution (±1 cm) and are continuous in time, but are spatially sparse, only being made at ~20 measurement points. In comparison, the depth changes between AUV bathymetric resurveys have lower vertical resolution (±20 cm) and are campaign-style (once a year at the most), but are spatially continuous along tracklines and can extend over a much larger area to where no pressure data exist. Thus, these two methods form a powerful and complementary combination. A secondary goal for this expedition was to use a realtime navigation correction algorithm called Terrain Relative Navigation (TRN) on AUV *Sentry* to more closely repeat the survey tracklines from prior years. This is the first year that TRN was used on all AUV *Sentry* dives.

Prior AUV Surveys:

AUV-based surveys yielding 1-meter scale multibeam bathymetry were begun at Axial Seamount in 2006 using MBARI Mapping AUVs, with additional MBARI surveys adding coverage in 2007, 2008, and 2009. These initial missions covered the summit caldera and part of the upper south rift. Following the 2011 eruption, MBARI surveys in 2011 and 2014 combined new coverage with repeated coverage in the areas of new lava flows; differencing repeated surveys resolved the thickness and extent of most of the 2011 lava flows. A subset of the 2014 missions repeated survey lines within the caldera from 2011; differencing these demonstrated that repeat AUV mapping could resolve the uplift within the caldera that followed the 2011 eruption. Following the April 2015 eruption, we began to conduct a pattern of repeated surveys extending across and well outside the summit caldera to monitor the vertical deformation of the entire summit region. The first long baseline surveys were conducted in August 2015, four months following the eruption, and this expedition's surveys are the eighth repeat of those lines. AUV *Sentry* was used during expeditions in 2015, 2017, 2020, 2022, and now 2024. MBARI Mapping AUVs were used during 2016, 2018, 2019, and 2023. No repeat surveys occurred during 2021. The original repeat survey pattern was extended with additional lines southeast of the caldera starting in 2020. In most years additional surveys have been collected that augmented the overall bathymetric coverage of Axial Seamount. Including this 2024 expedition, the overall coverage of Axial Seamount now includes 89 Mapping AUV and AUV *Sentry* survey missions covering the summit and extending along both the north and south rifts for a total north-south distance of 80 km. The repeat pattern centered on the caldera is about 25 km NNW-SSE and 10 km WSW-ENE, with an additional extension about 6 km to the southeast.

Utility of Terrain Relative Navigation for Repeat AUV Surveys:

TRN is a method for using realtime bathymetry data to determine a vehicle's position relative to an existing topographic map. The TRN algorithm ported to *Sentry* has been developed over several years by Steve Rock of Stanford, his students, and Rob McEwen and Rich Henthorn of MBARI. Prior uses have been to allow AUVs without high grade inertial navigation to use simple echosounder or DVL soundings to navigate relative to a 1-meter scale map generated by a multibeam-equipped AUV. For this project, the goal is to enable a survey AUV to closely follow previous survey lines by using realtime multibeam data to locate the AUV relative to a pre-existing map. The problem being addressed is that INS navigational drift during long survey lines can grow to as much as 100 m (or more when things go badly). When two repeat surveys follow exactly the same track, differencing the bathymetry compares center beam data with center beam data and is relatively insensitive to errors in the multibeam roll bias. If navigational drift causes the repeat surveys to only partially overlap, then outer beam data from both swaths are compared, a calculation that is biased by any roll bias errors for either or both surveys. Thus, failure of a repeat survey to follow the prior survey lines within 30 m or so

degrades the precision of any depth change observed by bathymetric differencing. If we can use TRN to ensure that AUVs precisely follow the previous tracklines being repeated, we eliminate the possibility of failing to achieve any overlap and improve the quality of our measurements of the vertical depth change between surveys.

AUV *Sentry* Operations during AT50-26:

The 2024 AUV *Sentry* repeat mapping dives were conducted such that: (1) the survey altitude was 65-70 meters for 1.5 meter lateral resolution on the seafloor, (2) the survey speed was ~1.8-2.0 knots (~1 m/s), (3) dive durations were between 17-20 hours, (4) and AUV *Sentry* came back into acoustic communication range of the ship for navigation updates periodically. In addition to the multibeam sonar, AUV *Sentry* was equipped with a WHOI magnetometer. The magnetometer data will be provided to Masako Tominaga and Maurice Tivey at WHOI for processing and analysis. No sidescan or subbottom profiler data were collected during these surveys.

We had hoped to make seven AUV *Sentry* dives in 2024, like we did in 2022, to resurvey all of the tracklines that cross the volcano summit. However, because of the failure of the ROV *Jason* winch early in the cruise, and the need to return to Astoria for a replacement part, several AUV dive opportunities were lost because of the lost time. Then once we were back at Axial, the first attempted AUV *Sentry* dive (730) had to be aborted soon after it started, due to a failure in the DVL sonar. Fortunately, after the *Sentry* team swapped in a spare DVL sonar, the AUV worked well the rest of the cruise and we were able to complete three full dives (731, 732, 733). During the abbreviated dive time, we prioritized resurveying the tracklines inside the caldera, the radial lines that cross the summit, and the lines SE of the caldera (see Figure 4.3.1, below).

Each of the dive missions was designed as a series of waypoints in consultation with *Sentry* Expedition Leader Zac Berkowitz. Each dive track was designed to coordinate with the planned movements of the ship and ROV *Jason*. Vehicle configurations, sensor performance, vehicle statistics, and post-dive summaries are detailed in the *Sentry* operations report “AT50-26-Sentry-cruise-report.pdf” provided by the *Sentry* team. The multibeam sonar on the vehicle is a 200-400 kHz Kongsberg EM2040, operated at 400 kHz. USBL updates were given periodically throughout each mission when the AUV was within range of the ship and these were incorporated into the AUV navigation in post-processing.

Both the *Sentry* team and the MBARI seafloor mapping group use MB-System for processing the AUV multibeam data (https://www.mbari.org/products/research-software/mb-system/). Following each survey mission, the *Sentry* operations team first processed the AUV navigation data with WHOI/NDSF software, and then ran an MB-System-based automated workflow that includes merging this updated navigation model into the processed multibeam and generating initial data products (e.g. grids and maps). Dave Caress then continued with processing, including interactive bathymetry editing, backscatter correction, and navigation adjustment with the MB-System tool mbnavadjust. At sea all of the new 2024 surveys were processed and co-registered together with the most recent prior surveys from 2023. The work to co-register all 89 1-meter-scale AUV surveys together for an updated comprehensive topography model of Axial Seamount was presented by Dave Caress at the 2024 Fall AGU Meeting.

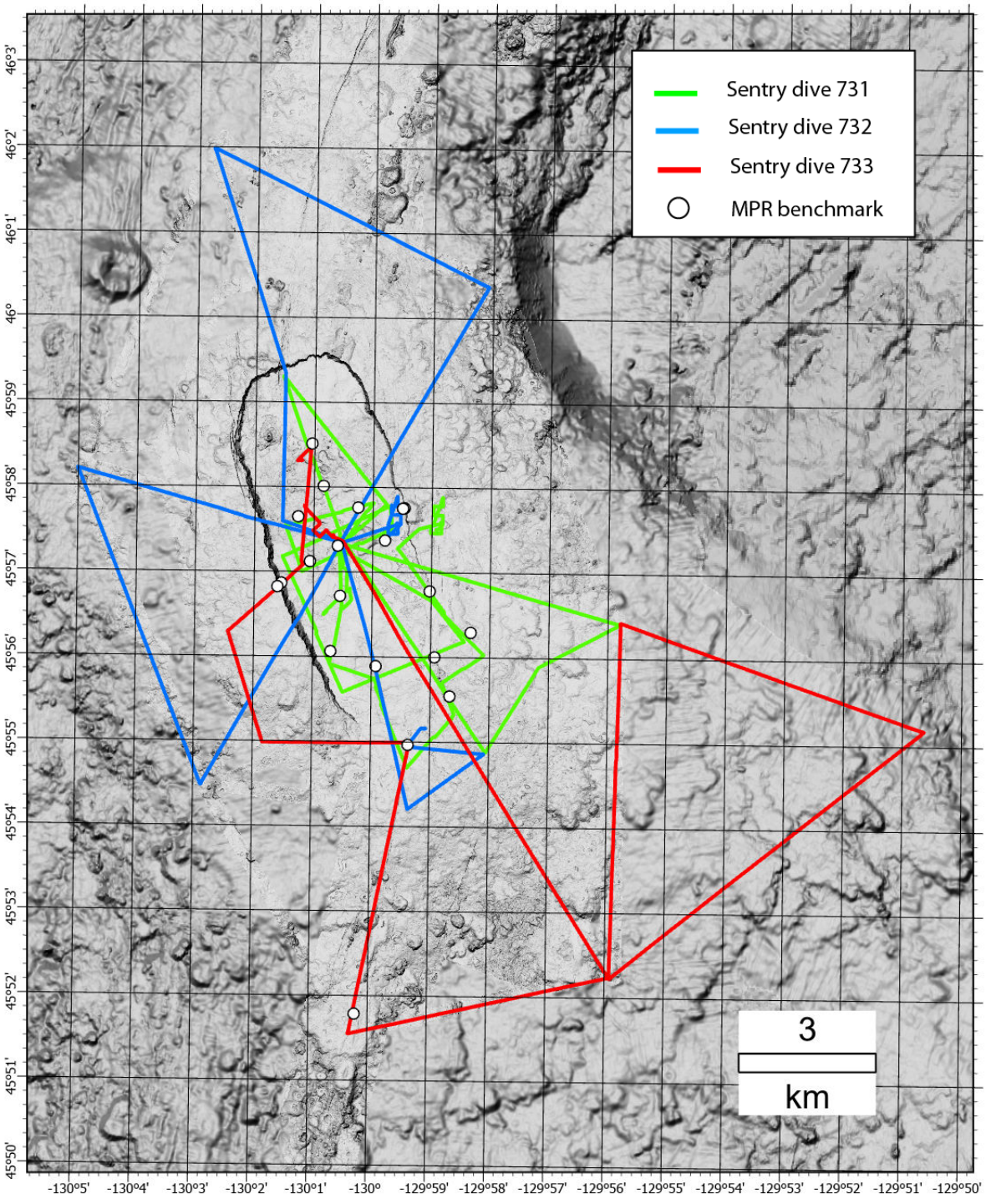


Figure 4.3.1 – The 2024 AUV survey tracklines for repeat multibeam bathymetry coverage.

4.4 - Mooring Operations

Jonathan Whitefield and Bill Chadwick

During the Axial2024 cruise we recovered 3 BPR moorings, and deployed 4. We also deployed 6 new seafloor benchmarks to expand our MPR array into the northern half of the caldera.

Leg 1

BPR-South2 deployment (Paros s/n 125320) – This BPR was brought back to Seattle to be checked after the last cruise in 2022. It was sent via truck by PMEL before departure, with battery in and logging enabled. We decided to deploy it first to get it off the deck. Built on deck before leaving port. No pear links in deck box, so had to acquire from benchmark box (replaced with ship supply). Would be good moving forward to have spare pear links and shackles to use for stopper/slip lines, rather than just exact amounts. On site 2024/06/22 14:25. Seas 5-7m, wind 10-15 but forecast to build slowly through the day. Wind and seas aligned. Acoustic Release s/n 60415 enabled before deployment. (Enable: 560217, Disable: 560234, Release: 542623). Deployed in 3 sections with starboard crane. First section may be a little long if higher seas, but with a tag line on the anchor it went over fine. Added an extra pear link/shackle at each break point for load transfer, and removed before final deployment. Suggest having these permanently added to the design, as it will make breaking upon recovery easier as well. Also needed to add a 5/8 shackle to the top of the spar to have a large enough space to pass a sling from the quick release. Release pulled at 15:44 GMT. Position of release was ~70m east of target. The acoustic release was disabled at 23:18. Note this is the BPR with the 1600m depth limit.

BPR-North recovery (Paros s/n 51185) - On site 2024/06/22 16:15. Set up deck with pole and grapple. Weak comms, so had to dial up xmit power (up to 9) and receive sensitivity (up to 5). Confirmed release at 16:45, on surface at 17:04. Grappled forward of stbd crane, then 20ft pendant attached to snap hook used to hook into chain just below first set of glass floats. Pulled up in 2 pieces, needed to add SAS/SL to tie into. Looks like Ti hardware was used to secured the SS clamps over the BPR. On deck at 17:30. Once secured, the BPR was removed to the lab, and the release on the recovered table was replaced with a new one.

BPR-West recovery (Paros s/n 107673) - On site right after finishing breakdown of BPR-North (they were deployed together in the same location). Xducer in water, immediately put settings to 9/5. Good comms, confirmed release at 18:33. On surface at 18:51. Recovery procedure same as BPR-North. On deck at 19:09. Table was landed on top of a new weight, and release replaced and prepped during transit.

Benchmark 506 deployment - Transited to benchmark 506 site while breaking down BPR-West. A Jason beacon was added to the pair of glass balls before deployment. A couple of holes had to be drilled in the plastic to accommodate a zip tie which would keep the pear link from hitting the beacon during deployment. The mooring was picked in one piece, with a slip line looped over the pin in the center of the benchmark. As the mooring was lowered, the slip line was pinched several times and the table had to be held by hand. It would be good to have either another shackle/pear link on the pin, or possibly fix a pear link to the table to use for deployments. Release was pulled at 21:08.

Benchmark 505 deployment - This was built during the short transit to the next site, and again deployed as one piece, beginning around 22:00. This time the slip line became caught as the mooring was being raised on the crane, and the line parted. Fortunately the table was at a height to be held by hand until the rest of the line was removed. This mooring spun in the increasing wind, and the loop of line at the top became wrapped around the quick release line. We had to lower the mooring and then bring it back close to the ship to unwrap it before completing the deployment. Release pulled at 22:32.

BPR-East recovery (Paros s/n 103402) - On site 2024/06/22 23:54. Sent release command and it was confirmed. On surface at 00:06. Although mooring location was on starboard bow, mooring came up on port side, suggesting a stronger current (or poor location information). Recovered with same procedure as before, and went smoothly. On deck at 2024/06/23 00:55. The glass floats were left on the deck to reuse during the next deployment. The BPR was removed, and the release left on the table, as this one will go back to PMEL. Upon trying to disable the release, there was no response in air to any command or ranging. It did ping a few times on deck during the rest of the cruise, but it was sent back to PMEL still enabled.

Comms/servicing notes

Connected to all three BPRs during first transit back to Astoria. All connected, although s/n 51185 had a time offset of -2h:40m. BPRs were serviced while at the dock in Astoria (between legs 1 & 2, while Jason winch was being repaired).

BPR-North1 (107673) – (recovered as BPR-West) Pulled data. Reinserted card and ran POL test. Sector was not the correct "2010", although this may be because the card was not wiped after removing data. Ran fclear, started logging again, and sector was "2010". PC and TC values are confirmed stable. Inner pair of o-rings on battery end had come loose and were pinched, so both were replaced. The outer o-ring on the BPR end had several dimples, so was replaced. The backing (flat) o-ring on the BPR end was stretched, so replaced. After closing, instrument was polled with status command. Dividers confirmed as 64/13/4. Date and time set to GMT. Card formatted to rename file to **north124.dat**, although it seems like there is a bug in the software that forces the X.3 extension to take the first three characters of the filename, rather than the input 3 character extension.

BPR-South1 (51185) - (recovered as BPR-North). Pressure case has a flange inside in the middle, so the batteries need to be changed from the base. POL test OK, sector "71718" so will format card as before. Formatted card but still not correct sector number. fclear reset it. Logging shows stable PC and TC values. All O-rings at battery end replaced, as well as flat o-ring at BPR end. After closing, instrument was polled with status command. Dividers confirmed as 64/13/4. Card formatted to rename file to **south124.dat** (label on BPR is now correct)

BPR-North2 (103402) - (recovered as BPR-East). Pressure case also has a flange in center. Pulled card, copied data, POL test OK. All battery o-rings changed. Outer and flat o-ring changed on BPR end. Card formatted to **north224.dat**. After closing, instrument was polled with status command. Dividers confirmed as 64/13/4. Ran fclear on card, started logging. Sector "2010" verified. PC and TC stable.

Leg 2

BPR-North2 (103402) - deployed with acoustic release s/n 60413. (Enable: 560110, Disable: 560133, Release: 542562). Seas were calm and wind less than 5 knots. The mooring was deployed in two sections, using recovered line and hardware from a recovered mooring, but with an extra pear link below the sets of glass spheres. This made putting a stopper line in a lot easier. The release was disabled before deployment, and dropped at 2024/06/26 06:01.

BPR-North1 (107673) - deployed with acoustic release s/n 33135. (Enable: 321657, Disable: 321674, Release: 335177). The mooring had been built on deck at the same time as BPR-North2, again using recovered components, so was ready to go as soon as we were on station. Deployment was the same as BPR-North2, and just as quick. Again, the release was deployed disabled. Quick release pulled at 2024/06/26 06:28.

BPR-South1 (51185) - deployed with acoustic release s/n 34822. (Enable: 164054, Disable: 164077, Release: 146426). This mooring was built during the transit to the deployment site as there had been no room to set it up previously. The final set of recovered line and hardware was removed from the wire basket by crane, and set up for deployment, with preparation completed just as we arrived on site. As with the previous two deployments, it went over in two pieces, with a disabled release. Quick release pulled at 2024/06/26 07:29.

Benchmark 505 glass ball recovery – 2024/06/26 ~23:00. Discussion was had previously to note the way that the floats sat on the surface, with potential for a flasher to be mounted and enable nighttime recovery. However, the floats sit on their side in the water, so it's not likely easy to put a strobe on. Ship made approach with top loop afterwards, and was easy to grapple and clip in. May be worth considering transferring load from hook pendant to loop directly, as there was quite a lot of line out causing some swing while the floats were moved aft. Will reuse for later 501 benchmark deployment.

Benchmark 501/502 deployment - built several up on the deck reusing balls from 505 and 506. Beacons were charged overnight by the Jason team as the previous deployments had been down for a few days. A separate small shackle/pear link was used for the slip line on the benchmark. The top loop wrapped around the moorings in the air, so we had to bring the whole package close to the ship to spin it and untangle it. Once 502 was on the bottom, the top loop had once again wrapped around the floats, which made it a little difficult for Jason to move. Could it be possible to send the loop down loosely tied, and then have Jason release it when moving the benchmark to the final location? 501 deployed at 2024/06/30 00:08. 502 deployment time not noted in the Log.

Benchmark 506 glass ball recovery - Was able to clip into loop this time, and the shorter pendant made things easier. Swung round to reuse on 502 deployment. On deck at 2024/06/30 02:25.

Benchmark 502 glass ball recovery - no issues on this one. Connected the crane to the top loop again, but conditions were calm enough that there was very little swing. On deck at 2024/06/30 23:12.

Benchmark 504 deployment - Again used the small sacrificial shackle/pear link for the slip line. This seems to work well, although should consider using a longer tag line as it had to be released before the weights went over the side. On the bottom, the lower pull loop for the pin was very difficult for Jason to grab on, because it became bunched up in the center hole. It was suggested that for the final deployment the lower loop was fixed onto the side bolts with an elastic band. Release time was not logged in the eLog.

Benchmark 503 deployment - set up the lower loop on one of the side bolts, and stretched an elastic band between two bolts to hold it in place. This held during the deployment, and was much easier for the Jason team to grab on to. Release time was not logged in the eLog.

Benchmark 502/504/503 glass ball recoveries - had to wait for the patchy fog to clear in the morning, as visibility was less than 200m when the sun came up. It cleared enough to release the first set, but closed in once they were on the surface. They were close enough to the ship that we were able to see them for the full recovery. By the last recovery, the fog had mostly lifted. 502 and 503 recovery times not noted in the eLog. 504 floats on deck 2024/07/01 02:14.

Omissions

- Time corrections were not recorded from the recovered moored BPRs.

Recommendations

- PMEL to send more hardware, especially 5/8 sling links - e.g. send enough hardware for at least one complete mooring, plus extra sling links. With only exactly enough (in fact less due to the missing sling links in the benchmark box), it was difficult to make adjustments on the fly based on crane use, sea conditions, etc.
- add at least two sets of 1/2" shackle / 5/8" sling links to breaks in the BPR mooring lines (above and below the set of 6 glass spheres) to allow for slip lines to be safely used during deployment.
- add a shackle/pear link to the top of the spar on the benchmark mooring to give somewhere for a quick release to be connected.
- loosely tie the 3 meter loop on the top of the benchmark moorings so it doesn't tangle on the deployment, but can be easily released by Jason once on the bottom.
- include extra shackle/pear link (1/2" or smaller) for each benchmark to sacrifice as a place to slip lines from.
- send more elastic bands. Several were cut very narrow and broke, leaving only a couple of spare by the end of the cruise. This is not something we should run out of as it means that the pull pins couldn't be secured.
- Use elastic bands to loop the lower amsteel quick release line around the side bolts of the benchmarks to make easier release for Jason.

Table 4.4.1: BPR Mooring Recoveries in 2024

AXIAL Moored BPRs recovered in 2024	LAT	LON	Depth (m)
BPR-North (51185)	45.97694	-130.01819	1555
BPR-West (107673)	45.97885	-130.01873	1554
BPR-East (103402)	45.94523	-129.95877	1538

Recovery times	Released	On surface	Recovered
BPR-North (51185)	6/22/24 16:45	6/22/24 17:04	6/22/24 17:30
BPR-West (107673)	6/22/24 18:33	6/22/24 18:51	6/22/24 19:09
BPR-East (103402)	6/22/24 23:45	6/23/24 0:06	6/23/24 0:55

Table 4.4.2: BPR Mooring Deployments in 2024

Moored BPRs DEPLOYED in 2024	LAT	LON	Depth (m)	Max Depth	Date/Time deployed
BPR-North2 (103402)	45.986879	-130.02295	~1580	6800	6/26/24 6:01
BPR-North1 (107673)	45.979812	-130.01991	~1580	6800	6/26/24 6:28
BPR-South1 (51185)	45.916822	-129.99003	~1530	6800	6/26/24 7:29
BPR-South2 (125320)	45.943419	-129.99464	~1534	1600	6/22/24 15:44

Table 4.4.3: Acoustic Release Codes for BPR Moorings deployed in 2024

Acoustic Release info	S/N	Enable	Disable	Release
BPR-North2 (103402)	60413	560110	560133	542562
BPR-North1 (107673)	33135	321657	321674	335177
BPR-South1 (51185)	34822	164054	164077	146426
BPR-South2 (125320)	60415	560217	560234	542623

4.5 - Multibeam mapping from R/V Atlantis

Jeff Beeson and Bill Chadwick

During the two round-trip transits from Astoria, Oregon to Axial Seamount (due to the need to repair the ROV *Jason* winch in port) seafloor bathymetry, backscatter, and water-column backscatter data were collected using the *R/V Atlantis* EM124 multibeam sonar system. A total of ~1,700 line kilometers resulting in 9,775 square kilometers of multibeam data were collected. Slight adjustments to transit waypoints allowed us to expand the existing multibeam coverage on the continental margin and on the Juan de Fuca Plate.

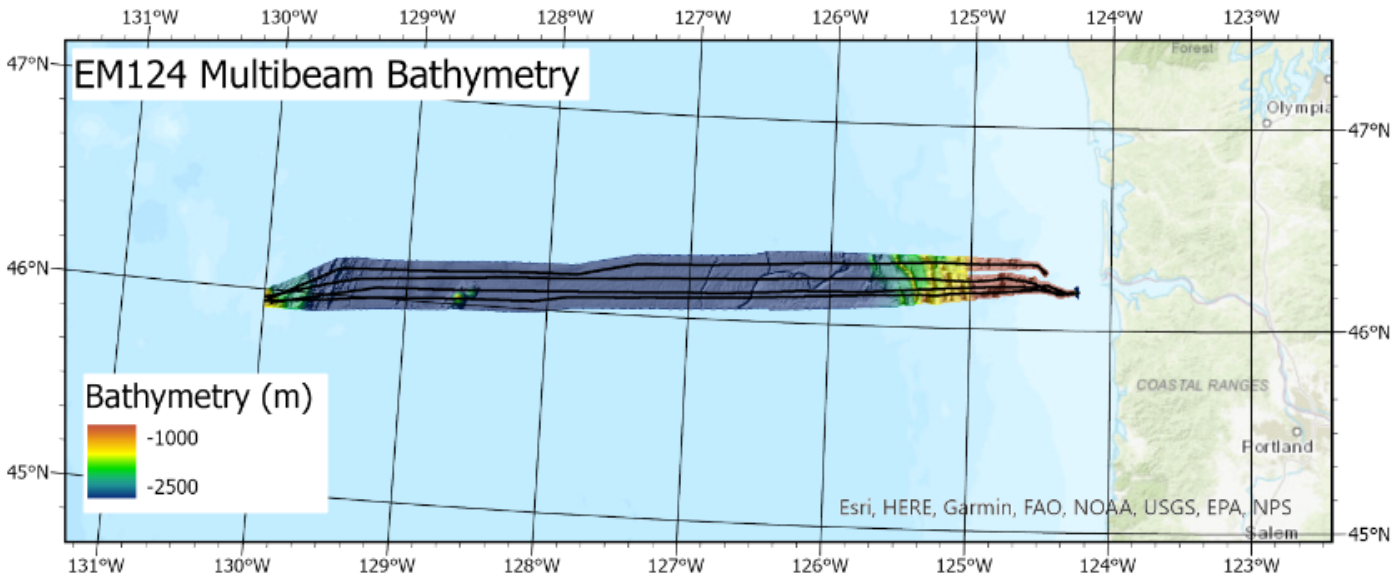


Figure 4.5.1 – Map showing coverage of multibeam sonar mapping during AT5-26 (two round trips between Astoria and Axial Seamount, due to the return to port for the ROV *Jason* winch repair.

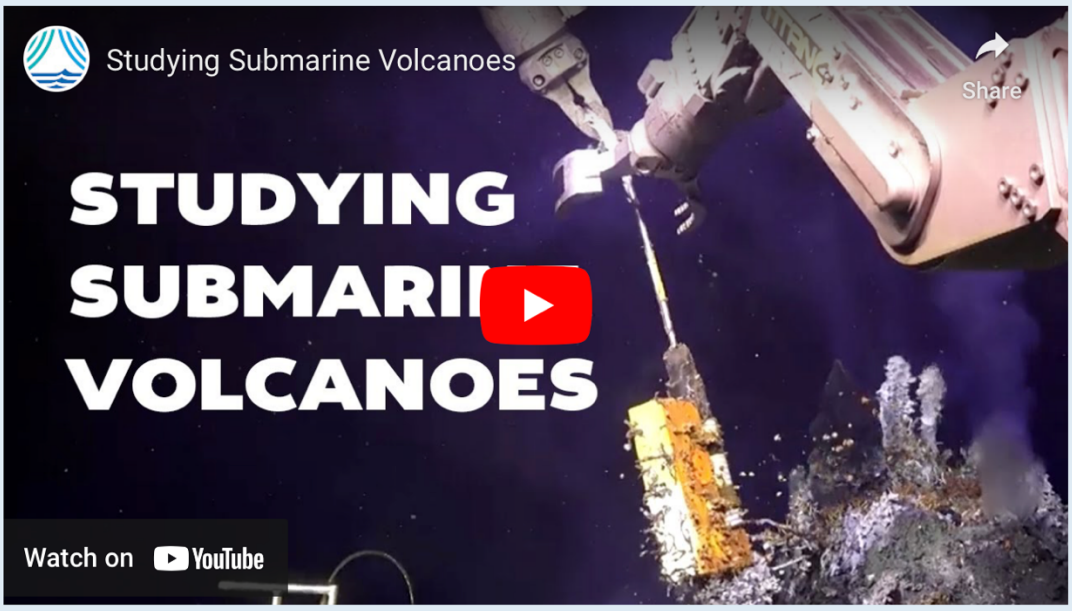
4.6 - Outreach

Bill Chadwick

Marley Parker, a freelance videographer and science communicator, joined the expedition to help us convey our science to the general public and the world at large. She created several cruise blog posts and 3-minute video that was an overview of the science activities at sea that was posted on the WHOI NDSF web site:

https://ndsf.whoi.edu/tracking-the-ups-and-downs-of-axial-seamount/

The video by itself is also available on YouTube at this URL:
https://www.youtube.com/watch?v=vfDNJMSduJo&t=2s



The same post with photos added is titled “Measuring the Might of Axial” on her website, here: https://mlparkermedia.com/blog/measuring-the-might-of-axial

Expedition Leader Akel Kevis-Stirling gives instructions as Fred Denton maneuvers the manipulator arm of ROV Jason while working on Axial Seamount.

Measuring the Might of Axial

July 11, 2024 in Ocean Exploration

Along with another one titled “The ones doing it” linked here: https://mlparkermedia.com/blog/the-people-doing-it

Clindor Cacho prepares to recover a set of mooring balls from the aft deck of R/V *Atlantis*.

The People Doing It

August 25, 2024 in Ocean Exploration

5.0 - ROV *Jason* Overview and Notes About Imagery and Data Logging

Bill Chadwick

Overview

Obviously, the cruise started with the discovery of the major failure of the *Jason* winch brake pad, which impacted the cruise by us losing 3 days - to return to Astoria, install & test the new brake pad in port, and then return to Axial. However, after the repair and getting back on station, ROV *Jason* worked perfectly during our one 5-day "monster" dive (J2-1579). Thanks goodness!

Data Logging

Noteworthy for this year is that data logging in the *Jason* control van utilized the logging software Sealog only, and the older Virtual Van software was officially retired. Fortunately, Sealog was considerably improved since our last cruise with ROV *Jason*. Here are the comments I gave to Tina Haskins at WHOI after the cruise about Sealog:

COMMENTS ON SEALOG

• The wording about controlling ASNAPs is too ambiguous. Specifically, one action turns the execution of ASNAPs on/off (under System Management > "Toggle ASNAP"), and another just determines whether or not they are displayed in the SeaLog (the "ASNAP" toggle button on the upper right of the "event" window), but the on-screen wording does not clearly distinguish between these two functions. It would be easy to turn them off mistakenly instead of just hiding them from the display. Under the System Management menu it should more clearly say "Turn ASNAPs ON" or "OFF" ("toggle" is too vague). It would be nice if there was a display on the SeaLog screen somewhere that confirmed whether the ASNAPs were turned on/off.

• In the online version of SeaLog, when I click on the toggle button to "Show ASNAP", it automatically resets the Event window to the beginning of the dive, instead of just leaving the Event window where it was in the dive timeline. This is annoying.

• The day after arriving back in port (and renav was finished), I exported a .csv file from SeaLog, and the file it produced included ALL the previous Jason dives & cruises since 2022-20-22! Obviously, this is a bug. Also, it had 93 columns (!), so it seemed to include all the possible event types from ALL the cruises since 2022. This took a lot of editing to get it down to the information I wanted relevant to our cruise. However, when I just tried it again from the online SeaLog version for our dive, the CSV export options "Events w/renav" and "Events w/o aux data" were much more boiled down and had many fewer columns (much closer to what I would want). Was this a change made since our cruise, or did I somehow do a universal export on the ship by mistake?

INTERACTION BETWEEN SEALOG AND NAV-G

• We found that the Jason altitude in SeaLog was displayed as 0.0, so it was not being fed from the Doppler sonar into SeaLog in real-time, nor in the SeaLog record online after renav. However, there is an altitude column with valid numbers in the .csv file exported from SeaLog after renav.

• It would be nice to have the option to have the navigator's screen as an option to be the 4th frame grab in SeaLog. That was not possible during our cruise.

• We found that if a target is added in Nav-G on the navigator's screen, it is not automatically added to the watch-stander's navigation screen. To make that happen, we needed to manually re-input the target file on the watch-stander's navigation screen, which is somewhat cumbersome and requires the logger to know where to find the file, etc.

• We found that we could not change the color table for the bathymetry underlay on the watch-stander's navigation screen (it was input as a bathy grid with depth data, rather than a static image, which was a nice new capability). While trying to change the color table, the watch-stander's nav screen froze one time and the program had to be re-booted. It seemed difficult to change the max & min depths for the color ramp selected on the bathy underlay on the watch-stander's navigation screen.

• In Nav-G, it would be nice if we were able to add Lat/Long or ArcGIS Shapefiles for polygon overlays on bathymetry map underlays.

• In Nav-G, it would be nice to be able to change the font size of target names on the watch-stander's navigation screen.

Imagery

H264 Continuous HD Video Recordings

Three 1080i camera streams (SciCam, BrowCam, PilotCam) were recorded to hard drive-based video files. Raw videos are MPEG Transport Stream (.ts) files compressed using the H264 codec. Image resolution is 1920x1080 pixels. In addition to the video files, metadata broadcast in real-time on the *Jason* network (.txt files) was captured to subtitle files (.srt format), which can produce a line of text overlay on the video (time, lat, long, heading, depth). These components were merged into a Matroska container file (.mkv). These .mkv files are playable using open source video players such as VLC. Filenames include camera name and start timestamp. Automated clip duration was set at 15 minutes and the .mkv files are 583 MB each.

Dive	Number of H264 .mkv files	Total file size
J2-1579	1524	884 GB (or 1.82 TB, if you include the .ts, .txt, and .srt files)

In addition, this year an additional set of prototype "gen2" H264 files were produced in parallel. These are .mp4 files and have a higher data rate, and so have larger file sizes (each 3.17 GB in size). They total 5.69 TB just by themselves, compared with 3.18 TB for ALL the other Jason data from the cruise!

Sulis 4K High-Definition video highlights

Highlight video from the SciCam was manually recorded to hard disk (on demand) at a higher quality format than the H264 recordings. These "UHD" highlight recordings were recorded in 4K (3840 x 2160 pixels) using the Apple ProRes422 family of codecs (.mov) at a data rate of ~590 Mbit/s. The video files are renamed after each dive so that they indicate lowering ID, start time, and stop time. Some of the highlight videos are provided in both regular HD format (1920x1080 and 143 Mbit/s) and 4K (UHD) format. A summary listing of the highlight video clips are included in the table below. The recordings include time code.

Dive	# of UHD files	UHD format file size	# of HD files	HD format file size
J2-1579	97	1.17 Tb	2	436 Mb

4K video frame grabs

Frame grabs from *Jason* video can be captured in 3 different ways and at 3 different resolutions. The highest resolution are 4K frame grabs from the Sulis science camera, which are manually captured using a button on the control box at the Watch Leader station in the *Jason* control van. Each image takes some time to process, so there is a limit to how many images you can capture in a short amount of time. The images are saved as sulis*.jpg files (5968 x 3352 pixels) with date and time in the file name. The files are 3-10 Mb in size. The 4K images are beautifully crisp.

HD video frame grabs

The two other ways to capture frame grabs are lower quality and/or resolution. One way is to manually capture images in .jpg format at the Video Logger station. They can choose which camera to capture from, and the resolution and size varies accordingly (files from the Sulis camera are 0.7-1.5 Mb in size). The other way is with Data Logger entries into the Sealog (1920x1080 pixels, from all 3 cameras on *Jason* simultaneously, and saved in compressed jpg format). While Sealog frame grabs are the lowest resolution, they are also the most frequent, since they are captured automatically every log entry and every 30 sec otherwise. File names include date and time.

Dive	# of 4K frame grabs	Total file size	# of HD frame grabs	Total file size
J2-1579	553	2.56 GB	360	331 Mb

6.0 – ROV *JASON* Dives

6.1 - ROV *Jason* Dive Statistics

Dive No.	Dates	Max Depth	Hours Descending	Hours Ascending	Hours on Bottom	Hours in water	Time On Deck	Time on Deck not available to science
J2-1579	2024/06/26 – 2024/07/01	1578	01:14	01:34	127:45	130:33	72	72

6.2 - ROV *Jason* Dive Goals

J2-1579 - Goals were to make pressure measurements at the existing MPR benchmarks in the southern half of the caldera, the east-west line of benchmarks in the center of the caldera, and then deploy six new benchmarks in the central and northern caldera and make the first pressure measurements at those. In addition, recover and deploy Mini-BPR pressure recorders on some of the benchmarks, with the aid of the Jason elevator to get them up and down from the seafloor. Finally, recover and deploy HOBO/MISO temperature probes at as many hydrothermal vents as possible (also with the aid of the Jason elevator).

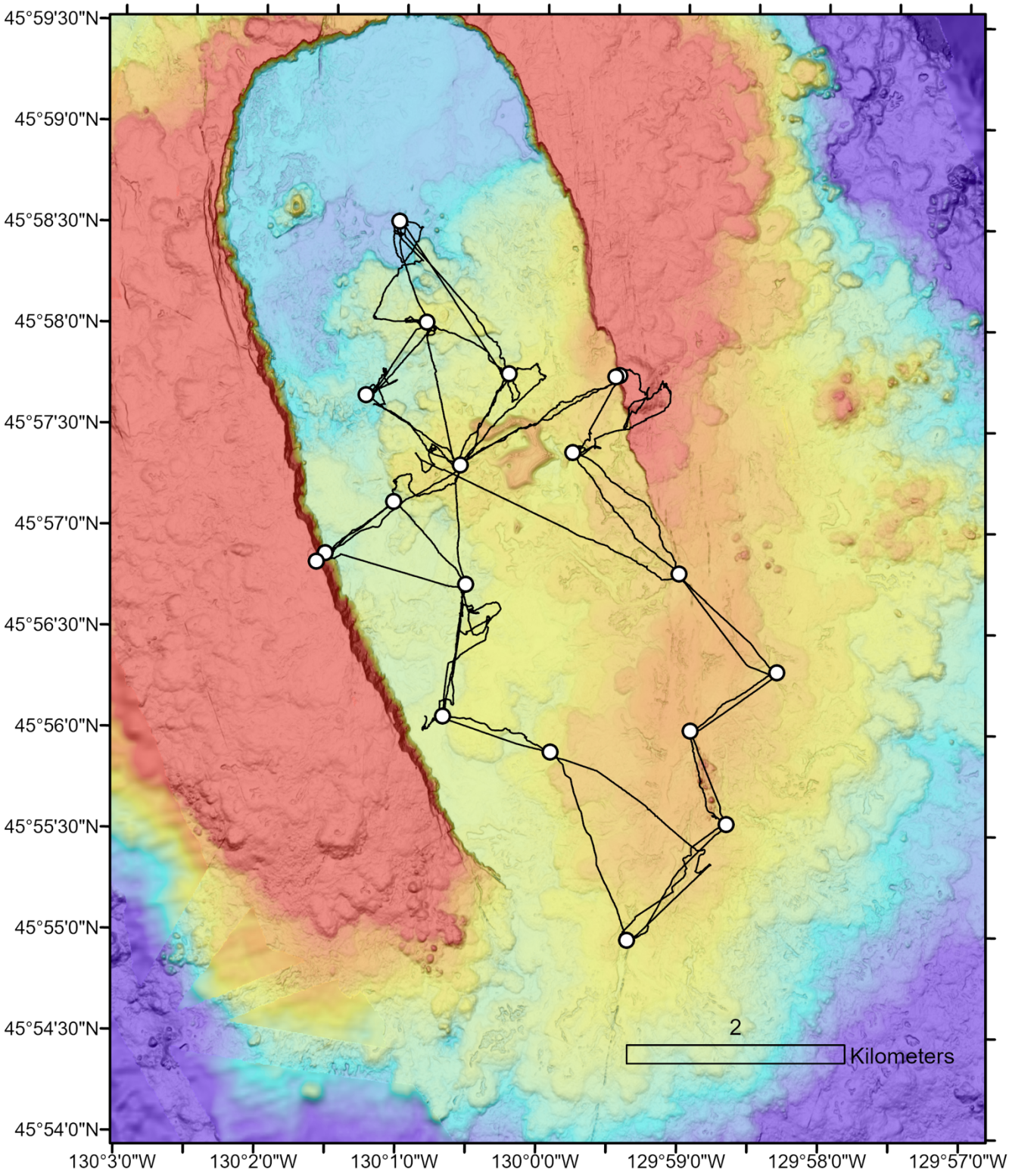
6.3 – ROV *Jason* Navigation

Navigation of ROV *Jason* was accomplished by USBL from *R/V Atlantis* and in general was very good. We had no trouble finding the pressure benchmarks on the seafloor. Some new markers were deployed in 2024. They are listed in the table below.

Table 6.3.1 – New Marker Deployments in 2024 – all at new seafloor benchmarks

Benchmark/Marker	Lat	Long	Depth	Location description
AX-501/Mkr285	45.96089	-130.02113	1560	AX-501 - NW of caldera center
AX-502/Mkr219	45.96693	-130.01404	1532	AX-502 - N of caldera center
AX-503/Mkr287	45.97524	-130.01739	1577	AX-503 - N caldera floor
AX-504/Mkr238	45.96275	-130.00421	1532	AX-504 - NE of caldera center
AX-505/Mkr269	45.95210	-130.01769	1550	AX-505 - W of caldera center
AX-506/Mkr202	45.95633	-129.99655	1530	AX-506 - E of caldera center

6.4 - ROV *Jason* Dive Map for dive J2-1579



6.5 – ROV *Jason* Dive J2-1579 Log (edited/corrected from *Jason* Sealog export after renav)

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-26T09:15:07.139Z					Jason off deck - start of dive J2-1579
2024-06-26T09:16:12.337Z	45.9341582	-130.0140179	54.5	2.3	Jason in water
2024-06-26T09:28:12.773Z	45.9343939	-130.0138901	82.1	62.7	squid
2024-06-26T09:29:39.622Z	45.9343927	-130.0140633	82.6	97.1	baby squid
2024-06-26T10:02:57.565Z	45.9343024	-130.0131100	95.5	992.3	red fish or invert
2024-06-26T10:12:21.391Z	45.9344283	-130.0133934	96.3	1277.3	cool invert
2024-06-26T10:18:43.729Z	45.9342604	-130.0132125	181.5	1452.1	all stop at 100m altitude
2024-06-26T10:19:53.843Z	45.9343265	-130.0132648	180.8	1453.6	started heading down
2024-06-26T10:29:40.662Z	45.9344424	-130.0136419	139.1	1534.6	can see the bottom
2024-06-26T10:30:03.934Z	45.9344336	-130.0136557	137.1	1539.1	On bottom. Starting dive at ASHES vent field. First task is to swap temp probes at Inferno vent.
2024-06-26T10:32:52.964Z	45.9343736	-130.0135066	103.9	1538.7	in transit to ashes vent field
2024-06-26T10:45:35.948Z	45.9338305	-130.0136023	178.5	1538.6	Watch change: Bill - Susan - Kendal - Valentine
2024-06-26T10:47:51.886Z	45.9337666	-130.0135997	178.8	1538.2	OOI cable
2024-06-26T10:48:48.727Z	45.9337845	-130.0136167	178.9	1537.6	Cable and white microbial mat-covered lava flow. Old stuff.
2024-06-26T10:50:14.519Z	45.9337312	-130.0137021	179.1	1538.2	Moving slowly toward Inferno chimney
2024-06-26T10:50:56.252Z	45.9336748	-130.0136966	147.2	1537.6	Inferno chimney straight ahead.
2024-06-26T10:51:17.123Z	45.9336316	-130.0137052	152.8	1537.0	Mushroom to the left with hi-def camera. Inferno to the right.
2024-06-26T10:51:49.240Z	45.9336110	-130.0137421	148.7	1537.1	Inferno straight ahead.
2024-06-26T10:51:57.984Z	45.9336012	-130.0137371	148.6	1537.1	Inferno chimney
2024-06-26T10:52:46.093Z	45.9336125	-130.0137257	161.2	1537.0	Going to do highlights on 4K
2024-06-26T10:52:49.106Z	45.9336132	-130.0137252	163.8	1537.0	4K highlights start
2024-06-26T10:53:42.528Z	45.9336090	-130.0136236	218.8	1536.9	Inferno is 3-4m high. Lots of chimneys on top. Miso temp recorder on the top of chimney.
2024-06-26T10:54:43.081Z	45.9335222	-130.0136273	337.5	1536.9	Circling Inferno and collecting HD footage.

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-26T10:57:08.033Z	45.9336278	-130.0136984	181.7	1537.1	Going to continue with HD video until finish circling. Now coming in closer and circling the other way.
2024-06-26T10:58:08.467Z	45.9336034	-130.0137010	181.7	1537.0	Zooming in now to the top of Inferno. Beautiful smoking black beehive on top.
2024-06-26T11:00:02.792Z	45.9335891	-130.0136765	181.8	1536.0	4K highlights stop
2024-06-26T11:01:52.034Z	45.9335504	-130.0136897	60.2	1536.1	~1536m at top of Inferno.
2024-06-26T11:02:11.811Z	45.9335564	-130.0136714	56.8	1537.0	Tubeworms look healthy.
2024-06-26T11:02:34.329Z	45.9335721	-130.0136784	38.4	1537.9	Positioning to exchange the temperature probe.
2024-06-26T11:03:10.039Z	45.9335607	-130.0136624	35.3	1538.0	The beehive will break when we pull out the probe.
2024-06-26T11:05:07.291Z	45.9335531	-130.0136715	35.2	1538.0	Zooming in on beehive.
2024-06-26T11:05:16.038Z	45.9335546	-130.0136751	34.8	1538.0	4K highlights start
2024-06-26T11:05:52.431Z	45.9335576	-130.0136622	34.7	1538.0	Zooming in and disturbed the beehive. (knocked it over).
2024-06-26T11:06:57.994Z	45.9335573	-130.0136674	34.6	1538.0	Miso is out of the vent and in the Jason stbd arm. Will grab it with the port arm while get the replacement out of the basket.
2024-06-26T11:08:36.931Z	45.9335548	-130.0136687	35.0	1538.0	Recovered MISO is 2017-002
2024-06-26T11:08:39.930Z	45.9335553	-130.0136703	35.0	1538.0	4K highlights stop
2024-06-26T11:10:14.803Z	45.9335597	-130.0136753	33.6	1537.9	Zooming on orifice where will deploy a new Miso. Tubeworms, palm worms, scaleworms, limpets.
2024-06-26T11:11:07.453Z	45.9335628	-130.0136766	33.4	1537.9	Next task is to take the temperature of the vent before deploying new temp probe. Will use Jason probe.
2024-06-26T11:14:24.656Z	45.9335481	-130.0136667	33.0	1537.8	4K highlights start
2024-06-26T11:15:03.533Z	45.9335503	-130.0136633	32.9	1537.8	Zooming in on orifice.Jason temp probe in the vent now.
2024-06-26T11:15:45.794Z	45.9335689	-130.0136788	32.9	1537.8	Temp at 186C tops so far. Going in again to get better measurement.
2024-06-26T11:16:20.920Z	45.9335766	-130.0136837	32.9	1537.8	Temp climbing. 188C now.
2024-06-26T11:16:51.036Z	45.9335590	-130.0136643	33.0	1537.8	Temp over 200C now.
2024-06-26T11:17:40.739Z	45.9335617	-130.0136824	33.0	1537.8	Tmax=214 now. Continuing to rise.
2024-06-26T11:18:27.529Z	45.9335579	-130.0136761	33.1	1537.8	Tmax=250C, for now.
2024-06-26T11:20:06.564Z	45.9335489	-130.0136751	33.1	1537.8	Stable temp at ~277C.

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-26T11:20:08.421Z	45.9335479	-130.0136753	33.1	1537.8	4K highlights stop
2024-06-26T11:21:06.404Z	45.9335520	-130.0136602	33.4	1537.8	Stowing the Jason temp probe.
2024-06-26T11:22:25.613Z	45.9335495	-130.0136640	34.0	1537.9	The old MISO probe will be switched from port to stbd arm now so can use the arm to deploy new probe.
2024-06-26T11:23:29.401Z	45.9335467	-130.0136558	34.1	1537.9	Performing hand off now.
2024-06-26T11:27:09.080Z	45.9335658	-130.0136741	34.6	1537.9	Grabbing Miso 2023-005 which will be deployed at Inferno for 2 years.
2024-06-26T11:28:38.204Z	45.9335596	-130.0136741	34.6	1537.9	4K highlights start
2024-06-26T11:30:17.429Z	45.9335547	-130.0136694	34.6	1537.9	Placing Miso 2023-005 in the vent at Inferno.
2024-06-26T11:31:28.112Z	45.9335786	-130.0136861	34.5	1537.9	Checking to make sure the probe is in a good place.
2024-06-26T11:32:48.732Z	45.9335612	-130.0136639	34.6	1537.9	Going to try to get the probe in deeper.
2024-06-26T11:33:46.232Z	45.9335722	-130.0136879	34.4	1537.8	The probe is in there. Looks good. Miso probe 2023-005 in place at Inferno.
2024-06-26T11:34:00.406Z	45.9335768	-130.0136704	34.4	1537.8	4K highlights stop
2024-06-26T11:34:27.854Z	45.9335670	-130.0136624	34.4	1537.8	Bill is grabbing some frames.
2024-06-26T11:36:04.357Z	45.9335528	-130.0136599	34.3	1537.8	Next will stow the old miso in the front port basket. That's Miso probe 2017-002 being placed in the left milk crate.
2024-06-26T11:38:56.390Z	45.9335535	-130.0136910	39.9	1536.7	Still working on the bungie to hold the old probe in place.
2024-06-26T11:41:00.794Z	45.9335469	-130.0137023	38.5	1536.9	Bungee on probe - On highway to Hell (vent)
2024-06-26T11:44:23.091Z	45.9333596	-130.0139609	186.4	1537.9	Made it to Hell vent
2024-06-26T11:44:29.131Z	45.9333606	-130.0139664	186.2	1537.9	4K highlights start
2024-06-26T11:46:58.779Z	45.9333545	-130.0139253	249.4	1537.3	Rotating around the top to get some nice video footage before probe replacement
2024-06-26T11:50:29.109Z	45.9333347	-130.0139209	203.5	1537.5	Scottie is swapping Sonardyne screen to the port armpit camera
2024-06-26T11:50:33.589Z	45.9333373	-130.0139299	198.5	1537.4	4K highlights stop
2024-06-26T11:51:16.711Z	45.9333304	-130.0139458	183.7	1537.4	Getting in position for temperature probe work
2024-06-26T11:53:44.381Z	45.9333275	-130.0139533	183.0	1538.2	In position for temperature probe replacement
2024-06-26T11:54:04.593Z	45.9333211	-130.0139604	182.6	1538.2	Grabbing the probe
2024-06-26T11:54:10.032Z	45.9333187	-130.0139571	182.7	1538.2	Probe is off
2024-06-26T11:55:00.721Z	45.9333202	-130.0139536	183.4	1538.1	The probe that has been recovered is MISO 2017 - 019

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-26T11:55:48.404Z	45.9333174	-130.0139573	183.4	1538.1	Grabbing JASON temperature probe to measure temperature in the vent
2024-06-26T11:56:39.555Z	45.9333350	-130.0139672	183.4	1538.0	Some blue mat
2024-06-26T11:57:01.572Z	45.9333275	-130.0139445	183.4	1538.0	temperature is 273
2024-06-26T11:57:26.129Z	45.9333185	-130.0139532	183.4	1538.0	Still rising - 289 degrees
2024-06-26T11:58:20.277Z	45.9333193	-130.0139616	183.2	1538.0	Temperature is 293
2024-06-26T12:00:04.295Z	45.9333396	-130.0139457	184.3	1538.0	trying to reposition jason temperature probe to get higher temperature
2024-06-26T12:03:32.055Z	45.9333161	-130.0139613	184.9	1538.0	Stowing the Jason temp probe.
2024-06-26T12:06:32.715Z	45.9333283	-130.0139716	185.4	1538.0	removing bungee to grab new MISO probe
2024-06-26T12:07:24.528Z	45.9333039	-130.0139317	184.0	1538.0	changing old MISO probe from the starboard arm to the port arm
2024-06-26T12:09:36.813Z	45.9333163	-130.0139431	182.3	1538.1	getting ready to grab a new MISO probe
2024-06-26T12:09:40.910Z	45.9333137	-130.0139436	182.4	1538.1	4K highlights start
2024-06-26T12:10:16.871Z	45.9332983	-130.0139438	183.2	1538.0	grabbing MISO probe 2023 - 002
2024-06-26T12:10:47.706Z	45.9333065	-130.0139427	183.1	1538.0	MISO probe 2023 - 002 going to Hell vent
2024-06-26T12:12:19.843Z	45.9333117	-130.0139455	182.8	1538.0	can see chalcopyrite lining the inside of the chimney
2024-06-26T12:12:38.803Z	45.9333117	-130.0139534	183.0	1538.0	repositioned probe MISO 2023 - 002 even better
2024-06-26T12:13:06.046Z	45.9333171	-130.0139543	182.2	1538.1	shimmering water along the probe
2024-06-26T12:13:20.908Z	45.9333170	-130.0139416	182.6	1538.1	small tubeworms
2024-06-26T12:13:54.197Z	45.9333211	-130.0139431	183.7	1538.0	bacterial mats on tubeworms
2024-06-26T12:14:30.298Z	45.9333258	-130.0139425	183.7	1538.0	probe MISO 2023-002 placed
2024-06-26T12:15:18.861Z	45.9333238	-130.0139508	184.0	1538.0	4K highlights stop
2024-06-26T12:15:54.071Z	45.9333262	-130.0139464	179.5	1536.3	end of probe replacement at Hell - now heading to Virgin vent
2024-06-26T12:17:43.085Z	45.9333304	-130.0139630	184.1	1536.0	old miso probe 2017-019 from hell in the basket
2024-06-26T12:19:02.606Z	45.9333414	-130.0139315	184.1	1536.0	putting bungee on old probe
2024-06-26T12:20:52.422Z	45.9333704	-130.0138692	59.2	1538.4	Heading to Virgin vent
2024-06-26T12:21:14.394Z	45.9334178	-130.0137632	59.9	1539.4	Nice pillow lavas on the way to Virgin
2024-06-26T12:21:54.624Z	45.9333925	-130.0136626	61.6	1539.9	Vent coming up in the background
2024-06-26T12:22:52.734Z	45.9334185	-130.0135681	61.5	1539.6	Nice microbial mats and a little experiment

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-26T12:25:07.035Z	45.9334291	-130.0134446	61.3	1539.0	new microbial mats
2024-06-26T12:27:09.711Z	45.9336241	-130.0132368	51.1	1538.6	That's virgin surrounded by an experiment
2024-06-26T12:27:53.743Z	45.9336188	-130.0132187	50.7	1539.4	There is the old probe buried in anhydrite
2024-06-26T12:30:37.184Z	45.9336311	-130.0131730	52.0	1540.4	Going to do Jason temperature probe first
2024-06-26T12:31:43.622Z	45.9336486	-130.0131946	52.6	1540.4	Taking Jason probe
2024-06-26T12:32:03.547Z	45.9336381	-130.0131661	52.5	1540.4	4K highlights start
2024-06-26T12:32:26.539Z	45.9336361	-130.0131820	52.8	1540.3	Going to measure temperature in Virgin vent
2024-06-26T12:32:51.122Z	45.9336408	-130.0131505	52.9	1540.3	Start temp measurement - we broke a piece
2024-06-26T12:33:23.651Z	45.9336432	-130.0131972	52.6	1540.3	Temperature is 56 degrees
2024-06-26T12:33:34.671Z	45.9336540	-130.0131956	53.1	1540.3	No more chimneys !
2024-06-26T12:34:33.424Z	45.9336280	-130.0131906	53.0	1540.3	Temperature in donut is 91
2024-06-26T12:34:45.386Z	45.9336335	-130.0132014	53.1	1540.3	Temperature still rising - 93
2024-06-26T12:35:06.831Z	45.9336361	-130.0131889	53.2	1540.3	Still rising - 104 deg
2024-06-26T12:36:11.530Z	45.9336275	-130.0131772	53.1	1540.3	New try - 153 degrees
2024-06-26T12:37:56.840Z	45.9336273	-130.0132023	53.2	1540.3	Temp is 274!
2024-06-26T12:38:54.797Z	45.9336366	-130.0131825	53.3	1540.3	End of temperature measurement: 280 degrees Celsius!
2024-06-26T12:39:17.851Z	45.9336243	-130.0131786	53.3	1540.3	4K highlights stop
2024-06-26T12:39:33.466Z	45.9336335	-130.0131790	53.1	1540.3	Stow Jason temperature probe
2024-06-26T12:39:56.254Z	45.9336440	-130.0131550	52.3	1540.3	Going to grab HOBO 153 from Virgin vent
2024-06-26T12:40:16.811Z	45.9336259	-130.0131613	52.6	1540.3	Jason temperature probe is stored
2024-06-26T12:40:56.525Z	45.9336398	-130.0131782	50.8	1540.3	Digging for HOBO 153
2024-06-26T12:41:16.616Z	45.9336430	-130.0131772	52.1	1540.3	Grabbed HOBO 153. Recovered
2024-06-26T12:43:27.607Z	45.9336304	-130.0131893	51.6	1540.4	Going to deploy MISO 2023 - 007
2024-06-26T12:43:29.499Z	45.9336282	-130.0131884	51.6	1540.4	4K highlights start
2024-06-26T12:44:44.725Z	45.9336412	-130.0131551	51.3	1540.4	Removing bungee to grab new MISO probe
2024-06-26T12:46:31.893Z	45.9336305	-130.0132051	51.0	1540.4	Grabbing MISO 2023 - 007
2024-06-26T12:47:11.289Z	45.9336595	-130.0131865	50.8	1540.4	Positioning MISO 2023 - 007

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-26T12:51:25.139Z	45.9336160	-130.0131918	51.0	1540.3	Trying to find a better position for probe
2024-06-26T12:53:48.097Z	45.9336460	-130.0132059	50.8	1540.3	Final decision for probe position
2024-06-26T12:53:49.650Z	45.9336457	-130.0132057	50.7	1540.3	4K highlights stop
2024-06-26T12:54:14.436Z	45.9336364	-130.0131872	50.8	1540.3	Probe MISO-2023-007 is in place!
2024-06-26T12:55:34.243Z	45.9336240	-130.0131989	51.3	1540.3	Doing some framegrabs
2024-06-26T12:56:53.338Z	45.9336373	-130.0132068	51.0	1538.6	leaving Virgin vent
2024-06-26T12:57:08.305Z	45.9336379	-130.0132152	51.3	1538.8	transiting to benchmark AX-106
2024-06-26T13:04:05.093Z	45.9337842	-130.0130652	41.4	1537.3	in transit
2024-06-26T13:05:21.763Z	45.9338858	-130.0129507	41.8	1536.8	jelly?
2024-06-26T13:06:18.340Z	45.9339782	-130.0128314	41.5	1537.0	Passing over jumbled lava
2024-06-26T13:07:08.919Z	45.9341016	-130.0128112	40.9	1536.9	Striated sheet flows (beautiful)
2024-06-26T13:13:13.995Z	45.9342251	-130.0123224	44.8	1537.2	Still in transit to benchmark
2024-06-26T13:16:02.425Z	45.9343594	-130.0118778	42.8	1537.1	Transit, waiting for ship to catch up to JASON
2024-06-26T13:16:35.717Z	45.9343925	-130.0117024	44.5	1537.0	Marker near benchmark spotted
2024-06-26T13:17:41.384Z	45.9344296	-130.0115714	63.5	1537.7	Benchmark AX-106 spotted behind marker
2024-06-26T13:18:22.164Z	45.9344210	-130.0115196	62.5	1539.3	Arrived at AX-106
2024-06-26T13:20:49.042Z	45.9344138	-130.0115091	65.1	1540.3	Picking up and putting MPR on benchmark
2024-06-26T13:22:32.952Z	45.9344184	-130.0115014	65.0	1540.3	MPR placement
2024-06-26T13:24:53.236Z	45.9344136	-130.0114963	65.2	1540.3	Active brittle stars all over
2024-06-26T13:27:12.829Z	45.9344222	-130.0115005	65.3	1540.2	Repositioning MPR
2024-06-26T13:29:11.905Z	45.9344123	-130.0114983	65.5	1540.2	start pressure measurement
2024-06-26T13:30:33.724Z	45.9344123	-130.0114977	65.4	1540.2	AX-106 is located NE of Ashes
2024-06-26T13:33:53.673Z	45.9344140	-130.0115063	65.3	1540.2	Hydroid growing on flag mast
2024-06-26T13:34:17.876Z	45.9344175	-130.0115017	65.9	1540.2	pink bugs in hydroid on flag mast
2024-06-26T13:35:30.203Z	45.9344174	-130.0114908	65.5	1540.2	Nudibranch
2024-06-26T13:35:56.631Z	45.9344166	-130.0114970	65.2	1540.2	Flag ahoy
2024-06-26T13:49:46.327Z	45.9344137	-130.0115149	65.5	1540.0	stop pressure measurement

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-26T13:50:13.273Z	45.9344110	-130.0114932	65.9	1540.0	Finished pressure sensor reading at AX-106
2024-06-26T13:50:46.509Z	45.9344209	-130.0114917	65.8	1540.0	Recovering MPR
2024-06-26T13:51:33.931Z	45.9344131	-130.0115219	65.6	1540.0	Stowed MPR
2024-06-26T13:53:14.234Z	45.9344252	-130.0114934	63.0	1535.9	Transit to AX-307 north (1.5h transit time)
2024-06-26T13:54:43.465Z	45.9346780	-130.0113590	10.1	1536.7	Nice lava contact
2024-06-26T13:55:52.571Z	45.9348531	-130.0113039	9.9	1535.3	OOI cable
2024-06-26T14:01:37.848Z	45.9355089	-130.0112684	9.3	1535.8	OOI cable
2024-06-26T14:30:39.667Z	45.9387701	-130.0104252	15.2	1534.2	45 more minutes to AX-307. Transiting.
2024-06-26T14:38:33.208Z	45.9402777	-130.0100755	10.6	1531.8	Pillows
2024-06-26T14:44:44.656Z	45.9410541	-130.0099955	11.8	1532.9	Still transiting to AX-307.
2024-06-26T14:49:04.617Z	45.9413100	-130.0099484	11.4	1535.5	Watch change: Scott - Suzy - Kendall - Morgan
2024-06-26T14:50:38.795Z	45.9414233	-130.0099240	12.0	1536.7	Shrimp straight ahead.
2024-06-26T15:00:36.061Z	45.9422705	-130.0097287	11.1	1539.2	Striated sheet flow.
2024-06-26T15:02:04.346Z	45.9424350	-130.0097295	11.5	1538.9	Jumbled flow and crab.
2024-06-26T15:02:20.962Z	45.9424722	-130.0097096	11.9	1538.9	Not a crab, it's a crinoid.
2024-06-26T15:15:45.925Z	45.9440738	-130.0094455	10.4	1537.5	45 more minutes to AX-307. Transiting.
2024-06-26T15:19:49.520Z	45.9444997	-130.0094084	11.6	1537.6	Starfish
2024-06-26T15:23:26.944Z	45.9448481	-130.0093349	4.1	1536.7	Lots of rope on the seafloor
2024-06-26T15:25:02.391Z	45.9451371	-130.0093398	19.8	1538.6	Shrimp
2024-06-26T15:27:34.035Z	45.9453235	-130.0090803	77.0	1539.0	Arrived at AX-307
2024-06-26T15:32:57.122Z	45.9453561	-130.0090338	164.8	1540.7	MPR placement
2024-06-26T15:35:35.112Z	45.9453585	-130.0090373	164.8	1540.7	start pressure measurement
2024-06-26T15:45:51.496Z	45.9453472	-130.0090281	164.7	1540.6	collecting MPR data (cont.)
2024-06-26T15:46:02.414Z	45.9453495	-130.0090206	164.7	1540.6	sea creature
2024-06-26T15:55:16.887Z	45.9453540	-130.0090283	164.6	1540.5	Done collecting MPR measurement
2024-06-26T15:55:17.947Z	45.9453538	-130.0090286	164.6	1540.5	stop pressure measurement
2024-06-26T15:58:18.386Z	45.9453584	-130.0090351	164.6	1540.5	MPR replaced on Jason.

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-26T15:58:33.694Z	45.9453516	-130.0090377	164.6	1540.5	Recovering old Mini-BPR 2014-12 from benchmark
2024-06-26T15:58:56.112Z	45.9453534	-130.0090288	164.6	1540.5	Placing Mini-BPR 2014-12 in Jason basket
2024-06-26T15:59:31.018Z	45.9453422	-130.0090626	164.6	1540.5	2014-12 Mini-BPR
2024-06-26T16:00:48.709Z	45.9453578	-130.0090119	117.3	1538.0	Leaving AX-307. Heading to next benchmark (will replace Mini-BPR on next visit)
2024-06-26T16:01:52.710Z	45.9454468	-130.0089085	17.8	1535.8	Transiting to AX-403 (at base of west caldera wall)
2024-06-26T16:03:13.675Z	45.9454330	-130.0090798	227.0	1538.3	1 hour and 20 min approx to next benchmark.
2024-06-26T16:10:15.840Z	45.9451411	-130.0106396	274.9	1536.9	Passing lava flows and brittle sea stars.
2024-06-26T16:11:14.328Z	45.9451639	-130.0107112	275.7	1536.4	Roof collapse
2024-06-26T16:16:43.270Z	45.9452245	-130.0112671	275.3	1537.1	shrimp
2024-06-26T16:28:17.288Z	45.9456179	-130.0132564	283.1	1536.9	~1 hour to next benchmark
2024-06-26T16:38:46.308Z	45.9459944	-130.0151778	283.6	1538.2	Transiting.
2024-06-26T17:27:41.136Z	45.9474686	-130.0243933	280.4	1547.7	crab
2024-06-26T17:33:04.456Z	45.9477062	-130.0254483	295.3	1547.8	Travelling up parallel to the base of the west caldera wall.
2024-06-26T17:34:47.085Z	45.9478197	-130.0256071	296.7	1545.2	Approaching benchmark AX-403
2024-06-26T17:36:01.087Z	45.9478565	-130.0256358	316.6	1547.0	Arrived at AX-403
2024-06-26T17:40:38.946Z	45.9478696	-130.0256341	316.5	1547.0	Placement of the MPR
2024-06-26T17:41:37.410Z	45.9478573	-130.0256399	316.5	1546.9	start pressure measurement
2024-06-26T18:01:08.750Z	45.9478578	-130.0256222	316.6	1546.9	stop pressure measurement
2024-06-26T18:02:43.758Z	45.9478657	-130.0256450	316.6	1547.0	Replacement of MPR in the MPR holster.
2024-06-26T18:03:39.104Z	45.9478545	-130.0256470	316.6	1547.0	Recovered old mini-BPR 2020-05 on AX-403
2024-06-26T18:04:57.831Z	45.9478577	-130.0256423	316.5	1547.0	Swapping the old Mini-BPR 2020-05 with a new Mini-BPR from the Jason basket.
2024-06-26T18:05:30.048Z	45.9478652	-130.0256547	316.5	1546.9	Successfully placed on AX-403
2024-06-26T18:06:08.556Z	45.9478464	-130.0256300	316.6	1546.9	New Mini-BPR is 2020-04 on benchmark AX-403
2024-06-26T18:07:48.824Z	45.9477833	-130.0256495	237.2	1538.5	Transit begins to next benchmark, AX-404 (west-caldera-rim)
2024-06-26T18:35:58.776Z	45.9470708	-130.0263557	251.0	1418.8	Scaling the west caldera wall. Lots of stars.
2024-06-26T18:40:33.520Z	45.9471771	-130.0266370	222.6	1394.8	Approaching benchmark AX-404. Flag down :()
2024-06-26T18:41:29.124Z	45.9471518	-130.0266573			Watch change: Jeff - Haley - Ava - Mia

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-26T18:41:29.124Z	45.9471518	-130.0266573	211.1	1397.2	Arrived at AX-404
2024-06-26T18:51:41.264Z	45.9471505	-130.0266675	211.1	1397.3	start pressure measurement
2024-06-26T19:11:56.726Z	45.9471570	-130.0266698	210.8	1397.4	stop pressure measurement
2024-06-26T19:13:38.222Z	45.9471536	-130.0266759	210.2	1397.4	MPR returned to holster
2024-06-26T19:18:05.452Z	45.9471543	-130.0266751	210.7	1397.4	Port biobox out, new Mini-BPRs on seafloor temporarily
2024-06-26T19:19:46.591Z	45.9471550	-130.0266772	210.4	1397.4	Mini-BPR 2020-05 moved from basket to port biobox.
2024-06-26T19:20:39.937Z	45.9471513	-130.0266772	210.9	1397.4	Mini-BPR 2020-01 moved from benchmark AX 404 into port biobox.
2024-06-26T19:24:27.902Z	45.9471485	-130.0266692	211.4	1397.4	Mini-BPR 2014-08 transferred from seafloor to benchmark
2024-06-26T19:24:34.111Z	45.9471472	-130.0266690	211.4	1397.4	4K highlights start
2024-06-26T19:24:59.821Z	45.9471514	-130.0266711	211.5	1397.4	Mini-BPR 2014-08 repositioned on benchmark.
2024-06-26T19:26:14.752Z	45.9471512	-130.0266664	211.4	1397.5	Mini-BPR 2016-02 transferred to port milk crate.
2024-06-26T19:26:16.139Z	45.9471515	-130.0266657	211.4	1397.5	4K highlights stop
2024-06-26T19:29:53.658Z	45.9471664	-130.0266774	215.2	1395.6	Jason off bottom, beginning transit to AX-505.
2024-06-26T20:24:07.528Z	45.9501653	-130.0211498	58.9	1543.2	Jason on bottom, searching for benchmark AX-505
2024-06-26T20:26:48.406Z	45.9503268	-130.0208571	74.4	1543.2	Pillow basalts on left, sheet flows on right
2024-06-26T20:26:50.128Z	45.9503264	-130.0208552	75.3	1543.2	4K highlights start
2024-06-26T20:27:46.696Z	45.9503893	-130.0207717	49.9	1543.1	4K highlights stop
2024-06-26T20:30:06.297Z	45.9505498	-130.0204670	57.1	1542.9	4K highlights start
2024-06-26T20:31:57.407Z	45.9506212	-130.0202895	54.1	1542.3	4K highlights stop
2024-06-26T20:45:29.754Z	45.9518489	-130.0178227	118.2	1547.2	Searching for benchmark AX-505
2024-06-26T20:47:04.260Z	45.9517763	-130.0176859	132.2	1546.8	Benchmark AX-505 in sight using beacon location
2024-06-26T20:47:05.005Z	45.9517754	-130.0176846	131.8	1546.8	4K highlights start
2024-06-26T20:48:32.800Z	45.9517421	-130.0176277	164.7	1546.7	Arriving at benchmark AX-505, benchmark slightly skewed with glass balls attached
2024-06-26T20:49:37.426Z	45.9517317	-130.0176346	131.7	1546.9	Jason set to pull pin to release descent anchor.
2024-06-26T20:49:40.612Z	45.9517320	-130.0176340	131.7	1546.9	4K highlights stop
2024-06-26T20:50:12.874Z	45.9517338	-130.0176325	131.7	1546.9	First pull pin released
2024-06-26T20:51:15.882Z	45.9517276	-130.0176346	131.7	1546.9	Using sonar to search for a flat area to move benchmark AX-505

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-26T20:53:47.113Z	45.9518965	-130.0178374	310.0	1545.9	Navigating to orginial target to continue search for flat area to move benchmark AX-505
2024-06-26T20:57:04.579Z	45.9520568	-130.0179262	98.3	1548.8	Still searching for flat location, lots of lobate flows and pillows
2024-06-26T20:59:20.117Z	45.9520686	-130.0176898	91.7	1549.3	4K highlights start
2024-06-26T20:59:44.235Z	45.9520728	-130.0176685	89.1	1549.9	4K highlights stop
2024-06-26T21:00:12.092Z	45.9520695	-130.0176733	89.6	1549.9	Navigating east of original target, jason on bottom to assess new location
2024-06-26T21:02:02.625Z	45.9520794	-130.0176654	90.2	1549.9	Deploying marker at potential benchmark site, marker number 269
2024-06-26T21:02:24.087Z	45.9520780	-130.0176848	90.2	1550.0	4K highlights start
2024-06-26T21:03:22.247Z	45.9520944	-130.0177199	149.8	1548.3	Navigating to benchmark site to retrieve benchmark AX-505 to move to marker 269
2024-06-26T21:03:25.820Z	45.9521013	-130.0177289	158.0	1548.2	4K highlights stop
2024-06-26T21:09:14.522Z	45.9517771	-130.0176595	157.9	1547.1	Benchmark in sight
2024-06-26T21:10:52.323Z	45.9517245	-130.0176022	45.7	1546.8	Arrival at benchmark, attempting to grab and transfer
2024-06-26T21:11:14.012Z	45.9517289	-130.0176098	46.4	1546.7	4K highlights start
2024-06-26T21:12:22.190Z	45.9517266	-130.0176069	44.2	1546.9	Benchmark AX-505 has been lifted off seafloor, navigating to marker 269
2024-06-26T21:13:13.584Z	45.9517807	-130.0175926	14.9	1547.2	4K highlights stop
2024-06-26T21:16:20.936Z	45.9520152	-130.0175950	354.0	1548.8	Marker 269 is in sight.
2024-06-26T21:17:28.491Z	45.9520552	-130.0176058	354.8	1550.1	4K highlights start
2024-06-26T21:17:40.126Z	45.9520507	-130.0176067	354.8	1550.1	Benchmark AX-505 is being placed near marker 269
2024-06-26T21:20:59.994Z	45.9520893	-130.0176229	354.9	1550.2	4K highlights stop
2024-06-26T21:22:02.215Z	45.9520878	-130.0176284	359.9	1550.3	Difficulty placing benchmark on flat surface, several attempts to place on seafloor without tilt
2024-06-26T21:25:03.600Z	45.9521041	-130.0176205	7.5	1549.9	Navigating back towards marker 269
2024-06-26T21:31:27.136Z	45.9521974	-130.0175858	32.5	1550.4	Benchmark AX-505 placed on seafloor, backing away from benchmark to assess placement from a distance
2024-06-26T21:33:20.667Z	45.9522533	-130.0176814	177.2	1548.3	Navigating back towards marker 269
2024-06-26T21:35:26.115Z	45.9520951	-130.0177097	169.7	1550.0	Marker 269 in sight potential site located right of the marker looking south.
2024-06-26T21:37:19.369Z	45.9521009	-130.0177013	165.6	1550.4	4K highlights start

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-26T21:38:28.377Z	45.9521002	-130.0177053	166.5	1550.3	Removing weight and placing near marker 269. (?moving marker?)
2024-06-26T21:38:47.000Z	45.9521003	-130.0177091	166.4	1550.4	4K highlights stop
2024-06-26T21:39:52.610Z	45.9521380	-130.0176615	103.7	1549.4	Leaving marker 269 to retrieve benchmark AX-505.
2024-06-26T21:40:59.973Z	45.9522077	-130.0175862	18.7	1550.4	Cliff breaking off as Jason lands to retrieve benchmark AX-505.
2024-06-26T21:41:24.824Z	45.9522102	-130.0175821	17.7	1550.4	Benchmark AX-505 off seafloor, beginning transit to marker 269.
2024-06-26T21:43:32.881Z	45.9521118	-130.0176742	203.4	1550.1	Marker 269 in sight.
2024-06-26T21:46:37.488Z	45.9520938	-130.0177184	170.9	1550.0	Benchmark AX-505 placed on seafloor, backing away from benchmark to assess placement from a distance
2024-06-26T21:46:44.593Z	45.9520986	-130.0177144	182.8	1549.9	4K highlights start
2024-06-26T21:47:25.866Z	45.9521021	-130.0176781	223.5	1550.3	4K highlights stop
2024-06-26T21:49:34.506Z	45.9521024	-130.0176994	209.2	1550.5	Final benchmark AX-505 location: N 45.952101 W 130.017689
2024-06-26T21:50:12.738Z	45.9521021	-130.0176995	209.6	1550.5	Retrieving weights from seafloor.
2024-06-26T21:54:02.328Z	45.9521010	-130.0176927	229.4	1550.5	Moving marker 269 away from benchmark.
2024-06-26T21:58:10.524Z	45.9521023	-130.0176893	227.2	1550.5	4K highlights start
2024-06-26T21:59:58.150Z	45.9521023	-130.0176877	228.9	1550.5	4K highlights stop
2024-06-26T22:00:36.523Z	45.9521057	-130.0176889	229.0	1550.5	MPR placed on benchmark. Note glass balls are still attached to new benchmark
2024-06-26T22:00:40.506Z	45.9521048	-130.0176898	229.0	1550.5	start pressure measurement
2024-06-26T22:20:53.322Z	45.9521077	-130.0176979	229.0	1550.7	stop pressure measurement
2024-06-26T22:22:26.333Z	45.9521060	-130.0176985	229.7	1550.7	MPR removed from benchmark, back on Jason.
2024-06-26T22:24:26.234Z	45.9521061	-130.0176997	229.6	1550.7	4K highlights start
2024-06-26T22:25:23.678Z	45.9521063	-130.0176905	229.6	1550.7	Pulling pin to release glass balls
2024-06-26T22:26:28.579Z	45.9521058	-130.0176856	230.0	1550.7	4K highlights stop
2024-06-26T22:26:35.311Z	45.9521054	-130.0176845	230.0	1550.7	4K highlights start
2024-06-26T22:26:39.810Z	45.9521050	-130.0176854	229.9	1550.7	Pin released.
2024-06-26T22:26:53.531Z	45.9521006	-130.0176960	229.9	1550.7	4K highlights stop
2024-06-26T22:28:13.006Z	45.9522201	-130.0177247	315.4	1548.7	Jason off bottom, positioning jason for recovery of floatpack by ship
2024-06-26T22:28:15.729Z	45.9522275	-130.0177369	309.8	1548.6	4K highlights start
2024-06-26T22:28:35.253Z	45.9522673	-130.0178222	316.3	1543.8	4K highlights stop

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-26T22:49:16.974Z	45.9538658	-130.0176723	94.1	1476.4	Watch change: Bill - Susan - Kendal - Valentine
2024-06-26T23:10:50.326Z	45.9539819	-130.0155858	64.4	1474.6	We are waiting for the ship to recover the glass balls
2024-06-26T23:14:04.745Z	45.9537628	-130.0157115	64.9	1474.5	Glass balls are recovered
2024-06-26T23:15:58.036Z	45.9535877	-130.0158217	63.8	1472.9	Waiting for the ship to change heading - then we'll take control back and start transit to AX-101
2024-06-26T23:19:55.035Z	45.9531543	-130.0158331	144.5	1459.1	The ship had to move quite a bit to recover the glass balls - it is going to take a while to get back on planned track
2024-06-26T23:26:44.151Z	45.9526796	-130.0144492	58.0	1473.4	Beginning transit to AX-101 - 470 m to go - Estimated time: less than 30 min
2024-06-26T23:36:37.705Z	45.9532185	-130.0117335	40.5	1525.1	Return to the seafloor transiting to AX-101
2024-06-26T23:36:50.952Z	45.9532482	-130.0116715	36.4	1524.9	Nice lobate lavas
2024-06-26T23:42:40.525Z	45.9536150	-130.0108123	30.6	1524.8	Nice lava tubes
2024-06-26T23:45:19.601Z	45.9537836	-130.0103842	24.5	1524.7	Passing over jumbled lava
2024-06-26T23:46:48.920Z	45.9538960	-130.0103082	17.2	1524.6	Still transiting to AX - 101
2024-06-26T23:48:49.687Z	45.9540679	-130.0102039	17.9	1524.6	Sheet flow going towards AX - 101
2024-06-26T23:49:06.818Z	45.9541109	-130.0101607	17.4	1524.6	Contact between lobate and sheet flow
2024-06-26T23:56:05.184Z	45.9549849	-130.0098767	8.3	1523.3	Almost at AX-101 - Flat fractured sheet flow
2024-06-26T23:56:43.648Z	45.9550500	-130.0099096	352.9	1527.2	AX-101 in sight
2024-06-26T23:57:16.434Z	45.9550601	-130.0099099	345.6	1526.7	Marker near AX-101
2024-06-26T23:58:10.550Z	45.9551589	-130.0099570	324.0	1527.3	The bucket is a tephra sampler. It's sitting next to AX-101.
2024-06-26T23:58:58.334Z	45.9552042	-130.0100062	236.7	1529.1	AX-101 benchmark and Marker 243, caldera center.
2024-06-26T23:59:36.092Z	45.9551868	-130.0099954	235.0	1530.3	This is the first generation of benchmarks. This is the 2010 version.
2024-06-27T00:01:53.531Z	45.9551904	-130.0099890	232.8	1530.2	That's a mini-BPR that has been out here for 2 years. We will swap it out on this cruise.
2024-06-27T00:02:37.657Z	45.9551799	-130.0099939	232.1	1530.2	Zooming in on the benchmark and the Jason MPR for the measurment.
2024-06-27T00:04:02.141Z	45.9551888	-130.0099956	231.7	1530.2	Positioning the Jason MPR to do the measurement.
2024-06-27T00:04:29.774Z	45.9551755	-130.0099744	232.7	1530.2	start pressure measurement
2024-06-27T00:06:14.847Z	45.9551790	-130.0099778	232.9	1530.2	Starting pressure measurement at AX-101 with the MPR.

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-27T00:08:30.048Z	45.9551896	-130.0099944	233.4	1530.2	Less brittle stars and hydroids at this benchmark.
2024-06-27T00:16:24.341Z	45.9551923	-130.0099898	232.9	1530.2	0024 UTC will be the recovery time for the MPR.
2024-06-27T00:20:09.998Z	45.9551819	-130.0099745	232.8	1530.2	Not a lot going on here. Less biology than previous benchmark stops.
2024-06-27T00:24:08.848Z	45.9551821	-130.0099756	233.2	1530.2	stop pressure measurement
2024-06-27T00:24:47.646Z	45.9551914	-130.0099887	231.3	1530.3	Finished MPR reading at AX-101, caldera center.
2024-06-27T00:25:08.539Z	45.9551906	-130.0099825	231.3	1530.3	This is the reference point for the measurments.
2024-06-27T00:26:10.754Z	45.9551919	-130.0099950	231.5	1530.3	Stowed the MPR on the Jason basket.
2024-06-27T00:26:34.925Z	45.9551914	-130.0099922	231.2	1530.3	Next we will swap out the mini-BPR
2024-06-27T00:27:22.779Z	45.9551916	-130.0099837	231.4	1530.2	Recovered Mini-BPR 2016-10 and placed in port basket.
2024-06-27T00:29:37.867Z	45.9551999	-130.0099786	245.6	1528.3	Deploying mini-BPR 2016-02 on benchmark AX-101
2024-06-27T00:29:45.102Z	45.9552126	-130.0099643	249.8	1527.8	Done here and heading out.
2024-06-27T00:30:16.339Z	45.9552676	-130.0099041	349.0	1527.6	There's an old marker here as well.
2024-06-27T00:30:48.220Z	45.9552969	-130.0098383	59.7	1527.6	Now we are transiting to AX-402 at the base of the east wall.
2024-06-27T00:31:38.154Z	45.9553297	-130.0097903	60.3	1527.8	The transit will be about 2 hours.
2024-06-27T00:32:41.340Z	45.9553571	-130.0096866	61.0	1525.4	1600 meter distance
2024-06-27T00:42:51.907Z	45.9559071	-130.0084074	50.5	1528.1	Still in transit
2024-06-27T00:49:36.010Z	45.9563299	-130.0076373	126.4	1526.6	Cucumber?
2024-06-27T00:49:59.181Z	45.9563595	-130.0076571	189.1	1525.5	Cucumber?
2024-06-27T00:51:07.860Z	45.9564339	-130.0074545	58.8	1526.1	Still in transit to AX402
2024-06-27T00:54:20.381Z	45.9566271	-130.0070128	66.3	1528.6	Beautiful lobate flows
2024-06-27T00:54:56.642Z	45.9566227	-130.0069223	82.7	1526.9	Fissure
2024-06-27T00:55:38.634Z	45.9566574	-130.0068069	56.3	1526.4	Following a crevasse
2024-06-27T01:01:53.618Z	45.9569813	-130.0059504	61.7	1527.7	Crab
2024-06-27T01:04:07.723Z	45.9571034	-130.0056393	61.4	1525.8	Sheet flows on transit to AX-402
2024-06-27T01:04:11.777Z	45.9571044	-130.0056329	61.3	1525.9	Big crab
2024-06-27T01:04:18.675Z	45.9571056	-130.0056180	62.2	1526.1	Crab
2024-06-27T01:04:24.435Z	45.9571063	-130.0056015	61.9	1525.9	Crab

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-27T01:04:34.309Z	45.9571055	-130.0055725	61.4	1525.8	Crab
2024-06-27T01:04:38.696Z	45.9571040	-130.0055623	61.7	1525.6	Crab
2024-06-27T01:05:44.625Z	45.9571407	-130.0054005	62.4	1525.6	Lava
2024-06-27T01:08:27.988Z	45.9572376	-130.0048991	64.1	1525.6	Cucumber
2024-06-27T01:08:57.002Z	45.9572625	-130.0047954	62.6	1524.6	Crab
2024-06-27T01:12:15.950Z	45.9576072	-130.0043283	59.9	1529.7	Pillow basalts on transit to AX-402
2024-06-27T01:15:07.674Z	45.9578160	-130.0038986	61.5	1529.8	Gorgeous pillow basalt
2024-06-27T01:15:30.349Z	45.9578354	-130.0038565	61.5	1529.2	Pillow
2024-06-27T01:16:05.734Z	45.9578586	-130.0037736	62.2	1529.2	4K highlights start
2024-06-27T01:17:41.183Z	45.9579603	-130.0035432	66.5	1530.8	Crab on pillow
2024-06-27T01:19:04.251Z	45.9579604	-130.0034065	82.7	1530.7	Pillow field on transit to AX-402
2024-06-27T01:20:09.411Z	45.9580757	-130.0031655	67.0	1531.4	Contact
2024-06-27T01:21:01.144Z	45.9582491	-130.0030377	67.7	1532.2	Pillows
2024-06-27T01:23:45.011Z	45.9582838	-130.0025847	69.3	1520.8	Cable?
2024-06-27T01:25:23.873Z	45.9583411	-130.0022714	69.2	1512.8	Fissure
2024-06-27T01:25:45.820Z	45.9583621	-130.0021869	68.8	1512.9	Fissures
2024-06-27T01:26:01.717Z	45.9583725	-130.0021314	69.3	1512.8	On top of tumulus
2024-06-27T01:26:52.964Z	45.9584164	-130.0019469	68.5	1511.6	Fissure through tumulus
2024-06-27T01:27:12.919Z	45.9584278	-130.0018616	69.2	1511.7	Large fissure
2024-06-27T01:27:59.694Z	45.9584652	-130.0016635	70.0	1511.2	Large cliff wall
2024-06-27T01:28:36.635Z	45.9585300	-130.0014522	70.0	1512.5	End of tumulus
2024-06-27T01:28:46.947Z	45.9585435	-130.0014029	68.5	1511.7	Fissure through jumbled lava
2024-06-27T01:29:20.580Z	45.9585952	-130.0012504	69.7	1511.0	Tumulus fissure
2024-06-27T01:32:04.305Z	45.9587636	-130.0006742	72.7	1520.2	Still in transit to AX-402
2024-06-27T01:34:37.509Z	45.9591023	-130.0002363	49.5	1522.1	Big fissure
2024-06-27T01:37:13.395Z	45.9593410	-129.9998257	49.5	1524.2	Still in transit
2024-06-27T01:37:28.665Z	45.9593721	-129.9997898	49.6	1524.1	Field of pillows

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-27T01:38:55.723Z	45.9595578	-129.9995547	46.1	1526.7	Pillow and sponge
2024-06-27T01:42:55.835Z	45.9598816	-129.9989754	49.1	1522.6	Jumbled flow transiting towards AX-402
2024-06-27T01:43:04.551Z	45.9598939	-129.9989534	50.1	1521.2	Big fissure
2024-06-27T01:44:00.584Z	45.9599640	-129.9987996	49.9	1524.7	Going downslope
2024-06-27T01:45:00.192Z	45.9600102	-129.9985915	49.1	1528.1	Sedimented lineated sheet flow with sponge
2024-06-27T01:46:06.922Z	45.9601152	-129.9984598	53.8	1529.9	Big slow fish - says Bill
2024-06-27T01:48:40.887Z	45.9602986	-129.9981960	18.3	1526.4	Collapse in sheet flow
2024-06-27T01:49:21.602Z	45.9603578	-129.9982362	33.2	1526.1	Fissure
2024-06-27T01:51:42.990Z	45.9605202	-129.9977657	64.1	1525.5	Pillars !
2024-06-27T01:53:03.921Z	45.9604578	-129.9974340	64.9	1526.5	Pillow lavas
2024-06-27T01:53:53.060Z	45.9604784	-129.9972731	64.4	1526.1	Fresh looking pillows (glassy)
2024-06-27T01:55:26.395Z	45.9605246	-129.9970058	65.9	1525.3	Glassy pillow lavas and lobes
2024-06-27T01:57:24.208Z	45.9606798	-129.9966308	63.5	1525.2	Still transiting to AX - 402 - passing over fresh looking flows
2024-06-27T02:01:47.758Z	45.9609469	-129.9958815	64.1	1524.5	Still going over pillows and lobes on the way to AX - 402
2024-06-27T02:02:58.278Z	45.9610226	-129.9956974	64.1	1524.6	Collapse
2024-06-27T02:03:26.605Z	45.9610442	-129.9956114	64.3	1523.3	Collapse structure is well correlated with the bathymetry
2024-06-27T02:04:29.355Z	45.9610893	-129.9953583	64.6	1522.3	Big pillows
2024-06-27T02:09:42.461Z	45.9613950	-129.9945228	64.7	1520.1	Hydrothermal residue
2024-06-27T02:09:50.974Z	45.9614020	-129.9944893	65.0	1520.3	Coming up on big collapse
2024-06-27T02:09:59.815Z	45.9614120	-129.9944555	64.6	1520.5	Big pillars
2024-06-27T02:10:24.928Z	45.9614440	-129.9943872	62.7	1520.2	Massive pillars !!!!
2024-06-27T02:11:26.257Z	45.9615257	-129.9942277	63.0	1520.1	Octopus !
2024-06-27T02:12:26.745Z	45.9615199	-129.9942284	62.9	1520.1	Cruising octopus
2024-06-27T02:14:32.715Z	45.9615640	-129.9941189	69.5	1519.8	Collapse
2024-06-27T02:14:42.745Z	45.9615761	-129.9940596	68.6	1520.5	Still in transit to AX-402
2024-06-27T02:15:11.805Z	45.9615617	-129.9939256	68.0	1519.9	Collapse
2024-06-27T02:16:07.540Z	45.9615689	-129.9936973	68.0	1520.5	Big collapse !

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-27T02:16:33.847Z	45.9615817	-129.9935954	71.4	1520.9	Collapse still well correlated with bathymetry
2024-06-27T02:18:32.899Z	45.9616399	-129.9930296	69.2	1519.6	hydrothermal deposits
2024-06-27T02:20:10.381Z	45.9617304	-129.9926197	63.5	1518.6	Lobate lavas covered with hydrothermal deposits on the way to AX - 402
2024-06-27T02:22:32.039Z	45.9620351	-129.9920257	61.8	1517.5	Lobe crust
2024-06-27T02:25:50.708Z	45.9624691	-129.9915144	13.9	1514.0	Coming up on the east wall - talus
2024-06-27T02:26:03.012Z	45.9625007	-129.9915004	357.1	1514.2	Marker !
2024-06-27T02:26:32.767Z	45.9625882	-129.9915196	355.3	1514.0	Benchmark AX - 402 in sight
2024-06-27T02:26:55.798Z	45.9626139	-129.9915371	14.8	1514.6	Markers 251 and 245
2024-06-27T02:28:13.956Z	45.9626663	-129.9916015	75.0	1514.9	No flag on the pole
2024-06-27T02:29:49.985Z	45.9626781	-129.9915561	85.8	1516.5	Arrived on benchmark AX - 402 at the base of the caldera's east wall
2024-06-27T02:30:06.044Z	45.9626744	-129.9915669	85.4	1516.5	Getting ready for MPR measurement
2024-06-27T02:33:03.308Z	45.9626719	-129.9915503	84.9	1516.5	Removing bungee to deploy MPR on benchmark
2024-06-27T02:33:10.322Z	45.9626721	-129.9915496	84.9	1516.5	Grabbing MPR
2024-06-27T02:36:31.791Z	45.9626716	-129.9915651	84.9	1516.5	start pressure measurement
2024-06-27T02:45:00.000Z	45.9626716	-129.9915651			Watch change: Scott - Suzy - Kendall - Morgan
2024-06-27T02:56:57.914Z	45.9626764	-129.9915656	84.4	1516.4	stop pressure measurement
2024-06-27T02:58:43.114Z	45.9626779	-129.9915638	84.3	1516.4	MPR removed from benchmark, back on Jason.
2024-06-27T03:03:13.689Z	45.9626702	-129.9915647	85.7	1516.3	Mini-BPR 2020-08 and Mini-BPR 2020-03 placed on seafloor
2024-06-27T03:05:02.282Z	45.9626738	-129.9915746	85.3	1516.2	Mini-BPR 2020-06 recovered off benchmark AX-402 and placed in side biobox
2024-06-27T03:06:05.772Z	45.9626715	-129.9915668	85.3	1516.3	Mini-BPR 2020-03 is placed on benchmark AX-402
2024-06-27T03:07:33.707Z	45.9626688	-129.9915584	85.7	1516.2	Mini-BPR 2016-12 is placed in side biolbox with Mini-BPR 2020-06
2024-06-27T03:09:59.244Z	45.9626702	-129.9915476	86.2	1516.3	Mini-BPR 2020-08 is in starboard porch basket
2024-06-27T03:13:21.606Z	45.9626399	-129.9915385	103.0	1511.8	Transit to AX-401
2024-06-27T03:22:30.006Z	45.9627046	-129.9911585	94.1	1467.8	Approaching benchmark AX-401
2024-06-27T03:25:13.971Z	45.9627152	-129.9911309	128.3	1469.5	Getting ready for MPR measurement
2024-06-27T03:26:31.212Z	45.9627169	-129.9911215	128.6	1469.4	start pressure measurement
2024-06-27T03:31:54.901Z	45.9627113	-129.9911267	128.8	1469.4	deep sea fish

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-27T03:46:06.801Z	45.9627179	-129.9911257	128.6	1469.3	stop pressure measurement
2024-06-27T03:47:35.809Z	45.9627175	-129.9911333	128.7	1469.4	MPR removed from benchmark, back on Jason.
2024-06-27T03:48:46.604Z	45.9627178	-129.9911219	128.6	1469.4	Mini-BPR 2020-02 removed from benchmark
2024-06-27T03:50:31.144Z	45.9627153	-129.9911169	129.1	1469.3	Mini-BPR 2020-08 is placed on benchmark AX-401
2024-06-27T03:51:03.922Z	45.9627142	-129.9911384	129.0	1468.5	Transit to elevator which is located just to the east on the east rim
2024-06-27T03:51:08.954Z	45.9627140	-129.9911447	126.0	1468.1	Crab
2024-06-27T04:02:25.090Z	45.9631868	-129.9901470	96.7	1470.3	approaching elevator
2024-06-27T04:07:59.475Z	45.9631748	-129.9900069	47.5	1470.4	Loading elevator with Mini-BPRs
2024-06-27T04:12:07.096Z	45.9631812	-129.9899987	45.8	1469.7	Loading MISO temperature probes on elevator
2024-06-27T04:13:01.834Z	45.9631798	-129.9900018	45.7	1469.7	Loaded Mini-BPR 2020-02 and Mini-BPR 2016-10 on elevator
2024-06-27T04:19:08.298Z	45.9631678	-129.9900073	46.0	1469.6	Loading MISO temperature probe
2024-06-27T04:30:20.588Z	45.9631688	-129.9900043	46.1	1469.0	MISO temp probe removed from elevator to starboard milk crate
2024-06-27T04:36:14.129Z	45.9631972	-129.9899833	277.7	1469.3	Loading Mini-BPR 2020-06 and Mini-BPR 2016-12 onto elevator
2024-06-27T04:43:02.028Z	45.9632028	-129.9900225	181.8	1469.4	Loading Mini-BPR 2020-05 and Mini-BPR 2020-01 onto elevator from port side biobox
2024-06-27T04:44:30.212Z	45.9632046	-129.9900328	185.0	1469.4	Mini-BPR 2020-05 loaded
2024-06-27T04:45:44.910Z	45.9632007	-129.9900317	184.3	1469.3	Mini-BPR 2020-01 loaded on elevator
2024-06-27T04:54:44.191Z	45.9632211	-129.9900081	242.3	1468.1	Rotating elevator to prepare for pin release.
2024-06-27T04:59:30.633Z	45.9632176	-129.9899966	238.2	1468.7	Pin released to send elevator to surface.
2024-06-27T05:00:14.393Z	45.9632315	-129.9899079	298.9	1466.9	Elevator sent to surface
2024-06-27T05:04:16.297Z	45.9628678	-129.9892262	122.2	1467.0	After ship recovers eleavtor Jason will next transit to AX-506
2024-06-27T05:33:58.770Z	45.9616092	-129.9877450	289.4	1400.0	JELLY
2024-06-27T06:45:00.000Z					Watch change: Jeff - Haley - Ava - Mia
2024-06-27T07:53:55.395Z	45.9614984	-129.9852855	151.3	1400.6	Saw styrofoam cup escape from mesh bags under Jason.
2024-06-27T09:38:14.295Z	45.9608345	-129.9850783	181.8	1299.9	Ship has recovered elevator - Jason about to start transiting to AX-506
2024-06-27T09:41:22.151Z	45.9603858	-129.9852382	214.6	1300.3	Transiting to AX-506
2024-06-27T10:33:35.266Z	45.9566823	-129.9944840	237.8	1297.9	Searching for AX-506.

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-27T10:49:14.578Z	45.9561475	-129.9954725	299.8	1500.1	Watch change: Bill - Susan - Kendal - Valentine
2024-06-27T10:51:08.874Z	45.9561660	-129.9955789	299.4	1526.0	Vehicle on bottom searching for AX-506
2024-06-27T10:53:53.080Z	45.9560452	-129.9960489	276.7	1526.5	Getting USBL on elevator sorted
2024-06-27T10:56:57.363Z	45.9562357	-129.9965082	320.4	1526.8	Glass balls in sight
2024-06-27T10:57:20.316Z	45.9562484	-129.9965148	317.6	1527.5	Benchmark in sight
2024-06-27T10:58:08.040Z	45.9562769	-129.9965674	290.1	1529.6	AX-506 benchmark spotted-- need to move to new position
2024-06-27T11:00:34.481Z	45.9562845	-129.9966082	205.8	1530.8	AX-506 sitting on the seafloor, rather tipped over.
2024-06-27T11:02:15.571Z	45.9562816	-129.9966027	205.8	1530.9	Disconnect line to anchor first then we can move it where we want. Will move it to a flat place and make a MPR measurement.
2024-06-27T11:08:03.821Z	45.9562978	-129.9966014	205.3	1530.9	Grabbing one of the blue lines that needs to be disconnected from the benchmark.
2024-06-27T11:09:17.199Z	45.9562841	-129.9966013	205.3	1530.7	Next we will look for a place to put the benchmark that is flat.
2024-06-27T11:09:25.108Z	45.9562857	-129.9966017	203.7	1530.5	Coming off the bottom to look around.
2024-06-27T11:09:56.731Z	45.9562925	-129.9966027	206.9	1529.2	Checking out the area.
2024-06-27T11:11:20.589Z	45.9562987	-129.9965529	146.5	1527.8	Crab
2024-06-27T11:13:40.264Z	45.9563175	-129.9965349	262.3	1529.7	Looking around for a good spot for the benchmark. Pretty rugged here with a couple of fissures in the area.
2024-06-27T11:17:15.861Z	45.9563138	-129.9965686	274.8	1530.5	Picking up the benchmark AX-506 and preparing to move it to a more stable spot.
2024-06-27T11:18:34.984Z	45.9563422	-129.9965570	276.9	1530.3	350 lbs in air and 150 lbs in water (benchmark).
2024-06-27T11:21:04.391Z	45.9563409	-129.9965409	277.2	1530.0	Going to have a look at that placement after letting go of it.
2024-06-27T11:22:32.876Z	45.9563293	-129.9965270	302.8	1530.3	Looks a little tilted.
2024-06-27T11:24:41.766Z	45.9563244	-129.9965307	292.1	1530.7	Going to nudge the benchmark to make it more stable.
2024-06-27T11:25:44.080Z	45.9563270	-129.9965262	289.6	1530.5	Zooming out to view new placement.
2024-06-27T11:28:30.378Z	45.9562957	-129.9965647	305.2	1529.5	We want to put out a marker here eventually as well.
2024-06-27T11:31:19.037Z	45.9562629	-129.9966401	322.7	1531.4	Picking up the anchor chain and yellow rope to get it out of the way.
2024-06-27T11:35:39.317Z	45.9562818	-129.9965997	49.8	1531.2	Grabbing the blue rope to store in the stbd biobox.
2024-06-27T11:37:52.050Z	45.9562882	-129.9965833	49.5	1530.0	45deg 57.380' -129deg 59.793' Z=1530m. Position of AX-506.
2024-06-27T11:39:41.671Z	45.9562980	-129.9965573	49.4	1530.9	Pushing down on the benchmark to make sure it is on solid ground.

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-27T11:40:57.292Z	45.9563038	-129.9965540	48.7	1530.7	Looks stable. Pressure measurement next.
2024-06-27T11:44:03.570Z	45.9563272	-129.9965295	292.6	1530.7	Going for the MPR now, placing it on the benchmark.
2024-06-27T11:45:07.564Z	45.9563274	-129.9965272	292.6	1530.7	Nudging the MPR into place.
2024-06-27T11:46:09.412Z	45.9563280	-129.9965273	292.6	1530.7	Looking good.
2024-06-27T11:46:32.888Z	45.9563284	-129.9965284	292.6	1530.7	start pressure measurement
2024-06-27T11:47:19.850Z	45.9563285	-129.9965328	292.6	1530.7	AX-506. Newly placed - first pressure measurement. Note glass balls are still attached for this first measurement. Will release them on another visit when it is during daylight.
2024-06-27T12:06:06.831Z	45.9563249	-129.9965250	292.6	1530.7	stop pressure measurement
2024-06-27T12:07:27.662Z	45.9563279	-129.9965195	292.6	1530.7	Storing the MPR.
2024-06-27T12:09:01.072Z	45.9563395	-129.9965556	209.3	1529.2	We're going to grab a marker to put out near AX-506 benchmark.
2024-06-27T12:11:08.330Z	45.9563460	-129.9966013	209.1	1531.3	Grabbing marker 202 to deploy near the benchmark.
2024-06-27T12:12:38.751Z	45.9563553	-129.9965909	209.1	1531.3	Marker in place on the seafloor. Mkr-202 at benchmark AX-506.
2024-06-27T12:13:02.652Z	45.9563604	-129.9965798	193.6	1529.5	4K highlights start
2024-06-27T12:13:28.128Z	45.9563650	-129.9965643	198.5	1528.9	Overview of the new benchmark and marker.
2024-06-27T12:14:21.247Z	45.9563683	-129.9965157	246.7	1528.7	Looks good.
2024-06-27T12:14:32.484Z	45.9563655	-129.9965020	249.3	1528.6	4K highlights stop
2024-06-27T12:14:58.996Z	45.9563619	-129.9964951	238.9	1529.1	Next stop AX-302.
2024-06-27T12:16:03.154Z	45.9563510	-129.9964801	138.5	1527.4	Next stop is 1.5 - 2 hours away.
2024-06-27T12:35:46.268Z	45.9546507	-129.9947803	138.4	1524.2	Pillow lavas and lobes on the way to AX-302
2024-06-27T12:37:57.296Z	45.9545119	-129.9945476	139.1	1523.7	Coming up on large collapse
2024-06-27T12:38:55.523Z	45.9544607	-129.9944800	140.1	1523.2	Lava pillar
2024-06-27T12:40:02.551Z	45.9543313	-129.9943379	140.5	1527.7	Nice sheet flow at the bottom of the collapse
2024-06-27T12:41:15.639Z	45.9542449	-129.9941980	162.6	1522.3	Pillows and big fish!
2024-06-27T12:48:42.289Z	45.9535459	-129.9935937	162.6	1516.9	Big collapse - well correlated with bathymetry
2024-06-27T12:59:58.867Z	45.9522292	-129.9922465	163.6	1519.3	Pillows and lobes - still in transit to AX - 302
2024-06-27T13:04:43.199Z	45.9518236	-129.9917312	164.8	1517.9	Collapse

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-27T13:05:11.895Z	45.9517484	-129.9916996	163.2	1517.4	Pillar !
2024-06-27T13:06:29.033Z	45.9515390	-129.9915839	164.4	1521.6	Seeing the bottom of the large collapse
2024-06-27T13:07:37.474Z	45.9514652	-129.9914253	164.8	1523.7	Jumbled sheet flow
2024-06-27T13:11:31.353Z	45.9511636	-129.9909560	164.4	1518.8	Approaching southern wall of collapse
2024-06-27T13:13:03.462Z	45.9510292	-129.9907496	163.8	1518.5	Collapsed lobes
2024-06-27T13:18:06.610Z	45.9505409	-129.9901259	162.8	1516.9	Collapse again - well correlated with bathymetry - on the way to AX - 302
2024-06-27T13:18:08.538Z	45.9505389	-129.9901229	162.7	1516.9	4K highlights start
2024-06-27T13:18:55.924Z	45.9504812	-129.9900112	163.9	1518.9	4K highlights stop
2024-06-27T13:21:50.396Z	45.9501036	-129.9896451	178.6	1519.6	4K highlights start
2024-06-27T13:22:06.047Z	45.9500729	-129.9896052	179.4	1519.1	Another collapse
2024-06-27T13:22:49.908Z	45.9499963	-129.9894883	179.5	1519.5	4K highlights stop
2024-06-27T13:26:12.062Z	45.9495945	-129.9892007	178.3	1519.1	Large collapse
2024-06-27T13:26:49.041Z	45.9495516	-129.9891761	178.5	1518.3	Pillar
2024-06-27T13:29:01.427Z	45.9491990	-129.9887913	168.2	1518.0	Lava tube
2024-06-27T13:29:34.127Z	45.9491908	-129.9887780	169.9	1508.6	Stopping boat and coming up in water column to make way for Sentry
2024-06-27T13:31:17.109Z	45.9491674	-129.9887662	170.4	1457.1	Rising to 300m from bottom
2024-06-27T13:32:11.078Z	45.9491671	-129.9887604	171.4	1430.1	Still on transit to AX-302 off bottom
2024-06-27T13:33:41.322Z	45.9491502	-129.9887266	166.7	1384.0	Jelly
2024-06-27T13:41:20.031Z	45.9482449	-129.9869703	136.8	1299.7	Maintaining 1350m depth on transit
2024-06-27T13:42:48.691Z	45.9479203	-129.9864256	138.2	1299.7	Jelly
2024-06-27T13:48:57.525Z	45.9471925	-129.9850566	137.9	1299.4	Still in transit to AX-302 off bottom
2024-06-27T13:59:51.277Z	45.9465462	-129.9839386	139.6	1362.9	Sentry is past
2024-06-27T13:59:58.685Z	45.9465459	-129.9839390	137.7	1367.3	Descending to seafloor
2024-06-27T14:01:51.128Z	45.9465637	-129.9840057	137.3	1435.2	Jelly
2024-06-27T14:04:31.348Z	45.9465172	-129.9839467	139.4	1514.4	Bottom sighted
2024-06-27T14:05:23.226Z	45.9464085	-129.9838554	156.9	1516.2	Benchmark AX-302 sighted
2024-06-27T14:05:28.048Z	45.9464061	-129.9838519	174.1	1516.2	bonus: crab

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-27T14:06:32.802Z	45.9463875	-129.9838221	224.1	1517.9	Anemone on flag
2024-06-27T14:08:27.840Z	45.9463930	-129.9838205	224.7	1518.2	MPR placement
2024-06-27T14:08:59.004Z	45.9463908	-129.9838225	224.9	1518.2	MPR placed on benchmark AX-302
2024-06-27T14:10:40.392Z	45.9463781	-129.9838251	225.0	1518.2	start pressure measurement
2024-06-27T14:13:34.972Z	45.9463776	-129.9838156	225.0	1518.2	Flag
2024-06-27T14:13:42.934Z	45.9463776	-129.9838139	225.0	1518.2	ANemone
2024-06-27T14:13:50.454Z	45.9463779	-129.9838122	225.0	1518.2	Sponge?
2024-06-27T14:13:57.406Z	45.9463782	-129.9838123	225.0	1518.2	Thing on flag
2024-06-27T14:14:03.371Z	45.9463784	-129.9838125	225.0	1518.2	Spiky thing
2024-06-27T14:15:20.750Z	45.9463842	-129.9838194	225.0	1518.2	Entire flag
2024-06-27T14:18:41.468Z	45.9463926	-129.9838175	225.0	1518.2	Benchmark AX-302 on SE caldera wall near Trevi vent
2024-06-27T14:27:44.962Z	45.9463946	-129.9838211	225.0	1518.1	Opening up
2024-06-27T14:27:54.274Z	45.9463952	-129.9838235	225.0	1518.1	Anemone confirmed on flag
2024-06-27T14:30:15.861Z	45.9463838	-129.9838260	225.0	1518.1	stop pressure measurement
2024-06-27T14:30:30.176Z	45.9463825	-129.9838243	225.0	1518.1	Shrimps
2024-06-27T14:30:50.846Z	45.9463809	-129.9838251	225.1	1518.0	Recovering MPR
2024-06-27T14:33:10.644Z	45.9463896	-129.9838225	225.0	1518.0	Retrieving Mini-BPR from AX-302
2024-06-27T14:33:27.316Z	45.9463907	-129.9838209	225.2	1518.0	Mini-BPR 2016-04 recovered and placed in basket
2024-06-27T14:34:24.219Z	45.9463999	-129.9838164	224.6	1517.1	Leaving AX-302 without deploying new Mini-BPR - we will deploy one later
2024-06-27T14:34:39.180Z	45.9463814	-129.9838105	225.2	1515.4	Short transit to Trevi vent
2024-06-27T14:35:12.522Z	45.9463299	-129.9837911	186.0	1515.6	Trevi
2024-06-27T14:35:20.027Z	45.9463162	-129.9837823	186.5	1516.3	Tubeworms
2024-06-27T14:35:41.897Z	45.9462888	-129.9837527	230.8	1516.1	Shimmer in water
2024-06-27T14:36:07.047Z	45.9462735	-129.9837251	269.6	1515.8	Old HOBO probe in vent
2024-06-27T14:36:27.140Z	45.9462722	-129.9837230	269.4	1515.7	Probe in anhydride
2024-06-27T14:36:39.191Z	45.9462713	-129.9837220	269.5	1515.7	Vent
2024-06-27T14:36:47.543Z	45.9462705	-129.9837213	269.9	1515.7	Crab legs

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-27T14:36:57.297Z	45.9462697	-129.9837210	269.3	1515.7	Cooked crab at Trevi?
2024-06-27T14:37:13.569Z	45.9462692	-129.9837211	269.4	1515.7	4K highlights start
2024-06-27T14:37:27.893Z	45.9462688	-129.9837216	269.3	1515.7	HIghlights of Trevi started
2024-06-27T14:37:31.329Z	45.9462687	-129.9837217	269.4	1515.7	Clam bed
2024-06-27T14:37:35.226Z	45.9462685	-129.9837224	269.6	1515.7	Crab
2024-06-27T14:38:08.687Z	45.9462688	-129.9837262	269.8	1515.7	Worms
2024-06-27T14:39:05.909Z	45.9462629	-129.9837394	259.9	1515.7	4K highlights stop
2024-06-27T14:39:24.750Z	45.9462439	-129.9837561	169.5	1515.7	Flying over Trevi
2024-06-27T14:39:28.453Z	45.9462357	-129.9837569	154.9	1515.7	Crab
2024-06-27T14:40:32.412Z	45.9461392	-129.9836694	131.5	1514.2	In transit to AX-309
2024-06-27T14:41:31.358Z	45.9460551	-129.9835513	131.3	1514.2	AX-309 is to the southeast 1200m distance
2024-06-27T14:43:24.932Z	45.9459011	-129.9832703	131.1	1514.2	1.5 hour approximate transit
2024-06-27T14:45:00.000Z	45.9459011	-129.9832703			Watch change: Scott - Suzy - Kendall - Morgan
2024-06-27T15:03:36.868Z	45.9441689	-129.9806136	130.4	1511.5	Pillars of lava
2024-06-27T15:07:31.887Z	45.9439324	-129.9802880	130.6	1510.6	Cables
2024-06-27T15:29:35.043Z	45.9417920	-129.9768879	130.4	1509.8	crab
2024-06-27T15:46:33.226Z	45.9398078	-129.9742269	130.1	1513.3	Active OOI cable. JBOX
2024-06-27T15:46:55.577Z	45.9397701	-129.9741817	130.5	1512.9	botpt
2024-06-27T15:47:25.448Z	45.9397464	-129.9741519	131.2	1512.8	BOTPT - bottom pressure tilt instrument on the OOI
2024-06-27T16:01:07.156Z	45.9384226	-129.9720825	237.5	1523.0	Approaching benchmark AX-309
2024-06-27T16:01:44.169Z	45.9384271	-129.9720715	243.0	1524.5	Arrived at AX-309
2024-06-27T16:06:34.050Z	45.9384527	-129.9720881	243.0	1524.5	Moving MPR from holser to the benchmark
2024-06-27T16:08:26.336Z	45.9384513	-129.9720783	243.0	1524.5	MPR placed on benchmark AX-309
2024-06-27T16:09:29.160Z	45.9384557	-129.9720855	243.0	1524.5	start pressure measurement
2024-06-27T16:29:40.980Z	45.9384567	-129.9720946	243.0	1524.3	stop pressure measurement
2024-06-27T16:30:27.402Z	45.9384555	-129.9720907	243.0	1524.3	Removing MPR from benchmark and placing back onto Jason
2024-06-27T16:32:14.602Z	45.9383960	-129.9719687	176.7	1520.5	Beginning transit to AX-303

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-27T17:05:48.559Z	45.9360047	-129.9762380	234.5	1513.8	Transit to AX-303 in the south caldera coninued, 550m from the benchmark
2024-06-27T17:24:36.700Z	45.9343055	-129.9796362	233.7	1513.6	Cool collapse
2024-06-27T17:35:33.764Z	45.9334917	-129.9818090	266.6	1512.5	diffuse hydrothermal venting, bacteria mat, tubeworms
2024-06-27T17:37:45.763Z	45.9334131	-129.9821446	263.9	1510.6	Benchmark AX-303 in sight
2024-06-27T17:39:23.099Z	45.9333950	-129.9822346	175.0	1512.3	Arrived at AX-303 in southeastern caldera
2024-06-27T17:41:11.309Z	45.9334008	-129.9822311	174.4	1512.4	Placing MPR on benchmark
2024-06-27T17:49:14.083Z	45.9334096	-129.9822301	174.4	1512.3	MPR placement successful.
2024-06-27T17:49:16.981Z	45.9334095	-129.9822300	174.4	1512.3	start pressure measurement
2024-06-27T17:54:47.954Z	45.9333994	-129.9822326	174.4	1512.3	TIny tubeworms
2024-06-27T18:09:41.191Z	45.9333950	-129.9822324	173.9	1512.3	stop pressure measurement
2024-06-27T18:10:41.991Z	45.9333939	-129.9822302	173.9	1512.3	Placing MPR on Jason
2024-06-27T18:13:39.917Z	45.9333993	-129.9822313	173.4	1512.3	Moving MIni-BPR 2016-05 from benchmark AX-303 to the biobox
2024-06-27T18:15:32.414Z	45.9334019	-129.9822286	173.5	1512.3	MIni-BPR 2016-05 in biobox. Closing biobox
2024-06-27T18:18:01.208Z	45.9333693	-129.9822427	173.0	1510.6	990 meters to the next benchmark, AX-310, located southeast of current location
2024-06-27T18:25:40.729Z	45.9328351	-129.9818756	157.4	1510.9	Currently in transit to AX-310, located in the International District/hydrothermal vent field
2024-06-27T18:45:00.000Z					Watch change: Jeff - Haley - Ava - Mia
2024-06-27T19:18:46.433Z	45.9258881	-129.9779790	159.7	1521.8	Benchmark AX-310 in sight.
2024-06-27T19:18:52.434Z	45.9258790	-129.9779750	158.1	1522.0	4K highlights start
2024-06-27T19:19:47.848Z	45.9258215	-129.9779474	285.3	1524.1	4K highlights stop
2024-06-27T19:22:00.638Z	45.9257663	-129.9778982	284.3	1525.4	4K highlights start
2024-06-27T19:22:09.571Z	45.9257690	-129.9778989	284.3	1525.4	Removing MPR from Jason and placing on benchmark
2024-06-27T19:23:39.374Z	45.9257773	-129.9779027	284.7	1525.4	4K highlights stop
2024-06-27T19:26:10.660Z	45.9257701	-129.9778951	285.3	1525.4	start pressure measurement
2024-06-27T19:47:01.260Z	45.9257777	-129.9779055	284.3	1525.5	stop pressure measurement
2024-06-27T19:47:44.303Z	45.9257803	-129.9779052	284.2	1525.5	4K highlights start
2024-06-27T19:48:56.653Z	45.9257745	-129.9778876	284.0	1525.6	4K highlights stop

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-27T20:02:28.827Z	45.9250253	-129.9797386	232.3	1515.3	Transiting from AX-310 to AX-104.
2024-06-27T20:22:50.680Z	45.9238663	-129.9819363	232.9	1516.3	Transiting to AX-104. Collapse structures and microbial mats in sight.
2024-06-27T20:24:11.849Z	45.9235732	-129.9819961	186.0	1516.2	4K highlights start
2024-06-27T20:24:17.231Z	45.9235609	-129.9820037	175.5	1516.1	4K highlights stop
2024-06-27T20:25:12.238Z	45.9235825	-129.9819850	176.0	1517.5	4K highlights start
2024-06-27T20:25:39.281Z	45.9235701	-129.9819965	183.6	1516.3	4K highlights stop
2024-06-27T21:19:29.251Z	45.9164609	-129.9900378	145.1	1526.6	Nearby AX-104. Searching for the benchmark.
2024-06-27T21:23:17.021Z	45.9161270	-129.9895566	83.2	1526.5	Benchmark AX-104 in sight.
2024-06-27T21:24:55.853Z	45.9161578	-129.9894405	338.1	1528.5	Jason is in position at AX-104. Preparing to take MPR measurement.
2024-06-27T21:28:33.122Z	45.9161471	-129.9894553	337.3	1528.6	The MPR is in position on benchmark AX-104. We are checking the tilt and preparing to start pressure measurement.
2024-06-27T21:28:59.194Z	45.9161503	-129.9894506	337.1	1528.6	start pressure measurement
2024-06-27T21:30:43.948Z	45.9161415	-129.9894586	337.4	1528.6	Diffuse fluid venting at the benchmark.
2024-06-27T21:31:18.873Z	45.9161448	-129.9894581	337.2	1528.6	Scale worms are in sight nearby benchmark AX-104.
2024-06-27T21:32:08.817Z	45.9161465	-129.9894583	337.4	1528.6	4K highlights start
2024-06-27T21:33:11.073Z	45.9161443	-129.9894587	337.3	1528.6	4K highlights stop
2024-06-27T21:50:44.074Z	45.9161468	-129.9894585	335.6	1528.7	stop pressure measurement
2024-06-27T21:54:07.808Z	45.9161443	-129.9894589	335.5	1528.8	MPR is secured in the basket.
2024-06-27T21:56:49.319Z	45.9161417	-129.9894619	335.9	1528.7	Mini-BPR 2014-09 has been removed from Benchmark AX-104 and placed in the port-side basket. Moored BPR will be deployed near here so no Mini-BPR deployed
2024-06-27T21:57:55.089Z	45.9161486	-129.9894520	335.8	1527.0	Beginning transit to AX-308.
2024-06-27T22:55:07.984Z	45.9229247	-129.9931786	333.7	1520.9	Still on transit to AX-308 - Flying over pillow lavas and lava tubes
2024-06-27T22:55:18.415Z	45.9229413	-129.9931825	333.8	1521.5	Watch change: Bill - Susan - Kendal - Valentine
2024-06-27T23:05:44.126Z	45.9245311	-129.9938102	335.3	1525.3	Going over jumbled flows
2024-06-27T23:30:50.833Z	45.9289681	-129.9962017	336.3	1519.2	Lobate lavas and sheet flows on the way to AX-308
2024-06-27T23:31:17.169Z	45.9290559	-129.9962301	336.4	1519.8	500 m to go to AX - 308
2024-06-27T23:46:09.789Z	45.9311541	-129.9979610	334.6	1528.8	Yellow sediments

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-27T23:47:26.336Z	45.9313419	-129.9980447	334.2	1528.4	Cool pillow and starfish
2024-06-27T23:49:09.161Z	45.9314784	-129.9983746	295.9	1528.8	2011 lava
2024-06-27T23:49:22.015Z	45.9314826	-129.9983926	296.3	1528.6	Probably 2011 lava?
2024-06-27T23:49:56.442Z	45.9315073	-129.9985025	293.3	1528.3	AX-308 benchmark sighted
2024-06-27T23:50:34.666Z	45.9315350	-129.9986425	276.7	1527.0	At AX-308
2024-06-27T23:53:15.116Z	45.9315416	-129.9987007	272.2	1530.1	Placing MPR on benchmark
2024-06-27T23:54:00.293Z	45.9315388	-129.9987002	272.6	1530.0	Placement
2024-06-27T23:56:08.231Z	45.9315433	-129.9987054	273.3	1530.0	Brittle stars on AX-308
2024-06-27T23:56:26.191Z	45.9315435	-129.9987039	273.2	1530.0	start pressure measurement
2024-06-28T00:07:50.935Z	45.9315410	-129.9986986	273.1	1530.0	Hydroid growing up mooring flag
2024-06-28T00:08:49.035Z	45.9315440	-129.9986977	273.1	1530.0	4K highlights start
2024-06-28T00:12:27.101Z	45.9315483	-129.9986972	273.1	1530.1	4K highlights stop
2024-06-28T00:16:44.693Z	45.9315440	-129.9986977	273.3	1530.1	stop pressure measurement
2024-06-28T00:17:36.831Z	45.9315417	-129.9987007	271.6	1530.1	Recovering MPR
2024-06-28T00:18:13.451Z	45.9315411	-129.9987024	271.6	1530.1	MPR in holster
2024-06-28T00:18:37.975Z	45.9315409	-129.9986996	271.6	1530.2	Securing MPR in holster
2024-06-28T00:19:21.898Z	45.9315451	-129.9986982	273.6	1530.1	Recovering Mini-BPR 2014-13 from AX-308
2024-06-28T00:19:48.084Z	45.9315432	-129.9987037	273.4	1530.1	Fish
2024-06-28T00:20:14.007Z	45.9315430	-129.9987026	273.4	1530.1	Placing Mini-BPR 2014-13 in port biobox
2024-06-28T00:21:09.376Z	45.9315476	-129.9986974	273.7	1530.1	Searching biobox for new Mini-BPR
2024-06-28T00:21:17.886Z	45.9315462	-129.9986939	273.7	1530.1	not here
2024-06-28T00:21:55.154Z	45.9315434	-129.9986902	273.7	1530.1	Latching biobox
2024-06-28T00:22:08.735Z	45.9315438	-129.9986905	273.7	1530.1	Struggling to latch biobox
2024-06-28T00:23:55.218Z	45.9315459	-129.9986934	273.7	1530.1	Succesfully latched biobox
2024-06-28T00:24:17.215Z	45.9315467	-129.9986930	273.8	1530.1	Now going to search starboard biobox
2024-06-28T00:27:11.962Z	45.9315469	-129.9986936	272.2	1530.2	Searching starboard biobox
2024-06-28T00:27:22.359Z	45.9315464	-129.9986917	272.4	1530.2	Still at AX-308

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-28T00:28:26.545Z	45.9315461	-129.9986954	272.6	1530.1	Mini-BPR 2016-05 in starboard biobox but that was recovered earlier
2024-06-28T00:29:09.684Z	45.9315465	-129.9986865	272.6	1530.1	No more new Mini-BPRs to deploy. Will deploy another Mini-BPR here later.
2024-06-28T00:29:23.438Z	45.9315467	-129.9986918	272.9	1528.2	Leaving AX-308 without deploying a Mini-BPR here (will do so later)
2024-06-28T00:29:34.996Z	45.9315445	-129.9987206	272.7	1526.6	On transit to AX-106
2024-06-28T00:29:49.662Z	45.9315416	-129.9987460	268.7	1527.0	1km distance
2024-06-28T00:30:46.282Z	45.9315424	-129.9987838	284.6	1527.4	AX-106 is at Ashes (approx 1.5h time)
2024-06-28T00:33:12.294Z	45.9317634	-129.9992513	284.7	1527.9	Crab
2024-06-28T00:37:59.288Z	45.9320924	-130.0001692	284.5	1529.6	Fish
2024-06-28T00:49:22.776Z	45.9327147	-130.0016855	325.8	1538.6	Lava swirls and quite a lot of sediment cover.
2024-06-28T00:50:03.027Z	45.9328159	-130.0015978	324.6	1537.5	Crazy broken up jumbled sheet flow.
2024-06-28T00:55:15.819Z	45.9331337	-130.0025228	285.6	1537.8	Still in transit to AX-106 (from AX-308).
2024-06-28T00:58:53.105Z	45.9332246	-130.0035747	289.9	1536.0	We should be getting close to the western contact of 2011 lava flows.
2024-06-28T01:00:31.885Z	45.9333759	-130.0037896	312.7	1535.0	Contact?
2024-06-28T01:02:55.583Z	45.9333926	-130.0043529	260.0	1533.5	Driving along edge of 2011 lavas.
2024-06-28T01:05:50.710Z	45.9333328	-130.0049030	261.1	1533.6	Yellow hydrothermal mat.
2024-06-28T01:09:29.481Z	45.9333492	-130.0056711	261.7	1532.8	2011 flow.
2024-06-28T01:12:07.936Z	45.9336338	-130.0061889	292.2	1532.4	Lots of yellow hydrothermal seds.
2024-06-28T01:12:13.414Z	45.9336527	-130.0062134	291.7	1532.3	OOI cable.
2024-06-28T01:13:54.319Z	45.9338565	-130.0065428	298.3	1531.2	Super lobate and now jumbled flow
2024-06-28T01:21:34.980Z	45.9342967	-130.0083636	287.1	1533.0	Flat lobes.
2024-06-28T01:24:23.076Z	45.9342931	-130.0089235	290.1	1532.4	Lava whorl.
2024-06-28T01:25:13.238Z	45.9343281	-130.0090810	281.0	1532.3	Various lava forms.
2024-06-28T01:25:33.640Z	45.9343257	-130.0091680	277.3	1532.2	Striated (lineated) sheet flow.
2024-06-28T01:26:16.431Z	45.9343025	-130.0093927	274.6	1532.5	Beautiful
2024-06-28T01:30:10.909Z	45.9343735	-130.0103757	274.6	1534.8	We should be approaching the benchmark here.
2024-06-28T01:34:47.565Z	45.9344190	-130.0113375	260.2	1539.2	Spotted the marker.

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-28T01:35:47.687Z	45.9344340	-130.0114386	263.3	1538.1	We're at AX-106 benchmark area. Seeing the marker first and heading to benchmark now.
2024-06-28T01:36:43.207Z	45.9344457	-130.0114775	262.6	1537.5	Nice shot of benchmark
2024-06-28T01:37:27.756Z	45.9343677	-130.0115433	34.2	1539.7	AX-106 benchmark. Mkr-267 in the distance.
2024-06-28T01:39:15.280Z	45.9343852	-130.0115622	58.2	1540.9	Releasing the MPR from the holster.
2024-06-28T01:40:08.639Z	45.9343947	-130.0115561	58.2	1540.9	Placing the MPR on AX-106
2024-06-28T01:42:03.179Z	45.9343868	-130.0115509	58.7	1540.9	start pressure measurement
2024-06-28T02:02:09.205Z	45.9343969	-130.0115472	58.6	1540.6	stop pressure measurement
2024-06-28T02:02:54.491Z	45.9344083	-130.0115605	60.6	1540.8	Jason did a little lift and came back down. Will store the MPR in the holster next.
2024-06-28T02:03:55.105Z	45.9343944	-130.0115595	58.8	1540.8	Transfering MPR from benchmark to holster.
2024-06-28T02:06:00.319Z	45.9343926	-130.0115936	58.8	1540.8	Finished up with this benchmark.
2024-06-28T02:06:44.072Z	45.9343992	-130.0115603	57.9	1540.2	Next task is transiting from AX-106 to AX-307
2024-06-28T02:08:53.059Z	45.9347792	-130.0115364	11.6	1537.6	Transiting. See OOI cable
2024-06-28T02:12:16.225Z	45.9353797	-130.0114682	11.5	1537.5	Swirls
2024-06-28T02:16:29.924Z	45.9360539	-130.0114543	11.7	1537.0	1 km to go to AX-307
2024-06-28T02:25:58.784Z	45.9373891	-130.0112584	11.5	1537.1	Still in transit to AX-307 - Flying over pillows
2024-06-28T02:40:39.386Z	45.9390836	-130.0101999	60.0	1537.2	Heading towards Sentry for recovery - transit to AX - 307 will resume after that
2024-06-28T02:45:00.000Z	45.9390836	-130.0101999			Watch change: Scott - Suzy - Kendall - Morgan
2024-06-28T03:44:20.414Z	45.9424741	-130.0061794	235.3	1449.6	Sentry on surface
2024-06-28T04:09:06.603Z	45.9413399	-130.0088449	236.2	1449.8	Sentry on deck
2024-06-28T04:57:02.065Z	45.9435998	-130.0084024	152.4	1449.5	Elevator deployed from ship (near AX-307)
2024-06-28T05:43:43.209Z	45.9431318	-130.0083579	331.9	1533.5	Jason approaching elevator on seafloor
2024-06-28T05:47:38.254Z	45.9432250	-130.0083643	335.2	1539.7	Transferring 4 old Mini-BPRs to elevator from Jason
2024-06-28T05:51:19.651Z	45.9432186	-130.0083738	335.3	1539.6	Picking up new MIni-BPRs from elevator and moving them to Jason
2024-06-28T06:10:29.434Z	45.9432582	-130.0084503	165.1	1539.1	Moving to other side of elevator to retrieve other 2 Mini-BPRs
2024-06-28T06:19:26.689Z	45.9432471	-130.0084042	204.0	1539.0	Releasing elevator for the ship to recover at the surface
2024-06-28T06:44:37.678Z	45.9438347	-130.0052566	115.4	1450.0	Watch change: Jeff - Haley - Ava - Mia

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-28T07:16:32.738Z	45.9413698	-130.0069675	238.5	1473.1	Elevator recovered. Jason returning to bottom, transiting to Benchmark AX-307.
2024-06-28T08:04:14.276Z	45.9452841	-130.0091798	95.9	1536.1	Benchmark AX-307 in sight.
2024-06-28T08:06:27.806Z	45.9453110	-130.0091066	175.3	1541.1	Arrival at Benchmark AX-307.
2024-06-28T08:09:16.754Z	45.9453144	-130.0091246	176.2	1541.2	4K highlights start
2024-06-28T08:09:39.093Z	45.9453144	-130.0091210	176.1	1541.2	Removing MPR from Jason and placing on benchmark AX-307
2024-06-28T08:10:47.319Z	45.9453203	-130.0091251	176.3	1541.2	4K highlights stop
2024-06-28T08:16:45.375Z	45.9453186	-130.0091080	176.3	1541.2	start pressure measurement
2024-06-28T08:39:26.128Z	45.9453096	-130.0091067	176.2	1541.3	stop pressure measurement
2024-06-28T08:44:21.065Z	45.9453104	-130.0091118	176.1	1541.3	Removing MPR from benchmark and placing back onto Jason.
2024-06-28T08:45:30.570Z	45.9453027	-130.0091103	176.2	1541.3	Removing Mini-BPR 2020-02 and placing on Benchmark AX-307.
2024-06-28T08:46:31.101Z	45.9453105	-130.0091023	176.2	1541.3	Mini-BPR 2020-02 deployed on Benchmark AX-307.
2024-06-28T08:48:14.023Z	45.9452919	-130.0090978	316.6	1538.0	Beginning transit from AX-307 to AX-505.
2024-06-28T09:12:12.530Z	45.9472245	-130.0111930	309.5	1535.9	Cup(s) escaped mesh bag under Jason during transit.
2024-06-28T09:55:05.413Z	45.9520983	-130.0176493	267.7	1546.8	Benchmark AX-505 in sight.
2024-06-28T09:56:15.643Z	45.9520738	-130.0177561	224.3	1549.3	Arrival at Benchmark AX-505.
2024-06-28T10:01:04.614Z	45.9520625	-130.0177597	222.3	1550.5	Removing MPR from Jason and placing on Benchmark AX-505.
2024-06-28T10:13:38.989Z	45.9520841	-130.0177608	222.6	1550.5	start pressure measurement
2024-06-28T10:34:19.066Z	45.9520650	-130.0177528	222.6	1550.6	stop pressure measurement
2024-06-28T10:36:43.959Z	45.9520673	-130.0177566	222.6	1550.7	placing MPR back on Jason
2024-06-28T10:38:53.390Z	45.9520727	-130.0177447	222.6	1550.7	Placing Mini-BPR 2020-01 on benchmark AX-505
2024-06-28T10:39:39.444Z	45.9520702	-130.0177544	222.6	1550.7	Mini-BPR 2020-01 deployed on benchmark AX-505
2024-06-28T10:39:42.392Z	45.9520705	-130.0177548	222.6	1550.7	4K highlights start
2024-06-28T10:40:31.851Z	45.9520778	-130.0177349	231.6	1547.9	4K highlights stop
2024-06-28T10:41:52.072Z	45.9520842	-130.0177992	132.9	1548.3	4K highlights start
2024-06-28T10:42:27.410Z	45.9520390	-130.0177982	54.5	1547.5	4K highlights stop
2024-06-28T10:45:00.000Z	45.9520390	-130.0177982			Watch change: Bill - Susan - Kendal - Valentine
2024-06-28T10:48:46.969Z	45.9518377	-130.0180699	230.8	1546.7	We are now in transit to AX-403
2024-06-28T11:01:07.876Z	45.9508369	-130.0198942	232.2	1543.0	Jumbled to sheet flow transition

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-28T11:33:04.234Z	45.9482835	-130.0247246	231.9	1550.4	Transiting still toward AX-403 from AX-505.
2024-06-28T11:39:22.756Z	45.9478351	-130.0256914	299.3	1547.2	Here we are. At AX-403, base of the west wall.
2024-06-28T11:40:05.637Z	45.9478372	-130.0257071	326.5	1548.3	Sheet flow filled a depression and then drained out. Left is the talus from the wall.
2024-06-28T11:41:38.680Z	45.9478277	-130.0257123	321.4	1548.9	This one has a new Mini-BPR so don't need to replace it. Just going to do MPR reading on this visit.
2024-06-28T11:41:55.236Z	45.9478248	-130.0257087	321.4	1548.9	2nd and last visit here this year.
2024-06-28T11:42:25.011Z	45.9478215	-130.0257047	321.4	1548.9	Placing the MPR.
2024-06-28T11:43:05.882Z	45.9478243	-130.0257077	321.4	1548.9	Nudged into place.
2024-06-28T11:44:05.953Z	45.9478150	-130.0257078	321.4	1548.9	start pressure measurement
2024-06-28T11:44:45.496Z	45.9478085	-130.0257129	321.4	1548.9	AX-403 pressure measurement.
2024-06-28T11:53:29.730Z	45.9478217	-130.0257128	321.4	1549.0	Floating something - some little critter.
2024-06-28T11:53:36.115Z	45.9478229	-130.0257102	321.4	1549.0	Shrimp friend.
2024-06-28T12:01:25.037Z	45.9478205	-130.0257103	321.4	1549.0	Hydroids on the flag rope.
2024-06-28T12:04:08.719Z	45.9478082	-130.0257153	321.4	1549.0	stop pressure measurement
2024-06-28T12:04:40.105Z	45.9478041	-130.0257223	321.4	1549.0	Finished up with pressure reading at AX-403.
2024-06-28T12:05:49.347Z	45.9478019	-130.0257189	321.4	1549.0	MPR back in the holster.
2024-06-28T12:06:49.559Z	45.9478058	-130.0257274	241.2	1546.1	4K highlights start
2024-06-28T12:07:16.372Z	45.9477813	-130.0257609	213.8	1542.9	Going up the wall heading to AX-404.
2024-06-28T12:07:24.555Z	45.9477781	-130.0257637	214.7	1541.8	The west wall is in front of us.
2024-06-28T12:09:08.963Z	45.9477051	-130.0258524	185.1	1530.8	That looks like a narrow dyke.
2024-06-28T12:09:25.532Z	45.9477179	-130.0258923	160.2	1529.4	Wow
2024-06-28T12:09:52.229Z	45.9477061	-130.0258902	164.4	1526.8	Crinoid hang out.
2024-06-28T12:11:11.486Z	45.9476745	-130.0258750	186.8	1521.4	This dyke appears parallel to the rift zone.
2024-06-28T12:11:50.273Z	45.9476531	-130.0258669	187.3	1518.8	Looking at a spur that juts out from the wall.
2024-06-28T12:13:43.040Z	45.9475192	-130.0259204	221.4	1509.9	Still climbing.
2024-06-28T12:16:04.143Z	45.9473461	-130.0260435	214.4	1497.0	The west wall is less vertical than the east where we climbed earlier. There are talus ramps on parts of the west wall.

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-28T12:16:19.666Z	45.9473492	-130.0260875	241.1	1495.9	To the right now we are seeing more intact lavas.
2024-06-28T12:16:48.853Z	45.9473641	-130.0261168	270.3	1491.5	Transition. Looks like bathtub rings!
2024-06-28T12:17:56.268Z	45.9473530	-130.0261594	243.2	1483.3	Another transition. This is like a coating of lava plastered on the wall.
2024-06-28T12:18:30.465Z	45.9473387	-130.0261819	243.5	1480.2	Hard to tell. Just a thin vaneer of rings on the more massive wall.
2024-06-28T12:19:05.952Z	45.9473373	-130.0262103	243.0	1476.6	Seastar extravaganza (brittle stars too).
2024-06-28T12:19:42.011Z	45.9473413	-130.0262177	244.9	1473.2	Pillows now.
2024-06-28T12:19:52.575Z	45.9473349	-130.0262146	234.1	1472.2	Brittle star extravaganza.
2024-06-28T12:20:42.988Z	45.9473075	-130.0262216	253.8	1467.4	More of veneer (smooth and bathtub rings). Earlier ponded flow. Rings are from drain out.
2024-06-28T12:21:12.781Z	45.9473281	-130.0262390	259.3	1463.3	Massive flow here.
2024-06-28T12:21:44.094Z	45.9473378	-130.0262459	259.0	1459.2	Massive flow with talus beneath.
2024-06-28T12:22:25.185Z	45.9473336	-130.0263124	258.0	1454.2	4K highlights stop
2024-06-28T12:23:19.143Z	45.9472979	-130.0263805	260.4	1447.5	Highlights off - 16 minutes of traveling up the west wall.
2024-06-28T12:25:44.419Z	45.9472228	-130.0265129	243.5	1425.9	Hanging lobe.
2024-06-28T12:26:40.058Z	45.9472049	-130.0265445	243.8	1417.9	Crinoid couple.
2024-06-28T12:27:46.212Z	45.9472088	-130.0265795	243.1	1412.0	Approaching the top of the wall.
2024-06-28T12:28:08.453Z	45.9472036	-130.0265977	243.9	1409.2	10 more meters to top.
2024-06-28T12:28:24.215Z	45.9471946	-130.0266171	246.1	1407.6	King of the hill crab.
2024-06-28T12:29:15.919Z	45.9471763	-130.0266538	243.4	1399.9	The top of the west caldera wall
2024-06-28T12:29:35.655Z	45.9471805	-130.0266554	242.9	1397.5	Pillows and benchmark in sight
2024-06-28T12:29:37.557Z	45.9471794	-130.0266571	242.4	1397.3	4K highlights start
2024-06-28T12:29:54.721Z	45.9471634	-130.0266874	236.4	1396.4	Top of west wall and benchmark.
2024-06-28T12:30:48.969Z	45.9471298	-130.0267525	211.4	1398.3	AX-404 flag laying on the seafloor.
2024-06-28T12:31:35.830Z	45.9471357	-130.0267510	211.9	1399.3	4K highlights stop
2024-06-28T12:32:37.346Z	45.9471307	-130.0267418	212.1	1399.3	Grabbing the MPR from the holster.
2024-06-28T12:33:45.819Z	45.9471248	-130.0267532	212.2	1399.3	The MPR is placed on the benchmark.
2024-06-28T12:34:45.290Z	45.9471320	-130.0267387	212.2	1399.3	New Mini-BPR already here.

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-28T12:37:22.065Z	45.9471321	-130.0267503	212.3	1399.3	AX-404 MPR in place.
2024-06-28T12:37:36.202Z	45.9471381	-130.0267505	212.3	1399.3	start pressure measurement
2024-06-28T12:46:03.937Z	45.9471260	-130.0267413	212.4	1399.3	Some kind of worm tube poking out of the sediment
2024-06-28T12:57:18.876Z	45.9471404	-130.0267488	212.4	1399.3	stop pressure measurement
2024-06-28T12:58:16.057Z	45.9471398	-130.0267514	212.5	1399.3	End of MPR measurement at AX - 404
2024-06-28T12:58:54.119Z	45.9471400	-130.0267566	212.6	1399.3	Stowing the MPR
2024-06-28T13:00:14.657Z	45.9471521	-130.0267499	259.8	1397.7	Taking off to AX-101
2024-06-28T13:00:38.237Z	45.9471925	-130.0267056	52.5	1396.7	Off the edge
2024-06-28T13:07:28.925Z	45.9477643	-130.0254178	57.1	1547.8	Seeing the bottom again
2024-06-28T13:08:02.336Z	45.9478415	-130.0252986	61.9	1550.0	Start transit to AX-101 in the caldera
2024-06-28T13:10:52.112Z	45.9481203	-130.0248339	59.6	1550.6	Jumbled sheet flow
2024-06-28T13:12:22.066Z	45.9481915	-130.0247241	59.4	1550.1	1400 m to go to AX-101
2024-06-28T13:22:57.155Z	45.9487442	-130.0232688	59.4	1548.4	Anchor?
2024-06-28T13:25:22.171Z	45.9489561	-130.0228286	58.7	1550.1	Big fish!
2024-06-28T13:25:50.380Z	45.9489895	-130.0227628	58.9	1549.7	Transition jumbled / pillows
2024-06-28T13:26:43.439Z	45.9490807	-130.0226239	58.7	1549.2	Still in transit to AX-101 - Now flying over pillows
2024-06-28T13:34:03.139Z	45.9496754	-130.0214367	59.9	1544.1	Pillows
2024-06-28T13:36:25.005Z	45.9497924	-130.0209417	60.8	1542.6	Pretty basalt flows
2024-06-28T13:37:41.704Z	45.9498542	-130.0206514	60.7	1542.9	Whorls
2024-06-28T13:40:29.251Z	45.9500082	-130.0201414	82.7	1542.7	Octopus again
2024-06-28T13:41:07.741Z	45.9500201	-130.0201905	88.7	1542.2	4K highlights start
2024-06-28T13:42:02.654Z	45.9500116	-130.0201522	95.2	1541.7	4K highlights stop
2024-06-28T13:55:25.100Z	45.9516127	-130.0173261	49.5	1543.4	More pillows on transit on the way to AX-101
2024-06-28T13:56:17.927Z	45.9517114	-130.0171393	49.3	1545.2	Smooth pillows
2024-06-28T13:56:40.746Z	45.9517364	-130.0170576	49.0	1542.4	More sediments indicating older basalt
2024-06-28T14:03:02.147Z	45.9524347	-130.0158103	50.0	1531.5	Pillows
2024-06-28T14:16:34.965Z	45.9535664	-130.0129727	49.6	1526.1	Reached sheet flow (old)

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-28T14:18:00.853Z	45.9536540	-130.0126915	49.7	1527.7	Urchins everywhere
2024-06-28T14:28:42.553Z	45.9545476	-130.0105153	49.5	1525.6	Coming up on AX-101
2024-06-28T14:29:02.152Z	45.9545988	-130.0104165	50.1	1524.6	CRAB
2024-06-28T14:29:57.973Z	45.9547342	-130.0101819	45.0	1522.1	Nice swirls
2024-06-28T14:30:04.443Z	45.9547603	-130.0101617	44.8	1522.3	Hinge cracks
2024-06-28T14:30:46.988Z	45.9549319	-130.0100102	36.0	1522.6	Fissure
2024-06-28T14:31:18.597Z	45.9550556	-130.0099442	22.6	1522.8	Benchmark AX-101 sighted
2024-06-28T14:34:23.537Z	45.9551514	-130.0099179	308.2	1527.2	Circling benchmark
2024-06-28T14:35:52.912Z	45.9551822	-130.0099581	239.1	1529.8	Positioned at AX-101 (new Mini-BPR already deployed here)
2024-06-28T14:36:25.265Z	45.9551809	-130.0099583	239.0	1529.8	Unstrapping MPR
2024-06-28T14:37:04.134Z	45.9551893	-130.0099582	238.9	1529.8	Placing MPR
2024-06-28T14:37:49.866Z	45.9551827	-130.0099625	239.0	1529.8	MPR placed
2024-06-28T14:39:32.143Z	45.9551913	-130.0099664	238.9	1529.8	Positioning MPR
2024-06-28T14:42:11.683Z	45.9551752	-130.0099547	240.1	1529.8	Repositioning again
2024-06-28T14:43:34.928Z	45.9551801	-130.0099550	240.1	1529.8	start pressure measurement
2024-06-28T14:45:00.000Z	45.9551801	-130.0099550			Watch change: Scott - Suzy - Kendall - Morgan
2024-06-28T15:03:43.001Z	45.9551838	-130.0099532	240.0	1529.7	stop pressure measurement
2024-06-28T15:06:58.335Z	45.9552523	-130.0099880	52.0	1526.8	Transiting to AX-402
2024-06-28T16:52:02.582Z	45.9626408	-129.9915368	17.1	1513.9	Approaching AX-402
2024-06-28T16:53:20.075Z	45.9626574	-129.9915427	93.6	1515.4	Arrived at AX-402. (new Mini-BPR already deployed here)
2024-06-28T16:57:11.730Z	45.9626603	-129.9915519	93.8	1515.4	start pressure measurement
2024-06-28T17:13:34.336Z	45.9626579	-129.9915560	93.8	1515.3	shrimp
2024-06-28T17:17:19.824Z	45.9626666	-129.9915541	93.8	1515.3	stop pressure measurement
2024-06-28T17:20:00.598Z	45.9626711	-129.9914211	95.3	1510.6	Transiting to AX-401
2024-06-28T17:20:18.692Z	45.9626557	-129.9913706	95.3	1508.5	Heading up the east caldera wall.
2024-06-28T17:26:39.821Z	45.9627021	-129.9911052	123.0	1468.5	Arrived at AX-401 (new Mini-BPR already deployed here)
2024-06-28T17:27:15.953Z	45.9627023	-129.9911112	122.3	1468.6	Preparing for MPR deployment

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-28T17:30:43.489Z	45.9626974	-129.9911181	122.8	1468.6	Brittle star on MPR
2024-06-28T17:30:56.835Z	45.9626966	-129.9911175	122.7	1468.5	start pressure measurement
2024-06-28T17:35:56.231Z	45.9626959	-129.9911053	123.0	1468.5	Brittle star on MPR
2024-06-28T17:50:18.927Z	45.9627047	-129.9910884	122.3	1468.5	stop pressure measurement
2024-06-28T17:52:29.914Z	45.9626895	-129.9911408	157.5	1466.1	Transiting to AX-506
2024-06-28T17:53:09.831Z	45.9625854	-129.9910448	158.8	1466.0	Quick view of Fetch instrument (tripod on eastern caldera rim near AX-401)
2024-06-28T18:45:00.000Z					Watch change: Jeff - Haley - Ava - Mia
2024-06-28T18:50:48.477Z	45.9573252	-129.9950666	193.2	1464.6	Waiting for Sentry to deploy.
2024-06-28T20:34:50.489Z	45.9557553	-129.9969297	190.9	1400.2	Sentry is finished with deployment and we are transiting to AX-506.
2024-06-28T20:43:09.227Z	45.9562583	-129.9965415	11.9	1528.1	Benchmark AX-506 in sight (still has glass balls attached from deployment)
2024-06-28T20:43:16.449Z	45.9562683	-129.9965258	9.1	1528.0	4K highlights start
2024-06-28T20:43:55.238Z	45.9562774	-129.9964723	318.5	1527.6	4K highlights stop
2024-06-28T20:45:10.687Z	45.9562942	-129.9964400	299.3	1526.0	We are checking out the glass balls on the benchmark.
2024-06-28T20:47:59.313Z	45.9563092	-129.9964789	286.8	1529.0	Jason is positioning the MPR on benchmark AX-506.
2024-06-28T20:49:37.585Z	45.9563108	-129.9964990	286.8	1529.0	MPR is positioned on benchmark AX-506 (with the glass balls attached)
2024-06-28T20:50:01.728Z	45.9563127	-129.9964945	287.0	1528.9	start pressure measurement
2024-06-28T21:10:12.179Z	45.9563224	-129.9964839	284.9	1529.1	stop pressure measurement
2024-06-28T21:11:12.638Z	45.9563134	-129.9964821	285.0	1529.1	MPR has been returned to the holster.
2024-06-28T21:14:31.509Z	45.9563256	-129.9964889	283.3	1529.1	Port side swingarm is extended. Removing mini-BPR 2016-12.
2024-06-28T21:15:48.639Z	45.9563299	-129.9964936	283.1	1529.1	Mini-BPR 2016-12 is deployed on benchmark AX-506.
2024-06-28T21:16:37.884Z	45.9563332	-129.9964939	283.6	1529.1	Jason is flying up to ensure that the line and glass balls are not entangled
2024-06-28T21:20:13.691Z	45.9563158	-129.9965009	255.6	1529.3	4K highlights start
2024-06-28T21:21:14.639Z	45.9563215	-129.9964907	263.2	1529.2	Jason is struggling to hold the glass balls. Some movement.
2024-06-28T21:21:20.233Z	45.9563231	-129.9964859	262.9	1529.4	Benchmark moved slightly.
2024-06-28T21:21:56.947Z	45.9563176	-129.9964749	267.5	1529.5	We are going to take another measurement.
2024-06-28T21:22:29.423Z	45.9563159	-129.9964729	285.4	1529.4	4K highlights stop
2024-06-28T21:23:07.298Z	45.9563210	-129.9964739	298.1	1529.2	CORRECTION: We are going to release the glass balls and return to repeat the pressure measurement.

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-28T21:24:19.334Z	45.9563128	-129.9964761	294.4	1529.2	4K highlights start
2024-06-28T21:24:42.452Z	45.9563162	-129.9964717	295.1	1529.2	Jason is pulling the pin to Benchmark AX-506 to release the glass balls
2024-06-28T21:25:22.551Z	45.9563262	-129.9964611	294.3	1529.2	The pin appears to be sticking. Port side manipulator is moving in to hold the line to the glass balls.
2024-06-28T21:25:51.855Z	45.9563219	-129.9964716	294.8	1529.2	Glass balls are released. No further movement of the benchmark.
2024-06-28T21:25:57.838Z	45.9563248	-129.9964784	295.0	1529.2	4K highlights stop
2024-06-28T21:26:43.905Z	45.9563397	-129.9963986	284.8	1525.5	Jason is off bottom as we wait for recovery of the glass balls by the ship
2024-06-28T21:43:28.481Z	45.9568601	-129.9937722	112.6	1428.7	Another Cup escaped the mesh bag below Jason.
2024-06-28T22:11:09.942Z	45.9568551	-129.9958843	230.3	1526.7	Jason is back on bottom. Searching for benchmark AX-506.
2024-06-28T22:27:10.232Z	45.9563279	-129.9964880	268.9	1529.6	We temporarily lost the monitor on the logging station.
2024-06-28T22:27:16.079Z	45.9563285	-129.9964877	268.9	1529.6	Jason has arrived back on station at AX-506 to repeat a pressure measurement.
2024-06-28T22:27:44.195Z	45.9563292	-129.9964871	268.9	1529.6	Pressure measurement began at 22:25:25.
2024-06-28T22:42:10.036Z	45.9563243	-129.9964800	268.9	1529.8	stop pressure measurement
2024-06-28T22:42:58.208Z	45.9563261	-129.9964782	269.0	1529.8	The MPR has been removed from benchmark AX-506 and returned to the holster.
2024-06-28T22:45:00.000Z	45.9563261	-129.9964782			Watch change: Bill - Susan - Kendal - Valentine
2024-06-28T22:48:06.494Z	45.9563316	-129.9964915	268.1	1529.0	4K highlights start
2024-06-28T22:49:34.559Z	45.9562933	-129.9964261	134.7	1526.1	4K highlights stop
2024-06-28T22:50:24.593Z	45.9562261	-129.9962785	136.8	1527.6	Transiting from AX-506 to AX-302.
2024-06-28T22:54:03.793Z	45.9560657	-129.9954961	137.9	1528.4	Pretty pillows
2024-06-28T23:03:12.808Z	45.9554828	-129.9939574	147.5	1525.2	This is a long transit. About 2 hours.
2024-06-28T23:06:09.223Z	45.9552465	-129.9934802	146.5	1524.1	Sponge?
2024-06-28T23:09:20.289Z	45.9549859	-129.9931102	145.6	1524.3	Yellow-ish sediments.
2024-06-28T23:11:46.330Z	45.9547696	-129.9928428	145.5	1523.1	Lava pillars
2024-06-28T23:13:09.810Z	45.9546172	-129.9927165	148.8	1525.1	Collapse and pillars on the way to AX-302
2024-06-28T23:20:11.882Z	45.9539184	-129.9918294	148.5	1518.6	Still transiting to AX-302 - Flying over pillow lavas
2024-06-28T23:27:04.959Z	45.9532972	-129.9904698	152.3	1517.4	Big collapse
2024-06-28T23:27:49.260Z	45.9532499	-129.9904013	223.4	1519.5	Parking in the collapse

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-28T23:27:51.653Z	45.9532482	-129.9904001	228.6	1519.5	4K highlights start
2024-06-28T23:28:19.332Z	45.9532027	-129.9903891	141.0	1516.7	4K highlights stop
2024-06-28T23:29:12.058Z	45.9531366	-129.9903447	115.9	1516.5	900 m to go to AX-302
2024-06-28T23:30:22.808Z	45.9530631	-129.9901093	133.5	1521.7	4K highlights start
2024-06-28T23:31:04.245Z	45.9529913	-129.9899914	135.6	1518.2	4K highlights stop
2024-06-28T23:36:44.952Z	45.9525750	-129.9888338	139.5	1517.6	Coming up on large collapse
2024-06-28T23:46:11.715Z	45.9518534	-129.9874042	144.1	1520.7	680 m to reach AX - 302
2024-06-28T23:46:57.323Z	45.9517347	-129.9873613	147.5	1520.8	Again in a collapse in the 2011 lava flow - Jumbled lava
2024-06-28T23:49:13.326Z	45.9514494	-129.9871799	148.1	1520.1	Fissure
2024-06-28T23:53:28.226Z	45.9509394	-129.9868998	207.1	1518.4	Wall of another collapse
2024-06-28T23:54:44.521Z	45.9507978	-129.9867638	147.4	1516.6	Back on lobate surface - 550 m to go to AX - 302
2024-06-28T23:54:53.819Z	45.9507918	-129.9867582	154.9	1516.7	Big collapse in a vent
2024-06-28T23:54:58.970Z	45.9507884	-129.9867551	152.3	1516.8	4K highlights start
2024-06-28T23:55:37.089Z	45.9507208	-129.9866882	146.9	1516.6	4K highlights stop
2024-06-28T23:56:17.781Z	45.9506492	-129.9866056	183.5	1517.1	Lobe cross-section
2024-06-28T23:58:37.735Z	45.9503311	-129.9862283	154.5	1517.4	Big pillars and pillows !
2024-06-28T23:59:29.351Z	45.9502679	-129.9862071	153.2	1516.6	4K highlights start
2024-06-28T23:59:57.599Z	45.9502191	-129.9862168	171.9	1517.3	Big pillars areas
2024-06-29T00:01:13.150Z	45.9500691	-129.9861674	169.2	1517.5	Pillarrs pillars pillars
2024-06-29T00:03:42.182Z	45.9497478	-129.9861181	171.6	1516.8	Exploring the pillar canyon
2024-06-29T00:03:58.613Z	45.9497164	-129.9861280	165.5	1518.0	4K highlights stop
2024-06-29T00:13:20.572Z	45.9483446	-129.9853357	140.2	1518.8	Hydrothermal sediments
2024-06-29T00:13:40.392Z	45.9483101	-129.9852963	137.8	1520.3	Pillars ! three sisters
2024-06-29T00:13:42.501Z	45.9483069	-129.9852925	137.4	1520.4	4K highlights start
2024-06-29T00:15:25.566Z	45.9481734	-129.9849241	131.3	1518.8	Again - lots of yellow hydrothermal sediments on the lobate surface
2024-06-29T00:15:59.636Z	45.9481098	-129.9847978	137.8	1519.5	arches & pillars
2024-06-29T00:16:54.736Z	45.9480159	-129.9846981	136.3	1519.3	BEAUTIFUL video !!!!!!
2024-06-29T00:17:32.801Z	45.9479365	-129.9846372	140.0	1518.2	4K highlights stop

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-29T00:22:41.302Z	45.9472176	-129.9842237	148.7	1518.9	Almost at AX - 302
2024-06-29T00:24:51.003Z	45.9469288	-129.9842191	147.8	1519.4	Sheet flow draping pillows
2024-06-29T00:28:10.929Z	45.9464129	-129.9838266	221.5	1516.4	Coming up on AX - 302
2024-06-29T00:28:26.060Z	45.9464007	-129.9838080	231.9	1516.0	Anenome is still there on benchmark flag!
2024-06-29T00:29:12.668Z	45.9463881	-129.9837789	231.1	1518.6	Crab guarding the tephra bucket
2024-06-29T00:29:53.944Z	45.9463894	-129.9837787	231.0	1518.7	Landed at AX - 302
2024-06-29T00:31:16.359Z	45.9463867	-129.9837824	231.0	1518.7	Getting ready to deploy MPR
2024-06-29T00:32:08.050Z	45.9463826	-129.9837810	231.0	1518.7	Deploying MPR at AX - 302
2024-06-29T00:33:11.405Z	45.9463789	-129.9837731	231.0	1518.7	start pressure measurement
2024-06-29T00:33:23.177Z	45.9463802	-129.9837723	231.0	1518.7	Crab friend
2024-06-29T00:35:11.487Z	45.9463911	-129.9837742	231.0	1518.7	4K highlights start
2024-06-29T00:36:49.203Z	45.9463858	-129.9837725	231.0	1518.7	Crabs and anemones
2024-06-29T00:37:59.182Z	45.9463830	-129.9837759	231.0	1518.7	4K highlights stop
2024-06-29T00:40:29.634Z	45.9463888	-129.9837709	231.0	1518.7	Crab
2024-06-29T00:47:38.658Z	45.9463881	-129.9837800	231.0	1518.8	4K highlights start
2024-06-29T00:50:17.685Z	45.9463828	-129.9837732	231.0	1518.8	4K highlights stop
2024-06-29T00:51:03.624Z	45.9463828	-129.9837743	231.0	1518.8	Crab and cucumber
2024-06-29T00:51:29.102Z	45.9463831	-129.9837754	231.0	1518.8	Crab
2024-06-29T00:51:40.636Z	45.9463833	-129.9837758	231.0	1518.8	4K highlights start
2024-06-29T00:54:25.286Z	45.9463883	-129.9837722	231.0	1518.8	stop pressure measurement
2024-06-29T00:54:50.130Z	45.9463891	-129.9837755	231.0	1518.8	4K highlights stop
2024-06-29T00:55:21.374Z	45.9463905	-129.9837799	231.0	1518.8	MPR removal from AX-302
2024-06-29T00:59:54.016Z	45.9463847	-129.9837689	231.0	1518.8	Deploying Mini-BPR 2020-05 at AX-302
2024-06-29T01:01:24.351Z	45.9463840	-129.9837631	231.1	1518.8	Mini-BPR 2020-05
2024-06-29T01:03:49.571Z	45.9463902	-129.9837577	231.0	1518.8	Crab things
2024-06-29T01:04:00.834Z	45.9463904	-129.9837573	231.0	1518.8	REpositioning Mini-BPR 2020-05
2024-06-29T01:04:35.751Z	45.9463906	-129.9837574	231.1	1518.9	Mini-BPR 2020-05 deployed on AX-302

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-29T01:06:00.006Z	45.9463866	-129.9837765	230.9	1517.9	Transit from AX-302 to AX-309
2024-06-29T01:06:45.409Z	45.9463406	-129.9838092	133.6	1514.4	Transit distance: 1300m/ Transit time: 1.5h
2024-06-29T01:06:54.975Z	45.9463344	-129.9838126	136.0	1512.5	Coming up from bottom
2024-06-29T01:07:22.033Z	45.9463109	-129.9838295	136.1	1497.2	50m from bottom to swap out pilot controller box
2024-06-29T01:09:02.990Z	45.9462750	-129.9838796	133.3	1462.3	Stopping transit to handle pilot controller box switch
2024-06-29T01:12:14.189Z	45.9459859	-129.9834971	134.3	1444.5	EDIT: still transiting but changing pilot controller box
2024-06-29T01:12:56.512Z	45.9459253	-129.9834164	133.9	1440.1	Came up from bottom to avoid hitting the bottom while we change out stick box
2024-06-29T01:23:07.195Z	45.9451055	-129.9824499	140.9	1438.3	Still off bottom in transit
2024-06-29T02:00:35.002Z	45.9414398	-129.9783974	143.6	1437.8	Stick log replaced
2024-06-29T02:00:56.416Z	45.9414014	-129.9783545	144.3	1437.8	Still on transit
2024-06-29T02:02:30.773Z	45.9412253	-129.9781659	142.4	1437.8	Big red jelly
2024-06-29T02:09:56.517Z	45.9403458	-129.9772016	141.0	1438.4	Jelly
2024-06-29T02:21:35.514Z	45.9389912	-129.9756733	145.7	1438.1	Jelly
2024-06-29T02:22:47.048Z	45.9389162	-129.9755365	121.4	1441.3	Heading down to bottom
2024-06-29T02:24:43.062Z	45.9388063	-129.9752316	107.6	1492.6	30 minutes to AX-309
2024-06-29T02:25:37.834Z	45.9387476	-129.9750038	107.8	1512.5	Bottom sighted
2024-06-29T02:28:07.897Z	45.9384887	-129.9740196	106.8	1520.7	Old sheet flow
2024-06-29T02:28:24.134Z	45.9384570	-129.9739080	108.2	1521.9	Ropy
2024-06-29T02:32:18.535Z	45.9382652	-129.9724378	92.4	1522.5	Cool basalt
2024-06-29T02:34:02.296Z	45.9384491	-129.9721144	84.5	1522.0	AX-309 sighted
2024-06-29T02:34:59.496Z	45.9384725	-129.9720376	233.6	1524.1	Doppler Reset
2024-06-29T02:35:29.704Z	45.9384579	-129.9720310	234.6	1526.0	Landing at AX-309
2024-06-29T02:36:13.910Z	45.9384503	-129.9720353	234.6	1526.1	AX-309 will not be getting a Mini-BPR because it is close to a BPR on the OOI cable
2024-06-29T02:36:22.710Z	45.9384506	-129.9720358	234.6	1526.1	Getting out MPR
2024-06-29T02:37:01.799Z	45.9384522	-129.9720351	234.6	1526.1	MPR placed
2024-06-29T02:37:06.859Z	45.9384522	-129.9720350	234.6	1526.1	Placement
2024-06-29T02:38:24.718Z	45.9384508	-129.9720424	234.6	1526.1	start pressure measurement

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-29T02:42:34.791Z	45.9384469	-129.9720450	234.6	1526.1	Hydroids on flag
2024-06-29T02:42:59.522Z	45.9384458	-129.9720419	234.6	1526.1	Crinoid on flag
2024-06-29T02:45:00.000Z	45.9384458	-129.9720419			Watch change: Scott - Suzy - Kendall - Morgan
2024-06-29T02:58:12.827Z	45.9384418	-129.9720368	234.6	1526.0	stop pressure measurement
2024-06-29T03:01:32.075Z	45.9384263	-129.9720609	234.2	1522.5	Transiting to AX-303
2024-06-29T03:44:24.005Z	45.9354453	-129.9787940	207.2	1516.7	Doppler Reset
2024-06-29T04:05:42.470Z	45.9334542	-129.9821903	206.3	1511.8	Approaching AX-303.
2024-06-29T04:07:31.188Z	45.9334089	-129.9821911	182.6	1514.1	Arrived at AX-303
2024-06-29T04:10:57.100Z	45.9333988	-129.9821997	182.5	1514.1	start pressure measurement
2024-06-29T04:21:05.341Z	45.9334008	-129.9822061	182.5	1514.0	Tube worms
2024-06-29T04:30:45.890Z	45.9334045	-129.9821960	182.3	1514.0	stop pressure measurement
2024-06-29T04:35:09.931Z	45.9334096	-129.9822017	182.1	1513.9	Deploying Mini-BPR 2020-06 to AX-303
2024-06-29T04:38:50.582Z	45.9333710	-129.9821757	184.8	1512.0	Transiting to AX-310
2024-06-29T04:39:21.587Z	45.9333139	-129.9821643	183.1	1512.1	Crab and microb. mat.
2024-06-29T05:26:53.052Z	45.9283386	-129.9805053	143.2	1516.5	Big fish!
2024-06-29T05:47:01.999Z	45.9262990	-129.9790229	210.2	1516.5	Diva vent in International District vent field. We are going to swap a temperature probe at the base of El Guapo chimney (aka Pagoda vent) before we continue transit to AX-310
2024-06-29T05:47:39.651Z	45.9262855	-129.9790600	216.9	1515.8	*Tiny Towers vent
2024-06-29T05:49:28.196Z	45.9263304	-129.9791122	310.3	1512.9	Escargot vent
2024-06-29T05:49:58.482Z	45.9263539	-129.9791098	305.9	1513.2	Escargot vent
2024-06-29T05:51:44.077Z	45.9264574	-129.9792592	301.7	1513.4	Vent
2024-06-29T05:52:05.410Z	45.9264561	-129.9792730	303.1	1512.7	9mChimney
2024-06-29T05:52:58.688Z	45.9264279	-129.9793304	300.6	1512.7	Vents
2024-06-29T05:53:35.936Z	45.9264135	-129.9793731	300.5	1511.9	Hermosa Vent
2024-06-29T05:55:35.003Z	45.9264438	-129.9794689	341.9	1508.8	Vent
2024-06-29T05:56:51.789Z	45.9264406	-129.9794837	343.9	1511.5	El Guapo chimney

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-29T05:57:09.948Z	45.9264369	-129.9794838	343.3	1511.9	Smoking vent at El Guapo
2024-06-29T06:01:31.972Z	45.9264835	-129.9794845	354.6	1504.4	Bio mats
2024-06-29T06:02:26.278Z	45.9264848	-129.9794926	353.3	1500.0	Top of El Guapo
2024-06-29T06:02:38.921Z	45.9264858	-129.9794933	353.5	1499.7	Smoking top of El Guapo
2024-06-29T06:02:55.418Z	45.9264879	-129.9794925	353.2	1499.2	Black smoke
2024-06-29T06:03:12.811Z	45.9264901	-129.9794897	353.2	1498.4	Black smoke
2024-06-29T06:05:58.285Z	45.9265151	-129.9795580	159.5	1497.6	Close up of top of vent
2024-06-29T06:07:38.045Z	45.9265172	-129.9795488	158.9	1497.6	Shimmering water
2024-06-29T06:11:53.518Z	45.9264534	-129.9795272	42.9	1510.6	Bottom of El Guapo vent
2024-06-29T06:13:45.204Z	45.9264671	-129.9795247	65.5	1512.0	Small vent with temperature probe
2024-06-29T06:17:52.740Z	45.9264817	-129.9795025	350.4	1512.3	Preparing to collect the temperature probe
2024-06-29T06:18:26.032Z	45.9264780	-129.9795073	350.6	1512.3	Starting highlight video
2024-06-29T06:18:53.522Z	45.9264802	-129.9795050	350.5	1512.2	4K highlights start
2024-06-29T06:19:59.116Z	45.9264960	-129.9795044	350.5	1512.2	Collecting probe
2024-06-29T06:22:24.943Z	45.9264875	-129.9794970	353.8	1512.6	Collecting probe
2024-06-29T06:22:36.979Z	45.9264851	-129.9794960	351.7	1512.5	Collecting probe
2024-06-29T06:23:16.086Z	45.9264779	-129.9794958	351.5	1512.4	Probe collected MISO 2017-006 (deployed here in 2022)
2024-06-29T06:25:31.857Z	45.9264907	-129.9795013	351.2	1512.6	4K highlights stop
2024-06-29T06:26:27.871Z	45.9264867	-129.9795057	350.7	1512.5	4K highlights start
2024-06-29T06:26:57.347Z	45.9264879	-129.9795079	350.3	1512.4	Vent shimmer
2024-06-29T06:28:00.458Z	45.9264948	-129.9795093	351.3	1512.3	Taking temperature with Jason temp probe at Pagoda vent where probe was
2024-06-29T06:29:26.471Z	45.9264850	-129.9795050	351.3	1512.3	bye beehive
2024-06-29T06:33:19.633Z	45.9264844	-129.9794999	351.2	1512.2	4K highlights stop
2024-06-29T06:36:09.295Z	45.9264872	-129.9795049	351.6	1512.2	Jason temp probe inside vent
2024-06-29T06:43:07.457Z	45.9264908	-129.9795020	351.3	1512.3	210 C max temp recorded at El Guapo vent at base (aka Pagoda vent).
2024-06-29T06:45:00.000Z	45.9264908	-129.9795020			Watch change: Jeff - Haley - Ava - Mia
2024-06-29T06:47:09.296Z	45.9264869	-129.9795079	350.8	1512.3	4K highlights start

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-29T06:49:16.666Z	45.9264837	-129.9794962	350.1	1512.4	4K highlights stop
2024-06-29T06:50:40.102Z	45.9264840	-129.9795003	349.8	1512.4	4K highlights start
2024-06-29T06:51:59.706Z	45.9264889	-129.9795015	350.6	1512.3	Deploying new temperature probe 2023-001 at same vent (Pagoda) at south base of the El Guapo chimney
2024-06-29T06:55:47.399Z	45.9264872	-129.9795011	351.2	1512.1	4K highlights stop
2024-06-29T06:58:33.442Z	45.9264856	-129.9794995	350.4	1512.2	4K highlights start
2024-06-29T07:04:12.473Z	45.9264845	-129.9794978	349.4	1510.9	4K highlights start
2024-06-29T07:05:10.204Z	45.9264835	-129.9793726	359.5	1504.6	4K highlights stop
2024-06-29T07:05:28.257Z	45.9264800	-129.9793027	13.2	1504.5	started transiting to AX-310
2024-06-29T07:15:24.834Z	45.9257247	-129.9779248	82.2	1525.1	marker in sight
2024-06-29T07:16:34.735Z	45.9257623	-129.9778534	285.3	1525.3	arrived at AX-310
2024-06-29T07:17:43.697Z	45.9257683	-129.9778582	284.1	1525.9	4K highlights start
2024-06-29T07:19:29.808Z	45.9257576	-129.9778481	283.2	1525.9	4K highlights stop
2024-06-29T07:20:16.946Z	45.9257569	-129.9778524	283.5	1525.9	trying to place the MPR on AX-310
2024-06-29T07:20:50.461Z	45.9257583	-129.9778535	283.2	1525.9	MPR placed on benchmark AX-310
2024-06-29T07:20:55.560Z	45.9257585	-129.9778533	283.2	1525.9	start pressure measurement
2024-06-29T07:39:15.671Z	45.9257610	-129.9778495	283.8	1525.9	stop pressure measurement
2024-06-29T08:26:07.650Z	45.9220267	-129.9832522	226.7	1517.0	4K highlights start
2024-06-29T08:28:01.874Z	45.9218916	-129.9834538	217.0	1516.9	4K highlights stop
2024-06-29T08:57:20.191Z	45.9174095	-129.9870202	128.7	1523.8	Sentry is heading in our direction and we are waiting ~30 minutes before continuing our transit.
2024-06-29T09:43:46.363Z	45.9161692	-129.9894031	253.0	1525.8	After continued transit benchmark AX-104 is in sight.
2024-06-29T09:44:20.708Z	45.9161336	-129.9894056	328.1	1527.1	4K highlights start
2024-06-29T09:46:03.464Z	45.9161387	-129.9893971	333.0	1528.3	4K highlights stop
2024-06-29T09:46:26.868Z	45.9161394	-129.9894076	334.1	1528.3	Jason on bottom preparing to place MPR on AX-104
2024-06-29T09:50:57.133Z	45.9161421	-129.9893877	334.7	1528.3	Attempting to place the MPR on the benchmark. The tilt is 6.9deg and we are attempting re-placement.
2024-06-29T09:53:13.666Z	45.9161469	-129.9893956	334.9	1528.3	As Jason attempted to place the MPR, the entire concrete benchmark moved.

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-29T09:57:21.961Z	45.9161583	-129.9893875	334.5	1528.3	start pressure measurement
2024-06-29T10:17:55.720Z	45.9161512	-129.9893847	334.2	1528.4	stop pressure measurement
2024-06-29T10:18:15.375Z	45.9161613	-129.9893768	334.7	1528.4	Jason has removed the MPR from the benchmark.
2024-06-29T10:18:59.236Z	45.9161531	-129.9893830	334.9	1528.4	The MPR is secured in the holster on the Jason basket.
2024-06-29T10:21:25.940Z	45.9161451	-129.9893950	333.5	1528.5	We are waiting at AX-104 as sentry is recovered.
2024-06-29T10:26:41.116Z	45.9161494	-129.9893988	333.9	1528.4	Beginning transit to the location where Sentry will be recovered.
2024-06-29T10:45:00.000Z	45.9161494	-129.9893988			Watch change: Bill - Susan - Kendal - Valentine
2024-06-29T10:52:21.423Z	45.9182342	-129.9859028	47.2	1430.7	Sentry will be recovered next, then we will transit to AX-308.
2024-06-29T11:53:22.930Z	45.9224520	-129.9796966	45.7	1430.6	Sentry is just off the bottom now.
2024-06-29T12:30:08.456Z	45.9219264	-129.9814745	228.9	1429.7	Sentry at the surface and ready for recovery.
2024-06-29T12:32:29.256Z	45.9219905	-129.9813734	2.1	1422.2	Sentry on deck
2024-06-29T12:43:15.893Z	45.9234974	-129.9803619	358.6	1395.9	Start transit to AX-308
2024-06-29T12:45:38.880Z	45.9237052	-129.9814384	302.9	1395.7	1600 m to go to AX-308
2024-06-29T13:15:18.506Z	45.9275088	-129.9879321	300.9	1376.5	Still in transit to AX-308 - 1000 m to go
2024-06-29T13:44:37.767Z	45.9302300	-129.9938512	289.3	1375.9	Less than 500 m to go to AX-308
2024-06-29T14:04:24.162Z	45.9311560	-129.9983632	286.2	1504.7	Started descent towards AX-308
2024-06-29T14:05:21.039Z	45.9311942	-129.9985898	288.0	1524.5	On bottom !
2024-06-29T14:06:59.886Z	45.9314914	-129.9986674	339.2	1526.7	Arrived at benchmark AX-308
2024-06-29T14:08:48.655Z	45.9315469	-129.9987009	275.0	1529.9	Getting ready for MPR measurement
2024-06-29T14:09:50.700Z	45.9315443	-129.9986831	274.9	1529.9	Removing bungee to deploy MPR on benchmark
2024-06-29T14:10:25.611Z	45.9315433	-129.9986879	275.0	1529.9	Deploying MPR
2024-06-29T14:12:01.977Z	45.9315434	-129.9986858	275.0	1529.8	MPR placed on AX-308
2024-06-29T14:12:53.028Z	45.9315446	-129.9986842	275.0	1529.8	start pressure measurement
2024-06-29T14:29:23.362Z	45.9315472	-129.9987073	272.7	1529.8	Glowing shrimp
2024-06-29T14:32:06.076Z	45.9315420	-129.9986932	272.7	1529.8	stop pressure measurement
2024-06-29T14:32:31.609Z	45.9315467	-129.9986900	272.6	1529.8	Recovering MPR from AX-308
2024-06-29T14:33:12.384Z	45.9315441	-129.9986928	272.6	1529.8	MPR is back on Jason

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-29T14:33:32.222Z	45.9315489	-129.9986960	272.6	1529.8	Start transit to AX-106 - 1000 m to go
2024-06-29T14:35:00.470Z	45.9315534	-129.9986875	291.6	1525.9	Nevermind ! Need to deploy Mini-BPR at AX-308 before we transit!
2024-06-29T14:37:08.046Z	45.9315436	-129.9986896	289.7	1529.9	Back at benchmark to deploy Mini-BPR 2016-10
2024-06-29T14:37:41.398Z	45.9315456	-129.9986885	290.0	1529.9	Mini-BPR 2016-10 deployed on AX-308
2024-06-29T14:38:45.016Z	45.9315425	-129.9986934	290.0	1529.9	That was the last Mini-BPR! Jason is empty!
2024-06-29T14:39:13.628Z	45.9315459	-129.9987313	283.0	1524.8	Now starting transit to AX-106 - 1000 m to go
2024-06-29T14:40:49.668Z	45.9316368	-129.9991907	288.1	1527.2	Nice lineated sheet flow
2024-06-29T14:45:00.000Z	45.9316368	-129.9991907			Watch change: Scott - Suzy - Kendall - Morgan
2024-06-29T15:44:03.891Z	45.9343457	-130.0114280	324.7	1538.4	Approaching AX-106
2024-06-29T15:47:58.171Z	45.9344032	-130.0115618	63.3	1540.1	Placing the MPR.
2024-06-29T15:51:16.334Z	45.9344004	-130.0115559	64.0	1540.1	MPR placed
2024-06-29T15:52:01.087Z	45.9344068	-130.0115592	64.2	1540.1	start pressure measurement
2024-06-29T16:09:42.439Z	45.9344041	-130.0115554	64.4	1540.0	Sea creature on flag
2024-06-29T16:11:04.572Z	45.9344005	-130.0115544	64.5	1540.0	stop pressure measurement
2024-06-29T16:13:19.892Z	45.9344020	-130.0115501	63.9	1539.8	Start transit to AX-307
2024-06-29T16:16:40.387Z	45.9346883	-130.0119195	354.7	1538.0	OOI cable?
2024-06-29T16:41:44.022Z	45.9354971	-130.0105754	103.0	1539.7	Collecting sample of 2011 lava flow. Small pillow toe from edge of flow.
2024-06-29T17:16:17.507Z	45.9371656	-130.0104759	356.7	1535.3	what is this
2024-06-29T17:17:49.594Z	45.9373272	-130.0105091	1.3	1536.7	Came across railroad wheel anchor weights for a previous mooring
2024-06-29T18:20:29.651Z	45.9453221	-130.0091033	177.9	1541.1	Arrived at benchmark AX-307. MPR placement.
2024-06-29T18:24:00.322Z	45.9453165	-130.0091001	177.3	1541.1	MPR placed
2024-06-29T18:24:28.440Z	45.9453189	-130.0091007	178.0	1541.0	start pressure measurement
2024-06-29T18:44:44.558Z	45.9453211	-130.0091079	176.9	1541.0	stop pressure measurement
2024-06-29T18:45:00.000Z	45.9453211	-130.0091079			Watch change: Jeff - Haley - Ava - Mia
2024-06-29T18:45:51.044Z	45.9453282	-130.0091099	177.1	1541.0	MPR back in basket.
2024-06-29T18:50:44.426Z	45.9453777	-130.0091256	356.0	1537.8	Beginning transit to Benchmark AX-101 from Benchmark AX-307.
2024-06-29T20:02:47.832Z	45.9550563	-130.0098687	350.5	1525.0	Benchmark AX-101 in sight.

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-29T20:13:27.338Z	45.9551923	-130.0099594	234.5	1528.5	MPR removed from Jason, placed on benchmark AX-101.
2024-06-29T20:15:14.633Z	45.9551830	-130.0099633	233.2	1528.5	start pressure measurement
2024-06-29T20:35:17.423Z	45.9551741	-130.0099497	233.1	1528.5	stop pressure measurement
2024-06-29T20:36:39.236Z	45.9551705	-130.0099291	232.3	1528.6	MPR back on Jason.
2024-06-29T20:39:23.755Z	45.9551847	-130.0099715	236.1	1528.0	4K highlights start
2024-06-29T20:39:47.532Z	45.9551468	-130.0099430	236.9	1527.2	4K highlights stop
2024-06-29T20:40:58.487Z	45.9552186	-130.0102448	290.9	1526.1	Transiting 500m away from Benchmark AX-101 to deploy elevator from ship with more new Mini-BPRs (ones that have been turned-around on the ship)
2024-06-29T21:11:38.654Z	45.9563031	-130.0132484	169.2	1426.0	4K highlights start
2024-06-29T21:12:18.259Z	45.9562984	-130.0132349	169.7	1426.0	4K highlights stop
2024-06-29T21:36:35.875Z	45.9563290	-130.0132318	75.4	1425.9	Waiting on elevator.
2024-06-29T22:06:56.832Z	45.9563786	-130.0135606	208.0	1529.9	Elevator on bottom and is in sight.
2024-06-29T22:12:09.763Z	45.9563028	-130.0136233	232.0	1531.5	4K highlights start
2024-06-29T22:12:30.165Z	45.9563123	-130.0136180	231.4	1531.5	Mini-BPR 2014-09 is moved from elevator to the starboard biobox on Jason
2024-06-29T22:14:00.352Z	45.9563119	-130.0136080	232.4	1531.5	Jason is having trouble loading Mini-BPR 2016-05 in the starboard biobox.
2024-06-29T22:14:35.336Z	45.9563042	-130.0136022	232.4	1531.5	The pin on 2016-05 was quite stuck, and bent as it was removed from the elevator.
2024-06-29T22:14:36.577Z	45.9563037	-130.0136029	232.5	1531.5	4K highlights stop
2024-06-29T22:16:02.281Z	45.9563124	-130.0136218	231.9	1531.6	The clamp on 2016-05 appears to be much further from the collar, and is difficult to work with.
2024-06-29T22:16:24.535Z	45.9563092	-130.0135959	231.9	1531.6	Mini-BPR 2016-05 is in the Jason basket on the starboard side.
2024-06-29T22:17:21.054Z	45.9562979	-130.0136114	231.6	1531.6	Unloading the second biobox on the elevator.
2024-06-29T22:17:51.639Z	45.9562984	-130.0136287	231.8	1531.6	Mini-BPR fell out of the biobox onto the seafloor. Unclear what the number is at this moment.
2024-06-29T22:18:31.374Z	45.9563036	-130.0136255	231.9	1531.6	Mini-BPR 2016-13 is in the starboard side basket
2024-06-29T22:19:12.345Z	45.9563102	-130.0135904	231.4	1531.6	The dropped Mini-BPR is 2016-04.
2024-06-29T22:19:34.042Z	45.9563065	-130.0135797	231.5	1531.6	Mini-BPR 2016-04 is in the port side of Jason's basket
2024-06-29T22:31:19.852Z	45.9562823	-130.0136110	110.0	1531.1	We are searching for space on the vehicle to put the new MISO probe.

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-29T22:32:32.685Z	45.9562839	-130.0136318	109.9	1531.1	Mini-BPR 2016-04 was removed from the port-side Jason basket and placed in the port-side biobox.
2024-06-29T22:35:40.324Z	45.9562721	-130.0136192	110.0	1531.2	Port-side swingarm is put back with 2016-04 inside.
2024-06-29T22:45:00.000Z	45.9562721	-130.0136192			Watch change: Bill - Susan - Kendal - Valentine
2024-06-29T22:47:07.141Z	45.9562843	-130.0136254	106.7	1531.3	Old MISO probe (2017-006) has been transferred from the basket to the elevator.
2024-06-29T22:49:55.034Z	45.9562791	-130.0136139	107.0	1531.3	New MISO probe (2023-010) was transferred from the elevator to the Jason basket
2024-06-29T22:53:39.540Z	45.9563908	-130.0137910	309.8	1531.5	Start transit to AX-501 target site (benchmark not deployed there yet) - 750m away. During the rest of this dive we will deploy 4 additional new benchmarks in the northern half of the caldera, make pressure measurements at them, and deploy Mini-BPRs on them
2024-06-29T22:54:47.795Z	45.9564256	-130.0138263	309.3	1530.9	Old pillows
2024-06-29T22:57:12.220Z	45.9567588	-130.0140659	309.9	1533.6	Jumbled lava flow
2024-06-29T22:57:54.020Z	45.9568682	-130.0141704	309.7	1534.1	With sea urchins!
2024-06-29T23:02:32.767Z	45.9575288	-130.0147571	310.2	1535.0	Sea star chilling
2024-06-29T23:03:13.366Z	45.9575956	-130.0149061	310.0	1534.3	Coming up on large flow
2024-06-29T23:08:22.807Z	45.9582972	-130.0156111	310.3	1536.1	Old sedimented pillows
2024-06-29T23:14:26.885Z	45.9587333	-130.0165658	289.5	1539.9	Coming up on lavas that are more lobate - still on the way to Site AX-501
2024-06-29T23:20:24.191Z	45.9592012	-130.0175810	290.1	1540.5	crab
2024-06-29T23:21:49.486Z	45.9592815	-130.0178256	289.7	1539.7	Overlapping lava lobes
2024-06-29T23:23:53.007Z	45.9594367	-130.0181566	290.3	1539.5	250 m to go to Site AX-501
2024-06-29T23:25:12.617Z	45.9595398	-130.0183812	291.1	1541.0	Back to pillows
2024-06-29T23:27:20.669Z	45.9597169	-130.0187681	291.3	1540.9	Strange wildlife
2024-06-29T23:27:53.407Z	45.9597368	-130.0188349	289.6	1541.9	Strange animal was a salp?
2024-06-29T23:29:47.028Z	45.9598820	-130.0192068	289.6	1553.4	Can't see seafloor because we are going downslope
2024-06-29T23:30:35.411Z	45.9599402	-130.0194486	290.0	1556.9	Jumbled flow
2024-06-29T23:33:05.271Z	45.9601281	-130.0199919	290.5	1560.3	Landing on large sedimented lineated and fractured sheet flow
2024-06-29T23:35:45.022Z	45.9600828	-130.0202078	290.0	1560.4	Waiting for the ship to deploy benchmark AX-501

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-29T23:40:08.728Z	45.9601155	-130.0192217	80.2	1556.2	Fractured jubled flow
2024-06-29T23:40:39.287Z	45.9601322	-130.0190239	85.0	1554.5	Collapse wall
2024-06-29T23:40:58.885Z	45.9601260	-130.0189326	88.9	1551.3	Big pillow flow
2024-06-29T23:44:33.679Z	45.9601305	-130.0188751	84.1	1548.2	Nice pillow outcrop - some drained, some elongated and some collapsed
2024-06-29T23:44:55.648Z	45.9601286	-130.0188899	84.3	1548.2	Waiting for the ship to deploy benchmark AX-501
2024-06-30T00:03:31.067Z	45.9601392	-130.0189265	83.9	1548.2	Red jelly passing by
2024-06-30T00:05:33.296Z	45.9601348	-130.0188997	84.4	1548.2	Benchmark AX-501 in being deployed from the ship
2024-06-30T00:08:05.336Z	45.9601325	-130.0188903	84.2	1548.2	Benchmark AX-501 in the water
2024-06-30T00:16:33.165Z	45.9601308	-130.0189106	83.9	1548.2	Benchmark AX-501 is 850 m deep
2024-06-30T00:24:03.255Z	45.9602427	-130.0189591	357.5	1550.8	Benchmark AX-501 on seafloor - heading to find it
2024-06-30T00:28:40.022Z	45.9612041	-130.0195445	346.0	1553.4	Big collapse on the port side
2024-06-30T00:31:05.960Z	45.9614313	-130.0197637	328.3	1557.5	Lineated sheet flow at the bottom of the collapse - sedimented
2024-06-30T00:33:58.477Z	45.9616629	-130.0204023	210.4	1555.3	Found benchmark AX-501 on bottom
2024-06-30T00:37:06.416Z	45.9616345	-130.0204257	136.6	1558.2	Going to detach the descent anchor
2024-06-30T00:42:54.468Z	45.9616415	-130.0204205	123.8	1559.1	Anchor is disconnected from benchmark AX-501
2024-06-30T00:45:04.319Z	45.9616384	-130.0204006	123.6	1559.1	We are now going to move the benchmark to a general area and then look for a more specific spot
2024-06-30T00:55:08.467Z	45.9615519	-130.0206060	228.1	1548.3	Going to move the benchmark about 100m to south to a nice spot.
2024-06-30T01:02:44.010Z	45.9607789	-130.0211111	182.1	1549.8	Going to go to the bottom with the glass balls and benchmark and have a look here. Want a flat spot.
2024-06-30T01:05:55.887Z	45.9608711	-130.0211115	182.2	1553.5	Stepping to the north about 10m to find a flat spot.
2024-06-30T01:06:22.583Z	45.9608800	-130.0211161	181.8	1553.3	Let it go.
2024-06-30T01:08:29.441Z	45.9609030	-130.0210456	238.9	1560.1	AX-501 landed on a nice flat spot
2024-06-30T01:09:00.459Z	45.9608872	-130.0210346	253.4	1559.9	The sediment here could be an issue. Bill wants bare rock.
2024-06-30T01:09:54.708Z	45.9609527	-130.0209922	357.5	1560.0	Nice and flat here.
2024-06-30T01:11:23.989Z	45.9608943	-130.0210736	230.2	1560.6	There it is. Going to check how much sediment is here and if we stir it up when we set the vehicle down. Looks OK.

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-30T01:12:01.171Z	45.9608950	-130.0210948	232.7	1561.6	Will release the balls and the ship will recover them. Then we will deploy Sentry. Then we will come back down and do the measurement.
2024-06-30T01:19:27.845Z	45.9608937	-130.0210842	244.9	1561.6	Shutting off beacons and restarting the Sonardyne.
2024-06-30T01:22:29.991Z	45.9608944	-130.0210590	244.9	1561.6	Glass balls will come up at 60m/minute.
2024-06-30T01:28:30.747Z	45.9608755	-130.0211016	244.7	1560.9	45 57.6536 N -130 1.2675 W Z=1560m. Benchmark AX-501.
2024-06-30T01:28:33.126Z	45.9608739	-130.0210999	244.8	1561.0	4K highlights start
2024-06-30T01:30:46.277Z	45.9610342	-130.0207156	245.3	1556.0	We will put a marker here when we get back to the seafloor. Right now we are getting out of the way of ship to recover glass balls. Then Sentry deployment.
2024-06-30T01:31:28.331Z	45.9610656	-130.0205525	244.5	1551.6	The next task when we return to the seafloor will be to deploy a marker and do the pressure measurement.
2024-06-30T01:41:39.207Z	45.9617265	-130.0185458	246.9	1505.8	Aiming to deploy Sentry after the benchmark pressure measurement here at AX-501. Still in water column waiting for balls to surface.
2024-06-30T02:00:14.827Z	45.9619015	-130.0181100	244.4	1480.0	Change of plans. When balls are on board we will deploy Sentry, then head down and do the pressure measurement.
2024-06-30T02:27:57.469Z	45.9629733	-130.0190867	249.8	1493.8	Glass balls are on board. We will be deploying Sentry next.
2024-06-30T02:37:05.167Z	45.9627495	-130.0190205	244.8	1492.7	Jason is starting to "mosey" back to the benchmark position.
2024-06-30T02:37:32.234Z	45.9627441	-130.0190046	243.9	1492.7	Sentry is still on deck, but looks nearly ready to launch.
2024-06-30T02:49:37.592Z	45.9623507	-130.0192832	185.2	1492.3	Sentry is in the water again. 3rd dive. Next we will do pressure measurement at new benchmark AX-501.
2024-06-30T02:55:55.476Z	45.9623261	-130.0193213	191.3	1494.1	Watch change: Scott - Susie - Kendal - Morgan
2024-06-30T03:26:30.234Z	45.9608979	-130.0210560	270.2	1560.1	Arrived at benchmark AX-501
2024-06-30T03:27:53.319Z	45.9609040	-130.0210937	273.9	1560.0	Placed marker 285 by AX-501
2024-06-30T03:33:21.216Z	45.9609040	-130.0211197	301.5	1561.7	Deploying Mini-BPR 2016-05 on AX-501.
2024-06-30T03:35:58.962Z	45.9608881	-130.0211040	301.5	1561.7	Mini-BPR 2014-13 was stuck in milk crate.
2024-06-30T03:36:10.036Z	45.9608896	-130.0211023	301.5	1561.7	It is unstuck now.
2024-06-30T03:36:39.200Z	45.9608905	-130.0211055	301.5	1561.7	The Mini-BPR slid slightly out of the green stocking though.
2024-06-30T03:36:55.035Z	45.9608927	-130.0211042	301.5	1561.7	Still okay to deploy at the next benchmark

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-30T03:37:25.200Z	45.9609033	-130.0211068	301.5	1561.7	Brittle stars on MPR
2024-06-30T03:40:32.815Z	45.9608952	-130.0211049	301.5	1561.7	start pressure measurement
2024-06-30T04:00:32.960Z	45.9608918	-130.0211051	301.6	1561.6	stop pressure measurement
2024-06-30T04:03:33.855Z	45.9608996	-130.0210212	12.3	1560.1	Transiting to AX-502 target site (benchmark not deployed there yet)
2024-06-30T05:06:17.950Z	45.9661765	-130.0131671	92.5	1531.9	Octopus
2024-06-30T05:07:10.765Z	45.9661778	-130.0131646	12.7	1532.5	Octopus
2024-06-30T05:07:26.932Z	45.9661636	-130.0131437	19.6	1532.8	Octopus
2024-06-30T05:07:36.904Z	45.9661570	-130.0131371	18.1	1533.1	Octopus
2024-06-30T05:07:45.451Z	45.9661591	-130.0131409	18.7	1533.2	4K highlights start
2024-06-30T05:07:59.498Z	45.9661607	-130.0131444	18.4	1533.5	Octopus
2024-06-30T05:14:29.906Z	45.9661555	-130.0131289	17.8	1532.4	4K highlights stop
2024-06-30T05:21:11.570Z	45.9666421	-130.0136703	257.0	1533.2	Arrived at AX-502 which has jjust been deployed from the ship
2024-06-30T05:21:19.523Z	45.9666255	-130.0136743	262.9	1533.1	Benchmark on side!
2024-06-30T05:21:31.473Z	45.9666064	-130.0136884	268.4	1532.9	rough landing!
2024-06-30T05:27:43.366Z	45.9667994	-130.0140514	310.3	1529.7	Looking for a spot to place AX-502
2024-06-30T05:30:06.747Z	45.9669112	-130.0140852	334.8	1530.3	The spot.
2024-06-30T05:30:15.692Z	45.9669030	-130.0140821	20.2	1530.2	Where AX-502 will sit
2024-06-30T05:39:09.508Z	45.9666362	-130.0136694	260.2	1532.5	Approaching sideways benchmark after locating new spot
2024-06-30T05:43:55.242Z	45.9666263	-130.0137356	245.2	1534.7	Figuring out how to grab the benchmark
2024-06-30T05:44:21.938Z	45.9666272	-130.0137386	244.5	1534.7	Picking up the benchmark
2024-06-30T05:46:19.023Z	45.9666210	-130.0137399	245.1	1534.8	Positioning benchmark to grab it with other manipulator
2024-06-30T05:47:57.925Z	45.9666150	-130.0137485	244.9	1534.7	Switched to manipulator cam
2024-06-30T05:49:34.462Z	45.9666133	-130.0137440	244.9	1534.7	Right manipulator working to grab the blue rope beneath the benchmark, releasing the dropweights. Benchmark no longer connected to chain.
2024-06-30T05:50:33.111Z	45.9666096	-130.0137478	245.2	1534.7	Blue release rope put in milk crate
2024-06-30T05:53:16.026Z	45.9666996	-130.0138360	310.6	1530.5	Moving benchmark AX-502 to new location
2024-06-30T05:56:09.738Z	45.9668880	-130.0139911	0.6	1531.7	Placement of AX-502 on less rugged topography north of the initial location

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-30T05:58:28.534Z	45.9668840	-130.0139761	359.3	1532.0	AX-502 placed on the seafloor
2024-06-30T06:09:58.864Z	45.9669000	-130.0139811	359.2	1531.9	Moving around weights in Jason basket to attempt to get to the marker
2024-06-30T06:11:51.678Z	45.9668923	-130.0139962	359.1	1531.9	Two markers twisted together. Oh no.
2024-06-30T06:13:21.058Z	45.9668748	-130.0140021	359.1	1531.9	Marker 219 is the marker on the seafloor at AX-502
2024-06-30T06:15:18.152Z	45.9669027	-130.0139790	359.1	1531.8	Retrieval of the second marker.
2024-06-30T06:18:26.339Z	45.9668896	-130.0139878	359.0	1531.8	Wrapped up the marker with a twisting technique and placing back in the basket
2024-06-30T06:27:55.102Z	45.9669035	-130.0140046	286.7	1531.8	Mini-BPR 2014-13 placed on AX-502
2024-06-30T06:29:54.774Z	45.9669004	-130.0139947	286.6	1531.8	Placement of MPR on benchmark AX-502
2024-06-30T06:34:20.125Z	45.9669094	-130.0139993	287.0	1531.7	start pressure measurement
2024-06-30T06:45:00.000Z	45.9669094	-130.0139993			Watch change: Jeff - Haley - Ava - Mia
2024-06-30T06:56:07.451Z	45.9668949	-130.0140015	286.9	1531.6	stop pressure measurement
2024-06-30T06:57:07.127Z	45.9668862	-130.0140039	286.0	1531.7	MPR back on Jason.
2024-06-30T06:59:17.192Z	45.9668020	-130.0138483	146.2	1530.0	Beginning transit to Benchmark AX-101.
2024-06-30T08:15:46.799Z	45.9552239	-130.0100821	144.3	1526.6	marker in sight
2024-06-30T08:16:13.801Z	45.9551812	-130.0100544	116.1	1526.9	approaching AX-101
2024-06-30T08:18:07.204Z	45.9551793	-130.0099738	237.5	1528.5	Arrived at Benchmark AX-101.
2024-06-30T08:20:42.833Z	45.9551721	-130.0099547	236.8	1528.5	MPR on benchmark.
2024-06-30T08:25:27.341Z	45.9551586	-130.0099619	237.1	1528.5	start pressure measurement
2024-06-30T08:45:28.213Z	45.9551758	-130.0099770	236.7	1528.4	stop pressure measurement
2024-06-30T08:58:28.419Z	45.9551786	-130.0100059	102.9	1524.4	Beginning transit to western edge of 2015 flow on the way to the AX-504 site.
2024-06-30T10:23:21.876Z	45.9625521	-129.9999409	255.2	1529.0	Collected piece of upper crust of hollow lobe in 2015 lava flow. 4K highlights start
2024-06-30T10:24:39.233Z	45.9625630	-129.9999628	256.8	1528.6	4K highlights stop
2024-06-30T10:26:21.002Z	45.9626102	-130.0000244	309.7	1528.8	Repositioned Jason slightly. 4K highlights start
2024-06-30T10:27:00.632Z	45.9625689	-130.0000327	273.8	1529.4	Collected pillow toe from 2015 lava flow
2024-06-30T10:28:49.631Z	45.9625894	-130.0000123	273.9	1529.5	4K highlights stop
2024-06-30T10:48:00.509Z	45.9629410	-130.0006216	294.6	1528.2	Kendall is driving the ROV
2024-06-30T10:48:06.050Z	45.9629510	-130.0006299	294.8	1528.2	Watch change: Bill - Susan - Kendal - Valentine

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-30T10:57:30.192Z	45.9635918	-130.0010142	256.4	1526.9	We are hanging out near the new site where we want to drop new benchmark AX-504 - waiting for ship to deploy benchmark
2024-06-30T11:01:48.525Z	45.9633305	-130.0013968	257.0	1529.8	wow
2024-06-30T11:07:47.900Z	45.9631818	-130.0020461	262.9	1527.5	Val drove the ROV
2024-06-30T11:07:54.676Z	45.9631817	-130.0020656	264.0	1528.3	Now Susan is
2024-06-30T11:12:28.582Z	45.9631711	-130.0028146	273.9	1528.0	On transit to new benchmark AX-504 target site
2024-06-30T11:12:47.024Z	45.9631702	-130.0028013	273.8	1527.9	Professional JASON pilot back in chair :)
2024-06-30T11:14:28.543Z	45.9632121	-130.0029906	273.2	1528.9	hole
2024-06-30T11:17:28.604Z	45.9631144	-130.0033086	359.0	1528.4	Pillar
2024-06-30T11:18:35.276Z	45.9631067	-130.0035314	293.0	1529.6	Pillars
2024-06-30T11:19:17.026Z	45.9631374	-130.0035904	287.6	1529.8	what is this
2024-06-30T11:19:33.229Z	45.9631355	-130.0035940	288.6	1530.0	Biology on pillar
2024-06-30T11:20:06.000Z	45.9631376	-130.0036038	281.0	1529.5	Large biology on lava pillar
2024-06-30T11:21:30.682Z	45.9629674	-130.0034446	181.0	1528.3	Arch
2024-06-30T11:21:40.586Z	45.9629409	-130.0034198	182.6	1528.5	Big hole
2024-06-30T11:22:21.451Z	45.9628044	-130.0035276	216.5	1529.3	Wall and arch
2024-06-30T11:24:43.020Z	45.9626345	-130.0038476	243.6	1528.7	Ledge
2024-06-30T11:25:44.124Z	45.9625368	-130.0038041	280.1	1526.1	Bill is driving
2024-06-30T11:31:23.682Z	45.9628645	-130.0042564	189.3	1530.6	Bill landed the ROV!
2024-06-30T11:38:19.322Z	45.9628637	-130.0042253	188.0	1530.6	Bill attempting to sample with manipulator arm!
2024-06-30T11:38:53.289Z	45.9628764	-130.0042190	187.9	1530.6	Big lobe crust - in situ - of course !
2024-06-30T11:39:10.519Z	45.9628710	-130.0042217	188.3	1530.6	"I'm so strong" -Bill
2024-06-30T11:41:53.765Z	45.9627849	-130.0041804	146.3	1527.7	Bill's adventure had ended
2024-06-30T11:42:01.564Z	45.9627577	-130.0041633	158.4	1527.5	Pro driver in seat again
2024-06-30T11:43:43.126Z	45.9625584	-130.0037558	159.4	1523.2	Coming off bottom
2024-06-30T11:44:58.773Z	45.9625579	-130.0038124	158.1	1506.0	Waiting on deployment of benchmark AX-504
2024-06-30T11:47:32.466Z	45.9624946	-130.0037194	158.2	1506.5	After this deployment there will be one more benchmark left to deploy from Atlantis

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-30T11:48:14.863Z	45.9624043	-130.0036546	158.1	1507.0	Holding at a depth of 1500m
2024-06-30T11:52:17.837Z	45.9624151	-130.0036869	158.5	1507.2	Benchmark AX-504 deployed from Atlantis; now waiting for it to reach the seafloor
2024-06-30T11:58:46.412Z	45.9623273	-130.0036327	229.4	1522.4	Moseying over to the location of newly deployed benchmark
2024-06-30T11:59:56.409Z	45.9624427	-130.0038209	329.2	1529.0	Fish
2024-06-30T12:04:18.468Z	45.9626899	-130.0040484	109.3	1529.4	Benchmark has hit bottom; Jason on the way to locate it
2024-06-30T12:05:45.481Z	45.9624858	-130.0035968	103.0	1530.0	Benchmark AX-504 in sight
2024-06-30T12:05:52.306Z	45.9624724	-130.0035807	92.3	1530.0	Large dust cloud
2024-06-30T12:06:49.694Z	45.9624162	-130.0034673	3.8	1527.9	The current location is not ideal: planning to move it out of this hole
2024-06-30T12:07:52.832Z	45.9624392	-130.0034786	2.7	1529.1	Rope tangled?
2024-06-30T12:08:36.843Z	45.9624322	-130.0034867	13.1	1529.3	Can't see pull pin so we will lift entire benchmark to access it
2024-06-30T12:11:06.973Z	45.9624579	-130.0035144	153.9	1532.9	Landed next to benchmark
2024-06-30T12:14:15.769Z	45.9624568	-130.0035157	153.5	1532.9	LIfting concrete benchmark with arm to access pull pin to release descent anchor
2024-06-30T12:16:35.045Z	45.9624595	-130.0035081	153.5	1532.9	Moving again
2024-06-30T12:16:56.522Z	45.9624570	-130.0035114	153.4	1532.9	Trying to find the pull pin
2024-06-30T12:17:37.426Z	45.9624578	-130.0035133	153.5	1532.9	Pull pin
2024-06-30T12:18:03.143Z	45.9624642	-130.0035126	153.4	1532.9	Pull pin pulled
2024-06-30T12:20:00.134Z	45.9624614	-130.0035084	154.3	1532.3	Off bottom
2024-06-30T12:23:10.498Z	45.9624709	-130.0034900	154.8	1529.2	Grabbing benchmark AX-504 rope to glass balls to move it
2024-06-30T12:26:11.630Z	45.9624767	-130.0034793	155.2	1528.9	Rope untangled
2024-06-30T12:26:37.850Z	45.9624773	-130.0034789	155.1	1528.8	Leaving benchmark to scout out potential flat locations better suited for placement
2024-06-30T12:28:38.114Z	45.9626233	-130.0039411	298.3	1529.3	Traveling northwest
2024-06-30T12:29:34.678Z	45.9627568	-130.0042479	297.9	1530.0	Possible location?
2024-06-30T12:30:50.792Z	45.9627888	-130.0042245	292.5	1531.2	On bottom
2024-06-30T12:32:05.705Z	45.9627881	-130.0042344	292.3	1531.2	Deploying marker at potential benchmark site
2024-06-30T12:34:23.785Z	45.9627817	-130.0042288	292.2	1531.2	Marker: 238
2024-06-30T12:35:21.254Z	45.9627835	-130.0042289	292.0	1531.2	Marker deployed

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-30T12:37:01.774Z	45.9627828	-130.0042209	292.2	1531.2	Cool starfish at marker
2024-06-30T12:37:28.784Z	45.9627829	-130.0042258	292.2	1531.2	TIme to go retrieve benchmark AX-504 and bring it over here
2024-06-30T12:38:17.088Z	45.9627824	-130.0042391	260.9	1528.5	On our way
2024-06-30T12:40:56.568Z	45.9625041	-130.0035425	127.7	1530.1	Back at benchmark
2024-06-30T12:43:38.904Z	45.9624645	-130.0035110	126.7	1527.7	Grabbing benchmark AX-504 rope to move it to flat location
2024-06-30T12:47:57.096Z	45.9624634	-130.0034960	126.8	1514.5	Bringing up benchmark and Jason from bottom to 19m off bottom
2024-06-30T12:48:15.987Z	45.9624897	-130.0035172	237.4	1515.0	Moving to flat location with marker 238
2024-06-30T12:55:33.064Z	45.9627331	-130.0042304	302.8	1517.3	jelly
2024-06-30T12:57:04.230Z	45.9627255	-130.0042230	303.0	1524.6	Marker in sight
2024-06-30T12:57:13.317Z	45.9627282	-130.0042193	302.8	1524.4	Bringing Jason and benchmark down
2024-06-30T12:57:58.940Z	45.9627151	-130.0041929	302.9	1524.9	Benchmark AX-504 landed
2024-06-30T12:59:11.426Z	45.9627296	-130.0041644	271.2	1528.9	Assessing placement
2024-06-30T13:09:29.303Z	45.9627199	-130.0042403	100.2	1531.4	Going to move benchmark AX-504 to new location
2024-06-30T13:11:51.190Z	45.9627156	-130.0042358	100.2	1531.4	Moving AX-504
2024-06-30T13:13:20.731Z	45.9627156	-130.0042489	115.2	1531.4	Benchmark AX-504 placement escapades
2024-06-30T13:15:21.874Z	45.9627184	-130.0042516	115.6	1531.4	Moving once more
2024-06-30T13:17:08.885Z	45.9627198	-130.0042513	119.2	1531.4	Foot of benchmark is not level
2024-06-30T13:21:41.855Z	45.9627306	-130.0042173	14.1	1531.7	Moving to even more flat portion of the lobe
2024-06-30T13:23:03.051Z	45.9627284	-130.0042086	13.2	1531.7	Benchmark AX-504 placed; we need to check all feet
2024-06-30T13:24:55.206Z	45.9627283	-130.0042135	13.2	1531.7	Current weather conditions are foggy; we may have to wait to release glass balls from AX-504
2024-06-30T13:29:54.287Z	45.9627240	-130.0042151	60.7	1531.6	Placing MPR
2024-06-30T13:30:39.525Z	45.9627268	-130.0042136	60.7	1531.6	MPR placed
2024-06-30T13:31:19.864Z	45.9627279	-130.0042144	60.7	1531.6	Brittle star hitchhiker
2024-06-30T13:34:06.989Z	45.9627384	-130.0042160	60.7	1531.6	start pressure measurement
2024-06-30T13:38:32.854Z	45.9627281	-130.0042128	60.7	1531.7	Benchmark AX-504 position Latitude: 45 57.7648 Longitude: -130 00.2526 Depth: 1532m

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-30T13:43:16.649Z	45.9627301	-130.0042165	60.7	1531.7	Urchins
2024-06-30T13:44:01.891Z	45.9627302	-130.0042195	60.7	1531.7	4K highlights start
2024-06-30T13:47:48.492Z	45.9627187	-130.0042167	60.7	1531.7	4K highlights stop
2024-06-30T13:54:30.615Z	45.9627317	-130.0042055	60.7	1531.7	stop pressure measurement
2024-06-30T13:54:45.174Z	45.9627345	-130.0042087	60.7	1531.7	We will not be placing Mini-BPR here until later
2024-06-30T13:56:57.275Z	45.9627349	-130.0042178	60.7	1531.8	Still foggy so we will not release glass balls AX-504 at this time; also we will not be placing the Mini-BPR until later when we release the glass balls when it is less foggy
2024-06-30T13:57:08.599Z	45.9627353	-130.0042152	60.7	1531.8	Placing MPR in holster
2024-06-30T13:57:17.812Z	45.9627364	-130.0042132	60.7	1531.8	Strapping in
2024-06-30T13:58:13.393Z	45.9627462	-130.0042266	60.4	1531.2	Benchmark AX-504 position
2024-06-30T13:58:18.822Z	45.9627475	-130.0042310	60.7	1530.7	Leaving bottom
2024-06-30T13:59:23.453Z	45.9627745	-130.0042323	2.4	1530.3	Transit to next location for AX-503 deployment (2-3h time)
2024-06-30T13:59:27.591Z	45.9627785	-130.0042327	347.2	1530.3	1800m
2024-06-30T13:59:34.111Z	45.9627866	-130.0042372	353.2	1530.0	Distance
2024-06-30T13:59:53.725Z	45.9628168	-130.0042797	320.7	1529.8	Going from AX-504 to AX-503
2024-06-30T14:01:04.218Z	45.9628907	-130.0044408	319.9	1529.9	On our way to AX-503 target deployment position. About 3 hours.
2024-06-30T14:09:50.025Z	45.9640212	-130.0049082	319.0	1536.8	1150m to next benchmark location.
2024-06-30T14:13:00.308Z	45.9640792	-130.0052851	282.4	1537.6	Sponge?
2024-06-30T14:18:53.332Z	45.9648915	-130.0053780	336.9	1541.6	Pillow flow on the way to Site AX-503
2024-06-30T14:21:14.919Z	45.9652348	-130.0056728	349.2	1541.7	Contact
2024-06-30T14:24:56.491Z	45.9656202	-130.0063303	307.0	1542.4	1350 m to go to AX-503 site
2024-06-30T14:29:16.751Z	45.9660782	-130.0069909	312.3	1538.2	Coming up on inflated lava flow
2024-06-30T14:30:22.482Z	45.9662319	-130.0071029	329.3	1530.2	Series of parallel fissures
2024-06-30T14:33:05.813Z	45.9666658	-130.0073567	329.3	1531.9	Big fissure
2024-06-30T14:42:48.226Z	45.9677910	-130.0085435	319.7	1536.1	Still in transit to Site AX-503 - nice contact
2024-06-30T14:43:10.323Z	45.9678188	-130.0086073	319.3	1534.2	Flying over on sheet flow

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-30T14:44:53.195Z	45.9678704	-130.0087010	317.2	1534.9	Contact sheet flow / lobate lavas (some lobes are collapsed)
2024-06-30T14:45:00.000Z	45.9678704	-130.0087010			Watch change: Scott - Suzy - Kendall - Morgan
2024-06-30T14:45:56.714Z	45.9680031	-130.0088730	316.6	1534.7	Large flat flow
2024-06-30T15:51:29.862Z	45.9742903	-130.0171289	152.1	1571.8	Dropping benchmark AX-503 from ship
2024-06-30T15:52:58.298Z	45.9742489	-130.0171231	151.5	1571.8	Dropped benchmark AX-503 mooring from ship
2024-06-30T16:11:18.988Z	45.9748874	-130.0164628	110.8	1573.6	Jason approaching AX-503 on bottom
2024-06-30T16:19:55.237Z	45.9750857	-130.0169123	270.4	1575.1	Scouting a more optimal location for AX-503
2024-06-30T16:22:34.073Z	45.9751900	-130.0173704	312.8	1575.7	Not seeing any sheet flows
2024-06-30T16:24:41.624Z	45.9752243	-130.0174126	89.6	1578.3	New location for AX-503 determined. mostly flat and stable.
2024-06-30T16:25:03.422Z	45.9752077	-130.0173997	126.7	1576.9	Returning to retrieve AX-503
2024-06-30T16:31:40.149Z	45.9748898	-130.0164124	63.6	1573.9	Lifting AX-503 and taking it to new location
2024-06-30T16:40:22.596Z	45.9752354	-130.0174089	113.0	1578.4	Benchmark AX-503 placed on seafloor
2024-06-30T16:43:29.768Z	45.9752397	-130.0174125	112.1	1578.4	Decided to not take an MPR measurement yet - will release glass balls first - then return later to take MPR measurement
2024-06-30T16:48:52.416Z	45.9752559	-130.0174037	204.3	1578.3	Moving weights in basket to retrieve marker for benchmark AX-503
2024-06-30T16:49:51.791Z	45.9752538	-130.0174258	204.2	1578.3	Marker 287 placed next to AX-503
2024-06-30T16:56:17.183Z	45.9752463	-130.0173854	2.0	1578.2	Releasing the glass balls from AX-503
2024-06-30T17:07:18.391Z	45.9747421	-130.0146091	77.0	1569.7	Waiting for ship to retrieve glass balls at surface
2024-06-30T18:24:30.824Z	45.9752499	-130.0173808	90.4	1576.4	Jason back on bottom and arrived back at AX-503
2024-06-30T18:28:38.928Z	45.9752411	-130.0173738	101.9	1578.0	Mini-BPR 2016-04 placed on AX-503
2024-06-30T18:32:50.060Z	45.9752436	-130.0173848	104.5	1578.0	Placing MPR on AX-503
2024-06-30T18:45:00.000Z	45.9752436	-130.0173848			Watch change: Jeff - Haley - Ava - Mia
2024-06-30T18:51:36.569Z	45.9752493	-130.0173781	104.9	1577.9	start pressure measurement
2024-06-30T18:51:59.220Z	45.9752494	-130.0173752	104.8	1577.9	MPR measurement started at 18:49
2024-06-30T19:11:19.572Z	45.9752345	-130.0173718	104.8	1577.8	stop pressure measurement
2024-06-30T19:17:44.838Z	45.9751031	-130.0174663	173.3	1574.8	Positioning Jason and ship for Sentry recovery - then will transit to AX-502
2024-06-30T22:23:19.061Z	45.9669508	-130.0141222	103.5	1530.2	Benchmark AX-502 in sight (with glass balls)

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-06-30T22:24:15.333Z	45.9669211	-130.0140186	48.7	1530.5	arrived at AX-502
2024-06-30T22:32:12.195Z	45.9669702	-130.0140203	281.4	1531.5	4K highlights start
2024-06-30T22:33:40.216Z	45.9669565	-130.0140205	281.5	1531.4	Jason releasing the glass balls for the ship to recover
2024-06-30T22:33:53.117Z	45.9669562	-130.0140209	281.5	1531.4	4K highlights stop
2024-06-30T22:50:27.084Z	45.9665525	-130.0132022	175.4	1438.8	Glass balls should be at the surface at any time.
2024-06-30T22:55:12.167Z	45.9661323	-130.0131108	175.2	1438.8	Watch change: Bill - Susan - Kendal - Valentine
2024-06-30T23:14:22.667Z	45.9672256	-130.0162423	322.8	1438.9	The glass balls are on board. Will head down to AX-502 to make pressure measurement next.
2024-06-30T23:19:20.024Z	45.9669098	-130.0163791	98.0	1533.3	Back on the seafloor. Yippee!
2024-06-30T23:21:27.128Z	45.9669387	-130.0157138	90.1	1534.2	Passing over inflated sheet flow and now over lobates and pillows.
2024-06-30T23:23:13.862Z	45.9669449	-130.0152211	88.0	1533.6	The AUV map is pretty darn right on.
2024-06-30T23:27:56.163Z	45.9669362	-130.0142019	90.2	1529.6	Marker in sight.
2024-06-30T23:28:14.533Z	45.9669352	-130.0141236	86.3	1530.0	Benchmark AX-502 straight ahead.
2024-06-30T23:28:46.745Z	45.9669274	-130.0140377	24.9	1530.0	Zooming in on the benchmark.
2024-06-30T23:29:16.589Z	45.9669349	-130.0140211	341.5	1530.3	Marker 219 and Benchmark AX-502.
2024-06-30T23:31:01.322Z	45.9669466	-130.0140185	287.0	1532.0	Taking the MPR out of the holster and placing it on benchmark AX-502.
2024-06-30T23:32:59.902Z	45.9669461	-130.0140209	285.3	1531.9	Mini-BPR 2014-13 deployed on the benchmark (for the next 2 years).
2024-06-30T23:35:19.718Z	45.9669454	-130.0140166	284.1	1532.0	That same brittle star is still on the MPR - riding around the caldera.
2024-06-30T23:36:31.047Z	45.9669515	-130.0140188	285.1	1531.9	start pressure measurement
2024-06-30T23:36:58.834Z	45.9669475	-130.0140261	285.8	1532.0	AX-502 pressure measurement.
2024-06-30T23:56:15.551Z	45.9669476	-130.0140057	288.0	1532.1	stop pressure measurement
2024-06-30T23:56:52.443Z	45.9669516	-130.0140096	286.7	1532.2	Finishing up at AX-502.
2024-06-30T23:57:31.065Z	45.9669413	-130.0140301	287.0	1532.2	Buttoning up the MPR in the holster.
2024-07-01T00:00:18.493Z	45.9669545	-130.0140132	293.5	1527.0	Heading off to the next benchmark: AX-504, to the southeast about 900m.
2024-07-01T00:00:50.296Z	45.9669549	-130.0140093	294.6	1527.0	Doing some housekeeping. Putting the blue cord in the stbd biobox.
2024-07-01T00:07:45.742Z	45.9666431	-130.0134506	127.0	1531.1	Pretty jumbled up seafloor. Heavily sedimented.
2024-07-01T00:12:50.327Z	45.9665294	-130.0128782	127.0	1532.7	800 m to go to benchmark AX-504

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-07-01T00:14:07.957Z	45.9664781	-130.0127905	126.2	1531.4	Big fissures in sight
2024-07-01T00:16:04.823Z	45.9663720	-130.0125954	128.8	1532.0	Big fissure
2024-07-01T00:16:52.300Z	45.9663307	-130.0124798	130.5	1532.1	Fractured jumbled sheet flow - very chaotic
2024-07-01T00:23:20.131Z	45.9661751	-130.0115865	107.2	1536.7	Now flying over sedimented lobate flows
2024-07-01T00:25:02.957Z	45.9660696	-130.0113083	107.4	1535.4	Approaching collapsed jumbled flow
2024-07-01T00:25:42.211Z	45.9660686	-130.0111672	105.5	1535.3	Flat sedimented lineated sheet flow
2024-07-01T00:26:34.220Z	45.9660485	-130.0109878	107.3	1535.3	Approaching other jumbled flow that is collapsed -> rim ?
2024-07-01T00:27:24.301Z	45.9660295	-130.0109245	106.8	1535.3	Back over large lava lobes
2024-07-01T00:29:04.125Z	45.9659499	-130.0105452	125.4	1535.4	Ropy lava flow
2024-07-01T00:32:47.973Z	45.9656576	-130.0097693	122.5	1537.7	Contact
2024-07-01T00:33:48.915Z	45.9655907	-130.0095479	122.4	1538.7	Other contact - lobate over more sedimented sheet flow
2024-07-01T00:39:41.480Z	45.9654200	-130.0088603	124.6	1541.5	4K highlights start
2024-07-01T00:39:51.228Z	45.9653993	-130.0088047	125.2	1540.9	4K highlights stop
2024-07-01T00:47:01.626Z	45.9646753	-130.0070764	123.9	1538.2	Flying over less sedimented pillows - 300 m to go to AX-504
2024-07-01T00:48:04.174Z	45.9645857	-130.0068603	123.9	1539.0	Lobate lavas
2024-07-01T00:52:00.346Z	45.9640151	-130.0066506	166.7	1537.9	Lava whorl by pillow
2024-07-01T01:02:53.532Z	45.9632238	-130.0051384	125.3	1530.9	100m to AX-504
2024-07-01T01:07:36.694Z	45.9628849	-130.0052313	180.3	1530.6	Positioning Jason to a better approach to the benchmark to release balls
2024-07-01T01:09:46.368Z	45.9627645	-130.0052629	200.1	1532.1	Jelly
2024-07-01T01:09:59.118Z	45.9627675	-130.0052757	200.3	1532.0	Crashed jellly on seafloor
2024-07-01T01:13:08.762Z	45.9628375	-130.0049716	176.0	1529.8	Octopus?
2024-07-01T01:13:20.548Z	45.9628423	-130.0049719	177.1	1528.8	4K highlights start
2024-07-01T01:13:29.742Z	45.9628460	-130.0049758	177.4	1528.0	Octopus!
2024-07-01T01:14:04.522Z	45.9628592	-130.0049864	175.5	1527.9	4K highlights stop
2024-07-01T01:17:21.170Z	45.9628111	-130.0045855	124.4	1530.2	Still manuvering toward AX-504.
2024-07-01T01:18:17.149Z	45.9627319	-130.0044044	84.5	1528.6	There is the benchmark and glass balls at AX-504.

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-07-01T01:20:39.940Z	45.9626828	-130.0043133	64.8	1530.0	First task is to release the glass balls so that we can retrieve them before the sun sets.
2024-07-01T01:23:09.116Z	45.9627533	-130.0042407	6.8	1531.4	6 new benchmarks this cruise. 14 old ones. 20 benchmarks total summer 2024.
2024-07-01T01:24:43.801Z	45.9627889	-130.0042211	5.9	1531.7	Lining up to release the balls.
2024-07-01T01:28:11.398Z	45.9628040	-130.0042775	58.3	1532.3	Getting the left manipulator out to stabalize the benchmark when Jason releases the glass balls.
2024-07-01T01:29:44.704Z	45.9627547	-130.0042909	58.5	1532.3	Tilted the benchmark in the attempt to stabalize the benchmark...
2024-07-01T01:33:13.440Z	45.9627730	-130.0043150	58.9	1532.4	Glass balls released by Jason.
2024-07-01T01:34:06.718Z	45.9627193	-130.0043743	128.1	1526.0	We will wait to do the pressure measurement at AX-504 after the floats are on boqard the ship.
2024-07-01T02:15:38.922Z	45.9621311	-130.0042998	201.9	1437.1	Glass balls on board.
2024-07-01T02:16:06.876Z	45.9621780	-130.0043043	201.5	1437.2	Heading back to AX-504 benchmark to make pressure measurement.
2024-07-01T02:23:50.837Z	45.9627039	-130.0041342	345.5	1526.7	Benchmark in the distance.
2024-07-01T02:27:26.807Z	45.9627804	-130.0042919	72.3	1532.6	Housekeeping. Stowing the blue pull-pin line.
2024-07-01T02:28:56.968Z	45.9627693	-130.0042579	72.3	1532.6	Retrieving the MPR from the holster and placing it on benchmark AX=504.
2024-07-01T02:29:57.834Z	45.9627597	-130.0042926	72.3	1532.6	start pressure measurement
2024-07-01T02:30:32.172Z	45.9627729	-130.0042878	72.3	1532.6	AX-504. Will do reading and then deploy the Mini-BPR here for 2 years.
2024-07-01T02:43:49.528Z	45.9627792	-130.0042638	72.3	1532.6	Watch change: Scott - Susie - Kendal - Morgan
2024-07-01T02:50:40.487Z	45.9627871	-130.0042420	72.3	1532.6	stop pressure measurement
2024-07-01T02:51:26.114Z	45.9627773	-130.0042709	72.3	1532.6	MPR back to holster
2024-07-01T02:54:18.228Z	45.9627684	-130.0042646	72.3	1532.6	Placing Min-BPR 2014-09 on AX-504
2024-07-01T02:57:50.963Z	45.9628278	-130.0042969	20.6	1529.4	Transit to AX-101
2024-07-01T03:35:57.789Z	45.9599599	-130.0063045	207.2	1533.2	Collapsed lobes
2024-07-01T03:51:00.111Z	45.9585764	-130.0074547	278.8	1514.5	canyon
2024-07-01T04:17:46.585Z	45.9552026	-130.0098927	245.7	1528.8	Approaching benchmark AX-101
2024-07-01T04:21:58.698Z	45.9551945	-130.0100178	231.5	1530.3	Placing MPR on benchmark AX-101
2024-07-01T04:22:52.088Z	45.9552026	-130.0100271	231.6	1530.2	start pressure measurement

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-07-01T04:42:11.552Z	45.9552075	-130.0100160	232.1	1530.2	stop pressure measurement
2024-07-01T04:43:59.915Z	45.9552055	-130.0100133	232.1	1530.2	MPR back in the holster.
2024-07-01T04:44:51.529Z	45.9552277	-130.0099966	264.1	1527.6	Transit to AX-501
2024-07-01T05:59:40.636Z	45.9608968	-130.0209508	296.6	1556.4	Approaching benchmark AX-501
2024-07-01T06:02:09.418Z	45.9609278	-130.0211296	302.1	1561.3	Arrived at benchmark AX-501
2024-07-01T06:03:20.030Z	45.9609210	-130.0211392	302.1	1561.3	Placing MPR on benchmark AX-501
2024-07-01T06:06:26.010Z	45.9609250	-130.0211365	302.0	1561.3	start pressure measurement
2024-07-01T06:26:17.794Z	45.9609230	-130.0211498	299.8	1561.1	stop pressure measurement
2024-07-01T06:27:31.640Z	45.9609220	-130.0211494	300.0	1561.1	Placing MPR back in holder.
2024-07-01T06:29:00.287Z	45.9609562	-130.0211769	301.2	1558.9	Transiting to AX-502
2024-07-01T06:45:00.000Z					Watch change: Jeff - Haley - Ava - Mia
2024-07-01T07:28:33.616Z	45.9669376	-130.0140141	289.8	1531.8	arrived at benchmark AX-502
2024-07-01T07:28:53.714Z	45.9669417	-130.0140161	289.5	1531.8	Placing the MPR on AX-502
2024-07-01T07:30:27.967Z	45.9669393	-130.0140166	290.1	1531.7	start pressure measurement
2024-07-01T07:51:13.905Z	45.9669447	-130.0140168	290.0	1531.5	stop pressure measurement
2024-07-01T07:52:15.049Z	45.9669422	-130.0140210	288.8	1531.6	taking the MPR off AX-502
2024-07-01T07:54:06.284Z	45.9669459	-130.0140134	296.9	1530.9	Beginning transit to AX-503
2024-07-01T08:59:22.581Z	45.9751957	-130.0173961	355.6	1574.2	marker in sight
2024-07-01T09:00:47.606Z	45.9752548	-130.0174496	54.0	1575.8	arrived at benchmark AX-503
2024-07-01T09:02:50.211Z	45.9752769	-130.0174627	99.7	1577.3	placing the MPR on AX-503
2024-07-01T09:04:05.803Z	45.9752688	-130.0174632	99.6	1577.3	start pressure measurement
2024-07-01T09:29:07.660Z	45.9752700	-130.0174633	99.4	1577.2	stop pressure measurement
2024-07-01T09:31:13.963Z	45.9752729	-130.0174620	99.4	1577.2	retrieving the MPR
2024-07-01T09:33:16.335Z	45.9753962	-130.0173940	355.7	1574.5	Transiting to AX-504
2024-07-01T10:46:29.210Z	45.9666169	-130.0087626	145.5	1528.7	Watch change: Bill - Susan - Kendal - Valentine
2024-07-01T10:57:15.280Z	45.9652199	-130.0074204	145.5	1535.9	Flying over pillow lavas - 350 m to go
2024-07-01T11:14:38.786Z	45.9627856	-130.0043457	106.4	1527.1	Free breakfast for Bill! Benchmark AX-504 in sight!

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-07-01T11:16:03.536Z	45.9627680	-130.0042559	69.3	1530.4	Getting in position for MPR measurement
2024-07-01T11:16:37.318Z	45.9627677	-130.0042571	69.4	1530.5	Removing bungee to deploy MPR on benchmark
2024-07-01T11:17:23.693Z	45.9627646	-130.0042515	69.4	1530.5	Placing MPR on benchmark AX-504
2024-07-01T11:18:28.740Z	45.9627672	-130.0042604	69.4	1530.5	MPR positioned on benchmark AX-504
2024-07-01T11:19:01.530Z	45.9627676	-130.0042544	69.4	1530.5	start pressure measurement
2024-07-01T11:38:55.792Z	45.9627783	-130.0042524	69.4	1530.5	stop pressure measurement
2024-07-01T11:39:35.852Z	45.9627779	-130.0042472	69.4	1530.5	AX-504 measurement completed.
2024-07-01T11:39:46.371Z	45.9627794	-130.0042486	69.4	1530.5	Stowing the MPR now.
2024-07-01T11:42:39.708Z	45.9627594	-130.0043171	213.4	1527.5	Leaving AX-504. Bye bye.
2024-07-01T11:43:31.007Z	45.9627057	-130.0043408	205.8	1527.5	Next stop AX-101- the center of the caldera.
2024-07-01T11:52:36.606Z	45.9621372	-130.0045792	195.4	1531.7	Crab zoom.
2024-07-01T11:54:16.302Z	45.9620027	-130.0045783	204.0	1531.0	Crabs and crinoids on this older lava flow. Seastars and sponges, anemones.
2024-07-01T11:57:28.121Z	45.9617228	-130.0048642	204.2	1532.3	Sediments +++
2024-07-01T11:57:55.828Z	45.9616740	-130.0049006	204.1	1532.9	Ropy lava flow
2024-07-01T11:58:21.811Z	45.9616251	-130.0049569	203.7	1531.5	800 m to go to benchmark AX-101
2024-07-01T12:03:51.991Z	45.9611951	-130.0056934	198.9	1533.7	Large sedimented lineated sheetflow
2024-07-01T12:06:06.887Z	45.9608580	-130.0057219	198.9	1532.9	Coming up on collapse wall
2024-07-01T12:06:35.436Z	45.9607730	-130.0057536	194.9	1531.3	Collapsed lobes
2024-07-01T12:12:48.034Z	45.9600967	-130.0061763	156.4	1530.9	Collapsed lobes
2024-07-01T12:14:08.893Z	45.9599669	-130.0062814	193.2	1532.0	Double garage
2024-07-01T12:15:24.235Z	45.9598680	-130.0064406	245.4	1531.3	Small pillars
2024-07-01T12:16:32.733Z	45.9597008	-130.0064264	214.1	1532.7	Pillars !!!
2024-07-01T12:18:31.530Z	45.9594298	-130.0065716	212.0	1531.6	pilars pillars pillars
2024-07-01T12:20:49.225Z	45.9591584	-130.0069988	228.5	1531.1	Ropy lava flow
2024-07-01T12:21:43.087Z	45.9590124	-130.0071447	230.3	1523.7	Jumbled lava
2024-07-01T12:23:02.007Z	45.9587687	-130.0073148	218.5	1513.7	Big fissure
2024-07-01T12:23:18.919Z	45.9587198	-130.0073446	214.7	1511.4	Flatter sheet flow at the top

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-07-01T12:23:48.968Z	45.9586071	-130.0073999	204.8	1508.3	Big big big fissure
2024-07-01T12:24:12.770Z	45.9585085	-130.0074415	206.0	1509.8	Bathymetry is well correlated with visual observations
2024-07-01T12:26:16.081Z	45.9581750	-130.0077867	208.2	1510.2	Big big fissure AGAIN
2024-07-01T12:28:24.925Z	45.9578886	-130.0080967	231.1	1517.5	300 m to go to benchmark AX-101
2024-07-01T12:32:59.090Z	45.9574515	-130.0088304	203.9	1522.9	Sheet flows
2024-07-01T12:36:38.275Z	45.9570259	-130.0092455	192.0	1523.3	Fissure
2024-07-01T12:47:24.403Z	45.9552151	-130.0098941	274.8	1525.1	AX-101 spotted
2024-07-01T12:48:46.133Z	45.9552089	-130.0099869	236.5	1528.8	Landed next to benchmark
2024-07-01T12:49:19.316Z	45.9552180	-130.0099857	236.4	1528.8	Getting out MPR
2024-07-01T12:50:03.071Z	45.9552221	-130.0099961	236.5	1528.8	Placing MPR on benchmark AX-101
2024-07-01T12:50:46.378Z	45.9552239	-130.0099973	236.5	1528.8	Placed
2024-07-01T12:51:02.859Z	45.9552227	-130.0099970	236.5	1528.8	MPR drop (said like mic drop)
2024-07-01T12:52:04.148Z	45.9552198	-130.0099919	236.5	1528.8	start pressure measurement
2024-07-01T12:53:51.400Z	45.9552197	-130.0099927	236.5	1528.8	"MPR drop" clarification: means we landed it in the slot on the first try and it looked super cool"
2024-07-01T13:12:08.251Z	45.9552174	-130.0100017	236.5	1528.9	stop pressure measurement
2024-07-01T13:12:38.227Z	45.9552240	-130.0099933	236.6	1528.9	Done with the final MPR measurement of the monster dive!
2024-07-01T13:12:48.089Z	45.9552282	-130.0099893	236.6	1528.9	Grabbing MPR
2024-07-01T13:13:48.459Z	45.9552384	-130.0099942	236.6	1528.9	Securing MPR in holster
2024-07-01T13:14:11.408Z	45.9552357	-130.0099989	236.5	1528.9	Secured
2024-07-01T13:14:44.006Z	45.9552354	-130.0099886	238.1	1527.4	On our way to the elevator
2024-07-01T13:16:31.580Z	45.9553641	-130.0102639	294.8	1526.6	300m to elevator (approx 30 min)
2024-07-01T13:18:36.932Z	45.9554786	-130.0108096	294.7	1526.0	Sheet flows
2024-07-01T13:18:44.181Z	45.9554816	-130.0108361	294.0	1525.2	With cracks
2024-07-01T13:20:26.669Z	45.9555407	-130.0111760	293.9	1523.8	Parallel fissures
2024-07-01T13:20:54.002Z	45.9555630	-130.0112538	234.6	1524.1	Hinge of inflated flow
2024-07-01T13:22:25.814Z	45.9556789	-130.0114009	292.0	1528.4	Pillows

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-07-01T13:32:36.153Z	45.9562590	-130.0135255	302.8	1527.6	Elevator in sight
2024-07-01T13:33:10.843Z	45.9563167	-130.0135754	300.4	1528.2	Elevator will be going up to the ship empty
2024-07-01T13:35:21.846Z	45.9563512	-130.0136377	223.8	1530.0	Bioboxes
2024-07-01T13:36:18.546Z	45.9563481	-130.0136187	218.5	1528.7	Floating by the top of elevator
2024-07-01T13:37:23.877Z	45.9563753	-130.0136402	219.3	1527.5	Picking up and spinning the elevator to access the other side of it
2024-07-01T13:37:42.503Z	45.9563746	-130.0136342	218.8	1529.2	Elevator floating
2024-07-01T13:37:52.940Z	45.9563731	-130.0136273	217.0	1528.4	Elevator on bottom again
2024-07-01T13:38:20.348Z	45.9563629	-130.0136128	256.0	1529.2	Panning around elevator
2024-07-01T13:38:48.985Z	45.9563526	-130.0136207	342.4	1529.7	Positioning on southeast side of elevator
2024-07-01T13:39:09.083Z	45.9563522	-130.0136400	334.2	1531.2	On bottom
2024-07-01T13:40:06.090Z	45.9563619	-130.0136395	333.2	1531.3	Removing weights from elevator
2024-07-01T13:40:35.171Z	45.9563725	-130.0136174	333.7	1531.2	Elevator not floating yet
2024-07-01T13:41:24.785Z	45.9563692	-130.0136270	333.4	1531.2	Enough weight has been removed for elevator to come to surface now
2024-07-01T13:42:07.691Z	45.9563804	-130.0136061	318.9	1529.2	Elevator off bottom
2024-07-01T13:44:46.943Z	45.9563241	-130.0136567	333.4	1530.3	Pulling string
2024-07-01T13:45:42.251Z	45.9562838	-130.0135931	330.3	1529.2	Elevator off bottom and going to surface
2024-07-01T13:46:24.994Z	45.9561583	-130.0135744	145.3	1528.0	We will now wait to recover elevator at surface on the Atlantis
2024-07-01T13:48:50.930Z	45.9555670	-130.0133630	148.9	1526.5	Lots of sediment on old flows
2024-07-01T14:06:46.123Z	45.9546518	-130.0137424	333.4	1421.0	Floating at 1420m depth waiting for elevator to reach surface
2024-07-01T14:43:52.006Z	45.9560175	-130.0150408	350.6	1424.4	Elevator on deck
2024-07-01T14:45:00.000Z	45.9560175	-130.0150408			Watch change: Scott - Suzy - Kendall - Morgan
2024-07-01T14:46:31.016Z	45.9560637	-130.0150792	353.7	1431.9	On transit to Trevi vent (2600m) to recover and deploy MISO temp probes (last task for this dive)
2024-07-01T14:46:37.079Z	45.9560658	-130.0150808	353.3	1433.9	Expect a long transit
2024-07-01T14:47:34.079Z	45.9561065	-130.0150882	353.0	1451.0	Trevi is in the southeast of the caldera, and we will be travelling in that direction
2024-07-01T15:09:23.671Z	45.9547730	-130.0118219	115.6	1527.0	Skate
2024-07-01T15:10:39.103Z	45.9547608	-130.0117042	115.0	1526.9	Highlight collected

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-07-01T15:35:47.184Z	45.9531643	-130.0068205	115.2	1526.4	Blobfish
2024-07-01T15:35:55.470Z	45.9531625	-130.0068155	114.4	1526.6	Puffer?
2024-07-01T16:57:23.837Z	45.9476719	-129.9895245	114.5	1521.5	lava bridge
2024-07-01T17:07:42.926Z	45.9470275	-129.9876148	130.5	1523.0	Bathrub rings. Haggus rock
2024-07-01T17:15:07.603Z	45.9461132	-129.9860895	93.3	1519.2	Cave
2024-07-01T17:15:34.661Z	45.9460904	-129.9860423	71.5	1520.4	more cave
2024-07-01T17:15:47.676Z	45.9460787	-129.9860212	65.2	1520.3	Lobe drained out
2024-07-01T17:24:55.180Z	45.9462383	-129.9839195	66.9	1517.1	Debris
2024-07-01T17:26:06.442Z	45.9462603	-129.9838040	91.8	1515.2	Arrived at Trevi vent
2024-07-01T17:28:47.050Z	45.9462675	-129.9837977	174.3	1517.5	Anhydrate vent
2024-07-01T17:35:01.688Z	45.9462758	-129.9837608	299.0	1517.4	Removal of temperature probe from vent
2024-07-01T17:35:38.983Z	45.9462749	-129.9837500	299.0	1517.4	Recovered temp probe MISO-101
2024-07-01T17:50:57.218Z	45.9462655	-129.9837658	298.6	1517.3	Continuing to take temperature measurements with Jason probe. Highest so far has been 225 C
2024-07-01T17:51:55.472Z	45.9462843	-129.9837652	298.6	1517.3	Broke 230 C
2024-07-01T17:53:51.487Z	45.9462805	-129.9837670	298.6	1517.3	Temperature max logged as 231 C at Trevi anhydrate vent
2024-07-01T17:56:04.056Z	45.9462720	-129.9837707	298.8	1517.3	Returned temperature probe to Jason
2024-07-01T17:59:55.127Z	45.9462724	-129.9837748	297.9	1517.4	MISO 2023-010 temperature probe going into Trevi
2024-07-01T18:04:37.123Z	45.9462715	-129.9837779	297.7	1517.4	Working on adjusting the angle of MISO 2023-010
2024-07-01T18:06:54.135Z	45.9462811	-129.9837795	297.8	1517.3	Placed MISO 2023-010
2024-07-01T18:07:21.118Z	45.9462865	-129.9837749	297.8	1517.3	Housing outside of heat flow
2024-07-01T18:07:47.118Z	45.9462838	-129.9837686	297.8	1517.3	Crab leg
2024-07-01T18:09:39.452Z	45.9462830	-129.9837656	297.8	1517.3	Crab
2024-07-01T18:11:41.184Z	45.9462814	-129.9837723	299.7	1517.3	Pulling back from the vent, some highlights, and then Jason will come to the surface
2024-07-01T18:14:49.609Z	45.9462897	-129.9837132	270.6	1515.3	"Drop the mic" - Bill
2024-07-01T18:15:22.664Z	45.9462890	-129.9836963	269.8	1513.4	End of Monster Dive.
2024-07-01T18:15:44.121Z	45.9462846	-129.9836877	207.1	1510.7	*claps*

Date/Time (GMT)	Latitude	Longitude	Heading	Depth (m)	Jason Dive J2-1579 Sealog Description
2024-07-01T18:15:58.259Z	45.9462830	-129.9836859	208.6	1510.5	Off bottom
2024-07-01T19:38:07.789Z	45.9465078	-129.9846090	220.7	130.6	Beacon is off the cable.
2024-07-01T19:42:57.380Z	45.9464034	-129.9843914	247.6	15.8	Floats are coming off the cable.
2024-07-01T19:46:17.214Z	45.9466256	-129.9842287	238.7	3.5	Last float is off.
2024-07-01T19:49:40.181Z					Jason on deck - end of dive J2-1579