

Axial 2017 Cruise Report

Axial Seamount, Juan de Fuca Ridge

R/V Roger Revelle

July 13 – July 23, 2017

Jason Dives J2-965 – J2-969



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1 - Axial 2017 Cruise Summary

Bill Chadwick, Chief Scientist

Our research expedition to Axial Seamount was a great success, thanks to the combined efforts of the crew of the *R/V Revelle*, the *Jason* ROV and *Sentry* AUV teams, and the science party (and good luck with the weather!). We were able to complete five *Jason* dives, five *Sentry* dives, three CTD casts, and we deployed four instrument moorings and recovered five of them that had been out collecting data for the last two years. It was a big relief to feel we accomplished all our goals as we returned to Newport, OR, but the work of analyzing data and samples will continue for many months.

Two of the *Jason* ROV dives were mainly devoted to making pressure measurements at an array of seafloor benchmarks to measure how much the volcano had re-inflated since our last survey two years ago. We found the center of the caldera has risen 80 cm in the last two years, and 1.25 m since the end of the 2015 eruption. That means the volcano has recovered half of the deflation that occurred during the last eruption in just two and a quarter years. However, during that time the rate of re-inflation has also slowed substantially, from initial rates of 80 cm/yr to current rates of about 40 cm/yr (as of October 2017). That means the second half of re-inflation will take longer than the first and the next eruption is probably not due before 2020, depending on how the inflation rate varies between now and then. We'll be keeping an eye on it through the real-time data from the OOI Cabled Observatory, and will be attempting to forecast the next eruption as it gets closer.

Two of the other *Jason* ROV dives were devoted to sampling vent fluids and sulfide chimneys for chemical and microbiological analysis. One of those dives was in the caldera at vent sites that had been visited many times before, and we discovered that the "blue mat" has returned to the Marker N3 Vent site, which was paved over with new lava during the 2011 eruption. It's remarkable that there is something unique about the chemistry of the vent fluid at that site that the blue mat (a protozoan ciliate) really likes. The other chemistry dive was to a new vent site discovered just a year ago by an MBARI-led expedition making dives on Axial's north rift zone. There they found "mini-smokers" that are very unusual in that they are high-temperature (we measured up to 321°C), but are located on top of the thick 2015 lava flows. We found that these vents have a very different chemistry than the other hydrothermal vent sites in the caldera. The final *Jason* ROV dive was made along a graben along the NE rim of the caldera that traces the path of the dike that connects the 2015 lava flow on the NE caldera floor to another one on the rim. These parts of the 2015 eruption had not been visited previously, so we collected 14 new lava samples to fill in that gap. It's always interesting to get to explore new areas, and it's clear that Axial Seamount can still surprise us even after all these years!

Four of the five *Sentry* AUV dives were made to resurvey previously run multibeam sonar lines to look for volcanic ground deformation as depth changes between this year's survey and ones in previous years. This is done to complement the pressure measurements that we make at the benchmarks. The AUV resurveys have lower resolution for detected depth change, but we can make them quickly over a much larger area than is practical to cover with the pressure measurements. This year's AUV surveys included crisscrossing lines inside the caldera, radial lines extending outside the caldera like an asterisk, and two sets of circumferential ovals at different distances outside the caldera. This extra data on the surface displacements at Axial will help us better model the subsurface magma storage and supply system. The fifth *Sentry* AUV dive was made to collect high-resolution bathymetry in an area NE of the caldera where no high-resolution data had been collected before.

As always, we are grateful to the National Science Foundation and NOAA who supported our research, and we appreciate the support from the Scripps Institution of Oceanography, the captain and crew of *R/V Revelle*, the Woods Hole Oceanographic Institution, the National Deep Submergence Facility, and the *Jason* and *Sentry* teams.

2 – Science Participants

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Scott McCue	ROV Jason group	ROV	
Josh Manger	Scripps Inst. Oceanography	Scripps Marine Tech	
Brent DeVries	Scripps Inst. Oceanography	Scripps Marine Tech	

3 – Operations Log

Pacific Time (-7 GMT)	Date/Time GMT	Event
7/13 1700	7/14 0000	Depart Newport heading to Axial, Departure was delayed by ~ 8 hours due to Jason gear not being ready (from 0900 to 1700 local).
		Logging EM302 multibeam during the transit (~23 hours).
7/13 2100	7/14 0400	XBT #15401
7/14 1540	7/14 2240	Arrive on station at Axial. Preparing for recovery of BPR-South2 mooring.
7/14 1541	7/14 2241	Stop logging EM302 multibeam and all other acoustics. Ship at BPR-South2. 45° 54.959' -129° 59.609'
7/14 1543	7/14 2243	BPR-South2: Sending acoustic signal to locate release and receiving acknowledgement.
7/14 1546	7/14 2246	Sending release signal
7/14 1547	7/14 2247	Mooring has been released
7/14 1640	7/14 2340	BPR-South-2 mooring recovered on board
		Next tasks is to deploy the elevator with a transponder for Jason USBL navigation calibration.
7/14 1715	7/15 0015	Elevator in the water a little north of Mkr-113 vent. 45° 55.389' -129°59.502'
7/14 1818	7/15 0118	BPR-Center mooring released from seafloor.
7/14 1910	7/15 0210	BPR-Center on deck.
7/14 2034	7/15 0334	OBH-Center mooring deployed. Drop position: 45° 57.454' 130° 00.211'
		Next deployment will be BPR-North mooring.
7/14 2138	7/15 0438	BPR-North mooring deployed. Drop position: 45° 58.352' -130° 01.122
7/14 2250	7/15 0550	BPR-West mooring deployed. Drop position: 45° 57.012' -130° 02.166
		Next task: USBL calibration by Jason/Sentry teams using elevator on seafloor, previously deployed.
7/15 0232	7/15 0932	Start USBL calibration.
7/15 0637	7/15 1337	End USBL calibration.
		USBL calibration "good". Was going to deploy Jason at 0800 local but delayed 5 hours because Jason was not ready to go.
7/15 0815	7/15 1515	Elevator release command sent to burn wire.
7/15 0830	7/15 1530	Elevator released and coming up (was used for calibration).
7/15 0935	7/15 1635	Elevator on deck.
7/15 1102	7/15 1802	Sentry in the water. Sentry dive #442.
7/15 1235	7/15 1935	Jason off deck for dive J2-964 (first attempt).
7/15 1240	7/15 1940	Jason in the water.
7/15 1255	7/15 1955	Jason out of the water (dive aborted).
7/15 1303	7/15 2003	Jason on deck.
7/15 1401	7/15 2101	CTD in the water: Vertical cast CTD V17A-01 over Castle vent in the International District.
7/15 1529	7/15 2229	CTD on deck.
7/15 1616	7/15 2316	Jason off deck. Will use the same dive number J2-964.
7/15 1619	7/15 2319	Jason in the water for second attempt at dive J2-964.
7/15 1703	7/16 0003	Problems with the Jason winch at 140 m (again).
7/15 1710	7/16 0010	Dive J2-964 is officially over. The head pin on the sheave that measures cable tension was damaged when it hit the edge of the winch frame.
7/15 1740	7/16 0040	Jason on deck.
7/15 2129	7/16 0429	CTD V17A-02 over Vixen at Coquille vent field. 45° 55.050 -129° 59.577.
7/15 2253	7/16 0553	CTD on deck.
7/16 0013	7/16 0713	BPR-South-2 mooring deployed. Launch target: 45° 54.959' -129° 59.609'
7/17 0333	7/17 1033	Sentry recovered on deck after dive #442.

Pacific Time (-7 GMT)	Date/Time GMT	Event
7/16 ~0400	7/16 ~1100	Considered deploying BPR-Center next but Res-tech needed sleep; so ship waited for ~ 5 hours for Jason to be ready for next launch attempt at 0900 local.
		Overnight Jason team repaired Jason winch. Had to replace head pin at center hub of sheave on the level wind of the winch damaged during the last launch attempt due to improper setup on the winch.
		Winch repair lasted from 0100 - 1100 UTC. Jason team also needed to re-calibrate the tension meter on the head pin so entire delay lasted until ~1500 UTC (~14 hrs).
7/16 0840	7/16 1540	Jason in the water for dive J2-965 at the International District. (First successful dive)
7/16 2006	7/17 0306	Jason on deck. End of dive J2-965.
7/16 2045	7/17 0345	Sentry deployed. Sentry Dive #443 . 45° 57.332 -130°00.507'
		Sentry will be climbing caldera wall so will wait to deploy BPR-center.
7/16 2215	7/17 0515	Sentry has successfully climbed the NE caldera rim so now can prepare to deploy the BPR-Center mooring.
7/16 2252	7/17 0552	BPR-Center mooring deployed. 45° 57.447' -130° 00.658'
7/16 2310	7/17 0610	Calibrating position of OBH-Center mooring - deployed earlier (7/15 0334 UTC)
7/17 0100	7/17 0800	OBH-Center calibration complete.
7/17 0403	7/17 1103	Jason on deck preparing to deploy.
7/17 0416	7/17 1116	Jason in the water. Start of dive J2-966 .
7/17 1850	7/18 0150	Waiting for Sentry recovery while Jason is diving
7/17 1950	7/18 0250	Sentry recovered. End of dive 443. Jason resumes pressure dive J2-966.
7/18 1457	7/18 2157	Sentry in the water. Sentry dive 444 .
7/19 1603	7/19 2303	Jason recovered on deck. End of dive J2-966.
7/19 1636	7/19 2336	Sentry in transit to ship
7/19 1704	7/20 0004	Sentry recovered on deck. End of dive 444.
7/19 1710	7/20 0010	On the way to recover MAPR mooring on the NRZ.
7/19 1805	7/20 0105	Arrived at MAPR mooring recovery site
7/19 1905	7/20 0205	After not hearing from the MAPR mooring, repositioned the ship close to OBH-NRZ mooring.
7/19 1915	7/20 0215	Released OBH-NRZ mooring from the seafloor.
7/19 2030	7/20 0330	OBH-NRZ mooring recovered on deck.
7/19 2035	7/20 0335	Sent signal to MAPR mooring at OBH recovery site. No response.
		Moving to MAPR site directly to try to talk to the MAPR mooring.
7/19 2046	7/20 0346	Again - sending signal to MAPR mooring.
7/19 2049	7/20 0349	No reply from the MAPR mooring.
7/19 2056	7/20 0356	Moving ship due west of mooring to try a different angle.
7/19 2105	7/20 0405	No reply from the MAPR mooring at this location west of the mooring.
		Moving ship to the south to try again.
7/19 2125	7/20 0425	Ship located south of the MAPR mooring now.
7/19 2130	7/20 0430	Sent last signal to MAPR mooring. No response. Giving up for now due to fading daylight. Will try again another day.
		Transiting to Jason launch site at Vixen.
7/19 2355	7/20 0655	On site at Vixen dive location for Jason dive J2-967.
7/20 0007	7/20 0707	Start of Jason dive J2-967
7/20 1848	7/21 0148	Sentry has launched. Sentry dive #445
7/21 0619	7/21 1319	End of Jason dive J2-967.
7/21 0720	7/21 1420	Sentry just dropped its weights and is headed for the surface.
7/21 0816	7/21 1516	Sentry recovered and secured. End of dive #445.
7/21 0925	7/21 1625	Back at MAPR mooring site on NRZ. Sent MAPR mooring enable signals but got no response. Location is about 1 km SE of the mooring.
7/21 0935	7/21 1635	Moving ship to within 500 m of the mooring and will try again.

Pacific Time (-7 GMT)	Date/Time GMT	Event
7/21 1014	7/21 1714	Moved to within 300 m away with DP on. Attempting to enable again.
7/21 1017	7/21 1717	No response. Giving up on trying to enable the MAPR mooring. Decided to just send release command (blind) - looking for it at the surface.
7/21 1035	7/21 1735	The MAPR mooring at surface . Never heard a response from it.
7/21 1112	7/21 1812	MAPR mooring floats on board - being recovered through A-frame.
		While recovering the MAPR mooring Jason is preparing for NRZ mini black smoker chimney dive. Weather is good enough; Winds are dying down and seas are calming.
7/21 1140	7/21 1840	1st MAPR from the wire aboard. Sea Pickle (pyrosome) was hitchhiking on it.
7/21 1143	7/21 1843	2nd MAPR aboard.
7/21 1147	7/21 1847	3rd MAPR aboard.
7/21 1150	7/21 1850	4th MAPR aboard.
7/21 1153	7/21 1853	5th MAPR aboard.
7/21 1155	7/21 1855	Acoustic release and entire MAPR mooring aboard.
7/21 1156	7/21 1856	Short transit to Jason dive target site.
7/21 1230	7/21 1930	Fire and boat drill.
7/21 1319	7/21 2019	Jason in the water for dive J2-968 .
7/21 2016	7/22 0316	End of Jason dive J2-968.
7/21 2132	7/22 0432	Sentry in the water. Sentry dive 446 .
		Ship stayed near Sentry during first part of survey until time to be at the Jason launch location at 4am local.
7/22 0405	7/22 1105	Start of Jason dive J2-969 .
7/22 1225	7/22 1925	End of Jason dive J2-969.
7/22 1320	7/22 2020	Sentry on board. End of dive 446.
7/22 ~ 1430	7/22 ~2130	CTD cast: V17A-03 over NRZ Happy Hour vent field (mini black smokers). 46° 7.252' -129° 58.208'.
7/22 1546	7/22 2246	CTD back on board.
7/22 1600	7/22 2300	Started mapping bathy and water column data after CTD. Using CTD data for SVP. Heading to port.
7/22 1600	7/22 2300	EM302 line 51: start processing with this line - before that it was turn data. 46° 6.87' - 129° 56.66'.
7/22 1645	7/22 2345	Depart Axial on way back to Newport
7/23 ~1515	7/23 ~ 2215	Arrived at NOAA MOC-P dock in Newport.

4 – Discipline Summaries

4.1 Geology/Geophysics

4.1.1 Pressure Measurements to Monitor Volcanic Deformation at Axial Seamount

Bill Chadwick, Scott Nooner, and Matt Cook

We have made ROV-based campaign-style pressure measurements with a “mobile pressure recorder” (MPR) on seafloor benchmarks at Axial Seamount since 2000 to monitor vertical movements of the seafloor due to volcanic inflation and deflation caused by magma movements beneath the volcano. In addition, we have deployed various kinds of continuously-recording bottom pressure recorders (BPRs) throughout the caldera. Some BPRs are autonomous moorings that record for 1-3 years at a time (2 of these were deployed and recovered from 2015-2017, and 4 were deployed in 2017). Three others are BPR/Tilt instruments that are connected to the OOI Cabled Array (and a 4th OOI BPR/Tilt instrument was deployed on a UW/OOI cruise in August 2017). In addition, we deploy “mini-BPRs” (deployed and recovered by ROV) on some of the MPR benchmarks. The aim is to have both campaign-style and continuous pressure measurements at all of our monitoring sites (the array of 10 seafloor benchmarks). Where the MPR measurements are co-located with a BPR, then the MPR data can determine the instrumental drift of the BPR. What is new this year is that for the first time we can constrain the drift rates of all the BPRs at Axial. This section summarizes this year’s operations.

Autonomous BPR moorings

We recovered the two autonomous BPR moorings (Center and South2) that were deployed in August 2015 and they both had successfully recorded. These two BPRs were turned-around at sea and redeployed in the same locations. Two additional BPRs were also deployed. The BPR formerly deployed at the “South1” location in previous years (and had to be returned to Seattle for maintenance after our 2015 cruise) was deployed this year in a new location “North” of the caldera center. A fourth new BPR (not previously used at Axial) was deployed at another new location “West” of the caldera (see table below). All the moored BPRs are built by NOAA/PMEL and record pressure and temperature every 15 seconds in psi, which is converted to depth by multiplying by 0.670 m/psi.

Table 4.1.1-1 BPR Mooring Deployment Locations in 2017 (drop positions – not surveyed by Workboat)

Name	Lat Deg	Lat Min	Lon Deg	Lon Min	Lat	Lon	Depth
BPR-Center	45	57.447	-130	00.658	45.95745	-130.01097	1530
BPR-South2	45	54.958	-129	59.619	45.91597	-129.99365	1530
BPR-West	45	57.011	-130	02.141	45.95018	-130.03568	1418
BPR-North	45	58.350	-130	01.128	45.97250	-130.01880	1578

By comparing the BPR-Center and BPR-South2 data with the 2015-2017 MPR survey at benchmarks AX-101 (Center) and AX-104 (South-2), we determined the drift rate of the autonomous BPRs. How those rates compare with the previous 2013-2015 data is shown in the following table.

Table 4.1.1-2 Autonomous Moored BPR Drift Rates Determined by Comparing with MPR Surveys

Name	S/N	Dynamic range (psi)	Drift rate 2015-2017 (cm/yr)	Drift rate 2013-2015 (cm/yr)	Drift rate 2011-2013 (cm/yr)
BPR-Center	103402	10,000	-15.365	-20.101	-8.576
BPR-South2	125320	3,000	-3.514	-5.048	n/a
BPR-South1	51185	10,000	n/a	-8.169	n/a

This shows that (1) the same BPR deployed in the same location can have a different drift rate from deployment to deployment, and (2) BPRs with larger dynamic ranges tend to have larger drift rates.

Mini-BPRs (TG11s)

During Jason dives J2-966 and J2-967 this year, we recovered 6 mini-BPRs that were deployed on MPR benchmarks in 2015 (see table below). These 6 mini-BPRs were built at Scripps and are owned by Glenn Sasagawa and Scott Nooner. They were deployed with a wrap of lead sheeting secured with hose clamps and tape around the pressure case to make them each about 5 pounds heavy in water. All but one recorded for the entire period - the batteries in Mini-BPR #08 exhausted prematurely on April 24, 2017 (3 months before recovery).

Mini-BPR units 06, 07, 08, 09, 12, and 13 were deployed at the benchmarks listed in the following table, which also includes the Paros S/Ns, models, psi-ranges, and drift rates in cm/yr of the mini-BPRs (based on a comparison with the 2015-2017 MPR results at the same benchmarks):

Table 4.1.1-3 MINI-BPRs RECOVERED in 2017

BENCHMARK NAME	Mini-BPR	Paros S/N	Paros model	Range (psi)	Drift rate (cm/yr)
AX-105 Pillow Mound	#13	132674	46K	6000	-14.159
AX-106 Ashes	#09	127331	43K	3000	+30.154
AX-302 Trevi	#06	125331	42K	2000	+3.147
AX-303 Marker 33 site	#12	132673	46K	6000	-8.601
AX-307 Magnesia West	#07	125573	42K	2000	+19.876
AX-308 BPR-South1	#08	127329	43K	3000	-10.279

The drift rates are highly variable and the largest drift rates are not on sensors with the largest dynamic range. The miniBPRs reported pressures in kPa every 100 seconds (1 min 40 sec). The pressure was converted from kPa to psi using $1\text{kPa} = 0.14503773800722\text{ psi}$ and then to depth in meters using $1\text{ psi} = 0.670\text{ meters}$.

All the non-cabled BPR data this year 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). In other words, he used real data to calculate the tidal constituents for Axial, which provides better predicted-tides than the generic tide-prediction program SPOTL which we have used in previous years.

MiniBPR unit 09 had two one-line bad-data records in the raw data (05/06/2016 19:21:40 and 06/16/2016 03:41:40). MiniBPR unit 12 had periods of noise in the middle of the record, roughly from 05/09/2016 to 12/10/2016 solidly, then intermittently to 03/25/2017, and the data are fine thereafter. We don't know why yet.

Another note of interest is that we noticed that Mini-BPR #13 (the one at the MPR reference benchmark, AX-105) was in a different orientation on the benchmark when it was first observed in 2017, compared to when it was last seen in 2015. Mini-BPR #13 was flipped over on its side, not resting on the plastic "feet" that were attached and was in a different orientation. Looking at the data, there was a sudden offset in the pressure record on January 7, 2017 around 16:00. We interpret that this was probably caused by a fish swimming by and getting caught in the handle of the mini-BPR and then freaking out briefly to get away, which probably flipped the instrument. To correct the detided time-series for this offset, the detided data during the fish-bump depth offset were removed (between 15:00-16:30), the detided data after the offset were offset to match the detided data before the offset, and the detided data during the offset were interpolated. The raw depth time-series was not corrected.

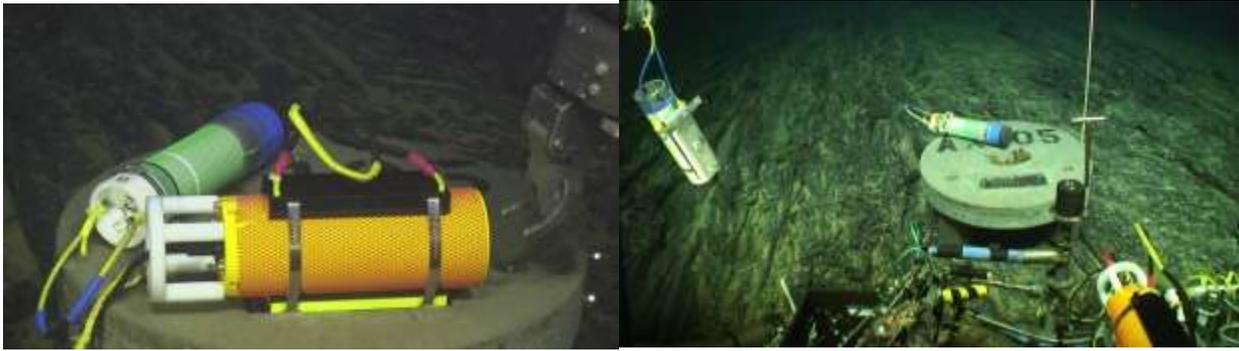


Fig. 4.1.1-1 Frame grabs of Mini-BPR #13 on benchmark AX-105 in 2015 (left) and in 2017 (right).

To replace the mini-BPRs we recovered, we deployed four new mini-BPRs (units 02, 04, 05, and 10) that were built by Glenn Sasagawa at Scripps through an NSF-grant to Bill Chadwick and these were deployed at MPR benchmarks in July 2017 as follows:

Table 4.1.1-4 MINI-BPRs DEPLOYED in 2017

BENCHMARK NAME	Mini-BPR	Paros S/N	Paros model	Range (psi)
AX-303 Marker 33 site	#02	137987	43K	3000
AX-105 Pillow Mound	#04	137988	43K	3000
AX-302 Trevi	#05	137989	43K	3000
AX-307 Magnesia West	#10	137990	43K	3000

That left only one MPR benchmark (AX-308) without a BPR on the benchmark or nearby.

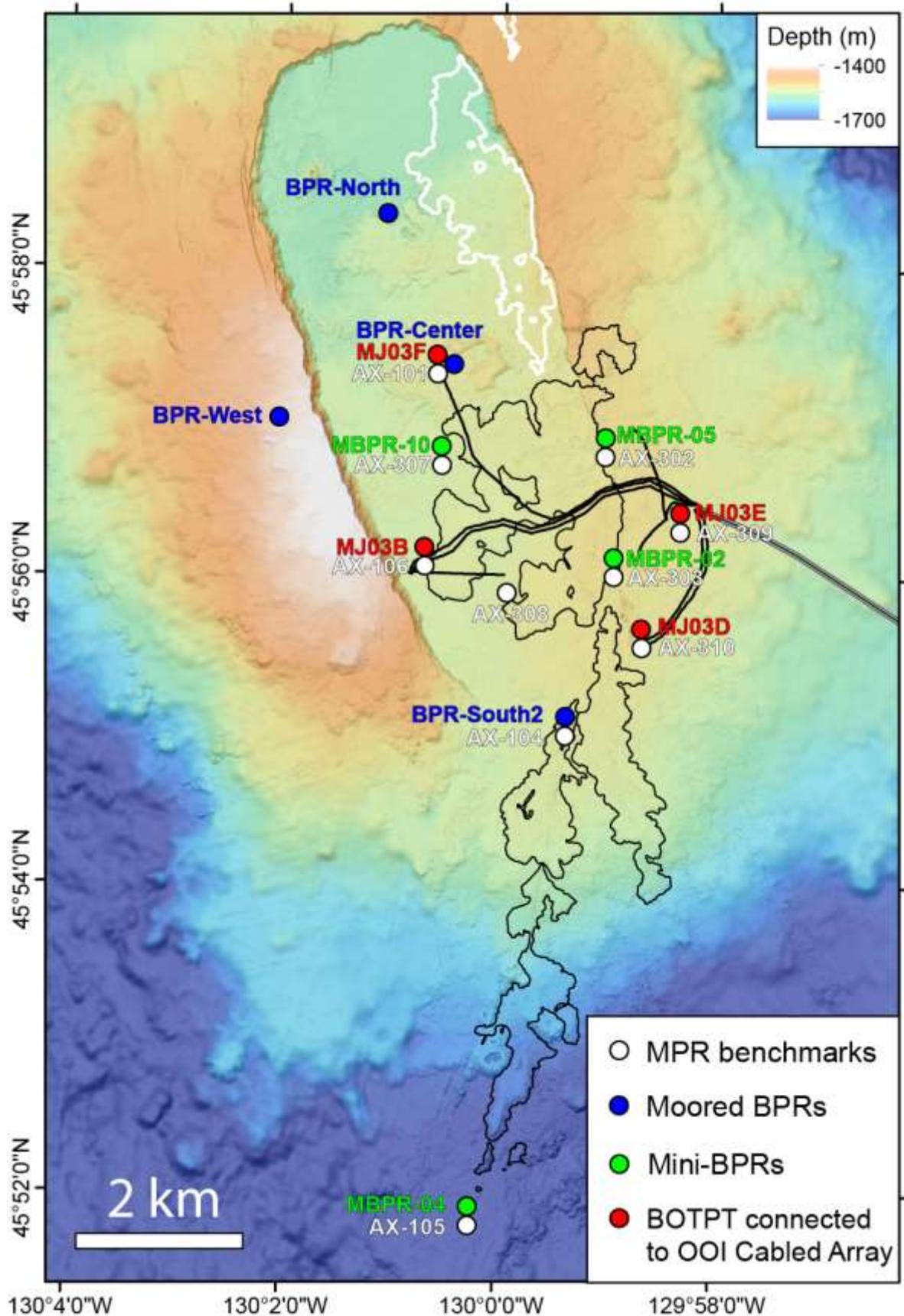


Fig. 4.1.1-2 Figure showing MPR benchmarks and co-located BPRs (after the 2017 cruise).

MPR measurements

The MPR measurements provide a precise depth for each benchmark *relative* to the reference site AX-105 (Pillow Mound), which is located ~10 km south of the center of the caldera. This year, the pressure was measured at the benchmarks during Jason dives J2-966 and J2-967. We had intended to conduct the measurements during a single dive, but dive J2-966 had to be aborted due to telemetry problems (control for the thrusters was dropping out and a board had to be replaced).

This was the first year that we conducted the MPR survey with ROV Jason in single body mode. This meant that Jason could only transit between sites at a speed of 0.5 knots, instead of the usual 0.8 knots when Jason is in dual-body mode operating with Medea. We found that operating in single-body mode made the most difference for the longest transit between AX-104 and AX-105 (6 km), which took 7 hours this year instead of 4 hours in previous years with Medea. On the other hand, the shorter transits, for example between AX-308 and AX-106 (1 km), were about the same as in previous years, because although the ship had to transit slower, the bottom approach and departure with the ROV were quicker due to not having to wait for Medea to settle out after a transit. Basically, Jason usually drove on the bottom from one site to another and as soon as we arrived we could start working. Each full transect took about 24 hours, and overall we made almost 3 transects. We made 3 repeat measurements at AX-106, AX-302, and AX-303, and 2 repeat measurements at AX-101, AX-105, AX 307, and AX-308. Bag City (AX-104) was the tie point between the two dives, with 2 repeat measurements on each dive.

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 in a laptop PC in the Jason control room. The two Paros pressure gauges that we have used in the past (s/n 43535 and 62201) were used again this year. We conducted some fluid sampling for Dave Butterfield during both pressure dives. The MPR pressure data were converted to depth then corrected for ocean tides using data collected by the Mini-BPR #13, which was recovered at AX-105 at the end of the 2nd pressure dive. Instrument drift was calculated during the survey and was removed. The uncertainty in the pressure measurements was determined by the scatter of repeated measurements at each benchmark and was ± 1.0 cm this year. The 2015-2017 MPR results show uplift (inflation) at all stations relative to AX-105.

Table 4.1.1-5 Depth changes from August 2015 to July 2017 at MPR benchmarks. Uncertainty is ± 1.0 cm.

BENCHMARK NAME	Depth change (cm)
AX-101 Caldera Center	88.3
AX-104 Bag City	42.7
AX-105 Pillow Mound	0.0
AX-106 Ashes	59.5
AX-302 Trevi	50.0
AX-303 Marker 33 site	53.4
AX-307 Magnesia West	83.1
AX-308 South1	70.6
AX-309 RSN-PN	37.6
AX-310 Intern. District	47.7

The MPR survey also allowed us to constrain the drift rate of the OOI Cabled Array BPRs for the first time since they were powered up in September 2014, since both of our previous MPR surveys were during their period of operation. The MPR data show that the drift at all three of the OOI-BPRs (BOTPT-A301-MJ03F - Central Caldera near benchmark AX-101, BOTPT-A302-MJ03E - Eastern Caldera near benchmark AX-309, and BOTPT-A303-MJ03D - International District near benchmark AX-310) was less than 1 cm/yr, which we consider “essentially zero”, considering the errors. Thus, no drift corrections need to be made to the OOI NANO-BPR data from the BOTPT instruments on the cabled observatory inside the summit caldera. Note that a 4th BOTPT instrument was deployed in the ASHES vent field on the OOI Cabled Array in mid-August 2017 during an OOI operations and maintenance cruise (on one of the R/V Reville by the University of Washington

OOI group). The drift rate of this new instrument (BOTPT-A304-MJ03B - ASHES Vent Field near benchmark AX-106) will be determined during the next MPR survey.

Results of the Pressure Measurements

The data from the 2017 MPR survey and the BPRs that were recovered show that by mid-July 2017 Axial Seamount had re-inflated about half of the total amount of deflation that occurred during the 2015 eruption (1.25 m of post-eruption re-inflation compared to 2.54 m of co-eruption deflation). However, the rate of re-inflation since the 2015 eruption has decreased with time, so it is likely the “second half” of re-inflation will take longer. It appears Axial will not be ready to erupt again before 2020. A more specific forecast of the timing of the next eruption will have to await more data and will depend on how re-inflation proceeds over the coming years. We will be able to track the re-inflation with the real-time BPR data from the OOI Cabled Array (see plots of those data at this URL: <https://www.pmel.noaa.gov/eoi/rsn/>). The spatial distribution of re-inflation is consistent with the source geometry derived from modeling of our previous MPR surveys – that is, a prolate spheroid (cigar-or-football shape) that is located at a depth of about 3.8 km beneath the eastern wall of the caldera near AX-302 (Trevi) and oriented with the long-axis nearly vertical but steeply dipping to the WNW. Complementary bathymetric re-surveys with the Sentry AUV to reveal volcanic deformation over a larger area are described in the next section.

Table 4.1.1-6 Cement Benchmark Locations

AXIAL CEMENT BENCHMARK NAMES	LAT	LON	Depth	LAT DEG	LAT MIN	LON DEG	LON MIN
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

4.1.2 - Rock Collections

Bill Chadwick

Eighteen lava-rock samples, five sulfide samples, and one sulfur sample were collected during this expedition. Four of the eighteen lava samples were collected on Jason dive J2-967 and fourteen others were collected on Jason dive J2-969. Of the four rocks samples on dive J2-967, all were collected near the 1998 “southern pillow mound” at the end of the second pressure dive, which ended near benchmark AX-105. Of the four, two (J967-Geo-27 and 28) were collected on the southern edge of the 1998 lava flow. These were collected first, but were numbered and logged later, so their sample numbers out of order in the sampling sequence. These two samples will be used as teaching specimens and therefore are not included in our SESAR sample list for this cruise. The other two rock samples from that dive (J967-Geo-25 and 26) were collected from two separate small pads of 2011 lava, the first (J967-Geo-25) from the western 2011 eruptive fissure and the second (J967-Geo-26) from the eastern 2011 eruptive fissure (where the dive ended). Neither of these 2011 lava flows had been sampled before.

The five sulfide chimney samples were collected for geo-microbiological work for collaborators Srishti Kashyap and Jim Holden (University of Massachusetts at Amherst). During Jason dive J2-965, two sulfide samples were collected at the top of El Guapo chimney in the International District vent field (J965-Geo-11 and J965-Geo-12). On Jason dive J2-966, two more sulfide samples were collected from the top of Inferno chimney in the ASHES vent field (J966-Geo-06 and J966-Geo-11). The final sulfide sample was collected on Jason dive J2-968 on Axial’s north rift zone at the mini-smoker site (J968-Geo-01). The one sulfur sample was also collected with Jason’s suction sampler on this dive at the mini-smoker site (J968-Geo-11).

The remaining fourteen lava samples were collected on Jason dive J2-969, which started on the floor of the caldera near the southern end of the eruptive fissures for the 2015 lava flow in the NE caldera and then continued up the eastern caldera wall and onto the NE rim of the caldera. On the rim, Jason traversed along the graben that subsided during the 2015 eruption (shown by before and after MBARI AUV bathymetry) and connects the 2015 lava flow in the NE caldera to the next 2015 lava flow to the north on the NE rim of the caldera. The graben formed along the path of the dike that erupted both flows. All the fourteen rock samples are of 2015 lava from areas that had not been visited before. The dive found that 2015 lava had erupted from the graben about 200 m further south than was evident from depth changes in the before-and-after AUV bathymetry. There was also a lot of complex lava-sediment interaction observed along the graben where 2015 lava sometimes burrowed under sediment and other times flowed on top of it.

All of the rock samples from dive J2-969 are of 2015 lava. The first four lava samples (J969-Geo-01 to 04) were collected on the floor of the caldera, near the eruptive fissure for the 2015 flow in the NE caldera. The remaining ten samples (J969-Geo-05 to 14) were collected on the NE rim of the caldera. Samples J969-Geo-09 and 11 were collected for museum display specimens. Glass from these specimens was sent to Dave Clague at MBARI for microprobe analysis. The remaining samples were sent to Ken Rubin at University of Hawaii or archiving.

Fig. 4.1.2-1 Samples (l to r) J969-GEO-11 (East Rim), J965-GEO-12 sulfide from El Guapo and J969-GEO-11.



Table 4.1.2-1 Geology Samples

Sample	date - time (UTM)	latitude	longitude	total depth	Sampling comment	Location	PI
J965-Geo-11	2017/07/16 20:50:09	45.92651	-129.97952	1515	J965-GEO-11 Sample of chimney wall at top of El Guapo near HFS and gas samples. Placed in aft-port quadrant of milk crate.	El Guapo	James Holden
J965-Geo-12	2017/07/16 20:51:59	45.92651	-129.97952	1515	J965-GEO-12 Additional piece of chimney from El Guapo top. Can see chalcopyrite on sample. Placed in stbd biobox.	El Guapo	James Holden
J966-Geo-06	2017/07/19 19:44:58	45.93356	-130.01367	1541	J966-GEO-06. Piece of chimney on side of Inferno Vent encased in diffuse flow. Covered in a biological mat. Small piece. Placed in port-side biobox.	Inferno Vent	James Holden
J966-Geo-11	2017/07/19 20:37:40	45.93356	-130.01367	1541	J966-GEO-11 A small sample of the Inferno chimney was placed in the port-side biobox. Sample crumbled and consisted primarily of tubeworms taken from same area as fluid samples.	Inferno Vent	James Holden
J967-Geo-27	2017/07/21 09:38:34	45.86324	-130.00368	1718	J967-Geo-27. Piece of intact pillow from 1998 flow just past where new lava flowed out of the fissure. Small bud below a tube spanning two pillows. Some glass shattered off rock while sampling. Put into milk crate. (Sample number out of order as recorded after dive). South Pillow Mounds.	South Pillow Mounds	Scott Nooner (teaching specimen)
J967-Geo-28	2017/07/21 10:19:04	45.86470	-130.00339	1718	J967-Geo-28. Grabbed piece of freshly crushed bud from striated pillow. Can see upper glass layer. Pillow adjacent to flatter-smaller intact lavas. 1998 lava flow. (Sample number out of order as recorded after dive). South Pillow Mounds.	South Pillow Mounds	Scott Nooner (teaching specimen)
J967-Geo-25	2017/07/21 11:01:34	45.86720	-130.00211	1710	J967-Geo-25. Here in the 2011 lava flow. In a little mound surrounded by 1998 flow. Sampled a 2011 pillow toe. Put in stbd milk crate.	South Pillow Mounds	Clague/Rubin
J967-Geo-26	2017/07/21 12:00:33	45.86922	-129.99852	1724	J967-Geo-26 Large pillow toe from 2011 flow surrounded by 1998 flow. Put in stbd biobox.	South Pillow Mounds	Clague/Rubin
J968-Geo-01	2017/07/21 22:07:10	46.12069	-129.96967	1766	J968-geo-01. Little black chimney at the top of a mound. Some bag creatures nearby. Same location visited by MBARI in 2016.	Prosecco	James Holden

Sample	date - time (UTM)	latitude	longitude	total depth	Sampling comment	Location	PI
J968-Geo-11	2017/07/22 00:04:50	46.12023	-129.96995	1771	J968-GEO-11 Suction of the sulfur deposits at the Limoncello site. Getting some other sediment as well. Small snails on frozen-molten sulfur. Shook sample hose and took second 2 more suctions of the site. Tilted hose up to ensure sample got into the chamber.	Limoncello	David Butterfield
J969-Geo-01	2017/07/22 12:20:17	45.97191	-129.99667	1531	J969-Geo-01 Crust near the 2015 eruptive fissure. Lobe (pillow-like) flow with collapse off to the side. Piece of upper crust with glassy surface. Placed in forward port side bin 5.	Axial caldera	Clague/Rubin
J969-Geo-02	2017/07/22 12:34:23	45.97311	-129.99675	1527	J969-Geo-02. Grabbing a piece of jumbled lobate from the edge of the collapse. Small fist-sized piece of thin glassy crust. Grabbed several pieces; shiny and fragile. In front-stbd center rock box.	Axial caldera	Clague/Rubin
J969-Geo-03	2017/07/22 12:50:30	45.97365	-129.99585	1525	J969-Geo-03 Piece of smooth pillow lobate. Small glassy lobate. Smooth exterior. Taken at the contact between 2015 lavas and the talus of the eastern caldera wall. Into bin 3.	Axial caldera	Clague/Rubin
J969-Geo-04	2017/07/22 13:10:04	45.97516	-129.99635	1527	J969-Geo-04. Piece of jumbled 2015 lava right at the contact with the talus. Thin glass crust. Platy.	Axial caldera	Clague/Rubin
J969-Geo-05	2017/07/22 15:16:33	45.98859	-129.99859	1473	J969-Geo-05 Piece of skin of newly erupted lava pillow on a fissure. Took a second piece. Forward-port quadrant of stbd rock box.	Axial East Rim	Clague/Rubin
J969-Geo-06	2017/07/22 15:28:27	45.99017	-129.99914	1473	J969-Geo-06 Piece of fresh skin on east side of where lava overflowed fissure on east side. Piece from overflow near top of fissure. Very glassy and covered with sediment. In the stbd rock box front-stbd quadrant. Took 3 pieces.	Axial East Rim	Clague/Rubin
J969-Geo-07	2017/07/22 15:35:02	45.99071	-129.99938	1474	J969-Geo-07 Piece of new flow crust a little more than halfway to waypoint #10 from #9. Crust over-topping the fissure on its east side. Fissure has heavy ash sediment on top. Aft-port section of center rock box.	Axial East Rim	Clague/Rubin

Sample	date - time (UTM)	latitude	longitude	total depth	Sampling comment	Location	PI
J969-Geo-08	2017/07/22 15:51:13	45.99241	-129.99960	1475	J969-Geo-08 Piece of this newly collapsed skin (when Jason was setting up) of the flow on top of the older sediment covered substrate-small Kipuka. Area with more significant extrusion of lava on top of ash sediment. Aft-stbd compartment of center rock box.	Axial East Rim	Clague/Rubin
J969-Geo-09	2017/07/22 16:05:23	45.99346	-129.99992	1478	J969-Geo-09 Piece of collapsed pillow crust from western wall of eruptive fissure. New flow with less sediment than eastern side of fissure. Just west of waypoint 11. Great pointy-lava drips. One piece in port rock box and second piece aft of center rock box.	Axial East Rim	Clague/Chadwick (display specimen)
J969-Geo-10	2017/07/22 16:35:44	45.99412	-130.00111	1483	J969-Geo-10 Piece of lineated sheet flow to the west of the fissure. Aft-stbd quadrant of stbd rock box.	Axial East Rim	Clague/Rubin
J969-Geo-11	2017/07/22 16:48:00	45.99375	-130.00189	1481	J969-Geo-11 Tiny lava "pillar". Under a ledge. Skinny ~ 1 foot tall pillar-looking piece. Area with new lava and sediment. Placed in dive weight box.	Axial East Rim	Clague/Chadwick (display specimen)
J969-Geo-12	2017/07/22 17:49:20	45.99521	-130.00140	1484	J969-Geo-12 Piece of crust in the sheet flow at the fissure within the eruptive fissure (western edge visible in sonar). In the weight box with Geo-11 (pillar sample). Sheet flow collapsed as Jason pulled away.	Axial East Rim	Clague/Rubin
J969-Geo-13	2017/07/22 17:57:04	45.99575	-130.00169	1482	J969-Geo-13 Piece of pillar top in collapse area after large area of sheet flow in the 2015 lava flow. Near western edge of eruptive fissure. Several pieces collected while parked on top of pillar. Pillar collapsing while sampling. Aft-port quadrant of stbd rock box.	Axial East Rim	Clague/Rubin
J969-Geo-14	2017/07/22 18:14:18	45.99663	-130.00208	1484	J969-Geo-14 Piece of crust from bottom of the wall on edge of the collapse area. Near or in the eruptive fissure. Some sediment. Placed in stbd swing arm biobox.	Axial East Rim	Clague/Rubin

Latitude and longitude values have been adjusted post-cruise and may not be the logged positions in the Virtual Van files.

Geology Samples

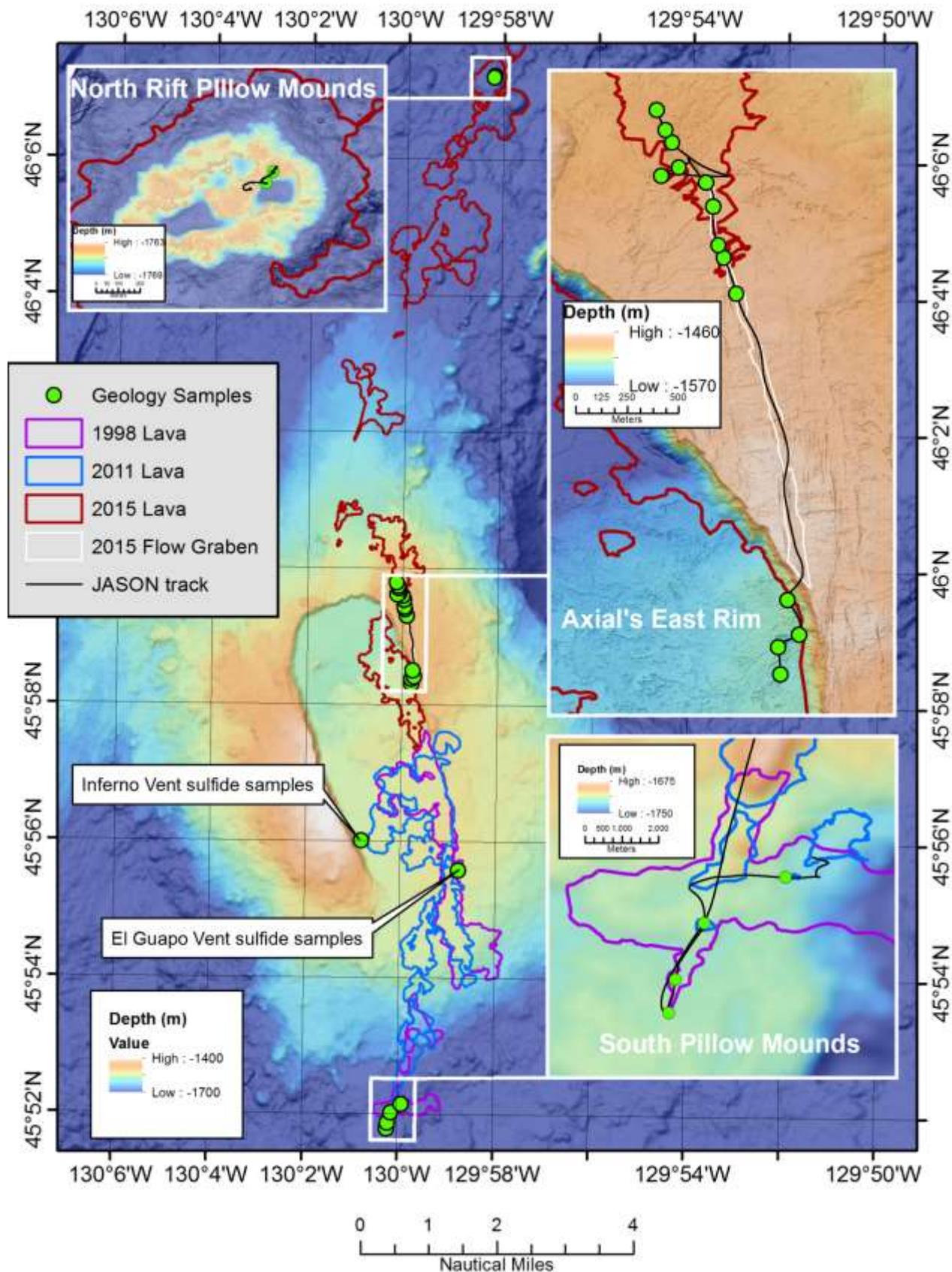


Figure 4.1.2-2 Map of geology samples for Axial 2017 expedition.

4.1.3 Tephra Samplers

Bill Chadwick

Several years ago Nick Deardorff (then a grad student at University of Oregon and now a faculty member at Indian University of Pennsylvania) designed and built some tephra samplers to collect samples at NW Rota seamount in the Mariana arc. After we found that the 2015 eruption at Axial Seamount produced tephra that we discovered deposited on our pressure benchmarks we decided to deploy those tephra samplers at Axial before the next eruptions, in case it too produces tephra. Last summer during the August 2016 MBARI cruise to Axial on R/V Western Flyer (D. Clague, Chief Scientist), we deployed two of these tephra samplers and this summer we deployed four more. The table and map below show the locations of the tephra samplers.

Table 4.1.3-1 Tephra samplers deployed in 2016 and 2017.

Instrument	Location	Depth	Latitude	Longitude	Dive Deployed	date	time
Tephra H	Castle	1516	45.92617	-129.97996	J-965	2017/07/16	19:18
Tephra C	AX-101	1530	45.95522	-130.00993	J-966	2017/07/17	18:32
Tephra D	AX-302	1518	45.94642	-129.98378	J-966	2017/07/17	22:01
Tephra F	East Rim graben	1466	45.97803	-129.99613	J-969	2017/07/22	13:54
Tephra A	NRZ	1644	46.04405	-130.01225	MBARI-880	2016/08/11	06:19
Tephra B	East Rim	1539	45.98632	-129.97214	MBARI-780	2016/08/10	01:17

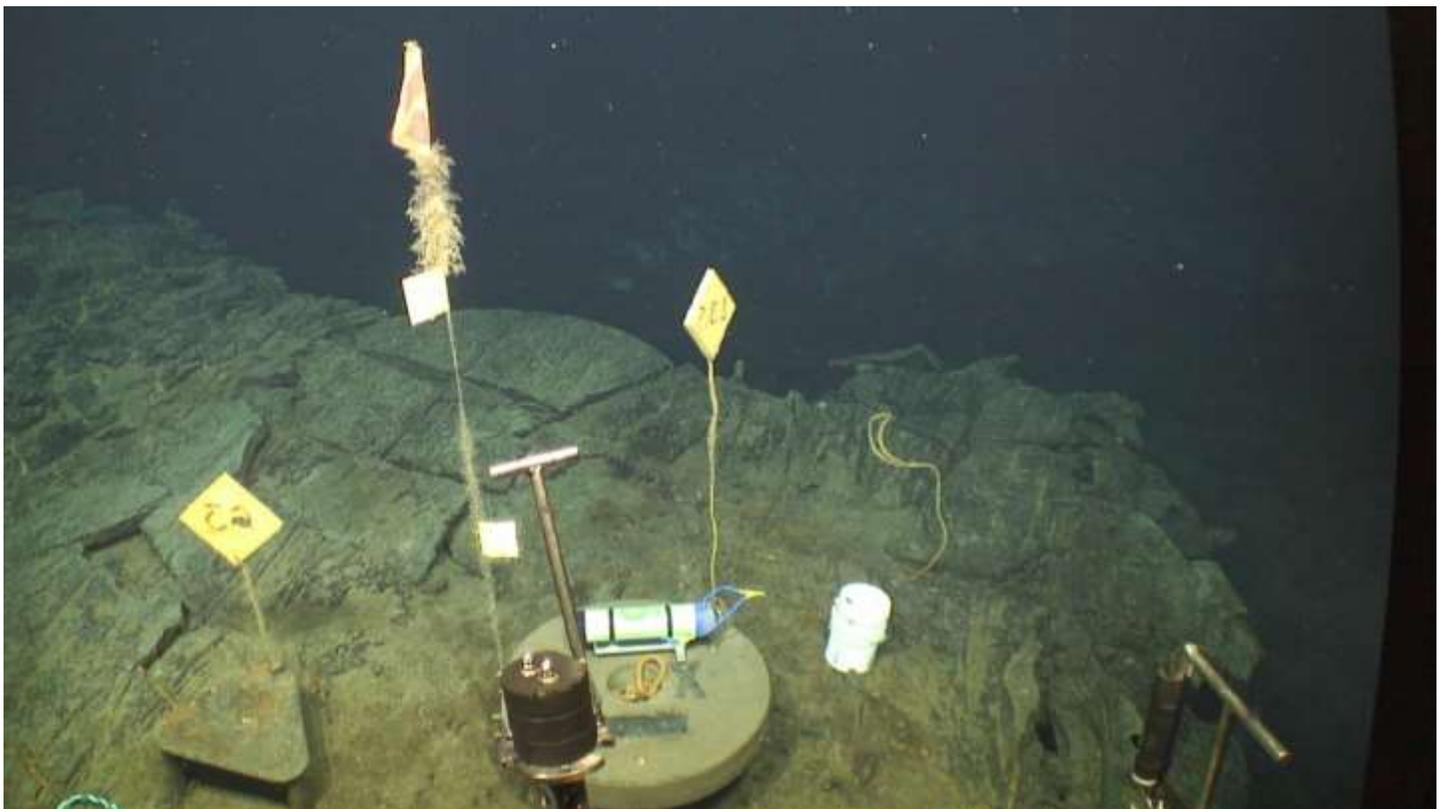
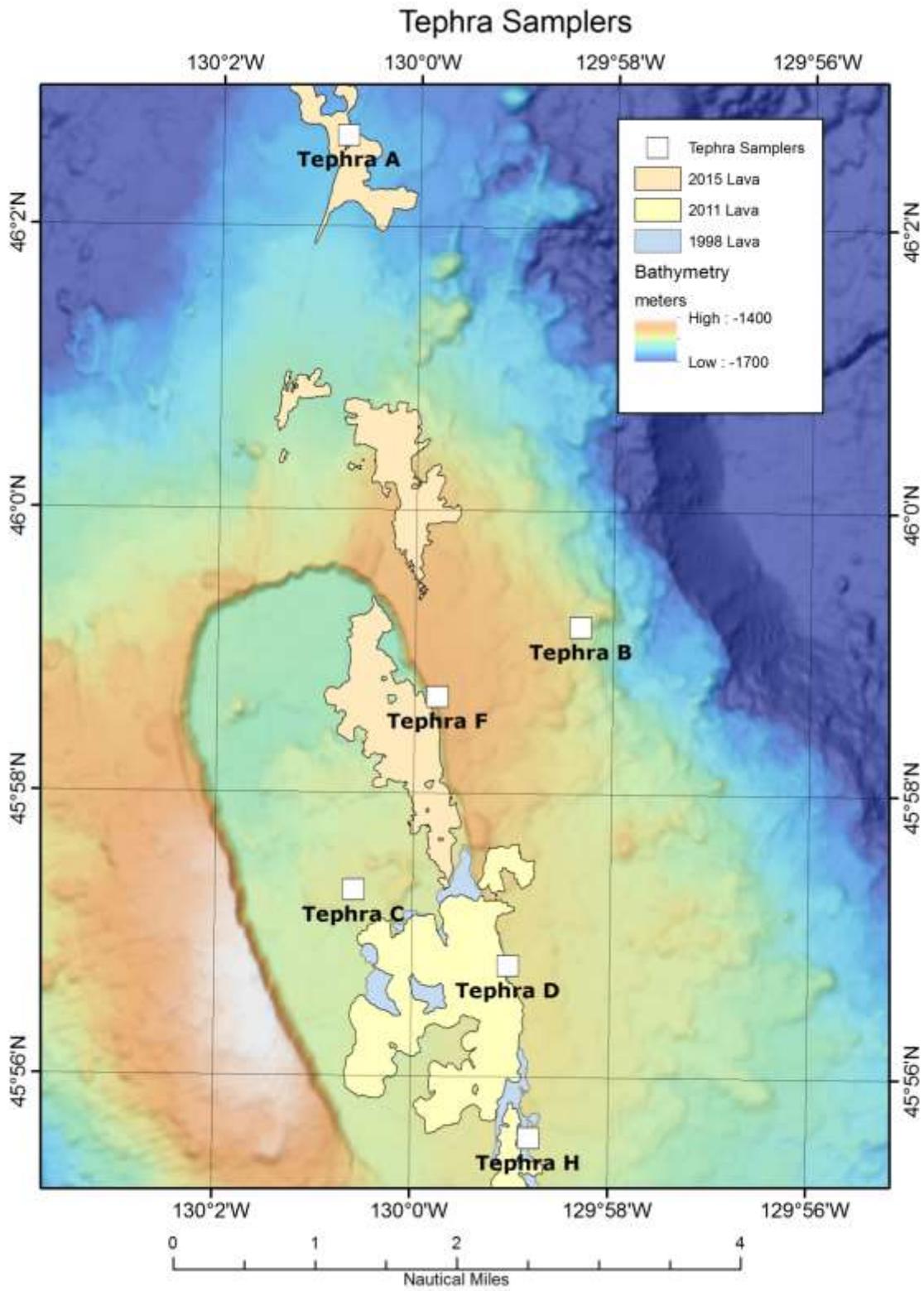


Fig. 4.1.3-1 Tephra D sampler at benchmark AX-302 Trevi site on 2011 lava flow.

Figure 4.1.3-2 Locations of Tephra samplers currently deployed at Axial Seamount.



4.2 Fluid Sampling

Hydrothermal Fluid Chemistry and Microbiology

Dave Butterfield

For this expedition, the primary participants for fluid chemistry were David Butterfield and Kevin Roe, who were responsible for collecting samples with HFPS, preserving and analyzing the samples onboard. Our shipboard analysis included pH, alkalinity titration, spectrophotometric hydrogen sulfide, ammonia and dissolved silica, and gas chromatography for hydrogen and methane. Two chemists were not enough to keep up with all of the sample collection, processing and analysis, and as a result, some of the gas chromatography and some ammonia analyses could not be completed. Fortunately, Tamara Baumberger and Millie were on board collecting titanium gas-tight samples, so there will be complete gas chemistry for many of the vents. Dr. Jim Holden's graduate student Srishti Kashyap was on board to collect samples for microbiology (with an emphasis on solid chimney samples). Srishti helped set up and process the in-situ filters that will go to Julie Huber and Carol Stepien.

Our goals for the expedition were to re-sample as many of the vent sites around the caldera as possible to continue the long-term time series for chemistry and microbiology. We have collected time-series samples in almost every year since 1998, with earlier sampling in 1995, and 1986-88, making this the longest and most complete time-series of any deep-ocean hydrothermal site. High-temperature vents were the priority this year, and sampling was very successful. We collected 32 successful fluid samples from 15 separate vents around the southern caldera (ASHES, International District, Coquille, Trevi) and 7 successful samples from 4 separate vents on the North Rift Zone. We also collected 11 in-situ filters for DNA analysis. Vent fluid samples and processing are described in Table 1. Samples taken for microbiology (including chimney samples) and processed by Srishti Kashyap on board are described in Table 2.

The setup for HFPS was similar to previous expeditions. There were no major changes between the December 2016 Falkor expedition and this expedition, but our success rate with sampling in 2017 was better, which we attribute in part to having enough space in the Revelle main lab to properly set up and maintain the sampler. Out of 49 attempted HFPS water samples (see Table) on this expedition, 9 recovered too little volume to analyze and 1 was over-pressurized and split open the bag. This is still a higher failure rate than desirable, but with replicate sampling we still recovered samples from all of the visited vent sites (except Casper, where only one sample was attempted). We used an SBE63 oxygen sensor attached to HFPS to measure oxygen in low-temperature vents and ambient seawater. Oxygen values reported during the dives are approximate and may be revised after post-cruise data analysis and calibration check. The AMT pH sensor (refurbished and calibrated in 2016 prior to the Falkor expedition) did not produce any valid data during this expedition.

In addition to the piston and bag samplers, we used membrane filters for in-situ filtration of diffuse vent fluid with addition of RNA-Later preservative for Julie Huber's lab and the same technique for near-bottom and water-column samples for Carol Stepien's e-DNA analysis. These latter samples are intended to capture the DNA from any organisms living around the vent fields, with the goal of using water-column e-DNA to identify animals. The Stepien lab is working on the methodology to screen for a wide range of animals (e.g. fish, tubeworms, limpets, etc.). Sample J965-HFS-04 represents near-bottom water within the International District vent field, J965-HFS-19 was taken during a transit from Diva vent (Int. Dist.) to Marker 113 at approximately 1400 m depth, 120 m above the seafloor, J965-HFS-26 was taken during ascent at the end of the dive above Marker 113, sample J967-HFS-10 was taken in transit between marker 33 and Trevi. The four eDNA filter samples are similar, but cover slightly different geographic areas. Results from these samples will determine if HFS is a suitable instrument to characterize bottom communities through environmental DNA.

The OOI team was planning to move the RAS/PPS-Mass Spectrometer combination instrument from El Gordo to a new site, and was considering the "Tiny Towers" site just south of Diva anhydrite vent. We sampled this vent to characterize the temperature and fluid composition before OOI installed the instrument. We found temperatures up to 173°C with very high gas content, making this a risky spot to place a RAS instrument due

to the possibility of excess gas pressure bursting the sample bags (as has happened at the El Gordo RAS site for some samples). We passed that information on to the OOI team from the ship. They decided to deploy the instrument at the Tiny Towers site, but to try to avoid the hottest part of the vent.

Exploring and sampling the field of small high-temperature chimneys on the thick 2015 NRZ lava flow was one of the most exciting events of the 2017 expedition. The small chimneys were venting dark black smoky fluids, with temperatures from 240 to 318°C. The chimney collected from Prosecco vent appears to be massive anhydrite coated with pyrrhotite, and is quite strong. The reaction zone for these fluids is a mystery, and we are looking for clues in the fluid chemistry. We also saw a small deposit of elemental sulfur that had flowed from a crack onto the seafloor near the area of active chimneys. Elemental sulfur is common where magmatic SO₂ degassing occurs, but is extremely rare at Axial Seamount, and signals that there is something unusual in the NRZ reaction zone.

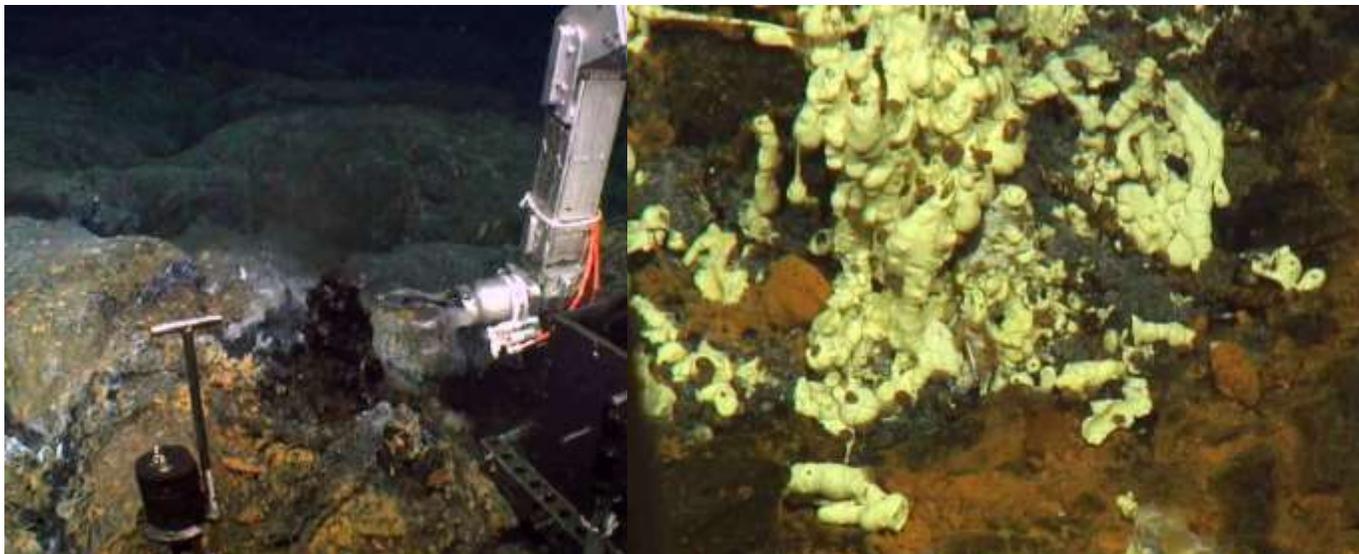


Figure 4.2-1 (left) Prosecco chimney prior to sampling. **Figure 4.2-2** Sulfur flow deposits at Limoncello.

The following table reports the lab and dive sample ID numbers, vent names, maximum temperature in °C, total liquid volume recovered, volume of gas headspace (in mL) if present, and the volume of individual sample aliquots saved. Sample locations and site notes are given in the ROV sample log elsewhere in this report. Gray shading indicates failed samples.

Table 4.2-1 Hydrothermal Vent Fluid Sample Processing. Total water aliquot volumes in ml.

Lab Sample #	Dive Sample #	Vent	Tmax	Total H2O Vol	Gas Head Vol	Gas	H2S/Si	pH/alk	majors	nutrient	Trace Metals	Microbio	Other	piston type
International District														
J965P1	J965-HFS-01	Castle	255.2	186	630	15	17	35	35		84			Ti
J965P2	J965-HFS-02	Castle	252.2	401	1320	16	15	35	35		300			Ti
J965B16	J965-HFS-05	Ambient	2.1	475	0	20	60	35	35	45	240	40		
J965P3	J965-HFS-06	El Guapo	340.8	164	420	15	15	35	35	40	24			Ti
J965P4	J965-HFS-07	El Guapo	341.9	32	0	12	failed sample		20					Ti
J965PF7	J965-HFS-08	El Guapo	341.5	332	530	10	22	35	35	45	125		60	PVC
J965P5	J965-HFS-13	Diva	173.6	386	750	9	18	35	35	45	230		14	Ti
J965PF8	J965-HFS-14	Diva	221.3	335	2440		30	35	30	50	125			PVC
J965PF9	J965-HFS-17	Tiny Towers	173.7	309	520	19	25	10	37	45	173			PVC
J965B17	J965-HFS-18	Tiny Towers	173.6	175	500			35	30		110			
J965B18	J965-HFS-20	Mkr 113	16.4	547	0	17	35	35	35	45	250	120	10	
J965B19	J965-HFS-21	Mkr 113	16.8	422	0	10	30	35	35	45	165	60	42	
J965BF21	J965-HFS-23	Mkr 113	16.1	137	0	7	30	35	15	20	30			
J965BF22	J965-HFS-24	Mkr 113	16.4	199	0	14	30	35	30	40	50			
J965B20	J965-HFS-25	Mkr 113 clams	2	414	0	22	42	35	35	45	150	40	45	
ASHES														
J966P1	J966-HFS-01	Virgin	209.5	369	85	9	25	35	15	35	250			PVC
J966PF9	J966-HFS-02	Virgin	232.2	239	320	10	30	37	35	15	112			Ti
J966P2	J966-HFS-03	Virgin	237.4	empty										Ti
J966P3	J966-HFS-07	Inferno	305.7	empty										Ti
J966P4	J966-HFS-08	Inferno	305.9	638	0	13	20	40	35	45	440		45	PVC
J966PF8	J966-HFS-10	Inferno	306.6	empty										Ti
J966P5	J966-HFS-12	Hell	293.3	562	0	17	28	40	35	45	352		45	PVC
J966PF7	J966-HFS-13	Hell	298.2	499	0	15	25	40	37	40	342			Ti
J966B16	J966-HFS-15	Anemone	28	466	0	25	30	35	35	45	176	120		
J966B17	J966-HFS-16	Anemone	28.7	545	0	16	40	39	35	45	250	120		
Pressure dive#2 multiple sites														

Lab Sample #	Dive Sample #	Vent	Tmax	Total H2O Vol	Gas Head Vol	Gas	H2S/Si	pH/alk	majors	nutrient	Trace Metals	Microbio	Other	piston type
J967P1	J967-HFS-01	Casper	296.5	empty										Ti
J967P2	J967-HFS-03	Vixen	322.8	410	200	10	25	35	35	45	215		45	Ti
J967PF9	J967-HFS-04	Vixen	323.5	340	77	10	25	35	35		235			PVC
J967B16	J967-HFS-06	Mkr 33	25.4	525	0	10	30	35	35	45	250	120		
J967B17	J967-HFS-07	Mkr 33	25	lost	bag split open									
J967BF21	J967-HFS-09	Mkr 33	28.4	450	0	13	32	35	35	45	290			thick bag
J967P3	J967-HFS-11	Trevi	231	410	14	10	30	35	35	45	255			Ti
J967P4	J967-HFS-12	Trevi	230.3	25	failed sample		25							Ti
J967PF8	J967-HFS-13	Trevi	231	429	2	15	29	35	35	45	225		45	PVC
J967B18	J967-HFS-16	Mkr N3	24.4	296	140	20	28	35	35	45	133			
J967PF7	J967-HFS-17	Mkr N3	24.5	577	85	10	25	35	35	42	385		45	PVC
J967B19	J967-HFS-21	Bag City	13.6	575	0	15	45	35	35	45	400			
J967B20	J967-HFS-22	Bag City	13.1	487	0	20	40	37	35	45	250	60		
J967BF22	J967-HFS-23	Bag City	13.1	367	0	10		37	35	45	240			
North Rift Zone														
J968P9	J968-HFS-02	Prosecco	317.9	empty				6	20					Ti
J968P8	J968-HFS-03	Prosecco	317.6	empty										Ti
J968B17	J968-HFS-04	Prosecco	317.5											
J968P1	J968-HFS-05	Prosecco	318.2	573	4	17	33	35	35	45	363		45	PVC
J968B18	J968-HFS-08	Prosecco-diffuse black	25.2	230	0	0	30	35	35	40	90			
J968B19	J968-HFS-09	Prosecco-diffuse black	26.2	500	0	10	35	40	35	45	275	60		
J968P4	J968-HFS-12	Kahlua	246	525	25	10	30	35	35	45	240	40	90	PVC
J968P5	J968-HFS-13	Kahlua	247.7	505	16	15	30	35	35	40	270	35	45	PVC
J968BF23	J968-HFS-15	BlackHoleOf Sambuca	37.3	295	0	10	30	35	35	35	90	60		
J968B20	J968-HFS-16	BlackHoleOf Sambuca	35	293	0	13	30	35	35	40	140			

Table 4.2-2 Microbiology Sample Information

Dive	Sample Name	Bag/Fliter #	FS#	Location	Tmax (°C)	Tavg (°C)	T2 (°C)	Volume (mL)	Allocated
J2-965	HFS-5	B16		Background SW above El Guapo	2.2				Total Counts
J2-965	GEO-11			El Guapo	341.5	341.2	70		Small chimney fragments for sulfide slurry, sparged bottle, frozen sample
J2-965	GEO-12			El Guapo	341.5	341.2	70		Larger chimney grab for sulfide slurry, sparged bottle, frozen and air-dried sample
J2-965	HFS-20	B18	929	Mkr 113	16.4	15.9	9		Total Counts + Enrichments
J2-965	HFS-21	B19	929	Mkr 113	16.8	16	8.5		Replicate Bag for Enrichments
J2-965	HFS-22	F13	929	Mkr 113	16.9	15.6	9.1	3501	RNA Filter
J2-965	HFS-25	B20		Clams near Mkr 113	2	2	2.2		Total Counts
J2-966	GEO-6			Inferno	305.7	305.2	98		Small chimney fragment for sulfide slurry, sparged bottle, frozen sample
J2-966	GEO-11			Inferno	306.6	305.9	70		Stem of a young and actively growing/smoking chimney; Sulfide slurry and remaining in sparged frozen falcon tube
J2-966	HFS-15	B16	930	Anemone	28	25.4	13		Total Counts + Enrichments
J2-966	HFS-16	B17	930	Anemone	28.7	26.2	13		Replicate Bag for Enrichments
J2-966	HFS-17	F13	930	Anemone	22.8	16.9	11	2156	RNA Filter
J2-967	HFS-6	B16	932	Mkr 33	25.4	24.9	10.4		Total Counts + Enrichments
J2-967	HFS-8	F13	932	Mkr 33	28	27.1	12	3000	RNA Filter
J2-967	HFS-18	F15	933	Mkr N3	24.6	24.3	12	3000	RNA Filter
J2-967	HFS-22	B20	931	Bag City	13.1	12.8	7.4		Total Counts + Enrichments
J2-967	HFS-24	F10	931	Bag City	13.3	12.6	6.8	3000	RNA Filter
J2-968	GEO-1			NRZ Mini Smoker Vents Proseco	317.6	316	40		1 ft active chimney whole for sulfide slurries, sparged bottles, frozen and air-dried sample
J2-968	HFS-9	B19	934	NRZ Proseco Diffuse Vent	26.2	23.5	6		Enrichments
J2-968	HFS-10	F13	934	NRZ Proseco Diffuse Vent	21.6	19.4	5	2500	RNA Filter
J2-968	HFS-16	B20		NRZ Sambuca	35	34	4		Total Counts + Enrichments

4.3 Gas Sampling

Tamara Baumberger and Camilla Wilkinson

The majority of samples taken for gas analysis were collected in titanium gas-tight bottles (GTBs), with internal volumes of approximately 150 to 167 ml. For dives J965, J966 and J967, 3 GTBs were placed in the ROV Jason basket and an additional two GTBs were connected to Dave Butterfield's hydrothermal fluid sampler (HFS), mounted on the back of the ROV. Dive J968 only carried 2 GTBs in the basket and 2 GTBs connected to the HFS. A total of 18 gas-tight samples were collected during the 4 ROV dives. Once the samplers were retrieved from the seafloor, they were processed on board using the seagoing vacuum line. Samples were subsampled in 3 cc aluminosilicate ampules for shore-based noble gas analysis and in 35 cc Pyrex ampules for shore-based total gas and isotope analysis. In addition, a subsample from a HFS bag sample was drawn into an evacuated flask and then processed on the seagoing vacuum line. All major Axial vent fields were sampled and gas contents reached from 460 mmol/kg at Diva (International District vent field), to 6.1 mmol/kg from the diffuse Marker 113 field. In terms of their gas contents, the high temperature vent fields can be divided into three groups. Samples with the highest gas contents were obtained from the International District (179 to 460 mmol/kg), intermediate gas contents were found at Ashes, Coquille, and Trevi (34.9 to 92.0 mmol/kg) and the lowest gas contents were observed in the first time sampled Happy Hour vent field (8.3 to 15.0 mmol/kg). The two sampled low temperature vent fields, Marker 113 and Marker 135, yielded gas contents of 6.1 mmol/kg and 57.9 mmol/kg, respectively. Sample J967-GTB-14 leaked fluid and was therefore not processed on the seagoing vacuum line. It was also observed that sample J965-GTB-16 was leaking gas. However, it turned out to be the sample with the highest gas concentration obtained during this cruise. Following inspection of the GTBs, it was determined that anhydrate precipitation around the stem tip and sample inlet was preventing an adequate seal for both leaking samples.

In addition to the above mentioned samples, we also conducted 3 CTD operations. Water samples, for gas analysis, were extracted from Niskin bottles triggered during 3 CTD casts and sealed (using an air operated copper tube crimper) in 2ft copper tubes for transport. We took a number of samples near perceived plume maxima and at depths of 1760 m to 1178 m.

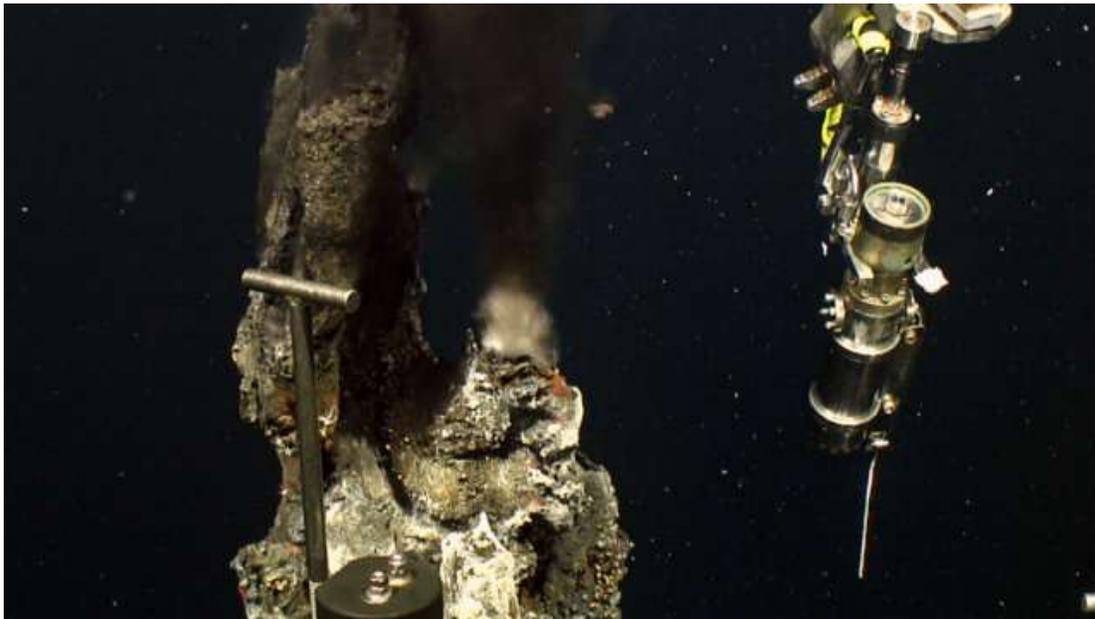


Fig. 4.3-1 Photograph showing the articulated arm of ROV Jason holding a gas-tight bottle with the snorkel pointing down. ROV Jason will maneuver the gas-tight bottle over the chimney; insert the snorkel into the top before hydraulically triggering the bottle in order to collect a sample. (Photo from El Guapo sample on J2-965 in International District.)

Fig. 4.3-2 Map of ROV Jason gas samples

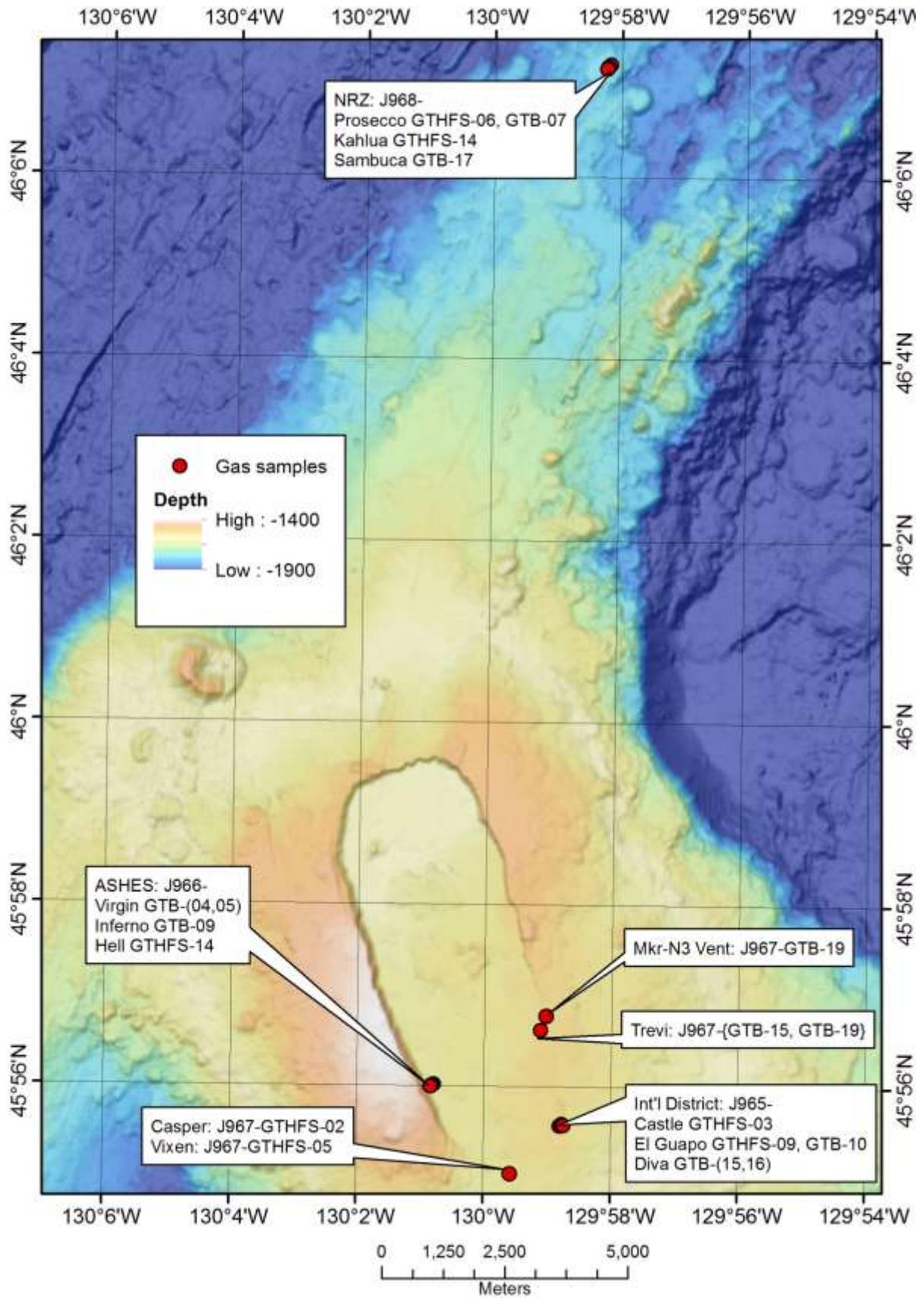


Table 4.3-1 Summary of Jason gas samples

Dive - Sample	Sampler	Descriptor	Chimney - Vent Field	Fluid wt. g	Vent T °C	[gas] mmol/kg	#Splits 3cc/35cc	Comment
J965-GTHFS-03	GT 10	orange-blue	Castle - International District	156.2	257	230	3/3	
J965-GTHFS-09	GT 12	yellow-green	El Guapo - International District	151.2	341	179	3/3	
J965-GTB-10	GT 5	black	El Guapo - International District	148.2	342	6.7	2/2	Poor sample quality
J965-GTB-15	GT 16	orange	Diva - International District	146.6	221	436	3/3	
J965-GTB-16	GT 17	white	Diva - International District	46.7	273	460	1/1	Leak - anhydrate precipitation
J966-GTB-04	GT 9	red	Virgin - Ashes	164.2	257	37.0	3/3	
J966-GTB-05	GT 7	green-red	Virgin - Ashes	164.4	257	52.3	3/3	
J966-GTHFS-09	GT 12	yellow-green	Inferno - Ashes	155.9	306	58.2	3/3	
J966-GTHFS-14	GT 11	nude	Hell - Ashes	153.5	297	34.9	3/3	
J967-GTHFS-02	GT 10	orange-blue	Casper - Coquille	153.9	296	87.3	3/3	
J967-GTHFS-05	GT 16	orange	Vixen - Coquille	144.1	323	92.0	3/3	
J967-GTB-14	GT 5	black	Trevi - Trevi	-	231	-	0/0	Leak - anhydrate precipitation
J967-GTB-15	GT 17	white	Trevi - Trevi	159.0	231	54.7	3/3	
J967-GTB-19	GT 2	green	Marker 135	158.6	13	57.9	3/3	
J968-GTHFS-06	GT 10	orange-blue	Prosecco - Happy Hour	157.6	317	8.3	3/3	
J968-GTB-07	GT 9	red	Prosecco - Happy Hour	152.3	317	7.2	3/3	
J968-GTHFS-14	GT 7	green-red	Kahlua - Happy Hour	167.6	248	11.7	3/3	
J968-GTB-17	GT 11	nude	Sambuca - Happy Hour	159.1	321	15.0	3/3	
Flasks:								
J965-HFS-21-B19	F 22	Flask	Marker 113	35.11	16.8	6.1	2/2	Flask sample from HFS bag 19

Table 4.3-2 Summary of CTD Helium Samples

Date (dd/mm/yy)	Station Number	Latitude of Cast (at bottom)	Longitude of Cast (at bottom)	Bottle #	Sample_ID (CTD deployment number, bottle number)	Depth (pressure_dbars)	Comments
7/15/2017	1	Latitude of CTD (deployed) 45-55.571N.	Longitude of CTD (deployed) 129-58.780W	1	V17A-01-01A	1511	
					V17A-01-01B		
				3	V17A-01-03A	1502	
					V17A-01-03B		
				5	V17A-01-05A	1477	
					V17A-01-05B		
		7	V17A-01-07A	1452			
			V17A-01-07B				
		9	V17A-01-09A	1427			
			V17A-01-09B				
		11	V17A-01-11A	1402	Bottle leaking, BUT A & B samples both sealed well.		
			V17A-01-11B				
		14	V17A-01-14A	1352			
			V17A-01-14B				
17	V17A-01-17A	1302					
	V17A-01-17B						
19	V17A-01-19A	1178					
	V17A-01-19B						
7/16/2017	2	Latitude of CTD (deployed) 45-55.051N.	Longitude of CTD (deployed) 129-59.592W	1	V17A-02-01A	1526	
					V17A-02-01B		
				3	V17A-02-03A	1516	
					V17A-02-03B		
				5	V17A-02-05A	1500	
					V17A-02-05B		
		7	V17A-02-07A	1476	Perceived Plume max		
			V17A-02-07B				
		9	V17A-02-09A	1451			

Date (dd/mm/yy)	Station Number	Latitude of Cast (at bottom)	Longitude of Cast (at bottom)	Bottle #	Sample_ID (CTD deployment number, bottle number)	Depth (pressure_dbars)	Comments
		Latitude of CTD (at depth 1526m) 45-55.055N.	Longitude of CTD (at depth 1526m) 129-59.592W		V17A-02-09B		
				11	V17A-02-11A V17A-02-11B	1426	Top of plume
		Latitude of CTD (on deck) 45-55.053N.	Longitude of CTD (on deck) 129-59.587W	13	V17A-02-13A V17A-02-13B	1400	
				17	V17A-02-17A V17A-02-17B	1297	
		Latitude of CTD (deployed) 46-07.248N.	Longitude of CTD (deployed) 129-58.195W	1	V17A-03-01A V17A-03-01B	1760	
				3	V17A-03-03A V17A-03-03B	1750	
		Latitude of CTD (at depth 1758m) 46-07.248N.	Longitude of CTD (at depth 1758m) 129-58.193W	5	V17A-03-05A V17A-03-05B	1727	
				7	V17A-03-07A V17A-03-07B	1702	
7/22/2016	3	Latitude of CTD (on deck) 46-06.904N.	Longitude of CTD (on deck) 129-56.811W	9	V17A-03-09A V17A-03-09B	1677	
				11	V17A-03-11A V17A-03-11B	1653	
		Latitude of CTD (at depth 1758m) 46-07.248N.	Longitude of CTD (at depth 1758m) 129-58.193W	13	V17A-03-13A V17A-03-13B	1627	
				15	V17A-03-15A V17A-03-15B	1602	

4.4 Microbiology

Thermophilic and Hyperthermophilic Biogeochemical Processes

Srishti Kashyap (University of Massachusetts Amherst)

The broad goals and objectives of microbiologists associated with this expedition were to 1) enrich and culture new microbes from diffuse vent fluids and sulfide chimney samples, 2) determine microbe-mineral spatial relationships using various spectroscopy tools, and 3) profile the microbial community and gene expression patterns of (sub)seafloor microbes as part of a long-term time series at Axial.

Hydrothermal and near-bottom fluids from Marker 113, Marker 33, Anemone, Marker N3, Bag City, and north rift zone diffuse vents Prosecco and Sambuca, as well as sulfide chimney samples from El Guapo (2x), Inferno (2x) and north rift zone Prosecco were collected by Jason II to achieve these goals. The following is a list of analyses performed on the collected samples:

- DNA and RNA filter samples from Marker 113, Anemone, Marker 33, Marker N3, Bag City, and north rift zone Prosecco for microbial metagenomic (community analysis) and metatranscriptomic (gene expression) profiles. These were collected for Julie Huber (WHOI) to continue the times series of such analyses.
- DNA filter samples from near-bottom seawater collected along transit at International District, from Diva to Marker 113, transit at Marker 113, from Marker 33 to Trevi, and from Marker N3 to Bag City. These were collected for Carol Stepien who will be performing metagenomic analysis to describe the macrofauna at these hydrothermal sites.
- Sample preservation from all hydrothermal and near bottom fluids to enumerate the total number of microbes in each sample.
- Enrichments using three different types of iron oxide minerals and three different carbon and energy sources ($H_2:CO_2$; acetate; lactate) at two temperatures (55°C and 80°C) initiated shipboard using five artificial seawater-sulfide chimney slurries (El Guapo (2x), Inferno (2x), and north rift zone Prosecco) as well as three diffuse vent fluids (Marker 113, Marker 33, Anemone). These were set up to culture and isolate novel hyperthermophilic and thermophilic microbes from these sites.
- Sulfide-chimney samples were frozen, anoxically contained, and air-dried for hyperspectral imaging, attenuated total reflectance, as well as Raman spectroscopies to determine the microbe- and/or organic-mineral spatial relationships.
- Cell culturing for novel mesophilic methanogens from hydrothermal fluids was initiated shipboard.
- Samples were collected by a member of the lab of James Holden (UMass) on board the ship for their own use as well as for the labs of Julie Huber (WHOI) and Carol Stepien (NOAA/PMEL).



Figure 4.4-1 Srishti Kashyap with sulfide sample in ship's laboratory.

Table 4.4-1 Samples preserved/collected for microbiology analyses.

Dive	Sample Name	Bag / Filter #	Location	PI	Allocated
J2-965	HFS-4	F10	Transit at Int'l District	Stepien	DNA Filter
J2-965	HFS-5	B16	Background SW above El Guapo	Holden	Total Counts
J2-965	GEO-11		El Guapo	Holden	Enrichments + Spectroscopy
J2-965	GEO-12		El Guapo	Holden	Enrichments + Spectroscopy
J2-965	HFS-19	F11	Transit from Diva to Mkr 113	Stepien	DNA Filter
J2-965	HFS-20	B18	Mkr 113	Holden/Huber	Total Counts + Enrichments
J2-965	HFS-21	B19	Mkr 113	Holden/Huber	Replicate Bag for Enrichments
J2-965	HFS-22	F13	Mkr 113	Huber	RNA Filter
J2-965	HFS-25	B20	Clams near Mkr 113	Holden	Total Counts
J2-965	HFS-26	F14	Ascent from Mkr 113	Stepien	DNA Filter
J2-966	GEO-6		Inferno	Holden	Enrichments + Spectroscopy
J2-966	GEO-11		Inferno	Holden	Enrichments + Spectroscopy
J2-966	HFS-15	B16	Anemone	Holden/Huber	Total Counts + Enrichments
J2-966	HFS-16	B17	Anemone	Holden/Huber	Replicate Bag for Enrichments
J2-966	HFS-17	F13	Anemone	Huber	RNA Filter
J2-967	HFS-6	B16	Mkr 33	Holden/Huber	Total Counts + Enrichments
J2-967	HFS-8	F13	Mkr 33	Huber	RNA Filter
J2-967	HFS-10	F14	Transit from Mkr 33 to Trevi	Stepien	DNA Filter
J2-967	HFS-18	F15	Mkr N3	Huber	RNA Filter
J2-967	HFS-20	F11	Transit from Mkr N3 to Bag City	Stepien	DNA Filter
J2-967	HFS-22	B20	Bag City	Holden/Huber	Total Counts + Enrichments
J2-967	HFS-24	F10	Bag City	Huber	RNA Filter
J2-968	GEO-1		NRZ Mini Smoker Vents Prosecco	Holden	Enrichments + Spectroscopy
J2-968	HFS-9	B19	NRZ Prosecco Diffuse Vent	Huber	Enrichments
J2-968	HFS-10	F13	NRZ Prosecco Diffuse Vent	Huber	RNA Filter
J2-968	HFS-16	B20	NRZ Sambuca	Holden/Huber	Total Counts + Enrichments

4.5 CTD and MAPR Water Column Studies

CTD Survey and MAPR Mooring recovery

Dave Butterfield and Sharon Walker

4.5.1 CTD Operations

To extend the water column hydrothermal plume time-series, we conducted 3 vertical CTD casts using the Revelle CTD and rosette. Dave Butterfield and Tamara Baumberger monitored the casts and took water samples. Tamara and Millie collected helium samples. Tamara and Dave ran the GC for methane and hydrogen analysis. Kevin and Dave collected samples for nutrients and trace metals. Sharon Walker processed the CTD data back on shore.

Auxilliary analog sensors supplied by the ship included oxygen, fluorometer, transmissometer, and altimeter. Sensors to measure turbidity (optical backscatter) and oxidation-reduction potential (ORP) were supplied by PMEL. The Revelle Marine Techs set up the Rosette for sampling prior to the casts.

Table 4.5.1-1 CTD vertical cast locations.

Station Name	Latitude (N)	Longitude (W)	Start time/End time	Bottom Depth (m)	Comments
V17A-01	45° 55.570'	-129° 58.780	15-Jul-2017 21:03 15-Jul-2017 22:28	1516	International District (Castle)
V17A-02	45° 55.055'	-129° 59.592	16-Jul-2017 04:28 16-Jul-2017 05:53	1532	"Vixen" vent site
V17A-03	46° 07.248'	-129° 58.193	22-Jul-2017 21:18 22-Jul-2017 23:00	1766	N Rift Zone "mini-smoker" site on 2015 lava

There were particle and ORP signals over Vixen and Castle vents. A CTD cast placed directly over (0.05 min N of and 0.1 min W of the sampled high-T vent sites) on the NRZ showed no visible plume on the CTD display during the cast, which was surprising given the intense black smoke and high temperatures at this site.

Figure 4.5.1-1 Turbidity anomaly profiles are shown below, along with profiles from the 2015 casts for comparison (note: the three profiles from T15A-01 are the "yo's" closest to station V17A-03).

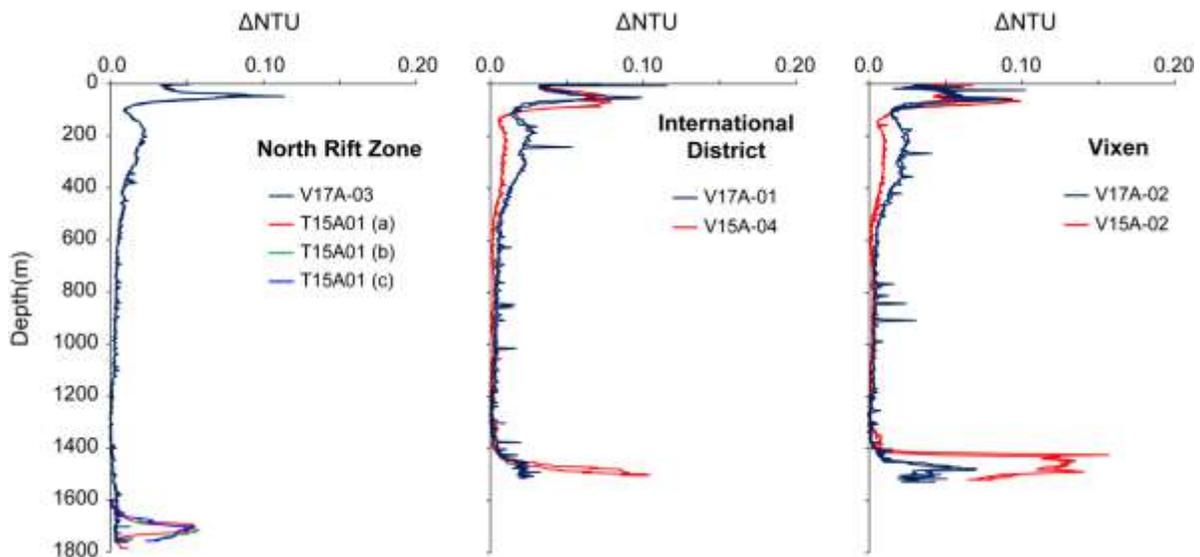


Table 4.5.1-2 V17-A-01 CTD Cast Location and Sampling Information
X indicates that a sample was taken for the given type of analysis.

Cast#	V17A-01					
Station Name:	International District Castle Vent					
Cruise:	RR1712 Axial 2017					
Date	7/15/2017					
Time start down	21:07					
Time at surface	22:26					
Latitude deg min	45	55.571				
Longitude deg min	129	58.796				
File	V17A01.HEX					
Rosette Pos#	depth	Helium	CH4/H2	Trace Met	Nutrients	DNA
1	1511	x	x			
2	1511			x	x	x
3	1502	x	x			
4	1502			x	x	x
5	1477	x	x			
6	1477			x	x	x
7	1452	x	x			
8	1452			x	x	
9	1427	x	x			
10	1427			x	x	
11	1402	x	x			
12	1402		x	x	x	
13	1375		x	x	x	
14	1352	x	x		x	
15	1352					
16	1325		x			
17	1302	x	x	saved for background water		
18	1302			x	x	x
19	1178	x	x			
20	1178					
21	1178					

Table 4.5.1-3 V17-A-02 CTD Cast Location and Sampling Information
 X indicates that a sample was taken for the given type of analysis.

Cast#	V17A-02					
Station Name:	Vixen					
Cruise:	RR1712 Axial 2017					
Date	7/16/2017					
Time start down	4:34					
Time at surface	5:52					
Latitude deg min	45	55.059				
Longitude deg min	129	59.604				
File	V17A02.HEX					
Rosette Pos#	depth	Helium	CH4/H2	Trace Met	Nutrients	DNA
1	1526	x	x			
2	1526			x	x	x
3	1516	x	x			
4	1516			x	x	x
5	1501	x	x			
6	1501			x	x	x
7	1476	x	x			
8	1476			x	x	
9	1450	x	x			
10	1450			x	x	
11	1426	x	x			
12	1426			x	x	
13	1400	x	x			
14	1400			x	x	
17	1298	x	x			
18	1298				x	

Table 4.5.1-4 V17-A-03 CTD Cast Location and Sampling Information X indicates that a sample was taken for the given type of analysis.						
Cast#	V17A-03					
Station Name:	NRZ Happy Hour Vent Field					
Cruise:	RR1712 Axial 2017					
Date	7/22/2017					
Time start down	21:30					
Time at surface	22:45					
Latitude deg min	46	7.253				
Longitude deg min	129	58.21				
File	V17A03.HEX					
Rosette Pos#	depth	Helium	CH4/H2	Trace Met		
1	1760	x	x			
2	1760			x		
3	1750	x	x			
4	1750			x		
5	1727	x	x			
6	1727			x		
7	1702	x	x	x		
8	1677			x		
9	1677	x	x			
10	1652			x		
11	1653	x	x			
12	1627			x		
13	1627	x	x			
14	1601			x		
15	1602	x	x			
16	1577			x		
17	1577		x			
19	1550		x			
21	1500		x			
23	1400		x			

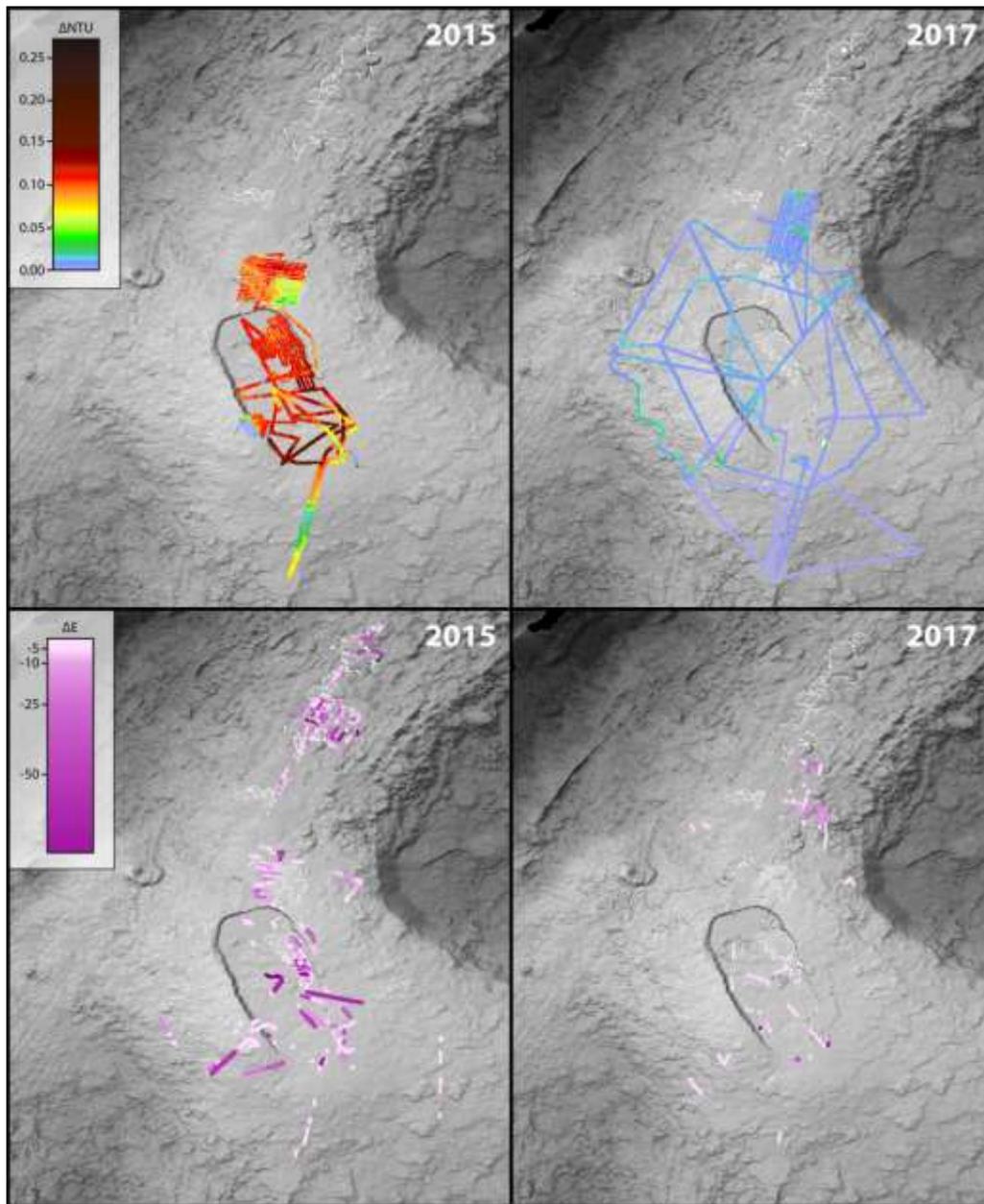
4.5.2 MAPR Plume data

Plume data from Sentry missions (MAPR)

Sharon Walker

A PMEL MAPR (Miniature Autonomous Plume Recorder) was mounted on Sentry for each mission during cruise RR1712. The MAPR measured temperature, pressure, turbidity (optical backscatter) and ORP. The latter two sensors are identical to those on the CTD. In general, the turbidity and ORP data from the sensors on the MAPR were of much better quality than the comparable sensors integrated directly into Sentry. While Sentry mission tracklines were different in 2015 and 2017, the surveys were conducted 65-70 m above bottom both years. The maps below are a useful comparison for broader plume distributions and intensities between 2015 and 2017 (top = turbidity (ΔNTU); bottom = ORP anomaly (ΔE); left = 2015; right = 2017).

Figure 4.5.2-1 MAPR turbidity and ORP anomaly maps for Sentry dives.



MAPR mooring (2015-2017)

Sharon Walker

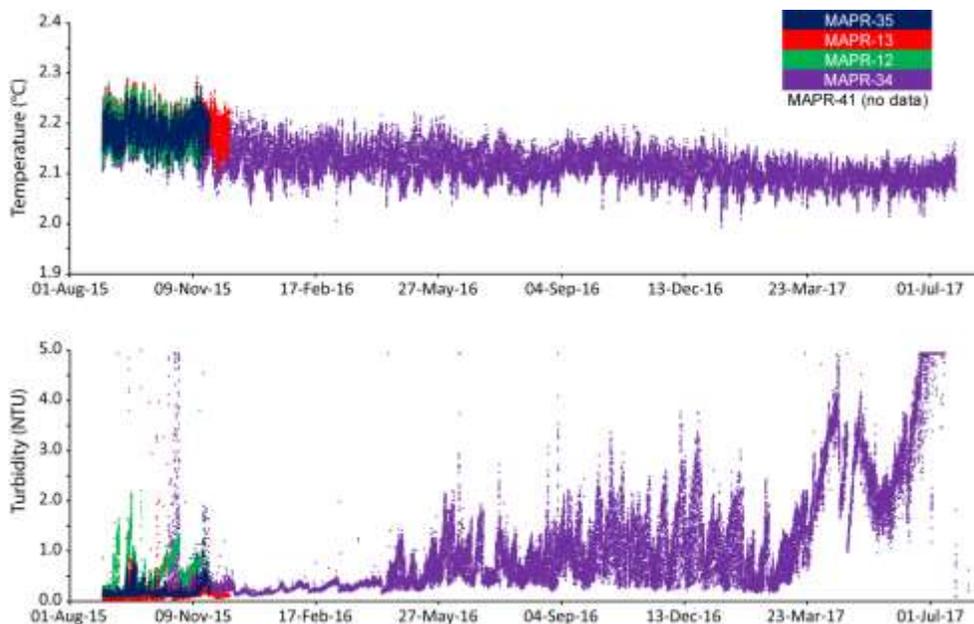
A MAPR mooring was installed in 2015 during the response to the eruption. The mooring was intended to track the evolution of the plume in conjunction with a time-series RAS sampler collecting vent fluids in a low-temperature vent on the nearby lava flow. The MAPR mooring was placed near the thick NRZ lava flows where a strong plume was seen in 2015. The mooring was supposed to be recovered in 2016 during an OOI cruise, but time ran out on that cruise and the mooring was left in the water.

The MAPR mooring was recovered during this cruise (located at 46° 05.607'N 129° 58.889'W; 1780m water depth). MAPRs were located at ~25 m intervals in the bottom 130 m of the water column. All MAPRs had significant bio-fouling upon recovery (photos below; seen in data especially after about mid-March 2016). Data was successfully recovered from 4 of the 5 MAPRs. MAPR-41, 30 meters above bottom, failed to begin sampling (no data). Unfortunately, this was the only ORP-capable MAPR on the mooring. MAPR-34 sampled for the entire duration of the mooring, while the other MAPRs sampled for only ~3 months. The short sampling period is due to excessive power use by the version of MAPR electronics installed in those MAPRs (MAPR-34 is equipped with older, but more reliable boards). Despite these setbacks, the data that was acquired was of good quality, and the record from MAPR-34 (~55 m above bottom) suggests that bio-fouling was not a significant problem until well after the other MAPRs stopped sampling. Significant variability in plume intensity (turbidity) can be seen in the first 3 months after deployment (4-7 months post-eruption).

Figure 4.5.2-2 Comparison of recovered MAPRs showing differences in bio-fouling.



Figure 4.5.2-3 Temperature (top) and turbidity (bottom) data from the MAPRs.



4.6 Axial 2017 Moorings

Lauren Roche

Objectives:

Recover 2 Bottom Pressure Recorders (BPRs) (BPR-South-2, BPR-Center)
Service and Redeploy 2 Recovered BPRs (BPR-South-2, BPR-Center)
Recover 1 Ocean Bottom Hydrophone (OBH)
Recover 1 Miniature Autonomous Plume Recorder Mooring (MAPR)
Deploy 2 new BPRS (BPR-North, BPR-West)
Deploy and Survey 1 OBH

BPR and OBH Recoveries

Moorings were recovered using the a-frame and capstan.

BPR-South-2 and BPR-Center were recovered on 7/14/17 and 7/15/17 in calm daylight conditions. Release commands were sent 0.3 nm from mooring location; each mooring took 20 minutes to reach the surface.

Moorings were deconstructed and BPRs taken into the lab for servicing.

OBH was recovered on 7/20/17. Acoustic release was successfully enabled but further communication was unsuccessful. Ship moved closer to OBH location and anchor was successfully released after attempting to communicate and various power and sensitivity settings. OBH platform had extensive corrosion.

BPR Turnarounds

BPR-South-2 and BPR-Center successfully recorded data for the duration of their 2-year deployments. BPR-South-2 had a clock error of +30 seconds; BPR-Center had a clock error of +24 seconds. The sensor coefficients for BPR-South-2 were not in the paros.txt file provided; coefficients for another instrument were inputted to be able to check the data. BPR-South-2 did not have the watchdog jumper on JP6; a jumper was taken from BPR-Center JP18 (Dirk Tagawa confirmed this jumper is not needed). For both BPRs, Paros valves were visually inspected, batteries were replaced, and o-rings were replaced. The face seal o-rings were small and therefore difficult to keep in place while attempting to assemble BPRs. CF cards and file names were reused (data was copied over and then erased from cards). BPRs were initialized on 7/16/17.

BPR and OBH Deployments

Deployments were performed with the a-frame and capstan.

BPR-North and BPR-West were initialized and deployed on 7/15/17.

OBH-Center was deployed on 7/15/17 and surveyed on 7/16/17. Had difficulty enabling release and once enabled, had some difficulty getting slant ranges. May have been due to interference from AUV Sentry although frequencies were different. *R/V Revelle* performed mooring calibration survey from four points around OBH-Center with a radius of 750 meters. Location was calculated using the program Angulate.

BPR-South-2 was redeployed on 7/15/17 and BPR-Center on 7/16/17. These instruments were rebuilt with new acoustic releases, line, anchors, and hardware. Sling links, platforms, and floats were reused. One shackle on BPR-Center became side loaded when a slip line was pulled out, but it righted itself as deployment continued. AUV Sentry was deployed between the BPR-South-2 and BPR-Center deployments; BPR-Center recorded data on deck for about 24 hours before deployment.

The hardware on the reused float packages (used for BPR-West and BPR-North) was rusted; this should be taken into consideration on next servicing

All releases tested and disabled.

MAPR Recovery

The MAPR mooring recovery was first attempted on 7/20/17. Acoustic release did not communicate when using various power and sensitivity settings from multiple locations around and directly on top of mooring. Recovery was postponed as nightfall approached. The following day, communication was attempted again but unsuccessful. Performed a blind release by sending release code multiple times while ship was in place for recovery. Blind release was successful; mooring surfaced in 20 minutes. MAPR mooring was recovered using a-frame and capstan, stopping to remove MAPRs as line came in. MAPR conditions were documented.

Table 4.6-1 Recoveries

Instrument	Date (UTC)	Time (UTC)	Depth (m)	Latitude	Longitude	Comments
BPR-South-2	7/14/2017	23:30	1530	45 55.081 N	129 59.550 W	time/location instrument on deck
BPR-Center	7/15/2017	2:20	1530	45 57.201 N	130 00.562 W	time/location instrument on deck
OBH	7/20/2017	3:06		46 05.736 N	129 58.780 W	time/location instrument on deck
MAPR	7/21/2017	18:55	1780	46 05.284 N	129 59.466 W	time/location instrument on deck

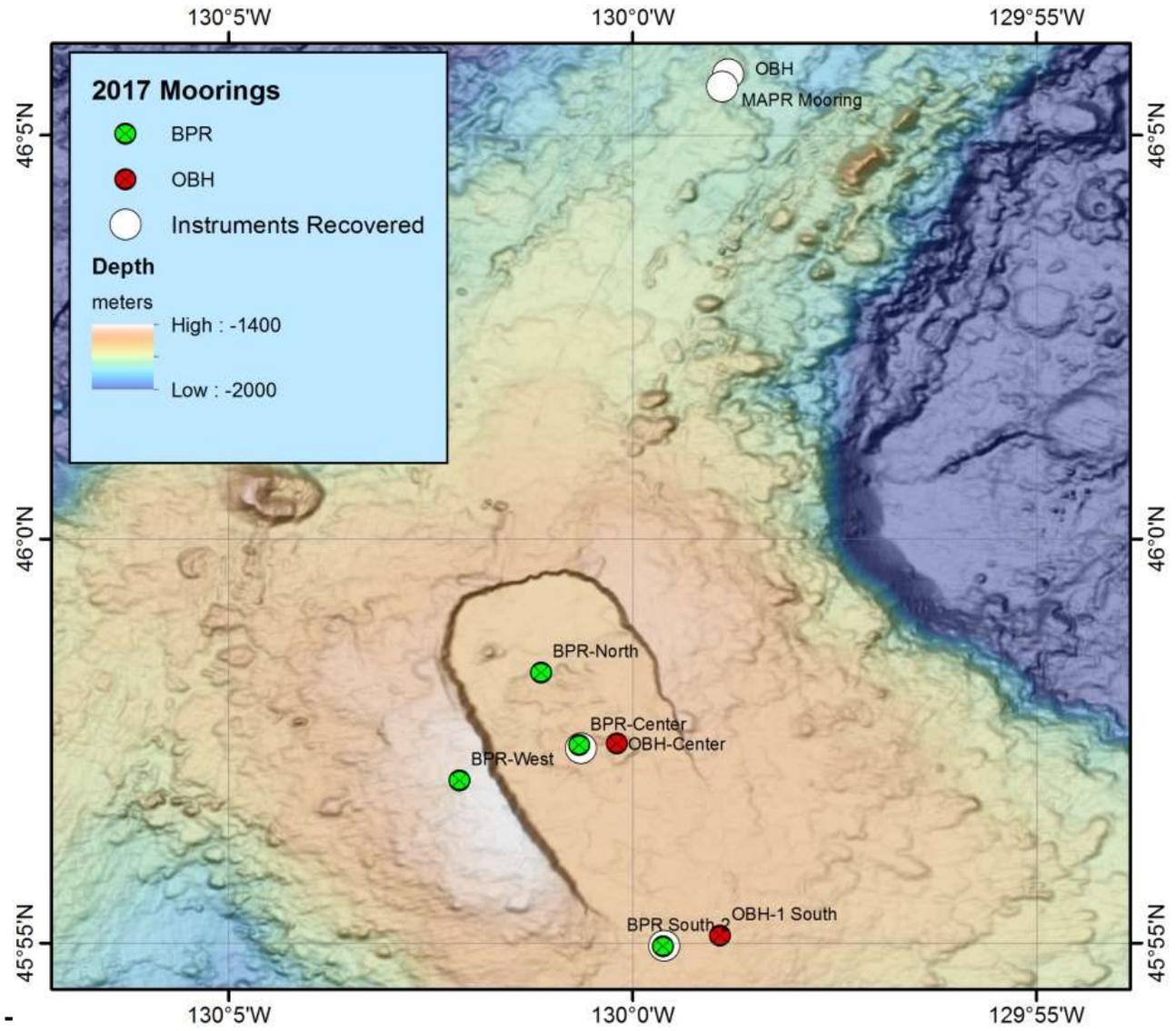
Table 4.6-2 Deployments

Instrument	Date (UTC)	Time (UTC)	Depth (m)	Latitude	Longitude	Comments
BPR-South-2	7/16/2017	7:13	1530	45 54.958 N	129 59.619 W	
BPR-Center	7/17/2017	5:52	1530	45 57.447 N	130 00.658 W	
BPR-North	7/15/2017	4:38	1578	45 58.350 N	130 01.128 W	
BPR-West	7/15/2017	5:50	1418	45 57.011 N	130 02.141 W	
OBH Center	7/15/2017	3:35	1558	45 57.467 N	130 00.195 W	Location calculated from survey

Table 4.6-3 Release Codes

Instrument	Release S/N	Enable	Disable	Release	Comments
BPR-South-2	35161	104600	104623	125267	
BPR-Center	34473	272474	272505	253162	
BPR-North	52409	613424	613441	631056	OSU release
BPR-West	43296	463105	463126	446426	
OBH	34394	270774	271001	252277	

Figure 4.6-1 2017 Moorings. (OBH-1 South was deployed previously and remains in place).



4.7 Mapping

4.7.1 AUV Sentry Bathymetric Surveys

Bill Chadwick and Scott Nooner

The primary goal of the Sentry dives 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 will be used to augment and expand the deformation monitoring at Axial Seamount conducted by the seafloor pressure measurements. The pressure data are higher vertical resolution (± 1 cm) and are continuous in time, but are only being made at 10 measurement points (analogous to campaign- and continuous-GPS on land). On the other hand, the AUV bathymetric resurveys have lower vertical resolution (± 20 cm), but can extend over a much larger area and are spatially continuous along survey tracklines. Thus they form a powerful combination.

The AUV Sentry mapping dives were conducted such that: (1) the survey altitude was 65 meters for 1.5 meter lateral resolution, (2) the survey speed was ~ 1.8 knots, (3) dive durations were between 16-26 hours, (4) AUV Sentry came back into acoustic communication range for navigation updates at least every 6-8 hours, and (5) an battery powered and internally recording PMEL MAPR instrument was mounted on AUV Sentry for all dives. The MAPR data collection was successful on all dives, but will require on-shore data analysis and is not discussed further here.

We made 5 successful AUV Sentry dives during this cruise (dives 442-446). Each dive mission was designed as a series of waypoints in consultation with Sentry Expedition Leader Sean Kelley. 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 "2017-nooner-cruise-report.pdf". The multibeam mapping sonar on the vehicle is a Reson 7125 400 kHz multibeam sonar. 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. Preliminary processing of the multibeam sonar data was done at sea, but final processing of the data and comparison with earlier surveys will be done by Dave Caress and Jenny Paduan at MBARI.

Sentry Dive Summaries

The first four of the five Sentry dives (442, 443, 444, and 445) were all parts of the overall repeat mapping pattern for measuring deformation between surveys. This continues a time series begun with the MBARI Mapping AUV in 2011, 2014, 2016, and by AUV Sentry in 2015 and now 2017. The fifth and final dive (446) was a standard bathymetric mapping dive to collect new high-resolution bathymetry in an unmapped area NE of the caldera ("mowing the lawn").

Table 4.7.1-1

Sentry Dive Lowering Statistics					
Lowering	Start Time	End Time	Survey Time hours	Deck-to-Deck hours	Distance Travelled (km)
Sentry 442	7/15/2017 18:03	7/16/2017 10:32	15.1	16.5	52.84
Sentry 443	7/17/2017 03:44	7/18/2017 02:48	21.8	23.1	73.29
Sentry 444	7/18/2017 21:51	7/20/2017 00:02	24.8	26.2	82.29
Sentry 445	7/20/2017 22:56	7/21/2017 15:14	11.9	16.3	40.29
Sentry 446	7/22/2017 04:31	7/22/2017 20:26	14.5	15.9	50.55

2017 Chadwick/Nooner Cruise Sentry Navigation

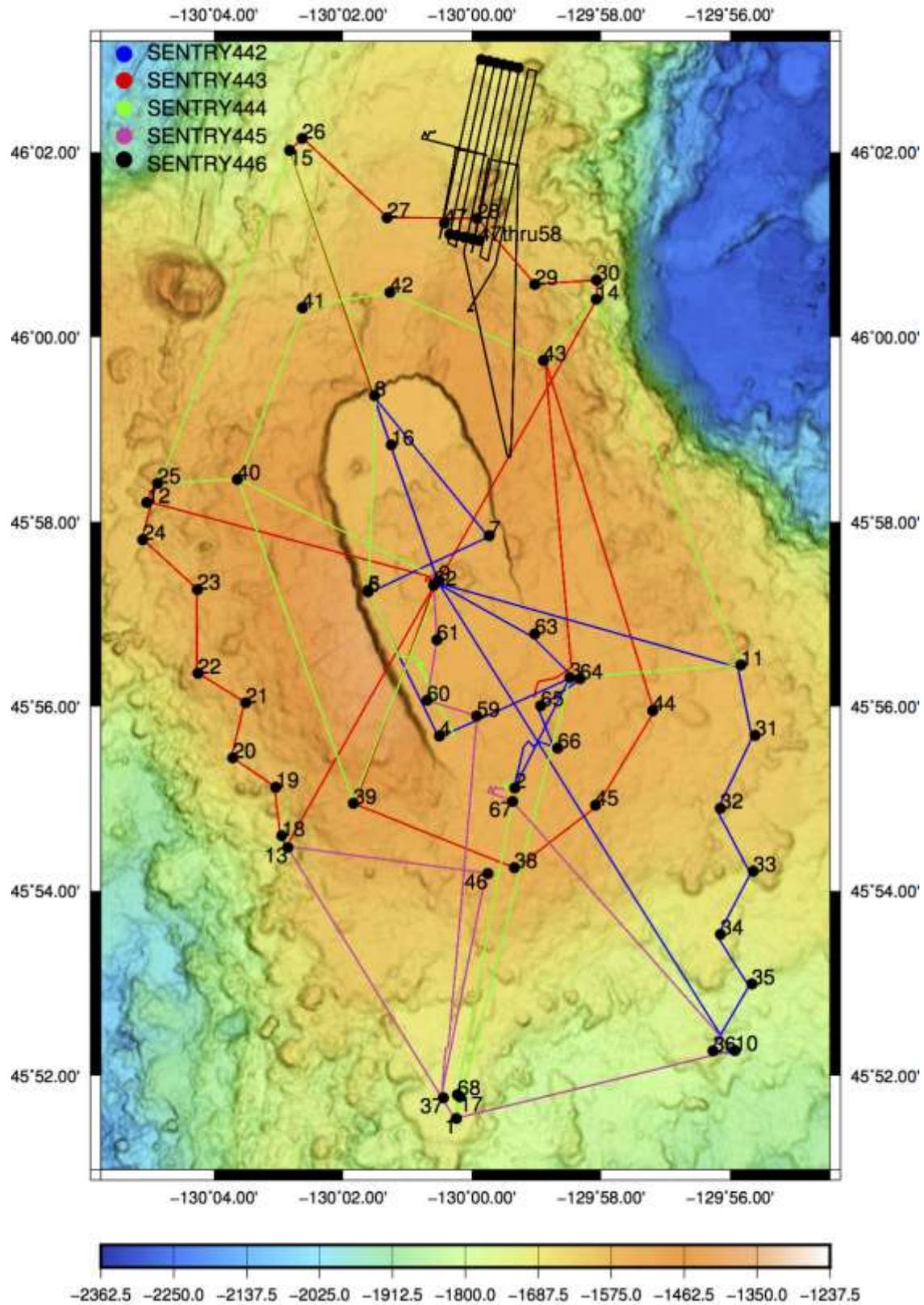


Figure 4.7.1-1 Map showing tracklines of the five AUV Sentry dives (color-coded according to dive number).

4.7.2 RR1712 R/V *Revelle* EM122 Multibeam Seafloor and Water Column Data

Susan G. Merle

Multibeam seafloor data (bathymetry and backscatter) were collected on the transit to and from Axial, whereas water column data were collected on the transit back to Newport only. 8,661 km² of seafloor were mapped, nearly all of which were repeat data.

The seafloor data were noisy, which is not surprising given the data were collected as the ship was transiting at 10 kts. Bad beams near nadir and noisy (washboard) ragged swath edges were persistent artifacts evident throughout the entire dataset. The data were cleaned using the MBSYSTEM 3D mbeditviz program. The bad beams were mostly removed but it was impossible to clean up the washboard edges of the data.

Three bubble streams were detected in the water column data, located 28 and 37 nautical miles offshore in water depths of 295 and 345 m respectively.

The data will be archived at NCEI, formerly NGDC.

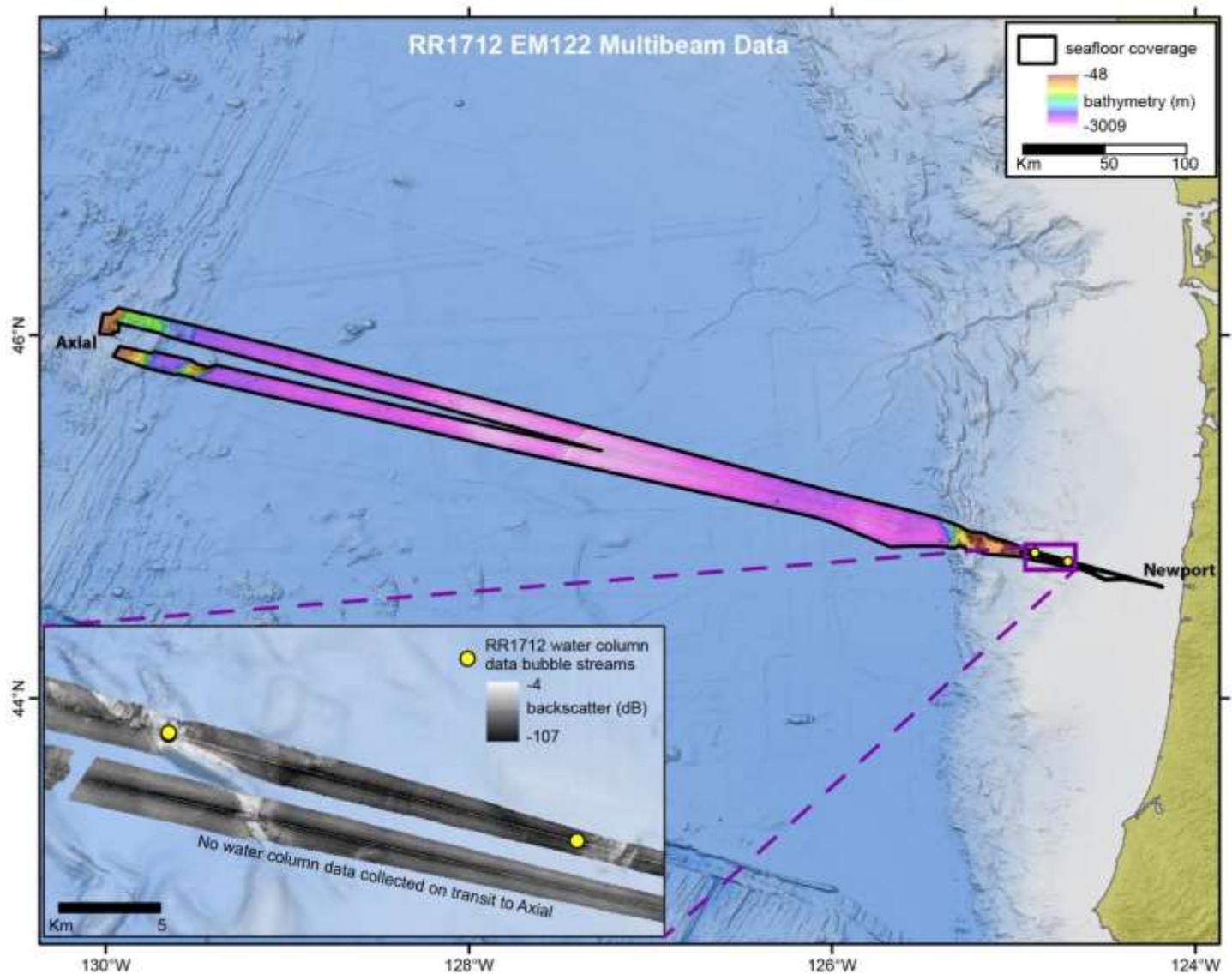


Figure 4.7.2-1 Map showing EM122 data collected.

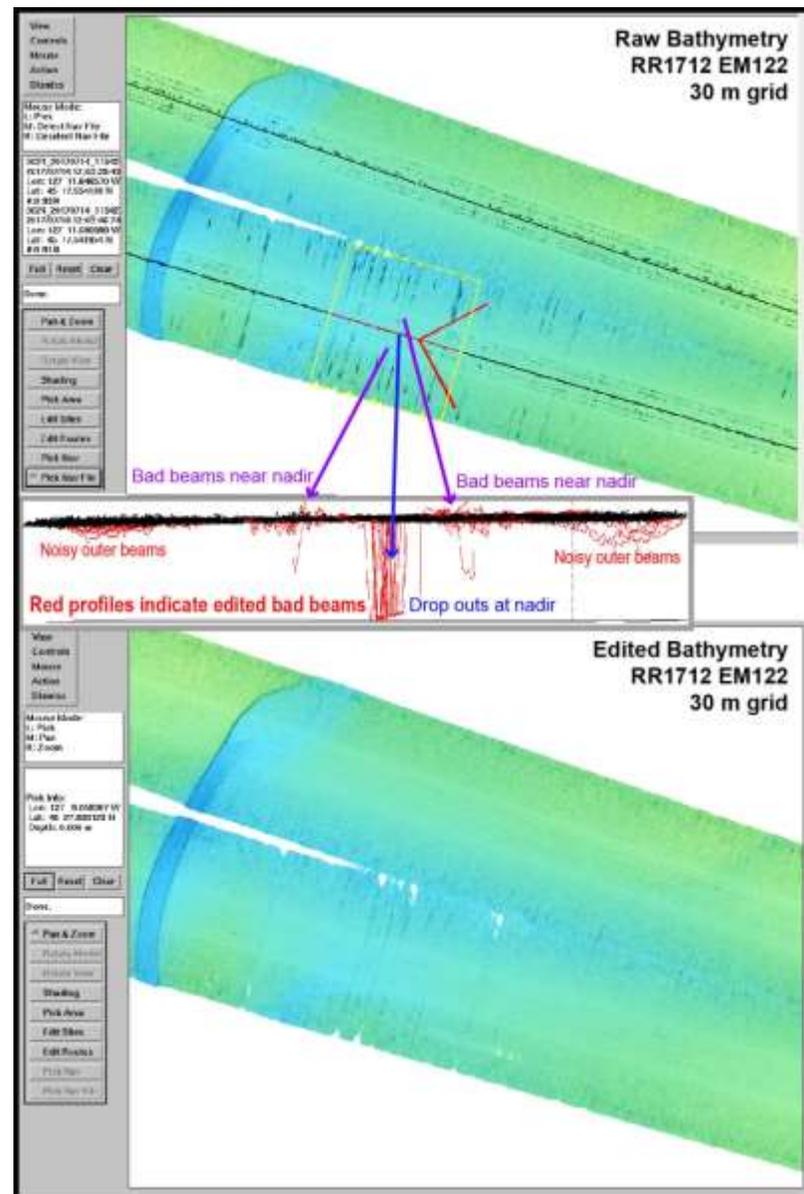
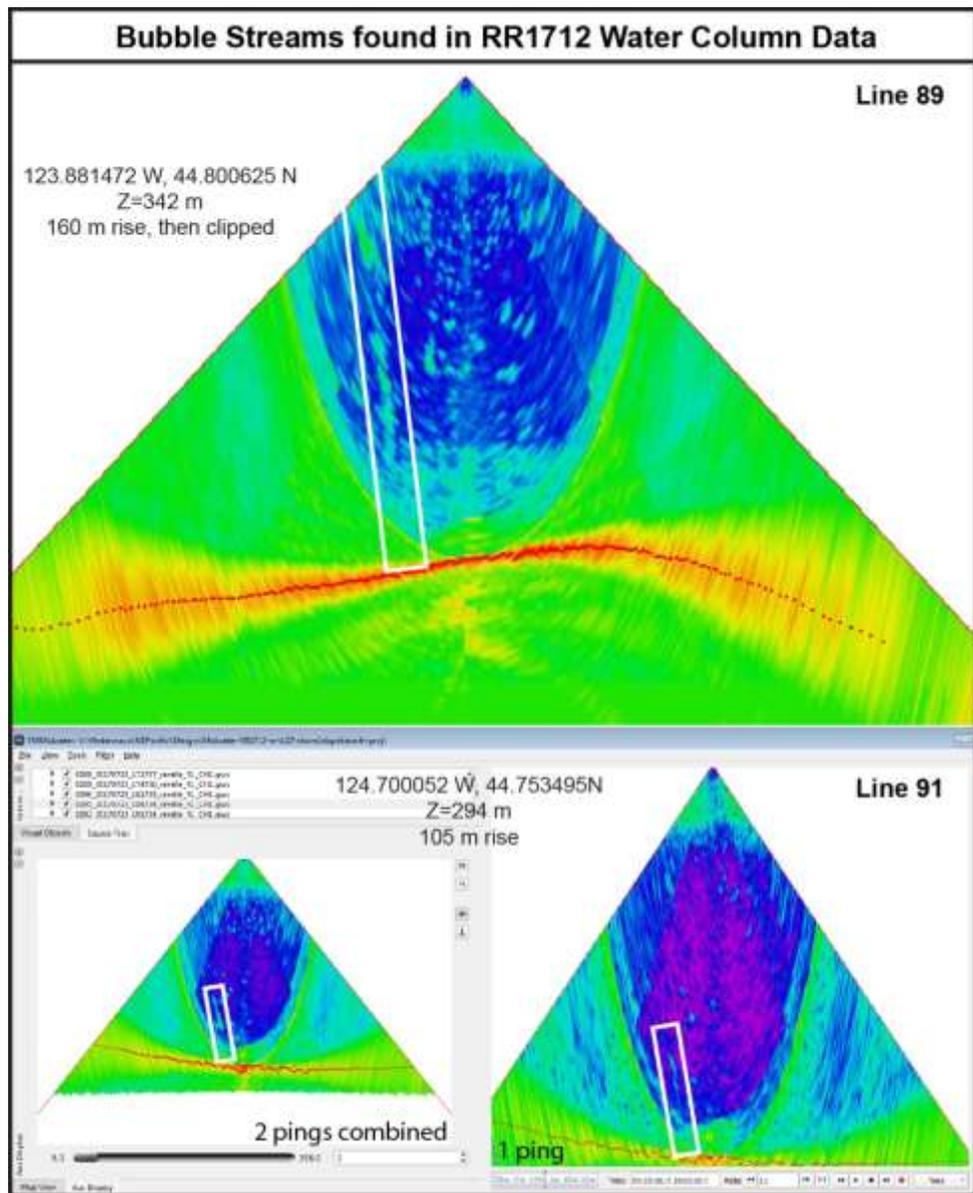


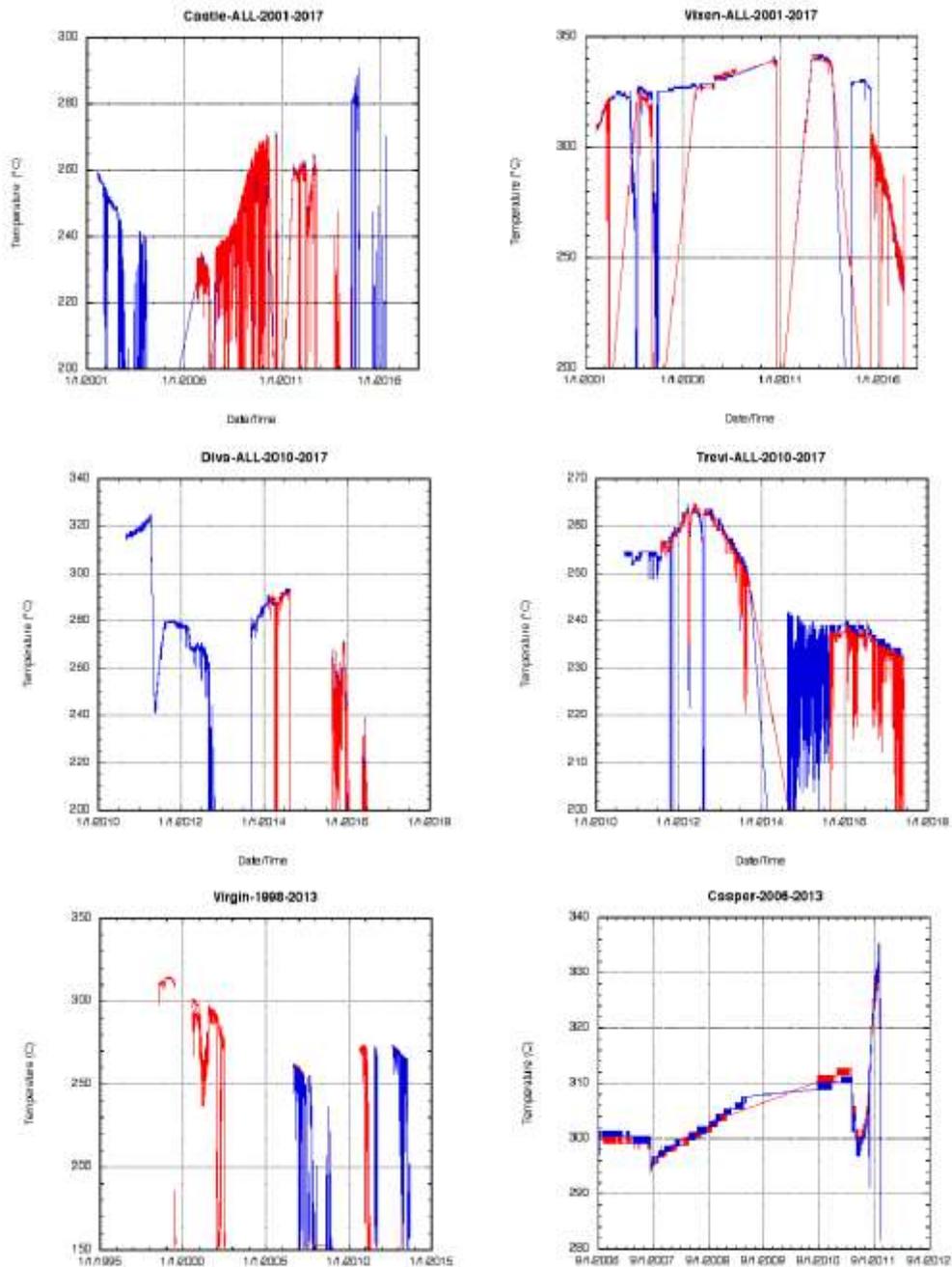
Figure 4.7.2-2 View of bubble streams detected near shore (left). (Right) Swaths showing noise and bad data in raw data (top) and data after editing (bottom).

4.8 Hydrothermal Vent Temperature Recorders

Bill Chadwick

We recovered HOBO-style high-temperature probes (aka MISO) at Castle, Diva, Trevi, and Vixen hydrothermal vents (all anhydrite chimneys). From these new data we have updated long-term plots of these temperature data at each vent. In each plot, there are trends in the maximum recorded temperature, but the excursions to lower temperature should be ignored, because they are largely due to the probes falling out of the vents. The two colors in parts of the plots are when probes with two independent sensors were used.

Fig. 4.8-1 Graphs of high-temperature recorders for various deployment years.



Observations:

- The Castle and Vixen records are both 2001-2017. Castle shows rising temperature leading up to the 2011 eruption, and perhaps the 2015 eruption, but the record is pretty incomplete since 2011 (it's difficult to keep the probe in the vent there). The Vixen record has a moderate rise in temperature from 2001-2013 and has been declining since then. There is an apparent decline from 2015-2017 but it could be due to the probe being on the edge of the fluid flow.
- The Diva and Trevi plots are both from 2010-2018. Diva was one of two probes showing a sudden temperature decrease during the 2011 eruption (the other was Casper; Vixen shows a small co-eruption decrease in 2015). Temperature at Diva rose before both the 2011 and 2015 eruptions and was lower afterward. At Trevi, temperature increased from 2011-2013 and has been declining since then.
- The current long-term plots from Virgin (1998-2013) and Casper vents (2006-2013) are included, even though there is no new data added. The temperature at Virgin vent had been declining since after the 1998 eruption, but the record is not very complete. Casper shows a co-eruption decrease in temperature in 2011, followed by an increase.

We currently have HOBO probes in the following vents: Virgin, Vixen, Castle, Diva, and Trevi.



Fig. 4.8-2 MISO 102-Left shows instrument at Diva before recovery in 2017 showing the tip of the wand not in the hot fluid. Right-image of probe at deployment in 2015. Jason was positioned in opposite headings between the 2 years.

Table 4.8-1 Temperature Recorders remaining at Axial Seamount.

Instrument	Location	type	Dive Deployed	Comments
MISO 153	Castle	HiTemp	J-965	Deployed 2017 in same place as one recovered.
HOBO 130	Diva	HiTemp	J-965	Replaced HOBO 102
HOBO 129	Virgin	HiTemp	J-966	In anhydrite flow
HOBO 151	Vixen	HiTemp	J-967	Deployed in place of Miso103
HOBO 104	Trevi	HiTemp	J-967	Deployed where took HFS and gas samples.
MTR 3040	Mkr113 Vent	LowTemp	J-965	Replaced MTR 3173
MTR 3197	Anemone	LowTemp	J-966	In lower temp flow; replaced 3043.
MTR 3048	Marker-33 V	LowTemp	J-967	Deployed at HFS sample site.
MTR 3201	Marker N3 V	LowTemp	J-967	Deployed at HFS sample site.
MTR 4127	Snow drift (NRZ)	LowTemp	J2-826	With Marker 261 where fluids and mat were sampled on 2015 lava
MTR 3312	Fuzzy tubeworm bush	LowTemp	J2-789	deployed 2014: 3m W of RSN cam
MTR 3185	Marshmallow	LowTemp	J2-789	deployed 2014: center of small lonely bush
MTR 3054	Medusa (Marker 68)	LowTemp	J2-789	deployed 2014: next to mkr anchor
MTR 4099	Anemone vent	LowTemp	J2-660	deployed 2012, placed where MTR 4096 was; Lost?
MTR 3004	Anemone vent	LowTemp	J2-726	deployed 2013; Lost?

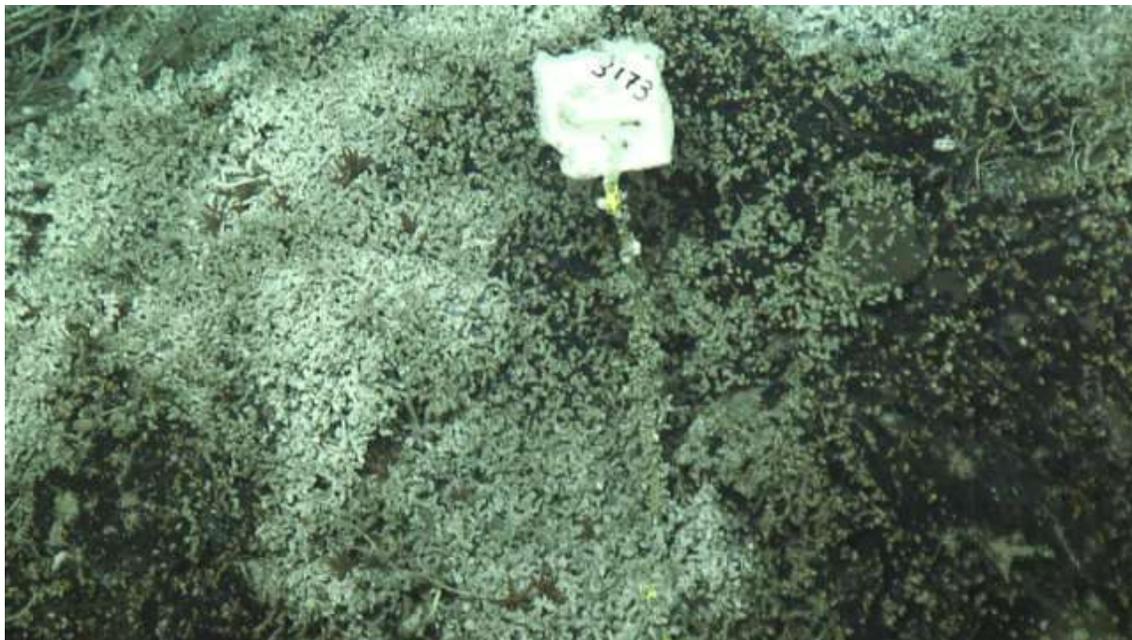


Fig 4.8-3 MTR 3173 at Mkr-113 vent before recovery on J2-965 after a 1-year deployment.

4.9 Outreach and Education

Bill Chadwick, Teresa Atwill, Andra Bobbitt

As in previous years, we maintained an on-line Cruise Blog for outreach and education at the following URL:

<http://axial2017.blogspot.com>



Figure 4.9-1 Teacher At Sea, Teresa Atwill, taking photos in the control van during the Jason.

Teresa Atwill (Lincoln County School District) was our teacher-at-sea this year and wrote all the entries on the cruise blog. The blog entries were posted daily (12 posts in total), from just prior to the cruise to just after we returned to port. The blogs describe the science teams and the research conducted onboard the ship, with background information to help readers better understand the geologic setting and significance of our research at Axial Seamount. Images and videos were embedded in the blogs to help illustrate the operations, the people, the submersible vehicles we were using, and life on board the *R/V Revelle*.

There were 2533 hits to the blog recorded, and the most popular blog entries were “Science Crew”, “The Thin Line”, “First Jason Dive”, “Before We Go”, “It’s Magical”, and “Text Messages and Transducers”. Since the cruise, the most popular blog post is the one about “STEM Careers”. Most hits to the blog are from the United States, Germany, Poland, and Australia with additional hits from other countries in smaller numbers.

After the cruise, Teresa Atwill created an additional web site linked to the one above that includes information for teachers on how to connect the research at Axial Seamount with classroom lessons about ocean and volcano research. The link to this site will be sent out to teachers through the Oregon Coast Stem Hub and other Northwest Stem Hub groups.

In addition, highlight videos from our five Jason ROV dives were created by Kjersten Hellis and are posted on the NOAA-PMEL-EOI You Tube channel, which is linked on the EOI web page:

<https://www.pmel.noaa.gov/eoi/>

...and the EOI Axial Seamount web page:

https://www.pmel.noaa.gov/eoi/axial_site.html

Direct links to the EOI YouTube channel for all our video clips is at this URL:

<https://www.youtube.com/channel/UCwYal-KFaA52F5IF9IUd9oA>

The URL for the 5 video clips from this year’s Axial cruise is:

<https://www.youtube.com/playlist?list=PLgxHFq3fMoN-AgwjAtUjmfqtmOCznHH94>

The URL for all the previous Axial Seamount video clips on the EOI You Tube channel is:

https://www.youtube.com/channel/UCwYal-KFaA52F5IF9IUd9oA/playlists?view=50&shelf_id=11&sort=dd

5.0 JASON Imagery and Video

Bill Chadwick

Automated H264 Continuous Video Recordings

Three 1080i camera streams (brow camera, pilot camera, science camera) were recorded to hard drive-based video files. Raw videos are MPEG Transport Stream (.ts) files compressed (output rate was 6000 kbps) using the H.264 codec. Image resolution is 1920x1080 pixels. These 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. In addition to the video files, metadata broadcast in real-time on the Jason network was captured to subtitle files (.srt format), which can produce a line of text overlain on the video. These components were merged into a Matroska container file (.mkv). Components are provided in subdirectories.

This was the first cruise with a new set of Jason control vans and consequently there was a little bit of a learning curve about the new video recording systems. The following problems occurred related to the continuous recording of video in H264 format, which led to missing video data on the Jason data hard disk delivered to us at the end of the cruise. However, once these missing data were identified, the Jason video was reprocessed at WHOI and most of the missing files were recovered and delivered to us (several months) after the cruise.

Dive	
J2-965	Initially 4+ hours of H264 video was missing from the time interval 2017-07-16 20:06:30 to 2017-07-17 00:12:09, but these data were recovered after reprocessing.
J2-966	Three days of the H264 video recordings (7/18, 7/19, and 7/22) were not processed at sea from .ts to .mkv files, and the files from 7/18 were not transferred and processed at all at sea. Consequently, these video files were missing from the data delivered at the end of the cruise. However, these data were recovered by reprocessing and were delivered after the cruise.
J2-967	H264 files were OK on the initial data hard disk.
J2-968	Same problem as for J2-966 – some .mkv files were not generated at sea, but the missing data were recovered during reprocessing after the cruise.
J2-969	Jason descent and first 6 minutes on the bottom were not recorded.

The following is a listing of the number of H264 files and the total file size

Dive	Number of H264 files	Total file size
J2-965	158	165.62 Gb
J2-966	693	807.28 Gb
J2-967	377	434.84 Gb
J2-968	79	89.86 Gb
J2-969	88	97.30 Gb
Totals	1395	1.595 Tb

High-Definition video highlights

Highlight video was recorded to hard disk at a higher quality format than the H264 recordings. The highlight recordings were compressed in real time using the ProRes422 family of codecs and are renamed after each dive so that they indicate lowering ID, start time, and stop time. A summary listing of the highlight video clips are included in the table below. The recordings include time code that is synchronized to the same time reference as the other logging computers in the Jason system.

Dive	Number of files	Total file size
J2-965	21	56.27 Gb
J2-966	25	51.85 Gb

J2-967	19	34.97 Gb
J2-968	18	35.64 Gb
J2-969	28	53.20 Gb
Totals	111	231.93 Gb

HD video frame grabs

Frame grabs were captured during the Jason dives by the video loggers from two of the many cameras on Jason simultaneously. The choice of the two camera is selectable, but usually included the Science Camera and another. These are saved as camA and camB*.tif files (1920 x 1080 pixels) that are ~3 Mb in size. File names include date and time.

Dive	Number of frame grabs	Total file size
J2-965	710	2.47 Gb
J2-966	1413	4.45 Gb
J2-967	813	2.65 Gb
J2-968	905	3.01 Gb
J2-969	1500	4.62 Gb
Totals	5341	17.20 Gb

Super Scorpio digital still camera

A Super Scorpio digital still camera was mounted on the same pan & tilt on Jason as the Science Camera. The images are saved as .jpg files (4672 x 2628 pixels) that are 4-6 Mb in size. The exposure and image quality are quite good when we took the time to stop and frame a picture for this camera, but the camera controls were not easy to use, so we did not utilize this camera very much.

Dive	Number of DSC images	Total file size
J2-965	7	37.8 Mb
J2-966	102	384.7 Mb
J2-967	47	205.9 Mb
J2-968	38	162.3 Mb
J2-969	108	446.6 Mb
Totals	302	1.24 Gb

Table 5-1 Video highlights.

New Clip Name	Dive ID	Original Clip ID	Log Start Time	Log End Time	Camera Source	Logger Comment
J2-965_20170716163110-20170716163116.mov	J2-965	SC1ATK22.mov	NA	16:31:17:00	Pilot	Throwaway
J2-965_20170716195147-20170716195625.mov	J2-965	SC1ATK23.mov	19:52:03:00	19:56:25:08	Science	360 view of the top of El Guapo.
J2-965_20170716195914-20170716202903.mov	J2-965	SC1ATK24.mov	19:59:19:00	20:29:01:29	Science	Fluid sample from the top of El Guapo.
J2-965_20170716202951-20170716203425.mov	J2-965	SC1ATK25.mov	20:29:52:29	20:34:25:06	Science	Gas tight bottle-5 sample from the top of El Guapo.
J2-965_20170716205009-20170716205101.mov	J2-965	SC1ATK27.mov				Chimney grab sample from the top of El Guapo.
	J2-965		21:32:10:00	21:33:30:11	Science	Gas tight bottle sample 15 at Diva. Larger fish in frame.
J2-965_20170716213159-20170716213329.mov	J2-965	SC1ATK29.mov				
J2-965_20170716220319-20170716220624.mov	J2-965	SC1ATK30.mov	22:03:21:00	22:06:24:20	Science	MISO retrieval and deployment at Diva.
J2-965_20170716220651-20170716221149.mov	J2-965	SC1ATK31.mov	22:06:51:00	22:11:49:00	Science	Fly over of Escargot with view of pig instrumentation on flat top.
J2-965_20170716221631-20170716221748.mov	J2-965	SC1ATK32.mov	22:16:32:00	22:17:48:15	Science	Temperature measurement at Tiny Towers.
J2-965_20170716222123-20170716222447.mov	J2-965	SC1ATK33.mov	22:21:24:00	22:24:48:09	Science	Blue mats and HSF-17 sample at Tiny Towers.
J2-965_20170716234859-20170716235029.mov	J2-965	SC1ATK34.mov	23:49:00:00	23:50:30:00	Science	Good view of tube worms
J2-965_20170716235222-20170716235412.mov	J2-965	SC1ATK35.mov	23:52:22:00	23:54:13:07	Science	Looking at a tube worm colony up close
J2-965_20170716235507-20170716235609.mov	J2-965	SC1ATK36.mov	23:55:10:00	23:56:09:23	Science	Trying to get a better view of the colony
J2-965_20170716235941-20170717000129.mov	J2-965	SC1ATK37.mov	23:59:40:00	00:01:29:15	Science	Noticing some peach colored microbe mats and red tube worms
J2-965_20170717000437-20170717000641.mov	J2-965	SC1ATK38.mov	00:04:36:00	00:06:41:10	Science	Getting temperature reading for HFS-20
J2-965_20170717001139-20170717001300.mov	J2-965	SC1ATK39.mov	00:11:40:00	00:13:00:21	Science	Preparing to take HFS-20; close up on tube worm colony
J2-965_20170717002928-20170717003059.mov	J2-965	SC1ATK40.mov	00:29:28:00	00:31:00:07	Science	Started with a good view of some tube worm tops; can see anemone later
J2-965_20170717013537-20170717013806.mov	J2-965	SC1ATK41.mov	01:35:37:00	01:38:05:28	Science	Close up view of clams and one sad, pathetic tubeworm

New Clip Name	Dive ID	Original Clip ID	Log Start Time	Log End Time	Camera Source	Logger Comment
J2-965_20170717014428-20170717014522.mov	J2-965	SC1ATK42.mov	01:44:28:00	01:45:23:03	Science	Interesting tube coming out of clam
J2-965_20170717015138-20170717015305.mov	J2-965	SC1ATK43.mov	01:50:59:00	01:53:05:28	Science	Recording of collapsed area where we want to sample from next time; may be more active
J2-965_20170717030311-20170717030457.mov	J2-965	SC1ATK44.mov	03:02:00 AM	03:04:00 AM	Science	Jason being pulled from water
J2-966_20170717111446-20170717111709.mov	J2-966	SC1ATK45.mov	11:14:45:00	11:17:08:21	Science	Jason being deployed for the 5 day pressure dive
J2-966_20170717123417-20170717123656.mov	J2-966	SC1ATK46.mov	12:34:17:00	12:36:57:11	Science	Coming in on AX308 for pressure measurement
J2-966_20170717182642-20170717182739.mov	J2-966	SC1ATK47.mov	18:27:20:00	18:27:40:08	Science	Coming in on AX101 for pressure measurement at caldera center
J2-966_20170717212754-20170717213051.mov	J2-966	SC1ATK48.mov	09:27:55 PM	21:30:51:29	Science	AX302 BPR swap in order to deploy Mini BPR #5 and MPR measurement.
J2-966_20170717233629-20170717233721.mov	J2-966	SC1ATK49.mov	23:36:28:00	23:37:22:09	Science	Ropey lava's and a cool crab
J2-966_20170718011431-20170718012049.mov	J2-966	SC1ATK50.mov	01:14:31:00	01:20:49:24	Science	Collapse zone at the border of 2011 flows, approach to Smiley Marker. Longer because I wanted to capture the approach
J2-966_20170718040751-20170718041026.mov	J2-966	SC1ATK51.mov	04:08:01:00	04:10:26:23	Science	Coming in on AX310 for pressure measurement next to the poi cable
J2-966_20170718070647-20170718070813.mov	J2-966	SC1ATK52.mov	07:06:49:00	07:08:13:00	Science	AX104 pressure measurement with MPR.
J2-966_20170718141059-20170718141416.mov	J2-966	SC1ATK53.mov	14:11:00:00	14:14:16:13	Science	View of fissure that opened during 1998 eruption as we approach AX-105
J2-966_20170718203122-20170718203139.mov	J2-966	SC1ATK54.mov				
J2-966_20170718203326-20170718203327.mov	J2-966	SC1ATK55.mov				
J2-966_20170718210139-20170718210511.mov	J2-966	SC1ATK56.mov	21:01:41:00	21:05:11:00	Science	AX104 pressure measurement and sculpin panorama.
J2-966_20170718225529-20170718225713.mov	J2-966	SC1ATK57.mov	22:55:28:00	22:57:13:22	Science	Beautiful view of different lava morphologies on the way to AX310
J2-966_20170718230006-20170718230335.mov	J2-966	SC1ATK58.mov	23:00:05:00	23:03:35:26	Science	Columns and collapse zones on approach to AX310. Looks like a Roman forum
J2-966_20170719102308-20170719102538.mov	J2-966	SC1ATK59.mov	10:23:09:00	10:25:38:16	Science	AX307 pressure measurement. Site of later mini BPR swap.
J2-966_20170719180132-	J2-966	SC1ATK60.mov	18:02:00:00	18:04:45:00	Science	view of Virgin Chimney before being

New Clip Name	Dive ID	Original Clip ID	Log Start Time	Log End Time	Camera Source	Logger Comment
20170719180433.mov						knocked down
J2-966_20170719180521-20170719180805.mov	J2-966	SC1ATK61.mov	18:05:00:00	18:08:05:29	Science	View of Virgin Chimney being toppled. Beautiful view with jellies drifting precariously past
J2-966_20170719185601-20170719185854.mov	J2-966	SC1ATK62.mov	18:56:00:00	18:58:54:24	Science	GTB-04 GT-9 red same taken at virgin vent
J2-966_20170719190332-20170719190738.mov	J2-966	SC1ATK63.mov	19:03:33:00	19:07:39:03	Science	First attempt at a second sample of Virgin using GTB-07.
J2-966_20170719191023-20170719191250.mov	J2-966	SC1ATK64.mov	19:10:24:00	10:12:50:14	Science	Second attempt at sampling of Virgin with GTB-07.
J2-966_20170719192345-20170719192736.mov	J2-966	SC1ATK65.mov	19:23:55:00	19:27:36:22	Science	View of Inferno prior to HOBO installation.
J2-966_20170719193404-20170719193553.mov	J2-966	SC1ATK66.mov	19:34:05:00	19:35:53:27	Science	View of Inferno prior to grab sample of chimney.
J2-966_20170719204504-20170719205118.mov	J2-966	SC1ATK67.mov	20:45:06:00	20:51:18:21	Science	Unfiltered piston sample #5 at Hell.
J2-966_20170719211519-20170719211840.mov	J2-966	SC1ATK68.mov	21:15:28:00	21:18:40:07	Science	MTR retrieval at Anemone. Number covered by bio growth.
J2-966_20170719225949-20170719230107.mov	J2-966	SC1ATK69.mov	22:59:00	23:01:00	Science	Pulling Jason from water
J2-967_20170720083311-20170720083334.mov	J2-967	SC1ATK70.mov	08:33:11:00	08:33:34:25	Science	Temperature measurement at Casper.
J2-967_20170720085304-20170720085543.mov	J2-967	SC1ATK71.mov	08:53:05:00	08:55:44:19	Science	Coming in hot for fluid sampling and HOBO retrieval on Vixen.
J2-967_20170720091457-20170720091603.mov	J2-967	SC1ATK72.mov	09:14:15:00	09:16:03:00	Science	Chalcopyrite on the end of the recovered MISO 103.
J2-967_20170720132358-20170720132548.mov	J2-967	SC1ATK73.mov	13:23:57:00	13:25:47:28	Science	Snowblower-like venting at Marker 33 vent
J2-967_20170720135110-20170720135320.mov	J2-967	SC1ATK74.mov	13:51:09:00	13:53:20:07	Science	Fluid sample HFS-06 at Marker 33 AKA the 'Slow Blower'
J2-967_20170720140706-20170720140956.mov	J2-967	SC1ATK75.mov	14:07:06:00	14:09:57:05	Science	Close-ups of some of the limpets and palmworms at Marker33
J2-967_20170720170352-20170720170910.mov	J2-967	SC1ATK76.mov	17:04:30:00	17:09:10:12	Science	positioning Jason and resting HOBO 104 next to Trevi vent
J2-967_20170720171609-20170720171914.mov	J2-967	SC1ATK77.mov	17:16:32:00	17:19:14:20	Science	Placing pump in Trevi vent to take HFS-11
J2-967_20170720185958-20170720190445.mov	J2-967	SC1ATK78.mov	18:59:59:00	19:04:45:22	Science	Blue mats surrounding Marker 135.
J2-967_20170720193346-	J2-967	SC1ATK79.mov	19:33:47:00	19:34:57:03	Science	Blue mat close up around Marker 135

New Clip Name	Dive ID	Original Clip ID	Log Start Time	Log End Time	Camera Source	Logger Comment
20170720193456.mov						sampling.
J2-967_20170720193648-20170720193815.mov	J2-967	SC1ATK80.mov	19:36:49:00	19:38:16:07	Science	More close up footage of blue mats.
J2-967_20170720194614-20170720194629.mov	J2-967	SC1ATK81.mov	19:46:20:00	19:46:30:00	Science	More blue mat footage.
J2-967_20170720194721-20170720194842.mov	J2-967	SC1ATK82.mov	19:47:22:00	19:48:42:23	Brow	Brow cam footage of blue mats.
J2-967_20170720200741-20170720201009.mov	J2-967	SC1ATK83.mov	20:07:43:00	20:10:09:22	Science	More blue mat footage as we begin our transit to Bag City.
J2-967_20170720234742-20170720234850.mov	J2-967	SC1ATK84.mov	23:47:42:00	23:48:50:18	Science	Coming into AX104 with a good view of big rat tail fish
J2-967_20170721111128-20170721111448.mov	J2-967	SC1ATK85.mov	11:11:28:00	11:14:48:26	Science	Entering a huge collapse in the previously unexplored areas near the south pillow mound
J2-967_20170721112024-20170721112457.mov	J2-967	SC1ATK86.mov	11:20:24:16	11:24:57:12	Science	Moving NE from 1998 collapse area up to some 2011 mounds
J2-967_20170721115538-20170721115808.mov	J2-967	SC1ATK87.mov	11:55:39 AM	11:58:09:09	Science	Now moving east of previous position to other unexplored 2011 flows. Video capture traverse over a 1998 collapse zone
J2-967_20170721131053-20170721131349.mov	J2-967	SC1ATK88.mov	13:10:55:00	13:13:50:01	Science	So many sea pickles. Jason on its way up
J2-968_20170721214411-20170721214541.mov	J2-968	SC1ATK89.mov	21:44:12:00	21:45:41:09	Science	Lava drips on overhang of 2015 flow.
J2-968_20170721214556-20170721214743.mov	J2-968	SC1ATK90.mov	21:06:02:00	21:47:43:28	Science	Leaving collapsed area with overhang.
J2-968_20170721215140-20170721215631.mov	J2-968	SC1ATK91.mov	21:51:44:00	21:56:31:25	Science	Chimlet and some black smoke leaving lower vent.
J2-968_20170721215806-20170721220434.mov	J2-968	SC1ATK92.mov	21:58:08:00	22:04:34:00	Science	Fly over of chimlet prior to sampling.
J2-968_20170721220716-20170721221140.mov	J2-968	SC1ATK93.mov	22:07:20:00	22:11:40:11	Science	Geology sample of chimlet.
J2-968_20170721230128-20170721230428.mov	J2-968	SC1ATK94.mov	23:01:28:00	23:04:28:07	Science	Very odd films around one of the Happy Hour vents. Temperatures much higher than expected
J2-968_20170722000355-20170722000811.mov	J2-968	SC1ATK95.mov	00:03:56:00	00:08:1:20	Science	'Sulfur paste' sample suctioned up with slurp holster at the Limoncello vent site
J2-968_20170722001823-20170722002139.mov	J2-968	SC1ATK96.mov	00:18:24:05	00:21:39:21	Science	Chimlets along pillow basalts with lots of black smoke.
J2-968_20170722002413-20170722002700.mov	J2-968	SC1ATK97.mov	00:24:14:12	00:27:01:13	Science	Geology sample of chimlets with lots of black smoke.

New Clip Name	Dive ID	Original Clip ID	Log Start Time	Log End Time	Camera Source	Logger Comment
J2-968_20170722003943-20170722004108.mov	J2-968	SC1ATK98.mov	00:39:42:00	00:41:08:17	Science	Kahlua vent sample HFS-12. Palm worms already established! On a 2 year flow!
J2-968_20170722004608-20170722004632.mov	J2-968	SC1ATK99.mov	00:46:01:00	00:46:32:29	Science	Zoom in on Kahlua
J2-968_20170722005337-20170722005430.mov	J2-968	SC1ATK100.mov	00:53:30:00	00:54:30:22	Science	Really cool chimlet at Kahlua
J2-968_20170722005644-20170722005714.mov	J2-968	SC1ATK101.mov	00:56:50:40	00:57:14:27	Science	Same chimlet
J2-968_20170722005736-20170722005754.mov	J2-968	SC1ATK102.mov	00:57:35:00	00:57:55:03	Science	Trial one of chimlet pan
J2-968_20170722005820-20170722005842.mov	J2-968	SC1ATK103.mov	00:58:20:00	00:58:55:00	Science	Try 2 of pan up chimlet
J2-968_20170722005902-20170722010219.mov	J2-968	SC1ATK104.mov	00:58:59:00	01:02:20:02	Science	Best chimlet pan yet! Really cool looking biota everywhere at the base of the chimlet
J2-968_20170722011552-20170722011854.mov	J2-968	SC1ATK105.mov	01:15:52:00	01:18:55:06	Science	Charcoal colored smoker with lots of bags and anhydrite(?) ← Now called Sambuca vent
J2-968_20170722013458-20170722013818.mov	J2-968	SC1ATK106.mov	01:34:59:00	01:38:18:08	Science	Close-up on some of the smoker's at Sambuca
J2-969_20170722123220-20170722123705.mov	J2-969	SC1ATK107.mov	12:32:14:00	12:37:05:00	Science	View of a depression in the northeast caldera, full recording of our sampling of Geo-02
J2-969_20170722124116-20170722124352.mov	J2-969	SC1ATK108.mov	12:41:15:00	12:43:52:14	Science	Collapse of very glassy, jumbled 2015 lava's
J2-969_20170722124805-20170722125137.mov	J2-969	SC1ATK109.mov	12:48:04:00	12:51:36:25	Science	Mingling of caldera wall and 2015 flows, and video of GEO-03 sampling
J2-969_20170722125947-20170722130131.mov	J2-969	SC1ATK110.mov	12:59:45:00	13:01:32:01	Science	Little octopus!
J2-969_20170722131333-20170722131439.mov	J2-969	SC1ATK111.mov	13:13:32:00	13:14:40:14	Science	Caldera wall as we move up towards WP6. Good views of talus.
J2-969_20170722132106-20170722132540.mov	J2-969	SC1ATK112.mov	13:21:06:00	13:25:41:08	Science	Pillow cross sections as we continue up wall. Awesome look at older lavas. Full video goes all the way up the wall, great view!
J2-969_20170722132853-20170722133054.mov	J2-969	SC1ATK113.mov	13:28:54:00	13:30:55:05	Science	Fissures within the graben in the northeast
J2-969_20170722134755-20170722134916.mov	J2-969	SC1ATK114.mov	13:47:50:00	13:49:16:27	Science	Covering the fissures as we move gradually north along the graben towards WP7
J2-969_20170722140241-20170722140425.mov	J2-969	SC1ATK115.mov	14:02:01:00	14:04:26:14	Science	Fissure with odd vesicular lavas. Jumbled flow

New Clip Name	Dive ID	Original Clip ID	Log Start Time	Log End Time	Camera Source	Logger Comment
J2-969_20170722150139-20170722150358.mov	J2-969	SC1ATK116.mov	15:01:49:0	15:03:59:16	Science	Following small narrow fissure that meets up with larger one. Amazing landscape
J2-969_20170722150809-20170722151115.mov	J2-969	SC1ATK117.mov	15:08:14:00	15:11:15:11	Science	Passing over immense fissure, cannot see the bottom of it
J2-969_20170722151408-20170722151706.mov	J2-969	SC1ATK118.mov	15:14:16:00	15:17:06:14	Science	Reaching end of a fissure, stopped and collected sample Geo-05 of pillow w/ drips
J2-969_20170722153004-20170722153049.mov	J2-969	SC1ATK119.mov	15:30:05:00	15:30:49:13	Science	Passing over large sheet flow with a raked morphology. Went in or out of fissure
J2-969_20170722153311-20170722153700.mov	J2-969	SC1ATK120.mov	15:33:37:00	15:37:01:07	Science	Collecting Geo-07 of 2015 pillows. Abundant Large rat tail fish in background
J2-969_20170722153944-20170722154111.mov	J2-969	SC1ATK121.mov	15:39:51:00	15:41:12:01	Science	Jumbled fissure with large deep cavernous hole. Difficult to get sense of scale
J2-969_20170722154830-20170722155138.mov	J2-969	SC1ATK122.mov	15:49:10:00	15:51:38:08	Science	Sampling Geo-08 a 2015 pillow. Next to Kipuka. Pillow collapsed!
J2-969_20170722155840-20170722160154.mov	J2-969	SC1ATK123.mov	15:58:47:00	16:01:54:16	Science	View of 2015 flows appearing to come out of fissure with sediment atop in various places, meeting with deep fissure showing old pillows and with sediment.
J2-969_20170722161456-20170722161557.mov	J2-969	SC1ATK124.mov	16:13:30:00	16:15:57:19	Science	following eruptive fissure, jumbled masses of collapsed pillows
J2-969_20170722162740-20170722163139.mov	J2-969	SC1ATK125.mov	16:27:50:00	16:31:40:13	Science	Attempted collection of pillow w/ sediment. Was too crumbly and glassy.
J2-969_20170722163431-20170722163719.mov	J2-969	SC1ATK126.mov	16:34:45:00	16:37:20:05	Science	Collecting Geo-10 from sheet flow
J2-969_20170722163911-20170722163938.mov	J2-969	SC1ATK127.mov	16:39:23:00	16:39:38:02	Science	Passing over lineated sheet flow with large fish grazing on sediment
J2-969_20170722164409-20170722164856.mov	J2-969	SC1ATK128.mov	16:44:16:00	16:48:56:18	Science	Small lava pillar under pillow, collected for Geo-11. 5 or 6 dead sea pickles adjacent
J2-969_20170722165349-20170722165537.mov	J2-969	SC1ATK129.mov	16:53:00:00	16:55:37:11	Science	Contact on western side of graben facing north.
J2-969_20170722172058-20170722172329.mov	J2-969	SC1ATK130.mov	17:21:00:00	17:23:29:16	Science	Traveling east back to fissure ~100 m northeast of WP11. Older collapsed pillow lava in rift zone
J2-969_20170722172642-20170722172816.mov	J2-969	SC1ATK131.mov	17:26:47:00	17:28:16:18	Science	Contact of old with the 2015 lava flows.
J2-969_20170722174121-20170722174205.mov	J2-969	SC1ATK132.mov	17:41:10:00	17:42:10:00	Science	Lineated sheet flow to jumbled
J2-969_20170722175200-	J2-969	SC1ATK133.mov	17:52:05:00	17:53:43:24	Science	Lineated sheet flows – platy

New Clip Name	Dive ID	Original Clip ID	Log Start Time	Log End Time	Camera Source	Logger Comment
20170722175343.mov						
J2-969_20170722180744-20170722181013.mov	J2-969	SC1ATK134.mov	18:08:06:00	18:10:13:14	Science	Collapsed pillows and sheet flow. Looks like ancient Roman architecture

6.0 JASON

6.1 Dive Statistics

Jason RR1712 Lowering Statistics					
Lowering	Start Time	End Time	Duration days hh:mm:ss	Max Depth	Note
J2-964	7/14/2017 22:24	7/16/2017 01:09	2 attempts	146.22	Aborted
J2-965	7/16/2017 15:34	7/17/2017 03:05	11:30:46	1520.32	Fluid
J2-966	7/17/2017 10:54	7/19/2017 23:02	2 12:08:21	1716.42	Pressure
J2-967	7/20/2017 05:43	7/21/2017 13:20	1 07:36:32	1723.23	Pressure
J2-968	7/21/2017 18:34	7/22/2017 03:42	09:07:37	1770.56	NRZ
J2-969	7/22/2017 11:03	7/22/2017 19:24	08:21:27	1535.38	East Rim

Fig. 6.1-1 Jason's control van displays.



6.2 Dive Summaries

Dive J2-965 International District and Mkr113 Vent Fluid Sampling

Main goals: Fluid sampling at International District Vent field and at Mkr113 Vent

Samples: 28 total; 20 fluid, 6 gas, 2 geology (sulfides)

Tasks Accomplished:

1) International District

- Castle vent: 1 GTHFS, 2 HFS pistons, recovered MISO141, deployed MISO-153
- Deployed Tephra Sampler H near base of Castle chimney with marker, Mkr-278
- Ambient HFS DNA sample while transiting through Int'l District vent field
- El Guapo (top): 1 HFS GT & GTB, 3 HFS pistons, 2 chimney pieces
- Diva vent: recovered MISO102, deployed HOBO 130, 3 GTB, 2 HFS pistons
- Tiny Towers: HFS 2 pistons and 1 bag.

2) Transit to Mkr113 Vent

- HFS DNA sample while transiting between Int'l District and Mkr-113 Vent.

3) Mkr113 Vent (Marker 62)

- Fluid Sampling: 5 HFS Bag samples; 1 HFS DNA sample
- Deployed Mkr-272 (replaced missing Mkr-62)
- Recovered MTR-3173 and deployed MTR-3040

Dive J2-966 Pressure Dive #1

Main goals: Make pressure measurements at array of seafloor benchmarks. We will make 3 transects of the array. We will collect fluid samples near the end.

Samples: 18 total; 2 geology (sulfides), 4 gas, 12 fluid.

Tasks Accomplished:

1) Make pressure measurements at seafloor benchmarks.

Measurement order: AX-308 -> AX-106-> AX-307->AX-101->Ax-302->AX-309->AX-303->AX-310->AX-104 ->AX-105->AX-104->AX-310->AX-303->AX-309->AX-302->AX-101->AX-307->AX-308->AX-106

Benchmark	Pressure measurements	Recover	Deploy
AX-308	2	MBPR-8 (pass 2)	None
AX-106 (Ashes)	3	MBPR-9 (pass 2)	None
AX-307	2	MBPR-7 (pass 2)	MBPR-10 (pass 1)
AX-101 (Center)	2	None	Tephra-C (pass 1)
AX-302 (Trevi)	2	MBPR-6 (pass 1)	MBPR-5, Tephra-D (pass 1)
AX-309	2	None	None
AX-303 (Mkr33 Vent)	2	MBPR-12 (pass 1)	MBPR-2 (pass 1)
AX-310 (International Dist)	2	None	None
AX-104 (Bag City)	2	None	None
AX-105 (South Pillow Mound)	1	None	None

2) ASHES Fluid Sampling after last measurement at AX-106.

- Virgin: 3 HFS pistons, 2 GTB
- Inferno: 2 geology (sulfides); 3 HFS; 1 GTB
- Hell: 2 HFS pistons; 1 GTHFS
- Anemone: 2 HFS bags, 1 HFS DNA

There were several Jason power issues during this dive. During the first measurement at AX-310 there was a power failure. Lost thruster power on several sites, including twice at AX-307 resulting in 3 attempts at the pressure measurement. Dive ended before all pressure measurements completed.

Dive J2-967 Pressure Dive #2

Main goals: Finish abbreviated third transect to make pressure measurements at array of seafloor benchmarks and collect fluid samples at Casper, Vixen, Mkr-33 Vent, Trevi, Mkr-N3 Vent and Bag City.

General path: Casper/Vixen -> AX-104 (Bag City) -> AX-303 (Mkr-33 Vent) -> AX-302 (Trevi) -> AX-104 (Bag City) -> AX-105 (South Pillow Mound)

Samples: 28 total;

Tasks Accomplished:

- 1) Casper: 1 HFS piston; 1 GTHFS; recovered MISO-103; deployed HOBO-151.
- 2) Vixen: 2 HFS pistons; 1 GTHFS
- 3) Transit to benchmarks AX-104 (Bag City vent). Make pressure measurement. No fluid sampling on this visit (will see if there is time on next visit).
- 4) AX-303 (Mkr33 vent) pressure measurement.
- 5) Mkr-33 Vent: 3 HFS bags, 1 HFS DNA. Recovered MTR-3052 and deployed MTR-3048.
- 6) Transit to benchmark AX-302 (Trevi): 1 HFS DNA during transit.
- 7) AX-302 (Trevi) pressure measurement.
- 8) Trevi Vent: Recovered HOBO-101, 3 HFS pistons, 2 GTBs, deployed HOBO-104.
- 9) Transit to Mkr N3 vent. Mkr-N3 Vent: 1 HFS bag, 1 HFS piston, 1 HFS DNA, 1 GTB. Recovered MTR-4128 and deployed MTR-3201.
- 10) Transit to AX-104 (Bag City vent): 1 HFS DNA sample.
- 11) AX-104 Pressure measurement. Deployed Mkr-276.
- 12) Bag City: 3 HFS bags, 1 HFS DNA.
- 13) Transit to AX-105 (South Pillow Mound). Pressure measurement. Recovered MBPR-13 and deployed MBPR-4.
- 14) Geology exploration of South Pillow Mound lava flows. Took 4 geology samples (Three 1998 lavas and one 2011 lava).

Dive J2-968 North Rift Zone Mini-Smoker Vents

Main goals: Explore top of 2015 lava flow with lava lake drain-out where MBARI ROV dive found mini-smoker vents active in August 2016.

Samples: 17 total; 11 fluid, 4 gas, 2 geology (sulfide & sulfur)

Tasks accomplished:

- 1) Explored new lava flow starting just north of where MBARI discovered small, black smokers in 2016. Observed areas of clear venting, 'bag' creatures and black smoke coming from cracks between lobates.

- 2) Sampled high-temperature venting area: sulfide chimney (GEO-01) with black smoke, fluids (3 HFS pistons and 1 bag) and gas (1 GTHFS and 1 GTB) at site named Prosecco. Tmax at black smoker was 317°C.
- 3) Sampled diffuse venting area at Prosecco: 2 HFS bags and 1 HFS DNA samples. Deployed Mkr-264 at site.
- 4) Explored stained region of the flow to the west and discovered erupted sulfur deposits. Named site Limoncello and took suction sample of sulfur (GEO-11). Area contained numerous sulfur excretions.
- 5) Moved to the east and discovered site with numerous skinny, short, venting, black chimneys. Named site Kahlua. Collected 2 HFS pistons, one GTHFS samples at the site. Deployed Mkr-241 at the site.
- 6) Explored further to the west toward mapped collapse feature but only found a depression with no active venting.
- 7) Moved back to the east toward active venting and discovered another area of small, venting chimneys. Venting was very black, chimney looked charred with sulfide worms surrounded by bag creatures. Called site Sambuca. Took 2 HFS bags and one GTB samples at the site.

Dive J2-969 Axial East Rim and Flow graben

Main goals: Explore starting on caldera floor near 2015 eruptive vents (1529 m), climb up caldera wall ~65 m to rim (1463 m), explore graben to north for ~ 2 km, sample rocks where 2015 lava is present.

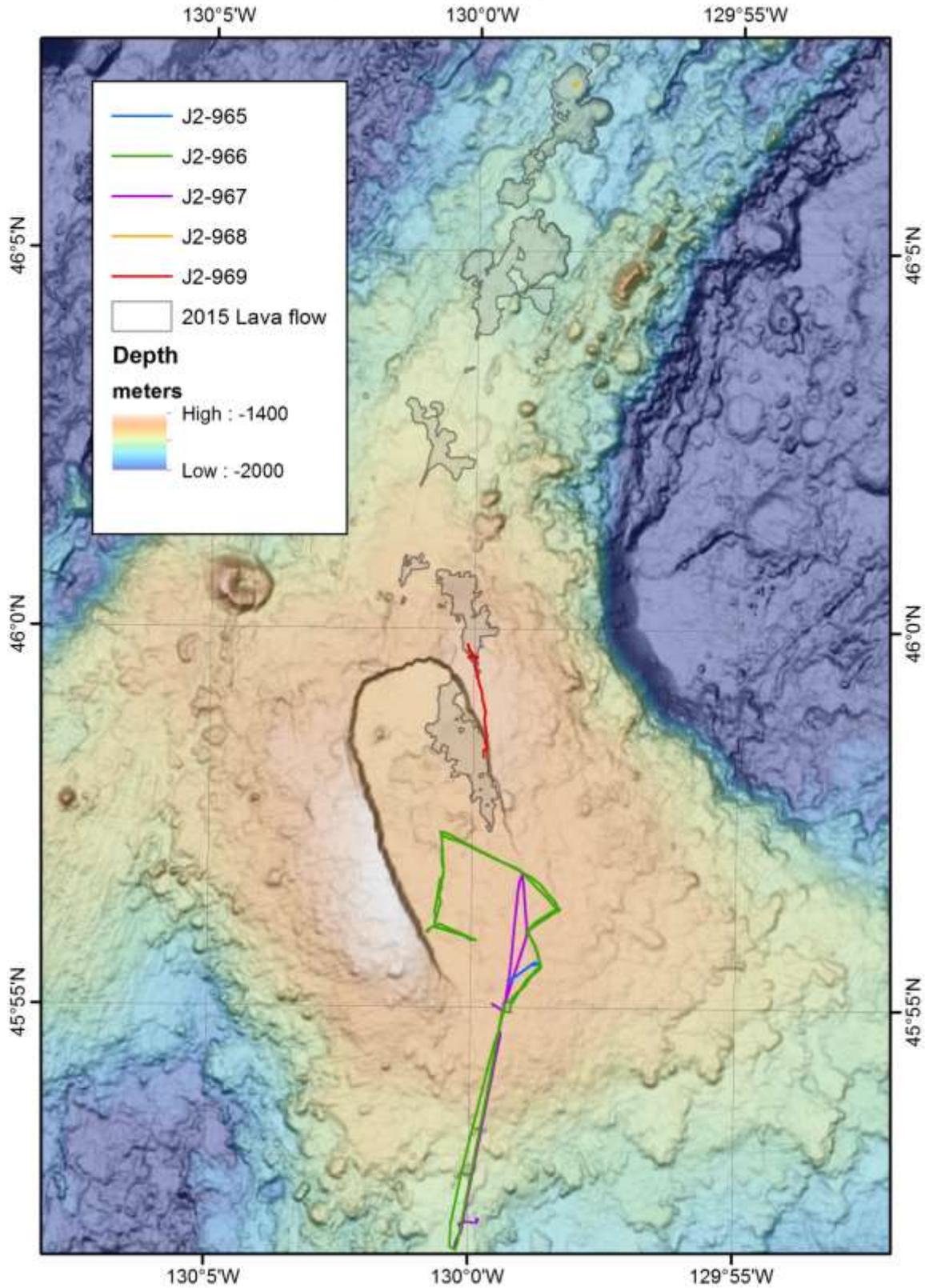
Samples: 14 total rock samples.

TASKS:

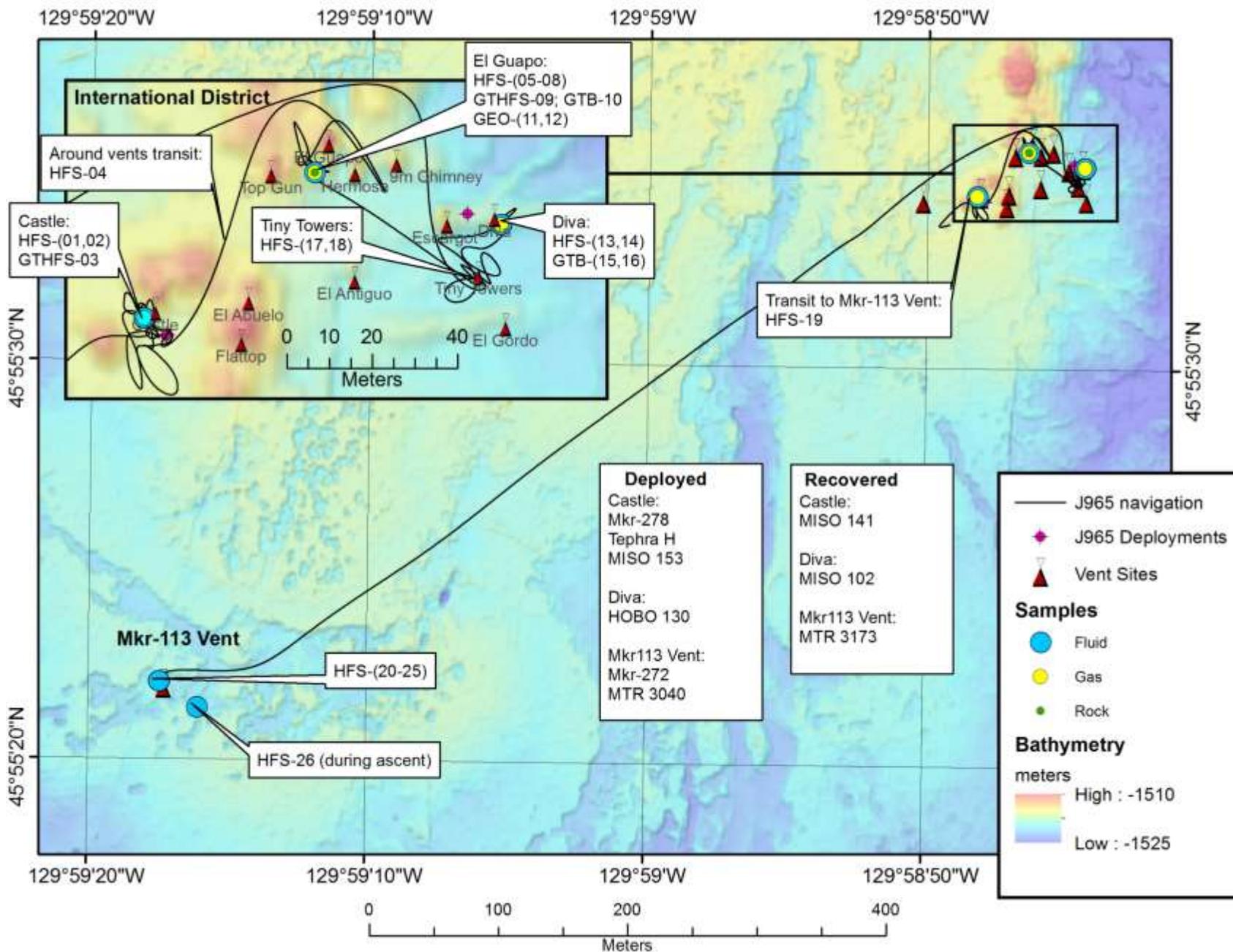
- 1) Sampled pieces of 2015 crust on the caldera floor near the eruptive fissure. (2 geology samples).
- 2) Took a geology sample at the contact between the 2015 flow and the talus of the east caldera wall.
- 3) Explored edge of flow along caldera wall to the north. Took a second sample at contact between 2015 flow and talus.
- 4) Climbed caldera wall to east rim at the 2015 graben.
- 5) Drove north in a zig-zag pattern along rim across fissures within the graben.
- 6) Deployed Tephra-F and Mkr-281 in a small depression in older flow on the east rim.
- 7) Continued to explore to the north within the graben in a zig-zag. Crossed many fissures and fractures.
- 8) Encountered new lavas between waypoints 8 & 9, coming up in the fissure and through ash sediment. Took a geology sample of the new lava (GEO-05).
- 9) Continued to explore new lavas while heading north along the rim. Took 9 more samples of 2015 lavas from various different areas.

6.3 Jason Dive Maps

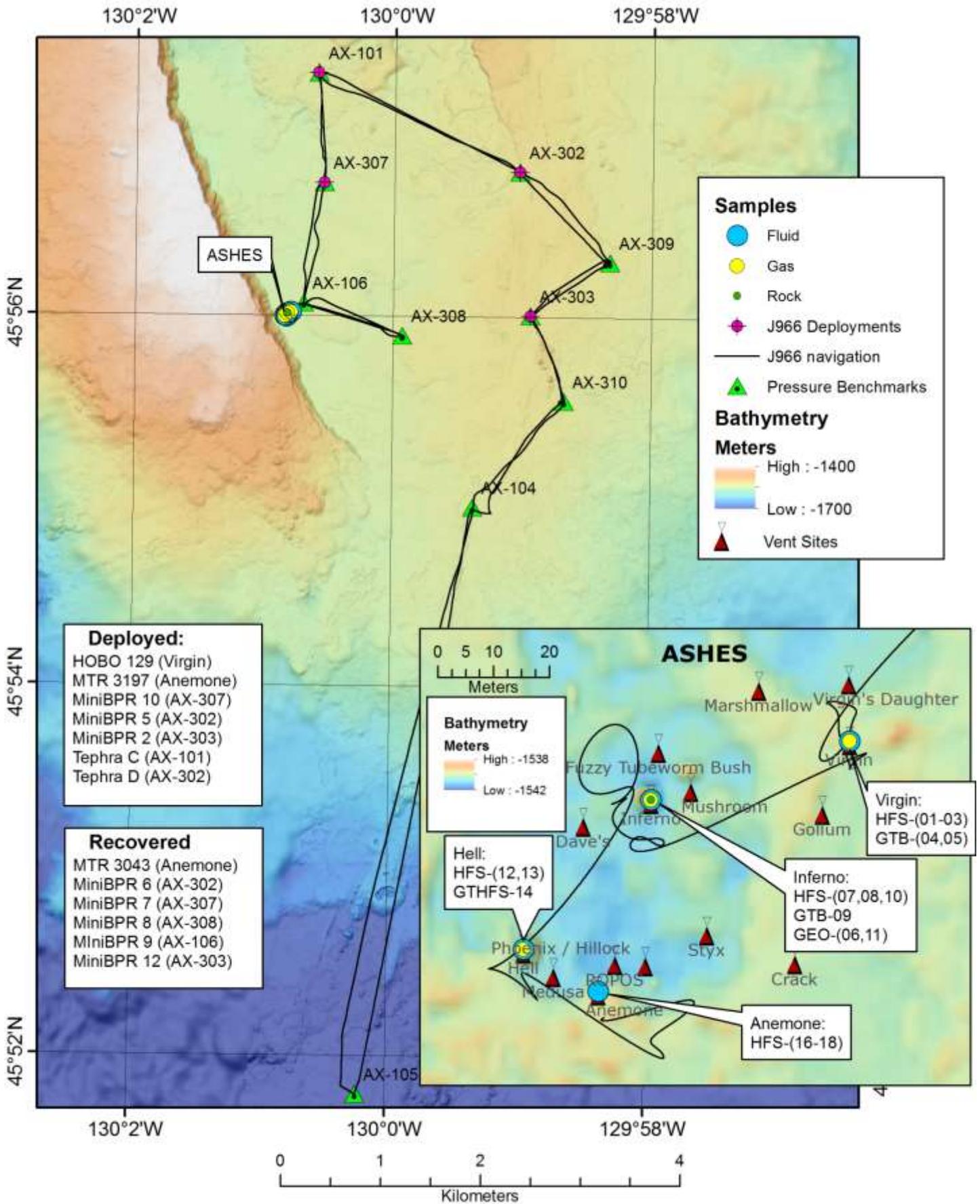
The map below shows all the 2017 Jason dives relative to the 2015 lava flows:



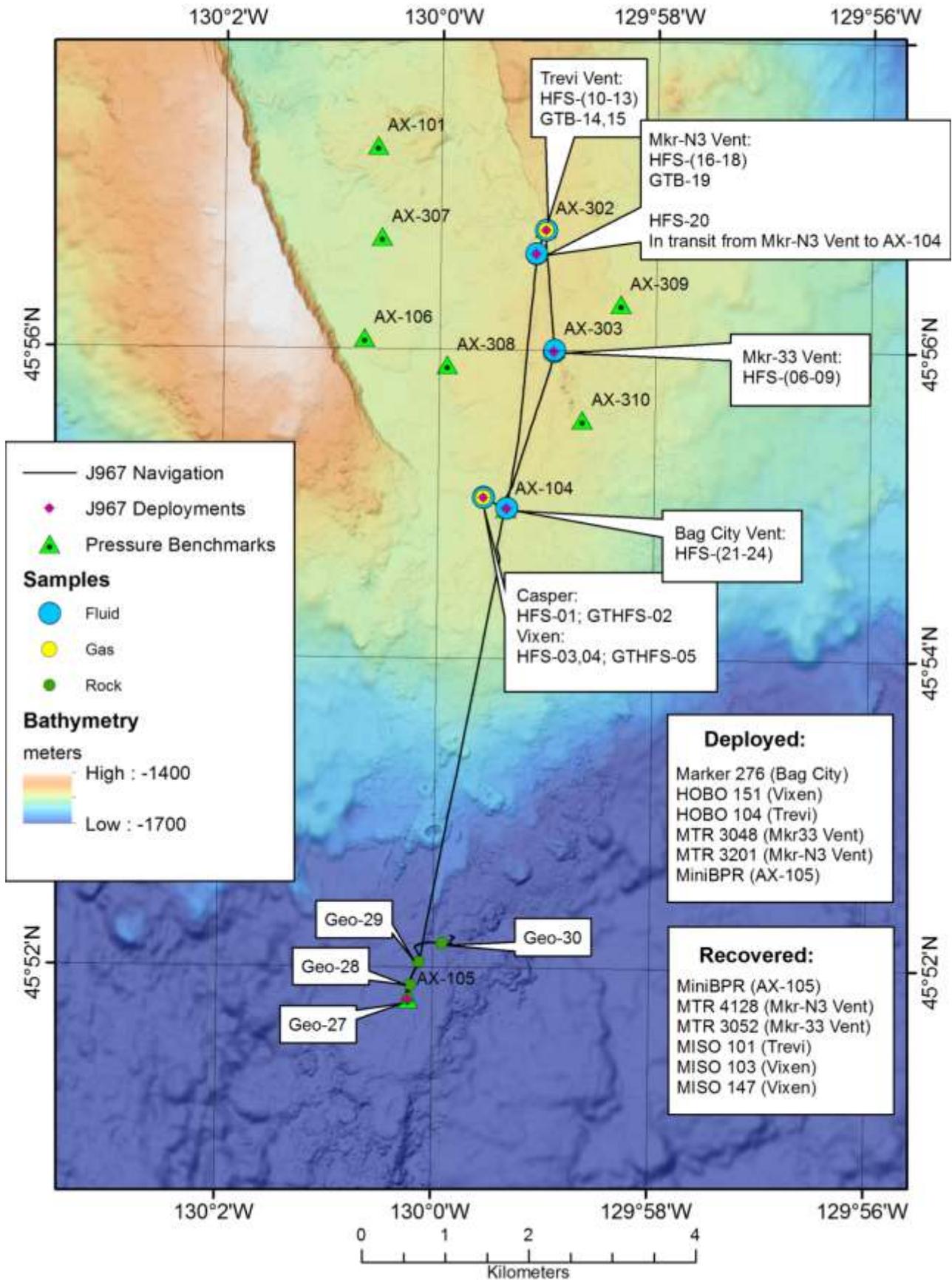
J2-965 International District & Mkr-113 Vent



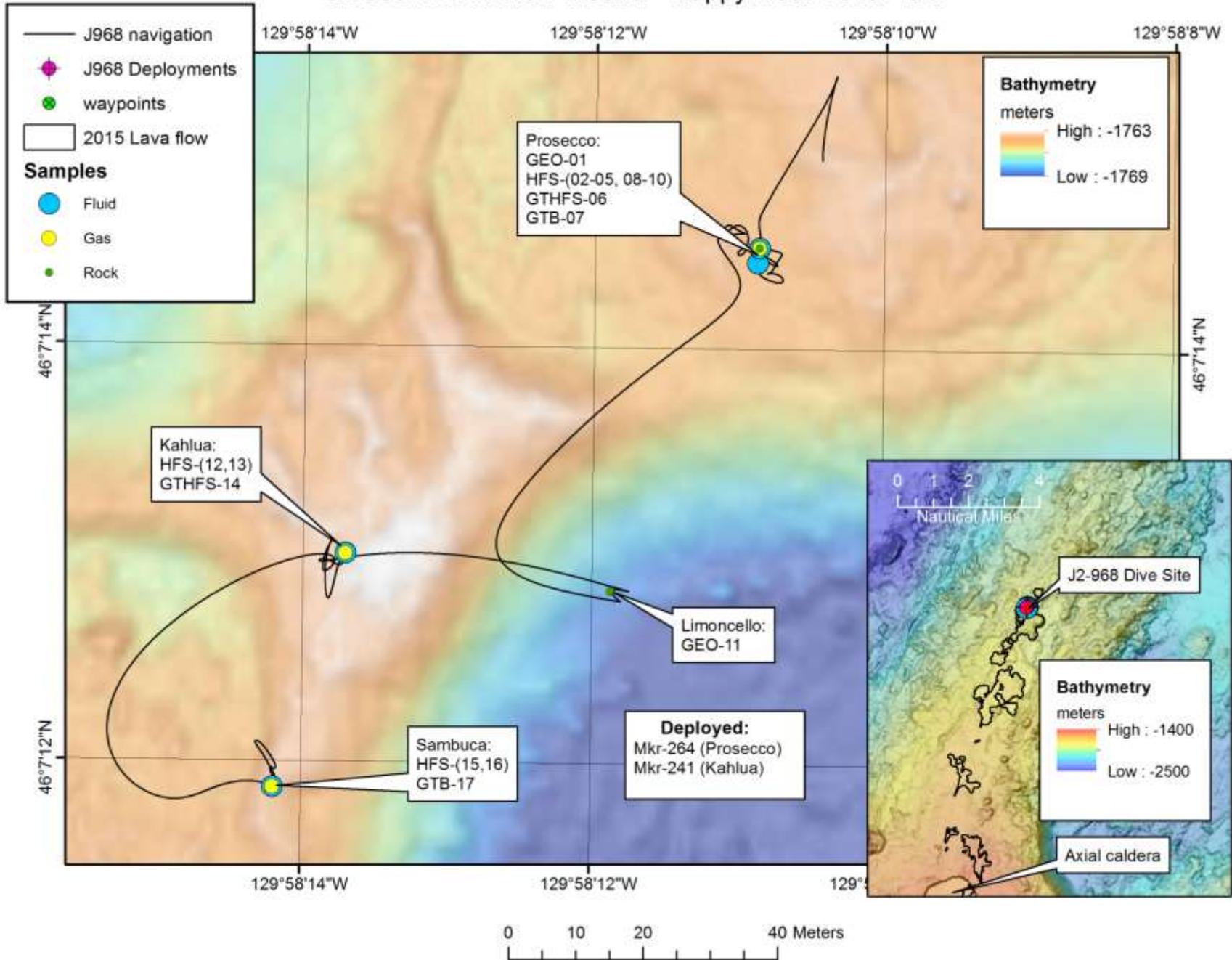
J2-966 First Pressure Dive | ASHES Fluid Sampling



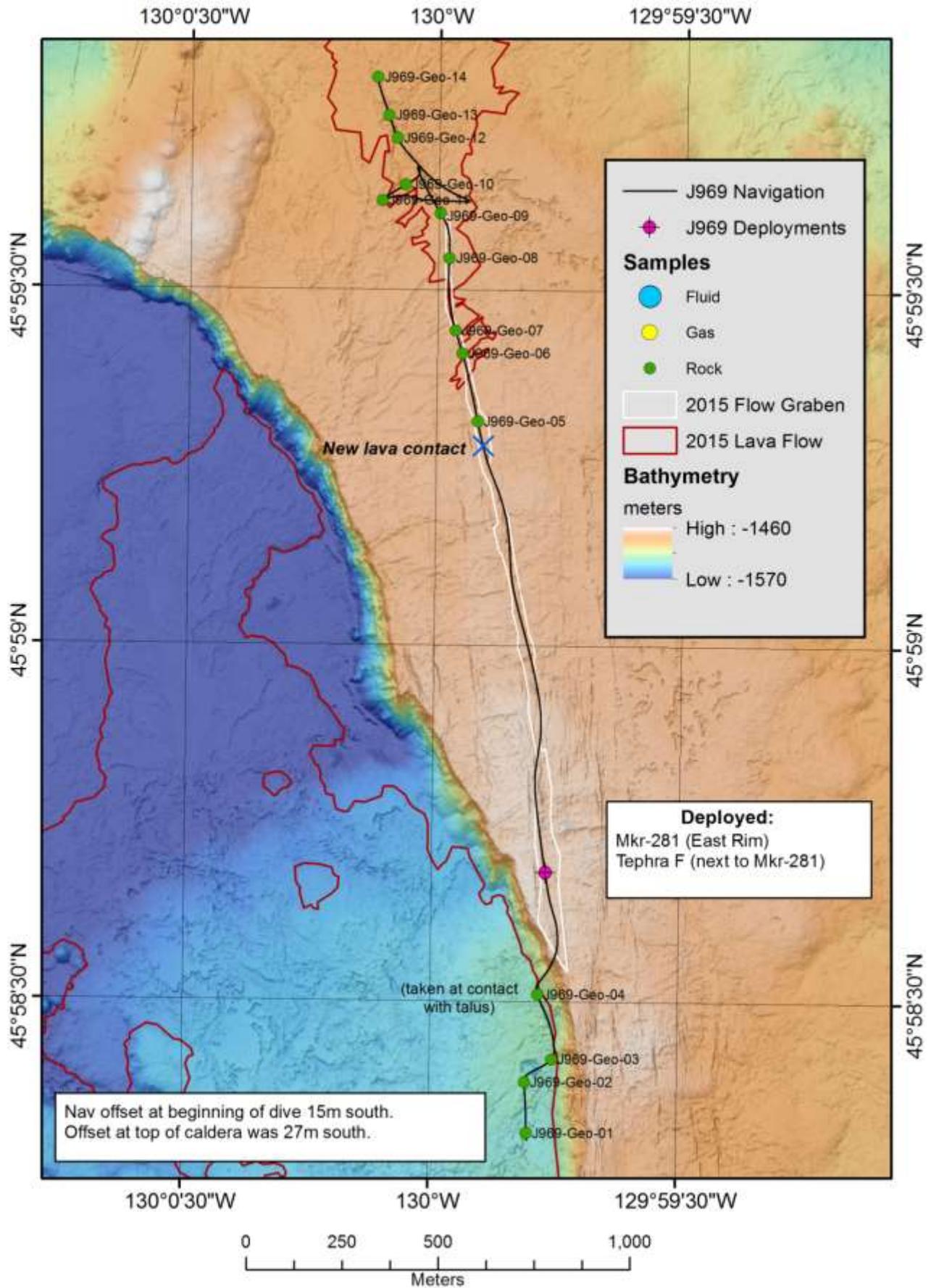
J2-967 Second Pressure Dive



J2-968: NRZ Pillow Mound - Happy Hour Vent Field



J2-969 East Rim Flow Graben



6.4 Jason Navigation

Navigation positions for 2017 Jason dives were better than the observed offsets from the 2015 expedition. The pressure benchmarks locations are ideal to use as baseline positions from year to year. Table 6.4-1 lists offsets from Jason RENAV positions for each benchmark visit. A few additional offsets noted by the data loggers are listed for International District sites. For some pressure measurement a range of distances and bearings is listed due to the wandering of position fixes while in place. (See Fig. 6.4-1 for a map illustrating the phenomena). The offsets were generally less than 10 meters and in most cases within 5 meters of the benchmark which is within visual range detection by Jason's pilots and cameras. Jason RENAV in 2017 did not incorporate DVL nav and smoothed USBL only.

Offsets between Jason navigation and the MBARI AUV 2017 1-meter grid bathymetry data were also noted by data loggers on dive J2-969. The offsets here were substantial, 23 and 20 meters. MBARI AUV grids are processed to internally align but have been known to have offsets from coarser, ship bathymetry. Knowing this, Susan Merle matched large vent chimneys previously navigated over the years to the new bathymetry. Prior the 2017 expedition, the MBARI grids were shifted to align with these vent locations for both ASHES and International District. The ASHES grid (axauvd1m) was shifted 13.2 X and -5.3 Y (meters). International District was shifted 10.5X -5.6Y meters (axauvc1m). For sampling in those areas, the shifted grids were used as Jason underlay maps during the dive and the offsets listed in Table 6.4-1 were from these grids. Unshifted MBARI grids would have had even greater observed offsets at both of these locations.

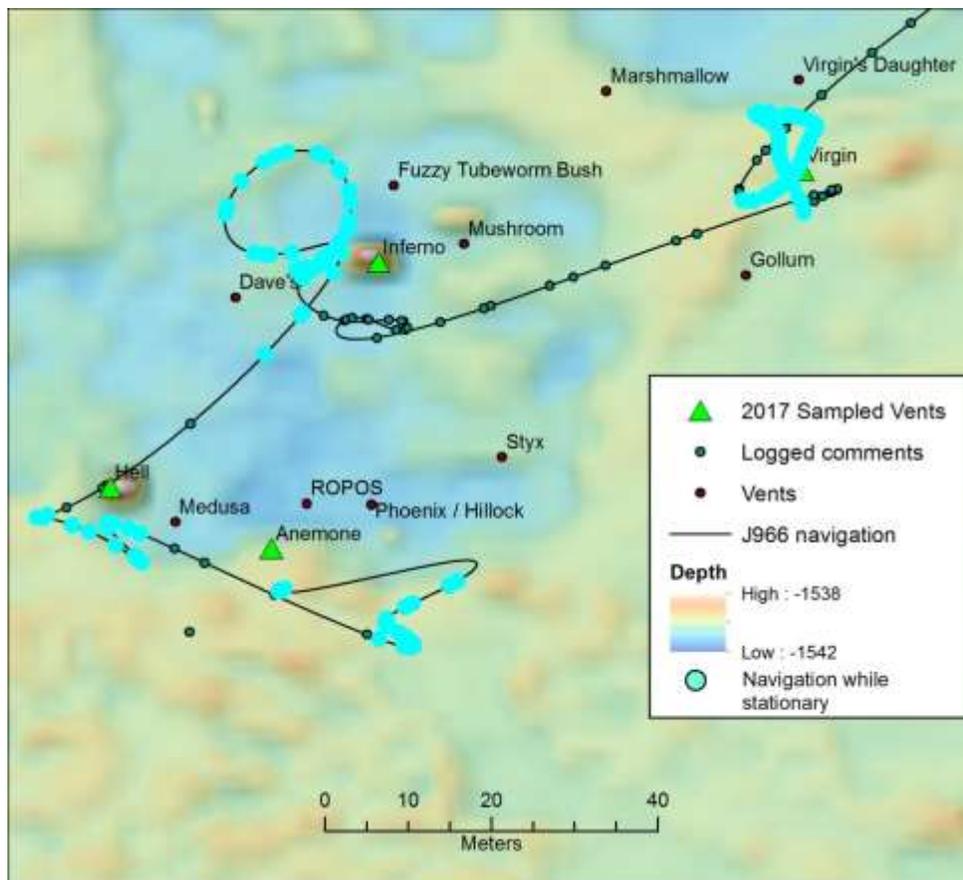


Figure 6.4-1 Map of Jason RENAV for dive J2-966. Logged comments are highlighted in bright blue during periods where Jason was actually stationary while sampling. During a dive, the navigation positions while stationary are a scattering of points on the navigation screens. Loggers estimate a single position from the scatter and record the position as a 'cursor' fix in the logged comments. Bathymetry grid was shifted to match known vents sites (axauvd1m) at ASHES.

Table 6.4-1 Navigations offsets observed at Pressure benchmarks from processed (RENAV) navigation after the expedition. 2015 offsets were the reported discrepancies from the data logger. Other 2017 offsets listed at the end of the table were data logger comments during the dive.

Benchmark	Dive	Offset (m)	bearing from benchmark	2015 Offsets/bearings	
AX-308	J966	5.5-10	158-120		
AX-308	J966	3-9.5	127-104		
AX-106	J966	4.7-7.9	121-127		
AX-106	J966	4-6.5	122-170		
AX-106	J966	2.5-10.2	260-131		
AX-101	J966	5.3	272		
AX-101	J966	4.5	45		
AX-307	J966	4.3	268		
AX-307	J966	4.8	303		
AX-302	J966	4.7	68		
AX-302	J966	3.3	183-112	5	340
AX-302	J967	1.2-4			
AX-309	J966	13	25		
AX-309	J966	2.5	22	14-20	340
AX-303	J966	3.5-4	143-127		
AX-303	J966	3.1-4	93-74		
AX-303	J967	8.1-9	175-29		
AX-310	J966	4.6-9	106-167		
AX-310	J966	7.0-9	67	8	310
AX-104	J966	8	79		
AX-104	J966	8.5	90		
AX-104	J967	4.9-6.0	100		
AX-105	J966	4.4	321		
AX-105	J967	2	183	12	280

Other logger offset notes:

Castle	J965	14	SW
Mkr-153/9m Chimney	J965	12	SW
El Guapo	J965	7.5	33

Six new markers were deployed in 2017, Fig. 6.4-2. Each dive carried 2 markers in the basket to use as needed. Two markers replaced older markers that were either missing or unreadable (Mkr-62 and Mkr-65 respectively). Two other markers were located next to Tephra samplers to assist in their future recovery. Finally two markers were deployed in newly sampled (fluid, gas and sulfides) venting sites on the 2015 lava pillow mound at the North Rift Zone. Table 6.4-2 lists the newly deployed markers and an updated listing of all markers presumed to still be at Axial Seamount.

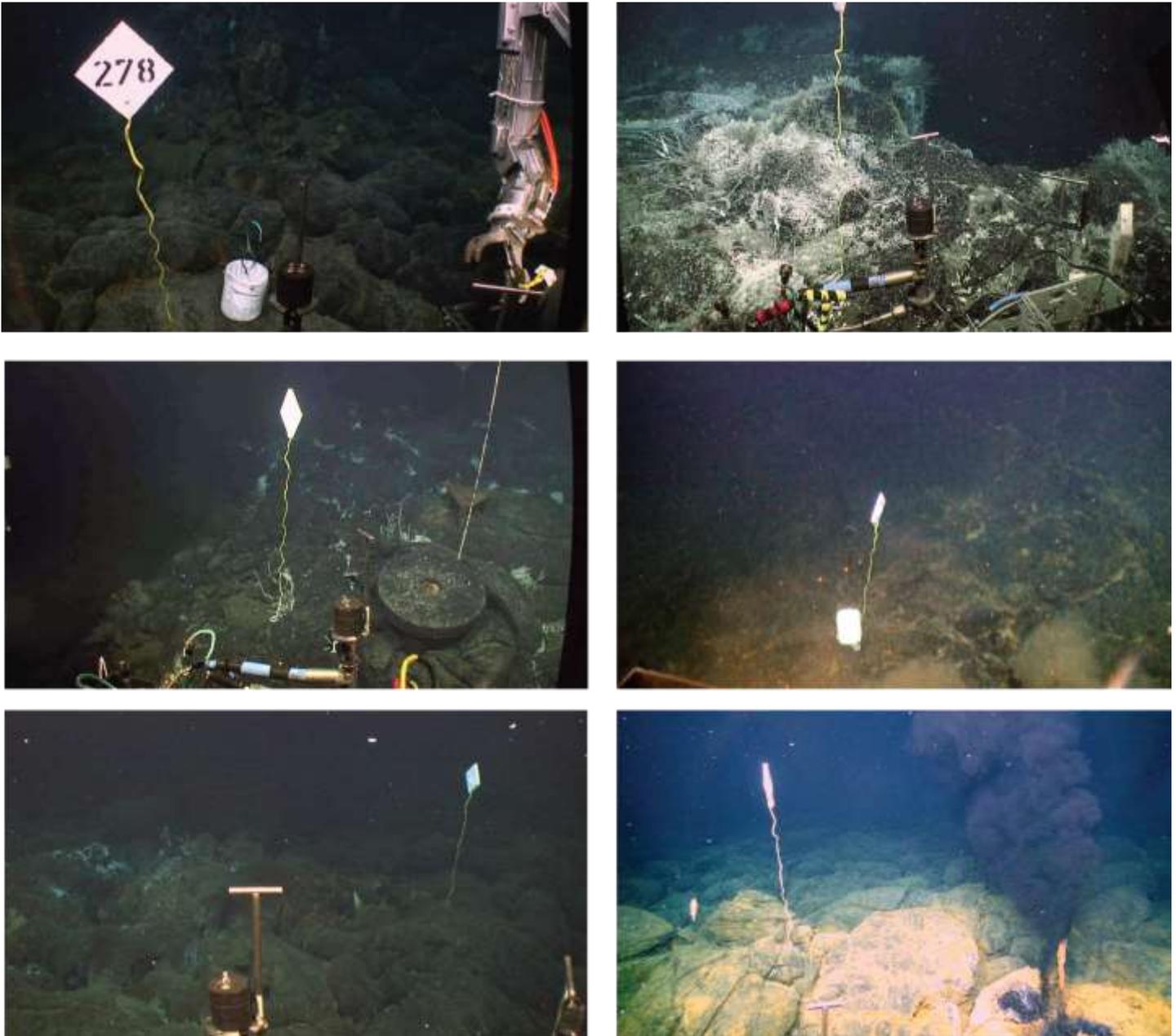


Fig. 6.4-2 New markers deployed in 2017; top to bottom, left to right: Mkr-278 at Castle Vent base, International District; Mkr-272 at Mkr-113 Vent; Mkr-276 at Bag City; Mkr-281 next to Tephra-F on East Rim; Mkr-264 at Prosecco; Mkr-241 at Kahlua.

Table 6.4-2 New markers and updated inventory of existing markers at Axial Seamount.

Deployed in 2017:							
Marker	Latitude	Longitude	Z	Region	Location	Deployed	comments
Mkr-278	45.92616	-129.97996	1516	International District	Castle	J-965	Next to Tephra-H.
Mkr-281	45.97803	-129.99613	1464	East Rim	East Rim graben	J-969	Next to Tephra-F in 2015 graben.
Mkr-241	46.12028	-129.97050	1763.9	NRZ	Kahlua	J-968	NRZ pillow mound sampling site (2017)
Mkr-264	46.12068	-129.96967	1764.3	NRZ	Prosecco	J-968	NRZ pillow mound sampling site (2017)
Mkr-276	45.91619	-129.98936	1528.9	Pre-1982 flow (W of 1998 lava)	Bag City	J-967	Replacing old Mkr-65 which is blackened and unreadable.
Mkr-272	45.92276	-129.98815	1520	Pre-1982 flow (W of 1998 lava)	Mkr113 Vent	J-965	Replacing missing Mkr-62.

All Axial Markers:

Marker	Latitude	Longitude	Z	Region	Location	Deployed	comments
Smiley marker	45.93326	-129.98178	1517	1998LavaFlow	E of Marker33 vent site		Saw in 2011. It survived the 2011 eruption. Near east edge of 2011 lava flows.
Mkr44	45.92603	-129.98010	1520	1998LavaFlow	Village		Sampled on R856 22:45:34. (Added back in 2011-lost off list). Sample R1010 09:17:48.
Ghost TrainWheel	45.93208	-129.98407	1519	1998LavaFlow			Has 1998 date on railroad wheel. Probably old mooring-discovered on R1012-not deployed then. Looks like on edge of 2011 lava flow-not sure if it is still there.
Mkr135	45.94370	-129.98518	1522	2011 lava over 98	MkrN3	J730	Deployed at post-eruption diffuse MkrN3 site where MTRs were deployed/recovered in 2013. Cursor position. On top of large pillow vv#12253
Mkr170	45.92769	-129.98248	1519	2011LavaFlow	Boca	J5-583	
Mkr166	45.93316	-129.98228	1520	2011LavaFlow	Marker33 Vent		Deployed after 2011 flow. Seen 2013 & 2015.
Mkr66	45.93342	-129.98228	1516	2011LavaFlow	AX203 near Marker 33 Vent		Attached to metal tripod benchmark that was moved from near AX105 to near Marker33 vent in 2011. Seen 2015.

Marker	Latitude	Longitude	Z	Region	Location	Deployed	comments
Mkr136	45.94642	-129.98379	1522	2011LavaFlow	AX-302 Trevi benchmark	J730	Mrk63 is on old benchmark AX-202 also at this AX-302 site (metal triangle). VV#8714. Seen 2015.
Mkr63	45.94639	-129.98382	1520	2011LavaFlow	AX-202 Trevi benchmark		Attached to metal tripod benchmark that was moved from caldera center to near Trevi vent in 2011. Seen 2015.
Mkr21	45.93327	-130.01359	1547	ASHES	~5m SW of Styx		
Mkr129	45.93327	-130.01374	1542	ASHES	Anemone	J726	Using 2013 sampling/MTR3004 cursor lat/long. VV#1045
Mkr129	45.93325	-130.01379	1543	ASHES	Anemone	J2-726	Deployed after sampling and leaving a MTR in 2013. Couldn't find 2012 MTR. Check position after 2013 cruise using Vent location.
Mkr47	45.93345	-130.01349	1542	ASHES	between Gollum- Dave's		Seen 2015 J2-824.
Mkr117	45.93331	-130.01334	1546	ASHES	Crack		Marker seen in 1998 (R466)
Mkr121	45.93355	-130.01325	1542	ASHES	Gollum	J2-521	Seen 2015.
Mkr64	45.93356	-130.01330	1545	ASHES	Gollum	J2-293	Seen 2015.
Tripod21	45.93357	-130.01329	1547	ASHES	Gollum		
Mkr27	45.93332	-130.01391	1546	ASHES	Hell		Deployed 1986 by PiscesIV. Using 2007 vent position.
Mrk2	45.93332	-130.01391	1546	ASHES	Hell		Deployed 1986 by PiscesIV on seafloor. Using 2007 vent position.
MrkL	45.93332	-130.01391	1546	ASHES	Hell	R466	Small square foam markers (eyeball) deployed 1998 in hole left by SUAVE sampling. Using 2007 vent position.
Mkr19	45.93349	-130.01367	1547	ASHES	Inferno		1998 unreadable due to bio-coating; marker deployed 1996. Spotted 2010 (bucket lid).
Mkrl	45.93373	-130.01341	1546	ASHES	Marshmallow	R471	Spotted 2010-1m from vent. Visible J2-293 ('07). Named White Vent originally (R471).
Mkr68	45.93328	-130.01389	1542	ASHES	Medusa- 2010	J2-521	Visible 2013 J2-726.
Mkr1	45.93363	-130.01358	1547	ASHES	Mushroom		Deployed 1986 by PiscesIV. Using 2007 vent position.
Mkr31	45.93363	-130.01358	1547	ASHES	Mushroom		Deployed 1986 by PiscesIV. Using 2007 vent position.
Mkr28	45.93328	-130.01362	1547	ASHES	Phoenix		Deployed 1986 by PiscesIV on seafloor. Originally referred to as Hillock Vent. Using 2007 vent position.

Marker	Latitude	Longitude	Z	Region	Location	Deployed	comments
Mkr32	45.93328	-130.01362	1547	ASHES	Phoenix		Deployed 1986 by PiscesIV on side of vent. Originally referred to as Hillock Vent. Using 2007 vent position.
Mkr54	45.93327	-130.01383	1547	ASHES	ROPOS	J2-293	Deployed 2007 (J2-293) on west edge of ROPOS vent (white diamond)
MkrD	45.93336	-130.01372	1546	ASHES	SE Phoenix	R468	visible J2-293 ('07); nav poor when viewed marker and bucket lid (better when sampling)
observatory platform	45.93362	-130.01389	1545	ASHES	West of Inferno	J2-580	
AX-106	45.93445	-130.01160	1542	ASHES	AX-106	J2-522	Cement benchmark AX-106 is ~150 m ENE of ASHES
Mkr60	45.95512	-130.00989	1534	CalderaCenter	AX-101	R623	Marker at Caldera Center near AX-101
Mkr61	45.95503	-130.00989	1534	CalderaCenter	AX-101	R623	Marker at Caldera Center near AX-101
Mkr128	45.91745	-129.99303	1534	Coquille	Casper	J730	Used Casper position from HOB0 102 deployment. Not a cursor position. VV# 10939
Mkr122	45.91717	-129.99290	1534	Coquille	Diffuse vent area	J2-520	Seen 2015.
Mkr57	45.91733	-129.99295	1537	Coquille	Vixen	J2-289	Deployed 2007. (J2-289) Old mkr57 deployed on R857(04). 2010 repositioned by ~.5m 2007 position over 10m off.
Mkr141	45.87992	-129.80294	1917	Dependable	Trusty	J731	Cursor position. Near sampling hole but too hot to place marker anchor in the sampling hole. VV# 15290.
Mkr142	45.88002	-129.80281	1919	Dependable	Weak & Rusty	J731	East side of Dependable. Marker deployed just above the vent sampled; just below and left of a first flange witnessed. Logged nav position (not cursor). VV# 14880.
Mkr155	45.94609	-129.98365	1520	E of 1998 & 2011 lava flows (E of Magnesia site)	Spanish Steps	J2-525	Deployed at new vent (later named Spanish Steps) near Trevi (J2-525)
Mkr156	45.94628	-129.98371	1520	E of 1998 & 2011 lava flows (E of Magnesia site)	Trevi	J2-525	Deployed at Trevi (J2-525)
Mkr-281	45.97803	-129.99613	1464	East Rim	East Rim graben	J-969	Next to Tephra-F in 2015 graben.
Mkr153	45.92650	-129.97920	1517	International District	9m Chimney		Seen 2015.
Mkr-278	45.92616	-129.97996	1516	International District	Castle	J-965	Next to Tephra H deployed in 2017. At Castle base out of venting area. Heading=327.

Marker	Latitude	Longitude	Z	Region	Location	Deployed	comments
Mkr150	45.92642	-129.97898	1520	International District	Diva		Seen 2015.
Mkr151	45.92619	-129.97894	1520	International District	El Gordo		
MkrN	45.92608	-129.97979	1522	International District	Flattop		Not seen 2010. Probably gone.
MkrN5	45.92615	-129.98014	1522	International District	Flattop		Didn't see marker in 2007/2010. Gone?
Mkr152	45.92655	-129.97937	1517	International District	Hermosa		
Mkr169	45.92651	-129.97940	1519	International District	Hermosa		
Mkr126	45.92580	-129.97787	1531	International District	AX-310	J730	Using cursor position for location. AX-310 site. VV#7452
Mkr-246	45.97808	-130.01242	1570	NE Caldera		J822	At J822-geo-24 sample site near WP5.
Mkr-241	46.12028	-129.97050	1763.9	NRZ	Kahlua	J-968	NRZ pillow mound sampling site (2017)
Mkr-264	46.12068	-129.96967	1764.3	NRZ	Prosecco	J-968	NRZ pillow mound sampling site (2017)
Mkr240	45.98298	-130.01111	1579	NRZ		J822	At J822-geo-25 sample site between WP6-WP7 (ROV weight management)
Mkr242	45.98298	-130.01111	1579	NRZ		J822	At J822-geo-25 sample site between WP6-WP7 (ROV weight management)
Mkr260	45.98298	-130.01111	1579	NRZ		J822	At J822-geo-25 sample site between WP6-WP7 (ROV weight management)
Mkr-275	45.97808	-130.01242	1570	NRZ		J822	At J822-geo-24 sample site near WP5.
Mkr294	46.07469	-129.99505	1716	NRZ		J826	RAS location on NRZ. Sampled on J820 and J826.
Mkr-K	46.11133	-129.97217	1752	NRZ		R1863	Marks venting area on top of the North Rift Zone 2015 lava flow
Mkr-UW	46.11476	-129.96307	1756	NRZ		R1863	Marks venting area on top of the North Rift Zone 2015 lava flow
Mkr261	46.08035	-129.99235	1727	NRZ	Snowdrift	J826	NRZ Snowdrift. Thick eruptive (orange-white) mat on way to WP5 in 2015 on new lava. Area of big collapse. Sampled in cracks with intense flow. MTR 4127 deployed at site.
Mkr-276	45.91619	-129.98936	1528.9	Pre-1982 flow (W of 1998 lava)	Bag City	J-967	Replacing old Mkr-65 which is blackened and unreadable.
Mkr-272	45.92276	-129.98815	1520	Pre-1982 flow (W of 1998 lava)	Mkr113 Vent	J-965	Replacing missing Mkr-62.

Marker	Latitude	Longitude	Z	Region	Location	Deployed	comments
Mkr143	45.94806	-129.98465	1522	Red Mat Bridges		J732	Anchor chain put in red mat surrounded by orange mat near edge of large collapse feature. (Not the sample site which was a nearby pillar). Position from cursor.
Mkr130	45.93846	-129.97209	1527	RSN PN	AX-309	J730	At RSN Primary Node site and AX-309. Cursor position. VV#7712. Seen 2015.
AX-105	45.86317	-130.00375	1723	SouthPillowMound	AX-105		Cement benchmark AX-105 at S. Pillow Mound site
Mkr127	45.94533	-130.00913	1545	West of Magnesia	AX-307	J730	Cursor position at AX-307 and Mkr127. Seen 2015.

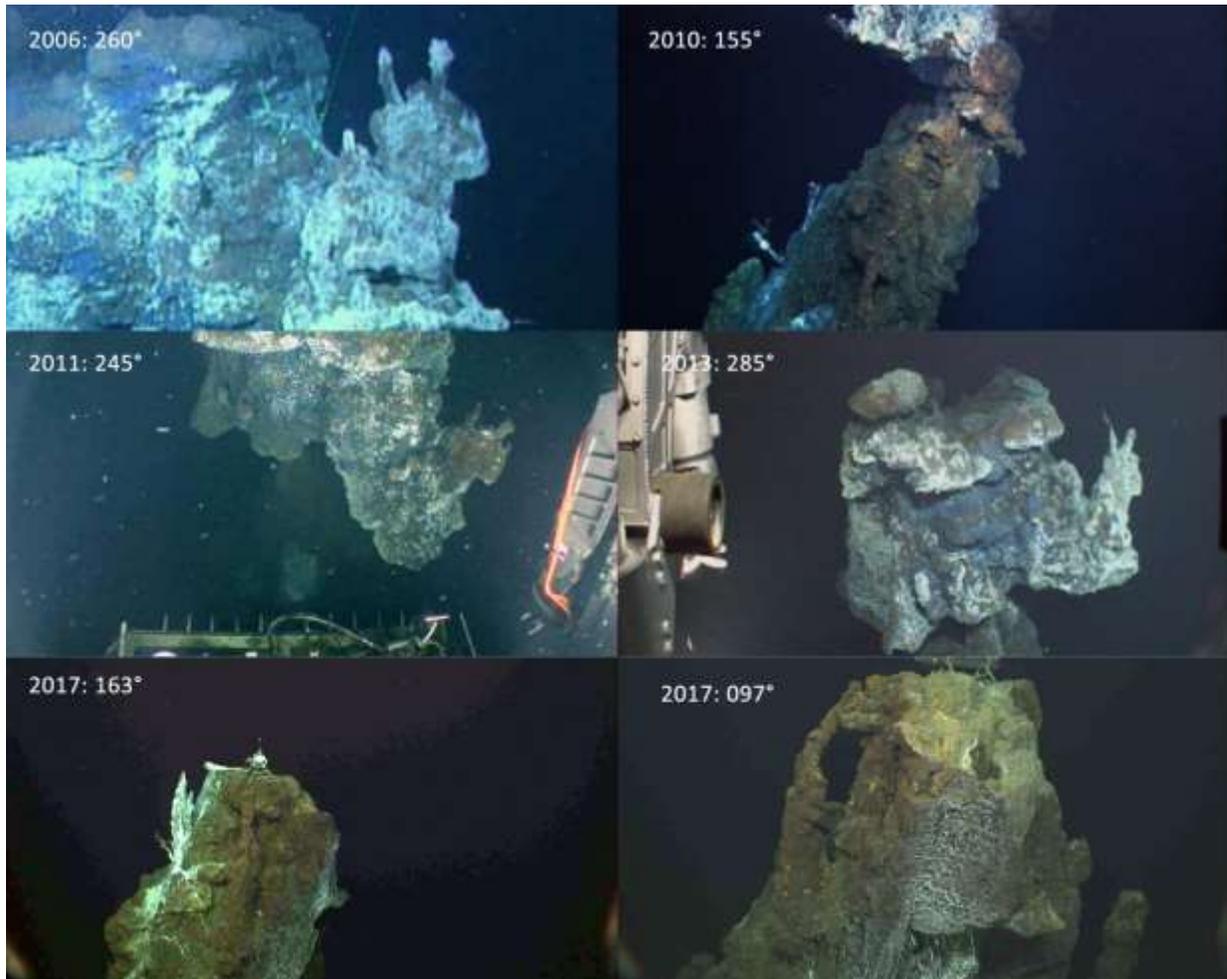
New high-temperature hydrothermal venting on one of the thick 2015 lava flows on the distal north rift zone was first discovered by the 2016 MBARI Western Flyer expedition (<http://www.mbari.org/at-sea/expeditions/northern-2016-expedition/>). ROV Don Ricketts discovered miniature black smokers on Dive 879 while traversing over the thickest part of one of the 2015 flows, which is over 60 meters thick. On this Axial 2017 expedition 15 samples were collected at four different locations in this new hydrothermal field, 3 sites of which were actively venting high-temperature fluids from narrow, bottle-like, chimneys. The entire site was named the Happy Hour Vent Field.

Table 6.4-3 Happy Hour venting sites identified on the 2015 NRZ pillow mound flow.

Venting Site	Latitude	Longitude	Depth	Marker	Comments
Prosecco	46.12068	-129.96967	1764	Mkr-264	Multiple black chimneys on new flow; 317°C. Flow observed in lobate cracks (not sampled).
Kahlua	46.12028	-129.97050	1764	Mkr-241	Thin chimlets with black smoke. Tmax=247°C.
Limoncello	46.12023	-129.96995	1770		Extruded sulfur not active venting.
Sambuca	46.11997	-129.97060	1764		Chimlets with Tmax=37°C and smoking black holes with Tmax=321°C

An unfortunate discovery on this expedition was the destruction of the signature element of the Escargot chimney in the International District.

Figure 6.4-3 Images of Escargot with the year and the ROV heading. The 2010 & 2017 image with similar headings show the top portion of the chimney has been eliminated.



6.5 Jason Samples

Jason samples were collected on each dive and numbered sequentially as collected. Samples are named by dive, type and their collection number: Dive-type-Number, J965-GEO-01 for example. The type in the name indicates the primary purpose of the sample and the description will indicate if there were subsamples of different types (such as rock collected that had biology on it). The time and date are GMT, not local times. Position information was evaluated after the dive to determine the best position within the cluster of fixes (sometimes over 10 meters) while stationary. See the navigation section, 6.4, to read about these issues regarding Jason USBL and post-processing. The VV field is the Virtual Van record ID at the time the sample was being collected. Sample metadata is submitted to SESAR (System for Earth Sample Registration) at www.geosamples.org.

Sample ID	dive	Date	Time	Latitude	Longitude	Gyro	Alt.	Depth	Description	Location	VV	PI
J965-HFS-01	J2-965	2017/07/16	18:35:42	45.92620	-129.98003	51.9	2.3	1513.8	J965-HFS-01 Unfiltered piston #1 t Castle Vent. Start 18:35. Stop 18:38. Tmax=255.2; Tavg=254; Vol=420ml; T2=75. Did not see any flow out sample pump.	Castle	180	Butterfield
J965-HFS-02	J2-965	2017/07/16	18:40:41	45.92620	-129.98003	51.9	2.3	1513.8	J965-HFS-02. Unfiltered Titanium Piston #2. Start 18:40. Stop 18:45. Tmax=253. Tavg=253. T2=25 Vol=375. Did not see flow out exhaust. Same location as sample - 01.	Castle	194	Butterfield
J965-GTHFS-03	J2-965	2017/07/16	18:49:40	45.92620	-129.98003	51.9	2.3	1513.8	J965-GTHFS-03 Gastight hydraulic function 5. Fired. GT-10 Orange Blue. Pump is shut off. Sample looked good. Same place as previous two samples. Tmax=256 T2=64.	Castle	219	Butterfield
J965-HFS-04	J2-965	2017/07/16	19:26:58	45.92620	-129.98003	19.9	3.9	1511.6	J965-HFS-04 DNA filter #10. Start 19:26. Stop 19:53. T1=2.2 Volume=3000ml. Taken while in transit at International District (El Abuelo; El Guapo; 9m Chimney; Hermosa). End position 45.92653/-129.97956. For Carol Stepien.	Int'l District transit	335	Stepien
J965-HFS-05	J2-965	2017/07/16	19:55:07	45.92620	-129.98003	256.3	14.8	1501.0	J965-HFS-05 Unfiltered Bag #16. Start 19:55. Stop 19:58. T1=2.2 Vol=500ml. Ambient near El Guapo. Bag #16. Good exhaust.	El Guapo	428	Butterfield

Sample ID	dive	Date	Time	Latitude	Longitude	Gyro	Alt.	Depth	Description	Location	VV	PI
J965-HFS-06	J2-965	2017/07/16	20:04:42	45.92620	-129.98003	245.6	15.1	1501.1	J965-HFS-06 Unfiltered Piston #3 Start 20:04. Stop 20:08. Tmax=340.8 Tav=328 T2=100 vol=400. Good exhaust. Seeing sulfide worms limpets and palm worms. Top of El Guapo.	El Guapo	461	Butterfield
J965-HFS-07	J2-965	2017/07/16	20:09:21	45.92620	-129.98003	245.5	15.1	1501.1	J965-HFS-07 Unfiltered Piston #4 Start 20:09. Stop 20:13. Tmax=341.9 Tav=341 T2=100 vol=500. Same exact location. FAILED SAMPLE 32ml total.	El Guapo	473	Butterfield
J965-HFS-08	J2-965	2017/07/16	20:13:52	45.92651	-129.97952	245.3	13.7	1501.2	J965-HFS-08 Filtered Piston #7 Start 20:15. Stop 20:16:53. Tmax=341.5 Tav=341.2 T2=70. Volume=425. Same place.	El Guapo	486	Butterfield
J965-GTHFS-09	J2-965	2017/07/16	20:18:56	45.92651	-129.97952	245.0	14.0	1501.2	J965-GTHFS-09 Fired. GT #12 (Green-Yellow). (Tmax for HFS at same site is 341.5degC and Tmax with Jason probe is 339.55degC.)	El Guapo	501	Baumberger
J965-GTB-10	J2-965	2017/07/16	20:32:50	45.92651	-129.97952	245.4	13.3	1501.3	J965-GTB-10 Sample triggered using a two armed approach. At same location as previous HFS/GTHFS samples. (Tmax for HFS at same site is 341.5degC and Tmax with Jason probe is 339.55degC.)	El Guapo	538	Baumberger
J965-Geo-11	J2-965	2017/07/16	20:50:09	45.92651	-129.97952	244.2	13.9	1501.3	J965-GEO-11 Sample of chimney wall at top of El Guapo near HFS and gas samples. Placed in aft-port quadrant of milk crate.	El Guapo	584	James Holden
J965-Geo-12	J2-965	2017/07/16	20:51:59	45.92651	-129.97952	244.4	13.2	1501.4	J965-GEO-12 Additional piece of chimney from El Guapo top. Can see chalcopyrite on sample. Placed in stbd biobox.	El Guapo	591	James Holden

Sample ID	dive	Date	Time	Latitude	Longitude	Gyro	Alt.	Depth	Description	Location	VV	PI
J965-HFS-13	J2-965	2017/07/16	21:14:19	45.92641	-129.97896	60.0	0.8	1518.1	J965-HFS-13 at Diva. Unfiltered Titanium piston #5. Start 21:14. Stop 21:16. Tmax=173 Tavg=163 T2=60 Vol=375ml. Chimney knocked down before sampling.	Diva	661	Butterfield
J965-HFS-14	J2-965	2017/07/16	21:20:35	45.92641	-129.97896	59.9	0.8	1518.1	J965-HFS-14 Filtered Piston #8. Start 21:20. Stop 21:23. Tmax=221 Tavg=213 T2=56 Vol=325. Good exhaust. Same place at Diva.	Diva	679	Butterfield
J965-GTB-15	J2-965	2017/07/16	21:35:19	45.92641	-129.97896	63.1	0.8	1518.3	J965-GTB-15 (GT-16 Orange) Fired. Tmax=229degC. Same place at Diva.	Diva	720	Baumberger
J965-GTB-16	J2-965	2017/07/16	21:48:19	45.92641	-129.97896	63.0	0.8	1518.4	J965-GTB-16 (GT-17 White). Fired. Placed in vent at slightly different spot than GTB-15 in same orifice. Nozzle was clean after firing; flow rate seems high. Tmax with Jason probe=273.96degC. At Diva.	Diva	758	Baumberger
J965-HFS-17	J2-965	2017/07/16	22:21:52	45.92628	-129.97903	213.3	1.3	1520.2	J965-HFS-17 Filtered Piston #9 at Tiny Towers (blue mat present).	Tiny Towers	870	Butterfield
J965-HFS-17	J2-965	2017/07/16	22:22:03	45.92628	-129.97903	213.3	1.3	1520.2	J965-HFS-17 Filtered Piston #9 at Tiny Towers (blue mat present). Start 22:22. Stop 22:25. Tmax=173.7 Tavg=173.4 T2=65 Vol=475.	Tiny Towers	871	Butterfield
J965-HFS-18	J2-965	2017/07/16	22:27:15	45.92628	-129.97903	213.4	1.3	1520.3	J965-HFS-18 Unfiltered Bag #17 Start 22:27. Stop 22:30. . Tmax=173.6 Tavg=173.5 T2=60 Vol=375. Same position as last samples at Tiny Towers.	Tiny Towers	891	Butterfield

Sample ID	dive	Date	Time	Latitude	Longitude	Gyro	Alt.	Depth	Description	Location	VV	PI
J965-HFS-19	J2-965	2017/07/16	22:54:22	45.92628	-129.97903	233.1	112.9	1403.9	J965-HFS-19 DNA filter #11. Start. 22:54 at Diva transit to Mkr-113 Vent site. Stop 23:27. T1= 2.2degC. At about 1400 m. DNA sample for Carol Stepien.	Transit	915	Stepien
J965-HFS-20	J2-965	2017/07/17	00:12:54	45.92276	-129.98815	12.4	3.3	1519.7	J965-HFS-20 Unfiltered Bag #18. At Mkr-113 Vent in 15.5degC. Start 00:12. Stop 00:16. Tmax=16.4 Tavg=15.9 T2=9 vol=500. In tubeworm patch near the recovered MTR with good diffuse flow.	Mkr-113 Vent	1027	Butterfield
J965-HFS-21	J2-965	2017/07/17	00:17:35	45.92276	-129.98815	12.2	3.3	1519.7	J965-HFS-21 Unfiltered Bag #19 Unfiltered. Start 00:17. Stop 00:20. Tmax=16.8 Tavg=16.0 T2=8.5 vol=500. Good exhaust. Same location as HFS-20.	Mkr-113 Vent	1045	Butterfield
J965-HFS-22	J2-965	2017/07/17	00:22:31	45.92276	-129.98815	12.2	3.3	1519.7	J965-HFS-22 DNA filter #13 Start 00:22. Stop 00:50. Tmax=16.9 Tavg=15.6 T2=9.1. Vol=3501ml. For Julie Huber. Same location at Mkr-113 Vent.	Mkr-113 Vent	1060	Julie Huber
J965-HFS-23	J2-965	2017/07/17	00:52:34	45.92276	-129.98815	11.5	3.2	1519.8	J965-HFS-23 Filtered Bag #21. Start 00:52. Stop 00:54. Tmax=16.1 Tavg=15.6 T2=8.9. Vol=352ml. Same location.	Mkr-113 Vent	1137	Butterfield
J965-HFS-24	J2-965	2017/07/17	00:57:09	45.92276	-129.98815	11.7	3.2	1519.8	J965-HFS-24 Filtered Bag #22 Start 00:57. Stop 00:59. Tmax=16.4 Tavg=16.2 T2=9.2. Vol=352ml. Same location.	Mkr-113 Vent	1151	Butterfield
J965-HFS-25	J2-965	2017/07/17	01:45:09	45.92276	-129.98815	75.5	0.8	1519.9	J965-HFS-25 Unfiltered bag #20. Start 01:44. Stop 01:47. Tmax=2.0 Tavg=2.0 T2=2.2 Vol=400ml. In vicinity of Mkr-113 Vent in a clam patch.	Mkr-113 Vent	1279	Butterfield

Sample ID	dive	Date	Time	Latitude	Longitude	Gyro	Alt.	Depth	Description	Location	VV	PI
J965-HFS-26	J2-965	2017/07/17	01:57:48	45.92258	-129.98777	216.9	105.3	1416.3	J965-HFS-26 DNA Filter #14 on the ascent. This will take ~25 minutes. Z=1427 Alt=100. (Finished at 0224. Tmax=3.7 Tavg=2.9 Vol=3500ml.)	Ascent	1313	Stepien
J966-HFS-01	J2-966	2017/07/19	18:27:54	45.93366	-130.01322	195.6	1.2	1540.5	J966-HFS-01 Unfiltered Piston #1 Start 18:27. Stop 18:29. Virgin Vent. Tmax=209.5 Tavg=202 T2=78 Vol=300ml. Got up to 223degC. Good exhaust. Down to 217deg so slightly mixed.	Virgin Vent	6749	Butterfield
J966-HFS-02	J2-966	2017/07/19	18:31:39	45.93366	-130.01322	195.6	1.2	1540.5	J966-HFS-02 Filtered Piston #9 Start 18:31. Stop 18:34. Tmax=232.2 Tavg=228 T2=70 vol=325ml. Exact same location.	Virgin Vent	6761	Butterfield
J966-HFS-03	J2-966	2017/07/19	18:35:45	45.93366	-130.01322	195.5	1.2	1540.4	J966-HFS-03 Unfiltered Piston #2 Start 18:35. Stop 18:37. Tmax=237.4 Tavg=231 T2=64 vol=325ml. Same exact location.	Virgin Vent	6772	Butterfield
J966-GTB-04	J2-966	2017/07/19	18:57:40	45.93366	-130.01322	194.3	1.2	1540.3	J966-GTB-04 GTB Red GT-9. Sample triggered using a two handed approach. Bottle moved significantly while triggered. Same location as HFS samples.	Virgin Vent	6839	Baumberger
J966-GTB-05	J2-966	2017/07/19	19:12:08	45.93366	-130.01322	147.6	0.8	1540.1	J966-GTB-05 Greed/Red GT-7. Triggered using a two-armed approach. Same location at different heading at Virgin-positioned in good flow.	Virgin Vent	6876	Baumberger
J966-Geo-06	J2-966	2017/07/19	19:44:58	45.93356	-130.01367	271.8	3.7	1537.6	J966-GEO-06. Piece of chimney on side of Inferno Vent encased in diffuse flow. Covered in a biological mat. Small piece. Placed in port-side biobox.	Inferno Vent	6968	James Holden

Sample ID	dive	Date	Time	Latitude	Longitude	Gyro	Alt.	Depth	Description	Location	VV	PI
J966-HFS-07	J2-966	2017/07/19	20:06:34	45.93356	-130.01367	258.0	4.5	1537.1	J966-HFS-07 Unfiltered Piston #3. Start 20:06. Stop 20:09. Tmax= 305.7 Tav=305.2 T2=98.0 Vol=500. From Inferno Vent where structural vent removed prior to sampling flow.	Inferno Vent	7024	Butterfield
J966-HFS-08	J2-966	2017/07/19	20:10:41	45.93356	-130.01367	258.1	4.5	1537.1	J966-HFS-08 Unfiltered Piston #4. Start 20:10. Stop 20:13. Tmax=305.9 Tav=305.3 T2=65.0 Vol=500. Same vent at Inferno.	Inferno Vent	7039	Butterfield
J966-GTB-09	J2-966	2017/07/19	20:16:35	45.93356	-130.01367	258.6	4.6	1537.0	J966-GTB-09 Fired. GT-12 Green-Yellow at Inferno in same vent as HFS samples. Temperature was stable at 305.7degC. Jason temperature probe was 305degC max.	Inferno Vent	7058	Baumberger
J966-HFS-10	J2-966	2017/07/19	20:19:35	45.93356	-130.01367	258.9	4.6	1537.0	J966-HFS-10 Filtered Piston #8. Start 20:19. Stop 20:21. Tmax=306.6 Tav=305.9 T2=70 Vol=400. Same location as previous HFS/GTB.	Inferno Vent	7068	Butterfield
J966-Geo-11	J2-966	2017/07/19	20:37:40	45.93356	-130.01367	258.8	4.6	1536.9	J966-GEO-11 A small sample of the Inferno chimney was placed in the port-side biobox. Sample crumbled and consisted primarily of tubeworms taken from same area as fluid samples.	Inferno Vent	7117	James Holden
J966-HFS-12	J2-966	2017/07/19	20:53:25	45.93332	-130.01396	184.9	4.2	1537.1	J966-HFS-12 Unfiltered piston #5 Start 20:56. Stop 20:59. Tmax=293.3 Tav=287.8 T2=90 Vol=500. Hell Vent top where active structural part of chimney removed prior to sampling.	Hell Vent	7159	Butterfield

Sample ID	dive	Date	Time	Latitude	Longitude	Gyro	Alt.	Depth	Description	Location	VV	PI
J966-HFS-13	J2-966	2017/07/19	21:00:37	45.93332	-130.01396	185.8	4.2	1537.1	J966-HFS-13 Filtered Piston #7. Start 21:00. Stop 21:04. Tmax=298.2 Tavg=297.1 T2=95 Vol=500. Same location as previous sample.	Hell Vent	7180	Butterfield
J966-GTHFS-14	J2-966	2017/07/19	21:05:59	45.93332	-130.01396	186.2	4.2	1537.1	J966-GTHFS-14 GT-11 (Nude). Triggered. Tmax=297degC. Same location at Hell.	Hell Vent	7195	Baumberger
J966-HFS-15	J2-966	2017/07/19	21:22:26	45.93325	-130.01379	239.5	0.8	1539.4	J966-HFS-15 Unfiltered Bag #16. Start 21:22. Stop 21:35. Tmax=28.0 Tavg=25.4 T2=13.0 Vol=500ml. Anemone Vent positioned into a lower vent site (first area was only 4degC).	Anemone Vent	7245	Butterfield
J966-HFS-16	J2-966	2017/07/19	21:26:44	45.93325	-130.01379	239.5	0.8	1539.4	J966-HFS-16 Unfiltered Bag #17 Start21:26. Stop 21:29. Tmax=28.7 Tavg=26.2 T2=13 Vol=500ml. Same location as previous sample.	Anemone Vent	7260	Butterfield
J966-HFS-17	J2-966	2017/07/19	21:33:54	45.93325	-130.01379	240.0	0.8	1539.3	J966-HFS-17 DNA filter Sample #13. Start 21:33. Stop 21:50. Tmax=22.8 Tavg=16.9 t2=11 Vol=2156. Same location.	Anemone Vent	7280	Julie Huber
J967-HFS-01	J2-967	2017/07/20	08:44:19	45.91742	-129.99299	303.0	0.8	1531.5	J967-HFS-01 Unfiltered Piston #1. Start 08:44. Stop 08:46. Tmax=296.5 Tavg=295.9 T2=70 Vol=400. Casper Vent directly in the high-temperature flow.	Casper Vent	7431	Butterfield
J967-GTHFS-02	J2-967	2017/07/20	08:48:15	45.91742	-129.99299	303.0	0.8	1531.4	J967-GTHFS-02 Sample triggered. Temp=296.4degC. GT-10 (orange-blue) taken in same place as HFS-01.	Casper Vent	7444	Baumberger
J967-HFS-03	J2-967	2017/07/20	09:02:10	45.91736	-129.99300	275.0	0.9	1530.9	J967-HFS-03 Unfiltered Piston #2. Start 09:02. Stop 09:05. Tmax=322.8 Tavg=322.2 T2=95 Vol=400. Vixen Vent. Good exhaust.	Vixen Vent	7486	Butterfield

Sample ID	dive	Date	Time	Latitude	Longitude	Gyro	Alt.	Depth	Description	Location	VV	PI
J967-HFS-04	J2-967	2017/07/20	09:07:22	45.91736	-129.99300	275.0	0.9	1530.9	J967-HFS-04 Starting filtered piston #9. Start 09:07. Stop 09:09. Tmax=323.5 Tavg=323.3 T2=101 Vol=375. Same location at Vixen.	Vixen Vent	7503	Butterfield
J967-GTHFS-05	J2-967	2017/07/20	09:10:21	45.91736	-129.99300	275.1	0.9	1530.9	J967-GTHFS-05. Triggered. GT-16 (orange). Tmax=323. Same location at Vixen.	Vixen Vent	7515	Baumberger
J967-HFS-06	J2-967	2017/07/20	13:50:53	45.93317	-129.98233	189.0	0.8	1513.3	J967-HFS-06 Start 13:51. Stop 13:55. Unfiltered Bag #16. Tmax=25.4 Tavg=24.9 T2=10.4 Vol=500ml. In "snow-blower" hole at Mkr-33 Vent site. Good exhaust. Floc coming out of vent.	Mkr-33 Vent	8145	Butterfield
J967-HFS-07	J2-967	2017/07/20	13:56:06	45.93317	-129.98233	189.1	0.8	1513.3	J967-HFS-07 Start 13:56. Stop 13:59. Unfiltered bag #17. Tmax=25.0 Tavg=24.5 T2=10.5 Vol=500ml. Same location at Mkr-33 Vent.	Mkr-33 Vent	8161	Butterfield
J967-HFS-08	J2-967	2017/07/20	14:02:32	45.93317	-129.98233	189.1	0.8	1513.4	J967-HFS-08. DNA filter #13 Start 14:02. Stop 14:25. Tmax= 28.0 Tavg=27.1 T2=12 Vol=3000. Same location at Mkr-33 Vent.	Mkr-33 Vent	8183	Julie Huber
J967-HFS-09	J2-967	2017/07/20	14:29:57	45.93317	-129.98233	188.6	0.8	1513.6	J967-HFS-09 Filtered bag #21. Start 14:30. Stop 14:34. Tmax=28.4 Tavg=27.7 T2=12.5 Vol=500ml. Same location at Mkr-33 Vent.	Mkr-33 Vent	8258	Butterfield
J967-HFS-10	J2-967	2017/07/20	14:47:52	45.93335	-129.98225	354.9	4.0	1510.1	J967-HFS-10 DNA filter #14 for Carol Stepien. Sample during transit from Mkr-33 to Trevi. Start 14:48. Stop 15:27. Tmax=2.2 Tavg=2.1 T2=2.2 Volume=5000ml.	Trevi Vent	8306	Stepien

Sample ID	dive	Date	Time	Latitude	Longitude	Gyro	Alt.	Depth	Description	Location	VV	PI
J967-HFS-11	J2-967	2017/07/20	17:21:25	45.94629	-129.98375	283.6	1.0	1518.1	J967-HFS-11 Start 17:21. Stop 17:24. Unfiltered Piston #3. Tmax=231 Tavg=230.3 T2=66 vol=400ml. Good exhaust. Same location at Trevi.	Trevi Vent	8698	Butterfield
J967-HFS-12	J2-967	2017/07/20	17:24:58	45.94629	-129.98375	283.2	1.1	1518.1	J967-HFS-12 Unfiltered Piston #4. Start 17:25. Stop 17:28. Tmax=230.3 Tavg=219 T2=68 vol=475. Not seeing exhaust. Same location at Trevi.	Trevi Vent	8710	Butterfield
J967-HFS-13	J2-967	2017/07/20	17:29:40	45.94629	-129.98375	283.4	1.0	1518.1	J967-HFS-13 Filtered Piston #8 Start 17:30. Stop 17:32. Tmax=231 Tavg=230.7 T2=77 vol=400ml. Same location. Good exhaust.	Trevi Vent	8726	Butterfield
J967-GTB-14	J2-967	2017/07/20	17:51:47	45.94629	-129.98375	282.4	0.8	1518.2	J967-GTB-14 Fired. Black GTB #5. Trevi Vent in the same place as the 230deg HFS samples. Had to bend the wand tip before firing.	Trevi Vent	8790	Baumberger
J967-GTB-15	J2-967	2017/07/20	17:58:48	45.94629	-129.98375	284.4	114.0	1518.2	J967-GTB-15 White GT-17 Fired at Trevi. Good placement.	Trevi Vent	8809	Baumberger
J967-HFS-16	J2-967	2017/07/20	19:19:03	45.94370	-129.98520	336.3	0.8	1520.4	J967-HFS-16 Unfiltered Bag Sample #18 Start 19:19. Stop 19:21. Tmax=24.4 Tavg=24.2 T2=12 Vol=400. At location where MTR was recovered at Mkr-N3 Vent.	Mkr-N3 Vent	9030	Butterfield
J967-HFS-17	J2-967	2017/07/20	19:24:23	45.94370	-129.98520	336.4	0.8	1520.4	J967-HFS-17 Filtered Piston #7 Start 19:23. Stop 19:27. Tmax=24.5 Tavg=24.4 T2=12 Vol=550. Same location at Mkr-N3 Vent.	Mkr-N3 Vent	9044	Butterfield
J967-HFS-18	J2-967	2017/07/20	19:27:51	45.94370	-129.98520	336.3	0.8	1520.4	J967-HFS-18 DNA Filter #15 Start 19:28. Stop 19:49. Tmax=24.6 Tavg=24.3 T2=12 Vol=3000 mL. Same location at Mkr-N3 Vent.	Mkr-N3 Vent	9056	Julie Huber

Sample ID	dive	Date	Time	Latitude	Longitude	Gyro	Alt.	Depth	Description	Location	VV	PI
J967-GTB-19	J2-967	2017/07/20	19:58:31	45.94370	-129.98520	336.3	0.8	1520.2	J967-GTB-19 Fired. GTB-2 Green. Same location at Mkr-N3 Vent.	Mkr-N3 Vent	9138	Baumberger
J967-HFS-20	J2-967	2017/07/20	20:08:15	45.94376	-129.98521	339.4	1.4	1519.7	J967-HFS-20 We are running another DNA sample as we transit from Mkr135 at Mkr-N3 Vent to AX104 (Bag City). Stop 20:45 Tmax=2.9 T2=2.2 Vol=5000	Transit	9168	Stepien
J967-HFS-21	J2-967	2017/07/21	00:47:27	45.91626	-129.98937	200.4	0.9	1528.8	J967-HFS-21 Unfiltered bag #19. In high-diffuse flow and tubeworm bush with Jason temp of 13.4. Start 00:47. Stop 00:51. Tmax=13.6 Tavg=13.4 Vol=502ml T2=7.3. Bag City.	Bag City Vent	9793	Butterfield
J967-HFS-22	J2-967	2017/07/21	00:51:15	45.91626	-129.98937	200.4	0.9	1528.8	J967-HFS-22 Unfiltered Bag #20 Start 00:51. Stop 00:55. Tmax=13.1 Tavg=12.8 T2=7.4 Vol=494ml. Had to start pump manually. Same location at Bag City.	Bag City Vent	9804	Butterfield
J967-HFS-23	J2-967	2017/07/21	00:55:44	45.91626	-129.98937	200.3	1.0	1528.8	J967-HFS-23 Filtered Bag #22. Start 00:56. Stop 00:59. Tmax=13.1 Tavg=12.8 Vol=495ml T2=6.4. Same location at Bag City.	Bag City Vent	9820	Butterfield
J967-HFS-24	J2-967	2017/07/21	01:00:32	45.91626	-129.98937	200.4	0.9	1528.8	J967-HFS-24 DNA filter #10. Start 01:00. Stop 01:22. Vol=3000ml Tmax=13.3 Tavg=12.6 T2=6.8. Same location at Bag City.	Bag City Vent	9832	Julie Huber

Sample ID	dive	Date	Time	Latitude	Longitude	Gyro	Alt.	Depth	Description	Location	VV	PI
J967-Geo-27	J2-967	2017/07/21	09:38:34	45.86324	-130.00368	56.4	1.2	1717.3	J967-GEO-27. Piece of intact pillow from 1998 flow just past where new lava flowed out of the fissure. Small bud below a tube spanning two pillows. Some glass shattered off rock while sampling. Put into milk crate. (Sample number out of order as recorded after dive). South Pillow Mounds. (Teaching specimen)	South Pillow Mounds	10066	Scott Nooner
J967-Geo-28.	J2-967	2017/07/21	10:19:04	45.86470	-130.00339	7.4	1.0	1716.8	J967-GEO-28. Grabbed piece of freshly crushed bud from striated pillow. Can see upper glass layer. Pillow adjacent to flatter-smaller intact lavas. 1998 lava flow. (Sample number out of order as recorded after dive). South Pillow Mounds. (Teaching specimen)	South Pillow Mounds	10150	Scott Nooner
J967-Geo-25	J2-967	2017/07/21	11:01:34	45.86720	-130.00211	89.9	1.0	1708.8	J967-GEO-25. Here in the 2011 lava flow. In a little mound surrounded by 1998 flow. Sampled a 2011 pillow toe. Put in stbd milkcrate.	South Pillow Mounds	10235	Clague / Rubin
J967-Geo-26	J2-967	2017/07/21	12:00:33	45.86922	-129.99852	88.5	1.2	1723.2	J967-GEO-26 Large pillow toe from 2011 flow surrounded by 1998 flow. Put in stbd biobox.	South Pillow Mounds	10426	Clague / Rubin
J968-Geo-01	J2-968	2017/07/21	22:07:10	46.12069	-129.96967	357.9	1.2	1765.0	J968-GEO-01. Little black chimney at the top of a mound. Some bag creatures nearby. Same location visited by MBARI in 2016.	Prosecco	10606	Kashyap / Holden / Butterfield

Sample ID	dive	Date	Time	Latitude	Longitude	Gyro	Alt.	Depth	Description	Location	VV	PI
J968-HFS-02	J2-968	2017/07/21	22:16:55	46.12069	-129.96967	357.7	1.1	1765.0	J968-HFS-02 Unfiltered piston #9. Start 22:18. Stop 22:20. Tmax=317.9 Tavg=317.6 T2=40 Vol=500ml. From hole created by taking sample geo-01. Snails, sulfide worms and some bacterial mat.	Prosecco	10638	Butterfield
J968-HFS-03	J2-968	2017/07/21	22:20:55	46.12069	-129.96967	357.7	1.1	1765.0	J968-HFS-03 Unfiltered piston #8. Start 22:21. Stop 22:24. Tmax=317.6 Tavg=316 T2=40 Vol=500ml. Same location.	Prosecco	10654	Butterfield
J968-HFS-04	J2-968	2017/07/21	22:25:55	46.12069	-129.96967	357.9	1.2	1764.9	J968-HFS-04 Unfiltered bag #17. Start 22:26. Stop 22:28. Tmax=317.5 Tavg=316.6 T2=40 Vol=300. Good exhaust. Same location.	Prosecco	10672	Butterfield
J968-HFS-05	J2-968	2017/07/21	22:30:02	46.12069	-129.96967	358.0	1.2	1764.9	J968-HFS-05 Unfiltered Piston #1. Start 22:30. Stop 22:33. Tmax=318.2 Tavg=317.7 T2=42 Vol=500C. Same location.	Prosecco	10686	Butterfield
J968-GTHFS-06	J2-968	2017/07/21	22:34:29	46.12069	-129.96967	358.1	1.2	1764.9	J968-GTHFS-06 Fired at same location as HFS samples at chimney sample hole. Blue-orange GTHFS sample Temp=317.5.	Prosecco	10700	Baumberger
J968-GTB-07	J2-968	2017/07/21	22:40:51	46.12069	-129.96967	357.8	1.2	1764.9	J968-GTB-07 (gas tight bottle) in the same orifice as the previous HFS samples. Firing. Red GTB-09 at same location. Jason temperature 314degC.	Prosecco	10717	Baumberger
J968-HFS-08	J2-968	2017/07/21	23:06:56	46.12067	-129.96967	206.3	0.8	1764.6	J968-HFS-08 Unfiltered bag #18. Start 23:07. Stop 23:10. Tmax=25.2 Tavg=21.2 T2=6 Vol=475. On other side of Prosecco vent mound from hi-temp HFS samples in diffuse flow between pillow lobes with white and orange mat. Slight change in position.	Prosecco	10796	Butterfield

Sample ID	dive	Date	Time	Latitude	Longitude	Gyro	Alt.	Depth	Description	Location	VV	PI
J968-HFS-09	J2-968	2017/07/21	23:10:56	46.12067	-129.96967	206.1	0.8	1764.5	J968-HFS-09. Unfiltered bag #19. Start 23:11. Stop 23:14. Tmax=26.2 Tavg=23.5 T2=6 Vol=475ml. Same location as HFS-08.	Prosecco	10809	Butterfield
J968-HFS-10	J2-968	2017/07/21	23:15:20	46.12067	-129.96967	206.1	0.8	1764.5	J968-HFS-10. DNA filter #13. Start 23:15. Stop 23:37. TMax=21.6 Tavg=19.4 T2=5 vol=2500ml. Same location in diffuse flow. (For Julie Huber) Saw gas bubbles from flow in back of vehicle on cameras.	Prosecco	10822	Julie Huber
J968-Geo-11	J2-968	2017/07/22	00:04:50	46.12023	-129.96995	103.0	0.8	1769.9	J968-GEO-11 Suction of the sulfur deposits at the Liminocello site. Getting some other sediment as well. Small snails on frozen-molten sulfur. Shook sample hose and took second 2 more suctions of the site. Tilted hose up to ensure sample got into the chamber.	Liminocello	10988	Butterfield
J967-HFS-12	J2-968	2017/07/22	00:41:11	46.12028	-129.97046	299.1	1.5	1763.8	J967-HFS-12 Unfiltered piston #4. Start 00:41. Stop 00:44. Tmax=246 Tavg=244.7 T2=28 Vol=500ml. Area with many chimneys and black smoke. Chimneys are small and thin. Palm worms already here. Sample site is where a chimney was removed for a sample but sample of chimney not successful.	Kahlua	11115	Butterfield
J967-HFS-13	J2-968	2017/07/22	00:44:36	46.12028	-129.97046	299.1	1.4	1763.8	J967-HFS-13 Unfiltered piston #5. Start 00:45. Stop 00:47. Tmax=247.7 Tavg=245.3 T2=29 Vol=500ml. Same location as previous sample.	Kahlua	11128	Butterfield
J967-GTHFS-14	J2-968	2017/07/22	00:50:01	46.12028	-129.97046	299.1	1.5	1763.8	J967-GTHFS-14 GT-7 Red-green in same orifice as previous samples here at Kahlua Site.	Kahlua	11144	Baumberger

Sample ID	dive	Date	Time	Latitude	Longitude	Gyro	Alt.	Depth	Description	Location	VV	PI
J968-HFS-15	J2-968	2017/07/22	01:28:59	46.11997	-129.97060	22.4	0.8	1764.4	J968-HFS-15 Start. Filtered Bag #23. Start 01:29. Stop 01:32. Tmax=37.3 Tavg=37.0 T2=2 vol=400ml. Area of smoking chimlets and black-diffuse smoke from depressions with bag creatures. Good exhaust. Reset flush pump and Beast working better after.	Sambuca	11293	Butterfield
J968-HFS-16	J2-968	2017/07/22	01:36:42	46.11997	-129.97060	22.1	0.8	1764.4	J968-HFS-16 Unfiltered Bag #20. Start 01:37. Stop 01:39. Tmax=35 Tavg=34 T2=4 vol=400ml. Same exact location as HFS-15 after reset flush pump and worked better for this sample.	Sambuca	11330	Butterfield
J968-GTB-17	J2-968	2017/07/22	01:55:41	46.11997	-129.97060	345.1	1.0	1764.4	J968-GTB-17 Fired Nude GT-11 at Sambuca's tallest chimlet near the previous sample site. Jason temp probe T=312degC.	Sambuca	11402	Baumberger
J969-Geo-01	J2-969	2017/07/22	12:20:17	45.97191	-129.99667	334.0	3.1	1527.6	J969-GEO-01 Crust near the 2015 eruptive fissure. Lobe (pillow-like) flow with collapse off to the side. Piece of upper crust with glassy surface. Placed in forward port side bin 5.	Axial caldera	11505	Clague / Rubin
J969-Geo-02	J2-969	2017/07/22	12:34:23	45.97311	-129.99675	50.5	0.8	1526.7	J969-GEO-02. Grabbing a piece of jumbled lobate from the edge of the collapse. Small fist-sized piece of thin glassy crust. Grabbed several pieces; shiny and fragile. In front-stbd center rock box.	Axial caldera	11568	Clague / Rubin
J969-Geo-03	J2-969	2017/07/22	12:50:30	45.97365	-129.99585	68.3	1.0	1524.3	J969-GEO-03 Piece of smooth pillow lobate. Small glassy lobate. Smooth exterior. Taken at the contact between 2015 lavas and the talus of the eastern caldera wall. Into bin 3.	Axial caldera	11634	Clague / Rubin

Sample ID	dive	Date	Time	Latitude	Longitude	Gyro	Alt.	Depth	Description	Location	VV	PI
J969-Geo-04	J2-969	2017/07/22	13:10:04	45.97516	-129.99635	344.1	1.6	1525.3	J969-GEO-04. Piece of jumbled 2015 lava right at the contact with the talus. Thin glass crust. Platy.	Axial caldera	11720	Clague / Rubin
J969-Geo-05	J2-969	2017/07/22	15:16:33	45.98859	-129.99859	332.8	1.7	1471.7	J969-GEO-05 Piece of skin of newly erupted lava pillow on a fissure. Took a second piece. Forward-port quadrant of stbd rock box.	Axial East Rim	12264	Clague / Rubin
J969-Geo-06	J2-969	2017/07/22	15:28:27	45.99017	-129.99914	351.0	0.9	1472.4	J969-GEO-06 Piece of fresh skin on east side of where lava overflowed fissure on east side. Piece from overflow near top of fissure. Very glassy and covered with sediment. In the stbd rock box front-stbd quadrant. Took 3 pieces.	Axial East Rim	12316	Clague / Rubin
J969-Geo-07	J2-969	2017/07/22	15:35:02	45.99071	-129.99938	29.8	1.3	1472.9	J969-GEO-07 Piece of new flow crust a little more than halfway to waypoint #10 from #9. Crust over-topping the fissure on its east side. Fissure has heavy ash sediment on top. Aft-port section of center rock box.	Axial East Rim	12349	Clague / Rubin
J969-Geo-08	J2-969	2017/07/22	15:51:13	45.99241	-129.99960	3.2	0.8	1473.9	J969-GEO-08 Piece of this newly collapsed skin (when Jason was setting up) of the flow on top of the older sediment covered substrate-small Kipuka. Area with more significant extrusion of lava on top of ash sediment. Aft-stbd compartment of center rock box.	Axial East Rim	12422	Clague / Rubin

Sample ID	dive	Date	Time	Latitude	Longitude	Gyro	Alt.	Depth	Description	Location	VV	PI
J969-Geo-09	J2-969	2017/07/22	16:05:23	45.99346	-129.99992	263.9	0.8	1477.1	J969-GEO-09 Piece of collapsed pillow crust from western wall of eruptive fissure. New flow with less sediment than eastern side of fissure. Just west of waypoint 11. Great pointy-lava drips. One piece in port rock box and second piece aft of center rock box. (Display specimen)	Axial East Rim	12493	Clague / Chadwick
J969-Geo-10	J2-969	2017/07/22	16:35:44	45.99412	-130.00111	327.2	0.8	1482.7	J969-GEO-10 Piece of lineated sheet flow to the west of the fissure. Aft-stbd quadrant of stbd rock box.	Axial East Rim	12607	Clague / Rubin
J969-Geo-11	J2-969	2017/07/22	16:48:00	45.99375	-130.00189	266.6	1.2	1480.1	J969-GEO-11 Tiny lava "pillar". Under a ledge. Skinny ~ 1 foot tall pillar-looking piece. Area with new lava and sediment. Placed in dive weight box. (Display specimen).	Axial East Rim	12655	Clague / Chadwick
J969-Geo-12	J2-969	2017/07/22	17:49:20	45.99521	-130.00140	339.4	0.8	1483.7	J969-GEO-12 Piece of crust in the sheet flow at the fissure within the eruptive fissure (western edge visible in sonar). In the weight box with Geo-11 (pillar sample). Sheet flow collapsed as Jason pulled away.	Axial East Rim	12918	Clague / Rubin
J969-Geo-13	J2-969	2017/07/22	17:57:04	45.99575	-130.00169	300.9	1.1	1480.5	J969-GEO-13 Piece of pillar top in collapse area after large area of sheet flow in the 2015 lava flow. Near western edge of eruptive fissure. Several pieces collected while parked on top of pillar. Pillar collapsing while sampling. Aft-port quadrant of stbd rock box.	Axial East Rim	12952	Clague / Rubin

Sample ID	dive	Date	Time	Latitude	Longitude	Gyro	Alt.	Depth	Description	Location	VV	PI
J969-Geo-14	J2-969	2017/07/22	18:14:18	45.99663	-130.00208	58.6	0.8	1483.2	J969-GEO-14 Piece of crust from bottom of the wall on edge of the collapse area. Near or in the eruptive fissure. Some sediment. Placed in stbd swing arm biobox.	Axial East Rim	13012	Clague / Rubin

6.6 Jason Dive Logs

Latitude and longitude listed are the smoothed (RENAV) positions. These positions were not always used as the best positions for the samples and vents and could differ from the positions listed in the sample tables. Refer to the sample table (Table XX-X) for the latitudes and longitudes used on the dive maps. Date and time are GMT (local time was Pacific Time, GMT -7). VV refers to the Virtual Van logging ID and is useful tool for using WHOI's online interface.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-965 Datalogger Comment
47	2017/07/16	15:34:41			50.7	0.0	0.6	Preparing for Jason Dive J-965 at International District-Axial Seamount
48	2017/07/16	15:36:33			37.9	0.0	0.6	Putting extra weights in the Port arm for descent and cable stretch.
49	2017/07/16	15:37:18			45.9	0.0	0.6	Putting extra weight in the STBD arm.
50	2017/07/16	15:37:50			45.4	1.2	0.6	Jason off deck.
51	2017/07/16	15:38:58			149.7	4.7	0.7	Beast power is on.
52	2017/07/16	15:40:27			346.7	183.1	2.2	JASON: Jason in water In the water!
53	2017/07/16	15:42:15			252.8	81.2	19.6	Grounds are clear-a beautiful day.
54	2017/07/16	15:44:50			236.2	67.2	26.8	Putting floats on the wire.
55	2017/07/16	16:21:10			237.4	133.4	153.3	Still descending. Preparing the logging navigation screen.
56	2017/07/16	16:32:29			236.2	131.1	140.2	Doing checks on the winch to ensure proper functioning at 140m.
57	2017/07/16	16:39:43			236.6	157.0	255.7	Winch going down. Wire out is 250 m.
58	2017/07/16	16:53:25			239.2	196.6	517.8	Deployment Location is 45deg 55.573'N -129deg 58.800'W with a depth of 1518m in International District.
59	2017/07/16	16:56:31			237.7	189.5	562.7	Main goals: Fluid sampling at International District Vent field and Mkr113 Vent (time permitting)
60	2017/07/16	17:00:12			237.2	141.8	605.7	Basket for this dive: HFS fluid sampler intake; suction sample hose; 3 gas-tight samplers; milk crate; 2 HOBOS; 1 MTR
61	2017/07/16	17:00:39			237.1	141.8	619.7	Basket on all dives: Jason high-temperature probe; Beast-HFS; MPR holster; 2 markers
62	2017/07/16	17:00:58			237.7	196.9	629.2	Port swing arm: empty STBD swing arm: 1 tephra sampler H (bucket)
63	2017/07/16	17:01:50			237.4	191.0	656.0	Tasks: 1) Fluid sampling at International District (Castle Vent: 1 GT; 2 pistons; recover MISO141; deploy MISO
64	2017/07/16	17:03:09			236.7	181.6	696.6	Deploy Tephra Sampler H (from port biobox) near base of Castle chimney; deploy marker
65	2017/07/16	17:03:39			237.0	194.1	712.1	El Guapo (top): 2 bags; collect chimney pieces
66	2017/07/16	17:04:30			236.9	196.1	737.5	Escargot (near top): 2 bags; collect chimney pieces if present
67	2017/07/16	17:05:00			236.7	196.1	753.5	Diva Vent: recover MISO102; 2 GT; 2 pistons; deploy HOBOS
68	2017/07/16	17:07:32			236.7	190.0	830.6	2) Transit to Mkr113 Vent (with physical MKR 62) 45deg 55.364' -129deg 59.286'W at 1526m depth

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-965 Datalogger Comment
48	2017/07/16	15:36:33			37.9	0.0	0.6	Putting extra weights in the Port arm for descent and cable stretch.
70	2017/07/16	17:08:18			236.5	199.3	855.4	4) Recover MTR3173 and replace with MTR3040
71	2017/07/16	17:11:55			236.6	199.4	965.0	Markers on the basket are Mkr-272 and Mkr-278.
72	2017/07/16	17:12:33			237.1	195.0	984.3	Gas-tight bottles on the basket are GT-5 (Black); GT-16 (Orange); GT-17 (White)
71	2017/07/16	17:11:55			236.6	199.4	965.0	Markers on the basket are Mkr-272 and Mkr-278.
74	2017/07/16	17:19:13			237.2	124.2	1188.7	Over 2/3 the way to the bottom!
75	2017/07/16	17:38:24			348.5	87.6	1430.0	Performing a cable stretch before heading to the bottom.
76	2017/07/16	17:45:38			353.9	87.3	1430.2	Done with wire stretch.
77	2017/07/16	17:47:02			352.7	86.3	1430.9	STBD arm weights released.
78	2017/07/16	17:49:07			353.9	88.3	1428.7	Port weights were released as well.
79	2017/07/16	17:49:15			354.4	88.2	1428.7	Ship is moving closer to the target before descent.
80	2017/07/16	17:54:30			26.2	80.2	1437.1	Dropping a weight from the basket.
81	2017/07/16	17:55:17			25.4	78.0	1439.2	Dropping more weights from the basket.
82	2017/07/16	17:58:32			25.6	73.6	1443.6	Ship is still moving over into position for going to the bottom.
85	2017/07/16	18:04:04			53.1	12.6	1503.5	Jason is now driving toward Castle. Ship has moved into position.
87	2017/07/16	18:05:02	45.926	-129.98031	53.5	8.7	1507.3	Seeing sonar targets as we near the bottom.
89	2017/07/16	18:05:24	45.92599	-129.98034	53.4	9.8	1506.3	NAV: Doppler Reset
91	2017/07/16	18:05:46	45.92599	-129.98038	53.2	8.3	1507.7	In DVL mode for navigation now. See bottom on the down camera.
93	2017/07/16	18:06:04	45.92599	-129.98040	53.6	5.6	1510.5	There is the bottom!
96	2017/07/16	18:07:18	45.92609	-129.98029	54.1	7.0	1509.2	Heading 054 toward Castle over an old pile of chimney that is SW of Castle.
99	2017/07/16	18:08:19	45.92616	-129.98013	50.0	7.9	1505.5	Looks like Castle so map is offset by 14m to the SW.
101	2017/07/16	18:08:46	45.92616	-129.98006	0.8	8.6	1507.7	This is definitely Castle Vent. Large area of white staining on one side of the chimney base.
104	2017/07/16	18:10:01	45.92617	-129.98003	350.4	3.5	1512.9	Moving around to STBD. There is the HOBO has fallen out of the vent flow.
106	2017/07/16	18:10:11	45.92617	-129.98004	10.8	3.5	1512.9	Frame_Grab:
107	2017/07/16	18:10:15	45.92617	-129.98004	17.4	3.5	1513.0	Frame_Grab:
108	2017/07/16	18:10:33	45.92617	-129.98006	42.2	2.9	1513.4	That is HOBO 141 at Castle vent.
111	2017/07/16	18:11:14	45.92616	-129.98008	54.0	2.4	1513.7	Frame_Grab:
114	2017/07/16	18:12:13	45.92612	-129.98008	53.1	1.9	1513.8	Looks like 2 small chimneys with great flow but don't recall which orifice the HOBO tip was placed in.
119	2017/07/16	18:14:18	45.92607	-129.98003	52.6	2.3	1513.8	Taking Jason probe temperatures before fluid sampling.
121	2017/07/16	18:14:57	45.92608	-129.98004	52.5	2.3	1513.8	Knocked down the lower anhydrite chimney with the probe tip.
124	2017/07/16	18:15:59	45.92612	-129.98005	52.5	2.3	1513.8	Placing tip in the orifice and high flow.
127	2017/07/16	18:16:45	45.92614	-129.98005	52.4	1.8	1513.8	The fallen chimney was in the way of the flow.
128	2017/07/16	18:16:54	45.92614	-129.98004	52.4	2.3	1513.8	Frame_Grab:

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-965 Datalogger Comment
130	2017/07/16	18:17:06	45.92614	-129.98003	52.4	2.3	1513.8	Repositioning the wand.
131	2017/07/16	18:17:16	45.92614	-129.98003	52.4	2.3	1513.8	Temperature over 200deg!
135	2017/07/16	18:18:46	45.92615	-129.97997	52.3	2.3	1513.8	Can see the palm worms around the vent.
137	2017/07/16	18:19:04	45.92615	-129.97996	52.4	2.3	1513.8	That is palm worms. First of many typos.
142	2017/07/16	18:21:33	45.92618	-129.97999	51.9	2.3	1513.9	Fish-there are 2 of them but not in the science cams.
144	2017/07/16	18:21:59	45.92618	-129.98000	51.9	2.3	1513.9	High temperature is 265.2deg C.
147	2017/07/16	18:23:00	45.9262	-129.98003	52.2	2.3	1513.9	Next we will fluid sample after stowing the temperature probe.
150	2017/07/16	18:23:49	45.92621	-129.98006	52.0	2.3	1513.9	Can see some tube worms as well.
161	2017/07/16	18:28:56	45.92604	-129.97994	52.0	2.3	1513.8	Placing HFS probe into the same orifice that we just read the temperature of 265.2degC.
171	2017/07/16	18:32:48	45.92614	-129.98001	52.0	2.3	1513.8	We're getting ready to sample here at Castle.
176	2017/07/16	18:34:33	45.92622	-129.98002	51.9	2.3	1513.8	Temp is coming up will be sampling soon.
178	2017/07/16	18:35:13	45.92623	-129.98004	51.9	2.3	1513.8	Big fat rattail in the brow cam.
180	2017/07/16	18:35:42	45.92622	-129.98005	51.9	2.3	1513.8	SAMPLE: HFS J965-HFS-01 Unfiltered piston #1 Start.
186	2017/07/16	18:38:22	45.92624	-129.98007	51.9	2.3	1513.8	J965-HFS-01 cont. Mouse position on new nav screen is 45df 55.569 129d 58.804 Z=1513 Alt=2.
187	2017/07/16	18:38:33	45.92625	-129.98007	51.9	2.3	1513.8	J965-HFS-01 cont. Finished.
191	2017/07/16	18:39:53	45.92624	-129.98009	51.9	2.3	1513.8	Heading is 052. Unfiltered piston Titanium. Tmax=255.2; Tavg=254; Vol=420ml; T2=75C Did not see any flow out sample pump.
194	2017/07/16	18:40:41	45.92622	-129.98009	51.9	2.3	1513.8	SAMPLE: HFS J965-HFS-02. Unfiltered titanium piston #2. Start.
198	2017/07/16	18:42:33	45.92622	-129.98005	51.9	2.3	1513.8	Looking for flow out the back of the beast.
200	2017/07/16	18:42:49	45.92623	-129.98005	51.9	2.3	1513.8	Don't see any flow out the back of the beast.
204	2017/07/16	18:44:15	45.92623	-129.98003	51.9	2.3	1513.8	The mouse position is ~15.4 m SW of the vents Castle position. This sample exactly same position as sample 1.
206	2017/07/16	18:44:40	45.92621	-129.98002	51.9	2.3	1513.8	J965-HFS-02 cont. finished.
208	2017/07/16	18:45:20	45.92619	-129.98000	51.9	2.3	1513.8	J965-HFS-02 Tmax=253. Tavg=253. T2=25 Vol=375. Did not see flow out exhaust.
213	2017/07/16	18:47:23	45.92624	-129.98001	51.9	2.3	1513.8	SAMPLE: HFS The last entry was the end of sample 2 at 18:45:53.
219	2017/07/16	18:49:40	45.92618	-129.98005	51.9	2.3	1513.8	SAMPLE: GTHFS J965-GTHFS-03 gastight hydraulic function 5. Fired. GT-10 Orange Blue
222	2017/07/16	18:50:33	45.9262	-129.98004	51.9	2.3	1513.8	J965-GTHFS-03. Temp-256 T2=64. Pump is shut off. It worked.
224	2017/07/16	18:51:15	45.9262	-129.98004	51.9	2.3	1513.8	Finished with HFS sampling here at Castle.
229	2017/07/16	18:53:05	45.92617	-129.97999	49.8	2.1	1513.9	Will stow HFS; Recover a MISO and deploy another. Then will deploy tephra sampler and marker.
232	2017/07/16	18:54:13	45.92617	-129.98000	49.9	2.1	1513.9	The location for the second cluster of points - closer to our target is: 45d 55.572. 129d 58.802
234	2017/07/16	18:54:39	45.92618	-129.98000	50.0	2.2	1513.9	DVL is wandering. Did not reset.
236	2017/07/16	18:55:10	45.92618	-129.98001	50.1	2.2	1513.9	Retrieving MISO153 from the basket for deployment.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-965 Datalogger Comment
238	2017/07/16	18:55:53	45.92618	-129.98001	50.2	2.3	1513.9	Placing tip of HOBO in the orifice just sampled.
246	2017/07/16	18:59:30	45.92616	-129.98002	50.3	2.2	1513.9	DEPLOY: HOBO temp probe. MISO 153. Positioning the HOBO and it is sitting straight up in the orifice at Castle.
250	2017/07/16	19:01:03	45.92616	-129.98000	51.5	2.8	1513.6	Pulling up from the site to recover the old HOBO and investigate the small foam float.
258	2017/07/16	19:04:21	45.92618	-129.97999	323.5	2.5	1514.0	The float had Moyer's bacterial traps on them from earlier expeditions. Not picking them up.
260	2017/07/16	19:04:36	45.92618	-129.98000	323.5	2.5	1514.0	There is the HOBO to recover. MISO141.
263	2017/07/16	19:05:36	45.92619	-129.98001	323.6	2.5	1514.0	The tip of the old MISO is bumping the newly deployed HOBO.
264	2017/07/16	19:06:00	45.9262	-129.98001	323.6	2.5	1514.0	RECOVER: HOBO temp probe. Grabbed it-have MISO 141 in the arm.
271	2017/07/16	19:08:57	45.9262	-129.98004	323.6	2.5	1514.0	Placing MISO141 into the basket.
273	2017/07/16	19:09:13	45.92619	-129.98004	323.6	2.5	1514.0	Placed in the aft-port compartment of the basket.
276	2017/07/16	19:10:07	45.92619	-129.98003	323.5	2.5	1514.0	Instrument is strapped down.
284	2017/07/16	19:13:40	45.92617	-129.97998	327.2	3.8	1513.0	Looking for a place to deploy the Tephra sampler.
286	2017/07/16	19:14:25	45.92618	-129.97997	327.7	1.1	1515.6	STBD swing arm is out.
289	2017/07/16	19:15:31	45.92618	-129.97995	327.1	0.8	1515.8	Removing the lid to the biobox and there is the Tephra sampler.
294	2017/07/16	19:17:21	45.92617	-129.97995	326.6	0.8	1515.8	This is Tephra sampler H deployed at the base of Castle at a heading of 326.
297	2017/07/16	19:18:25	45.92617	-129.97996	326.6	0.8	1515.8	DEPLOY: Tephra sampler. The Tephra sampler is STBD of the sampling area to keep it out of the way.
298	2017/07/16	19:18:28	45.92617	-129.97996	326.7	0.8	1515.8	Frame_Grab:
300	2017/07/16	19:18:47	45.92616	-129.97996	327.2	0.8	1515.8	DEPLOY: marker. Mkr-278 deployed at Castle vent with the Tephra H sampler.
304	2017/07/16	19:20:27	45.92615	-129.97998	354.4	3.4	1513.2	Frame_Grab:
305	2017/07/16	19:20:27	45.92615	-129.97998	354.4	3.4	1513.2	Frame_Grab:
306	2017/07/16	19:20:32	45.92615	-129.97998	350.5	3.5	1513.1	Frame_Grab:
308	2017/07/16	19:20:38	45.92615	-129.97998	348.5	3.8	1512.9	Frame_Grab:
309	2017/07/16	19:21:01	45.92614	-129.97998	349.7	5.6	1510.9	Great framegrabs of an overview of the vent and instruments.
311	2017/07/16	19:21:18	45.92614	-129.97998	353.1	7.2	1509.4	Moving up the chimney and taking framegrabs.
312	2017/07/16	19:21:19	45.92614	-129.97998	355.0	7.3	1509.2	Frame_Grab:
313	2017/07/16	19:21:21	45.92614	-129.97998	357.3	7.5	1509.0	Frame_Grab:
314	2017/07/16	19:21:24	45.92614	-129.97997	358.4	7.7	1508.7	Frame_Grab:
317	2017/07/16	19:22:09	45.92614	-129.97997	358.4	9.5	1506.7	The heading of 000 has a direct view of the white venting sediment. (Tephra and marker are at 326)
318	2017/07/16	19:22:13	45.92614	-129.97996	358.2	9.4	1506.7	Frame_Grab:
319	2017/07/16	19:22:15	45.92614	-129.97996	358.3	9.6	1506.7	Frame_Grab:
321	2017/07/16	19:23:03	45.92615	-129.97995	21.8	9.7	1506.7	While traveling between Castle and El Guapo will take an HFS DNA sample for Carol Stepien.
324	2017/07/16	19:23:34	45.92616	-129.97993	17.0	7.0	1509.3	Great lava tubes with only light sediment coating.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-965 Datalogger Comment
325	2017/07/16	19:23:53	45.92617	-129.97992	17.3	6.1	1509.8	Spider crab at the top of the pile.
326	2017/07/16	19:23:55	45.92617	-129.97992	16.8	6.0	1509.8	Frame_Grab:
331	2017/07/16	19:25:35	45.92624	-129.97986	20.1	3.1	1510.1	Yellow sediments coating some of the pillow lavas.
334	2017/07/16	19:26:34	45.9263	-129.97982	19.7	3.6	1511.3	More sediments as Jason moves away from the Castle.
335	2017/07/16	19:26:58	45.92633	-129.97980	19.9	3.9	1511.6	SAMPLE: HFS J965-HFS-04 DNA filter Start.
338	2017/07/16	19:27:42	45.92639	-129.97978	20.8	4.7	1511.5	Heading over another old chimney-could be El Abuelo.
340	2017/07/16	19:28:07	45.92642	-129.97977	23.4	5.7	1510.2	Inactive chimney El Abuelo. Several spider crabs on the chimney.
341	2017/07/16	19:28:09	45.92642	-129.97976	23.0	5.8	1510.2	Frame_Grab:
342	2017/07/16	19:28:27	45.92645	-129.97976	24.6	5.9	1509.9	Moving past with El Abuelo to starboard.
345	2017/07/16	19:29:29	45.92652	-129.97972	29.4	5.2	1507.8	Sample will take 10-15 minutes.
351	2017/07/16	19:32:01	45.92665	-129.97962	84.0	4.7	1509.6	Need to move the ship to get out of the no-fly zone.
356	2017/07/16	19:33:49	45.92666	-129.97953	84.8	6.2	1509.5	Smaller tubes and more sediment.
358	2017/07/16	19:34:27	45.92664	-129.97950	85.9	5.7	1508.5	Seeing crabs so maybe getting some spider crab DNA.
361	2017/07/16	19:35:14	45.92662	-129.97946	153.7	4.7	1510.0	There is the vent (El Guapo) ahead of us.
363	2017/07/16	19:35:40	45.9266	-129.97944	153.7	4.8	1510.1	Removing the HFS wand out of the camera view and holding it in the stbd manipulator.
365	2017/07/16	19:36:27	45.92657	-129.97941	177.4	4.7	1510.3	Frame_Grab:
367	2017/07/16	19:36:53	45.92656	-129.97939	164.0	4.6	1510.4	Areas of white staining at the base of El Guapo coming in at 161.
371	2017/07/16	19:38:09	45.92651	-129.97934	235.8	7.5	1509.5	Mkr-153 is visible here. 9m chimney is Mkr-153.
373	2017/07/16	19:38:44	45.92649	-129.97933	216.6	9.7	1508.7	Going back to Mkr-153 to see if there is any venting here.
375	2017/07/16	19:39:05	45.92649	-129.97932	217.3	10.3	1509.4	Seems like Mkr-153 is not exactly at the 9m Chimney but next door.
377	2017/07/16	19:39:36	45.92648	-129.97931	215.8	5.6	1512.8	Some diffuse venting with tube worms and an areas of concentrated flows.
378	2017/07/16	19:39:59	45.92647	-129.97931	216.1	4.9	1513.4	This could be a good target for diffuse sampling later. Two areas of concentrated flow.
379	2017/07/16	19:40:02	45.92647	-129.97931	215.9	4.9	1513.4	Frame_Grab:
382	2017/07/16	19:40:52	45.92647	-129.97931	308.8	6.3	1512.8	Circling around clockwise.
384	2017/07/16	19:41:11	45.92648	-129.97931	325.9	6.8	1512.7	Beautiful chimney with long tubeworms.
385	2017/07/16	19:41:21	45.92648	-129.97931	324.8	6.4	1512.6	Now heading to El Guapo.
386	2017/07/16	19:41:22	45.92648	-129.97931	324.3	6.2	1512.7	Frame_Grab:
388	2017/07/16	19:41:42	45.92648	-129.97932	301.2	5.4	1512.5	Great marker placement on top of the chimney stub.
391	2017/07/16	19:42:43	45.92651	-129.97933	286.7	8.3	1510.7	12m offset from the navigation to the Mkr-153 (offset is to the SW of old position).
396	2017/07/16	19:44:47	45.92658	-129.97939	248.0	7.5	1508.7	This could be Hermosa if the offset is true.
397	2017/07/16	19:44:54	45.92658	-129.97940	249.4	8.5	1507.8	Dave believes this is Hermosa.
398	2017/07/16	19:44:58	45.92658	-129.97940	249.7	8.9	1507.3	Frame_Grab:
408	2017/07/16	19:49:14	45.92659	-129.97950	208.1	6.0	1510.8	Going to the top of this vent and circling around. Top should be 1504m.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-965 Datalogger Comment
409	2017/07/16	19:49:27	45.92659	-129.97950	211.8	7.4	1508.7	Maybe that was El Guapo and not Hermosa.
414	2017/07/16	19:51:19	45.92654	-129.97953	139.6	13.2	1501.0	There is the top of El Guapo. Going to get some video of the chimney first.
415	2017/07/16	19:51:33	45.92654	-129.97954	139.5	12.9	1501.0	Does look like it is still boiling.
417	2017/07/16	19:51:52	45.92653	-129.97954	139.8	12.8	1501.0	HIGHLIGHTS: HD highlights start Taking highlight of El Guapo.
418	2017/07/16	19:52:00	45.92653	-129.97955	139.6	12.8	1501.0	J965-HFS-04 Stop.
421	2017/07/16	19:53:02	45.92653	-129.97956	126.2	13.4	1501.1	SAMPLE: J965-HFS-04. T1=2.2 Volume=3000. Stopped at top of El Guapo and was taken near bottom between Castle and here.
425	2017/07/16	19:54:24	45.92653	-129.97957	354.1	15.7	1501.0	SAMPLE: HFS That was DNA filter #10. HFS-04.
428	2017/07/16	19:55:07	45.92653	-129.97957	256.3	14.8	1501.0	SAMPLE: HFS J965-HFS-05 Start. Ambient near El Guapo. Bag #16.
429	2017/07/16	19:55:24	45.92654	-129.97957	213.4	14.6	1501.0	SAMPLE: HFS Unfiltered Bag #16
432	2017/07/16	19:56:22	45.92654	-129.97957	291.1	13.7	1501.1	Seeing good flow from the exhaust.
437	2017/07/16	19:58:13	45.92654	-129.97955	215.3	16.7	1499.6	SAMPLE: HFS Stop.
439	2017/07/16	19:58:46	45.92654	-129.97954	247.6	15.9	1500.0	SAMPLE: HFS T1=2.2 Vol=500. J965-HFS-05.
441	2017/07/16	19:59:12	45.92654	-129.97954	247.8	15.0	1501.1	Frame_Grab:
442	2017/07/16	19:59:26	45.92654	-129.97953	248.9	15.1	1500.9	HIGHLIGHTS: HD highlights start Wow-top of El Guapo.
444	2017/07/16	19:59:38	45.92653	-129.97953	245.7	12.9	1501.2	(Missed the highlights off from previous clips).
446	2017/07/16	20:00:06	45.92653	-129.97952	245.5	14.9	1501.1	Great video of the phase separation flow of El Guapo.
448	2017/07/16	20:00:35	45.92653	-129.97952	245.3	13.7	1501.1	Gas bubbles coming out of the side of the main flow.
449	2017/07/16	20:00:46	45.92652	-129.97952	245.4	13.7	1501.1	Ready to place the probe tip into the orifice.
452	2017/07/16	20:01:43	45.92652	-129.97951	245.2	14.0	1501.1	Temperature should reach 340degC. At 280deg and going up with HFS probe tip in the flow.
455	2017/07/16	20:02:46	45.92651	-129.97950	245.4	15.1	1501.1	Up to 336degC.
456	2017/07/16	20:02:56	45.92651	-129.97949	245.5	15.1	1501.1	Going to start with Piston #3 on the Beast.
461	2017/07/16	20:04:42	45.92651	-129.97948	245.6	15.1	1501.1	SAMPLE: HFS J965-HFS-06 Unfiltered Piston #3 Start. (Seeing sulfide worms limpets and palm worms).
466	2017/07/16	20:06:48	45.92651	-129.97948	245.4	13.7	1501.1	Dave can see the exhaust from the Beast-sample is good!
469	2017/07/16	20:08:02	45.92651	-129.97949	245.6	15.1	1501.1	Stop. Tmax=340.8 Tavg=328 T2=100 vol=400.
473	2017/07/16	20:09:21	45.92651	-129.97951	245.5	15.1	1501.1	SAMPLE: HFS J965-HFS-07 Unfiltered Piston #4 Start. Same exact location.
475	2017/07/16	20:09:42	45.92652	-129.97951	245.7	15.1	1501.1	Great highlights of the diverse biology while sampling near the top of El Guapo.
481	2017/07/16	20:12:23	45.92652	-129.97954	245.3	13.7	1501.2	Navigation screen position is 45deg 55.59049 129deg58.77090 using USBL supposedly. Some confusion about the nav with the new interface.
483	2017/07/16	20:13:00	45.92652	-129.97954	245.5	13.7	1501.2	SAMPLE: HFS Tmax=341.9 Tavg=341 T2=100 vol=500 Stop.
486	2017/07/16	20:13:52	45.92652	-129.97954	245.3	13.7	1501.2	SAMPLE: HFS J965-HFS-08 Filtered Piston #7 Start. Same place.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-965 Datalogger Comment
490	2017/07/16	20:15:15	45.92652	-129.97953	245.3	15.1	1501.2	Offset of the navigation is 7.5m at 033 from current location to our vent location for the top of El Guapo.
493	2017/07/16	20:16:07	45.92652	-129.97953	245.3	13.7	1501.2	Frame_Grab:
495	2017/07/16	20:16:53	45.92651	-129.97952	245.3	13.7	1501.2	J965-HFS-08 Stop. Top of El Guapo. Heading for these samples is 245.
497	2017/07/16	20:17:28	45.92651	-129.97952	245.2	13.7	1501.2	SAMPLE: HFS Tmax=341.5 Tavg=341.2 T2=70. Volume=425.
501	2017/07/16	20:18:56	45.92651	-129.97952	245.0	14.0	1501.2	SAMPLE: GTHFS J963-GTHFS-09 Fired.
504	2017/07/16	20:19:43	45.92651	-129.97952	245.0	13.7	1501.2	J965-GTHFS-09 Bottle GT #12.
509	2017/07/16	20:21:22	45.9265	-129.97951	245.2	13.7	1501.2	Stowing the HFS wand.
511	2017/07/16	20:21:48	45.9265	-129.97951	245.0	13.2	1501.2	El Guapo GTHFS is GT-12 Green-Yellow!!
530	2017/07/16	20:29:33	45.92652	-129.97953	245.2	14.0	1501.3	SAMPLE: GTB J965-GTB-10 Sampler is in the vent
534	2017/07/16	20:31:07	45.92653	-129.97954	245.0	13.4	1501.3	SAMPLE: GTB J965-GTB-10 Sampler repositioned after being knocked out of the vent.
538	2017/07/16	20:32:50	45.92653	-129.97954	245.4	13.3	1501.3	SAMPLE: GTB J965-GTB-10 Sample triggered using a two armed approach.
540	2017/07/16	20:33:12	45.92653	-129.97954	245.4	14.0	1501.3	Frame_Grab:
542	2017/07/16	20:33:44	45.92653	-129.97954	245.2	13.6	1501.3	SAMPLE: GTB Sampler removed from vent. Vent partially removed.
554	2017/07/16	20:39:11	45.92656	-129.97957	244.4	15.0	1501.3	Using Jason Probe post gas-tight sample Tmax=328c Probe appears to have crystals growing on it.
555	2017/07/16	20:39:18	45.92657	-129.97957	245.0	13.1	1501.3	Probe out of vent.
557	2017/07/16	20:39:35	45.92657	-129.97957	244.9	13.4	1501.3	Pyrite line visible on vent. Probe back in vent.
560	2017/07/16	20:40:41	45.92659	-129.97958	245.2	15.0	1501.3	Excavation of vent. Small explosion.
562	2017/07/16	20:41:18	45.9266	-129.97958	245.0	13.7	1501.3	Probe is back in the vent.
567	2017/07/16	20:43:22	45.92662	-129.97958	245.5	15.0	1501.3	Tmax=339.55degC
569	2017/07/16	20:43:35	45.92662	-129.97958	245.0	13.1	1501.3	Probe is out of vent.
581	2017/07/16	20:49:21	45.92653	-129.97954	243.7	13.6	1501.4	SAMPLE: Geo Attempting to Sample chimney at the top of El Guapo.
584	2017/07/16	20:50:09	45.92652	-129.97953	244.2	13.9	1501.3	SAMPLE: Geo J965-GEO-11 Sample of chimney wall at top of El Guapo.
586	2017/07/16	20:50:59	45.92651	-129.97953	244.6	13.0	1501.4	J965-GEO-11 Sample is located in the aft-port quadrant of the milk crate.
589	2017/07/16	20:51:36	45.92651	-129.97953	243.4	15.0	1501.4	Attempting to further sample chimney.
590	2017/07/16	20:51:55	45.9265	-129.97952	244.4	13.9	1501.4	Frame_Grab:
591	2017/07/16	20:51:59	45.9265	-129.97952	244.4	13.2	1501.4	SAMPLE: Geo J965-GEO-12 Sample collected. Can see chalcopyrite on sample.
593	2017/07/16	20:52:24	45.9265	-129.97952	244.2	13.0	1501.4	J965-GEO-12 Sample placed in the starboard biobox.
598	2017/07/16	20:54:10	45.92648	-129.97947	246.4	15.1	1501.4	Start transit from El Guapo to Escargot.
602	2017/07/16	20:55:51	45.92645	-129.97940	130.5	4.8	1511.1	Frame_Grab:
604	2017/07/16	20:56:20	45.92644	-129.97938	135.2	5.2	1511.2	Approaching 9m Vent with Mkr-153.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-965 Datalogger Comment
609	2017/07/16	20:58:26	45.92637	-129.97923	123.2	6.5	1511.0	Continuing transit to Escargot.
613	2017/07/16	20:59:38	45.92633	-129.97915	183.4	6.5	1514.2	Arrived at Escargot.
614	2017/07/16	20:59:57	45.92632	-129.97913	183.1	7.0	1513.8	Resistivity probe (OOI) atop vent present.
616	2017/07/16	21:00:29	45.92631	-129.97910	186.2	6.6	1513.7	Frame_Grab:
618	2017/07/16	21:00:56	45.9263	-129.97908	185.5	6.3	1515.2	Frame_Grab:
620	2017/07/16	21:01:27	45.92629	-129.97906	184.8	2.4	1517.0	Frame_Grab:
622	2017/07/16	21:01:34	45.92629	-129.97905	184.6	2.1	1517.2	Approaching Diva.
624	2017/07/16	21:02:12	45.92628	-129.97903	183.8	1.8	1517.6	Mrk-150 at Diva present. Last digit damaged.
625	2017/07/16	21:02:14	45.92628	-129.97903	183.8	1.8	1517.6	Frame_Grab:
626	2017/07/16	21:02:15	45.92628	-129.97903	183.8	1.8	1517.6	Frame_Grab:
628	2017/07/16	21:02:39	45.92628	-129.97903	185.7	1.5	1517.8	Confirmed. Mrk-50 Present at small anhydrite chimney.
630	2017/07/16	21:03:11	45.92628	-129.97902	169.3	2.1	1517.3	Tip of the HOBO at Mkr-150 is out of the vent.
632	2017/07/16	21:03:53	45.92628	-129.97902	76.6	1.1	1517.5	HOBO 102 is the HOBO who's tip is out of the vent.
635	2017/07/16	21:04:39	45.92629	-129.97903	60.4	1.6	1518.0	Frame_Grab:
638	2017/07/16	21:05:43	45.9263	-129.97905	60.8	1.6	1518.0	Jason probing vent at Mkr-150.
641	2017/07/16	21:06:34	45.92631	-129.97906	60.6	1.6	1518.0	Chimney has been knocked down. HFS temperature probe is in the Diva orifice.
645	2017/07/16	21:08:24	45.92632	-129.97908	60.6	0.8	1518.1	The USBL calibration is not perfect so we are seeing the USBL wander around when we sit down.
652	2017/07/16	21:11:09	45.9263	-129.97903	60.0	0.8	1518.1	Still measuring temperature.
657	2017/07/16	21:12:56	45.92629	-129.97900	60.0	0.8	1518.1	SAMPLE: HFS J965-HFS-13 Continue. Unfiltered Titanium piston #5.
661	2017/07/16	21:14:19	45.92628	-129.97899	60.0	0.8	1518.1	SAMPLE: HFS J965-HFS-13 Sample started NOW.
664	2017/07/16	21:15:31	45.92628	-129.97899	60.0	0.8	1518.1	J965-HFS-13 cont. 45d55.6 129d58.7 13.4 m SW of vents target.
667	2017/07/16	21:16:32	45.92629	-129.97899	60.0	0.8	1518.1	J965-HFS-13 cont. Stop.
670	2017/07/16	21:17:08	45.9263	-129.97899	60.0	0.8	1518.1	J965-HFS-13 cont. Tmax=173 Tavg=163 T2=60 Vol=375
673	2017/07/16	21:18:07	45.92631	-129.97900	60.1	0.8	1518.1	Temperature probe is back in the vent.
679	2017/07/16	21:20:35	45.92633	-129.97901	59.9	0.8	1518.1	SAMPLE: HFS J965-HFS-14 Start.
680	2017/07/16	21:20:47	45.92633	-129.97902	59.9	0.8	1518.1	J965-HFS-14 cont. Filtered piston #8.
684	2017/07/16	21:22:19	45.92634	-129.97901	59.9	0.8	1518.1	J965-HFS-14 cont. Can see the exhaust from the Beast.
686	2017/07/16	21:22:53	45.92635	-129.97901	59.8	0.8	1518.2	J965-HFS-14 cont. Depth=1518 Altitude=0
689	2017/07/16	21:23:54	45.92634	-129.97900	59.8	0.8	1518.2	J965-HFS-14 cont. Stop.
691	2017/07/16	21:24:19	45.92634	-129.97899	59.8	0.8	1518.2	J965-HFS-14 cont. Tmax=221 Tavg=213 T2=56 Vol=325.
694	2017/07/16	21:25:23	45.92633	-129.97898	59.8	0.8	1518.2	Taking Two GTBs here.
701	2017/07/16	21:28:26	45.9263	-129.97896	60.0	0.8	1518.2	SAMPLE: GTB HFS wand is parked.
711	2017/07/16	21:32:40	45.92632	-129.97904	62.0	1.1	1518.4	Frame_Grab:
712	2017/07/16	21:32:41	45.92632	-129.97904	62.0	1.1	1518.4	Frame_Grab:
714	2017/07/16	21:33:29	45.92633	-129.97906	62.8	0.8	1518.3	SAMPLE: GTB J965-GTB-15 (GT-16 Orange) in the vent.
717	2017/07/16	21:34:11	45.92633	-129.97907	62.5	1.2	1518.3	Frame_Grab:

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-965 Datalogger Comment
720	2017/07/16	21:35:19	45.92634	-129.97907	63.1	0.8	1518.3	J965-GTB-15 cont. Triggered.
723	2017/07/16	21:36:14	45.92635	-129.97907	61.9	0.8	1518.3	J965-GTB-15 cont. Still sampling.
725	2017/07/16	21:36:47	45.92635	-129.97907	61.9	0.8	1518.3	Frame_Grab:
728	2017/07/16	21:37:59	45.92636	-129.97906	63.4	0.8	1518.3	J965-GTB-15 cont. GTB removed from the vent.
731	2017/07/16	21:38:39	45.92636	-129.97905	62.8	0.8	1518.3	J965-GTB-15. Problem with the hydraulics. Arms are not responding.
733	2017/07/16	21:39:17	45.92636	-129.97905	62.6	0.8	1518.3	Problem solved. Arms are responding again!
736	2017/07/16	21:40:11	45.92636	-129.97904	61.9	0.8	1518.4	J965-GTB-15 cont. Sample placed in basket.
738	2017/07/16	21:40:37	45.92636	-129.97903	62.2	0.8	1518.4	J965-GTB-15 Tmax=229 so far.
745	2017/07/16	21:43:35	45.92636	-129.97899	62.4	0.8	1518.3	Preparing to take another GTB Sample.
748	2017/07/16	21:45:00	45.92637	-129.97897	62.9	0.8	1518.3	Putting Bungee cord on the Orange GTB grabbing white.
752	2017/07/16	21:46:11	45.92638	-129.97896	62.7	0.8	1518.3	SAMPLE: GTB J965-GTB-16 (GT-17 White) Placed in vent at slightly different spot than GTB-15 in same orifice.
756	2017/07/16	21:47:59	45.92639	-129.97895	62.9	0.8	1518.4	J965-GTB-16 cont. Start pushing ram using a two arm approach.
758	2017/07/16	21:48:19	45.9264	-129.97895	63.0	0.8	1518.4	J965-GTB-16 cont. Triggered.
760	2017/07/16	21:48:51	45.9264	-129.97895	62.7	0.8	1518.4	J965-GTB-16 cont. Sampler still in the vent.
762	2017/07/16	21:49:07	45.9264	-129.97895	62.8	0.8	1518.3	J965-GTB-16 cont. Sampler removed from the vent.
764	2017/07/16	21:49:41	45.9264	-129.97895	62.9	0.8	1518.3	Frame_Grab:
765	2017/07/16	21:49:42	45.9264	-129.97895	62.9	0.8	1518.3	Frame_Grab:
766	2017/07/16	21:49:44	45.9264	-129.97895	62.9	0.8	1518.3	Frame_Grab:
768	2017/07/16	21:50:19	45.9264	-129.97896	62.9	0.8	1518.4	J965-GTB-16 cont. Nozzle is clean.
770	2017/07/16	21:50:56	45.92641	-129.97896	63.2	0.8	1518.4	Now we will use the Jason temp probe to collect Tmax from the vent.
776	2017/07/16	21:53:10	45.92642	-129.97895	65.2	0.8	1518.4	Jason temperature has been placed in the same place the previous GTB was collected.
781	2017/07/16	21:55:27	45.92644	-129.97892	65.4	0.8	1518.4	Flow rate seems very high.
784	2017/07/16	21:56:21	45.92644	-129.97891	65.5	0.8	1518.4	Tmax=273.96c
790	2017/07/16	21:59:02	45.92643	-129.97893	64.2	0.8	1518.5	DEPLOY: HOBO temp probe Deploying HOBO 130.
794	2017/07/16	22:00:25	45.92641	-129.97895	64.0	0.8	1518.5	HOBO deployed in vent.
796	2017/07/16	22:00:40	45.92641	-129.97896	64.1	0.8	1518.5	RECOVER: HOBO temp probe Recovering HOBO 102.
797	2017/07/16	22:00:56	45.92641	-129.97896	64.4	1.0	1518.5	HOBO 102 probe tip was not in the vent.
807	2017/07/16	22:05:04	45.92638	-129.97907	65.4	0.8	1518.5	Recovered HOBOs are secured in the basket.
808	2017/07/16	22:05:08	45.92638	-129.97907	64.0	0.8	1518.5	Frame_Grab:
810	2017/07/16	22:05:46	45.92638	-129.97909	55.5	2.1	1518.3	Transiting from Diva to Escargot.
814	2017/07/16	22:07:22	45.92638	-129.97913	224.5	5.2	1516.0	Frame_Grab:
815	2017/07/16	22:07:30	45.92638	-129.97913	225.0	4.8	1516.1	Arrived at Escargot.
818	2017/07/16	22:08:20	45.92637	-129.97914	194.2	6.5	1514.9	Frame_Grab:
821	2017/07/16	22:09:31	45.92637	-129.97914	102.8	5.0	1515.3	Less biology than previously observed at Escargot.
824	2017/07/16	22:10:14	45.92636	-129.97914	78.1	5.4	1514.2	Snail's head was broken off and OOI group flattened the top to deploy instrumentation.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-965 Datalogger Comment
825	2017/07/16	22:10:25	45.92636	-129.97913	76.8	5.6	1513.9	Instrumentation is a pig.
828	2017/07/16	22:11:32	45.92635	-129.97910	80.4	6.0	1514.2	Due to the presence of OOI instrumentation and lack of live material we will not be sampling at Escargot.
830	2017/07/16	22:11:47	45.92635	-129.97910	98.1	6.4	1514.0	OOI Will sample it-whenever they have instruments.
832	2017/07/16	22:12:12	45.92634	-129.97908	120.0	5.1	1515.0	Transiting to Tiny Towers from Escargot.
836	2017/07/16	22:13:38	45.92631	-129.97905	170.5	1.7	1517.1	No USBL fix at Escargot or Diva.
837	2017/07/16	22:13:58	45.92631	-129.97904	184.5	2.8	1518.4	Approaching Tiny Towers.
839	2017/07/16	22:14:31	45.92629	-129.97903	209.3	1.4	1520.1	Thinking of putting the OOI RAS here.
842	2017/07/16	22:15:09	45.92628	-129.97903	207.9	2.0	1519.7	Diffuse venting leaving base of the vent. Some blue mats and white bacterial mats covering the summit.
843	2017/07/16	22:15:11	45.92628	-129.97903	207.9	2.1	1519.6	Frame_Grab:
844	2017/07/16	22:15:13	45.92628	-129.97903	209.1	2.2	1519.4	Frame_Grab:
845	2017/07/16	22:15:21	45.92628	-129.97903	207.9	2.4	1519.3	Frame_Grab:
847	2017/07/16	22:15:39	45.92627	-129.97903	213.4	1.5	1520.0	Small chimlets and diffuse flow.
848	2017/07/16	22:15:54	45.92627	-129.97903	216.9	1.2	1520.3	About 5m south of Diva.
850	2017/07/16	22:16:18	45.92626	-129.97904	214.0	1.3	1520.3	Frame_Grab:
852	2017/07/16	22:16:53	45.92625	-129.97905	212.4	1.3	1520.2	Preparing for Jason temperature probe measurement.
854	2017/07/16	22:17:06	45.92625	-129.97905	212.5	1.3	1520.2	Probe is in diffuse flow.
855	2017/07/16	22:17:33	45.92625	-129.97906	213.5	1.3	1520.2	Sampling in area with white bacterial mat and palm worms.
858	2017/07/16	22:18:09	45.92624	-129.97907	213.3	1.3	1520.2	MISTAKE: Sampling using HFS Probe not Jason Temperature Probe.
860	2017/07/16	22:18:38	45.92624	-129.97909	213.3	1.3	1520.2	Frame_Grab:
864	2017/07/16	22:20:16	45.92625	-129.97912	213.3	1.3	1520.2	Preparing to collect HFS Sample at tiny towers.
866	2017/07/16	22:20:42	45.92625	-129.97912	213.3	1.3	1520.2	Frame_Grab:
868	2017/07/16	22:21:09	45.92626	-129.97912	213.3	1.3	1520.2	Blue mat (siliates) present.
870	2017/07/16	22:21:52	45.92626	-129.97912	213.3	1.3	1520.2	SAMPLE: HFS J965-HFS-17 Filtered Piston #9.
871	2017/07/16	22:22:03	45.92627	-129.97912	213.3	1.3	1520.2	J965-HFS-17 cont. Start.
876	2017/07/16	22:23:46	45.92628	-129.97909	213.3	1.3	1520.3	J965-HFS-17 cont. Still sampling.
878	2017/07/16	22:24:05	45.92629	-129.97909	213.3	1.3	1520.3	J965-HFS-17 cont. Exhaust from the beast is present.
881	2017/07/16	22:25:16	45.92629	-129.97906	213.4	1.3	1520.3	J965-HFS-17 cont. Depth=1520 Altitude=1 45d55.58 129d58.74
882	2017/07/16	22:25:25	45.92629	-129.97906	213.4	1.3	1520.3	J965-HFS-17 cont. Stop.
884	2017/07/16	22:25:52	45.92629	-129.97905	213.4	1.3	1520.3	J965-HFS-17 cont. Tmax=173.7 Tavg=173.4 T2=65 Vol=475.
886	2017/07/16	22:26:08	45.92629	-129.97904	213.4	1.3	1520.3	Preparing to Sample using a bag at the same spot.
888	2017/07/16	22:26:43	45.92629	-129.97903	213.4	1.3	1520.3	SAMPLE: HFS J965-HFS-18 Unfiltered Bag #17
890	2017/07/16	22:27:06	45.92629	-129.97902	213.4	1.3	1520.3	SAMPLE: HFS J965-HFS-18 cont. Position is 5m SW of the vents position.
891	2017/07/16	22:27:15	45.92629	-129.97902	213.4	1.3	1520.3	J965-HFS-18 Start.
894	2017/07/16	22:28:21	45.92628	-129.97900	213.4	1.3	1520.3	NOTE: WHEN WE SAY "VENTS POSITION REFERRING TO NOAA VENTS PROGRAM POSITIONS FOR THESE VENT SITES"

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-965 Datalogger Comment
900	2017/07/16	22:30:38	45.92627	-129.97902	213.5	1.3	1520.3	J965-HFS-18 cont. Stop.
901	2017/07/16	22:30:52	45.92627	-129.97902	213.5	1.3	1520.3	J965-HFS-18 cont. Probe removed from the vent.
905	2017/07/16	22:32:22	45.92628	-129.97906	211.9	1.3	1520.3	J965-HFS-18 cont. Tmax=173.6 Tavg=173.5 T2=60 Vol=375.
908	2017/07/16	22:33:04	45.92629	-129.97908	213.2	2.9	1518.6	Transiting to Mkr-113 Vent from Tiny Towers (~1 hr).
912	2017/07/16	22:35:02	45.92635	-129.97914	213.2	21.4	1497.8	Will be transiting through the water column - not along the bottom - to Mkr-113 vent site.
914	2017/07/16	22:52:34	45.92602	-129.98104	233.3	112.7	1404.0	SAMPLE: HFS Preparing to take a DNA sample as we transit through the water column to Mkr-113 vent site.
915	2017/07/16	22:54:22	45.92595	-129.98117	233.1	112.9	1403.9	SAMPLE: HFS. J965-HFS-19 (DNA filter 11) start.
916	2017/07/16	23:11:34	45.92545	-129.98215	233.5	114.9	1404.2	J965-HFS-19 cont. Taken at constant depth of 1404m.
920	2017/07/16	23:45:05	45.92285	-129.98729	234.2	6.8	1515.6	J965-HFS-19 Sample complete at 23:27.
922	2017/07/16	23:45:59	45.92284	-129.98741	233.7	6.1	1516.0	J965-HFS-19 DNA filter 11. Ambient 2.2c. At about 1400 m. DNA sample for Carol Stepien.
928	2017/07/16	23:48:24	45.92284	-129.98773	265.4	4.8	1517.7	We traversed ~790m to the southwest from Tiny Towers. Are in the vicinity of Mrk-113 Vent.
930	2017/07/16	23:48:35	45.92284	-129.98776	266.8	5.1	1517.6	Looking for the vent site.
931	2017/07/16	23:48:45	45.92284	-129.98778	267.9	4.6	1517.7	Lava pillars and collapse areas.
933	2017/07/16	23:49:33	45.92284	-129.98787	267.7	3.8	1518.0	Starting to see some tube worms and bacterial mat in the area.
935	2017/07/16	23:50:02	45.92284	-129.98792	266.1	2.3	1518.0	Tubeworms. We see the MTR marker in the distance.
938	2017/07/16	23:51:01	45.92283	-129.98801	308.1	4.4	1517.7	Approaching the MTR tiny marker.
940	2017/07/16	23:51:09	45.92283	-129.98802	315.5	4.8	1517.5	Don't see another marker here.
942	2017/07/16	23:51:35	45.92283	-129.98804	318.4	4.8	1517.5	NAV: Doppler Reset
944	2017/07/16	23:52:09	45.92282	-129.98808	318.5	5.0	1517.4	Moving the HFS nozzle out of the way so can get some good highlight video here.
946	2017/07/16	23:52:35	45.92282	-129.98810	319.0	5.0	1517.4	HIGHLIGHTS: HD highlights start
948	2017/07/16	23:53:05	45.92281	-129.98811	332.1	3.9	1518.6	Looks less active than in 2015.
949	2017/07/16	23:53:32	45.9228	-129.98813	331.0	4.0	1518.5	Palm worms; limpets and tubeworms. Not seeing much flow here.
951	2017/07/16	23:53:47	45.9228	-129.98813	330.7	4.0	1518.5	See some diffuse flow in the upper left.
952	2017/07/16	23:54:03	45.92279	-129.98814	330.4	4.0	1518.4	Tubeworms look healthier there.
954	2017/07/16	23:54:17	45.92279	-129.98814	330.1	3.9	1518.6	Zooming out to see if there is anything underneath here.
956	2017/07/16	23:54:36	45.92278	-129.98815	330.3	4.1	1518.4	Diffuse flow coming up over the side of the flow.
957	2017/07/16	23:55:02	45.92278	-129.98815	331.0	4.1	1518.5	This site is on a lava arch with collapse surrounding it.
960	2017/07/16	23:55:44	45.92277	-129.98816	346.4	4.2	1518.4	Moving around the corner to look for better flow.
961	2017/07/16	23:55:49	45.92277	-129.98816	348.5	4.4	1518.3	Anemone.
963	2017/07/16	23:56:10	45.92276	-129.98816	1.3	4.2	1518.4	See some clams.
964	2017/07/16	23:56:27	45.92276	-129.98816	5.1	4.2	1518.5	A patch of clams mid-screen.
967	2017/07/16	23:57:31	45.92275	-129.98816	3.8	4.2	1518.4	Overview of the site.
969	2017/07/16	23:57:54	45.92275	-129.98816	2.5	4.2	1518.4	Tubeworms are hanging over the edge.
971	2017/07/16	23:58:15	45.92275	-129.98816	3.1	4.2	1518.4	We're still scoping out a sampling site.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-965 Datalogger Comment
975	2017/07/16	23:59:40	45.92275	-129.98816	7.7	2.9	1518.7	Pinkish bacterial mat. Lots of iron-stained old mat.
976	2017/07/16	23:59:46	45.92275	-129.98816	7.8	3.0	1518.5	HIGHLIGHTS: HD highlights start
978	2017/07/17	00:00:09	45.9228	-129.98810	7.1	4.0	1518.2	Backing up a bit to get a good view of a sampling site.
979	2017/07/17	00:00:27	45.9228	-129.98810	10.3	2.7	1519.1	2015 MTR mid-screen.
982	2017/07/17	00:01:33	45.9228	-129.98810	346.5	4.4	1518.1	HIGHLIGHTS: HD highlights stop
985	2017/07/17	00:02:08	45.9228	-129.98809	355.9	4.3	1518.3	MTR3117 mid-screen.
986	2017/07/17	00:02:30	45.92278	-129.98812	350.7	4.8	1517.7	Don't see a large marker here. Did Mkr-113 vent eat up another marker?
990	2017/07/17	00:03:58	45.92279	-129.98812	12.1	3.3	1519.6	Nice healthy tube worms; clams; anemones; limpets. Very lush.
992	2017/07/17	00:04:26	45.92279	-129.98812	11.7	3.3	1519.6	Can see the float of the MTR.
994	2017/07/17	00:04:39	45.92279	-129.98812	11.6	3.3	1519.6	Looking for good diffuse flow in the middle of the tube worm patch.
995	2017/07/17	00:04:45	45.92279	-129.98812	11.8	3.3	1519.6	HIGHLIGHTS: HD highlights start
997	2017/07/17	00:05:13	45.92279	-129.98812	11.7	3.3	1519.6	Placing HFS probe into the center of the tube worm patch.
1001	2017/07/17	00:06:39	45.92279	-129.98812	12.4	3.3	1519.6	Unfortunately this is only 9.8degC.
1002	2017/07/17	00:06:43	45.92279	-129.98812	12.4	3.3	1519.6	HIGHLIGHTS: HD highlights stop
1003	2017/07/17	00:06:57	45.92279	-129.98812	12.6	3.3	1519.6	Looking for some warmer water.
1007	2017/07/17	00:08:04	45.92279	-129.98812	12.6	3.3	1519.6	Moved further down the tube worm patch and getting up to 11degC.
1008	2017/07/17	00:08:13	45.92279	-129.98812	12.5	3.3	1519.6	High was 11.7degC.
1010	2017/07/17	00:08:38	45.92279	-129.98812	12.5	3.3	1519.6	Found an adjacent spot that is warmer. Almost 15degC.
1011	2017/07/17	00:08:54	45.92279	-129.98812	12.5	3.3	1519.6	Frame_Grab:
1012	2017/07/17	00:08:55	45.92279	-129.98812	12.5	3.3	1519.6	Frame_Grab:
1014	2017/07/17	00:09:07	45.9228	-129.98812	12.6	3.3	1519.6	Gorgeous biology.
1015	2017/07/17	00:09:21	45.9228	-129.98812	12.6	3.3	1519.6	Temperature high here was 15.5degC and stable.
1017	2017/07/17	00:09:58	45.9228	-129.98812	12.5	3.3	1519.6	O2 sensor .32 compared to background value of .62.
1019	2017/07/17	00:10:29	45.9228	-129.98812	12.6	3.3	1519.6	Seeing the scaleworms tucked between the limpets and worms.
1022	2017/07/17	00:11:30	45.9228	-129.98812	12.4	3.3	1519.7	Frame_Grab:
1024	2017/07/17	00:11:36	45.9228	-129.98812	12.4	3.2	1519.7	Frame_Grab:
1027	2017/07/17	00:12:54	45.9228	-129.98812	12.4	3.3	1519.7	SAMPLE: HFS. J965-HFS-20 Start Unfiltered Bag #18. At Mkr-113 Vent in 15.5degC.
1031	2017/07/17	00:13:42	45.9228	-129.98812	12.5	3.3	1519.7	Doing some biology video while sampling.
1032	2017/07/17	00:13:56	45.9228	-129.98812	12.4	3.2	1519.7	Dinner watch change.
1036	2017/07/17	00:14:34	45.9228	-129.98812	12.2	3.3	1519.7	SAMPLE: HFS Photos of limpets on a ledge on top of each other.
1040	2017/07/17	00:16:10	45.9228	-129.98812	12.2	3.2	1519.7	SAMPLE: HFS J965-HFS-20 Stop.
1042	2017/07/17	00:16:38	45.9228	-129.98812	12.4	3.2	1519.7	SAMPLE: HFS Tmax=16.4 Tavg=15.9 T2=9 vol=500.
1045	2017/07/17	00:17:35	45.9228	-129.98812	12.2	3.3	1519.7	SAMPLE: HFS J965-HFS-21 Bag #19 Unfiltered. Start.
1046	2017/07/17	00:17:55	45.9228	-129.98812	12.2	3.2	1519.7	SAMPLE: HFS Same exact location as previous sample.
1050	2017/07/17	00:19:05	45.9228	-129.98812	12.2	3.3	1519.7	Frame_Grab:

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-965 Datalogger Comment
1053	2017/07/17	00:20:17	45.9228	-129.98813	12.2	3.3	1519.7	SAMPLE: HFS J965-HFS-21 Stop. (There is good exhaust on this sample).
1055	2017/07/17	00:20:41	45.9228	-129.98813	12.3	3.3	1519.7	SAMPLE: HFS Tmax=16.8 Tavg=16.0 T2=8.5 vol=500.
1056	2017/07/17	00:20:47	45.9228	-129.98812	12.2	3.3	1519.7	Frame_Grab:
1060	2017/07/17	00:22:31	45.9228	-129.98812	12.2	3.3	1519.7	SAMPLE: HFS J965-HFS-22 Start. DNA filter #13 for Julie Huber.
1062	2017/07/17	00:22:54	45.9228	-129.98812	12.1	3.3	1519.7	SAMPLE: HFS Long sample in the exact same location at Mkr113 Vent.
1069	2017/07/17	00:25:39	45.9228	-129.98813	11.9	3.2	1519.7	Location with the cursor is 45deg55.36544'N - 129deg59.28903'W in a cluster of fixes at Mkr113 Vent.
1074	2017/07/17	00:27:39	45.9228	-129.98813	11.7	3.2	1519.7	Frame_Grab:
1075	2017/07/17	00:27:42	45.9228	-129.98813	11.7	3.2	1519.7	See a cluster of mussels on top of a pillow.
1079	2017/07/17	00:29:22	45.9228	-129.98813	11.8	3.2	1519.7	Frame_Grab:
1083	2017/07/17	00:30:57	45.9228	-129.98813	11.6	3.2	1519.7	HIGHLIGHTS: HD highlights start About a minute ago.
1085	2017/07/17	00:31:28	45.9228	-129.98813	11.6	3.3	1519.7	Rattail (chimera) under the ROV.
1087	2017/07/17	00:32:03	45.9228	-129.98813	11.6	3.3	1519.7	HIGHLIGHTS: HD highlights stop
1089	2017/07/17	00:32:15	45.9228	-129.98813	11.6	3.3	1519.7	Zoom in on anemone.
1097	2017/07/17	00:35:36	45.9228	-129.98813	11.8	3.2	1519.8	Depth here is 1522.
1110	2017/07/17	00:41:54	45.9228	-129.98814	11.6	3.3	1519.8	Still hanging out here taking this large volume bag.
1119	2017/07/17	00:45:33	45.9228	-129.98814	11.5	3.2	1519.8	Beautiful tubeworms in the brow cam - bright red plumes.
1127	2017/07/17	00:49:24	45.9228	-129.98815	11.6	3.2	1519.8	Still sampling..... same sample.....
1131	2017/07/17	00:50:41	45.9228	-129.98815	11.6	3.2	1519.8	J965-HFS-22 Stop.
1134	2017/07/17	00:51:35	45.9228	-129.98815	11.5	3.2	1519.8	J965-HFS-22 cont. Vol=3501ml. Tmax=16.9 Tavg=15.6 T2=9.1.
1137	2017/07/17	00:52:34	45.9228	-129.98815	11.5	3.2	1519.8	SAMPLE: HFS J965-HFS-23 Filtered bag #21. Start.
1139	2017/07/17	00:53:22	45.9228	-129.98815	11.6	3.2	1519.8	J965-HFS-23 cont. Same exact position.
1142	2017/07/17	00:54:32	45.9228	-129.98815	11.7	3.3	1519.8	J965-HFS-23 cont. Kevin is at the helm.
1144	2017/07/17	00:54:39	45.9228	-129.98815	11.7	3.2	1519.8	J965-HFS-23 cont. stop.
1146	2017/07/17	00:55:06	45.9228	-129.98815	11.7	3.2	1519.8	J965-HFS-23 cont. Vol=352ml Tmax=16.1 Tavg=15.6 T2=8.9.
1151	2017/07/17	00:57:09	45.9228	-129.98816	11.7	3.2	1519.8	SAMPLE: HFS J965-HFS-24 Filtered bag #22 start.
1156	2017/07/17	00:59:22	45.9228	-129.98816	11.5	3.2	1519.8	J965-HFS-24 cont. Stop.
1158	2017/07/17	00:59:58	45.9228	-129.98816	11.5	3.2	1519.8	J965-HFS-24 cont. Vol=352ml Tmax=16.4 Tavg=16.2 T2=9.2.
1164	2017/07/17	01:02:10	45.9228	-129.98816	11.0	3.2	1519.9	End of sampling in this particular spot. May sample in the area more - if have time.
1165	2017/07/17	01:02:24	45.9228	-129.98816	11.1	3.2	1519.9	Stowing the HFS wand.
1174	2017/07/17	01:06:22	45.92281	-129.98816	24.7	2.9	1519.7	Mkr-272 up above the sampling site on a semi-flat spot. (DEPLOY???)
1179	2017/07/17	01:08:24	45.92281	-129.98814	20.8	1.6	1519.9	RECOVER: MTR temp probe MTR-3173 (was deployed on dive J824). The rope is covered in barnacles.
1184	2017/07/17	01:10:29	45.92281	-129.98814	21.0	1.6	1519.9	Next we will grab the Jason temp probe and find a place to deploy a new MTR.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-965 Datalogger Comment
1188	2017/07/17	01:11:52	45.92282	-129.98812	24.0	1.1	1519.6	Want to deploy it in the flow - but don't want it to get buried in limpets.
1191	2017/07/17	01:12:46	45.92284	-129.98809	21.9	0.8	1519.9	Ahead a batch of limpets; tubeworms and palmworms with some good diffuse flow.
1197	2017/07/17	01:15:07	45.9228	-129.98810	353.9	4.8	1518.1	Maneuvering around still searching for a spot for the MTR.
1202	2017/07/17	01:17:06	45.92282	-129.98811	357.3	2.6	1519.7	Have the Jason temp probe out now. Poking around.
1205	2017/07/17	01:18:07	45.9228	-129.98813	5.2	3.6	1519.3	The probe sunk deep into the biota.
1206	2017/07/17	01:18:31	45.92281	-129.98817	19.1	3.5	1519.4	Don't want to lose the MTR so will try to find a better place where it won't be gobbled up by limpets.
1212	2017/07/17	01:20:39	45.9228	-129.98817	27.1	3.3	1519.9	Back where we sampled. Will put it in this crevice behind the tubeworms.
1215	2017/07/17	01:21:54	45.9228	-129.98817	27.3	3.2	1519.9	Balls of bacterial mat have been dislodged and are floating by.
1219	2017/07/17	01:23:28	45.9228	-129.98817	35.0	3.2	1519.8	Still looking for a MTR spot.....
1222	2017/07/17	01:24:05	45.92281	-129.98814	19.2	2.9	1519.3	Pretty sad looking tubeworms covered in bacmat.
1228	2017/07/17	01:26:37	45.9228	-129.98817	38.2	3.6	1519.8	The navigation looks pretty good here (at least in relation to our historical vent positions). We are <10m W of position.
1233	2017/07/17	01:28:52	45.9228	-129.98817	38.3	3.6	1519.8	Jason temp probe in 1 spot. T=16.7.
1235	2017/07/17	01:29:16	45.9228	-129.98817	38.2	3.5	1519.8	Will deploy the MTR here in the 16.7C spot.
1240	2017/07/17	01:31:21	45.9228	-129.98817	38.8	3.6	1519.9	DEPLOY: MTR temp probe MTR-3040 deployed right on top of the sampling site.
1242	2017/07/17	01:31:51	45.92282	-129.98819	63.7	2.8	1519.5	Finished deploying and recovering MTRs at Mkr-113 vent.
1248	2017/07/17	01:34:08	45.92282	-129.98818	75.1	1.0	1520.0	Going to poke around in the clams with the HFS probe next.
1252	2017/07/17	01:35:44	45.92282	-129.98818	75.8	0.8	1519.9	HIGHLIGHTS: HD highlights start Clams.
1254	2017/07/17	01:36:08	45.92282	-129.98818	75.8	0.8	1519.9	Clams and limpets and snails and scaleworms.
1256	2017/07/17	01:36:41	45.92282	-129.98818	75.8	0.9	1519.9	One sad pathetic tubeworm.
1262	2017/07/17	01:39:05	45.92282	-129.98818	75.5	0.8	1519.9	Here goes the HFS wand to check out the temp of these clams.
1265	2017/07/17	01:40:23	45.92282	-129.98818	75.5	0.8	1519.9	Not a big temperature spike here. T=2.5 now.
1269	2017/07/17	01:41:49	45.92282	-129.98818	75.5	0.8	1519.9	No temperature anomaly here. It's 2.5C and ambient is 2.0.
1272	2017/07/17	01:42:55	45.92282	-129.98818	75.5	0.8	1519.9	These clams look healthy; even though there is no real heat flow here.
1276	2017/07/17	01:44:23	45.92282	-129.98818	75.5	0.8	1519.9	Zooming on in. Red thing coming out of the clam??? The secret life of clams.
1279	2017/07/17	01:45:09	45.92282	-129.98818	75.5	0.8	1519.9	SAMPLE: HFS J965-HFS-25 Unfiltered bag #20. Started a minute ago.
1282	2017/07/17	01:46:20	45.92282	-129.98818	75.5	0.8	1519.9	J965-HFS-25 cont. In the midst of the clams. Here in the vicinity of Mkr-113 vent. Z=1519.
1284	2017/07/17	01:46:42	45.92282	-129.98818	75.5	0.8	1519.9	Zoomed in on HFS sampling site.
1286	2017/07/17	01:47:09	45.92282	-129.98818	75.5	0.8	1519.9	J965-HFS-25 cont. Stop.
1289	2017/07/17	01:48:22	45.92282	-129.98818	75.6	0.8	1519.9	J965-HFS-25 cont. Tmax=2.0 Tavg=2.0 T2=2.2 Vol=400ml.
1296	2017/07/17	01:50:37	45.92283	-129.98815	209.8	2.4	1518.2	Just picked up MTR 3173 to the claw and will carry it to the

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-965 Datalogger Comment
								surface.
1297	2017/07/17	01:50:53	45.92283	-129.98810	211.9	2.8	1517.9	JASON: Jason off bottom Going to head to the surface now.
1298	2017/07/17	01:51:01	45.92282	-129.98808	211.2	2.9	1517.8	JASON: Jason on bottom
1300	2017/07/17	01:51:23	45.92281	-129.98804	212.0	4.4	1517.5	Still see the bottom..... Changing pilots for the ascent.
1303	2017/07/17	01:52:28	45.92276	-129.98809	211.8	3.5	1519.4	Next time we come here look across the collapse to the other side. May be better venting there.
1305	2017/07/17	01:52:41	45.92277	-129.98808	241.0	3.8	1519.4	Pink mat again.
1307	2017/07/17	01:53:10	45.92277	-129.98803	215.5	5.4	1517.5	Jason is searching around.
1309	2017/07/17	01:53:43	45.92276	-129.98801	218.0	14.6	1508.8	We've seen that before but it's hard to get in there.
1310	2017/07/17	01:53:49	45.92276	-129.98800	216.2	16.1	1507.3	The seafloor is out of sight now.
1313	2017/07/17	01:57:48	45.92258	-129.98777	216.9	105.3	1416.3	SAMPLE: HFS J965-HFS-26 DNA filter #14 on the ascent. This will take ~25 minutes. Z=1427 Alt=100.
1314	2017/07/17				217.5	196.3	516.2	Coming up at 30 m/minute.
1315	2017/07/17				217.9	198.7	297.8	The ship has control now.
1316	2017/07/17				216.9	193.1	228.0	Will stop at 50m from the surface.
1317	2017/07/17				217.9	184.1	162.6	J965-HFS-26 cont. Finished at 0224. Tmax=3.7 Tavg=2.9 Vol=3500ml.
1318	2017/07/17				216.6	174.3	55.4	Jason floats are in site. Coming to the surface.
1319	2017/07/17				196.5	156.1	12.7	Can see Jason approaching the ship.
1320	2017/07/17				192.8	171.9	2.5	Jason on the surface.
1321	2017/07/17				194.5	196.9	2.4	Recording highlight of the recovery.
1322	2017/07/17				143.9	199.4	1.0	JASON: Jason out of water
1323	2017/07/17				351.8	199.4	1.0	JASON: Jason on deck End Dive J965.

J2-966

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-966 Datalogger Comment
1324	2017/07/17	10:54:05			1.5	0.0	0.7	Preparing to launch. The next dive will be J966.
1325	2017/07/17	11:14:19			23.1	1.1	0.6	Jason off the deck.
1326	2017/07/17	11:16:07			58.6	180.9	2.2	JASON: Jason in water Start of dive J2-966.
1327	2017/07/17	11:16:47			206.4	190.5	2.1	Pyrosomes everywhere.
1328	2017/07/17	11:23:17			222.2	188.1	5.0	This will be a 4+ day pressure dive with fluid sampling toward the end of the dive.
1329	2017/07/17	11:27:08			222.7	188.7	15.6	Putting the footballs on the cable.
1330	2017/07/17	11:29:50			220.1	157.7	20.0	Putting on the last float.
1331	2017/07/17	11:30:10			219.7	158.0	21.1	Paying out cable.
1332	2017/07/17	11:36:05			221.2	193.3	124.9	Deployment location: Benchmark AX-308 -129d 59.928' 45d 55.896' Z=1533m.
1333	2017/07/17	11:37:06			222.9	180.1	125.1	Main goals: Make pressure measurements at array of seafloor benchmarks.
1334	2017/07/17	11:37:36			223.1	183.2	125.3	Goals cont: Make 3 transects of the array. Collect fluid samples near the end.
1335	2017/07/17	11:39:20			220.7	186.1	154.8	Basket: HFS; suction sampler hose; 3 GTB; milk crate; 2 hobos (104 and 129); 3 MTRs (3048; 3197; 3201); MPR; 2 tephra samplers (C;D).
1336	2017/07/17	11:43:21			221.6	194.2	240.4	All dives: Jason high-temp probe; Beast-HFS; MPR holster; 2 markers.
1337	2017/07/17	11:51:32			221.0	188.4	485.7	Port swing arm: 2 mini-BPRs. Stbd swing arm: 2 mini BPRs.
1338	2017/07/17	11:53:47			221.2	193.1	554.3	Will be deploying all 4 mini-BPRs and recovering 6 of them.
1340	2017/07/17	11:54:23			221.3	193.1	572.0	The 6 BPRs being recovered should all fit in the 2 bioboxes on the swing arms.
1341	2017/07/17	11:55:23			221.3	191.5	601.1	Tasks: Make pressure measurements at seafloor benchmarks. Suction up any ash.
1342	2017/07/17	11:56:39			221.0	194.6	638.1	The Jason CTD is not working because it has a ground fault.
1343	2017/07/17	11:57:09			220.8	166.5	652.1	Benchmark: AX-308. Recover Mini-BPR (MBPR) 2nd pass.
1344	2017/07/17	11:57:49			220.6	144.4	666.7	Benchmark: AX-106 (Ashes). Recover Mini-BPR 2nd pass.
1345	2017/07/17	11:58:26			220.7	144.4	682.1	Benchmark: AX-307. Recover MBPR. Deploy MBPR.
1346	2017/07/17	11:58:56			220.8	182.6	696.5	Benchmark: AX-101 (Center). Deploy Tephra sampler.
1347	2017/07/17	11:59:49			220.7	182.6	721.2	Benchmark: AX-302 (Trevi). Recover MBPR. Deploy MBPR and Tephra sampler.
1348	2017/07/17	12:00:23			221.0	134.5	739.4	Benchmark: AX-309: Recover and deploy nothing.
1349	2017/07/17	12:01:01			220.8	198.3	759.4	AX-303 (Mkr 33 Vent). Recover MBPR. Deploy MBPR.
1350	2017/07/17	12:01:23			221.0	133.3	770.2	AX-310 (International Dist). Recover and deploy none.
1351	2017/07/17	12:01:55			220.9	181.8	786.2	Benchmark: AX-104 (Bag City). Recover and deploy none.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-966 Datalogger Comment
1352	2017/07/17	12:03:03			221.0	183.9	820.3	AX-105 (South Pillow Mound). Recover MBPR on last pass. Deploy MBPR.
1353	2017/07/17	12:08:15			221.4	118.7	988.1	CLARIFICATION: Will set MBPR at AX-307 and AX-302 to the side to clear out biobox and deploy on the 2nd pass after recovering MBPRs out for 2 years.
1354	2017/07/17	12:09:15			221.5	197.0	1020.0	Order of ops: AX-308 -> AX-105. AX-105 -> AX-308. AX-308 -> AX-105.
1355	2017/07/17	12:10:18			221.2	184.0	1052.9	Tasks cont: Sample vent fluids at following locations during the last transect:
1356	2017/07/17	12:11:41			221.1	184.0	1097.3	After AX-106: Virgin; Inferno; Anemone at Ashes (2.5 hrs). Look for MTRs to recover (3043; 3004; 4099). Deploy 1 MTR.
1357	2017/07/17	12:12:29			221.3	198.2	1122.7	After AX302: Trevi. Recover Hobo-101 and deploy a new Hobo (1 hr).
1358	2017/07/17	12:13:04			221.1	183.7	1140.4	Transit to Mkr-N3 vent. Also recover MTR-4128 and deploy 1 MTR (1.5 hr).
1359	2017/07/17	12:13:48			221.0	160.6	1163.8	After AX-303: Mkr33 vent. Also recover MTR-3052 and deploy 1 MTR (1.5 hr).
1360	2017/07/17	12:15:41			221.3	105.1	1224.2	After AX-310: Transit to Vixen and Casper vents on the way to AX-104. Also recoverHobo-103 and deploy a new hobo. Look for missing hobo-147.
1361	2017/07/17	12:16:00			221.3	97.5	1234.8	After AX-104: Sample at Bag City vent.
1362	2017/07/17	12:16:36			221.0	97.5	1253.1	End of dive at AX-105. Do not recover and exchange MBPR here until the very end of dive.
1366	2017/07/17	12:34:09	45.93137	-129.99853	85.0	3.5	1527.9	JASON: Jason on bottom
1367	2017/07/17	12:34:29	45.93139	-129.99853	84.6	2.7	1528.6	HIGHLIGHTS: HD highlights start In vicinity of AX-308.
1370	2017/07/17	12:35:21	45.93142	-129.99855	209.5	2.6	1528.3	This area was not covered by the 2011 lava flow.
1375	2017/07/17	12:37:20	45.93147	-129.99859	329.2	4.6	1526.3	Moving in search of the benchmark.
1377	2017/07/17	12:37:36	45.93148	-129.99859	324.6	5.1	1525.6	Benchmark straight ahead.
1378	2017/07/17	12:37:54	45.93149	-129.99860	325.7	4.2	1526.8	Highlights stopped a bit ago.
1381	2017/07/17	12:38:43	45.9315	-129.99861	323.1	4.7	1526.2	Setting up for pressure reading at AX-308.
1392	2017/07/17	12:43:55	45.93153	-129.99865	268.4	1.0	1529.8	The benchmark is right below us. The mini-BPR is on the benchmark.
1394	2017/07/17	12:44:33	45.93153	-129.99865	268.7	1.0	1529.8	Switching to full-screen science cam on the display.
1398	2017/07/17	12:45:48	45.93153	-129.99866	269.3	1.0	1529.8	Little mini-starfish sitting in the measurement spot.
1401	2017/07/17	12:46:36	45.93153	-129.99866	269.2	1.1	1529.8	Picking up the MPR (mini pressure recorder). Will leave MBPR (mini-BPR) on the benchmark for now.
1405	2017/07/17	12:48:18	45.93154	-129.99868	269.2	1.1	1529.8	PRESSURE: Start AX-308 pressure reading.
1408	2017/07/17	12:49:11	45.93155	-129.99870	269.2	1.1	1529.8	Pressure measurement at AX-308 in progress.
1415	2017/07/17	12:52:16	45.93158	-129.99873	269.2	1.1	1529.8	Are going to lift it up and put it back down. Think brittle star is messing up the measurement.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-966 Datalogger Comment
1421	2017/07/17	12:54:58	45.93157	-129.99876	269.5	1.1	1529.8	Trying to get rid of the brittle star on the plate.
1425	2017/07/17	12:56:19	45.93156	-129.99877	269.6	1.0	1529.8	Using the MPR to move the brittle star.
1426	2017/07/17	12:56:24	45.93156	-129.99877	269.6	1.0	1529.8	It's removed.
1430	2017/07/17	12:57:35	45.93155	-129.99878	269.6	1.0	1529.8	PRESSURE: Start Re-starting the measurement.
1432	2017/07/17	12:58:19	45.93155	-129.99878	269.6	1.0	1529.8	Here at AX-308 which is east of Ashes.
1442	2017/07/17	13:02:57	45.93155	-129.99874	269.8	1.0	1529.9	This year the baseplate on the MPR is the same as in all previous years - except 2015.
1448	2017/07/17	13:05:14	45.93154	-129.99870	269.8	1.0	1529.9	Some kind of crinoids hanging on the flag rope.
1451	2017/07/17	13:06:07	45.93154	-129.99868	269.8	1.0	1529.9	Hydroid or crinoid? Where's a biologist when you need one?
1474	2017/07/17	13:17:05	45.93156	-129.99869	269.9	1.1	1529.9	PRESSURE: End AX-308 pressure measurement.
1476	2017/07/17	13:17:48	45.93157	-129.99868	269.9	1.0	1529.9	Retrieving the MPR.
1479	2017/07/17	13:19:02	45.93158	-129.99866	269.9	1.0	1529.9	It's back in the cradle on the basket.
1481	2017/07/17	13:19:23	45.93159	-129.99865	269.8	1.0	1530.0	15 minutes behind schedule says Bill.
1484	2017/07/17	13:20:19	45.9316	-129.99865	271.2	1.4	1529.7	Our task here is done. See you next time.
1488	2017/07/17	13:21:39	45.93161	-129.99867	271.1	2.7	1528.2	Moving to AX-106 just to the east of Ashes.
1489	2017/07/17	13:22:00	45.93161	-129.99867	271.3	3.2	1527.8	Will travel at 60 m above the bottom.
1492	2017/07/17	13:22:50	45.93161	-129.99872	271.7	13.3	1517.8	The next site is ~ 1km to the west and slightly north.
1499	2017/07/17	14:21:11	45.93408	-130.00990	291.8	3.9	1531.2	Jason on bottom during last part of transit to AX-106. We're about 100+ away.
1507	2017/07/17	14:24:36	45.93419	-130.01050	291.3	3.0	1534.7	We're traveling toward the benchmark to the east of Ashes.
1509	2017/07/17	14:25:12	45.93421	-130.01061	292.1	4.0	1534.7	Heading to AX-106 benchmark.
1510	2017/07/17	14:25:32	45.93422	-130.01068	292.6	3.0	1534.6	We're at the edge of the 2011 flow.
1513	2017/07/17	14:26:20	45.93425	-130.01083	291.1	3.1	1536.2	Traveling over the 2011 lava flow now.
1515	2017/07/17	14:26:45	45.93426	-130.01091	292.7	3.1	1536.5	Pillow lavas.
1518	2017/07/17	14:27:41	45.93429	-130.01106	291.9	3.5	1537.3	Going from pillow lavas to jumbled flows.
1522	2017/07/17	14:29:11	45.93434	-130.01128	289.7	3.8	1537.7	We're coming into lineated lavas now. When we went from pillows to jumbled that was probably the flow boundary
1523	2017/07/17	14:29:33	45.93435	-130.01133	301.4	3.5	1538.0	The AX-106 benchmark is up ahead.
1525	2017/07/17	14:29:39	45.93435	-130.01134	300.2	3.3	1538.0	The navigation is good.
1527	2017/07/17	14:30:24	45.93436	-130.01142	28.3	3.3	1538.5	The benchmark is beneath us.
1530	2017/07/17	14:31:08	45.93438	-130.01148	70.7	1.4	1540.1	Looks like a white sea star off in the distance.
1531	2017/07/17	14:31:26	45.93438	-130.01150	70.8	0.9	1540.6	There's a mini-BPR on this benchmark that was deployed in 2015.
1533	2017/07/17	14:32:01	45.93439	-130.01153	67.3	0.8	1540.6	Setting down on the seafloor for the next MPR (mobile pressure recorder) reading.
1535	2017/07/17	14:32:22	45.93439	-130.01154	67.4	0.8	1540.7	Another brittle star in the rectangle for deployment.
1538	2017/07/17	14:33:22	45.9344	-130.01158	67.9	0.8	1540.7	Jimmy's set to deploy the MPR after knocking the brittle star away.
1540	2017/07/17	14:33:56	45.9344	-130.01159	67.9	0.8	1540.7	Big crinoid on the mini BPR (MBPR).
1544	2017/07/17	14:35:17	45.9344	-130.01161	68.0	0.8	1540.7	The mobile pressure recorder is being placed on the benchmark.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-966 Datalogger Comment
1545	2017/07/17	14:35:24	45.9344	-130.01161	67.9	0.8	1540.7	Nudged it.
1547	2017/07/17	14:35:52	45.9344	-130.01162	68.0	0.8	1540.7	PRESSURE: Start AX-106.
1563	2017/07/17	14:43:15	45.93443	-130.01155	68.7	0.8	1540.6	Just did some panning around looking at the crinoid on the MBPR and hydroids on the rope. Also looked at a round hairy thing on the seafloor.
1566	2017/07/17	14:44:15	45.93442	-130.01153	68.6	0.8	1540.7	Tons of brittle stars all over the seafloor.
1568	2017/07/17	14:44:46	45.93442	-130.01153	68.6	0.8	1540.7	Pressure measurement in progress. Jason shift change.
1573	2017/07/17	14:46:44	45.93441	-130.01152	68.6	0.8	1540.6	PRESSURE: End That was a geologist identifying the biology - so may not be totally correct.....
1578	2017/07/17	14:48:36	45.9344	-130.01154	68.6	0.8	1540.6	ACRONYMS: MPR=mobile pressure recorder; MBPR=mini BPR.
1594	2017/07/17	14:56:17	45.93453	-130.01160	68.4	0.8	1540.6	PRESSURE: End measurement one on this device.
1597	2017/07/17	14:57:22	45.93455	-130.01158	68.4	0.8	1540.6	Grabbing the MPR from the benchmark.
1598	2017/07/17	14:57:28	45.93455	-130.01158	68.3	0.8	1540.6	MPR off the benchmark.
1600	2017/07/17	14:57:55	45.93456	-130.01157	68.4	0.8	1540.7	MPR is on the basket.
1602	2017/07/17	14:58:32	45.93458	-130.01156	68.1	0.8	1540.7	Hopefully the crinoid on the mini BPR will decide to leave before we come back to retrieve it on another run.
1604	2017/07/17	14:58:54	45.93459	-130.01156	68.6	0.8	1540.7	NAV: Doppler Reset
1606	2017/07/17	14:59:29	45.9346	-130.01155	21.6	4.0	1537.6	Moving offset from AX-106 at ASHES.
1608	2017/07/17	14:59:53	45.93462	-130.01155	12.5	3.5	1538.0	Moving off site from AX-106. Next stop is AX-307.
1610	2017/07/17	15:00:15	45.93464	-130.01154	12.6	3.4	1538.0	Anticipating a 1.5 hour transit to the next site.
1613	2017/07/17	15:01:33	45.93472	-130.01153	13.5	3.5	1538.3	Transiting with bottom in view. Ropey flows and pillows with sediment.
1616	2017/07/17	15:02:11	45.93476	-130.01152	12.8	3.4	1538.6	Interspersed sheet flows with some pillow features.
1618	2017/07/17	15:02:36	45.9348	-130.01152	13.7	3.2	1538.5	Striated sheet flows with fairly heavy sediment.
1619	2017/07/17	15:02:59	45.93484	-130.01152	12.6	3.7	1537.9	OOI cable at ASHES.
1621	2017/07/17	15:03:11	45.93486	-130.01151	12.6	4.0	1537.3	Has a loop in it draped over the sheet flow.
1701	2017/07/17	15:42:53	45.93929	-130.01119	11.2	3.9	1537.9	Transiting over the lava flows of Axial Seamount.
1721	2017/07/17	15:52:12	45.94049	-130.01088	11.4	4.1	1537.5	Coming over a ridge of lava and a collapsed sheet flow area below.
1723	2017/07/17	15:52:38	45.94055	-130.01087	10.9	4.2	1537.4	Fish.
1725	2017/07/17	15:53:17	45.94063	-130.01085	11.3	5.9	1537.5	Heavy sedimented sheet flow.
1732	2017/07/17	15:56:09	45.94102	-130.01075	11.3	6.1	1537.5	Sheet flow forever!
1736	2017/07/17	15:57:34	45.9412	-130.01070	11.0	6.1	1537.5	Edge of a collapse with pillows on top.
1746	2017/07/17	16:02:11	45.94182	-130.01058	10.9	4.6	1537.8	Back into sheet flows with heavy sediment.
1748	2017/07/17	16:02:44	45.9419	-130.01056	10.6	4.1	1539.6	Fish.
1749	2017/07/17	16:03:01	45.94194	-130.01056	10.9	4.1	1539.5	Swirly lava in the striated sheet flow.
1754	2017/07/17	16:04:49	45.94219	-130.01052	10.8	4.2	1538.8	More jumbled flow.
1761	2017/07/17	16:07:58	45.94262	-130.01043	11.4	3.9	1537.8	Fish.
1775	2017/07/17	16:14:26	45.94354	-130.01026	11.0	4.2	1539.5	200m more meters to reach the next benchmark at AX-307 (Magnesia).

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1777	2017/07/17	16:14:43	45.94358	-130.01025	10.5	3.4	1539.1	Fish in the jumbled flow.
1791	2017/07/17	16:21:30	45.9445	-130.01004	11.1	4.4	1537.6	Within a 130m of the benchmark.
1798	2017/07/17	16:24:30	45.94483	-130.00989	10.9	4.2	1538.1	Moving into flat sheet flows.
1801	2017/07/17	16:25:19	45.94491	-130.00983	10.9	4.2	1539.0	Great patterns in the sheet flow with heavy sediment.
1808	2017/07/17	16:28:07	45.94511	-130.00958	9.9	4.4	1538.1	Lots of floaters in the water column as we approach the site in the sheet flow.
1810	2017/07/17	16:28:59	45.94516	-130.00950	11.4	4.3	1538.7	Fish in the heavy sedimented sheet flow.
1813	2017/07/17	16:29:49	45.94519	-130.00943	9.0	4.3	1538.8	Jelly.
1815	2017/07/17	16:30:08	45.94521	-130.00940	14.9	3.9	1539.0	Big red jelly.
1817	2017/07/17	16:30:43	45.94523	-130.00936	12.3	4.2	1538.8	There is the marker flag in the upper right of the science cam.
1819	2017/07/17	16:31:32	45.94527	-130.00931	58.4	3.7	1539.1	Water is not clear so hard to keep track of it.
1821	2017/07/17	16:31:42	45.94527	-130.00930	58.0	4.1	1538.8	Dead ahead now in the sheet flow.
1823	2017/07/17	16:32:08	45.94529	-130.00928	57.7	4.3	1539.1	Wavy sheet flow approaching the benchmark.
1825	2017/07/17	16:32:48	45.94531	-130.00925	70.3	3.1	1540.1	AX-307 at Magnesia with a mini-BPR.
1827	2017/07/17	16:33:21	45.94533	-130.00923	120.3	2.7	1540.2	Frame_Grab:
1828	2017/07/17	16:33:28	45.94533	-130.00923	136.3	2.5	1540.3	Nice overview of the site with Mkr-127.
1829	2017/07/17	16:33:32	45.94534	-130.00923	140.0	2.6	1540.3	Frame_Grab:
1833	2017/07/17	16:34:46	45.94537	-130.00921	166.7	0.8	1542.4	Approaching the benchmark at heading of 166.
1834	2017/07/17	16:35:00	45.94537	-130.00921	166.7	0.9	1542.4	Looks like a line on a release pin was left behind.
1838	2017/07/17	16:36:16	45.9454	-130.00920	166.8	0.8	1542.3	Going to deploy a mini-BPR out of the stbd swing arm at the site but not on the benchmark to get some more cargo space available.
1842	2017/07/17	16:38:01	45.9454	-130.00920	166.9	0.8	1542.3	Grabbing a mini-BPR from the stbd biobox.
1844	2017/07/17	16:38:12	45.9454	-130.00920	166.9	0.8	1542.3	Looks like mini-BPR 10 is the winner!
1846	2017/07/17	16:38:56	45.9454	-130.00920	167.1	0.8	1542.3	DEPLOY: SIO-BPR Placing mini-BPR 10 on the seafloor next to the benchmark for a later placement.
1850	2017/07/17	16:40:31	45.94538	-130.00918	167.9	0.8	1542.3	Stowing the stbd swing arm and biobox.
1852	2017/07/17	16:40:51	45.94538	-130.00917	167.9	0.8	1542.3	Fish.
1858	2017/07/17	16:43:29	45.94536	-130.00912	166.0	0.8	1542.5	Frame_Grab:
1860	2017/07/17	16:43:45	45.94535	-130.00912	166.8	0.8	1542.4	Preparing to place MPR on the benchmark.
1863	2017/07/17	16:44:48	45.94535	-130.00911	166.9	0.8	1542.4	Grabbing the MPR.
1865	2017/07/17	16:45:19	45.94535	-130.00911	166.9	0.8	1542.4	Placing the MPR on the benchmark AX-307.
1867	2017/07/17	16:45:46	45.94535	-130.00911	166.9	0.8	1542.4	Can see one tiny brittle star on the landing pad.
1869	2017/07/17	16:46:20	45.94535	-130.00911	166.9	0.8	1542.4	Looking at the placement on the benchmark.
1870	2017/07/17	16:46:29	45.94535	-130.00911	166.9	0.8	1542.4	Placement looks good.
1872	2017/07/17	16:46:56	45.94535	-130.00912	167.0	0.9	1542.4	PRESSURE: Start AX-307 Magnesia first pressure measurement begin.
1880	2017/07/17	16:50:29	45.94534	-130.00919	166.0	0.8	1542.4	Frame_Grab:
1887	2017/07/17	16:53:19	45.94531	-130.00921	166.4	0.9	1542.4	Navigation is great as we are tracking within 4m of the benchmark position.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-966 Datalogger Comment
1916	2017/07/17	17:07:26	45.94538	-130.00915	167.5	0.9	1542.3	PRESSURE: End Done with AX-307.
1919	2017/07/17	17:08:15	45.9454	-130.00915	167.5	0.8	1542.3	Retrieving the MPR from the benchmark.
1920	2017/07/17	17:08:25	45.9454	-130.00915	167.4	0.8	1542.3	Transit distance to next site will be 1000m.
1922	2017/07/17	17:08:34	45.94541	-130.00915	167.4	0.8	1542.3	Grabbed the MPR.
1924	2017/07/17	17:09:07	45.94543	-130.00914	167.4	0.8	1542.4	Placing MPR on the basket.
1925	2017/07/17	17:09:32	45.94545	-130.00914	167.4	0.8	1542.3	MPR is safely on the basket.
1928	2017/07/17	17:10:20	45.9455	-130.00913	124.2	2.4	1540.4	Coming off the site and heading to AX-101.
1931	2017/07/17	17:11:10	45.94558	-130.00912	0.0	5.1	1537.8	Moving off the sheet flow into a jumbled flow.
1933	2017/07/17	17:11:35	45.94563	-130.00911	0.4	4.3	1537.0	Frame_Grab:
1934	2017/07/17	17:11:47	45.94565	-130.00911	0.7	4.2	1536.9	Looked like an abandoned piece of line on the seafloor.
2056	2017/07/17	18:12:18	45.95343	-130.00956	3.8	4.1	1529.4	Navigation shows Sentry already passed by this area just before we arrived.
2057	2017/07/17	18:12:25	45.95344	-130.00956	2.1	4.0	1529.3	Ship will be at the site in 5 minutes.
2062	2017/07/17	18:14:31	45.95371	-130.00961	2.3	3.8	1528.4	Large pillows in this flow. Very round.
2076	2017/07/17	18:20:57	45.95452	-130.00975	2.9	3.3	1525.5	Ship is now in position at the site. Driving Jason the final 100m.
2086	2017/07/17	18:25:31	45.955	-130.00985	1.7	2.7	1524.1	Driving over a ridge.
2088	2017/07/17	18:25:46	45.95503	-130.00985	2.0	1.7	1524.4	There is the marker at Caldera Center.
2090	2017/07/17	18:26:27	45.95507	-130.00987	2.9	3.2	1526.7	There is a marker but can't see the number.
2092	2017/07/17	18:26:56	45.9551	-130.00988	352.6	3.1	1527.3	There is the other marker on the other side of the benchmark. Looks like both Mkr-60 and Mkr-61 are here.
2094	2017/07/17	18:27:27	45.95513	-130.00989	285.1	2.0	1528.3	Positioning the vehicle for pressure measurement.
2096	2017/07/17	18:27:36	45.95514	-130.00989	261.5	2.2	1528.5	Large fish near the benchmark.
2097	2017/07/17	18:28:00	45.95516	-130.00990	238.1	1.9	1528.7	Short highlight of the area.
2100	2017/07/17	18:28:57	45.9552	-130.00991	239.3	0.8	1529.8	A bit of sediment on the benchmark.
2102	2017/07/17	18:29:08	45.9552	-130.00992	239.3	0.8	1529.8	On the bottom.
2107	2017/07/17	18:31:15	45.95524	-130.00994	239.2	0.8	1529.7	Preparing to deploy a Tephra sampler at this site.
2109	2017/07/17	18:31:38	45.95525	-130.00994	239.2	0.8	1529.7	Removing Tephra C from the port side of the basket.
2111	2017/07/17	18:32:16	45.95525	-130.00994	239.2	0.8	1529.8	DEPLOY: Tephra Tephra C deployed to the left of the benchmark at this heading of 239. Caldera Center AX-101.
2114	2017/07/17	18:33:30	45.95524	-130.00994	239.3	0.8	1529.7	Placing the MPR on the benchmark.
2118	2017/07/17	18:34:44	45.95523	-130.00994	239.3	0.8	1529.7	Position here is 45 57.31335N 130deg 0.59561'W.
2122	2017/07/17	18:36:20	45.95522	-130.00994	239.3	0.8	1529.7	MPR is on the benchmark.
2124	2017/07/17	18:36:35	45.95522	-130.00994	239.3	0.8	1529.7	PRESSURE: Start AX-101.
2127	2017/07/17	18:38:02	45.9552	-130.00994	239.3	0.8	1529.7	NAV: Doppler Reset
2130	2017/07/17	18:38:35	45.9552	-130.00994	239.3	0.8	1529.7	Pilot questioning the placement of the MPR on the benchmark. It is snug on the right from our view but some space on left.
2166	2017/07/17	18:56:26	45.95525	-130.01002	239.6	0.8	1529.7	PRESSURE: End Measurement Complete AX-101.
2170	2017/07/17	18:57:51	45.95521	-130.00998	239.7	0.8	1529.7	MPR is secured in the basket
2176	2017/07/17	19:00:10	45.95507	-130.00983	237.9	3.2	1527.2	Moving Jason up 100 m in preparation for the transit from AX101 to AX302.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-966 Datalogger Comment
2186	2017/07/17	19:04:48	45.95455	-130.00926	115.9	7.2	1524.3	CORRECTION. We are transiting along the bottom from AX101 to AX302.
2190	2017/07/17	19:06:14	45.95439	-130.00902	116.8	28.1	1500.2	Now we are moving 100 m up in the water column.
2193	2017/07/17	21:17:20	45.94649	-129.98404	115.2	4.1	1516.3	We have arrived on the bottom near AX302.
2201	2017/07/17	21:20:39	45.94639	-129.98384	207.8	1.9	1516.6	We have arrived on station at AX302 (marker 136? Last digit damaged).
2213	2017/07/17	21:26:26	45.94639	-129.98374	223.6	1.5	1517.0	Frame_Grab:
2216	2017/07/17	21:27:18	45.9464	-129.98374	224.9	0.8	1517.8	Mini-BPR #5 has been removed from the starboard biobox and is being placed alongside the mini-BPR to be recovered in order to make space.
2218	2017/07/17	21:27:40	45.94641	-129.98374	224.9	0.9	1517.7	NAV: Doppler Reset Doppler Reset.
2220	2017/07/17	21:28:29	45.94641	-129.98374	224.8	0.8	1517.8	The MPR is being removed from the basket.
2228	2017/07/17	21:31:50	45.94644	-129.98373	224.6	0.9	1517.8	The MPR is in place on the benchmark.
2230	2017/07/17	21:32:11	45.94644	-129.98373	224.8	0.9	1517.7	PRESSURE: Start Starting MPR measurement on Station AX-302
2234	2017/07/17	21:33:51	45.94644	-129.98373	224.8	0.9	1517.7	Location is 45d56.78408 129d59.03032. Depth is 1515.4 m. Altitude is 1.48 m.
2235	2017/07/17	21:34:00	45.94644	-129.98373	224.8	0.9	1517.7	Frame_Grab:
2240	2017/07/17	21:35:59	45.94643	-129.98373	224.9	0.9	1517.8	Frame_Grab:
2274	2017/07/17	21:52:14	45.94639	-129.98386	225.0	0.8	1517.8	PRESSURE: End MPR AX-302 measurement stopped.
2279	2017/07/17	21:54:13	45.94641	-129.98387	225.2	0.8	1517.9	MPR has been removed from the benchmark and secured in the basket.
2285	2017/07/17	21:56:36	45.94644	-129.98389	225.1	0.8	1517.9	RECOVER: Mini-BPR #6 has been recovered from AX302 and placed in the starboard biobox.
2290	2017/07/17	21:58:58	45.94645	-129.98390	225.2	0.8	1517.9	DEPLOY: Mini-BPR #5 is in position on the benchmark at station AX302.
2292	2017/07/17	21:59:04	45.94645	-129.98390	225.2	0.8	1517.9	Frame_Grab:
2293	2017/07/17	21:59:11	45.94645	-129.98390	225.1	0.8	1517.9	Frame_Grab:
2297	2017/07/17	22:01:00	45.94645	-129.98388	225.4	0.8	1517.9	Tephra Sampler D has been removed from the milk crate in the basket.
2300	2017/07/17	22:01:42	45.94644	-129.98386	225.4	0.8	1517.9	DEPLOY: Tephra sampler D is in place on the seafloor beside benchmark AX302.
2306	2017/07/17	22:04:26	45.94638	-129.98368	225.3	0.8	1517.9	Starting transit from AX302 to AX309.
2318	2017/07/17	23:26:18	45.93958	-129.97330	144.0	3.6	1518.5	Seafloor in sight.
2321	2017/07/17	23:27:08	45.9395	-129.97325	143.2	2.5	1520.3	Older sedimented pillows and lobes.
2328	2017/07/17	23:30:20	45.93914	-129.97297	139.0	2.4	1520.5	Still heading toward the benchmark AX-309 for another pressure measurement.
2334	2017/07/17	23:32:59	45.93883	-129.97266	145.7	4.6	1521.1	Crab ahead.
2339	2017/07/17	23:34:58	45.93866	-129.97245	144.4	5.0	1521.1	NAV: Doppler Reset
2342	2017/07/17	23:35:44	45.93861	-129.97237	140.6	5.1	1521.2	Benchmark in sight.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-966 Datalogger Comment
2344	2017/07/17	23:36:10	45.93859	-129.97234	138.5	2.7	1522.7	Traveling over jumbled flow and lava swirly areas.
2345	2017/07/17	23:36:30	45.93858	-129.97231	147.6	1.7	1523.6	Lots of sediment on these ropey lavas.
2347	2017/07/17	23:36:49	45.93856	-129.97229	173.2	1.0	1524.4	HIGHLIGHTS: HD highlights start Approaching AX-309 benchmark.
2349	2017/07/17	23:37:28	45.93854	-129.97224	137.0	1.4	1524.8	HIGHLIGHTS: HD highlights stop
2352	2017/07/17	23:38:04	45.93853	-129.97221	248.9	1.5	1524.6	AX-309 in a heavily sedimented area surrounded by ropey flows.
2355	2017/07/17	23:39:30	45.93853	-129.97216	241.8	0.8	1525.6	Preparing to set up for pressure measurement here to the east of the caldera wall.
2358	2017/07/17	23:40:30	45.93853	-129.97213	241.6	0.8	1525.6	Placing the MPR (mobile pressure recorder) on the benchmark.
2360	2017/07/17	23:40:46	45.93854	-129.97213	241.4	0.8	1525.6	Maneuvering the pressure recorder.
2362	2017/07/17	23:41:10	45.93854	-129.97212	241.5	0.8	1525.6	See more brittle stars on the benchmark.
2364	2017/07/17	23:41:41	45.93855	-129.97212	241.8	0.8	1525.6	Looks like the sensor is in the groove on the benchmark.
2367	2017/07/17	23:42:41	45.93856	-129.97211	241.7	0.8	1525.7	PRESSURE: Start AX-309 start.
2369	2017/07/17	23:43:23	45.93857	-129.97211	241.6	0.8	1525.7	The brittle stars seem attracted to the sensor. One is moving in on it and climbing up it.
2375	2017/07/17	23:45:35	45.93858	-129.97211	242.3	0.8	1525.7	Will not deploy or recover anything here (except the MPR).
2384	2017/07/17	23:49:38	45.93855	-129.97209	242.1	0.8	1525.7	This benchmark went out a few years ago and there is not nearly as much biota on the flag and marker ropes.
2409	2017/07/18	00:01:54	45.93846	-129.97200	242.1	0.8	1525.8	PRESSURE: End AX-309 pressure reading. Another rattail in the background.
2412	2017/07/18	00:02:46	45.93847	-129.97201	242.1	0.8	1525.8	Stowing the MPR.
2415	2017/07/18	00:03:48	45.93848	-129.97202	241.8	0.8	1525.8	Finishing up some housekeeping.
2417	2017/07/18	00:04:25	45.93849	-129.97204	235.5	1.8	1524.2	Taking off and will head to Mkr-33 benchmark. Bearing 235 - 976 meters away.
2421	2017/07/18	00:05:34	45.93851	-129.97207	238.9	8.1	1518.1	Crinoid.
2422	2017/07/18	00:05:59	45.93852	-129.97209	239.0	9.8	1516.1	Moving over older lavas.
2424	2017/07/18	00:06:17	45.93853	-129.97210	236.6	8.3	1516.4	Lava pillars ahead.
2429	2017/07/18	01:04:28	45.93526	-129.98002	235.7	4.5	1513.0	Bottom in sight.
2436	2017/07/18	01:07:17	45.93498	-129.98036	227.7	2.6	1515.0	We're traveling toward the marker. Probably on older lavas yet.
2439	2017/07/18	01:08:21	45.93487	-129.98050	228.0	2.1	1515.0	Should be coming upon the Smiley marker soon.
2445	2017/07/18	01:10:51	45.93459	-129.98084	225.9	1.7	1514.9	Coming upon a collapse area.
2447	2017/07/18	01:11:31	45.93452	-129.98093	223.1	1.5	1514.8	NAV: Doppler Reset
2449	2017/07/18	01:11:54	45.93447	-129.98099	222.5	1.6	1514.7	Still moving over older lavas. Lobate flows.
2451	2017/07/18	01:12:25	45.93442	-129.98106	223.8	2.0	1514.3	These lavas predate the 1998 flow.
2453	2017/07/18	01:12:54	45.93435	-129.98115	225.0	1.5	1514.8	Seeing lots of sediment raining down and on the flow.
2456	2017/07/18	01:13:53	45.93427	-129.98126	223.8	1.8	1514.6	Coming upon the collapse that we see in the AUV data.
2459	2017/07/18	01:14:43	45.93418	-129.98137	222.7	3.2	1514.4	We're about 23m east of the AUV bathymetry. We're above the collapse. Lava pillars.
2461	2017/07/18	01:15:28	45.93411	-129.98147	225.0	3.9	1513.5	The collapse is beneath us. Jumbled lava and large pillows.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-966 Datalogger Comment
2463	2017/07/18	01:15:56	45.93405	-129.98155	221.7	3.2	1514.2	Large pillows and rattail
2465	2017/07/18	01:16:23	45.934	-129.98161	222.2	3.1	1514.2	Lava pillars and skylights.
2468	2017/07/18	01:17:24	45.93389	-129.98174	224.0	2.4	1513.5	We're still on older lavas. Tubeworms here.
2473	2017/07/18	01:19:28	45.93368	-129.98198	222.7	1.9	1513.6	Seeing bacterial mat.
2475	2017/07/18	01:19:46	45.93365	-129.98201	223.7	2.3	1513.5	We're getting close to the benchmark.
2476	2017/07/18	01:19:54	45.93365	-129.98202	223.3	2.0	1513.5	Have not seen a contact.
2479	2017/07/18	01:20:56	45.93357	-129.98209	199.5	2.4	1513.0	I never did see a contact - Bill says it was probably when we saw the first tubeworms.
2481	2017/07/18	01:21:04	45.93357	-129.98210	189.4	2.2	1513.1	Mkr-33 benchmark ahead.
2482	2017/07/18	01:21:21	45.93355	-129.98211	186.8	2.3	1513.2	HIGHLIGHTS: HD highlights stop ~506 minutes of highlights just ended.
2484	2017/07/18	01:21:52	45.93352	-129.98214	180.9	1.8	1513.6	Benchmark AX-303 right ahead.
2487	2017/07/18	01:22:42	45.93348	-129.98217	180.6	1.4	1514.1	We will be swapping out the mini BPR here (maybe on the last transit.
2488	2017/07/18	01:22:51	45.93347	-129.98218	181.1	1.3	1514.1	Will pull one mini BPR.
2490	2017/07/18	01:23:09	45.93346	-129.98219	180.6	1.4	1514.1	Mini-BPR out of the port swing arm and set it down until we return for the swap.
2491	2017/07/18	01:23:24	45.93345	-129.98219	180.5	1.5	1514.0	See patches of bacterial mat and a few tubeworms.
2495	2017/07/18	01:24:51	45.93343	-129.98221	179.5	1.3	1514.2	Opening the port biobox and retrieving the mini-BPR. Grabbing the #2 miniBPR and placing it near the benchmark.
2497	2017/07/18	01:25:17	45.93342	-129.98222	179.9	1.4	1514.2	Still working on that.
2501	2017/07/18	01:26:40	45.93342	-129.98223	179.3	0.8	1514.8	Little shrimp.
2503	2017/07/18	01:27:18	45.93342	-129.98223	178.8	0.8	1514.8	Placed the mini-BPR close to the benchmark.
2506	2017/07/18	01:28:32	45.93342	-129.98223	178.8	0.8	1514.8	Grabbing the MPR and placing it on the benchmark. No brittle stars on this benchmark - as far as I can see.
2512	2017/07/18	01:30:46	45.93343	-129.98223	179.1	0.8	1514.8	The MPR has been placed.
2514	2017/07/18	01:31:05	45.93343	-129.98223	179.0	0.8	1514.8	PRESSURE: Start MPR start at AX-303 at Mkr-33 site.
2515	2017/07/18	01:31:18	45.93344	-129.98223	179.0	0.8	1514.8	Pressure reading in progress.
2521	2017/07/18	01:33:50	45.93344	-129.98221	179.1	0.8	1514.8	Took some framegrabs of the reading.
2525	2017/07/18	01:35:08	45.93344	-129.98220	179.1	0.8	1514.9	Taking reading.....
2526	2017/07/18	01:35:28	45.93343	-129.98219	179.1	0.8	1514.9	See some shiny lavas here; but most are covered in sediment.
2542	2017/07/18	01:42:36	45.93343	-129.98221	179.2	0.8	1514.9	Jason will have to come up in the water column ~100m or so when we recover Sentry.
2559	2017/07/18	01:50:48	45.93339	-129.98220	179.1	0.8	1514.9	PRESSURE: End AX-303 at Mkr-33 Vent site pressure sensor reading finished.
2561	2017/07/18	01:51:30	45.93339	-129.98218	179.4	0.8	1514.9	Will stow the sensor in the cradle and then come up 100m - so that we don't get in the way of Sentry.
2563	2017/07/18	01:51:55	45.93338	-129.98217	179.4	0.8	1515.0	MPR stowed in cradle.
2565	2017/07/18	01:52:17	45.93338	-129.98216	180.7	1.3	1514.5	Coming up to 100m off the bottom.
2570	2017/07/18	01:57:36	45.9335	-129.98202	332.6	116.1	1400.0	Jason is at 100m above the seafloor.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-966 Datalogger Comment
2571	2017/07/18	02:18:14	45.9335	-129.98248	335.4	115.7	1398.9	Sentry is not at ~890m and coming up fast. We will probably hold position here while it is recovered.
2572	2017/07/18	02:27:41	45.93346	-129.98232	332.8	116.4	1398.8	Sentry is near the surface. Should be at the surface in ~7 minutes
2573	2017/07/18	02:51:31	45.93337	-129.98230	332.7	116.3	1398.7	Sentry is on deck.
2574	2017/07/18	02:55:45	45.93314	-129.98206	162.0	54.0	1461.4	Moving the ship and heading south to AX-310 at International District.
2577	2017/07/18	02:57:58	45.93294	-129.98188	161.5	5.0	1510.8	There's the bottom.
2584	2017/07/18	03:00:39	45.93268	-129.98172	172.8	5.9	1514.0	Large pillows and collapse features.
2588	2017/07/18	03:02:05	45.93257	-129.98164	173.0	4.9	1514.9	Lots of floc and floaties in the water column.
2601	2017/07/18	03:08:06	45.93222	-129.98122	158.2	3.6	1513.4	Great arch with spider crab.
2640	2017/07/18	03:27:28	45.93015	-129.97982	157.9	4.9	1508.3	Ship had to change its heading to work with the wind as we slide south sideways.
2645	2017/07/18	03:29:04	45.92995	-129.97969	158.5	5.3	1508.6	Moving over collapsed lava flows. Ridges and pits.
2648	2017/07/18	03:30:18	45.92979	-129.97959	158.3	7.4	1508.0	Jason is getting large navigation errors while the ship changes heading.
2656	2017/07/18	03:33:36	45.92934	-129.97929	157.3	4.7	1510.2	Fish over the lava flow.
2664	2017/07/18	03:37:05	45.92897	-129.97906	158.9	7.7	1512.7	Waiting for the ship to transfer control back to Jason.
2667	2017/07/18	03:38:11	45.9289	-129.97901	157.6	5.3	1514.5	Ship is driving itself at the moment.
2672	2017/07/18	03:40:18	45.9288	-129.97895	157.9	4.3	1515.6	Waiting for the ship to get some headway south.
2675	2017/07/18	03:41:32	45.92874	-129.97892	157.6	4.0	1516.0	Jason is headed south.
2678	2017/07/18	03:42:09	45.9287	-129.97890	157.8	4.6	1515.6	Large pillows with sediment.
2691	2017/07/18	03:48:27	45.928	-129.97854	158.2	4.8	1518.2	Fish.
2697	2017/07/18	03:51:00	45.92772	-129.97843	161.5	2.9	1520.4	Spider crab.
2699	2017/07/18	03:51:12	45.9277	-129.97843	160.9	2.4	1521.0	Round pillow with light sediment.
2704	2017/07/18	03:53:08	45.92752	-129.97841	164.9	2.9	1523.8	Jumbled flow.
2713	2017/07/18	03:57:24	45.92714	-129.97836	164.1	3.7	1523.2	Fish in jumbled flow.
2715	2017/07/18	03:57:47	45.92711	-129.97834	163.8	4.1	1523.0	Frame_Grab:
2718	2017/07/18	03:58:40	45.92701	-129.97831	164.1	3.2	1523.0	Yellow sediments.
2719	2017/07/18	03:58:58	45.92698	-129.97830	164.4	3.7	1523.3	Moving into a very flat sheet flow.
2725	2017/07/18	04:01:27	45.92668	-129.97821	166.4	4.2	1523.7	OOI cable over the sheet flow.
2730	2017/07/18	04:03:13	45.92644	-129.97816	165.9	4.0	1522.4	Fish.
2734	2017/07/18	04:04:52	45.92623	-129.97811	167.9	4.5	1522.8	Within 50m of the benchmark AX-310.
2735	2017/07/18	04:04:58	45.92622	-129.97811	166.2	4.5	1522.7	Jumbled sheet flow.
2740	2017/07/18	04:06:39	45.92603	-129.97804	166.4	4.0	1522.4	Pillow lava transition.
2741	2017/07/18	04:06:52	45.92601	-129.97803	164.5	3.7	1522.6	Contact between lava flows.
2743	2017/07/18	04:07:19	45.92597	-129.97801	166.5	4.2	1522.4	There is the marker on the benchmark.
2747	2017/07/18	04:08:39	45.92588	-129.97794	218.8	4.3	1524.2	Easy to spot in the sheet flow. AX-310 at International District.
2748	2017/07/18	04:08:50	45.92587	-129.97793	239.7	3.8	1525.2	Lots of OOI cables and instruments very nearby.
2750	2017/07/18	04:09:08	45.92585	-129.97792	260.7	3.9	1525.2	Mkr-126 at AX-310 with a nearby spider crab.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-966 Datalogger Comment
2753	2017/07/18	04:10:05	45.92582	-129.97788	286.6	1.8	1527.2	Approaching the benchmark for landing.
2755	2017/07/18	04:10:47	45.9258	-129.97786	283.2	0.8	1528.0	Highlights of the approach.
2757	2017/07/18	04:11:04	45.9258	-129.97785	282.6	0.8	1528.0	Navigation is spot-on!
2759	2017/07/18	04:11:48	45.92579	-129.97784	282.6	0.8	1528.0	Retrieving the MPR and placing it on the benchmark.
2762	2017/07/18	04:12:43	45.92578	-129.97783	282.7	0.8	1528.0	NAV: Doppler Reset
2764	2017/07/18	04:13:07	45.92578	-129.97782	282.9	0.8	1528.0	Nudging MPR on the benchmark.
2767	2017/07/18	04:14:32	45.92579	-129.97782	284.8	0.8	1527.9	Slight adjustment on the benchmark.
2770	2017/07/18	04:15:17	45.92579	-129.97782	284.3	0.8	1527.9	Doesn't appear to be in the black area.
2773	2017/07/18	04:16:20	45.92579	-129.97783	283.4	0.8	1528.0	Picking the MPR back up and repositioning.
2778	2017/07/18	04:18:20	45.9258	-129.97784	283.9	0.8	1528.0	PRESSURE: Start AX-310 begin first reading.
2794	2017/07/18	04:25:49	45.9258	-129.97790	284.3	0.8	1528.0	Power out. Screens went dead.
2802	2017/07/18	04:28:46	45.92581	-129.97800	284.3	0.8	1521.6	042540 : ground fault - power lost
2803	2017/07/18	04:28:56	45.92582	-129.97801	272.5	7.0	1521.8	Power back on
2808	2017/07/18	04:30:49	45.92582	-129.97808	199.7	6.3	1521.3	MPR is dangling from the basket.
2810	2017/07/18	04:31:26	45.92582	-129.97811	199.7	6.3	1521.3	Power came up and then went back out. Ground fault.
2815	2017/07/18	04:33:31	45.92583	-129.97820	199.7	6.3	1521.3	Bringing power back up.
2818	2017/07/18	04:34:19	45.92583	-129.97823	206.3	47.9	1478.7	Cameras are back.
2819	2017/07/18	04:34:43	45.92583	-129.97824	239.2	48.7	1477.4	Off bottom at 50m altitude.
2820	2017/07/18	04:35:23	45.92583	-129.97826	218.1	41.1	1484.8	Stopping ship movement as systems come back online.
2821	2017/07/18	04:37:27	45.92583	-129.97833	217.9	34.9	1490.8	Can't see the MPR at this point or know where it is dangling from on the basket.
2822	2017/07/18	04:39:42	45.92582	-129.97840	218.4	44.6	1480.5	Both arms are working.
2823	2017/07/18	04:40:35	45.92582	-129.97843	218.1	47.5	1477.6	Moving the ship back to the site.
2829	2017/07/18	04:46:54	45.9257	-129.97828	4.1	31.2	1493.6	Ship is moving east back toward AX-310.
2833	2017/07/18	04:50:27	45.92571	-129.97800	4.9	13.8	1513.5	Doppler is working.
2836	2017/07/18	04:51:21	45.92572	-129.97797	3.2	7.7	1520.8	There is the bottom and the OOI cable.
2838	2017/07/18	04:51:37	45.92572	-129.97796	4.8	5.3	1523.0	AX-310 is just beyond the view.
2839	2017/07/18	04:51:46	45.92572	-129.97796	2.8	3.6	1524.8	There are the OOI instruments.
2841	2017/07/18	04:52:14	45.92572	-129.97795	1.8	0.8	1527.8	Landing on the sheet flow and the dangling MPR is in front of the vehicle for easy pickup.
2843	2017/07/18	04:52:34	45.92573	-129.97795	6.8	0.8	1527.8	Gently approaching the MPR to retrieve it back into the basket.
2847	2017/07/18	04:54:17	45.92574	-129.97796	321.2	1.1	1527.6	Stirring up a lot of sediment getting into position to retrieve the MPR.
2850	2017/07/18	04:55:18	45.92574	-129.97797	255.7	1.2	1528.3	Frame_Grab:
2852	2017/07/18	04:55:44	45.92573	-129.97797	256.0	0.8	1528.2	Bringing out the stbd manipulator to grab the MPR.
2855	2017/07/18	04:56:56	45.92573	-129.97797	255.9	0.8	1528.2	Have the instrument in the manipulator.
2857	2017/07/18	04:57:09	45.92572	-129.97797	255.9	0.8	1528.2	Regrabbing the MPR to place it in the basket.
2859	2017/07/18	04:57:46	45.92572	-129.97797	255.7	0.8	1528.2	Placing MPR in the basket.
2863	2017/07/18	04:59:26	45.9257	-129.97795	271.6	1.9	1527.0	Moving back over to the AX-310.
2865	2017/07/18	04:59:49	45.9257	-129.97795	275.2	2.7	1526.0	Restarted the MPR to get communication back with Jason.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-966 Datalogger Comment
2867	2017/07/18	05:00:27	45.92569	-129.97794	322.8	2.8	1525.9	Good view of the OOI instruments.
2870	2017/07/18	05:01:29	45.92569	-129.97792	44.9	2.1	1526.5	Stirred up a lot of sediment so waiting for it to settle before moving over to the benchmark.
2878	2017/07/18	05:04:40	45.92572	-129.97787	24.9	4.0	1524.6	There is the benchmark.
2879	2017/07/18	05:04:53	45.92573	-129.97787	21.4	4.2	1524.2	We will restart this measurement.
2884	2017/07/18	05:06:42	45.92577	-129.97785	284.0	4.1	1525.0	Approaching the benchmark AX-310.
2887	2017/07/18	05:07:37	45.92578	-129.97784	283.4	4.1	1525.0	Retrieving the MPR from the basket.
2889	2017/07/18	05:08:04	45.92579	-129.97783	283.4	4.1	1525.1	Looking at the cable to the instrument.
2892	2017/07/18	05:09:06	45.92579	-129.97783	284.7	1.6	1527.1	Holding the instrument up while landing to keep the cable out of the way of the basket.
2894	2017/07/18	05:09:57	45.9258	-129.97782	281.0	0.8	1527.7	Placing MPR on AX-310.
2899	2017/07/18	05:11:48	45.92579	-129.97781	280.9	0.8	1527.7	Had to move one crinoid off the platform with a gentle nudge.
2901	2017/07/18	05:12:31	45.92579	-129.97781	280.9	0.8	1527.7	MPR in place on the benchmark.
2903	2017/07/18	05:12:49	45.92579	-129.97781	281.5	0.8	1527.7	PRESSURE: Start AX-310 measurement started.
2920	2017/07/18	05:20:39	45.92575	-129.97780	281.9	0.8	1527.6	NAV: Doppler Reset
2935	2017/07/18	05:28:00	45.92572	-129.97784	281.7	0.8	1527.6	Frame_Grab:
2948	2017/07/18	05:33:52	45.92576	-129.97780	281.5	0.8	1527.5	PRESSURE: End Finished AX-310 measurement with no incidents!
2951	2017/07/18	05:34:46	45.92576	-129.97778	280.6	0.8	1527.5	Retrieving the MPR from the benchmark.
2953	2017/07/18	05:35:17	45.92575	-129.97778	281.0	0.8	1527.6	Next benchmark is 1400m away at 221.
2955	2017/07/18	05:35:43	45.92575	-129.97778	281.0	0.8	1527.6	Placing MPR on the basket.
2958	2017/07/18	05:36:46	45.9257	-129.97781	283.0	1.5	1527.1	Leaving AX-310 and headed to the next one at Bag City AX-104.
2959	2017/07/18	05:36:52	45.92569	-129.97781	286.4	2.6	1526.0	Moving the ship south as well.
2963	2017/07/18	05:38:05	45.92559	-129.97789	228.1	6.7	1521.9	Sheet flows and OOI cables.
2965	2017/07/18	05:38:49	45.92551	-129.97797	229.6	3.6	1524.6	Swirls in sheet flow.
2967	2017/07/18	05:39:07	45.92547	-129.97801	225.3	3.4	1524.6	Heavy sediment.
2969	2017/07/18	05:39:34	45.9254	-129.97807	225.9	3.4	1523.4	More jumbled feature like a small ridge.
2970	2017/07/18	05:40:01	45.92533	-129.97815	225.9	4.3	1522.1	Should be less than 90 minutes to the next site.
2977	2017/07/18	05:42:52	45.92488	-129.97872	224.8	5.4	1520.6	Moving fairly quickly over sheet flows.
3015	2017/07/18	06:01:32	45.92298	-129.98147	218.5	4.0	1516.2	transiting over the 2011 lava flows
3031	2017/07/18	06:08:36	45.92202	-129.98235	217.4	5.1	1518.6	Striated sheet flows with a few fish.
3034	2017/07/18	06:10:01	45.92183	-129.98255	216.5	4.8	1518.5	Jumbled flow.
3038	2017/07/18	06:11:26	45.92165	-129.98274	217.2	7.1	1516.7	Small ridge.
3041	2017/07/18	06:12:04	45.92157	-129.98282	217.1	6.2	1515.2	Going over a large collapsed area.
3049	2017/07/18	06:15:39	45.92117	-129.98327	217.8	4.7	1520.9	Sheet flows.
3052	2017/07/18	06:16:58	45.92104	-129.98344	217.4	5.0	1520.4	Ridge of jumbled lava.
3054	2017/07/18	06:17:12	45.92102	-129.98348	217.8	3.1	1520.2	Collapse pillar.
3058	2017/07/18	06:18:36	45.92088	-129.98367	223.3	4.3	1520.4	Fish.
3061	2017/07/18	06:19:58	45.92075	-129.98387	225.2	5.8	1516.8	Moved on top of a pillow flow.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-966 Datalogger Comment
3065	2017/07/18	06:21:19	45.92064	-129.98408	225.1	4.3	1517.9	Window of collapse with some pillars.
3069	2017/07/18	06:23:03	45.92049	-129.98435	223.8	5.8	1516.6	Windows through the flow.
3078	2017/07/18	06:26:55	45.92013	-129.98498	226.0	4.1	1519.6	Pillow flow with no windows of collapse.
3079	2017/07/18	06:27:03	45.92011	-129.98501	225.2	4.2	1519.7	Two rattail fish.
3082	2017/07/18	06:27:35	45.92006	-129.98510	225.2	5.4	1518.4	There is another collapse window.
3097	2017/07/18	06:34:48	45.91917	-129.98621	226.7	3.5	1522.0	Jumbled sheet flows.
3103	2017/07/18	06:37:10	45.9189	-129.98655	226.9	4.4	1522.5	More jagged flows.
3105	2017/07/18	06:37:52	45.91881	-129.98664	226.1	3.2	1523.7	Pillow flows.
3114	2017/07/18	06:41:39	45.91839	-129.98711	230.0	4.8	1522.3	Pillow flows with areas of collapse.
3160	2017/07/18	07:04:08	45.91626	-129.98934	223.3	3.1	1526.6	We are approaching station at AX-104.
3166	2017/07/18	07:06:40	45.91615	-129.98939	324.9	3.1	1526.6	We are on station at AX-104.
3168	2017/07/18	07:07:04	45.91614	-129.98939	324.6	3.1	1526.7	The MPR is out of the basket and is being placed on the benchmark.
3178	2017/07/18	07:12:01	45.91618	-129.98940	329.1	0.8	1528.7	The MPR is in in place at station AX-104. Scott noted that the base of the MPR does not appear to be flush to the benchmark.
3180	2017/07/18	07:12:21	45.91618	-129.98940	329.1	0.8	1528.7	Tilt measurements are at 4.5d approximately.
3182	2017/07/18	07:12:37	45.91618	-129.98940	329.5	0.8	1528.7	PRESSURE: Start Measurement begun AX-104 (Bag City).
3183	2017/07/18	07:12:58	45.91618	-129.98940	329.6	0.8	1528.7	Tilt measurement was basically the same as previous measurements.
3198	2017/07/18	07:19:52	45.91621	-129.98939	330.0	0.8	1528.7	Area characterized by large pillows associated with the 98' lava flows. Abundant biology and diffuse flow.
3224	2017/07/18	07:32:09	45.91613	-129.98937	330.1	0.8	1528.6	PRESSURE: End End Measurement at station AX-104.
3226	2017/07/18	07:32:42	45.91613	-129.98937	330.2	0.8	1528.6	MPR is being moved from the benchmark and placed back in the basket.
3228	2017/07/18	07:33:20	45.91612	-129.98938	330.2	0.8	1528.6	MPR is secure in the basket.
3232	2017/07/18	07:34:45	45.91609	-129.98942	284.1	3.7	1526.0	Beginning transit from station AX-104 to AX-105.
3234	2017/07/18	07:35:14	45.91607	-129.98944	212.8	4.6	1525.1	We are traversing along the bottom in hopes of finding two HOBOS that were lost in previous years due to a loss of hydraulics upon recovery.
3253	2017/07/18	07:44:05	45.91539	-129.98996	191.2	5.9	1525.8	NAV: Doppler Reset
3342	2017/07/18	08:28:32	45.90904	-129.99166	196.9	6.7	1529.1	NAV: Doppler Reset
3352	2017/07/18	08:32:35	45.90887	-129.99167	206.7	7.5	1528.2	We've exceeded the distance of the HOBO hunt and are moving higher in the water column for easier navigation.
3353	2017/07/18	08:32:48	45.90885	-129.99167	204.9	7.8	1527.9	We were unable to find either of the two missing HOBOS.
3496	2017/07/18	10:11:56	45.86769	-130.00228	216.8	45.0	1536.5	Screens went back. Hydraulics are out.
3497	2017/07/18	10:12:58	45.86409	-130.00323	192.5	51.5	1529.7	All thrusters have quit working on the vehicle.
3498	2017/07/18	10:15:06	45.85716	-130.00507	191.0	53.2	1530.2	The vehicle has begun working properly again. All thrusters and hydraulics are back.
3499	2017/07/18	13:47:42	45.86646	-130.00267	200.7	69.2	1646.0	We're about 400m NE of the South Pillow Mound site. Still transiting in the water column.
3500	2017/07/18	13:50:42	45.86605	-130.00278	200.6	71.0	1646.0	The benchmark at the South Pillow Mound is AX-105.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-966 Datalogger Comment
3502	2017/07/18	13:59:21	45.86486	-130.00305	200.6	73.3	1646.7	Starting to come down to seafloor. Altitude is 74m now.
3506	2017/07/18	14:03:27	45.86427	-130.00328	199.2	3.7	1714.7	Seafloor in sight.
3509	2017/07/18	14:04:11	45.86415	-130.00333	200.7	4.5	1715.1	Heading SW toward benchmark AX-105.
3510	2017/07/18	14:04:28	45.8641	-130.00335	200.2	4.2	1715.7	We're down on the south rift zone at 1715m.
3512	2017/07/18	14:04:45	45.86406	-130.00337	201.4	3.8	1716.4	NAV: Doppler Reset
3517	2017/07/18	14:06:54	45.86374	-130.00351	201.1	2.5	1716.1	We're moving over the 1998 lava flow. Lobate pillows dusted with sediments.
3521	2017/07/18	14:08:20	45.86354	-130.00362	201.4	2.6	1716.0	The benchmark down here is south of the 1998 lava flow - we are near the fissure where the 1998 lava erupted.
3522	2017/07/18	14:08:29	45.86352	-130.00364	200.5	2.7	1716.0	These lavas predate the 1998 flow.
3525	2017/07/18	14:09:09	45.86343	-130.00368	201.8	2.6	1715.9	Ropey lavas between the lobate flows.
3526	2017/07/18	14:09:21	45.86341	-130.00369	201.0	2.3	1716.0	See the flag in the distance.
3527	2017/07/18	14:09:32	45.86339	-130.00371	200.9	1.9	1715.9	Crinoid on ropery lava.
3530	2017/07/18	14:10:16	45.86332	-130.00375	201.4	2.6	1714.9	Sponge to right (possibly glass). 2 large crinoids.
3532	2017/07/18	14:10:52	45.86328	-130.00378	134.1	2.3	1714.6	The fissure is just east of this benchmark.
3534	2017/07/18	14:11:18	45.86325	-130.00379	86.4	2.3	1714.7	HIGHLIGHTS: HD highlights start 1998 fissure and AX-105 benchmark.
3536	2017/07/18	14:11:52	45.86323	-130.00381	82.2	2.4	1714.6	Maneuvering to approach the benchmark from the right angle.
3538	2017/07/18	14:12:28	45.86321	-130.00382	81.8	2.7	1714.3	The mini-BPR is sitting on the benchmark in an odd way.
3541	2017/07/18	14:13:04	45.8632	-130.00383	81.5	2.3	1714.7	Grabbing the mini-BPR out of the biobox and will leave it on the seafloor until our last visit here this expedition.
3542	2017/07/18	14:13:24	45.8632	-130.00383	82.1	2.4	1714.5	Grabbing mini-BPR-4 from the port biobox.
3545	2017/07/18	14:14:31	45.86322	-130.00383	357.4	2.1	1715.0	HIGHLIGHTS: HD highlights stop
3547	2017/07/18	14:14:57	45.86323	-130.00383	353.1	1.5	1715.8	A mixture of ropery and lineated sheet flows here in the area of the benchmark.
3549	2017/07/18	14:15:16	45.86323	-130.00382	355.1	1.0	1716.2	Depth here is 1717m.
3551	2017/07/18	14:15:58	45.86324	-130.00382	357.7	0.8	1716.3	The flag doesn't have much biota on it. A bit but not much.
3553	2017/07/18	14:16:13	45.86325	-130.00381	357.8	0.8	1716.3	Setting the mini-BPR (MBPR) #4 on the seafloor near the benchmark.
3556	2017/07/18	14:17:18	45.86326	-130.00380	357.7	0.8	1716.3	Grabbing the mobile pressure recorder (MPR) and setting it on the benchmark for pressure reading at AX-105.
3558	2017/07/18	14:17:52	45.86326	-130.00380	357.7	0.8	1716.3	Looks like he got it on the first try.
3559	2017/07/18	14:18:00	45.86326	-130.00380	357.7	0.8	1716.3	PRESSURE: Start AX-105 South Pillow Mound.
3561	2017/07/18	14:18:28	45.86326	-130.00379	357.7	0.8	1716.3	Recording pressure measurements at AX-105 - South pillow mound.
3570	2017/07/18	14:22:28	45.8632	-130.00380	357.6	0.8	1716.4	Looking around now during the measurement.
3573	2017/07/18	14:23:12	45.8632	-130.00380	357.5	0.8	1716.4	Hydroid on the flag. Looks like eggs beneath it.
3574	2017/07/18	14:23:30	45.86319	-130.00380	357.5	0.8	1716.4	More hydroids on the flag line.
3578	2017/07/18	14:24:57	45.86319	-130.00381	357.5	0.8	1716.4	Zooming in on the crinoid on the seafloor.
3582	2017/07/18	14:26:07	45.86319	-130.00380	357.4	0.8	1716.4	Lots of crinoids on the seafloor. Possibly limpets - maybe snails.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-966 Datalogger Comment
3584	2017/07/18	14:27:00	45.8632	-130.00380	357.4	0.8	1716.4	What's that gelatinous creature?
3587	2017/07/18	14:27:47	45.8632	-130.00379	357.4	0.8	1716.4	Some sort of pink worm?
3603	2017/07/18	14:35:10	45.86319	-130.00371	357.3	0.8	1716.4	The MBPR looks like it was rolled over. It's slightly off the base and rolled over. Crinoids wrapped around parts of it.
3608	2017/07/18	14:37:26	45.86318	-130.00371	357.3	0.8	1716.4	This will finish up 1 loop of 3 that we will complete on this pressure dive.
3611	2017/07/18	14:38:14	45.86318	-130.00371	357.3	0.8	1716.4	PRESSURE: End AX-105 pressure reading completed.
3613	2017/07/18	14:38:44	45.86318	-130.00372	357.3	0.8	1716.4	Retrieving the pressure sensor and placing it in the cradle on Jason.
3616	2017/07/18	14:39:45	45.86317	-130.00373	353.2	2.6	1714.7	Jason is leaving the seafloor.
3618	2017/07/18	14:40:13	45.86317	-130.00373	353.5	3.6	1713.6	Will be heading north now toward the Bag City benchmark.
3622	2017/07/18	14:41:53	45.86315	-130.00376	11.8	8.8	1708.2	Coming up to 300m above the seafloor. Will be traveling over 6 km to Bag City benchmark.
3625	2017/07/18	14:43:20	45.86313	-130.00377	12.0	41.9	1675.3	Waiting for the ship to change heading - then will start ascent off the seafloor(300m above it) and head north.
3626	2017/07/18	14:43:57	45.86312	-130.00378	11.4	50.0	1666.7	Correction: The transit is over 5 km.
3627	2017/07/18	14:45:02	45.86311	-130.00378	11.4	49.9	1666.9	Seafloor out of site.
3628	2017/07/18	17:52:49	45.89012	-129.99870	14.4	34.8	1587.0	h264 recordings turned off during transit due to apparent overheating.
3629	2017/07/18	18:28:06	45.89573	-129.99679	11.9	39.8	1547.0	NAV: Doppler Reset
3771	2017/07/18	20:03:23	45.91018	-129.99153	14.1	4.1	1532.5	NAV: Doppler Reset
3853	2017/07/18	20:43:51	45.91577	-129.98945	6.0	3.1	1527.2	NAV: Doppler Reset
3862	2017/07/18	20:47:23	45.9161	-129.98940	94.0	4.0	1526.7	We are approaching the station marker for AX-104 at Bag City.
3867	2017/07/18	20:49:08	45.91615	-129.98939	357.9	3.3	1526.2	The MPR is being removed from the cradle in the Jason Basket
3871	2017/07/18	20:50:56	45.91615	-129.98940	335.9	1.0	1528.5	The water near this station is murky and the benchmarks markers and surrounding rocks are covered in biology.
3879	2017/07/18	20:54:06	45.91614	-129.98940	335.8	0.9	1528.5	We are having trouble getting the MPR to sit flush against the benchmark due to the presence of abundant biology.
3882	2017/07/18	20:55:18	45.91614	-129.98940	335.4	0.9	1528.5	We are attempting to scrape biology off of the benchmark using the base of the MPR.
3887	2017/07/18	20:57:31	45.91615	-129.98939	334.8	0.9	1528.5	The MPR is in place on the benchmark at station AX-104 (Bag City).
3892	2017/07/18	20:59:12	45.91615	-129.98938	334.0	0.9	1528.5	PRESSURE: Start Begin Measurement AX-104.
3893	2017/07/18	20:59:23	45.91615	-129.98938	334.5	0.9	1528.5	Frame_Grab:
3896	2017/07/18	21:00:31	45.91615	-129.98938	334.0	0.9	1528.5	Location is 45d54.96940 129d59.36138. depth=1526.5 m. Altitude=1.34 m.
3899	2017/07/18	21:01:25	45.91616	-129.98939	333.6	0.9	1528.5	Frame_Grab:
3903	2017/07/18	21:02:44	45.91617	-129.98939	333.3	0.9	1528.5	Frame_Grab:
3907	2017/07/18	21:04:29	45.91619	-129.98939	333.0	0.9	1528.5	We are seeing diffuse flow tube worms limpets and a sculpin.
3938	2017/07/18	21:19:27	45.91611	-129.98949	331.9	0.9	1528.5	PRESSURE: End End Measurement AX-104.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-966 Datalogger Comment
3940	2017/07/18	21:19:50	45.9161	-129.98949	331.9	0.9	1528.5	Jason is being removed from the benchmark at station AX-104 and placed back into the basket.
3943	2017/07/18	21:20:36	45.91606	-129.98945	331.8	0.8	1528.5	The MPR is secured in the basket.
3947	2017/07/18	21:22:17	45.91596	-129.98924	145.1	6.8	1523.0	We are beginning the transit from station AX-104 to AX-310.
4092	2017/07/18	22:34:16	45.91827	-129.98626	31.7	7.5	1522.1	CORRECTION. We waited for ~30 minutes to deploy Sentry. We are now on our way to AX310.
4125	2017/07/18	22:50:12	45.92012	-129.98467	31.0	2.6	1521.0	Heading toward AX-310 at the International District.
4137	2017/07/18	22:55:54	45.92079	-129.98409	31.2	3.0	1519.0	HIGHLIGHTS: HD highlights start Approach to International District benchmark.
4145	2017/07/18	22:59:27	45.92122	-129.98370	31.1	6.4	1519.0	Moving over area of pillars and collapse with jumbled ropey flow in the bottom.
4146	2017/07/18	22:59:32	45.92123	-129.98369	31.3	6.5	1519.0	HIGHLIGHTS: HD highlights stop
4149	2017/07/18	23:00:25	45.92135	-129.98359	31.2	6.1	1519.0	HIGHLIGHTS: HD highlights start Pillars.
4155	2017/07/18	23:03:02	45.92165	-129.98334	31.2	3.6	1519.0	Giant rattail.
4158	2017/07/18	23:03:38	45.92171	-129.98329	31.0	3.2	1519.0	HIGHLIGHTS: HD highlights stop
4161	2017/07/18	23:05:02	45.92187	-129.98315	30.8	2.4	1518.0	Still moving northeast toward the benchmark at the International District.
4168	2017/07/18	23:07:39	45.92218	-129.98289	31.3	2.6	1518.1	Moving over areas of inflated lavas and collapse.
4170	2017/07/18	23:08:08	45.92224	-129.98284	31.2	4.6	1518.0	The USBL nav is almost perfectly matching the shifted AUV underlay here near the International District.
4174	2017/07/18	23:09:58	45.92244	-129.98265	30.9	3.0	1516.7	Moving over inflated flow with skylights.
4185	2017/07/18	23:14:52	45.92296	-129.98204	42.1	4.6	1517.0	We are ~470 meters away on a course of 45 degrees.
4197	2017/07/18	23:20:06	45.92347	-129.98135	41.7	3.2	1517.0	I just saw a SEA PICKLE (PYROSOME). At 1570 meters. We're near the International District. This is scary and not good.
4204	2017/07/18	23:23:29	45.9238	-129.98091	42.0	4.2	1516.0	The pyrosome was east of the Skadi vents: 45d 55.5738 -129d 58.7092 Z=1570m.
4207	2017/07/18	23:24:10	45.92388	-129.98081	41.9	5.4	1516.0	Jumbled mound of lava with a crab on top.
4209	2017/07/18	23:24:59	45.92396	-129.98071	41.9	4.0	1516.0	Something to the right. May be a pyrosome again. And it's big!!!
4211	2017/07/18	23:25:30	45.92402	-129.98064	41.9	5.0	1516.0	Rattail straight ahead.
4228	2017/07/18	23:33:09	45.9248	-129.97965	41.8	3.9	1516.0	Getting closer to the benchmark..... Less than 200m to benchmark.
4238	2017/07/18	23:37:55	45.9253	-129.97894	41.9	5.9	1516.0	We're moving over ropey/lineated flow.
4242	2017/07/18	23:39:32	45.92543	-129.97869	42.0	5.4	1516.0	Lineated/jumbled flow here.
4251	2017/07/18	23:43:24	45.92568	-129.97813	32.2	8.0	1518.7	Something odd-looking ahead.
4253	2017/07/18	23:43:46	45.92569	-129.97809	31.1	7.7	1518.8	That's part of the OOI cable instruments.
4254	2017/07/18	23:43:52	45.9257	-129.97808	32.7	7.9	1518.9	NAV: Doppler Reset
4257	2017/07/18	23:44:42	45.92573	-129.97799	22.6	6.6	1521.2	The benchmark is right below us.
4259	2017/07/18	23:45:07	45.92574	-129.97796	20.3	6.5	1521.3	Going down to the seafloor for the pressure reading with the MPR.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-966 Datalogger Comment
4262	2017/07/18	23:46:19	45.92577	-129.97787	289.6	1.4	1526.8	Ropey/lineated sheet flow. Quite a lot of sediment. We're east of the 2011 lava flow.
4266	2017/07/18	23:47:46	45.9258	-129.97779	286.0	1.2	1526.9	Jason is removing the MPR from the cradle and placing it on benchmark AX-310.
4268	2017/07/18	23:48:26	45.92581	-129.97777	285.6	1.2	1526.9	PRESSURE: Start AX-310 in the spot at International District.
4284	2017/07/18	23:56:00	45.92584	-129.97777	285.4	1.2	1526.9	This benchmark doesn't have a lot of life. No hydroids on the flag and no brittle stars on the seafloor (as far as I can see anyway)...
4287	2017/07/18	23:56:34	45.92584	-129.97777	285.5	1.2	1526.9	Make a liar out of me - there's a brittle star on the benchmark.
4289	2017/07/18	23:57:34	45.92583	-129.97778	285.2	1.2	1526.9	Look - there's a hydroid on the marker line.
4293	2017/07/18	23:58:55	45.92582	-129.97778	285.3	1.2	1526.9	Freaky thing in the science cam - it's a holothurian.
4312	2017/07/19	00:07:59	45.92575	-129.97773	285.1	1.2	1527.0	PRESSURE: End AX-310 MPR reading completed here near the International District.
4315	2017/07/19	00:08:42	45.92577	-129.97773	285.3	1.1	1527.0	Grabbing the MPR and placing it in the cradle on Jason.
4316	2017/07/19	00:08:58	45.92578	-129.97773	285.5	1.1	1527.0	Next will head to the benchmark near Mkr-33 vent.
4318	2017/07/19	00:09:28	45.9258	-129.97774	288.7	2.4	1526.1	Jason is off the seafloor.
4325	2017/07/19	00:12:08	45.92598	-129.97780	343.2	6.1	1521.1	Skate straight ahead. Spots on it's back.
4446	2017/07/19	01:12:14	45.93303	-129.98184	330.5	9.6	1506.5	Beautiful Jelly in science cam
4448	2017/07/19	01:12:53	45.93311	-129.98191	330.3	8.5	1507.5	Er
4450	2017/07/19	01:13:15	45.93314	-129.98194	331.5	8.7	1507.2	We're passing over tubeworms
4452	2017/07/19	01:14:03	45.93322	-129.98200	329.7	8.2	1507.0	The benchmark is straight ahead.
4455	2017/07/19	01:14:38	45.93327	-129.98204	331.7	6.9	1508.4	The navigation is darn-near perfect.
4459	2017/07/19	01:16:08	45.93336	-129.98213	182.2	1.4	1514.0	Just above the bottom.
4462	2017/07/19	01:17:06	45.9334	-129.98216	186.8	0.8	1514.6	Measurement first and then mini-BPR swap.
4464	2017/07/19	01:17:57	45.93343	-129.98218	186.6	0.8	1514.6	Jason is picking up the MPR and setting it on benchmark AX-303 north of Mrk-33 Vent.
4467	2017/07/19	01:18:36	45.93345	-129.98220	185.9	0.8	1514.6	Close - but no cigar. Jimmy's nudging the sensor into place.
4469	2017/07/19	01:19:14	45.93345	-129.98220	184.4	0.8	1514.6	PRESSURE: Start AX-303 just north of Mkr-33 Vent pressure sensor reading.
4472	2017/07/19	01:20:26	45.93346	-129.98221	184.4	0.8	1514.6	Limpets? Snails? in Super Scorpio.
4475	2017/07/19	01:21:24	45.93347	-129.98220	184.2	0.8	1514.6	We're sitting in the 2011 lava flow.
4478	2017/07/19	01:22:25	45.93347	-129.98220	184.2	0.8	1514.6	Rock covered with limpets and maybe a few small tubeworms.
4480	2017/07/19	01:23:04	45.93347	-129.98220	184.2	0.8	1514.6	Trash (tape?) under the benchmark.
4488	2017/07/19	01:26:16	45.93347	-129.98218	183.8	0.8	1514.7	Smaller rattail checking out the MBPR on the seafloor.
4490	2017/07/19	01:26:47	45.93347	-129.98218	183.8	0.8	1514.7	Zoomed in on the flag rope. Some bacterial mat on it.
4494	2017/07/19	01:28:10	45.93347	-129.98217	183.8	0.8	1514.7	Holothurian on the 2011 lava.
4517	2017/07/19	01:39:12	45.9334	-129.98223	183.6	0.8	1514.7	PRESSURE: End AX-303 pressure measurement at AX-303 north of Mrk-33 stopped.
4523	2017/07/19	01:41:26	45.93339	-129.98223	183.6	0.8	1514.7	MPR placed in basket.
4525	2017/07/19	01:41:55	45.93339	-129.98223	183.6	0.8	1514.7	Swapping out MBPRs next.

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4528	2017/07/19	01:43:02	45.93338	-129.98224	183.7	0.8	1514.7	Pulling around the port biobox and unlatching the bungee.
4531	2017/07/19	01:43:56	45.93337	-129.98224	184.0	0.8	1514.8	RECOVER: Grabbing MBPR #12 and placing it in the port biobox. It's been deployed for 2 year.
4538	2017/07/19	01:46:57	45.93336	-129.98223	184.9	0.8	1514.8	DEPLOY: Placing the mini Bottom Pressure Recorder (MBPR) #2 on AX-303 benchmark.
4540	2017/07/19	01:47:06	45.93337	-129.98223	185.7	0.8	1514.8	That's it for here.
4543	2017/07/19	01:48:14	45.93338	-129.98221	184.9	1.9	1513.6	Jason lifting off the bottom. Heading 56 degrees 950 meters.
4548	2017/07/19	01:50:29	45.93345	-129.98210	223.9	3.9	1511.4	Nice overview shot with the Super Scorpio.
4553	2017/07/19	01:52:15	45.93355	-129.98194	57.2	3.0	1512.7	Lifting off and heading to AX-309 east of the International District.
4558	2017/07/19	01:54:17	45.93374	-129.98165	59.1	4.2	1512.4	We're on our way with the bottom in sight. Passing over a collapse.
4559	2017/07/19	01:54:28	45.93375	-129.98163	54.3	3.7	1512.3	Moving among pillars and collapse features.
4562	2017/07/19	01:55:06	45.93382	-129.98152	60.0	4.9	1512.6	We should be coming upon the contact now.
4567	2017/07/19	01:57:11	45.93406	-129.98115	58.0	2.4	1513.5	We might not even recognize the contact here.
4569	2017/07/19	01:57:58	45.93415	-129.98100	56.6	3.4	1513.2	In a lot of places here it's 2011 lava on top of 1998 lava so they are not that different looking - anymore.
4607	2017/07/19	02:16:06	45.93559	-129.97818	55.5	5.9	1512.8	We just lost the thruster.
4608	2017/07/19	02:16:26	45.93562	-129.97812	55.7	7.2	1512.8	It's back?? Ground fault??
4612	2017/07/19	02:17:38	45.9357	-129.97794	55.7	7.0	1512.8	Might have been a rattail. Jimmy says that's what happens. We hope that's what happened.
4640	2017/07/19	02:31:14	45.93665	-129.97586	55.8	5.5	1512.8	Moving toward AX-309. 5m off the bottom. Can barely see the seafloor.
4680	2017/07/19	02:50:48	45.93797	-129.97303	56.6	26.7	1496.8	Too far above bottom to see.
4681	2017/07/19	02:56:31	45.93838	-129.97240	56.4	125.2	1398.7	Within 30m of benchmark but over 100m above bottom.
4682	2017/07/19	02:59:01	45.93852	-129.97237	57.0	147.7	1379.2	Waiting for Sentry to pass by before going to the benchmark.
4683	2017/07/19	03:00:20	45.93853	-129.97245	355.7	145.9	1378.0	Hanging out above the benchmark at 145m above bottom.
4684	2017/07/19	03:03:56	45.93835	-129.97275	1.6	145.6	1378.1	Cool jelly.
4685	2017/07/19	03:10:47	45.93793	-129.97275	2.3	146.0	1378.2	Sentry has just made its turn to the east to go over AX-309. Jason is safely south and above its path.
4686	2017/07/19	03:12:57	45.93794	-129.97261	1.9	145.2	1378.1	Sentry will pass 60m to the north of the benchmark.
4687	2017/07/19	03:14:48	45.93802	-129.97248	2.0	145.8	1378.1	Sentry is out of the work area.
4688	2017/07/19	03:16:19	45.9381	-129.97239	2.0	141.0	1382.8	Heading to the bottom and AX-309.
4689	2017/07/19	03:20:48	45.93828	-129.97221	2.5	26.8	1496.2	Hose clamps just floated by.
4691	2017/07/19	03:21:23	45.93829	-129.97220	2.6	8.4	1514.5	There is the bottom.
4693	2017/07/19	03:21:59	45.9383	-129.97219	2.1	6.8	1516.5	Benchmark should be 20m to the NE.
4695	2017/07/19	03:22:29	45.93831	-129.97218	32.5	7.0	1516.6	Driving ahead to the site.
4697	2017/07/19	03:22:42	45.93831	-129.97217	33.4	9.4	1516.6	NAV: Doppler Reset
4698	2017/07/19	03:22:54	45.93831	-129.97217	33.5	6.0	1517.3	There is the benchmark dead ahead.
4701	2017/07/19	03:23:49	45.93833	-129.97216	90.3	5.6	1520.1	Great overviews of the site.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-966 Datalogger Comment
4703	2017/07/19	03:24:21	45.93833	-129.97215	166.3	4.3	1522.3	Spinning around to line up for MPR deployment.
4706	2017/07/19	03:25:06	45.93834	-129.97214	245.9	2.5	1524.3	Markers always seem to be oriented backwards.
4707	2017/07/19	03:25:16	45.93834	-129.97213	244.9	2.1	1524.8	This is Mkr-130.
4710	2017/07/19	03:26:10	45.93835	-129.97212	242.5	0.8	1526.6	On the bottom with AX-309 in front of the basket.
4713	2017/07/19	03:27:15	45.93836	-129.97211	241.5	0.8	1526.6	Retrieving the MPR from the basket.
4714	2017/07/19	03:27:26	45.93836	-129.97210	241.5	0.8	1526.6	Frame_Grab:
4718	2017/07/19	03:28:48	45.93837	-129.97208	241.5	0.8	1526.6	Placing the MPR on the benchmark.
4719	2017/07/19	03:28:55	45.93837	-129.97208	241.5	0.8	1526.6	MPR is in place.
4721	2017/07/19	03:29:22	45.93837	-129.97207	241.0	0.8	1526.5	PRESSURE: Start Begin AX-309 pressure measurement #2.
4725	2017/07/19	03:31:02	45.93839	-129.97204	240.9	0.8	1526.5	Heading at this benchmark is 241.
4764	2017/07/19	03:49:51	45.93841	-129.97198	239.7	0.8	1526.5	PRESSURE: End Done with AX-309 measurement.
4768	2017/07/19	03:51:19	45.9384	-129.97204	239.7	0.8	1526.6	Picking MPR off the benchmark.
4770	2017/07/19	03:51:37	45.9384	-129.97206	239.7	0.8	1526.6	Placing MPR in the basket.
4773	2017/07/19	03:52:52	45.93839	-129.97212	239.7	0.8	1526.5	Moving to the next site at AX-302 (Trevi).
4777	2017/07/19	03:54:09	45.9384	-129.97224	243.3	1.9	1525.2	1280m at 315 to Trevi.
4779	2017/07/19	03:54:57	45.93841	-129.97233	280.9	4.1	1519.3	Collapsed area with remnant pillow flows.
4781	2017/07/19	03:55:34	45.93843	-129.97240	283.6	6.3	1519.9	Switching over to USBL.
4786	2017/07/19	03:57:17	45.9385	-129.97263	314.5	13.5	1512.2	Flying high with no visibility.
4795	2017/07/19	04:01:09	45.9388	-129.97321	315.8	13.3	1512.4	Jason is testing the Reson mapper and just powering it up.
4809	2017/07/19	04:07:37	45.93945	-129.97411	316.2	13.0	1506.4	Jelly.
4856	2017/07/19	05:16:43	45.94604	-129.98342	315.9	33.9	1486.2	Jelly.
4857	2017/07/19	05:17:54	45.94613	-129.98357	318.0	33.7	1485.4	Almost at AX-302 (Trevi) with about 50m to go.
4858	2017/07/19	05:18:29	45.94617	-129.98363	317.0	17.3	1500.7	Coming down closer to the bottom.
4860	2017/07/19	05:18:40	45.94618	-129.98365	318.4	12.9	1505.1	There is the bottom.
4862	2017/07/19	05:19:18	45.94622	-129.98371	317.3	9.3	1512.2	There was the marker for Trevi (Mkr-156).
4863	2017/07/19	05:19:25	45.94623	-129.98372	334.2	9.4	1512.5	NAV: Doppler Reset
4865	2017/07/19	05:19:40	45.94624	-129.98375	13.6	8.8	1513.0	See some white staining on the bottom.
4870	2017/07/19	05:21:43	45.94633	-129.98389	313.3	5.2	1514.3	Benchmark and marker and Tephra D sampler.
4873	2017/07/19	05:22:26	45.94635	-129.98393	228.9	5.7	1514.3	Great overview of the instruments on top of the flow with a big collapse area below.
4875	2017/07/19	05:22:42	45.94636	-129.98394	221.0	3.9	1516.1	The white staining is in the collapse.
4877	2017/07/19	05:23:14	45.94637	-129.98396	257.7	6.7	1515.2	Making a second approach but flew over the white staining.
4878	2017/07/19	05:23:31	45.94638	-129.98397	253.2	4.3	1517.0	That area was directly west of the benchmark.
4880	2017/07/19	05:23:52	45.94639	-129.98398	249.3	3.9	1517.5	Now flying over pillow flow and sediment.
4883	2017/07/19	05:24:37	45.9464	-129.98399	255.2	4.1	1517.6	Waiting for the ship to get the site out of the danger donut.
4885	2017/07/19	05:25:23	45.94641	-129.98399	257.3	4.3	1517.3	Moving back to the benchmark.
4887	2017/07/19	05:26:02	45.94642	-129.98399	255.3	4.2	1517.5	Tubeworms in the diffuse flow. Yellow staining and/or sediment between some pillows.
4890	2017/07/19	05:26:35	45.94642	-129.98398	244.5	4.8	1517.4	Great close-ups of the flow.
4892	2017/07/19	05:27:10	45.94643	-129.98396	252.5	5.3	1515.1	Slowly moving back to the site.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-966 Datalogger Comment
4893	2017/07/19	05:27:20	45.94643	-129.98395	253.8	5.9	1514.4	Seem to be driving in reverse.
4896	2017/07/19	05:28:11	45.94643	-129.98392	233.0	4.8	1514.9	Back at the benchmark at AX-302.
4899	2017/07/19	05:29:27	45.94643	-129.98387	229.9	1.8	1518.1	Two markers at this site (Mkr-136 and Mkr-63 which is on the old benchmark).
4901	2017/07/19	05:30:00	45.94643	-129.98385	230.6	1.4	1518.4	The new mini-BPR was already deployed at this site (#5) and the old one (#6) picked up.
4903	2017/07/19	05:30:19	45.94643	-129.98384	231.1	1.0	1518.8	Jason landing in position to take the measurement.
4905	2017/07/19	05:30:51	45.94643	-129.98382	231.3	1.3	1519.2	Heading at this benchmark is 231.
4908	2017/07/19	05:32:00	45.94642	-129.98378	230.6	1.3	1519.3	Retrieving the MPR from the basket.
4910	2017/07/19	05:32:10	45.94642	-129.98378	230.6	1.3	1519.3	Here comes a fish.
4912	2017/07/19	05:32:54	45.94642	-129.98376	230.6	0.8	1519.2	Placing MPR on benchmark AX-302.
4917	2017/07/19	05:35:04	45.94641	-129.98374	230.6	0.8	1519.2	MPR is in place.
4920	2017/07/19	05:35:42	45.94641	-129.98374	230.5	0.8	1519.2	PRESSURE: Start Begin AX-302 measurement with MPR for second time on this dive at Trevi.
4927	2017/07/19	05:38:19	45.9464	-129.98375	230.2	0.8	1519.2	Great photos of biology on the flag tether.
4929	2017/07/19	05:38:41	45.9464	-129.98376	230.2	0.8	1519.2	Frame_Grab:
4931	2017/07/19	05:39:22	45.9464	-129.98376	230.2	0.8	1519.2	Frame_Grab:
4935	2017/07/19	05:41:03	45.94639	-129.98378	230.0	0.8	1519.2	Frame_Grab:
4939	2017/07/19	05:42:29	45.94639	-129.98378	229.9	2.1	1519.2	Frame_Grab:
4967	2017/07/19	05:55:56	45.94645	-129.98380	229.8	1.8	1519.1	PRESSURE: End Done at AX-302 for its second measurement.
4969	2017/07/19	05:56:32	45.94646	-129.98383	229.9	0.8	1519.1	Retrieving the MPR from the benchmark.
4972	2017/07/19	05:57:22	45.94648	-129.98388	229.9	1.4	1519.1	Placing the MPR in the basket.
4974	2017/07/19	05:57:45	45.94649	-129.98390	229.8	2.2	1519.1	Next is the transit to AX-101 at Caldera Center.
4976	2017/07/19	05:58:23	45.94652	-129.98395	234.9	3.6	1516.3	Bearing 296 at 2000+ meters to AX-101.
4977	2017/07/19	05:58:30	45.94652	-129.98396	263.9	5.1	1514.7	Off the bottom and here we go!
4987	2017/07/19	06:02:43	45.94671	-129.98444	297.2	7.5	1513.9	Seafloor barely visible at this altitude as transit toward AX-101.
4993	2017/07/19	06:05:18	45.94683	-129.98482	297.2	9.3	1512.5	Windows of collapse in the flow.
5056	2017/07/19	06:35:47	45.94841	-129.98937	296.8	12.4	1512.1	Checking lights on the ROV.
5059	2017/07/19	06:37:01	45.94848	-129.98957	296.8	12.6	1512.1	Hose clamp came off the sonar.
5061	2017/07/19	06:37:08	45.94849	-129.98960	296.3	12.6	1512.1	Lights back on.
5276	2017/07/19	08:24:12	45.95492	-130.00798	294.4	3.9	1525.5	We are on the bottom approaching station AX-101.
5293	2017/07/19	08:32:31	45.95522	-130.00970	240.3	2.6	1527.5	We have arrived on station at AX-101.
5296	2017/07/19	08:33:20	45.95522	-130.00980	239.9	2.9	1527.4	The MPR is being removed from the basket and placed on the benchmark at station AX-101.
5303	2017/07/19	08:36:08	45.95522	-130.00999	238.6	0.8	1529.4	The MPR is in position and is flush to the benchmark at station AX-101.
5304	2017/07/19	08:36:12	45.95522	-130.00999	238.6	0.8	1529.4	PRESSURE: Start AX-101 at Caldera Cetner.
5305	2017/07/19	08:36:22	45.95522	-130.00999	238.5	0.8	1529.4	Frame_Grab:
5328	2017/07/19	08:47:18	45.95523	-130.00983	237.6	0.8	1529.4	Frame_Grab:
5348	2017/07/19	08:56:50	45.95527	-130.00986	237.5	0.8	1529.3	PRESSURE: End End Measurement.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-966 Datalogger Comment
5350	2017/07/19	08:57:13	45.95526	-130.00986	238.3	0.8	1529.3	The MPR is being removed from the benchmark at station AX-101 and placed back into the basket.
5352	2017/07/19	08:57:56	45.95524	-130.00985	237.8	0.8	1529.3	The MPR is secured in the basket.
5354	2017/07/19	08:58:21	45.95523	-130.00985	235.5	2.2	1528.2	We are beginning our transit from station AX-101 to station AX-307.
5517	2017/07/19	10:19:24	45.94569	-130.00903	199.6	1.7	1538.3	Frame_Grab:
5518	2017/07/19	10:19:26	45.94568	-130.00903	200.0	1.6	1538.3	Frame_Grab:
5522	2017/07/19	10:20:39	45.94557	-130.00906	226.0	2.2	1537.8	We are on the bottom approaching station AX-307.
5527	2017/07/19	10:22:43	45.94546	-130.00910	73.0	5.5	1536.1	We just lost the forward lateral thruster.
5530	2017/07/19	10:23:49	45.94542	-130.00911	165.9	2.4	1539.4	We have arrived on station at AX-307.
5531	2017/07/19	10:23:57	45.94542	-130.00911	166.5	2.5	1539.2	The thruster appears to be working again.
5533	2017/07/19	10:24:10	45.94541	-130.00911	166.1	2.4	1539.4	The MPR is being removed from the basket and placed on the benchmark at AX-307.
5539	2017/07/19	10:26:35	45.94538	-130.00912	167.9	0.8	1541.2	The MPR is in position and flush to the benchmark at Station AX-307.
5541	2017/07/19	10:27:10	45.94537	-130.00912	168.0	0.8	1541.2	PRESSURE: Start AX-307 Magnesia West.
5546	2017/07/19	10:29:15	45.94537	-130.00912	168.1	0.8	1541.2	The location is 45d56.7234 N. 130d0.54404 W. Depth is 1539.1 m. Altitude is 1.13 m.
5564	2017/07/19	10:37:55	45.94536	-130.00909	170.9	0.8	1541.3	The vehicle started moving away uncontrollably from the benchmark.
5566	2017/07/19	10:38:18	45.94536	-130.00909	170.7	0.8	1541.3	The MPR was moved in an attempt to keep it from dragging.
5568	2017/07/19	10:38:58	45.94536	-130.00910	170.7	0.8	1541.3	PRESSURE: End AX-307.
5569	2017/07/19	10:39:00	45.94536	-130.00910	170.7	0.8	1541.3	PRESSURE: Start AX-307 again.
5598	2017/07/19	10:52:51	45.94536	-130.00907	170.6	0.8	1541.3	AX-307 benchmark is called "Magnesia West".
5602	2017/07/19	10:54:31	45.94535	-130.00906	170.6	0.8	1541.3	This is an area of lineated sheet flows - older than the 2011 flow.
5605	2017/07/19	10:55:05	45.94535	-130.00905	170.6	0.8	1541.3	Brittle stars on the benchmark and a small white sea star on the seafloor.
5608	2017/07/19	10:56:11	45.94535	-130.00904	230.3	3.4	1538.6	Lost thrusters and are floating off and up in the water column.
5609	2017/07/19	10:56:24	45.94534	-130.00904	249.7	5.9	1536.1	Enabled the thrusters.
5611	2017/07/19	10:56:46	45.94534	-130.00904	252.2	7.8	1534.1	Lost the thrusters again.
5612	2017/07/19	10:56:50	45.94534	-130.00904	252.3	8.2	1533.8	Enabled again.
5615	2017/07/19	10:57:52	45.94534	-130.00903	252.6	10.5	1531.4	We were 17 minutes into the 20 minute pressure measurement so that is probably enough Bill says.
5618	2017/07/19	10:58:58	45.94534	-130.00902	252.7	10.7	1531.1	PRESSURE: End AX-307. When we lost thrusters at 10:56:45 (or so). Only a 17 minute reading due to thruster loss.
5620	2017/07/19	10:59:14	45.94534	-130.00901	252.2	10.8	1531.2	We're now 10 m off the bottom.
5622	2017/07/19	10:59:41	45.94534	-130.00901	252.3	10.8	1531.2	We still have to swap the MBPR at AX-307.
5625	2017/07/19	11:00:48	45.94534	-130.00899	251.8	5.0	1536.7	Jimmy is grabbing the MPR by the rope. Luckily the rope is shorter than the cable so it is probably OK.
5626	2017/07/19	11:00:57	45.94534	-130.00899	253.4	4.4	1537.7	Back on the bottom.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-966 Datalogger Comment
5630	2017/07/19	11:02:15	45.94535	-130.00898	248.9	4.5	1537.4	The benchmark is right in front of us.
5634	2017/07/19	11:03:40	45.94536	-130.00897	232.3	0.8	1541.4	Anemone and holothurian.
5636	2017/07/19	11:04:28	45.94537	-130.00897	232.3	0.8	1541.3	Have to get out the second arm to assist with stowing the MPR on Jason.
5641	2017/07/19	11:06:32	45.94538	-130.00901	229.7	1.3	1541.3	Stowing the MPR in the cradle on Jason - using the port arm.
5646	2017/07/19	11:08:27	45.94538	-130.00908	178.9	0.8	1541.3	Heading over to the benchmark to swap out the mini BPRs.
5654	2017/07/19	11:11:59	45.94536	-130.00920	179.5	0.8	1541.3	RECOVER: Placing MBPR #7 in the stbd biobox.
5659	2017/07/19	11:13:59	45.94534	-130.00922	180.5	0.8	1541.3	DEPLOY: Placing MBPR #10 on AX-307. That completes the MBPR swap here.
5665	2017/07/19	11:16:16	45.94533	-130.00921	179.5	0.8	1541.3	PRESSURE: Start Going to put the MBPR on the benchmark and do the measurement again (for a 3rd time).
5666	2017/07/19	11:16:34	45.94533	-130.00921	179.5	0.8	1541.3	We're still at AX-307.....
5670	2017/07/19	11:17:45	45.94533	-130.00918	179.5	0.8	1541.3	There is a randomness about the thruster failures that make it hard to decipher.
5674	2017/07/19	11:19:10	45.94533	-130.00915	179.9	0.8	1541.3	Temporary power loss on the thrusters around 11:18:25
5676	2017/07/19	11:19:58	45.94534	-130.00913	180.0	0.8	1541.3	Thruster function quickly recovered; JASON team trying to troubleshoot the problem as we continue measurement
5678	2017/07/19	11:20:21	45.94534	-130.00912	180.0	1.0	1541.3	Measurement shouldn't be compromised
5694	2017/07/19	11:27:58	45.94535	-130.00910	179.5	0.8	1541.3	Big red shrimp near the port arm.
5711	2017/07/19	11:36:03	45.94544	-130.00914	179.4	0.8	1541.3	PRESSURE: End Finally - finished up the pressure reading here at AX-307 after 3 attempts due to thruster problems.
5713	2017/07/19	11:36:30	45.94544	-130.00914	179.4	0.8	1541.3	Grabbing the MPR and stowing it in the cradle on Jason.
5716	2017/07/19	11:37:17	45.94543	-130.00913	179.8	0.8	1541.4	That's it for this place this time around.
5718	2017/07/19	11:37:47	45.94543	-130.00913	178.1	2.8	1538.9	Lifting off.
5720	2017/07/19	11:38:21	45.94542	-130.00913	177.9	2.3	1539.5	Next benchmark is AX-106 NE of Ashes.
5727	2017/07/19	11:41:15	45.94537	-130.00913	188.7	2.8	1539.1	The ship is changing its heading. Will head on to the next benchmark soon.
5731	2017/07/19	11:42:40	45.94531	-130.00914	189.2	2.5	1539.4	We're heading out now. The next benchmark is 1230 m at a bearing of 190 degrees.
5736	2017/07/19	11:45:02	45.94519	-130.00917	189.5	3.0	1539.1	We will be skirting along the west edge of the 2011 flow - but traveling over older flow.
5739	2017/07/19	11:45:41	45.94514	-130.00918	189.9	2.6	1539.4	Beautiful lava flow high spot here.
5744	2017/07/19	11:48:04	45.94496	-130.00922	189.9	2.9	1539.2	Ropey sheet flow with elevated areas is unusual looking.
5750	2017/07/19	11:50:20	45.94475	-130.00927	190.0	3.8	1537.0	Big mound of ropery jumbled lava.
5753	2017/07/19	11:51:07	45.94468	-130.00928	190.1	5.4	1536.3	RSN bunch of cable on the seafloor. RSN junk....
5759	2017/07/19	11:53:47	45.94443	-130.00934	189.6	4.0	1536.3	Lot's of fish on this transect.
5770	2017/07/19	11:58:39	45.94397	-130.00944	189.6	3.2	1536.3	Another JASON engineer is here to discuss thruster drop out.
5783	2017/07/19	12:03:53	45.94346	-130.00953	189.1	4.3	1536.3	Maybe the new GUI is the problem? They are saying that the motors are being turned off as if commanded from on deck.
5786	2017/07/19	12:04:48	45.94336	-130.00955	189.4	4.0	1536.2	They are checking a command log now to see if that theory is

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-966 Datalogger Comment
								right.
5791	2017/07/19	12:06:54	45.94312	-130.00959	189.2	4.2	1536.2	Doesn't seem to be a command problem like they were discussing. Rethinking now.
5814	2017/07/19	12:17:52	45.94182	-130.01012	188.8	3.7	1536.3	Found a record in the system of errors; trying to cross reference errors with downed motors.
5825	2017/07/19	12:22:42	45.94129	-130.01027	190.7	6.1	1534.6	They think they are onto something; have isolated some of the errors.
5829	2017/07/19	12:24:07	45.94113	-130.01024	194.0	7.7	1534.7	Bearing adjusted; now 767 meters out at a bearing of 186 degrees.
5845	2017/07/19	12:31:37	45.94018	-130.00980	194.5	5.8	1528.8	They think it might be a communication error with the received data.
5902	2017/07/19	12:59:57	45.93642	-130.01098	194.4	11.7	1528.8	200m to AX-106.
5925	2017/07/19	13:11:03	45.93494	-130.01147	195.9	8.8	1531.6	30 m from the benchmark east of Ashes.
5927	2017/07/19	13:11:18	45.93491	-130.01148	195.2	6.8	1533.7	Coming down.
5928	2017/07/19	13:11:24	45.9349	-130.01148	195.8	5.3	1535.1	Seafloor in sight.
5931	2017/07/19	13:12:07	45.93481	-130.01151	194.6	6.9	1533.9	The flag is straight ahead. Great navigation.
5933	2017/07/19	13:12:36	45.93475	-130.01152	157.5	4.7	1536.3	AX-106 benchmark east of Ashes right ahead.
5939	2017/07/19	13:15:25	45.93455	-130.01158	73.4	0.8	1539.7	We're going to take the miniBPR and put it in the biobox. We won't have a mini-BPR here until next cruise will put a BPR tilt meter here.
5941	2017/07/19	13:15:41	45.93453	-130.01158	73.5	0.8	1539.7	Crinoid on the miniBPR
5945	2017/07/19	13:17:08	45.93445	-130.01160	72.7	0.8	1539.8	RECOVER: MBPR #9 at AX-106 and placed in port biobox. Crinoid attached.
5947	2017/07/19	13:17:59	45.93442	-130.01160	72.6	0.8	1539.8	Closing the mangled crinoid (and MBPR in the port biobox.
5950	2017/07/19	13:18:41	45.93441	-130.01160	73.6	0.8	1539.8	Stowing the biobox.
5952	2017/07/19	13:19:08	45.9344	-130.01160	72.9	0.8	1539.8	Grabbing the MPR and placing it on AX-106 benchmark.
5955	2017/07/19	13:20:07	45.93439	-130.01160	71.9	0.8	1539.8	Beautiful. In place.
5959	2017/07/19	13:22:02	45.9344	-130.01159	72.4	0.8	1539.8	PRESSURE: Start AX-106 pressure reading starts now.
5961	2017/07/19	13:22:18	45.9344	-130.01158	72.5	0.8	1539.8	Actually began that reading at 1320.
5964	2017/07/19	13:23:30	45.93441	-130.01158	72.4	0.8	1539.8	Sitting on a lob ate flow.
5968	2017/07/19	13:24:58	45.93442	-130.01157	72.4	0.8	1539.9	Going to re-position the MPR.
5970	2017/07/19	13:25:07	45.93442	-130.01157	72.4	0.8	1539.9	We will re-start the reading.
5972	2017/07/19	13:25:48	45.93443	-130.01156	72.4	0.8	1539.9	PRESSURE: Start Re-started the reading at 1324 (at AX-106).
5974	2017/07/19	13:26:22	45.93443	-130.01156	72.4	0.8	1539.9	Brittle stars on the benchmark and lots on the seafloor. Hydroids on the rope.
6011	2017/07/19	13:44:15	45.93442	-130.01151	72.9	0.8	1540.0	PRESSURE: End Finished up pressure reading at AX-106 east of Ashes.
6014	2017/07/19	13:45:32	45.9344	-130.01153	73.4	0.8	1540.0	Stowing sensor in the cradle.
6019	2017/07/19	13:47:23	45.93438	-130.01155	69.3	2.1	1538.6	Buttoning things up here and heading for AX-308 which will end this second circuit around the caldera.

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6023	2017/07/19	13:48:34	45.93436	-130.01157	119.2	2.4	1538.7	Maneuvering around and heading to the next benchmark. It's 1 km away at a heading of 106.
6026	2017/07/19	13:49:45	45.93434	-130.01159	117.4	2.5	1538.6	We will pass over a contact between older flows and the 2011 flow. Not sure we will see it as the 2011 flow is looking older these days - just like us all.
6031	2017/07/19	13:51:38	45.93431	-130.01163	117.3	2.7	1538.6	The MPR cable is wanting to flop down in front of the vehicle.
6034	2017/07/19	13:52:41	45.9343	-130.01165	117.4	2.4	1538.8	Waiting for the go-ahead from the captain.
6042	2017/07/19	13:56:21	45.93426	-130.01167	117.6	3.7	1536.6	We're moving now heading 106 degrees - 1 km away.
6046	2017/07/19	13:57:44	45.93427	-130.01165	117.4	3.7	1536.8	After the next reading we will end the second circuit.
6056	2017/07/19	14:02:08	45.93441	-130.01140	118.5	3.7	1536.6	We will actually be moving across the 2011 flow for most of this transect.
6061	2017/07/19	14:04:25	45.93455	-130.01114	124.6	4.1	1536.8	Contact.
6062	2017/07/19	14:04:33	45.93456	-130.01112	124.2	3.6	1536.8	CONTACT!!
6064	2017/07/19	14:04:58	45.93459	-130.01107	122.9	3.9	1536.2	Moving from ropey/lineated older lavas onto the 2011 pillow flow.
6068	2017/07/19	14:06:11	45.93467	-130.01089	121.6	3.0	1534.7	The flow is now sedimented. Not seeing many animals.
6078	2017/07/19	14:10:43	45.93488	-130.01013	113.1	4.0	1532.0	Crab up ahead.
6096	2017/07/19	14:19:29	45.93458	-130.00860	113.0	3.9	1530.1	Moving over jumbled flow now.
6101	2017/07/19	14:21:34	45.93445	-130.00825	113.1	3.3	1530.1	Tubeworms???
6116	2017/07/19	14:28:14	45.9341	-130.00718	112.9	4.2	1530.0	Now we're passing over lineated sheet flow.
6117	2017/07/19	14:28:31	45.93409	-130.00714	113.1	4.6	1530.0	Here comes some jumbled lavas.
6138	2017/07/19	14:38:08	45.93368	-130.00570	112.9	4.8	1530.1	RSN cable paralleling our transect.
6155	2017/07/19	14:46:15	45.93331	-130.00446	112.9	5.4	1530.1	Still transiting 4 meters above the bottom heading toward AX-308 to finish up this 2nd loop of pressure readings.
6157	2017/07/19	14:47:02	45.93327	-130.00433	113.0	6.6	1530.1	470 meters to go to benchmark AX-308.
6173	2017/07/19	14:54:08	45.93289	-130.00309	112.9	10.4	1530.1	Still transiting.
6191	2017/07/19	15:02:52	45.93245	-130.00161	113.0	9.8	1530.1	Due to the ground fault the pilots are going to cycle power to try to fix the thruster problem.
6195	2017/07/19	15:04:26	45.93236	-130.00133	112.9	9.2	1530.1	Did not end up cycling power as the logger they wanted to enable was already running.
6203	2017/07/19	15:07:55	45.93216	-130.00071	112.7	4.0	1530.1	Old and new lava contacts.
6208	2017/07/19	15:09:59	45.93204	-130.00032	113.6	3.8	1528.7	Moving into exclusively new lavas.
6212	2017/07/19	15:11:09	45.93198	-130.00011	113.4	4.2	1527.6	Flatter pillow lava flow.
6213	2017/07/19	15:11:16	45.93197	-130.00009	113.3	5.0	1527.0	Significant amount of sediment.
6216	2017/07/19	15:12:16	45.93192	-129.99991	113.5	5.0	1525.8	Pilots have troubleshooted the error message and appears problem is a board on the vehicle.
6218	2017/07/19	15:12:40	45.9319	-129.99984	113.4	5.1	1526.1	Should be an easy swap of a stack of boards once the vehicle is recovered.
6220	2017/07/19	15:13:20	45.93187	-129.99972	114.1	4.2	1526.3	Spider crab on flows transitioning to flatter jumbled pillows and some sheet flows.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-966 Datalogger Comment
6226	2017/07/19	15:15:57	45.93175	-129.99931	115.2	3.9	1526.4	Sheet flows with ridges of jumble.
6230	2017/07/19	15:17:23	45.93171	-129.99913	114.5	2.9	1527.1	Heavier sediment and more pillow forms.
6236	2017/07/19	15:19:54	45.93165	-129.99890	151.3	3.2	1527.4	There is benchmark AX-308.
6239	2017/07/19	15:20:44	45.93163	-129.99884	148.6	0.8	1529.9	First the mini-BPR will be recovered.
6242	2017/07/19	15:21:45	45.93162	-129.99880	146.0	0.8	1530.0	This should be BRP #8.
6244	2017/07/19	15:22:07	45.93162	-129.99878	146.4	0.8	1530.0	RECOVER: Jason has the miniBPR #8 and will move it to the basket. AX-308.
6247	2017/07/19	15:23:15	45.93161	-129.99875	146.2	0.8	1530.0	This is headed for the STBD bio box with two other mini BPRs.
6251	2017/07/19	15:24:38	45.93161	-129.99874	146.4	0.8	1530.0	STBD swing arm biobox is open.
6254	2017/07/19	15:26:02	45.93161	-129.99874	147.4	0.8	1530.0	Placing miniBPR #8 in the biobox with a two-arm operation. (Passing it from Port to Stbd arm). AX-308
6256	2017/07/19	15:26:18	45.93161	-129.99874	147.5	0.8	1530.0	STBD arm now has the miniBPR.
6258	2017/07/19	15:26:52	45.93161	-129.99874	147.4	0.8	1529.9	#8 is in the biobox.
6260	2017/07/19	15:27:13	45.93161	-129.99874	147.3	0.8	1529.9	Lid is shut and now strapping it down.
6265	2017/07/19	15:29:32	45.9316	-129.99875	147.3	0.8	1530.0	Lid is strapped.
6268	2017/07/19	15:30:06	45.9316	-129.99875	147.4	0.8	1530.0	Stowing the STBD swing arm.
6271	2017/07/19	15:31:23	45.9316	-129.99876	168.3	2.0	1528.7	Repositioning the vehicle to do the MPR measurement after the miniBPR recovery.
6278	2017/07/19	15:34:30	45.9316	-129.99876	276.4	0.8	1530.1	Landing in front of AX-308.
6281	2017/07/19	15:35:05	45.93159	-129.99876	276.6	0.8	1530.1	Retrieving the MPR from the basket.
6282	2017/07/19	15:35:25	45.93159	-129.99876	276.6	0.8	1530.1	Placing MPR on the benchmark at AX-308.
6289	2017/07/19	15:38:08	45.93159	-129.99876	276.8	0.8	1530.1	Fine tuning the placement on the benchmark.
6291	2017/07/19	15:39:02	45.93158	-129.99877	276.7	0.8	1530.1	A little nudge.
6293	2017/07/19	15:39:30	45.93158	-129.99877	276.8	0.8	1530.1	Placement is good.
6295	2017/07/19	15:39:59	45.93158	-129.99877	277.8	0.8	1530.1	PRESSURE: Start AX-308 begin second measurement.
6333	2017/07/19	15:58:33	45.93158	-129.99868	278.7	0.8	1530.2	Fish standing guard.
6338	2017/07/19	16:00:10	45.9316	-129.99873	279.5	0.8	1530.2	PRESSURE: End End measurement at AX-308 (#2).
6341	2017/07/19	16:01:18	45.93162	-129.99880	278.8	0.8	1530.2	Retrieving the MPR from the benchmark.
6343	2017/07/19	16:01:41	45.93163	-129.99883	279.1	0.8	1530.2	Placing the MPR in the basket.
6344	2017/07/19	16:01:52	45.93164	-129.99884	279.1	0.8	1530.2	A bit of bio is attached to the arm.
6345	2017/07/19	16:02:00	45.93164	-129.99885	281.2	0.8	1530.2	It was wiggled off.
6349	2017/07/19	16:03:07	45.93168	-129.99897	277.3	2.0	1529.3	Lifting off and heading back to ASHES at 286 for 1000m.
6351	2017/07/19	16:03:58	45.93171	-129.99908	286.5	6.3	1524.6	Will be working with the possibility of thruster ground fault.
6354	2017/07/19	16:04:53	45.93175	-129.99922	285.7	6.2	1525.0	At ASHES will do the benchmark measurement then start fluid sampling.
6356	2017/07/19	16:05:20	45.93177	-129.99930	287.1	5.6	1525.2	Nice striated sheet flows with sediment on the way back to ASHES.
6388	2017/07/19	16:20:48	45.9325	-130.00273	280.3	14.7	1526.2	NAV: Doppler Reset
6399	2017/07/19	16:25:35	45.93265	-130.00340	288.0	13.9	1526.6	Flying high so no bottom imagery.
6427	2017/07/19	16:39:30	45.9331	-130.00556	288.4	8.9	1526.7	About 30 more minutes to the site.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-966 Datalogger Comment
6459	2017/07/19	16:54:26	45.93366	-130.00827	288.6	8.4	1526.7	Shrimp.
6462	2017/07/19	16:55:32	45.9337	-130.00846	288.8	7.9	1526.6	There is the OOI cable.
6464	2017/07/19	16:56:02	45.93372	-130.00855	288.6	7.7	1526.6	Jason and the cable on the way to ASHES.
6480	2017/07/19	17:03:12	45.93399	-130.00990	288.8	8.0	1526.7	Thermal blanket.
6481	2017/07/19	17:03:33	45.934	-130.00997	288.7	8.4	1526.7	Mark location.
6483	2017/07/19	17:03:55	45.93402	-130.01004	288.3	8.7	1526.6	Position with the navigation en route is 45 56.03948 -130 0.59308.
6485	2017/07/19	17:04:19	45.93403	-130.01012	288.2	8.6	1526.6	That could be a Paul Johnson instrument near ASHES.
6488	2017/07/19	17:05:31	45.93408	-130.01035	288.6	9.3	1526.6	Photo 17:03:33 of blanket on Virtual Van.
6491	2017/07/19	17:06:09	45.9341	-130.01047	288.3	9.8	1526.7	Fish.
6500	2017/07/19	17:10:12	45.93425	-130.01114	288.3	13.3	1526.6	Almost at the benchmark at ASHES AX-106.
6508	2017/07/19	17:13:47	45.93435	-130.01152	287.0	5.8	1535.3	Moving Jason to the benchmark location.
6510	2017/07/19	17:14:26	45.93437	-130.01156	19.5	6.0	1535.6	There is the benchmark.
6514	2017/07/19	17:15:35	45.9344	-130.01163	64.8	3.8	1537.9	Approaching AX-106.
6517	2017/07/19	17:16:40	45.93441	-130.01166	65.3	4.1	1537.9	Retrieving the MPR from the basket.
6522	2017/07/19	17:18:35	45.93444	-130.01169	65.2	1.4	1540.3	Moving close to AX-106.
6524	2017/07/19	17:19:34	45.93445	-130.01169	64.6	0.8	1540.9	Placing the MPR on the benchmark.
6527	2017/07/19	17:20:09	45.93445	-130.01169	64.7	0.8	1540.9	Aligning the MPR.
6530	2017/07/19	17:21:16	45.93446	-130.01168	64.9	0.8	1540.9	Got the crinoid out.
6532	2017/07/19	17:22:01	45.93446	-130.01167	64.8	1.0	1540.9	Alignment looks good.
6534	2017/07/19	17:22:13	45.93446	-130.01167	64.8	0.8	1541.0	PRESSURE: Start AX-106 begin measurement #3.
6539	2017/07/19	17:24:07	45.93445	-130.01164	64.7	0.9	1541.0	After measurement will need to change the ship's heading.
6540	2017/07/19	17:24:12	45.93445	-130.01164	64.6	0.8	1541.0	Frame_Grab:
6541	2017/07/19	17:24:24	45.93445	-130.01164	64.6	0.8	1541.0	Biology on the marker tether.
6542	2017/07/19	17:24:28	45.93445	-130.01164	64.6	0.9	1541.0	Frame_Grab:
6544	2017/07/19	17:24:45	45.93445	-130.01163	64.7	0.8	1541.0	Frame_Grab:
6545	2017/07/19	17:24:57	45.93445	-130.01163	64.6	0.8	1541.0	Top of the line with a purple filter feeder.
6554	2017/07/19	17:28:35	45.93442	-130.01160	64.8	0.8	1541.0	Fish approach.
6555	2017/07/19	17:28:40	45.93442	-130.01160	64.5	0.9	1541.0	Frame_Grab:
6556	2017/07/19	17:28:45	45.93442	-130.01160	64.8	0.8	1541.0	Rattail.
6559	2017/07/19	17:30:02	45.93441	-130.01159	64.9	0.8	1541.0	When fish hit the basket it quickly twisted about so you could see how a miniBPR could get hit fairly hard.
6562	2017/07/19	17:30:42	45.9344	-130.01158	65.0	0.8	1541.0	The mystery of the southern pillow mound miniBPR continues.
6565	2017/07/19	17:31:42	45.93439	-130.01157	65.0	0.8	1541.0	There is the rattail again.
6575	2017/07/19	17:36:30	45.93439	-130.01151	65.3	0.8	1541.0	Fish approach again.
6578	2017/07/19	17:37:32	45.93439	-130.01150	65.1	0.8	1541.0	Frame_Grab:
6580	2017/07/19	17:37:44	45.93439	-130.01150	65.0	0.8	1541.0	Frame_Grab:
6590	2017/07/19	17:42:17	45.93442	-130.01158	65.4	0.8	1540.9	PRESSURE: End Last measurement for AX-106 at ASHES.
6593	2017/07/19	17:43:08	45.93441	-130.01163	65.6	0.8	1540.9	NAV: Doppler Reset
6594	2017/07/19	17:43:16	45.93441	-130.01164	65.5	0.8	1540.9	Retrieving the MPR from the benchmark.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-966 Datalogger Comment
6596	2017/07/19	17:43:40	45.93441	-130.01167	65.3	0.8	1541.0	Placing MPR on the basket.
6598	2017/07/19	17:44:14	45.9344	-130.01172	65.3	0.8	1541.0	MPR secure.
6603	2017/07/19	17:46:13	45.93436	-130.01194	56.2	2.1	1539.8	Heading to ASHES for fluid sampling. 150m at 235 to Inferno.
6607	2017/07/19	17:47:16	45.93432	-130.01208	270.7	2.6	1539.6	Ship is changing its heading while we transit.
6613	2017/07/19	17:50:03	45.93417	-130.01249	263.8	2.5	1539.3	Sheet flows and swirls and pressure ridges with broken lava plates.
6619	2017/07/19	17:52:17	45.93401	-130.01281	219.5	3.4	1538.3	Heading to Virgin Vent at ASHES first for fluid sampling.
6622	2017/07/19	17:53:20	45.93393	-130.01293	220.3	4.8	1536.7	OOI cable.
6623	2017/07/19	17:53:32	45.93392	-130.01296	219.5	4.5	1536.6	Should drive over Virgin's Daughter at this heading.
6625	2017/07/19	17:53:51	45.9339	-130.01299	219.4	4.2	1537.1	Is that Virgin's daughter right there?
6626	2017/07/19	17:54:01	45.93389	-130.01300	219.4	3.4	1537.6	Gorgeous little vent.
6628	2017/07/19	17:54:30	45.93386	-130.01305	216.7	4.5	1537.0	Old gear next to the vent.
6631	2017/07/19	17:55:07	45.93382	-130.01310	219.7	4.2	1537.4	This is actually Virgin.
6633	2017/07/19	17:55:43	45.93379	-130.01314	219.3	4.4	1537.2	Ship's heading is good here.
6636	2017/07/19	17:56:40	45.93374	-130.01320	220.1	4.4	1537.2	Swapping out science laptops from the MPR to the HFS.
6639	2017/07/19	17:57:35	45.93371	-130.01323	219.9	4.1	1537.4	Bringing up the Beast power.
6641	2017/07/19	17:58:18	45.93368	-130.01326	220.1	4.3	1537.2	Old NeMO Net frame from many years ago.
6643	2017/07/19	17:58:43	45.93367	-130.01327	220.2	4.3	1537.2	Setting up for fluid sampling at Virgin.
6647	2017/07/19	18:00:23	45.93364	-130.01328	196.3	3.6	1537.2	Position is 45 56.02043 130 0.79124 from the mouse on the nav screen.
6649	2017/07/19	18:00:35	45.93364	-130.01328	193.6	2.8	1537.8	Two spires of hot fluid from the vent.
6652	2017/07/19	18:02:03	45.93363	-130.01328	194.4	1.2	1540.5	Heading is 194 here.
6654	2017/07/19	18:02:14	45.93363	-130.01328	194.4	1.2	1540.5	Highlights are on before knocking this down for sampling.
6658	2017/07/19	18:03:22	45.93363	-130.01327	194.5	1.2	1540.5	Frame_Grab:
6659	2017/07/19	18:03:30	45.93363	-130.01327	194.5	1.2	1540.5	Frame_Grab:
6664	2017/07/19	18:04:46	45.93363	-130.01326	194.6	1.2	1540.5	Highlights off.
6665	2017/07/19	18:04:59	45.93363	-130.01325	194.6	1.2	1540.5	Preparing to use the Jason temperature probe first.
6667	2017/07/19	18:05:23	45.93364	-130.01325	194.7	1.2	1540.5	Highlights back on.
6670	2017/07/19	18:05:48	45.93364	-130.01325	194.7	1.2	1540.5	Using probe.
6672	2017/07/19	18:06:08	45.93364	-130.01324	194.7	1.2	1540.5	Knocked down one spire and will get temperature from the orifice.
6673	2017/07/19	18:06:31	45.93364	-130.01324	194.7	1.2	1540.5	Temperature is rising quickly.
6675	2017/07/19	18:06:49	45.93364	-130.01324	194.7	1.2	1540.5	Over 230deg and rising.
6677	2017/07/19	18:07:16	45.93365	-130.01323	194.8	1.2	1540.5	Temp here as varied from 250deg to 318degC at this vent.
6678	2017/07/19	18:07:21	45.93365	-130.01323	194.8	1.2	1540.5	The max was in 1995.
6679	2017/07/19	18:07:33	45.93365	-130.01323	194.8	1.2	1540.5	That was an Alvin temperature in 1995.
6681	2017/07/19	18:08:03	45.93365	-130.01323	194.8	1.2	1540.5	High so far was 257degC.
6683	2017/07/19	18:08:07	45.93365	-130.01323	194.8	1.2	1540.5	Ending highlights.
6685	2017/07/19	18:08:36	45.93366	-130.01322	194.8	1.2	1540.5	Excavating a bit more to get clear flow. Regrows in a few days.
6688	2017/07/19	18:09:53	45.93367	-130.01322	194.8	1.2	1540.5	Moving a bit more chimney away.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-966 Datalogger Comment
6689	2017/07/19	18:10:01	45.93367	-130.01322	194.8	1.2	1540.5	Temp that time got up to 240degC.
6694	2017/07/19	18:11:37	45.93367	-130.01322	195.0	1.2	1540.5	Moving the probe around a bit to find the highest temperature.
6698	2017/07/19	18:13:20	45.93368	-130.01321	195.0	1.2	1540.5	High temp here is 250.6degC.
6700	2017/07/19	18:13:35	45.93368	-130.01321	195.0	1.2	1540.5	Slight repositioning.
6701	2017/07/19	18:13:51	45.93368	-130.01321	195.0	1.2	1540.5	Moving wand again.
6703	2017/07/19	18:14:21	45.93369	-130.01321	195.0	1.3	1540.5	Excavating a bit more to get the anhydrite out of the view.
6704	2017/07/19	18:14:30	45.93369	-130.01321	195.0	1.3	1540.5	Good view of the flow now.
6707	2017/07/19	18:15:31	45.93369	-130.01321	196.9	1.2	1540.5	Stowing the wand.
6710	2017/07/19	18:16:17	45.9337	-130.01321	196.9	1.2	1540.5	Retrieving the HFS wand.
6713	2017/07/19	18:17:16	45.9337	-130.01321	196.9	1.2	1540.5	Going to switch arms to hold onto the HFS wand for sampling.
6717	2017/07/19	18:19:01	45.9337	-130.01320	195.6	1.2	1540.5	Positioning the HFS wand in the flow.
6719	2017/07/19	18:19:12	45.93371	-130.01320	195.6	1.2	1540.5	Beast pump is on.
6723	2017/07/19	18:20:46	45.93371	-130.01320	195.6	1.2	1540.5	HFS temperature is rising...over 160degC. This is not going to be hot enough here.
6724	2017/07/19	18:20:51	45.93371	-130.01320	195.6	1.2	1540.5	Repositioning the wand.
6727	2017/07/19	18:21:53	45.93371	-130.01320	195.6	1.2	1540.5	Temp here is 175degC and rising.
6730	2017/07/19	18:22:50	45.93371	-130.01321	195.6	1.2	1540.5	Start and stopped the pump on Beast.
6731	2017/07/19	18:22:56	45.93372	-130.01321	195.6	1.2	1540.5	Temperature is rising again.
6733	2017/07/19	18:23:23	45.93372	-130.01321	195.6	1.2	1540.5	Close-up on pilot camera shows some palm worms near the hot water.
6736	2017/07/19	18:24:11	45.93372	-130.01322	195.6	1.2	1540.5	Not hot enough so moving slightly within the flow.
6737	2017/07/19	18:24:21	45.93372	-130.01322	195.6	1.2	1540.5	175deg and going up here.
6739	2017/07/19	18:24:52	45.93372	-130.01323	195.6	1.2	1540.5	Jason has control of the ship again (there had been a problem with Jason control but seems ok now).
6740	2017/07/19	18:24:57	45.93372	-130.01323	195.6	1.2	1540.5	Temp is now 205deg and rising.
6742	2017/07/19	18:25:34	45.93372	-130.01323	195.6	1.2	1540.5	Temperature is still rising.
6744	2017/07/19	18:25:51	45.93372	-130.01323	195.6	1.2	1540.5	At 218degC so far.
6749	2017/07/19	18:27:54	45.93372	-130.01325	195.6	1.2	1540.5	SAMPLE: HFS J966-HFS-01 Unfiltered Piston #1 Start. Virgin Vent. Got up to 223degC. Down to 217deg so slightly mixed.
6754	2017/07/19	18:29:47	45.93372	-130.01326	195.6	1.2	1540.5	Can see exhaust coming out of the Beast.
6755	2017/07/19	18:29:56	45.93372	-130.01326	195.6	1.2	1540.5	SAMPLE: HFS Stopped.
6757	2017/07/19	18:30:24	45.93372	-130.01326	195.6	1.2	1540.5	SAMPLE: HFS J966-HFS-01 Tmax=209.5 Tavg=202 T2=78 Vol=300ml.
6761	2017/07/19	18:31:39	45.93372	-130.01327	195.6	1.2	1540.5	SAMPLE: HFS J966-HFS-02 Filtered Piston #9 Start in the exact same location.
6766	2017/07/19	18:33:59	45.93372	-130.01326	195.6	1.2	1540.4	SAMPLE: HFS J966-HFS-02 Stopped.
6769	2017/07/19	18:34:40	45.93372	-130.01326	195.6	1.2	1540.4	SAMPLE: HFS Tmax=232.2 Tavg=228 T2=70 vol=325ml. J966-HFS-02.
6772	2017/07/19	18:35:45	45.93372	-130.01326	195.5	1.2	1540.4	SAMPLE: HFS J966-HFS-03 Unfiltered Piston #2 Start. Same exact location.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-966 Datalogger Comment
6775	2017/07/19	18:36:10	45.93372	-130.01326	195.6	1.2	1540.4	At Virgin Vent sampling with the Beast.
6778	2017/07/19	18:37:24	45.93371	-130.01325	195.6	1.2	1540.4	SAMPLE: HFS J966-HFS-03 Stop.
6780	2017/07/19	18:38:02	45.93371	-130.01325	195.6	1.2	1540.4	J966-HFS-03 Tmax=237.4 Tavg=231 T2=64 vol=325ml.
6783	2017/07/19	18:39:00	45.93371	-130.01325	195.5	1.2	1540.4	Next will take a GTHFS.
6785	2017/07/19	18:39:22	45.93371	-130.01325	195.5	1.2	1540.4	Not going to do this with the Beast as we want to save them for Inferno.
6787	2017/07/19	18:39:51	45.93371	-130.01325	195.5	1.2	1540.4	Stowing the HFS wand.
6790	2017/07/19	18:40:16	45.93371	-130.01325	195.4	1.2	1540.4	Wand is in the holster.
6794	2017/07/19	18:42:01	45.9337	-130.01324	194.4	1.2	1540.4	Releasing the aft GTB from the basket. GTB #9 Red.
6798	2017/07/19	18:43:16	45.9337	-130.01324	194.4	1.2	1540.4	Have Red GTB #9 in the manipulator.
6802	2017/07/19	18:44:38	45.93369	-130.01324	194.4	1.2	1540.4	Moving the tip into position in Virgin. Checking the ram clearance. Looks like it might be too short.
6804	2017/07/19	18:45:20	45.93369	-130.01324	194.4	1.2	1540.4	Want to keep tip just out of the anhydrite to prevent fouling.
6806	2017/07/19	18:45:42	45.93369	-130.01324	194.4	1.2	1540.4	Looking at pilot cam for tip placement.
6808	2017/07/19	18:46:06	45.93369	-130.01324	194.4	1.2	1540.4	Waiting for the watch change. Akel will be driving.
6813	2017/07/19	18:48:07	45.93368	-130.01324	194.4	1.2	1540.4	Ram doesn't fit. Ever so slightly too short.
6815	2017/07/19	18:49:01	45.93368	-130.01324	194.4	1.2	1540.4	This will be a two-handed firing of the GTB.
6819	2017/07/19	18:50:09	45.93367	-130.01324	194.4	1.2	1540.4	Going in for the sample.
6821	2017/07/19	18:50:36	45.93367	-130.01324	194.4	1.2	1540.4	Moving the GTB into position.
6824	2017/07/19	18:51:42	45.93366	-130.01324	194.4	1.2	1540.4	Positioning the wand into the flow.
6826	2017/07/19	18:52:06	45.93366	-130.01324	194.4	1.2	1540.4	Trying to get a good view of the tip of the wand bottle.
6833	2017/07/19	18:55:07	45.93364	-130.01323	194.4	1.2	1540.4	GTB is in position.
6839	2017/07/19	18:57:40	45.93363	-130.01322	194.3	1.2	1540.3	SAMPLE: GTB J966-GTB-04 GTB sample has been triggered using a two handed approach.
6841	2017/07/19	18:58:05	45.93363	-130.01322	194.4	1.2	1540.3	The instrument moved significantly while being triggered. Dave has confirmed that it was triggered.
6844	2017/07/19	18:59:05	45.93363	-130.01322	194.3	1.2	1540.3	The GTB wand has been removed and is being placed in the basket.
6851	2017/07/19	19:02:17	45.93362	-130.01321	194.2	1.2	1540.3	That GTB sample was J966-GTB-04 and was the Red GT-9 GTB.
6854	2017/07/19	19:03:10	45.93361	-130.01321	194.2	1.2	1540.3	We are preparing to take another GTB sample at the Virgin vent in the same vent site as the previous sample J966-GTB-04.
6856	2017/07/19	19:03:51	45.93361	-130.01321	194.2	1.2	1540.3	The Green/Red (GT-7) GTB has been removed from the basket and is being placed in the virgin vent flow.
6865	2017/07/19	19:07:48	45.93362	-130.01321	194.2	1.2	1540.3	Dave is unsure of whether or not the wand is in the appropriate position to collect a good fluid sample.
6872	2017/07/19	19:10:39	45.93363	-130.01320	147.6	0.8	1540.1	Jason was repositioned. The wand is surrounded by vent fluid and is in position. The GTB is ready to be triggered.
6876	2017/07/19	19:12:08	45.93363	-130.01319	147.6	0.8	1540.1	SAMPLE: GTB J966-GTB-05 Triggered using a two-armed approach.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-966 Datalogger Comment
6879	2017/07/19	19:13:18	45.93364	-130.01319	147.7	0.8	1540.1	J966-GTB-05 cont. Location is 45d55.8619 N. 129d59.92845 W. The Depth is 1537.8. Altitude is 1.4 m.
6880	2017/07/19	19:13:23	45.93364	-130.01318	147.7	0.8	1540.1	The Red/Green GT
6881	2017/07/19	19:13:34	45.93364	-130.01318	147.6	0.8	1540.1	The Red/Green GTB is being placed back in the basket.
6885	2017/07/19	19:14:39	45.93364	-130.01318	147.7	0.8	1540.1	The GTBs have been secured with a bungee cord in the basket.
6889	2017/07/19	19:16:07	45.93364	-130.01318	147.3	0.8	1540.1	We are preparing to deploy a HOBO in the Virgin vent.
6892	2017/07/19	19:17:11	45.93364	-130.01318	147.6	0.8	1540.1	HOBO #129 is being removed from the basket and placed over Virgin Vent.
6895	2017/07/19	19:18:23	45.93363	-130.01320	147.6	0.8	1540.1	DEPLOY: HOBO temp probe HOBO 129 deployed. The hobo is secured nicely in Virgin Vent.
6898	2017/07/19	19:19:05	45.93363	-130.01322	147.6	0.8	1540.1	We are preparing to transit from Virgin Vent to Inferno vent.
6903	2017/07/19	19:21:27	45.93359	-130.01333	218.8	3.1	1537.6	Transiting from Virgin Vent to Inferno Vent ~35 m SW.
6905	2017/07/19	19:21:47	45.93358	-130.01335	255.1	3.7	1537.0	Heading is ~235.
6908	2017/07/19	19:22:56	45.93356	-130.01343	255.9	3.0	1538.5	We are passing Mushroom Vent.
6911	2017/07/19	19:23:35	45.93354	-130.01346	269.6	2.7	1538.4	We are approaching Inferno Vent.
6912	2017/07/19	19:23:56	45.93354	-130.01349	276.0	4.0	1537.1	HIGHLIGHTS: HD highlights start
6915	2017/07/19	19:24:53	45.93351	-130.01355	317.3	5.3	1536.3	Several small black smokers are visible on the surface of Inferno Vent.
6916	2017/07/19	19:25:01	45.93351	-130.01356	333.2	5.2	1536.5	NAV: Doppler Reset
6919	2017/07/19	19:25:49	45.9335	-130.01361	344.6	5.6	1536.2	Frame_Grab:
6924	2017/07/19	19:27:40	45.93348	-130.01368	344.2	5.0	1536.6	HIGHLIGHTS: HD highlights stop
6936	2017/07/19	19:33:03	45.9335	-130.01371	267.5	5.3	1536.0	We are waiting to resume fluid sampling in order to get some nice super scorpio frame grabs.
6938	2017/07/19	19:33:20	45.9335	-130.01371	270.5	5.2	1536.1	Frame_Grab:
6940	2017/07/19	19:34:04	45.9335	-130.01370	270.6	5.2	1536.2	HIGHLIGHTS: HD highlights start
6945	2017/07/19	19:35:38	45.9335	-130.01369	270.6	5.2	1536.1	We are preparing to collect a sample of the chimney.
6946	2017/07/19	19:35:54	45.9335	-130.01368	268.7	5.2	1536.1	HIGHLIGHTS: HD highlights stop
6954	2017/07/19	19:39:32	45.93349	-130.01366	270.5	5.1	1536.2	Frame_Grab:
6959	2017/07/19	19:41:13	45.93349	-130.01365	270.5	5.0	1536.2	Dave and Shristi are selecting targets for geologic sampling.
6962	2017/07/19	19:42:05	45.93349	-130.01364	271.0	3.9	1537.6	A target on the side of the Inferno Vent which is encased in diffuse flow has been selected. The rock is covered in a biological mat.
6968	2017/07/19	19:44:58	45.9335	-130.01365	271.8	3.7	1537.6	SAMPLE: Geo J966-GEO-06.
6970	2017/07/19	19:45:20	45.9335	-130.01365	276.2	3.5	1537.8	A small sample of the vent was not destroyed during sampling is being placed in the port-side bio box.
6974	2017/07/19	19:46:49	45.9335	-130.01366	16.9	4.8	1536.9	We are searching for fluid sampling targets and potentially an additional chimney sample location.
6986	2017/07/19	19:52:26	45.9335	-130.01373	272.4	4.8	1536.6	Dave has identified a target for fluid sampling on top of Inferno in an area encased by 4 small active hydrothermal vents.
6998	2017/07/19	19:57:40	45.93354	-130.01376	258.1	4.6	1537.0	Frame_Grab:

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-966 Datalogger Comment
6999	2017/07/19	19:57:41	45.93354	-130.01376	258.1	4.6	1537.0	We are attempting to remove an active chimney sample using the port arm.
7001	2017/07/19	19:58:14	45.93354	-130.01376	257.8	4.5	1537.1	The sample crumpled and we were unable to recover any of the crumpled material.
7004	2017/07/19	19:59:11	45.93355	-130.01375	257.9	4.5	1537.1	SAMPLE: HFS We removed the structural vent.
7005	2017/07/19	19:59:24	45.93355	-130.01375	257.9	4.5	1537.1	The HFS wand is in position in the vent that we just removed.
7008	2017/07/19	20:00:11	45.93356	-130.01374	257.9	4.5	1537.1	SAMPLE: HFS J966-HFS-07 Unfiltered Piston #3.
7011	2017/07/19	20:01:11	45.93356	-130.01374	257.9	4.5	1537.1	Location is 45d56.01178 N. 130d0.81919 W. Depth is 1534.9 m. Altitude is 5.3 m.
7013	2017/07/19	20:02:01	45.93356	-130.01373	258.0	4.5	1537.1	J966-HFS-07 cont. Part of the vent was just destroyed by the HFS wand.
7018	2017/07/19	20:03:39	45.93356	-130.01373	258.0	4.5	1537.1	J966-HFS-07 cont. Still sampling vent fluid.
7024	2017/07/19	20:06:34	45.93356	-130.01375	258.0	4.5	1537.1	SAMPLE: HFS J966-HFS-07 Unfiltered Piston 3. Starting Sample Now.
7027	2017/07/19	20:07:21	45.93355	-130.01376	258.0	4.5	1537.1	J966-HFS-07 cont. Correction! The sample was not started at 20:00:44. It was started at 20:07:19.
7028	2017/07/19	20:07:25	45.93355	-130.01376	258.0	4.5	1537.1	The location has not changed.
7033	2017/07/19	20:09:16	45.93355	-130.01376	258.1	4.5	1537.1	J966-HFS-07 Unfiltered Piston. End sampling.
7035	2017/07/19	20:09:50	45.93355	-130.01376	258.1	4.5	1537.1	J966-HFS-07 cont. Tmax= 305.7 Tavg=305.2 T2=98.0 Vol=500.
7037	2017/07/19	20:10:25	45.93356	-130.01376	258.1	4.5	1537.1	SAMPLE: HFS Preparing to take another piston sample.
7039	2017/07/19	20:10:41	45.93356	-130.01375	258.1	4.5	1537.1	SAMPLE: HFS J966-HFS-08 Unfiltered piston 4. START.
7043	2017/07/19	20:12:22	45.93356	-130.01373	258.1	4.5	1537.1	The location of both samples J966-HFS-07 and J966-HFS-08 are the same.
7045	2017/07/19	20:12:39	45.93357	-130.01373	258.1	4.5	1537.1	The samples were taken from the same vent.
7047	2017/07/19	20:13:32	45.93358	-130.01372	258.1	4.5	1537.1	J966-HFS-08 cont. End sampling.
7049	2017/07/19	20:13:59	45.93358	-130.01372	258.2	4.6	1537.1	Closing the port side biobox. The HFS wand may move a bit.
7052	2017/07/19	20:14:54	45.9336	-130.01371	258.6	4.6	1537.0	The port side biobox is secured. The HFS wand remained stable within the vent.
7054	2017/07/19	20:15:32	45.93361	-130.01371	258.7	4.6	1537.0	J966-HFS-08 cont. Tmax=305.9 Tavg=305.3 T2=65.0 Vol=500.
7058	2017/07/19	20:16:35	45.93363	-130.01370	258.6	4.6	1537.0	SAMPLE: GTB J966-GTB-09 GT-12 Green-Yellow
7060	2017/07/19	20:17:17	45.93364	-130.01371	258.6	4.6	1537.0	J966-GTB-09 is the GT-12 (Green/Yellow) sampler. Sample was taken from the same vent as the previous two HFS.
7063	2017/07/19	20:18:21	45.93366	-130.01372	258.6	4.6	1537.0	The temperature was stable for the GTB at 305.7.
7065	2017/07/19	20:18:37	45.93366	-130.01372	258.7	4.6	1537.0	Preparing to take filtered piston #8.
7068	2017/07/19	20:19:35	45.93368	-130.01373	258.9	4.6	1537.0	SAMPLE: HFS J966-HFS-10 Start.
7069	2017/07/19	20:20:04	45.93368	-130.01374	259.0	4.6	1537.0	J966-HFS-10 cont. This sample is coming from the same site on the Inferno vent as the previous two HFS and the previous GTB.
7074	2017/07/19	20:21:42	45.93368	-130.01377	258.9	4.6	1537.0	J966-HFS-10 cont. Measurement Complete.
7076	2017/07/19	20:22:13	45.93368	-130.01379	259.0	4.6	1537.0	J966-HFS-10 cont. Tmax=306.6 Tavg=305.9 T2=70 Vol=400.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-966 Datalogger Comment
7078	2017/07/19	20:22:44	45.93367	-130.01380	259.0	4.6	1537.0	Preparing to take an additional HFS.
7082	2017/07/19	20:24:09	45.93365	-130.01382	259.1	4.6	1537.0	SAMPLE: HFS The HFS wand is being removed from the active vent and placed back in the basket.
7085	2017/07/19	20:25:28	45.93362	-130.01384	259.0	4.5	1537.0	We are preparing to take a Jason temperature probe measurement.
7087	2017/07/19	20:25:52	45.93361	-130.01384	259.0	4.5	1537.0	The probe wand is in position on the vent site we've previously been sampling.
7095	2017/07/19	20:29:08	45.93357	-130.01381	259.1	4.5	1537.0	The Jason temperature probe Tmax=305.
7097	2017/07/19	20:29:45	45.93357	-130.01380	259.1	4.6	1537.0	The Jason temperature probe has been removed from the vent and is being placed back on the basket.
7098	2017/07/19	20:29:59	45.93357	-130.01379	259.0	4.5	1537.0	We are preparing to attempt another chimney sampling from the Inferno vent site.
7102	2017/07/19	20:31:19	45.93357	-130.01377	258.8	4.6	1536.9	The port side biobox has been re-opened.
7113	2017/07/19	20:36:24	45.93357	-130.01371	258.9	4.6	1536.9	Rocks crumpled when we sampled the vent. Only tube worms seem to have been collected and placed in the port-side biobox.
7117	2017/07/19	20:37:40	45.93355	-130.01372	258.8	4.6	1536.9	SAMPLE: Geo J966-GEO-11 A small sample of the chimney was placed in the port-side biobox.
7121	2017/07/19	20:39:15	45.93351	-130.01376	259.0	4.6	1536.9	We are preparing to transit from Inferno to Hell.
7122	2017/07/19	20:39:21	45.9335	-130.01376	258.4	4.6	1536.9	NAV: Doppler Reset
7125	2017/07/19	20:40:33	45.93346	-130.01380	259.7	4.8	1535.7	We are in transit to Hell.
7131	2017/07/19	20:42:46	45.93339	-130.01388	252.2	1.4	1540.1	We are approaching Hell.
7137	2017/07/19	20:45:07	45.93332	-130.01397	184.9	4.2	1537.1	We are on station at Hell and are preparing to take a HFS at an active vent atop Hell.
7138	2017/07/19	20:45:14	45.93332	-130.01397	184.8	4.1	1537.1	HIGHLIGHTS: HD highlights start
7142	2017/07/19	20:46:43	45.9333	-130.01401	184.5	4.2	1537.1	SAMPLE: HFS We are preparing for an unfiltered piston sample
7145	2017/07/19	20:47:51	45.93329	-130.01403	184.5	4.2	1537.1	SAMPLE: HFS We have removed the active structural chimney atop hell. We are waiting for dust to clear prior to sampling.
7149	2017/07/19	20:49:19	45.93328	-130.01404	184.5	4.2	1537.2	The HFS wand is in position and we are prepared to sample.
7154	2017/07/19	20:51:22	45.93328	-130.01404	184.5	4.2	1537.1	HIGHLIGHTS: HD highlights stop
7159	2017/07/19	20:53:25	45.93328	-130.01401	184.9	4.2	1537.1	SAMPLE: HFS J966-HFS-12 Unfiltered piston #5 Start.
7162	2017/07/19	20:54:24	45.93327	-130.01399	185.4	4.2	1537.1	J966-HFS-12 cont. location is 45d55.89619 N 129d59.92845 W. Depth is 1535.6 m. Altitude is 5.11 m.
7166	2017/07/19	20:55:57	45.93325	-130.01396	185.7	4.2	1537.1	J966-HFS-12 cont. CORRECTION. Start Unfiltered piston #5 Now.
7174	2017/07/19	20:59:32	45.93324	-130.01393	185.6	4.2	1537.1	J966-HFS-12 stopped.
7176	2017/07/19	20:59:54	45.93324	-130.01393	185.8	4.2	1537.1	Tmax=293.3 Tavg=287.8 T2=90 Vol=500.
7178	2017/07/19	21:00:20	45.93324	-130.01393	186.1	4.2	1537.1	Preparing to sample using filtered piston #7.
7180	2017/07/19	21:00:37	45.93324	-130.01393	185.8	4.2	1537.1	SAMPLE: HFS J966-HFS-13 Start Measurement.
7181	2017/07/19	21:00:59	45.93324	-130.01394	185.6	4.2	1537.1	J966-HFS-13 cont. Sample 13 was taken from the same vent as sample 12.
7190	2017/07/19	21:04:41	45.93327	-130.01397	186.0	4.2	1537.1	J966-HFS-13 cont. End Measurement.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-966 Datalogger Comment
7192	2017/07/19	21:05:07	45.93328	-130.01397	186.1	4.2	1537.1	Tmax=298.2 Tavg=297.1 T2=95 Vol=500.
7193	2017/07/19	21:05:28	45.93328	-130.01397	186.1	4.2	1537.1	Preparing to take another HFS Gas Tight Sample.
7195	2017/07/19	21:05:59	45.93328	-130.01397	186.2	4.2	1537.1	SAMPLE: GTHFS J966-GTHFS-14 Triggered.
7197	2017/07/19	21:06:19	45.93328	-130.01396	186.2	4.2	1537.1	Measured 297d.
7200	2017/07/19	21:07:28	45.93327	-130.01395	185.4	4.1	1537.1	The J966-GTHFS-14 was sampled from the GT-11 (Nude) sampler
7202	2017/07/19	21:08:02	45.93327	-130.01393	184.8	4.2	1537.1	The HFS wand has been removed from the vent and is being placed back in the basket.
7206	2017/07/19	21:09:10	45.93325	-130.01389	184.9	4.1	1537.1	Preparing to transit from the Inferno vent to the Anemone vent.
7208	2017/07/19	21:09:59	45.93324	-130.01386	142.6	5.9	1535.6	We are leaving the MTR at marker 68 due to time constraints. If we have enough time on the next dive we can pick it up.
7214	2017/07/19	21:12:14	45.9332	-130.01379	135.7	3.2	1538.4	We have arrived on station at Anemone (Mrk-129).
7220	2017/07/19	21:14:52	45.93316	-130.01369	241.7	0.9	1538.9	There appears to be one hot vent and some cooler diffuse-type flow on this vent.
7222	2017/07/19	21:15:21	45.93315	-130.01367	239.2	0.8	1539.5	HIGHLIGHTS: HD highlights start
7226	2017/07/19	21:16:50	45.93315	-130.01365	239.6	0.8	1539.4	RECOVER: MTR temp probe We have just recovered the MTR 3043 at Mkr-129 and placed it in the milk crate. The number is covered by biology and is indistinguishable.
7228	2017/07/19	21:17:34	45.93314	-130.01364	239.6	0.8	1539.4	The HFS wand has been removed from the basket and is being placed in the hot vent on Anemone.
7231	2017/07/19	21:18:12	45.93314	-130.01364	239.6	0.8	1539.4	The vent is only 4degC.
7233	2017/07/19	21:18:45	45.93315	-130.01364	239.6	0.8	1539.4	HIGHLIGHTS: HD highlights stop
7235	2017/07/19	21:19:21	45.93315	-130.01364	239.5	0.8	1539.4	The HFS wand is being repositioned into a lower vent site.
7237	2017/07/19	21:20:00	45.93315	-130.01364	239.5	0.8	1539.4	This
7243	2017/07/19	21:22:00	45.93316	-130.01365	239.5	0.8	1539.4	SAMPLE: HFS Preparing to start a bag sample.
7245	2017/07/19	21:22:26	45.93316	-130.01365	239.5	0.8	1539.4	SAMPLE: HFS J966-HFS-15 Starting Unfiltered bag #16.
7247	2017/07/19	21:23:00	45.93316	-130.01365	239.5	0.8	1539.4	The event logger just crashed. It seems to be working fine again after a re-start.
7252	2017/07/19	21:24:56	45.93317	-130.01366	239.5	0.8	1539.4	Location is 45d58.89619N 129d59.98245W. Depth is 1537.0 m. Altitude is 1.37m.
7254	2017/07/19	21:25:34	45.93317	-130.01367	239.5	0.8	1539.4	Sampling Complete
7257	2017/07/19	21:26:05	45.93317	-130.01367	239.5	0.8	1539.4	Tmax=28.0 Tavg=25.4 T2=13.0 Vol=500
7258	2017/07/19	21:26:12	45.93317	-130.01367	239.5	0.8	1539.4	Preparing for unfiltered bag 17.
7260	2017/07/19	21:26:44	45.93317	-130.01367	239.5	0.8	1539.4	SAMPLE: HFS J966-HFS-16 Unfiltered Bag 17 Start.
7262	2017/07/19	21:27:24	45.93318	-130.01367	239.6	0.8	1539.4	J966-HFS-16 cont. Sample taken at the same vent site as the previous unfiltered bag sample (15).
7268	2017/07/19	21:29:51	45.93319	-130.01365	239.6	0.8	1539.4	J966-HFS-16 cont. Sampling Complete.
7270	2017/07/19	21:30:25	45.93319	-130.01364	239.6	0.8	1539.4	Tmax=28.7 Tavg=26.2 T2=13 Vol=500.
7271	2017/07/19	21:30:31	45.93319	-130.01364	239.6	0.9	1539.4	Preparing for an Oxygen Sensor Reading.
7278	2017/07/19	21:33:12	45.93321	-130.01360	240.0	1.1	1539.3	Oxygen reading 0.47 and slightly variable.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-966 Datalogger Comment
7280	2017/07/19	21:33:54	45.93322	-130.01359	240.0	0.8	1539.3	Starting DNA filter Sample #13.
7314	2017/07/19	21:50:17	45.9332	-130.01378	239.9	0.8	1539.3	SAMPLE: HFS J966-HFS-17 DNA Filter Sample #13 cont. End Sampling.
7315	2017/07/19	21:50:34	45.9332	-130.01378	239.8	0.8	1539.3	The HFS wand is being removed from the vent and placed back in the basket.
7318	2017/07/19	21:51:12	45.93321	-130.01378	239.8	0.8	1539.3	Tmax=22.8 Tavg=16.9 t2=11 Vol=2156
7319	2017/07/19	21:51:33	45.93321	-130.01378	239.8	0.8	1539.3	We didn't get the volume we'd wanted to sample because the sampling slowed down and we have to come off the bottom.
7321	2017/07/19	21:52:01	45.93321	-130.01378	239.8	0.8	1539.3	DEPLOY: MTR temp probe Deployed MTR 3197 at the Anemone Vent.
7328	2017/07/19	21:54:47	45.93321	-130.01378	240.0	0.8	1539.3	The basket is being secured and we are preparing to surface the ROV.
7332	2017/07/19	21:56:17	45.93316	-130.01388	198.2	3.9	1536.5	JASON: Jason off bottom
7335	2017/07/19	22:59:36	45.93359	-130.01374	200.5	142.8	2.5	Jason is at the surface.
7336	2017/07/19			-130.01374	184.2	186.1	1.0	JASON: Jason out of water
7337	2017/07/19			-130.01374	5.0	2.8	0.9	JASON: Jason on deck End of dive J2-966.

J2-967

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-967 Datalogger Comment
7340	2017/07/20	06:54:55			210.6	0.8	0.6	Preparing to deploy Jason for dive J2-967 for pt. 2 of a ~28 hr. pressure dive.
7341	2017/07/20	06:55:47			210.6	0.8	0.6	Deployment Location: Vixen Vent 45d55.040 N 129d59.577 W. Z-1537 m.
7342	2017/07/20	06:56:23			210.6	0.8	0.6	Main Goals: Finish abbrev. 3rd transect to make pressure measurements at array of seafloor benchmarks and collect fluid sampling during first half.
7343	2017/07/20	06:57:25			210.6	0.8	0.6	Basket: HFS-intake; Suction sampler hose; 3 Gas tight Samplers; Milk Crate; 2 Hobos (104 and 151); 3 MTRs (3048 and 3201); MPR Instrument.
7344	2017/07/20	06:57:51			210.6	0.8	0.6	Basket on All Dives: Jason high-temp probe; Beast-HFS; MPR Holster; 2 Markers.
7345	2017/07/20	06:58:28			210.6	0.8	0.6	Port swing arm and starboard swing arm empty.
7346	2017/07/20	06:58:51			87.5	0.8	0.6	General Path: Vixen; AX104; AX303; AX302; AX104; AX105.
7347	2017/07/20	06:59:11			83.8	0.8	0.6	Tasks 1-7 to follow:
7348	2017/07/20	06:59:41			177.7	0.8	0.6	1. Find Vixen/Casper vents. Recover HOB0-103 at Vixen. Fluid sampling at Vixen and Casper Vents. Deploy new Hobo. Look for HOB0 147.
7349	2017/07/20	07:00:01			201.5	0.8	0.5	2. Transit to benchmarks AX104. Make pressure measurement. No fluid sampling on this visit.
7350	2017/07/20	07:00:54			209.8	0.8	0.5	3. Transit to benchmark AX303. Make pressure measurement. Sample vent fluids at Mkr33 vent/ Mkr166 vent. Also recover MTR 3052 and deploy 1 new MTR.
7351	2017/07/20	07:01:32			210.4	0.8	0.5	4. Transit to benchmark AX302. Make pressure measurement. Sample fluids at Trevi vent. Also recover HOB0101 and deploy new HOB0.
7352	2017/07/20	07:01:55			210.2	0.8	0.5	5. Transit to Mkr N3 vent. Sample fluids. Also recover MTR 4128 and deploy 1 new MTR.
7353	2017/07/20	07:02:25			210.3	0.8	0.5	6. Transit back to benchmarks AX104. Make pressure measurement. Sample fluids nearby if time. End of fluid sampling.
7354	2017/07/20	07:02:52			211.0	0.8	0.5	7. Transit to AX105. Pressure measurement. Recover mini-BPR and put new min-BPR on benchmark. End of dive.
7355	2017/07/20	07:03:05			212.9	0.8	0.5	Aim to recover Jason at 04:00 on 21-July (local time).
7356	2017/07/20	07:03:16			211.7	0.8	0.5	JASON: Jason on deck
7357	2017/07/20	07:05:13			207.9	3.5	0.6	Jason is off the deck.
7358	2017/07/20	07:07:06			211.1	193.1	0.6	JASON: Jason in water
7359	2017/07/20	07:21:21			214.3	197.1	37.5	All floats have been added to the cable. Jason is heading down.
7360	2017/07/20	07:25:51			215.3	179.1	108.1	The USBL is being added to the cable now at 140.4 m.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-967 Datalogger Comment
7361	2017/07/20	07:26:25			215.5	185.3	108.2	Deck ops are paying out cable again. Jason is descending.
7362	2017/07/20	08:15:31	45.91707	-129.99303	215.2	128.6	1402.6	We are making the bottom approach now.
7365	2017/07/20	08:20:37	45.91722	-129.99275	292.0	6.4	1525.4	JASON: Jason on bottom
7367	2017/07/20	08:21:29	45.91725	-129.99278	293.1	6.1	1526.2	NAV: Doppler Reset
7371	2017/07/20	08:22:53	45.91731	-129.99284	306.1	3.6	1528.6	Heading 305.8.
7377	2017/07/20	08:25:07	45.91739	-129.99294	265.3	3.3	1528.7	We are approaching Marker 128.
7381	2017/07/20	08:26:43	45.91743	-129.99299	265.8	0.8	1531.4	Area of diffuse flow with one active chimney.
7386	2017/07/20	08:28:41	45.91746	-129.99302	302.8	0.8	1531.6	Preparing to take a Jason temperature probe measurement of the vent.
7388	2017/07/20	08:29:11	45.91746	-129.99303	302.8	0.8	1531.5	The Jason temperature probe wand is in the vent.
7397	2017/07/20	08:33:12	45.91746	-129.99302	302.8	0.8	1531.5	Jason Tmax=287.
7398	2017/07/20	08:33:16	45.91746	-129.99301	302.8	0.8	1531.5	HIGHLIGHTS: HD highlights start
7400	2017/07/20	08:33:35	45.91746	-129.99301	302.8	0.8	1531.5	HIGHLIGHTS: HD highlights stop
7404	2017/07/20	08:35:25	45.91745	-129.99297	302.8	0.8	1531.5	We are taking a Jason temperature probe measurement directly in the vent (as opposed to alongside it in the diffuse flow as in the previous measurement).
7405	2017/07/20	08:35:31	45.91745	-129.99297	302.8	0.8	1531.5	The probe is in the vent.
7409	2017/07/20	08:36:45	45.91743	-129.99295	302.8	0.8	1531.5	Jason temperature probe measurement Tmax=297.
7411	2017/07/20	08:37:22	45.91743	-129.99294	302.8	0.8	1531.5	Preparing to take a HFS.
7414	2017/07/20	08:38:08	45.91742	-129.99293	302.9	0.8	1531.5	The Jason temperature probe is secured in the basket.
7415	2017/07/20	08:38:27	45.91742	-129.99293	302.8	0.8	1531.5	The HFS wand is being removed from the basket and moved toward the vent.
7422	2017/07/20	08:41:21	45.91742	-129.99295	302.9	0.8	1531.5	The HFS wand is in the vent and the sampler is ready to be triggered.
7424	2017/07/20	08:41:59	45.91742	-129.99296	303.0	0.8	1531.5	We are preparing to take an unfiltered piston sample in the Casper vent.
7429	2017/07/20	08:43:51	45.91743	-129.99298	303.0	0.8	1531.5	Temp is ~296degC.
7431	2017/07/20	08:44:19	45.91743	-129.99298	303.0	0.8	1531.5	SAMPLE: HFS J967-HFS-01 Start Sampling Now.
7433	2017/07/20	08:44:59	45.91743	-129.99299	303.0	0.8	1531.5	Location is 45d55.89619 N 129d59.92845 W. Depth is 1528.9 m. Altitude is 1.12 m.
7438	2017/07/20	08:46:39	45.91743	-129.99299	303.0	0.8	1531.4	J967-HFS-1 cont. Sampling Complete.
7439	2017/07/20	08:47:03	45.91743	-129.99299	303.0	0.8	1531.4	J967-HFS-1 Tmax=296.5 Tavg=295.9 T2=70 Vol=400.
7442	2017/07/20	08:47:34	45.91743	-129.99299	303.0	0.8	1531.4	Frame_Grab:
7444	2017/07/20	08:48:15	45.91742	-129.99299	303.0	0.8	1531.4	SAMPLE: GTHFS J967-GTHFS-02 Triggering Sample Now.
7447	2017/07/20	08:49:30	45.91741	-129.99299	303.0	0.8	1531.4	Sample J967-GTHFS-2 was taken using gastight GT-10 (orange-blue).
7449	2017/07/20	08:49:36	45.91741	-129.99299	303.0	0.8	1531.4	Temperature was 296.4degC.
7450	2017/07/20	08:49:44	45.91741	-129.99299	303.0	0.8	1531.4	Preparing to transit from Casper to Vixen vent.
7452	2017/07/20	08:50:04	45.91741	-129.99299	302.9	0.8	1531.4	HFS wand is being removed from the vent and placed back in the basket.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-967 Datalogger Comment
7455	2017/07/20	08:51:33	45.91739	-129.99299	219.6	3.0	1529.0	This entire region has abundant diffuse vents with plenty of tubeworms and clams.
7458	2017/07/20	08:52:21	45.91738	-129.99299	229.8	1.9	1529.8	We are approaching the Vixen vent.
7461	2017/07/20	08:53:06	45.91737	-129.99299	228.2	0.9	1531.1	HIGHLIGHTS: HD highlights start
7466	2017/07/20	08:55:27	45.91737	-129.99300	237.8	1.9	1530.0	There is a HOBO that appears to be pointed into the chimney mound. We will recover this HOBO after fluid sampling.
7468	2017/07/20	08:55:38	45.91737	-129.99300	253.7	2.5	1529.5	HIGHLIGHTS: HD highlights stop
7471	2017/07/20	08:56:56	45.91738	-129.99300	274.9	0.9	1531.0	The HFS wand has been removed from the basket and is being placed in the Vixen Vent.
7473	2017/07/20	08:57:30	45.91738	-129.99300	274.9	0.9	1531.0	The HFS wand is in the vent and ready for sampling.
7478	2017/07/20	08:59:31	45.91737	-129.99300	275.0	0.9	1530.9	SAMPLE: HFS The wand has been placed deeper into the vent.
7483	2017/07/20	09:01:27	45.91737	-129.99300	275.0	0.9	1530.9	T=318degC.
7486	2017/07/20	09:02:10	45.91736	-129.99300	275.0	0.9	1530.9	SAMPLE: HFS J967-HFS-03 Starting unfiltered piston #2.
7489	2017/07/20	09:03:14	45.91736	-129.99299	275.0	0.9	1530.9	location is 45d55.89619 N. 129d59.92845 W. Depth is 1528.5 m. Altitude is 1.7 m.
7492	2017/07/20	09:04:28	45.91737	-129.99299	275.0	0.9	1530.9	J967-HFS-3 cont. Exhaust from the beast is visible.
7494	2017/07/20	09:04:53	45.91738	-129.99298	275.0	0.9	1530.9	J967-HFS-3 cont. End sampling.
7497	2017/07/20	09:05:35	45.91739	-129.99298	275.0	0.9	1530.9	J967-HFS-3 cont. Tmax=322.8 Tavg=322.2 T2=95 Vol=400.
7498	2017/07/20	09:05:45	45.91739	-129.99298	275.0	0.9	1530.9	Preparing for another unfiltered piston sample.
7501	2017/07/20	09:06:45	45.91742	-129.99298	275.0	0.9	1530.9	SAMPLE: GTHFS Never mind... We are preparing for a GTHFS sample.
7503	2017/07/20	09:07:22	45.91743	-129.99297	275.0	0.9	1530.9	SAMPLE: GTHFS J967-HFS-04 Starting filtered piston #9.
7505	2017/07/20	09:07:52	45.91744	-129.99297	275.0	0.9	1530.9	WATCH OUT! There was intense discussion amongst the fluid samplers and they decided at the last minute to take a filtered piston sample.
7507	2017/07/20	09:08:04	45.91745	-129.99297	275.0	0.9	1530.9	THIS SAMPLE IS NOT A GTHFS SAMPLE!
7511	2017/07/20	09:09:37	45.91747	-129.99297	275.0	0.9	1530.9	HIGHLIGHTS: HD highlights start J967-GTHFS-4 cont. (actually an HFS sample) complete.
7512	2017/07/20	09:10:00	45.91747	-129.99297	275.0	0.9	1530.8	J967-GTHFS-4 cont. (actually an HFS sample) Tmax=323.5 Tavg=323.3 T2=101 Vol=375.
7514	2017/07/20	09:10:10	45.91747	-129.99297	275.1	0.9	1530.8	Preparing for GTHFS Sample.
7515	2017/07/20	09:10:21	45.91747	-129.99297	275.1	0.9	1530.9	SAMPLE: GTHFS J967-GTHFS-05. Triggered.
7517	2017/07/20	09:10:49	45.91746	-129.99297	275.1	0.9	1530.8	J967-GTHFS-5 cont. was taken using GT-16 (orange).
7520	2017/07/20	09:11:49	45.91745	-129.99298	275.1	0.9	1530.8	J967-GTHFS-5 Tmax=323.
7527	2017/07/20	09:14:46	45.91737	-129.99296	204.6	0.8	1530.9	RECOVER: HOBO temp probe Recovering HOBO with an indistinguishable number from the Vixen vent.
7529	2017/07/20	09:15:06	45.91736	-129.99296	204.5	0.8	1530.9	HIGHLIGHTS: HD highlights start The HOBO probe is covered in chalcopyrite.
7531	2017/07/20	09:15:58	45.91734	-129.99294	207.8	2.3	1529.2	HIGHLIGHTS: HD highlights stop

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-967 Datalogger Comment
7540	2017/07/20	09:19:54	45.91728	-129.99287	284.7	0.9	1530.8	The recovered HOBO is in the port arm. The HOBO to be deployed is being removed from the basket using the starboard arm. The recovered HOBO will be secured in its place.
7546	2017/07/20	09:22:30	45.91728	-129.99284	285.2	0.9	1530.7	DEPLOY: HOBO temp probe Deploying HOBO temperature probe #151 at the Vixen Vent Site.
7550	2017/07/20	09:23:43	45.91728	-129.99284	284.8	0.9	1530.7	Recovered HOBO temperature probe has been secured in the basket. Presumably this is HOBO #147.
7554	2017/07/20	09:25:17	45.91728	-129.99284	318.7	1.1	1530.6	Beginning Transit from Vixen vent to AX104 (Bag City).
7560	2017/07/20	09:27:41	45.91726	-129.99281	16.0	1.1	1530.6	We have stopped to take photos of the vent prior to transiting to Bag City.
7563	2017/07/20	09:28:50	45.91725	-129.99275	16.8	1.4	1530.5	Beginning transit to AX104 (Bag City).
7618	2017/07/20	09:55:49	45.91616	-129.98966	97.3	2.9	1527.0	We are approaching station AX104 (Bag City).
7623	2017/07/20	09:57:37	45.91614	-129.98948	347.6	2.1	1526.9	We are on station at AX104 (Bag City).
7624	2017/07/20	09:57:55	45.91613	-129.98946	347.6	2.3	1526.8	The MPR is being removed from the basket and placed on the benchmark at station AX104.
7632	2017/07/20	10:01:31	45.91614	-129.98936	354.8	1.0	1528.1	The benchmark is covered in biology.
7634	2017/07/20	10:01:40	45.91614	-129.98937	354.8	1.0	1528.1	We are attempting to scrape the benchmark using the base of the MPR.
7645	2017/07/20	10:07:03	45.91617	-129.98944	354.4	1.0	1528.0	The MPR is in position on the benchmark.
7647	2017/07/20	10:07:10	45.91617	-129.98944	354.4	1.1	1528.0	PRESSURE: Start
7651	2017/07/20	10:08:57	45.91615	-129.98942	354.3	1.0	1528.0	Location is 45d54.97109 N. 129d59.36646 W. Depth is 1525.8 m. Altitude is 1.52 m.
7689	2017/07/20	10:27:06	45.91612	-129.98944	353.9	1.0	1527.9	PRESSURE: End
7690	2017/07/20	10:27:33	45.91612	-129.98943	353.6	1.0	1527.9	The MPR is being removed from the benchmark and secured in the basket.
7693	2017/07/20	10:28:18	45.91613	-129.98941	353.5	0.9	1527.9	The MPR is secured in the basket.
7695	2017/07/20	10:29:00	45.91614	-129.98938	21.7	2.9	1526.2	We are beginning our transit from station AX104 to station AX303 (Mkr33 Vent).
7960	2017/07/20	12:41:00	45.93334	-129.98230	27.3	3.2	1510.3	Jason approaching AX-303.
7965	2017/07/20	12:42:49	45.93344	-129.98234	83.2	2.9	1509.8	Have to wait until things settle out with the ship. Have to move away from the benchmark.
7966	2017/07/20	12:42:58	45.93345	-129.98235	71.3	2.5	1509.9	NAV: Doppler Reset
7970	2017/07/20	12:44:04	45.93352	-129.98237	111.1	3.0	1509.7	Diffuse venting in this area with some bacmat and tubeworms
7975	2017/07/20	12:46:33	45.93367	-129.98238	165.5	3.5	1509.4	Lots of little critters in the water.
7977	2017/07/20	12:46:51	45.93369	-129.98238	176.1	3.6	1509.6	Jimmy is backing up to get out of the donut of death range.
7982	2017/07/20	12:48:46	45.93374	-129.98237	168.7	3.1	1509.6	After the pressure reading will head south ~25 m to the south to the Mkr-33 vent site and fluid sample.
7984	2017/07/20	12:49:28	45.93374	-129.98237	169.1	3.2	1509.6	We're on the 2011 lava flow.
7991	2017/07/20	12:52:27	45.93365	-129.98234	167.5	3.7	1509.5	We're moving forward toward the pressure benchmark AX-303.
7995	2017/07/20	12:53:59	45.93356	-129.98233	168.0	3.5	1509.5	The benchmark is ahead.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-967 Datalogger Comment
8000	2017/07/20	12:55:49	45.93347	-129.98230	179.0	0.8	1512.8	Coming in for a landing.
8004	2017/07/20	12:57:15	45.93343	-129.98228	175.0	0.8	1512.9	Retrieving the MPR from the cradle.
8007	2017/07/20	12:58:13	45.93342	-129.98227	175.1	0.9	1512.8	Placing the MPR on the benchmark (AX-303).
8009	2017/07/20	12:58:51	45.93341	-129.98227	175.2	0.8	1512.9	PRESSURE: Start Starting pressure reading here at AX-303.
8029	2017/07/20	13:08:25	45.93334	-129.98223	175.4	0.8	1512.9	Zooming in on the biota.
8033	2017/07/20	13:09:52	45.93334	-129.98224	175.4	0.8	1512.9	Zooming in on some limpets and baby tubeworms. Scaleworms too.
8037	2017/07/20	13:11:27	45.93336	-129.98224	175.4	0.8	1513.0	Nicer pic in the Super Scorpio - same spot as previous with biota.
8040	2017/07/20	13:12:32	45.93337	-129.98224	175.4	0.8	1513.0	Comparing the two cameras with same zoom. Super scorpio and science cam.
8043	2017/07/20	13:13:15	45.93338	-129.98224	175.4	0.8	1513.0	A little blue mat here too (ciliates).
8058	2017/07/20	13:20:18	45.93341	-129.98217	175.4	0.8	1513.0	PRESSURE: End AX-303 reading finished.
8060	2017/07/20	13:20:39	45.93341	-129.98217	174.9	0.9	1513.0	Grabbing the MPR and stowing it in the cradle on Jason.
8064	2017/07/20	13:22:26	45.93336	-129.98218	176.5	2.3	1511.6	Backing up to Mkr-33 vent site (Mkr-166).
8068	2017/07/20	13:23:34	45.93331	-129.98219	175.6	2.3	1511.5	Marker right ahead on stbd side.
8069	2017/07/20	13:23:58	45.93333	-129.98220	176.9	2.1	1511.4	Small mound here with some diffuse venting.
8071	2017/07/20	13:24:09	45.93329	-129.98220	177.1	2.0	1511.5	HIGHLIGHTS: HD highlights start Mkr-33 vent site.
8073	2017/07/20	13:24:36	45.93328	-129.98220	179.8	0.8	1512.8	Slow snowblower. We didn't stir that up.
8076	2017/07/20	13:26:00	45.93323	-129.98222	178.7	0.8	1512.9	Cottage cheese-looking snowblower coming out of multiple sites.
8078	2017/07/20	13:26:11	45.93323	-129.98223	178.3	0.8	1512.9	HIGHLIGHTS: HD highlights stop About 30 sec ago.
8083	2017/07/20	13:28:18	45.93319	-129.98226	176.8	2.1	1511.8	Will recover MTR-3052 here during this stop.
8087	2017/07/20	13:29:34	45.93317	-129.98229	189.6	0.9	1512.9	Some straggly-looking tubeworms here. Quite a lot of diffuse flow.
8089	2017/07/20	13:30:23	45.93317	-129.98231	189.3	0.8	1513.1	Will recover the M
8091	2017/07/20	13:30:41	45.93316	-129.98231	189.3	0.8	1513.0	whoops. Will recover the MTR first.
8097	2017/07/20	13:33:30	45.93317	-129.98235	188.9	0.8	1513.1	MTR-3052 picked up and placed in the port biobox.
8101	2017/07/20	13:34:41	45.93318	-129.98235	189.5	0.8	1513.1	Grabbing the beast wand to poke around for a sampling site.
8105	2017/07/20	13:36:17	45.93319	-129.98235	189.6	0.8	1513.1	Checking the temp in the area of the "slow-blower".
8112	2017/07/20	13:39:07	45.93319	-129.98233	190.6	0.8	1513.1	J967-HFS-06 will be the next sample.
8116	2017/07/20	13:40:51	45.93318	-129.98234	190.6	0.8	1513.1	Taking some Super-scorpio pics.
8119	2017/07/20	13:41:40	45.93316	-129.98234	190.6	0.8	1513.1	Will take oxygen reading before sampling.
8122	2017/07/20	13:42:41	45.93315	-129.98235	190.3	0.8	1513.2	Pulling the wand out of the flow. Going to switch from port to stbd Jason arm.
8125	2017/07/20	13:43:47	45.93313	-129.98237	188.7	0.8	1513.3	Grabbing the wand with the stbd arm.
8130	2017/07/20	13:45:41	45.93311	-129.98239	189.3	0.8	1513.3	The wand is back in the same place - the "slow-blower".
8133	2017/07/20	13:46:45	45.93312	-129.98240	188.9	0.8	1513.3	The nozzle is down in the hole quite deep.
8135	2017/07/20	13:47:11	45.93312	-129.98240	189.0	0.8	1513.3	Temp is 24C now and stabilizing .
8138	2017/07/20	13:48:25	45.93314	-129.98241	189.0	0.8	1513.3	Oxygen is .27 at 25 C.
8143	2017/07/20	13:50:12	45.93318	-129.98242	189.1	0.8	1513.3	Depth here is 1513. Heading is 189.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-967 Datalogger Comment
8145	2017/07/20	13:50:53	45.9332	-129.98242	189.0	0.8	1513.3	SAMPLE: HFS J967-HFS-06 start. Unfiltered bag #16. In "slow-blower" hole.
8147	2017/07/20	13:51:24	45.93321	-129.98241	189.1	0.8	1513.3	Cottage-cheese looking floc coming out of this orifice.
8149	2017/07/20	13:51:47	45.93322	-129.98241	189.3	0.8	1513.3	HIGHLIGHTS: HD highlights start J967-HFS-06 sample site.
8152	2017/07/20	13:52:53	45.93323	-129.98240	189.2	0.8	1513.3	J967-HFS-06 cont. Can see flow coming out.
8159	2017/07/20	13:55:33	45.93324	-129.98238	189.2	0.8	1513.3	J967-HFS-06 cont. stop. Tmax=25.4 Tavg=24.9 T2=10.4 Vol=500ml.
8161	2017/07/20	13:56:06	45.93324	-129.98238	189.1	0.8	1513.3	SAMPLE: HFS J967-HFS-07 start. Unfiltered bag #17.
8163	2017/07/20	13:56:57	45.93324	-129.98238	189.1	0.8	1513.3	J967-HFS-07 cont. Same sampling site.
8167	2017/07/20	13:58:13	45.93323	-129.98237	189.2	0.8	1513.3	J967-HFS-07 cont. 45d 55.9902 129d 58.9399. Z=1520. 189 degree heading.
8169	2017/07/20	13:58:42	45.93323	-129.98237	189.1	0.8	1513.3	Bill is zooming the sci cam around and looking at the site.
8170	2017/07/20	13:58:51	45.93323	-129.98237	189.1	0.8	1513.3	Pretty good flow going on here.
8171	2017/07/20	13:58:58	45.93323	-129.98237	189.1	0.8	1513.3	J967-HFS-07stop.
8173	2017/07/20	13:59:23	45.93323	-129.98237	189.0	0.8	1513.3	J967-HFS-07 cont. Tmax=25.0 Tavg=24.5 T2=10.5 Vol=500ml.
8175	2017/07/20	14:00:02	45.93322	-129.98236	189.1	0.8	1513.4	SAMPLE: HFS CORRECTION: Unfiltered bag #17 was sample 7.
8179	2017/07/20	14:01:03	45.93322	-129.98235	189.1	0.8	1513.4	Doing another oxygen reading now.
8181	2017/07/20	14:01:46	45.93321	-129.98234	189.1	0.8	1513.4	Oxygen is 0.225 at 26.5C.
8183	2017/07/20	14:02:32	45.93319	-129.98233	189.1	0.8	1513.4	SAMPLE: HFS J967-HFS-08. DNA filter #13 start.
8186	2017/07/20	14:03:30	45.93317	-129.98231	189.0	0.8	1513.4	This one will take a while.
8193	2017/07/20	14:06:26	45.93308	-129.98230	189.0	0.8	1513.4	Several different types of bac mat here: orange; white-stringy; snow-blower like with "cottage cheese" looking floc.
8195	2017/07/20	14:06:55	45.93308	-129.98230	189.2	0.8	1513.4	Zoomed in on tubeworms and scaleworms.
8197	2017/07/20	14:07:16	45.93307	-129.98231	189.0	0.8	1513.4	HIGHLIGHTS: HD highlights start Zoom at Mkr-33 while sampling.
8200	2017/07/20	14:08:32	45.93308	-129.98232	189.1	0.8	1513.4	Palm worms and tube worms poking out of a limpet clump. Snails down at the bottom (brownish-golden color)
8204	2017/07/20	14:09:34	45.9331	-129.98233	188.8	0.8	1513.4	The brownish stuff is an iron oxide precipitate??
8206	2017/07/20	14:10:10	45.93312	-129.98233	188.8	0.8	1513.4	The snails are hanging out farther from the flow. They must like lower temps than the limpets do.
8209	2017/07/20	14:11:29	45.93316	-129.98234	188.8	0.8	1513.4	PMEL Raps anchor.
8215	2017/07/20	14:13:55	45.93321	-129.98235	188.9	0.8	1513.4	Little black fish.
8217	2017/07/20	14:14:06	45.93321	-129.98236	189.0	0.8	1513.4	That fish was not a rattail.
8220	2017/07/20	14:15:05	45.93322	-129.98236	189.0	0.8	1513.5	Palm worm zoom - in the midst of a bunch of limpets. Looks like scale worms on the limpets as well.
8223	2017/07/20	14:16:27	45.93321	-129.98236	189.1	0.8	1513.5	Dancing palm worm zoom.
8226	2017/07/20	14:17:25	45.9332	-129.98236	189.0	0.8	1513.5	Nice footage on the science cam.
8231	2017/07/20	14:19:14	45.93318	-129.98237	188.8	0.8	1513.5	The two GTHFS samples have been used up previously at Casper and Vixen.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-967 Datalogger Comment
8234	2017/07/20	14:20:04	45.93317	-129.98237	188.8	0.8	1513.5	Furry (hair-like) mat to the left of the screen.
8239	2017/07/20	14:22:21	45.93317	-129.98237	188.6	0.8	1513.5	Slimy-hairy biofilm mat.
8248	2017/07/20	14:26:20	45.93319	-129.98229	188.7	0.8	1513.5	J967-HFS-08 cont. Tmax= 28.0 Tavg=27.1 T2=12 Vol=3000. Stop 1425.
8249	2017/07/20	14:26:27	45.93319	-129.98229	188.8	0.8	1513.5	Another oxygen reading next.
8253	2017/07/20	14:27:51	45.9332	-129.98226	188.7	0.8	1513.5	Oxygen = 0.183 at 27.5C.
8258	2017/07/20	14:29:57	45.93323	-129.98223	188.6	0.8	1513.6	SAMPLE: HFS J967-HFS-09 Filtered bag #21. Start.
8267	2017/07/20	14:34:01	45.93329	-129.98225	188.4	0.8	1513.6	J967-HFS-08 cont. stop.
8269	2017/07/20	14:34:21	45.93329	-129.98226	188.4	0.8	1513.6	CORRECTION: That was sample #9
8272	2017/07/20	14:35:24	45.93329	-129.98227	188.6	0.8	1513.6	J967-HFS-09 cont. Tmax=28.4 Tavg=27.7 T2=12.5 Vol=500ml.
8274	2017/07/20	14:35:54	45.93328	-129.98228	188.7	0.8	1513.5	Next we will deploy the MTR here where we were sampling.
8283	2017/07/20	14:39:45	45.93323	-129.98230	189.7	0.8	1513.5	DEPLOY: MTR temp probe MTR-3048 deployed in the same spot as our HFS samples.
8285	2017/07/20	14:40:29	45.93322	-129.98230	189.2	0.8	1513.6	Lots of floc coming out of the hole where we deployed the MTR.
8287	2017/07/20	14:41:01	45.93321	-129.98230	189.2	0.8	1513.6	That about wraps it up here.
8289	2017/07/20	14:41:28	45.9332	-129.98229	189.2	0.8	1513.6	Dave will take a DNA sample on the transit.
8297	2017/07/20	14:44:41	45.93319	-129.98226	356.8	3.9	1510.3	Flushing the beast out. Will do oxygen before DNA background sample for Carol.
8300	2017/07/20	14:45:49	45.93322	-129.98225	356.2	3.9	1510.4	Getting ready for transit from Mkr-33 to Trevi.
8304	2017/07/20	14:47:11	45.9333	-129.98225	355.1	4.2	1509.9	Starting transit. Shift change.
8306	2017/07/20	14:47:52	45.93335	-129.98225	354.9	4.0	1510.1	SAMPLE: HFS J967-HFS-10 DNA filter #14 for Carol Stepien. Sample during transit from Mkr-33 to Trevi. Start.
8310	2017/07/20	14:49:04	45.93348	-129.98227	354.8	3.9	1509.9	The sample (HFS-10) will last about 40 minutes.
8312	2017/07/20	14:49:41	45.93355	-129.98228	354.8	3.9	1510.0	Moving over the 2011 lava flow.
8314	2017/07/20	14:50:28	45.93366	-129.98230	354.7	3.6	1510.1	Heading to AX-302 at Trevi.
8333	2017/07/20	14:59:30	45.93493	-129.98249	355.6	3.5	1509.0	Collapse windows.
8335	2017/07/20	14:59:40	45.93495	-129.98249	355.8	4.1	1508.9	Small bridge between windows.
8339	2017/07/20	15:01:28	45.9352	-129.98252	355.6	5.2	1507.5	Another large collapse feature.
8351	2017/07/20	15:06:46	45.93593	-129.98263	355.1	5.3	1507.6	Transit over pillow lavas.
8376	2017/07/20	15:18:44	45.93739	-129.98283	355.4	7.8	1505.7	Large collapse.
8378	2017/07/20	15:19:16	45.93745	-129.98284	355.5	6.8	1507.3	Some pillars remaining in a collapse feature.
8394	2017/07/20	15:26:55	45.93841	-129.98295	355.6	6.0	1506.2	J967-HFS-10 Stopped. En route to Trevi from Mkr33 Vent for Carol Stepien.
8398	2017/07/20	15:28:05	45.93856	-129.98296	355.1	7.8	1506.7	SAMPLE: HFS Tmax=2.2 Tavg=2.1 T2=2.2 Volume=5000ml.
8400	2017/07/20	15:28:50	45.93865	-129.98297	356.0	9.4	1505.6	Beautiful collapse edges-very large.
8439	2017/07/20	15:47:53	45.94112	-129.98327	355.9	6.2	1506.2	Pillow flows with windows and collapse and pillars (wanting that comma again!!).
8447	2017/07/20	15:51:24	45.94166	-129.98331	356.0	5.4	1507.3	Water is a bit murkier but still over pillows and collapse.
8456	2017/07/20	15:55:08	45.94227	-129.98341	355.4	5.5	1508.3	OOI cable draped down a collapse.
8469	2017/07/20	16:01:18	45.94329	-129.98358	355.8	6.5	1509.3	More OOI cable stretched out more tightly.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-967 Datalogger Comment
8470	2017/07/20	16:01:21	45.9433	-129.98358	355.8	6.6	1509.1	USR:eventlogger
8471	2017/07/20	16:01:31	45.94333	-129.98358	355.6	7.2	1508.7	Doesn't drape over that collapse.
8502	2017/07/20	16:16:18	45.9454	-129.98383	355.0	5.5	1516.0	Heavy sediment.
8512	2017/07/20	16:20:42	45.94599	-129.98379	355.8	5.6	1513.2	Approaching the venting area. First is Spanish Steps.
8515	2017/07/20	16:21:34	45.94609	-129.98378	355.8	5.8	1512.5	Looks like a marker there so this is the Spanish Steps.
8516	2017/07/20	16:21:49	45.94611	-129.98378	354.5	6.2	1512.2	Can't see the number but should be Mkr155.
8519	2017/07/20	16:22:43	45.9462	-129.98378	355.3	6.4	1511.7	Continuing to Trevi. There is the marker!
8520	2017/07/20	16:22:53	45.94622	-129.98378	355.6	6.5	1512.1	Marker here is Mkr156.
8524	2017/07/20	16:24:18	45.94632	-129.98379	35.3	6.7	1514.3	Lots of activity at Trevi. Tephra sampler; markers; two benchmarks and some extra line.
8525	2017/07/20	16:24:23	45.94633	-129.98379	38.8	6.6	1514.5	Great overview photos.
8529	2017/07/20	16:25:56	45.94639	-129.98380	231.6	3.5	1515.8	Mkr63 and Mkr136. That is the benchmark markers not the marker at Trevi Vent.
8531	2017/07/20	16:26:16	45.9464	-129.98380	231.5	3.6	1515.7	Ship needs to make a heading change.
8535	2017/07/20	16:27:36	45.94642	-129.98380	231.5	3.5	1515.9	Waiting for the ship before doing the measurement.
8537	2017/07/20	16:28:16	45.94642	-129.98381	231.7	3.8	1515.6	Putting the HFS wand back into its holster. Didn't realize it was in the port basket.
8540	2017/07/20	16:29:25	45.94642	-129.98380	231.6	3.8	1515.6	Powering down Beast.
8543	2017/07/20	16:30:19	45.94642	-129.98380	231.7	2.1	1517.3	Landing in front of the benchmark.
8545	2017/07/20	16:30:37	45.94641	-129.98380	230.5	1.6	1517.7	Life on the edge here (or instruments on the edge!).
8549	2017/07/20	16:32:05	45.94641	-129.98379	233.7	0.8	1518.6	Retrieving the MPR from the basket.
8552	2017/07/20	16:33:13	45.94641	-129.98379	234.1	0.8	1518.6	Placing the MPR on the benchmark at AX-302 (Trevi).
8554	2017/07/20	16:33:34	45.94641	-129.98379	234.1	0.8	1518.6	Looks fairly critter free in the landing zone.
8556	2017/07/20	16:34:08	45.94641	-129.98380	234.1	0.8	1518.6	Ship is now in position at its new heading.
8559	2017/07/20	16:35:27	45.94642	-129.98380	234.3	0.8	1518.7	Fine tuning the placement.
8562	2017/07/20	16:36:12	45.94642	-129.98381	234.3	1.0	1518.7	PRESSURE: Start Starting measurement.
8568	2017/07/20	16:38:53	45.94642	-129.98383	233.9	0.8	1518.7	This is the third (and final) measurement for AX-302.
8590	2017/07/20	16:49:25	45.94644	-129.98373	231.6	0.8	1518.7	USR:eventlogger
8591	2017/07/20	16:49:32	45.94644	-129.98373	231.7	0.8	1518.7	USR:eventlogger
8593	2017/07/20	16:49:40	45.94644	-129.98373	231.6	0.8	1518.7	Close-up of miniBPR #5.
8602	2017/07/20	16:53:51	45.94643	-129.98374	231.4	0.8	1518.7	Best position for here by the cursor is 45deg 56.78506 -129deg 59.02675 (AX-302).
8608	2017/07/20	16:56:30	45.94641	-129.98376	230.8	0.8	1518.7	PRESSURE: End Stopping AX-302 third pressure measurement.
8610	2017/07/20	16:57:00	45.94641	-129.98376	230.8	0.8	1518.7	Retrieving the MPR from the benchmark.
8613	2017/07/20	16:58:00	45.9464	-129.98376	230.8	0.8	1518.8	Placing the MPR on the basket.
8615	2017/07/20	16:58:25	45.9464	-129.98376	229.8	0.8	1518.7	Small fish.
8617	2017/07/20	16:58:42	45.9464	-129.98376	230.0	0.8	1518.8	Next we will move over to the Trevi Vent at MKR-156 for fluid sampling.
8618	2017/07/20	16:58:56	45.9464	-129.98376	230.0	0.8	1518.8	Powering on the Beast.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-967 Datalogger Comment
8623	2017/07/20	17:00:50	45.94637	-129.98375	232.1	2.5	1516.9	Coming up off the site.
8624	2017/07/20	17:00:54	45.94637	-129.98375	231.9	3.4	1516.1	NAV: Doppler Reset
8626	2017/07/20	17:01:07	45.94636	-129.98375	231.7	5.6	1514.1	Nice overview again as we move over to the vent area.
8628	2017/07/20	17:01:44	45.94635	-129.98375	190.3	6.2	1513.3	Can see the white staining ahead.
8629	2017/07/20	17:01:54	45.94635	-129.98375	189.3	6.3	1513.2	The two locations are only 20m apart.
8631	2017/07/20	17:02:14	45.94634	-129.98375	188.9	5.2	1513.8	There is Trevi.
8634	2017/07/20	17:03:10	45.94631	-129.98375	189.7	2.5	1516.7	There is some leftover equipment off to the side but there is no marker here. Mkr-156 is missing.
8636	2017/07/20	17:03:57	45.94629	-129.98375	188.6	2.3	1516.9	HIGHLIGHTS: HD highlights start Trevi highlight.
8637	2017/07/20	17:04:03	45.94629	-129.98375	188.8	2.5	1516.7	Preparing for fluid sampling.
8640	2017/07/20	17:04:51	45.94627	-129.98375	188.7	2.5	1516.8	Do not easily see the HOBO that is supposed to be here.
8642	2017/07/20	17:05:17	45.94627	-129.98375	233.6	1.7	1516.8	There is the HOBO off to the left.
8644	2017/07/20	17:05:48	45.94626	-129.98375	262.2	1.1	1517.3	Looks like the HOBO wand is still in the vent!
8646	2017/07/20	17:06:13	45.94625	-129.98374	280.6	0.9	1517.5	(Just brought down the iris on the camera and could see much better).
8648	2017/07/20	17:06:38	45.94625	-129.98374	284.1	2.2	1518.0	USR:eventlogger
8649	2017/07/20	17:06:51	45.94625	-129.98374	284.1	190.5	1518.0	Lots of palm worms around the vent.
8650	2017/07/20	17:07:02	45.94625	-129.98374	284.1	193.8	1518.0	Close-up up of the wand tip and it is slightly outside the hot water.
8651	2017/07/20	17:07:14	45.94625	-129.98374	284.1	193.5	1518.0	USR:eventlogger
8653	2017/07/20	17:08:07	45.94624	-129.98374	283.1	0.8	1518.0	Saw a small-dark fish dart about.
8654	2017/07/20	17:08:21	45.94624	-129.98374	283.1	0.8	1518.0	Retrieving a HOBO out of the basket.
8657	2017/07/20	17:09:09	45.94624	-129.98374	283.1	0.8	1518.0	Putting HOBO 104 on the side of the vent for now. Will put into position later.
8658	2017/07/20	17:09:16	45.94624	-129.98374	283.1	0.8	1518.0	HIGHLIGHTS: HD highlights stop
8661	2017/07/20	17:10:28	45.94624	-129.98374	283.2	0.8	1518.0	RECOVER: HOBO temp probe Grabbing the old HOBO #101 with port arm. Looks in good shape.
8663	2017/07/20	17:10:43	45.94624	-129.98374	283.2	0.8	1518.0	Placing HOBO-101 in the basket.
8667	2017/07/20	17:12:22	45.94624	-129.98376	283.4	0.8	1518.0	Basket maintenance with securing the HOBO better.
8670	2017/07/20	17:13:12	45.94625	-129.98377	283.4	0.8	1518.0	Putting the bungee on the basket HOBOS.
8674	2017/07/20	17:14:39	45.94626	-129.98378	283.4	0.8	1518.0	Best position for Trevi Vent by the cursor is 45deg 56.77472 - 129deg 59.02453.
8676	2017/07/20	17:15:17	45.94627	-129.98379	283.2	1.1	1518.0	Moving to a better position in front of the vent for fluid sampling.
8678	2017/07/20	17:15:41	45.94627	-129.98379	283.3	1.1	1518.1	Retrieving the HFS wand.
8679	2017/07/20	17:15:55	45.94627	-129.98379	283.4	1.1	1518.1	Placing wand in the vent.
8681	2017/07/20	17:16:17	45.94628	-129.98379	283.4	0.8	1518.0	HIGHLIGHTS: HD highlights start Trevi vent sampling.
8682	2017/07/20	17:16:21	45.94628	-129.98379	283.4	1.1	1518.0	Beast pump is on.
8685	2017/07/20	17:17:16	45.94629	-129.98379	283.0	1.1	1518.1	Pushing the wand further down the orifice.
8687	2017/07/20	17:17:56	45.9463	-129.98379	283.2	1.1	1518.1	Temp is 220deg and rising.
8690	2017/07/20	17:18:59	45.9463	-129.98379	283.6	1.1	1518.1	Temp high here was 230degC. Want to bring the wand tip up a bit.

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8692	2017/07/20	17:19:17	45.9463	-129.98379	283.6	1.1	1518.1	HIGHLIGHTS: HD highlights stop
8695	2017/07/20	17:20:23	45.9463	-129.98378	283.6	1.1	1518.1	Temp is close to 230degC.
8698	2017/07/20	17:21:25	45.9463	-129.98378	283.6	1.0	1518.1	SAMPLE: HFS J967-HFS-11 Start. Unfiltered Piston #3.
8703	2017/07/20	17:23:06	45.94629	-129.98377	283.7	1.1	1518.1	SAMPLE: HFS J967-HFS-11 Can see good exhaust.
8704	2017/07/20	17:23:23	45.94629	-129.98376	283.4	1.1	1518.1	J967-HFS-11 Steady at 230deg.
8706	2017/07/20	17:23:55	45.94629	-129.98376	283.5	1.1	1518.1	J967-HFS-11 Stop.
8708	2017/07/20	17:24:18	45.94629	-129.98376	283.4	1.0	1518.1	SAMPLE: HFS J967-HFS-11 Tmax=231 Tavg=230.3 T2=66 vol=400ml.
8710	2017/07/20	17:24:58	45.94629	-129.98375	283.2	1.1	1518.1	SAMPLE: HFS J967-HFS-12 Unfiltered Piston #4. Start.
8712	2017/07/20	17:25:05	45.94629	-129.98375	283.3	1.1	1518.1	Same exact location at Trevi Vent.
8714	2017/07/20	17:26:01	45.94629	-129.98374	283.2	1.1	1518.1	J967-HFS-12 Not seeing the exhaust.
8719	2017/07/20	17:27:41	45.94629	-129.98372	283.0	1.1	1518.1	J967-HFS-12 Does not look like there is exhaust on larger screen display.
8720	2017/07/20	17:27:49	45.94629	-129.98372	283.2	1.1	1518.1	SAMPLE: HFS J967-HFS-12 Stop.
8724	2017/07/20	17:29:20	45.94628	-129.98372	283.4	1.0	1518.1	SAMPLE: HFS J967-HFS-12 Tmax=230.3 Tavg=219 T2=68 vol=475.
8726	2017/07/20	17:29:40	45.94628	-129.98372	283.4	1.0	1518.1	SAMPLE: HFS J967-HFS-13 Filtered Piston #8 Start. Same location.
8728	2017/07/20	17:30:20	45.94628	-129.98372	283.3	1.1	1518.1	SAMPLE: HFS J967-HFS-13 Exhaust looks great.
8733	2017/07/20	17:32:05	45.94626	-129.98373	282.8	1.3	1518.1	SAMPLE: HFS J967-HFS-13 End.
8734	2017/07/20	17:32:33	45.94626	-129.98374	282.8	1.1	1518.1	SAMPLE: HFS J967-HFS-13 Tmax=231 Tavg=230.7 T2=77 vol=400ml.
8736	2017/07/20	17:32:44	45.94626	-129.98374	282.9	1.1	1518.1	Done with the fluid sampler.
8738	2017/07/20	17:33:07	45.94626	-129.98374	282.8	1.1	1518.1	Next we will be taking GTBs (one or two).
8739	2017/07/20	17:33:13	45.94626	-129.98374	282.7	0.9	1518.1	Stowing the Beast wand.
8744	2017/07/20	17:35:07	45.94625	-129.98374	283.0	1.1	1518.1	Retrieving a GTB from the basket.
8748	2017/07/20	17:36:57	45.94625	-129.98374	283.2	1.0	1518.1	Grabbing the aft basket GTB. Should be GT-17 White.
8752	2017/07/20	17:38:12	45.94625	-129.98373	283.1	1.1	1518.1	It is NOT GT-17 White. It is Black GTB #5.
8756	2017/07/20	17:39:56	45.94625	-129.98371	283.1	1.1	1518.1	Placing the wand tip of the bottle into the vent orifice.
8761	2017/07/20	17:41:46	45.94625	-129.98370	283.6	0.8	1518.1	SAMPLE: GTB Close-up of the tip placement.
8766	2017/07/20	17:43:37	45.94624	-129.98371	283.1	0.8	1518.1	Repositioning and dealing with the HFS handle in the way.
8771	2017/07/20	17:45:35	45.94623	-129.98372	283.6	1.4	1518.1	USR:eventlogger
8772	2017/07/20	17:45:38	45.94623	-129.98372	283.6	0.8	1518.1	Frame_Grab:
8773	2017/07/20	17:46:02	45.94623	-129.98372	284.0	1.2	1518.1	Bending the wand tip.
8775	2017/07/20	17:46:16	45.94623	-129.98372	283.5	1.1	1518.1	Used the port wand to adjust the angle on the wand tip.
8776	2017/07/20	17:46:24	45.94623	-129.98373	283.5	1.1	1518.1	Back at the vent orifice.
8779	2017/07/20	17:47:09	45.94623	-129.98373	283.6	0.8	1518.1	Getting a close-up of the wand tip but the HFS hoses are in the view.
8782	2017/07/20	17:48:09	45.94623	-129.98374	284.1	0.8	1518.0	Going to reposition Jason to get a better angle so the tip can be viewed while sampling.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-967 Datalogger Comment
8787	2017/07/20	17:50:38	45.94626	-129.98374	282.9	175.1	1518.2	Looks like this position will give a better view.
8789	2017/07/20	17:51:29	45.94628	-129.98374	282.3	0.8	1518.2	SAMPLE: GTB Looks good here. Ready to fire.
8790	2017/07/20	17:51:47	45.94629	-129.98374	282.4	0.8	1518.2	SAMPLE: GTB J967-GTB-14 Fired. Trevi Vent in the same place as the 230deg HFS samples.
8793	2017/07/20	17:52:44	45.94631	-129.98373	282.1	0.8	1518.2	Placing the bottle back in the basket. Great sample using one arm and the plunger.
8795	2017/07/20	17:53:32	45.94633	-129.98373	282.2	1.3	1518.2	Bungee on the bottle.
8798	2017/07/20	17:54:04	45.94634	-129.98373	282.1	1.2	1518.2	Grabbing a second GTB.
8801	2017/07/20	17:55:14	45.94636	-129.98373	281.9	1.2	1518.2	Looks like White GT-17 will be the next bottle out of the basket.
8802	2017/07/20	17:55:41	45.94637	-129.98373	282.2	0.8	1518.2	Last sample was Black GT-5 for J967-GTB-14.
8804	2017/07/20	17:56:19	45.94637	-129.98373	283.2	1.1	1518.2	White GT-17 is out of the basket.
8805	2017/07/20	17:56:30	45.94637	-129.98373	283.4	1.5	1518.2	Preparing for a sample in the same place at Trevi.
8809	2017/07/20	17:58:48	45.94637	-129.98373	284.4	114.0	1518.2	SAMPLE: GTB J967-GTB-15 White GT-17 Fired at Trevi. Good placement.
8810	2017/07/20	17:59:04	45.94638	-129.98373	284.4	175.1	1518.2	Looks great!
8812	2017/07/20	17:59:39	45.94638	-129.98373	284.3	0.8	1518.2	Placing bottle back into the basket.
8814	2017/07/20	18:00:18	45.94638	-129.98373	284.3	1.3	1518.2	Bungee on the bottle.
8819	2017/07/20	18:02:16	45.94639	-129.98371	283.7	1.3	1518.2	Adjusting the bottle in the basket.
8827	2017/07/20	18:05:39	45.94639	-129.98372	283.8	2.0	1518.2	Still doing basket maintenance.
8828	2017/07/20	18:06:02	45.94639	-129.98372	283.8	1.8	1518.2	That bottle did not land nicely in the basket.
8832	2017/07/20	18:09:23	45.94638	-129.98374	283.9	179.0	1518.2	Putting the bungee back on the bottle. Last time it flipped the bottle into the basket instead of upright.
8834	2017/07/20	18:10:23	45.94638	-129.98372	283.9	176.1	1518.2	Bottle is secure.
8836	2017/07/20	18:10:56	45.94638	-129.98371	273.0	0.8	1518.0	Now will put the HOBO in place at the vent. This is HOBO-104.
8841	2017/07/20	18:12:55	45.94639	-129.98366	259.7	0.8	1518.3	Positioning to deploy.
8845	2017/07/20	18:14:16	45.9464	-129.98362	259.8	0.8	1518.2	Bending the wand tip with both arms.
8846	2017/07/20	18:14:31	45.9464	-129.98362	259.8	0.8	1518.2	Nice curve in the wand now.
8848	2017/07/20	18:14:42	45.9464	-129.98362	259.8	0.8	1518.2	Placing tip in the vent.
8850	2017/07/20	18:15:28	45.9464	-129.98360	259.4	0.8	1518.2	Fish.
8852	2017/07/20	18:15:47	45.9464	-129.98360	259.4	0.8	1518.2	Small and tan that moves like it isn't well.
8854	2017/07/20	18:16:14	45.9464	-129.98360	258.9	0.9	1518.2	DEPLOY: HOBO temp probe HOBO-104 deployed at Trevi vent where just took fluid and gas samples.
8855	2017/07/20	18:16:28	45.9464	-129.98359	258.5	0.8	1518.2	Going to go for a closer view of the wand tip.
8857	2017/07/20	18:16:55	45.9464	-129.98359	258.5	0.8	1518.2	Close-up on the pilot camera looks like the tip is pointed back into the hot water.
8860	2017/07/20	18:17:38	45.94639	-129.98359	259.3	0.8	1518.1	Placement the HOBO looks good.
8862	2017/07/20	18:18:06	45.94639	-129.98359	259.9	0.8	1518.2	We will not deploy a marker to replace the missing one here. We saw the Spanish Steps marker and the AX-302 markers so place is well-located.
8863	2017/07/20	18:18:19	45.94638	-129.98359	259.9	0.8	1518.2	A little behind schedule so decided not to deploy.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-967 Datalogger Comment
8866	2017/07/20	18:19:04	45.94637	-129.98359	262.3	0.9	1517.9	Next site is 300m bearing 200. Mkr N3 Vent is next but we will go look at the titanium donut left from a previous year.
8867	2017/07/20	18:19:07	45.94637	-129.98359	262.4	1.0	1517.9	Tube worms.
8868	2017/07/20	18:19:15	45.94637	-129.98359	264.2	1.1	1517.4	Good overview.
8870	2017/07/20	18:19:52	45.94636	-129.98359	268.1	3.3	1514.8	The ring is up to the left. Dave Dyer's experiment from APL.
8872	2017/07/20	18:20:10	45.94635	-129.98359	265.5	3.8	1513.5	Nope that wasn't it. Still looking.
8876	2017/07/20	18:21:48	45.94633	-129.98361	329.5	3.4	1515.2	Can't seem to locate it again.
8878	2017/07/20	18:22:12	45.94633	-129.98362	39.2	3.4	1515.2	USR:eventlogger
8880	2017/07/20	18:22:43	45.94633	-129.98363	24.5	7.3	1514.1	It is directly below Jason.
8882	2017/07/20	18:23:07	45.94633	-129.98364	44.6	2.7	1518.5	There is the ring.
8885	2017/07/20	18:24:11	45.94634	-129.98368	97.2	7.3	1514.4	Overview of the site.
8886	2017/07/20	18:24:22	45.94634	-129.98368	100.6	8.4	1513.2	Frame_Grab:
8887	2017/07/20	18:24:24	45.94634	-129.98368	99.7	8.2	1513.4	USR:eventlogger
8889	2017/07/20	18:24:48	45.94634	-129.98370	118.4	6.1	1515.0	Taking a survey of the site.
8891	2017/07/20	18:25:04	45.94634	-129.98371	118.6	5.4	1516.1	USR:eventlogger
8892	2017/07/20	18:25:06	45.94634	-129.98372	117.5	5.3	1516.1	Frame_Grab:
8894	2017/07/20	18:25:55	45.94633	-129.98376	316.6	6.5	1514.1	Ready to transit to Mkr-N3 vent.
8896	2017/07/20	18:26:04	45.94633	-129.98377	241.0	5.5	1513.6	300m at 200 to the site.
8899	2017/07/20	18:27:09	45.94629	-129.98384	218.1	3.5	1517.9	Sparse venting as we head away from this site and moving into pillow flows.
8912	2017/07/20	18:33:13	45.94569	-129.98424	201.0	4.4	1517.2	Some brighter sediments between the pillows.
8914	2017/07/20	18:33:55	45.94561	-129.98427	200.2	5.3	1516.1	Orange sediment.
8918	2017/07/20	18:35:30	45.94544	-129.98434	200.5	5.2	1516.5	Some pillow skins.
8923	2017/07/20	18:37:21	45.94524	-129.98442	196.0	5.5	1516.2	Fish.
8929	2017/07/20	18:39:37	45.945	-129.98453	195.9	4.6	1517.3	Small window in pillow. Sedimented pillow flow.
8930	2017/07/20	18:39:59	45.94496	-129.98454	196.2	3.6	1518.1	Flutter pillows and skin.
8932	2017/07/20	18:40:24	45.94492	-129.98456	196.0	3.1	1518.8	Orange hydrothermal sediment seems thicker but we are also closer to the bottom.
8935	2017/07/20	18:41:26	45.94481	-129.98462	196.2	3.2	1517.9	Definitely more sediments.
8939	2017/07/20	18:43:03	45.94467	-129.98470	196.2	7.6	1514.4	Flow has changed to jumbled.
8941	2017/07/20	18:43:15	45.94466	-129.98471	195.6	8.6	1512.7	Going over a slight ridge.
8945	2017/07/20	18:44:53	45.94456	-129.98479	198.3	3.5	1516.2	Watch change for Jason.
8952	2017/07/20	18:47:55	45.94446	-129.98489	200.1	2.1	1517.6	Lots of iron sediments here.
8975	2017/07/20	18:58:39	45.94385	-129.98506	201.3	1.5	1519.3	We are approaching a marker (undetermined).
8977	2017/07/20	18:59:08	45.94384	-129.98508	200.7	1.6	1519.4	Approaching the marker we see a lot of blue mat and microbial mats (white).
8979	2017/07/20	19:00:03	45.94382	-129.98510	330.5	1.4	1519.7	HIGHLIGHTS: HD highlights start
8981	2017/07/20	19:00:11	45.94382	-129.98510	330.6	1.4	1519.7	The undetermined marker is marker #135.
8988	2017/07/20	19:03:32	45.94379	-129.98512	316.2	1.9	1519.1	Frame_Grab:
8991	2017/07/20	19:04:27	45.94379	-129.98511	315.8	0.8	1520.3	Frame_Grab:

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-967 Datalogger Comment
8993	2017/07/20	19:04:45	45.94379	-129.98511	315.8	0.8	1520.3	HIGHLIGHTS: HD highlights stop
8995	2017/07/20	19:05:25	45.94378	-129.98510	315.5	0.8	1520.3	RECOVER: MTR temp probe Jason is recovering an MPR temperature probe which has been buried in microbial mats.
8997	2017/07/20	19:05:47	45.94379	-129.98510	315.4	0.8	1520.3	The number on the recovered MPR case is indistinguishable.
9001	2017/07/20	19:07:30	45.94379	-129.98510	315.2	0.8	1520.3	The HFS wand is being removed from the Jason basket and placed in the location we recovered the MTR from.
9003	2017/07/20	19:08:02	45.94379	-129.98510	315.3	0.8	1520.3	Frame_Grab:
9009	2017/07/20	19:10:33	45.9438	-129.98509	321.1	0.8	1520.3	We are repositioning the vehicle in order to get a better view of the vent.
9014	2017/07/20	19:12:27	45.94379	-129.98507	336.6	0.8	1520.4	The HFS sampling wand is being removed from the basket and placed in the diffuse-flow vent that we recovered the MTR from.
9025	2017/07/20	19:17:11	45.94374	-129.98508	336.2	0.8	1520.4	Oxygen Reading=0.244.
9030	2017/07/20	19:19:03	45.94372	-129.98512	336.3	0.8	1520.4	SAMPLE: HFS J967-HFS-16 Unfiltered Bag Sample #18 Start
9033	2017/07/20	19:20:26	45.94371	-129.98515	336.3	0.8	1520.4	J967-HFS-16 cont. Location 45d56.62141 N. 129d59.11370 W. Depth 1517.9 m. Altitude=1.17 m.
9036	2017/07/20	19:21:25	45.9437	-129.98517	336.3	0.8	1520.4	J967-HFS-16 cont. Stop.
9038	2017/07/20	19:21:54	45.9437	-129.98518	336.3	0.8	1520.4	J967-HFS-16 cont. Tmax=24.4 Tavg=24.2 T2=12 Vol=400.
9044	2017/07/20	19:24:23	45.9437	-129.98520	336.4	0.8	1520.4	SAMPLE: HFS J967-HFS-17 Filtered Piston #7 Start.
9046	2017/07/20	19:24:44	45.9437	-129.98521	336.3	0.8	1520.4	J967-HFS-17 cont. Sample was logged later at 19:23:11.
9048	2017/07/20	19:25:27	45.9437	-129.98521	336.3	0.8	1520.4	J967-HFS-17 Correction... Sample J967-HFS-17 was started at 19:23:11 and logged at 19:24:34.
9052	2017/07/20	19:26:40	45.94368	-129.98522	336.3	0.8	1520.4	J967-HFS-17 cont. stopped.
9053	2017/07/20	19:27:00	45.94368	-129.98522	336.3	0.8	1520.4	J967-HFS-17 cont. Tmax=24.5 Tavg=24.4 T2=12 Vol=550.
9056	2017/07/20	19:27:51	45.94367	-129.98522	336.3	0.8	1520.4	SAMPLE: HFS J967-HFS-18 DNA Filter #15 Start.
9058	2017/07/20	19:28:15	45.94366	-129.98522	336.2	0.8	1520.4	Samples J967-HFS-16 J967-HFS-17 and J967-HFS-18 were collected from the same vent. The HFS wand has not moved at all.
9070	2017/07/20	19:33:48	45.94361	-129.98516	336.0	0.8	1520.3	HIGHLIGHTS: HD highlights start
9073	2017/07/20	19:35:01	45.94363	-129.98514	336.1	0.8	1520.3	HIGHLIGHTS: HD highlights stop
9078	2017/07/20	19:36:51	45.94366	-129.98511	336.1	0.8	1520.3	HIGHLIGHTS: HD highlights start
9082	2017/07/20	19:38:15	45.94367	-129.98510	336.2	0.8	1520.3	HIGHLIGHTS: HD highlights stop
9083	2017/07/20	19:38:22	45.94368	-129.98510	336.2	0.8	1520.3	HIGHLIGHTS: HD highlights start
9085	2017/07/20	19:38:50	45.94368	-129.98510	336.2	0.8	1520.3	Highlight was not actually started.
9101	2017/07/20	19:46:20	45.94368	-129.98512	336.1	0.8	1520.3	HIGHLIGHTS: HD highlights start
9102	2017/07/20	19:46:30	45.94368	-129.98512	336.2	0.8	1520.3	HIGHLIGHTS: HD highlights stop
9105	2017/07/20	19:47:21	45.94368	-129.98512	336.2	0.8	1520.3	HIGHLIGHTS: HD highlights start Starting Brow Camera Highlight of the Blue Mats.
9109	2017/07/20	19:48:42	45.94369	-129.98511	336.1	0.8	1520.3	HIGHLIGHTS: HD highlights stop
9111	2017/07/20	19:49:33	45.94369	-129.98511	336.2	0.8	1520.3	J967-HFS-18 cont. End Sampling.
9114	2017/07/20	19:50:10	45.94369	-129.98510	336.2	0.8	1520.3	Tmax=24.6 Tavg=24.3 T2=12 Vol=3000 mL.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-967 Datalogger Comment
9115	2017/07/20	19:50:31	45.94369	-129.98510	336.2	0.8	1520.3	Preparing for a GTB sample.
9118	2017/07/20	19:51:25	45.94369	-129.98509	335.9	0.8	1520.3	The HFS wand is being secured in the basket.
9121	2017/07/20	19:52:20	45.94368	-129.98508	335.8	0.8	1520.3	Jason is removing the GT-2 (Green) GTB from the forward-starboard milk crate.
9128	2017/07/20	19:55:23	45.94367	-129.98505	335.7	0.8	1520.3	The G-2 Green GTB appears to be stuck on another GTB.
9130	2017/07/20	19:55:40	45.94367	-129.98505	336.0	0.8	1520.3	We have removed the G-2 Green GTB and are placing it on the vent site now.
9133	2017/07/20	19:56:52	45.94368	-129.98506	336.3	0.8	1520.3	The sampling wand is being placed in same vent in which the previous samples were measured.
9136	2017/07/20	19:57:58	45.94369	-129.98506	336.4	0.8	1520.3	The GTB is in position and is ready to be triggered.
9138	2017/07/20	19:58:31	45.9437	-129.98507	336.3	0.8	1520.2	SAMPLE: GTB J967-GTB-19 Starting Sample (GT-2 Green).
9140	2017/07/20	19:58:52	45.9437	-129.98507	335.7	0.8	1520.3	The G-2 (Green) GTB is being secured in the Jason basket.
9147	2017/07/20	20:01:59	45.94373	-129.98511	336.1	0.8	1520.2	DEPLOY: MTR temp probe Deploying MTR temperature probe at Mkr135 at Mkr-N3 vent.
9149	2017/07/20	20:02:18	45.94373	-129.98511	336.2	0.8	1520.3	The MTR has been deployed in the same region that the previous fluid samples for this site have been taken.
9152	2017/07/20	20:03:13	45.94374	-129.98513	336.3	0.8	1520.2	We are preparing to move the recovered MTR from Mkr. 135 from the forward-port milk crate to the starboard biobox to try and preserve blue siliates that have grown on the marker.
9154	2017/07/20	20:03:37	45.94374	-129.98514	336.8	0.8	1520.2	HIGHLIGHTS: HD highlights start
9156	2017/07/20	20:04:08	45.94374	-129.98515	336.2	0.8	1520.2	HIGHLIGHTS: HD highlights stop This highlight is of the MTR and marker being moved into the biobox.
9157	2017/07/20	20:04:26	45.94375	-129.98515	336.5	0.8	1520.2	We had a technical error and the previous recording was not actually taken.
9161	2017/07/20	20:06:02	45.94375	-129.98519	336.6	0.8	1520.2	The starboard biobox has been secured.
9166	2017/07/20	20:07:47	45.94376	-129.98521	337.8	0.9	1520.0	HIGHLIGHTS: HD highlights start
9168	2017/07/20	20:08:15	45.94376	-129.98521	339.4	1.4	1519.7	SAMPLE: HFS J967-HFS-20 We are running another DNA sample as we transit from Mkr135 (MkrN3 Vent) to AX104 (Bag City).
9170	2017/07/20	20:08:46	45.94377	-129.98521	332.9	2.6	1518.7	We are beginning our transit from Mkr135 to AX104 (Bag City).
9174	2017/07/20	20:10:10	45.94377	-129.98521	197.3	2.2	1518.4	USR:eventlogger
9176	2017/07/20	20:10:40	45.94377	-129.98520	187.0	2.1	1518.6	The previous highlight was from our departure from Mkr135 to highlight the abundance of the blue siliates.
9559	2017/07/20	23:21:36	45.91959	-129.98862	189.0	12.1	1515.4	Still transiting toward Bag City.
9563	2017/07/20	23:23:33	45.91932	-129.98866	188.9	5.6	1521.3	Will do pressure measurement at Bag City benchmark AX-104. Will fluid sample after that.
9569	2017/07/20	23:25:51	45.91901	-129.98870	189.1	5.7	1521.6	The benchmark here was not covered by the 2011 flow; but there was new lava in the collapse area next to the benchmark.
9572	2017/07/20	23:26:49	45.91888	-129.98872	189.1	5.4	1521.7	After fluid sampling at Bag City will head down to the South Pillow Mound benchmark.
9577	2017/07/20	23:28:40	45.91863	-129.98878	188.8	8.4	1521.6	Passing over individual lava pillars.

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9580	2017/07/20	23:29:35	45.9185	-129.98882	188.9	5.9	1521.6	The plan is to recover at 4am - but the weather is supposed to peak this evening.
9589	2017/07/20	23:33:54	45.91794	-129.98900	188.8	9.3	1521.6	Passing over an area of collapse and lava pillars.
9598	2017/07/20	23:37:54	45.91745	-129.98910	186.1	6.3	1521.7	Large collapse area to stbd on sonar.
9614	2017/07/20	23:45:23	45.91625	-129.98946	149.8	6.3	1524.5	We're on top of the target now. It's hard to see because the marker is black.
9615	2017/07/20	23:45:29	45.91624	-129.98946	110.6	6.4	1524.7	Descending down to the seafloor.
9617	2017/07/20	23:46:01	45.9162	-129.98946	117.1	5.3	1524.7	This vent field is quite large. Lots of tubeworms.
9619	2017/07/20	23:46:26	45.91617	-129.98946	46.0	4.6	1525.8	Searching for the marker.
9620	2017/07/20	23:46:32	45.91617	-129.98946	48.1	4.3	1526.0	There it is.
9622	2017/07/20	23:46:40	45.91616	-129.98946	47.1	5.4	1525.8	The benchmark is black.
9623	2017/07/20	23:46:50	45.91615	-129.98945	47.2	5.2	1526.1	NAV: Doppler Reset
9626	2017/07/20	23:47:38	45.91613	-129.98944	57.1	4.7	1526.4	The benchmark is right below us - AX-104.
9628	2017/07/20	23:48:07	45.91613	-129.98943	8.1	3.3	1527.1	HIGHLIGHTS: HD highlights start Benchmark (AX-104) and vicinity at Bag City.
9629	2017/07/20	23:48:12	45.91613	-129.98943	354.6	2.2	1527.2	Huge rattail.
9631	2017/07/20	23:48:53	45.91613	-129.98942	336.8	0.9	1528.7	HIGHLIGHTS: HD highlights stop
9634	2017/07/20	23:49:34	45.91614	-129.98941	337.8	0.9	1528.7	Zoomed in on the benchmark - which is a weird blackish color.
9638	2017/07/20	23:51:10	45.91617	-129.98939	335.6	1.6	1528.1	The MPR cable is under the fluid sampler hose. This is time for a little housekeeping.
9643	2017/07/20	23:53:15	45.9162	-129.98940	337.6	0.8	1528.7	Jason is retrieving the MPR from the cradle and placing it on the benchmark.
9645	2017/07/20	23:53:34	45.91621	-129.98940	337.5	0.8	1528.7	Why is this benchmark so black?
9649	2017/07/20	23:55:08	45.9162	-129.98942	337.4	0.8	1528.7	PRESSURE: Start AX-104 pressure measurement here at Bag City.
9652	2017/07/20	23:56:08	45.91619	-129.98943	337.1	0.8	1528.8	It's sort of a mystery why this benchmark and flag are so dark?
9659	2017/07/20	23:59:06	45.91613	-129.98945	337.1	0.8	1528.8	Great lava drip photos
9661	2017/07/20	23:59:36	45.91613	-129.98945	336.9	0.8	1528.8	Close-up of a pillow skin with little drips.
9663	2017/07/21	00:00:13	45.91612	-129.98945	337.1	0.8	1528.8	Spider close-up
9667	2017/07/21	00:01:56	45.91612	-129.98944	336.9	0.8	1528.8	Biology photos while taking the pressure measurement.
9669	2017/07/21	00:02:18	45.91612	-129.98944	336.8	0.8	1528.8	There has been a spider infestation at this site.
9675	2017/07/21	00:04:40	45.91616	-129.98941	337.0	0.8	1528.8	Flag has seen better days.
9684	2017/07/21	00:08:35	45.91618	-129.98939	337.2	0.8	1528.8	Tube worms don't look that lush or healthy.
9688	2017/07/21	00:10:13	45.91616	-129.98939	337.1	0.8	1528.8	Fish.
9690	2017/07/21	00:10:54	45.91615	-129.98939	337.0	0.8	1528.8	Amazing amount of diffuse vent fluid coming up from this site.
9697	2017/07/21	00:13:39	45.91614	-129.98938	337.1	0.8	1528.8	Two more minutes of pressure readings.
9699	2017/07/21	00:14:24	45.91615	-129.98938	336.9	0.8	1528.8	Bag City AX-104.
9702	2017/07/21	00:15:13	45.91615	-129.98937	337.1	0.8	1528.9	PRESSURE: End Done with this measurement.
9704	2017/07/21	00:15:35	45.91615	-129.98937	337.9	0.8	1528.8	Retrieving the MPR from the benchmark AX-104.
9706	2017/07/21	00:16:20	45.91616	-129.98936	337.7	0.8	1528.8	Putting MPR on the basket.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-967 Datalogger Comment
9709	2017/07/21	00:17:10	45.91617	-129.98936	337.2	0.8	1528.9	Going to put a fresh marker here since the old one is black.
9711	2017/07/21	00:18:01	45.91617	-129.98936	337.4	0.8	1528.8	Retrieving a marker from the basket Mkr-276.
9716	2017/07/21	00:19:42	45.91619	-129.98936	337.5	0.8	1528.9	DEPLOY: marker Mkr-276 deployed to the left of the benchmark (the old marker is to the right).
9719	2017/07/21	00:20:57	45.91621	-129.98937	337.1	0.8	1528.9	Going to sample down over the edge in front of the ROV. The heading in the virtual van is not the heading of Jason.
9728	2017/07/21	00:23:48	45.91625	-129.98942	100.1	0.8	1530.1	Went over the ledge and exploring an area to sample diffuse fluids.
9730	2017/07/21	00:24:13	45.91626	-129.98943	109.9	1.3	1529.7	Looks like a good place in the back of the tube worm clump.
9731	2017/07/21	00:24:21	45.91626	-129.98943	108.5	1.4	1529.4	That looks great in the limpet cavern.
9733	2017/07/21	00:24:42	45.91627	-129.98944	110.9	1.6	1529.4	Can't see the origin of the fluid.
9734	2017/07/21	00:24:47	45.91627	-129.98944	110.5	1.7	1529.2	Little black fish.
9748	2017/07/21	00:30:35	45.9163	-129.98941	159.8	0.8	1528.8	Looking around for a sampling site.
9753	2017/07/21	00:33:01	45.91626	-129.98936	199.4	1.1	1528.7	Poking around to find a good sampling site.
9762	2017/07/21	00:36:44	45.91621	-129.98936	200.6	0.9	1528.7	The next sample will be #21.
9763	2017/07/21	00:36:56	45.91621	-129.98936	200.4	1.0	1528.7	Retrieving the wand.
9768	2017/07/21	00:38:56	45.91622	-129.98937	200.2	1.0	1528.8	Using the port arm to check the temperature with the wand.
9771	2017/07/21	00:39:55	45.91623	-129.98937	200.4	0.9	1528.8	Want to find a warm spot. We're up to 12.6C here.
9775	2017/07/21	00:41:19	45.91624	-129.98937	200.2	0.9	1528.8	Poking around in this batch of tubeworms.
9779	2017/07/21	00:42:46	45.91626	-129.98937	200.6	0.9	1528.8	Lots of flow coming out here.
9780	2017/07/21	00:42:53	45.91626	-129.98937	200.7	0.9	1528.8	New spot now up to 13C.
9783	2017/07/21	00:43:34	45.91626	-129.98937	200.4	0.9	1528.7	Still poking around.
9785	2017/07/21	00:44:15	45.91626	-129.98937	200.4	0.9	1528.8	Temperature is 13.4 here.
9787	2017/07/21	00:44:43	45.91626	-129.98937	200.4	0.9	1528.8	Dave thinks we should just do this.
9793	2017/07/21	00:47:27	45.91624	-129.98940	200.4	0.9	1528.8	SAMPLE: HFS J967-HFS-21 Unfiltered bag #19. In diffuse flow and tubeworm bush. Start.
9800	2017/07/21	00:50:12	45.91622	-129.98941	200.3	0.9	1528.8	J967-HFS-21 cont. Stop.
9802	2017/07/21	00:50:48	45.91622	-129.98941	200.4	0.9	1528.8	J967-HFS-21 cont. Tmax=13.6 Tavg=13.4 Vol=502ml T2=7.3.
9804	2017/07/21	00:51:15	45.91622	-129.98941	200.4	0.9	1528.8	SAMPLE: HFS J967-HFS-22 Unfiltered bag #20 start.
9808	2017/07/21	00:52:38	45.91623	-129.98940	200.4	1.0	1528.8	J967-HFS-22 cont. 45d 54.96997 129d 59.3700. Z=1528 Hdg=239.
9810	2017/07/21	00:53:07	45.91623	-129.98940	200.4	1.0	1528.8	J967-HFS-22 cont. Had to start the sampling manually.
9811	2017/07/21	00:53:24	45.91624	-129.98939	200.4	1.0	1528.8	All the Bag City samples will have the same lat/long/Z/hdg.
9814	2017/07/21	00:54:14	45.91624	-129.98939	200.4	1.0	1528.8	J967-HFS-22 cont. Stop.
9816	2017/07/21	00:54:47	45.91625	-129.98938	200.4	1.0	1528.8	J967-HFS-22 cont. Stop now. Correction.
9818	2017/07/21	00:55:10	45.91625	-129.98938	200.4	1.0	1528.8	J967-HFS-22 cont. Tmax=13.1 Tavg=12.8 T2=7.4 Vol=494ml.
9820	2017/07/21	00:55:44	45.91626	-129.98937	200.3	1.0	1528.8	SAMPLE: HFS J967-HFS-23 Filtered bag #22. Start
9827	2017/07/21	00:58:40	45.91627	-129.98937	200.4	1.0	1528.8	J967-HFS-23 cont. Stop.
9829	2017/07/21	00:59:08	45.91627	-129.98937	200.3	1.0	1528.8	J967-HFS-23 cont. Tmax=13.1 Tavg=12.8 Vol=495ml T2=6.4.
9832	2017/07/21	01:00:32	45.91627	-129.98939	200.4	0.9	1528.8	SAMPLE: HFS J967-HFS-24 DNA filter #10. Start.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-967 Datalogger Comment
9842	2017/07/21	01:04:52	45.91628	-129.98945	200.2	1.0	1528.9	J967-HFS-24 cont. This is a 20 minute sample.
9869	2017/07/21	01:17:40	45.91627	-129.98934	199.0	1.1	1529.0	After this we will move up in the water column a bit during the Sentry launch.
9870	2017/07/21	01:18:00	45.91628	-129.98934	198.8	0.9	1529.0	Jimmy is adjusting the MPR in the cradle.
9875	2017/07/21	01:19:47	45.9163	-129.98935	198.6	1.0	1529.1	Rearranging things on the vehicle. Going to try to bungee the hobos.
9882	2017/07/21	01:22:34	45.91632	-129.98934	198.9	1.6	1529.1	J967-HFS-24 stop (at 3 liters).
9884	2017/07/21	01:23:15	45.91632	-129.98934	198.7	1.0	1529.1	J967-HFS-24 Vol=3000ml Tmax=13.3 Tavg=12.6 T2=6.8.
9887	2017/07/21	01:24:09	45.91631	-129.98934	199.0	1.0	1529.0	Oxygen sensor position 12. Turning on the sample pump.
9888	2017/07/21	01:24:30	45.91631	-129.98935	200.1	1.0	1529.0	Jimmy has rearranged the hobos.
9893	2017/07/21	01:26:07	45.91631	-129.98936	200.4	0.9	1529.0	Oxygen reading: O2=0.327 T=11.6
9894	2017/07/21	01:26:20	45.91631	-129.98936	200.5	0.9	1529.0	Picking up the wand and putting it into the holster.
9896	2017/07/21	01:26:48	45.91631	-129.98936	200.9	0.9	1529.0	Finished fluid sampling at Bag City vent.
9898	2017/07/21	01:27:14	45.91631	-129.98937	200.5	0.9	1529.0	Stowing the wand.
9901	2017/07/21	01:28:05	45.91631	-129.98937	199.7	0.8	1529.1	We're going to stay on the bottom while they launch Sentry. If the bridge is good with that.
9903	2017/07/21	01:28:57	45.91631	-129.98936	202.2	1.6	1528.7	Pulling back from the sampling site a bit.
9905	2017/07/21	01:29:17	45.91631	-129.98936	202.2	3.2	1527.4	The sampling site is about 5 meters north of the benchmark.
9908	2017/07/21	01:30:24	45.91631	-129.98935	203.2	10.4	1520.0	Going to come up about 70 meters for the Sentry launch - the captain likes that better.
9910	2017/07/21	01:31:01	45.91631	-129.98935	204.1	10.2	1520.2	Moving Jason 70 m up to 1460m and 30m to the side.
9913	2017/07/21	01:45:18	45.91587	-129.98980	202.3	71.1	1459.5	Sentry is almost ready to launch.
9914	2017/07/21	01:46:41	45.91588	-129.98981	202.2	71.3	1459.2	After the Sentry launch we will transit to AX-105 benchmark (South Pillow Mound).
9915	2017/07/21	01:51:50	45.91591	-129.98979	202.4	71.1	1459.6	Sentry is on its way down.
9916	2017/07/21	01:55:55	45.91592	-129.98978	202.2	71.1	1459.6	Hanging here because Sentry is not getting any USBL fixes.
9917	2017/07/21	01:57:32	45.91592	-129.98978	202.2	71.1	1459.5	Sentry was deployed at 0148 for dive #445.
9918	2017/07/21	01:59:18	45.91591	-129.98978	202.0	71.4	1459.3	The South pillow mound benchmark is ~6km south of us.
9919	2017/07/21	02:02:24	45.91591	-129.98978	202.1	71.3	1459.5	Still no word from Sentry.
9920	2017/07/21	02:09:37	45.91589	-129.98978	201.9	71.5	1459.2	Sentry is on the move. USBL problem solved.
9921	2017/07/21	02:14:25	45.91588	-129.98976	201.8	71.4	1459.4	We don't have control of the ship yet.
9922	2017/07/21	02:25:33	45.91577	-129.98974	190.8	71.4	1459.3	Jason crew has control. Distance to AX-105: ~6km. Heading: 190 degrees
9923	2017/07/21	02:26:08	45.91575	-129.98975	193.5	71.1	1459.8	We're currently sitting at a Dep of 1459 m and Alt of 71
9924	2017/07/21	02:26:46	45.91572	-129.98976	191.2	72.0	1459.1	Time to destination: estimated at around 390 minutes
9925	2017/07/21	03:57:10	45.90483	-129.99199	190.2	67.7	1478.3	No logging on this transit.
9955	2017/07/21	08:52:51	45.86414	-130.00393	191.1	4.0	1715.1	NAV: Doppler Reset
9972	2017/07/21	09:00:35	45.86329	-130.00391	115.1	3.0	1713.8	We are approaching station AX105.
9976	2017/07/21	09:02:25	45.86321	-130.00385	0.8	2.7	1714.1	The MPR has been removed from the basket and is being placed on the benchmark.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-967 Datalogger Comment
9979	2017/07/21	09:03:06	45.86318	-130.00382	350.7	0.9	1716.1	The BPR at AX105 is not in the same position that it was deployed in. The Collar and handle are hanging off of the benchmark.
9983	2017/07/21	09:04:45	45.86316	-130.00377	355.8	0.8	1716.2	The MPR is in position on the benchmark and we are prepared to start the measurement.
9984	2017/07/21	09:04:50	45.86316	-130.00377	355.8	0.8	1716.2	PRESSURE: Start
9987	2017/07/21	09:05:42	45.86315	-130.00375	355.7	0.8	1716.2	Location: 45d51.79302 N. 130d0.23356 W. Depth=1713.8 m. Altitude = 1.25 m.
10027	2017/07/21	09:25:19	45.86313	-130.00377	355.2	0.8	1716.0	PRESSURE: End
10029	2017/07/21	09:25:38	45.86313	-130.00377	355.2	0.8	1716.0	The MPR is being removed from the benchmark and secured in the Jason basket.
10039	2017/07/21	09:30:26	45.86315	-130.00374	29.4	0.8	1715.9	RECOVER: MBPR MBPR #13 is being recovered from the AX105 benchmark and placed in the starboard biobox.
10041	2017/07/21	09:30:39	45.86315	-130.00373	29.4	0.8	1715.9	BPR #13 is secured in the starboard biobox.
10044	2017/07/21	09:31:39	45.86316	-130.00372	29.6	0.8	1715.9	BPR #4 was deployed on the seafloor on a previous pass. BPR #4 is now being picked up off of the seafloor and placed on the benchmark at station AX105.
10047	2017/07/21	09:32:58	45.86317	-130.00371	29.3	0.8	1715.9	DEPLOY: MBPR #4 is in position on the benchmark at station AX105.
10049	2017/07/21	09:33:04	45.86317	-130.00371	29.0	0.8	1715.8	Frame_Grab: Moving off bottom and over benchmark.
10052	2017/07/21	09:34:30	45.86319	-130.00369	50.7	1.0	1715.6	Frame_Grab:
10054	2017/07/21	09:34:58	45.8632	-130.00369	51.5	1.4	1715.4	There is a large fissure a few meters east of AX105.
10057	2017/07/21	09:35:52	45.86321	-130.00368	50.4	0.8	1716.3	Correction. There is a large fissure a few meters WEST of AX105. Heading is 50deg.
		09:34:30						Narrow fissure adjacent to benchmark.
10059	2017/07/21	09:36:04	45.86322	-130.00368	49.7	0.8	1716.5	Frame_Grab: Followin the fissure (09:35). See lava in base of fissure.
10061	2017/07/21	09:36:45	45.86322	-130.00368	51.7	0.8	1716.0	Following the fissure North we see that a large portion of the fissure is filled by the 1998 flow.
10062	2017/07/21	09:36:57	45.86322	-130.00368	49.5	0.8	1716.5	We are landing to take a few rock samples.
09:37:04 - 11:02:04: Comments logged after the dive from video so logs may not be at the precise time but recorded to the nearest 30-second data from the automatic photo snap. Samples collected are not sequential as they were also logged after the dive.								
10063	2017/07/21	09:37:04	45.86322	-130.00368	49.3	1.3	1716.9	Primarily new flow with a few older pillows peaking out from the newer flow.
10066	2017/07/21	09:38:34	45.86324	-130.00368	56.4	1.2	1717.3	SAMPLE: Geo J967-GEO-27. Piece of intact pillow from 1998 flow just past where new lava flowed out of the fissure (southern contact). Small bud below a tube spanning two pillows. Some glass shattered off rock while sampling. Put into milk crate. (Sample number out of order as recorded after dive).
10067	2017/07/21	09:39:04	45.86324	-130.00368	56.4	1.2	1717.3	Older flows.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-967 Datalogger Comment
10068	2017/07/21	09:39:34	45.86325	-130.00369	21.2	0.9	1716.0	Coming off bottom and moving forward. Lobates adjacent to jumbled sheet flow.
10069	2017/07/21	09:40:04	45.86326	-130.00369	22.6	1.2	1715.8	Beautiful orange crinoid in jumbled sheet flow with sediment.
10070	2017/07/21	09:40:33	45.86327	-130.00369	22.7	0.9	1715.8	Frame_Grab:
10071	2017/07/21	09:40:34	45.86327	-130.00369	22.7	0.9	1715.8	Adjusted iris to get better photo and close-ups.
10072	2017/07/21	09:40:35	45.86327	-130.00369	22.6	0.9	1715.9	Frame_Grab:
10075	2017/07/21	09:42:04	45.86329	-130.00370	4.8	0.8	1716.4	Close-ups of other biology adjacent to the orange filter feeder.
10078	2017/07/21	09:43:34	45.86332	-130.00371	4.8	0.8	1716.4	Distant sea star images.
10079	2017/07/21	09:44:04	45.86332	-130.00371	4.8	0.8	1716.4	Jason moving again over the jumbed flow transitioning into larger pillows.
10081	2017/07/21	09:45:04	45.86335	-130.00371	3.9	1.1	1715.8	Heavier sediments.
10083	2017/07/21	09:46:04	45.86337	-130.00371	9.1	0.8	1716.8	Moving HFS wand from holster to STBD basket for better view.
10085	2017/07/21	09:47:04	45.8634	-130.00371	9.1	0.8	1716.8	Using port arm to touch sea star.
10088	2017/07/21	09:48:34	45.86346	-130.00370	9.7	0.8	1716.8	Imagery of sea star.
10090	2017/07/21	09:49:34	45.86351	-130.00368	9.3	1.6	1715.8	Jason moving over jumbled sheet flow with some larger pillow/tubes.
10091	2017/07/21	09:50:04	45.86353	-130.00368	23.3	2.3	1715.3	Heavier sediments and some striated flat flow.
10093	2017/07/21	09:51:04	45.86359	-130.00366	22.2	3.0	1715.0	Pillows and tubes covered with sediment.
10096	2017/07/21	09:52:34	45.86368	-130.00363	23.1	3.2	1714.5	Smaller darker pillows around larger sedimented pillows.
10100	2017/07/21	09:54:34	45.86383	-130.00358	21.5	2.3	1717.2	Another many-armed filter feeder (crinoid)and adjacent sea pen.
10103	2017/07/21	09:56:04	45.8639	-130.00356	24.8	0.8	1718.8	Biology close-ups in heavy-sedimented pillows.
10104	2017/07/21	09:56:22	45.86391	-130.00355	24.8	0.8	1718.8	Frame_Grab:
10105	2017/07/21	09:56:25	45.86392	-130.00355	24.8	0.8	1718.8	Frame_Grab: Filter feeders; coral-like animal and brittle stars.
10110	2017/07/21	09:58:34	45.86401	-130.00352	19.6	1.1	1718.2	Moving along.
10112	2017/07/21	09:59:34	45.86404	-130.00351	351.4	1.5	1718.3	Glass sponge?
10117	2017/07/21	10:02:04	45.8641	-130.00349	344.1	0.8	1719.0	Still taking images of glass sponge on older lavas.
10122	2017/07/21	10:04:34	45.86413	-130.00348	276.6	0.9	1719.1	Older pillows and striated lava tube.
10125	2017/07/21	10:06:04	45.86415	-130.00348	272.8	0.8	1719.4	Attempting to take sample of pillow. Too intact and not a good set-up.
10128	2017/07/21	10:08:04	45.86419	-130.00347	259.5	1.3	1719.4	Attempted rock sample from intact pillow flow.
10129	2017/07/21	10:08:34	45.86421	-130.00347	258.6	0.9	1719.4	No sample as too solid to take a large piece.
10130	2017/07/21	10:09:04	45.86422	-130.00347	259.6	0.8	1719.4	Moving again.
10132	2017/07/21	10:10:04	45.86425	-130.00346	9.6	1.7	1718.6	Larger pillows and tubes with moderate sediment. Crossed 1998 contact.
10133	2017/07/21	10:10:34	45.86427	-130.00346	14.2	2.4	1718.4	Smaller buds at bases.
10138	2017/07/21	10:13:04	45.86439	-130.00344	21.8	2.5	1716.4	Transition from large pillow to smaller then back again to larger pillows and tubes.
10139	2017/07/21	10:13:34	45.86442	-130.00344	12.9	2.8	1715.5	Large floc particles in water.
10140	2017/07/21	10:14:04	45.86445	-130.00343	12.6	2.4	1715.3	Smaller intact forms.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-967 Datalogger Comment
10142	2017/07/21	10:15:04	45.86451	-130.00342	5.2	2.3	1715.7	Some larger striated pillows with smaller pillow buds.
10143	2017/07/21	10:15:34	45.86453	-130.00342	8.1	0.9	1716.8	Setting down to sample.
10146	2017/07/21	10:17:04	45.8646	-130.00341	8.0	1.1	1716.7	1998 lava with glass. Attempted to sample bud taken from base of a large striated pillow. Sample crushed when attempted to remove from larger pillow.
10147	2017/07/21	10:17:34	45.86462	-130.00340	7.7	1.1	1716.7	Attempting to sample a different piece on side of adjacent pillow.
10150	2017/07/21	10:19:04	45.8647	-130.00339	7.4	1.0	1716.8	SAMPLE: J967-GEO-28. Grabbed piece of freshly crushed bud from striated pillow. Can see upper glass layer. Pillow adjacent to flatter-smaller intact lavas. 1998 lava flow. (Sample number out of order as recorded after dive).
10153	2017/07/21	10:20:34	45.86478	-130.00336	3.4	1.6	1716.3	Moving forward again.
10155	2017/07/21	10:21:34	45.86483	-130.00335	16.0	2.0	1715.7	Striated pillows and tubes mixed with smaller pillow buds.
10156	2017/07/21	10:22:04	45.86486	-130.00334	16.5	2.6	1716.0	Less sediment.
10157	2017/07/21	10:22:34	45.86489	-130.00333	17.5	2.1	1716.4	Larger pillows again. Possible mix of new and old flows.
10159	2017/07/21	10:23:34	45.86495	-130.00332	15.2	1.3	1720.1	Large striated pillow with sediment within smaller darker lavas. Contact 1998 and older flows.
10160	2017/07/21	10:24:04	45.86498	-130.00331	14.4	1.5	1720.3	Large rattail fish swam by.
10162	2017/07/21	10:25:04	45.86503	-130.00330	15.5	1.9	1720.0	Lavas look glassy but also a lot of sediment.
10165	2017/07/21	10:26:34	45.86511	-130.00329	351.1	1.7	1719.8	Touch down on bottom. Brittle stars on lavas with lots of sediment pockets between pillows.
10168	2017/07/21	10:28:04	45.86517	-130.00328	351.7	1.4	1720.2	Basket maintenance of moving MPR hoses into the basket instead of draping over the front.
10170	2017/07/21	10:29:04	45.8652	-130.00328	351.7	1.4	1720.2	Most of wires inside basket.
10173	2017/07/21	10:30:34	45.86524	-130.00327	352.3	1.0	1720.6	While on bottom Pilot attempting a rock sample in older lavas.
10174	2017/07/21	10:31:04	45.86525	-130.00327	350.7	1.0	1720.6	Lava in place so shattered by stbd manipulator. Not sampled.
10175	2017/07/21	10:31:34	45.86526	-130.00327	350.9	1.0	1720.6	Lifting off bottom and moving forward.
10176	2017/07/21	10:32:04	45.86527	-130.00327	356.3	1.4	1720.1	Contact with new lavas (smaller & darker pillows) next to heavily sedimented old pillows.
10179	2017/07/21	10:33:34	45.86528	-130.00328	18.0	2.6	1718.4	Heavy sediment on older lavas and coming into more newer flow.
10180	2017/07/21	10:34:04	45.86529	-130.00328	10.2	2.3	1718.1	Mix of old and new lavas.
10182	2017/07/21	10:35:04	45.86529	-130.00328	359.5	1.2	1719.4	Attempting sample with port manipulator.
10183	2017/07/21	10:35:34	45.86529	-130.00329	359.4	1.3	1719.4	Large bud on older pillow. Did not get it.
10184	2017/07/21	10:36:04	45.8653	-130.00329	0.9	1.2	1719.4	Trying newler lava adjacent to old but too far away.
10187	2017/07/21	10:37:34	45.86531	-130.00329	0.2	1.2	1719.3	Trying old bud again.
10188	2017/07/21	10:38:04	45.86531	-130.00329	1.6	1.1	1719.3	Got a large piece. 1998 lava. (Later in dive removed from basket. Pilot in training.)
10190	2017/07/21	10:39:04	45.86534	-130.00328	1.1	1.1	1719.4	Moving along again but eyeing the new small tube again.
10193	2017/07/21	10:40:34	45.86539	-130.00325	347.3	0.9	1719.4	Stopped again over patch of new lavas with some brittle stars. Many particles in water.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-967 Datalogger Comment
10194	2017/07/21	10:41:04	45.86542	-130.00323	347.3	1.0	1719.3	Attempting to sample again.
10195	2017/07/21	10:41:34	45.86545	-130.00321	347.2	1.0	1719.3	No sample.
10196	2017/07/21	10:42:04	45.86549	-130.00319	347.1	0.9	1719.3	Moving forward again over new lavas.
10197	2017/07/21	10:42:34	45.86553	-130.00316	12.7	2.5	1718.5	Mix of large and small pillow.
10199	2017/07/21	10:43:34	45.86563	-130.00310	26.0	2.9	1717.1	Primarily larger pillows.
10200	2017/07/21	10:44:04	45.86569	-130.00306	26.0	3.2	1717.2	Looks like less sediment but flying a little higher.
10202	2017/07/21	10:45:04	45.86579	-130.00299	21.7	2.4	1718.0	Some elongated tubes. More sediment visible as closer to the bottom.
10206	2017/07/21	10:47:04	45.86608	-130.00280	26.7	2.1	1718.0	Smaller intact pillows mixed with some large tubes.
10207	2017/07/21	10:47:34	45.86616	-130.00275	26.9	2.7	1716.8	Large tubes and climbing a bit.
10208	2017/07/21	10:48:04	45.86623	-130.00270	26.1	1.9	1715.2	Less sediment and flatter-smalelr lavas. A few larger forms.
10209	2017/07/21	10:48:34	45.86631	-130.00265	26.0	2.6	1713.9	Shrimp.
10210	2017/07/21	10:49:04	45.86638	-130.00259	28.1	2.1	1713.5	Still climbing.
10212	2017/07/21	10:50:04	45.86652	-130.00250	25.2	2.5	1712.4	Moving quickly forward over dark-glassy flow with some sediment.
10213	2017/07/21	10:50:34	45.86658	-130.00245	24.7	1.8	1712.3	Sea star.
10214	2017/07/21	10:51:04	45.86664	-130.00241	24.4	2.1	1711.8	Flatter forms giving way to some larger pillows and tubes. Less sediment.
10215	2017/07/21	10:51:34	45.86669	-130.00237	25.0	3.0	1710.1	Much less sediment.
10216	2017/07/21	10:52:04	45.86674	-130.00234	25.2	3.1	1709.7	Basket out against pillows.
10217	2017/07/21	10:52:34	45.86678	-130.00230	25.3	3.1	1709.7	STBD arm removing the sample from STBD milk crate (on top of HFS wand) taken at 10:38.
10218	2017/07/21	10:53:04	45.86681	-130.00228	25.3	3.1	1709.7	Some small leftover pieces are in the milk crate.
10219	2017/07/21	10:53:34	45.86684	-130.00225	25.3	3.2	1709.6	Moving along again.
10220	2017/07/21	10:54:04	45.86687	-130.00223	26.6	3.6	1709.1	Stirred up a bit of sediment although pillows don't appear to have too much. Patch of 2011 lava.
10221	2017/07/21	10:54:34	45.86689	-130.00221	27.7	3.2	1707.8	Some truncated lava tubes around base of larger pillows.
10223	2017/07/21	10:55:34	45.86692	-130.00218	59.7	2.7	1708.5	Attempting sample with port arm of truncated tube.
10225	2017/07/21	10:56:34	45.86695	-130.00216	59.4	2.6	1708.5	Using SBTD manipulator now at same location.
10226	2017/07/21	10:57:04	45.86696	-130.00216	71.2	3.5	1708.1	No sample. Moving left around this part of the flow.
10228	2017/07/21	10:58:04	45.86698	-130.00214	92.3	1.8	1708.3	Could this be a newer flow? In 2011 flow and probably in it for a few minutes.
10230	2017/07/21	10:59:04	45.86702	-130.00213	90.2	1.0	1708.8	Attempting sample with STBD arm on smaller bud. Have a nice bud in jaws and very glassy but fell.
10231	2017/07/21	10:59:34	45.86704	-130.00213	89.4	1.3	1708.8	Trying to pick up fallen piece but no luck.
10232	2017/07/21	11:00:04	45.86707	-130.00212	89.9	1.4	1708.8	Trying for another piece and got it. Looks like a broken piece of the first dropped lava.
Normal logging from here to end of dive.								
10235	2017/07/21	11:01:34	45.8672	-130.00211	89.9	1.0	1708.8	SAMPLE: Geo J967-geo-25. Here in the 2011 lava flow. In a little mound surrounded by 1998 flow. Put in stbde milkcrate.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-967 Datalogger Comment
10240	2017/07/21	11:03:13	45.86739	-130.00210	5.9	1.2	1710.5	1998 flow has stalked crinoids all over it and the 2011 flow does not.
10242	2017/07/21	11:03:49	45.86747	-130.00210	5.4	1.4	1713.5	Location 45d 52.0160 130d 0.13073 Z=1709.
10243	2017/07/21	11:04:01	45.8675	-130.00210	6.1	1.7	1713.3	Back in 1998 lava. All of a sudden see crinoids.
10246	2017/07/21	11:04:37	45.86759	-130.00211	4.9	1.9	1713.0	J967-geo-25 was a piece of 2011 pillow.
10248	2017/07/21	11:05:10	45.86762	-130.00211	5.6	2.8	1712.3	Moving north over the 1998 lava flow.
10251	2017/07/21	11:06:08	45.86774	-130.00212	4.8	2.5	1712.4	Seeing crinoids on this lava flow. Not all that heavily sedimented.
10256	2017/07/21	11:07:45	45.86799	-130.00217	5.3	0.8	1713.8	We're going to go into the collapse of the 1998 flow and move into a higher area with little mounds of the 2011 flow.
10264	2017/07/21	11:11:15	45.8684	-130.00239	323.2	1.8	1712.1	The last sample was a pillow toe.
10265	2017/07/21	11:11:30	45.86842	-130.00241	340.0	1.7	1712.0	Here's the collapse
10267	2017/07/21	11:12:02	45.86846	-130.00245	138.3	6.8	1711.0	HIGHLIGHTS: HD highlights start 1998 collapse to the SE of 2011 little mounds (which we will see next).
10269	2017/07/21	11:12:06	45.86847	-130.00246	138.7	6.7	1711.0	The nav is great.
10271	2017/07/21	11:12:43	45.86851	-130.00250	134.6	3.7	1714.5	Sea Pickle!!?? We have it on highlights. Z=1719.
10274	2017/07/21	11:13:38	45.86857	-130.00258	136.5	3.1	1715.2	Beautiful look at this area of bathtub rings and lava drips.
10277	2017/07/21	11:14:47	45.86863	-130.00266	136.4	3.3	1715.1	Amazing lava drips on the bottom of this arch. Beautiful crinoid too.
10278	2017/07/21	11:14:51	45.86863	-130.00266	136.5	3.3	1715.1	HIGHLIGHTS: HD highlights stop
10280	2017/07/21	11:15:17	45.86865	-130.00269	40.0	2.6	1714.3	Will turn toward the middle of the collapse and then head NE to see the contact.
10284	2017/07/21	11:16:36	45.86872	-130.00275	327.5	1.9	1715.3	Traveling over jumbled lavas toward the east edge of the collapse.
10285	2017/07/21	11:16:45	45.86872	-130.00275	329.2	2.8	1715.1	Scrambled up lavas.
10287	2017/07/21	11:17:05	45.86874	-130.00276	330.1	3.1	1715.3	Rattail.
10288	2017/07/21	11:17:11	45.86874	-130.00277	329.0	3.0	1715.2	USR:eventlogger
10290	2017/07/21	11:17:37	45.86876	-130.00277	330.4	2.7	1715.3	That's a different species of rattail. The tail is not as long and skinny. It's a bit darker.
10293	2017/07/21	11:18:59	45.86882	-130.00277	329.1	2.2	1715.4	The collapse area here seems more sedimented?
10297	2017/07/21	11:20:06	45.86887	-130.00273	60.9	2.4	1714.8	Turning 90 degrees to the right. It looks like it will drop off even more ahead.
10298	2017/07/21	11:20:15	45.86888	-130.00272	59.6	2.2	1714.4	Here we go.
10299	2017/07/21	11:20:24	45.86888	-130.00271	60.3	1.8	1714.7	Contact!!!
10301	2017/07/21	11:21:00	45.86891	-130.00267	61.1	1.9	1715.3	HIGHLIGHTS: HD highlights start Contact. 2011 lavas (pillows) over the 1998 lavas (collapsed jumbled).
10303	2017/07/21	11:21:32	45.86893	-130.00264	61.6	2.7	1713.6	The 2011 flow here is pillows.
10305	2017/07/21	11:21:41	45.86894	-130.00263	59.8	2.8	1712.9	The nav is right on.
10308	2017/07/21	11:22:41	45.86898	-130.00253	59.2	3.3	1708.9	Climbing up this mound of pillows.
10311	2017/07/21	11:23:39	45.86902	-130.00243	58.4	3.0	1705.4	Eruption rate mostly determines if we see pillows or sheet flows.
10313	2017/07/21	11:24:13	45.86904	-130.00237	59.3	3.6	1703.2	Getting steeper. Climbing up this little mound.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-967 Datalogger Comment
10315	2017/07/21	11:24:46	45.86906	-130.00231	58.7	4.5	1700.8	Pillows only occur underwater. The water cools the surface faster than air so it's more likely to form a crust all around (tubes).
10316	2017/07/21	11:25:01	45.86907	-130.00229	59.0	3.1	1699.8	HIGHLIGHTS: HD highlights stop
10324	2017/07/21	11:28:12	45.86917	-130.00195	59.9	2.6	1700.3	Holothurian.
10327	2017/07/21	11:29:09	45.8692	-130.00185	57.5	5.4	1700.7	Going down the other side of this little pillow mound (NE side).
10335	2017/07/21	11:32:56	45.86926	-130.00154	94.3	3.7	1705.1	The plan is to head to the east - moving off the 2011 flow onto 1998 flow and then to little patch of 2011 flow.
10337	2017/07/21	11:33:07	45.86926	-130.00153	96.1	3.7	1704.7	We only have about 20 more minutes on the bottom.
10342	2017/07/21	11:35:08	45.86927	-130.00139	97.1	2.8	1704.1	We're moving now.
10343	2017/07/21	11:35:15	45.86927	-130.00138	98.3	2.6	1704.3	Pillow lavas all around.
10348	2017/07/21	11:37:06	45.86927	-130.00126	94.9	2.6	1702.0	Not seeing any critters on the flow.
10350	2017/07/21	11:37:50	45.86927	-130.00121	95.5	4.0	1699.6	Mr. Crabby - King of the Hill.
10351	2017/07/21	11:37:59	45.86927	-130.00120	95.8	4.1	1698.9	Pillow drain out here.
10353	2017/07/21	11:38:18	45.86927	-130.00119	94.6	5.3	1698.2	Pillow tubes flowing down hill here.
10356	2017/07/21	11:39:16	45.86927	-130.00111	97.4	2.6	1698.5	We are moving along the east side of this pillow mound - heading east toward the contact.
10357	2017/07/21	11:39:16	45.86927	-130.00111	97.4	2.6	1698.5	USR:eventlogger
10358	2017/07/21	11:39:23	45.86927	-130.00110	92.2	3.0	1698.1	We're on 2011 flow.
10360	2017/07/21	11:39:47	45.86927	-130.00107	93.7	3.7	1697.1	Exploded pillow.
10369	2017/07/21	11:43:37	45.86929	-130.00078	95.6	1.4	1697.4	Still traveling to the east.
10377	2017/07/21	11:47:16	45.86933	-130.00051	96.7	1.5	1698.9	The ship is going half a knot.
10378	2017/07/21	11:47:32	45.86933	-130.00049	95.2	0.9	1698.0	We're staying off the bottom until the sensor on the cable gets over the mound.
10385	2017/07/21	11:50:23	45.86934	-130.00021	91.9	15.8	1690.7	We're in "mid-water" until the cable transponder is over the dome.
10388	2017/07/21	11:51:30	45.86933	-130.00005	91.4	24.2	1690.4	There's a transponder on the cable - that we're worried about scraping on the top of the mound.
10391	2017/07/21	11:52:17	45.86933	-129.99996	93.9	25.2	1689.8	USBL fixes are where we are at. The doppler has dropped out.
10392	2017/07/21	11:52:33	45.86933	-129.99991	94.0	24.9	1690.1	So we missed the contact on the eastern edge of this mound.
10394	2017/07/21	11:52:50	45.86932	-129.99986	94.7	23.8	1691.3	We're on the 1998 flow.... Coming back down to the bottom.
10399	2017/07/21	11:54:37	45.8693	-129.99958	95.3	4.7	1710.8	NAV: Doppler Reset Bottom in sight again.
10400	2017/07/21	11:54:52	45.8693	-129.99953	95.0	4.2	1711.3	NAV: Doppler Reset Reset now.
10402	2017/07/21	11:55:13	45.86929	-129.99946	94.9	2.8	1712.8	Moving over jumbled 1998 lavas.
10404	2017/07/21	11:55:38	45.86929	-129.99938	96.2	2.9	1712.3	Here we are coming up a bit off of the collapse.
10405	2017/07/21	11:55:43	45.86928	-129.99937	93.7	2.7	1712.3	HIGHLIGHTS: HD highlights start
10407	2017/07/21	11:56:11	45.86928	-129.99927	93.7	1.6	1713.1	Little circular collapse
10408	2017/07/21	11:56:22	45.86927	-129.99923	94.8	1.6	1713.6	Back on pillow/lobate flow.
10411	2017/07/21	11:57:15	45.86926	-129.99910	94.3	2.5	1714.6	Pillows are dusted with sediment. Several crinoids.
10413	2017/07/21	11:57:56	45.86925	-129.99896	96.0	2.6	1716.0	We are moving fast toward the next contact.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-967 Datalogger Comment
10415	2017/07/21	11:58:08	45.86925	-129.99892	93.2	3.1	1716.1	Crinoids.
10416	2017/07/21	11:58:11	45.86925	-129.99891	93.3	2.8	1716.3	HIGHLIGHTS: HD highlights stop.
10418	2017/07/21	11:58:44	45.86924	-129.99880	90.2	4.6	1717.3	Approaching the contact according to the nav. Don't see it on the bottom yet.
10420	2017/07/21	11:59:28	45.86923	-129.99870	83.0	2.3	1721.6	Bill thinks we are in the 2011 flow.
10422	2017/07/21	11:59:45	45.86923	-129.99865	82.9	1.1	1723.1	No crinoids. Bill thinks we're in the 2011 flow.
10423	2017/07/21	11:59:52	45.86923	-129.99863	86.0	1.1	1723.2	Is this a contact here?
10425	2017/07/21	12:00:18	45.86923	-129.99855	87.1	1.2	1723.2	Bill thinks we're in the 2011 flow.
10426	2017/07/21	12:00:33	45.86922	-129.99852	88.5	1.2	1723.2	SAMPLE: Geo J967-geo-26
10429	2017/07/21	12:01:21	45.86922	-129.99841	82.0	1.4	1723.1	Picking up a rock. Pillow bud.
10432	2017/07/21	12:02:14	45.86922	-129.99830	172.1	1.5	1722.8	Location here is: 45d 52.15330 129d 59.89575 Z=1724m.
10434	2017/07/21	12:02:34	45.86922	-129.99825	168.9	1.2	1723.2	Did not get that rock. Trying for another one.
10436	2017/07/21	12:03:23	45.86922	-129.99815	168.6	1.3	1723.2	J967-geo-26 cont. 2nd attempt at a piece of pillow here.
10439	2017/07/21	12:04:13	45.86922	-129.99805	168.4	1.3	1723.2	J967-geo-26 cont. Pillow toe. Big one. Into the stbd biobox.
10441	2017/07/21	12:04:42	45.86922	-129.99799	170.1	1.3	1723.2	That's it for this dive.
10443	2017/07/21	12:05:19	45.86922	-129.99790	149.2	2.6	1721.0	The second geo sample was larger than the first and is sitting on top of the other in the box.
10447	2017/07/21	12:07:03	45.86923	-129.99773	109.4	16.9	1710.3	This rock is from an area that is a little pad of the 2011 lava surrounded by 1998 flow.
10449	2017/07/21	12:07:17	45.86923	-129.99770	108.9	20.3	1706.8	JASON: Jason on bottom About 2 minutes ago.
10451	2017/07/21	13:10:59			102.9	174.5	49.6	Sea pickles everywhere here near the surface.
10452	2017/07/21	13:11:26			106.8	179.3	48.5	Sea pickles (pyrosomes) everywhere here near the surface. This is sad.....
10453	2017/07/21	13:12:08			105.8	188.3	44.5	Pulling the footballs off the cable.
10454	2017/07/21	13:13:04			108.6	150.1	32.3	45d 52.23788 129d 59.87570. Position of recovery.
10455	2017/07/21	13:13:27			108.1	141.4	27.5	Taking highlights and frame grabs of the pyrosomes (sea pickles).
10456	2017/07/21	13:14:04			109.5	157.8	17.3	HIGHLIGHTS: HD highlights stop Sea pickles.
10457	2017/07/21	13:17:32			106.1	112.9	2.5	JASON: Jason out of water
10458	2017/07/21	13:18:08			54.2	128.4	0.9	JASON: Jason out of water
10459	2017/07/21	13:18:28			30.5	128.4	0.8	Disregard first JASON out of water; second is right
10460	2017/07/21	13:19:56			30.5	128.4	0.8	JASON: Jason on deck
10461	2017/07/21	13:20:18			30.5	128.4	0.8	End of J2967

J2-968

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-968 Datalogger Comment
10463	2017/07/21	19:57:25			294.4	0.8	0.6	Prepping for J2-968 Dive at North Rift Zone of Axial Seamount at Little Chimneys
10464	2017/07/21	20:11:54			294.7	0.8	0.5	Beast power is on.
10465	2017/07/21	20:13:04			292.8	1.0	0.6	Jason off deck
10466	2017/07/21	20:13:49			302.4	3.8	0.6	Do not see Beast communications. Holding launch. Laptop wasn't plugged in.
10467	2017/07/21	20:15:18			299.6	3.8	0.6	Beast is communicating-going to proceed with launch.
10468	2017/07/21	20:16:46			41.6	3.8	0.6	JASON: Jason in water Holding launch due to sewage being discharged from ship.
10469	2017/07/21	20:16:57			41.7	3.8	0.7	Jason not in water!!
10470	2017/07/21	20:19:13			40.0	3.8	0.7	All clear to launch.
10471	2017/07/21	20:20:08			308.2	187.4	2.4	JASON: Jason in water Actually in the water this time for J2-968.
10472	2017/07/21	20:21:02			133.8	0.8	2.8	J2-968 8hr Fluid Sampling Dive
10473	2017/07/21	20:33:40			148.5	187.2	72.4	Deployment Location: 46deg 7.237'N -129deg 58.183'W z=1765m
10474	2017/07/21	20:34:11			148.9	176.8	79.6	Main Goals: Explore top of 2015 lava flow with lava lake drain-out where MBARI ROV dive found min-smoker vents active in August 2016.
10475	2017/07/21	20:35:35			149.1	182.9	107.1	If still active we will sample fluids.
10476	2017/07/21	20:38:16			149.4	185.9	115.6	Basket for this dive: HFS fluid sampler intake; suction sampler hose; 2 gas-tight samplers; milk-crate
10477	2017/07/21	20:38:44			149.0	176.0	115.8	Basket on all dives: Jason high-temp probe; Beast-HFS; 2 markers
10478	2017/07/21	20:39:12			149.1	189.9	115.9	Tasks: 1) Explore top of large 2015 pillow mound lava flow with drained out lava lake
10479	2017/07/21	20:39:46			148.8	185.7	119.2	at the top where MBARI ROV dive found min-smoker vents active in August 2016.
10480	2017/07/21	20:40:13			149.5	193.5	130.2	Vents were found at the margins of the collapse area. If still active-will sample fluids.
10481	2017/07/21	20:40:40			150.7	178.0	128.7	Whole dive will be within an area ~500m across at the top of the pillow mound; exploring the edges of the collapse area.
10482	2017/07/21	20:46:28			148.8	191.3	284.4	Descent is at 30m/min to match the wire out rate.
10483	2017/07/21	20:47:08			148.7	191.2	302.5	Traveling through the sea pickles.
10484	2017/07/21	21:03:31			148.9	190.9	789.0	1000m to go to the bottom.
10485	2017/07/21	21:10:24			149.0	134.1	1010.5	765 meters to go!
10486	2017/07/21	21:24:54			148.9	109.9	1451.6	About 10 minutes to go until bottom.
10487	2017/07/21	21:33:01			36.7	129.5	1636.9	We're at 1640m.
10488	2017/07/21	21:36:29			44.9	87.3	1677.6	About 100 m off the bottom.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-968 Datalogger Comment
10489	2017/07/21	21:38:20			84.6	43.7	1720.9	Bunches of German helmet jellys.
10490	2017/07/21	21:38:38			85.0	35.7	1729.3	We're 40m off the bottom.
10492	2017/07/21	21:39:31			85.2	16.6	1747.6	Waypoint 2 is where MBARI sampled in 2016.
10495	2017/07/21	21:40:12	46.12081	-129.96955	82.7	4.9	1760.1	There were multiple spots where they saw the small spigots with black smoke
10496	2017/07/21	21:40:21	46.12081	-129.96955	83.1	4.4	1760.6	JASON: Jason on bottom Bottom in sight.
10499	2017/07/21	21:41:11	46.12083	-129.96955	84.1	7.6	1757.7	This is all within the 2015 lava flow on the NRZ.
10501	2017/07/21	21:41:42	46.12084	-129.96955	81.8	9.5	1755.7	NAV: Doppler Reset
10503	2017/07/21	21:42:06	46.12085	-129.96955	43.7	5.2	1760.1	Heading to WP 1 first.
10506	2017/07/21	21:43:06	46.12087	-129.96954	45.3	1.7	1763.4	Lobate flows here. Looks like there may be a bit of eruptive mat on these flows (yellow color).
10508	2017/07/21	21:43:50	46.12089	-129.96954	64.8	1.4	1763.5	Beautiful collapse in this lobate/ sheet flow.
10510	2017/07/21	21:44:08	46.1209	-129.96953	142.9	1.4	1763.9	That's an incredible collapse with thick crust.
10511	2017/07/21	21:44:14	46.1209	-129.96953	159.6	1.8	1764.0	No jumble in the bottom of it.
10512	2017/07/21	21:44:24	46.1209	-129.96953	189.0	1.8	1764.2	HIGHLIGHTS: HD highlights start Collapse in the new flow.
10514	2017/07/21	21:45:03	46.12091	-129.96953	193.8	0.8	1765.3	Lava drips on the bottom of this ledge - at the edge of a collapse.
10518	2017/07/21	21:46:16	46.12092	-129.96952	198.2	1.9	1764.2	We're going to head to waypoint 2.
10520	2017/07/21	21:46:34	46.12092	-129.96952	198.4	3.2	1762.8	The nav is slightly off - to the west of the bathymetry.
10521	2017/07/21	21:47:02	46.12092	-129.96953	201.1	3.4	1761.4	Moving over the top of the 2015 flow.
10523	2017/07/21	21:47:30	46.12091	-129.96953	214.6	4.2	1760.9	Light colored block (a piece of the wall) is a cross section that was lifted up by the flow.
10525	2017/07/21	21:47:50	46.12091	-129.96953	171.2	5.5	1759.4	Settling in for a transect toward WP2.
10527	2017/07/21	21:48:12	46.1209	-129.96953	52.3	3.2	1761.6	We hope to find the little black smoker chimneys at WP2.
10528	2017/07/21	21:48:32	46.12089	-129.96954	58.8	2.0	1762.9	The nav is skewed slightly to the west of the bathymetry.
10531	2017/07/21	21:49:32	46.12087	-129.96956	210.4	1.4	1763.3	Akel is turning to head to WP 2.
10533	2017/07/21	21:49:49	46.12086	-129.96957	211.0	1.4	1763.6	The nav is ~2-5 m to the west of the bathymetry.
10534	2017/07/21	21:50:00	46.12085	-129.96957	210.5	1.2	1763.7	We're traveling over the same chunk of crust we saw earlier.
10536	2017/07/21	21:50:14	46.12085	-129.96958	211.5	1.8	1763.2	Jumbled up flow in the middle of these inflated lobes.
10537	2017/07/21	21:50:30	46.12084	-129.96958	211.8	1.2	1763.6	Scaleworm just swam by.
10540	2017/07/21	21:51:18	46.12081	-129.96961	211.9	1.5	1763.9	Eruptive mat still in the cracks between the pillows.
10541	2017/07/21	21:51:25	46.12081	-129.96961	212.6	1.7	1763.8	Seeing some white staining ahead.
10542	2017/07/21	21:51:29	46.12081	-129.96961	212.1	1.7	1763.8	Another scaleworm
10544	2017/07/21	21:51:37	46.1208	-129.96961	211.4	1.7	1763.9	Could be the little chimney right here.
10546	2017/07/21	21:52:07	46.12079	-129.96963	223.7	1.2	1764.6	HIGHLIGHTS: HD highlights start Seeing a little smoke coming from this little black chimney on top of pillow lobes.
10547	2017/07/21	21:52:19	46.12078	-129.96963	224.0	1.2	1764.7	There's flow coming out of that little chimney.
10548	2017/07/21	21:52:31	46.12078	-129.96964	231.7	1.1	1764.8	Not black smoke - clearer than in 2016.
10551	2017/07/21	21:53:05	46.12076	-129.96965	216.0	1.3	1764.6	The smoke looks a bit darker - possibly in a hold behind the chimney.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-968 Datalogger Comment
10552	2017/07/21	21:53:26	46.12076	-129.96965	218.2	0.9	1764.9	Some white bacterial mat here; as well as yellow eruptive mat.
10554	2017/07/21	21:54:00	46.12075	-129.96966	213.2	0.8	1765.0	Zooming in on some smoke coming out of a hole. It's darker than what we saw earlier.
10556	2017/07/21	21:54:17	46.12075	-129.96966	213.0	0.8	1765.0	The spherical blobs on the rocks are probably "bag creatures".
10559	2017/07/21	21:55:26	46.12073	-129.96967	212.8	0.8	1765.0	Bag creature; little black spigot; darker smoke coming out of the base of this little mound.
10561	2017/07/21	21:55:34	46.12073	-129.96967	212.4	0.8	1765.0	See some little sulfide worms.
10563	2017/07/21	21:56:16	46.12073	-129.96967	213.0	0.8	1765.0	Large round globules of white floc also coming out.
10564	2017/07/21	21:56:32	46.12073	-129.96967	213.0	0.8	1765.0	HIGHLIGHTS: HD highlights stop
10567	2017/07/21	21:57:32	46.12072	-129.96967	212.9	0.8	1765.0	This is an inflated lobe area here.
10570	2017/07/21	21:58:07	46.12072	-129.96967	212.6	1.6	1764.4	We're going to circle the mound and see what else is here.
10571	2017/07/21	21:58:17	46.12072	-129.96967	213.9	1.1	1764.6	HIGHLIGHTS: HD highlights start Circling the mound.
10573	2017/07/21	21:58:37	46.12072	-129.96967	210.0	1.1	1764.8	Black smoke coming out of the end of a big lobe.
10574	2017/07/21	21:58:50	46.12071	-129.96967	204.7	1.6	1764.2	Having a look-see.
10577	2017/07/21	21:59:34	46.12071	-129.96967	121.2	1.8	1763.8	Zooming in and circling.
10579	2017/07/21	22:00:07	46.1207	-129.96967	81.1	1.2	1764.4	Lots of flow coming out of various cracks in the lobate flow.
10581	2017/07/21	22:00:50	46.1207	-129.96967	34.8	1.1	1765.2	Switching the nav screen to DVL from USBL.
10583	2017/07/21	22:01:10	46.1207	-129.96966	21.7	1.0	1765.2	Little black fish swam by.
10584	2017/07/21	22:01:24	46.1207	-129.96966	7.3	1.4	1765.0	Broken pillow tube ahead with radial fracture.
10585	2017/07/21	22:01:32	46.12069	-129.96966	3.6	1.4	1764.9	Lots of flow coming out of this area.
10587	2017/07/21	22:01:59	46.12069	-129.96966	357.5	1.6	1764.6	Another small chimney to the right that seems to not have any flow.
10590	2017/07/21	22:02:21	46.12069	-129.96966	355.2	1.0	1765.2	Clear fluid coming out of the little black chimney at the top of this little high spot.
10592	2017/07/21	22:02:53	46.12069	-129.96966	356.0	1.0	1765.2	First we will try to sample the little black chimney.
10594	2017/07/21	22:03:25	46.12069	-129.96966	356.8	1.3	1765.0	J968-geo-01 sample will be the little black chimney.
10596	2017/07/21	22:03:54	46.12069	-129.96966	0.4	1.6	1764.7	Moving in for the chimney grab.
10598	2017/07/21	22:04:28	46.12069	-129.96966	358.2	1.2	1765.0	The smoke looks like it has a black tinge to it - it's not totally clear fluids.
10600	2017/07/21	22:04:37	46.12069	-129.96966	357.9	1.2	1765.0	HIGHLIGHTS: HD highlights stop
10606	2017/07/21	22:07:10	46.1207	-129.96966	357.9	1.2	1765.0	SAMPLE: Geo J968-geo-01. Little black chimney at the top of this mound.
10608	2017/07/21	22:07:37	46.1207	-129.96966	358.2	1.2	1765.0	HIGHLIGHTS: HD highlights start 968-geo-01 Little black smoker chimney - Grabbed as one piece.
10610	2017/07/21	22:08:21	46.1207	-129.96967	358.8	1.2	1765.0	968-geo-01 cont. Going in the stbd biobox. Lots of dust roiled up - but looks like an excellent sample.
10617	2017/07/21	22:11:31	46.1207	-129.96966	357.6	1.1	1765.0	968-geo-01. Location: 46.12069 129.96967 Z=1766 Hdg=357.
10619	2017/07/21	22:11:42	46.1207	-129.96966	357.7	1.1	1765.0	HIGHLIGHTS: HD highlights stop
10621	2017/07/21	22:12:26	46.1207	-129.96967	358.0	1.2	1765.0	Grabbing the wand to take the temperature in the perfect little hole that was created after sampling the entire chimney.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-968 Datalogger Comment
10623	2017/07/21	22:12:57	46.1207	-129.96967	358.0	1.2	1765.0	Have the HFS wand out going for the orifice.
10625	2017/07/21	22:13:13	46.1207	-129.96967	357.8	1.2	1765.0	This will be a great temperature reading.
10627	2017/07/21	22:13:38	46.1207	-129.96967	357.9	1.2	1765.0	Temperature is 200C already.
10630	2017/07/21	22:14:49	46.1207	-129.96967	357.9	1.2	1765.0	Temperature is 306C now. That's hotter than Virgin was this time.
10632	2017/07/21	22:15:08	46.12069	-129.96967	357.9	1.2	1765.0	Temperature is 314C now.
10633	2017/07/21	22:15:29	46.12069	-129.96968	357.8	1.1	1765.0	Bag creatures around the flow here.
10635	2017/07/21	22:15:58	46.12069	-129.96968	357.8	1.1	1765.0	Bag creatures are generally at diffuse areas - weird - the temperature has risen to 316C.
10638	2017/07/21	22:16:55	46.12069	-129.96967	357.7	1.1	1765.0	SAMPLE: HFS J968-HFS-02 Unfiltered piston #9. Start.
10641	2017/07/21	22:17:38	46.12068	-129.96967	358.0	1.2	1765.0	Long tubes on the rock are rust-colored. BBQ tubeworms?
10643	2017/07/21	22:18:08	46.12068	-129.96967	357.9	1.2	1765.0	Scaleworm on the yellow/orange mat. Bill says it's "cute".
10645	2017/07/21	22:19:01	46.12067	-129.96966	357.8	1.2	1765.0	Looking around the sampling site. Snails to the right on the orange eruptive (?) mat.
10647	2017/07/21	22:19:12	46.12067	-129.96966	357.8	1.2	1765.0	Bag creatures and some white bacterial mat.
10648	2017/07/21	22:19:30	46.12067	-129.96965	357.9	1.2	1765.0	Sulfide worm in the background very near the hot flow.
10650	2017/07/21	22:19:36	46.12067	-129.96965	358.0	1.2	1765.0	J968-HFS-02 cont. stop.
10652	2017/07/21	22:20:09	46.12067	-129.96965	357.9	1.2	1765.0	J968-HFS-02 cont. Tmax=3179 Tavg=317.6 T2=40 Vol=500ml.
10654	2017/07/21	22:20:55	46.12067	-129.96964	357.7	1.1	1765.0	SAMPLE: HFS J968-HFS-03 Unfiltered piston #8.
10656	2017/07/21	22:21:08	46.12067	-129.96964	357.9	1.2	1765.0	J968-HFS-03 start.
10658	2017/07/21	22:21:51	46.12067	-129.96964	357.8	1.2	1765.0	J968-HFS-02 CORRECTION. Tmax was 317.9 (not 3179)!!
10660	2017/07/21	22:22:34	46.12067	-129.96964	357.8	1.2	1765.0	J968-HFS-03 cont. Zoomed in on intense flow and creatures.
10663	2017/07/21	22:23:16	46.12067	-129.96964	357.7	1.1	1765.0	Now are looking at the rocks below. Cute orange scaleworm. Looks like limpets and snails here.
10665	2017/07/21	22:23:44	46.12067	-129.96964	357.8	1.1	1765.0	The orange mat is just sort of wafting around (remember bacterial balls?).
10666	2017/07/21	22:23:47	46.12067	-129.96964	357.8	1.1	1765.0	J968-HFS-03 cont. Stop.
10668	2017/07/21	22:24:11	46.12067	-129.96964	357.9	1.2	1764.9	J968-HFS-03 cont. Tmax=317.6 Tavg=316 T2=40 Vol=500ml.
10672	2017/07/21	22:25:55	46.12068	-129.96966	357.9	1.2	1764.9	SAMPLE: HFS J968-HFS-04 Unfiltered bag #17. Start.
10674	2017/07/21	22:26:30	46.12068	-129.96967	358.0	1.2	1764.9	J968-HFS-04 cont. Can see the HFS exhaust now.
10679	2017/07/21	22:28:25	46.12067	-129.96967	358.0	1.2	1764.9	J968-HFS-04 cont. Looks like the top of this mound is about 20 m at a bearing of 110 degrees from the Jason nav fixes.
10680	2017/07/21	22:28:29	46.12067	-129.96967	358.1	1.2	1764.9	J968-HFS-04 cont. stop.
10682	2017/07/21	22:29:00	46.12067	-129.96968	358.0	1.2	1764.9	J968-HFS-04 cont. Tmax=317.5 Tavg=316.6 T2=40 Vol=300.
10685	2017/07/21	22:29:37	46.12067	-129.96968	358.1	1.2	1764.9	J968-HFS-05 next will be a piston sample.
10686	2017/07/21	22:30:02	46.12067	-129.96967	358.0	1.2	1764.9	SAMPLE: HFS J968-HFS-05 Unfiltered piston #1. Start.
10692	2017/07/21	22:32:08	46.12066	-129.96967	358.0	1.2	1764.9	Bill says there were multiple sites between these waypoints. The first obvious spot was WP2. Multiple sites between WP2 and WP3.
10694	2017/07/21	22:32:55	46.12065	-129.96967	358.0	1.2	1764.9	It's unusual to see such hot venting on a new flow. Is it over a

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-968 Datalogger Comment
								dike?
10695	2017/07/21	22:32:59	46.12065	-129.96967	358.0	1.2	1764.9	J968-HFS-05 cont. stop.
10697	2017/07/21	22:33:29	46.12065	-129.96966	358.2	1.2	1764.9	J968-HFS-05 cont. Tmax=318.2 Tavg=317.7 T2=42 Vol=500C.
10700	2017/07/21	22:34:29	46.12065	-129.96965	358.1	1.2	1764.9	SAMPLE: GTHFS J968-GTHFS-06 firing.
10704	2017/07/21	22:35:36	46.12065	-129.96964	358.2	1.2	1764.9	J968-GTHFS-06 cont. That was the blue-orange GTHFS sample T=317.5.
10706	2017/07/21	22:36:25	46.12064	-129.96964	358.2	1.2	1764.9	We have enough samples with the beast here in this orifice.
10707	2017/07/21	22:36:31	46.12064	-129.96964	358.2	1.2	1764.9	Stowing the beast.
10717	2017/07/21	22:40:51	46.12065	-129.96963	357.8	1.2	1764.9	SAMPLE: GTB J968-GTB-07 (gas tight bottle) in the same orifice as the previous HFS samples. Firing.
10720	2017/07/21	22:41:56	46.12066	-129.96964	357.7	1.1	1764.9	Red GTB-09 was sample J968-GTB-07.
10722	2017/07/21	22:42:20	46.12066	-129.96964	357.7	1.1	1764.9	Will now use the Jason temperature probe to double up on the temperature measurement.
10729	2017/07/21	22:45:07	46.12066	-129.96965	357.8	1.1	1764.8	Happy Hour Vent Field is what we are hoping to call this area.
10733	2017/07/21	22:46:41	46.12066	-129.96965	357.6	1.2	1764.8	Prosecco Vent has been declared as the name of this venting area.
10735	2017/07/21	22:47:13	46.12066	-129.96965	357.8	1.2	1764.8	The theme is probably due to Andra's recent travels to France.
10738	2017/07/21	22:48:22	46.12066	-129.96964	357.6	1.1	1764.8	Jason temperature in the last venting orifice (where the tiny black smoker was). Tmax Jason was 314C.
10740	2017/07/21	22:48:50	46.12066	-129.96964	357.6	1.1	1764.8	We're now going to try to find some low temperature venting around here.
10744	2017/07/21	22:50:15	46.12067	-129.96964	13.6	1.2	1764.7	Going to deploy a marker here on Prosecco.
10746	2017/07/21	22:50:45	46.12067	-129.96964	78.0	1.1	1764.4	Looking for diffuse flow here next.
10747	2017/07/21	22:51:00	46.12067	-129.96963	80.2	0.9	1764.6	Had a Jason shift change about 5 minutes ago
10749	2017/07/21	22:51:20	46.12068	-129.96963	121.9	1.0	1764.2	Look at the black smoke coming out a crack between lobes.
10752	2017/07/21	22:52:29	46.12068	-129.96963	179.6	0.9	1764.5	Dave wants lower temperature fluids next. Searching for a spot on Prosecco mound.
10754	2017/07/21	22:53:03	46.12068	-129.96963	209.8	0.8	1764.7	NAV: Doppler Reset
10758	2017/07/21	22:54:33	46.12068	-129.96963	207.6	0.8	1764.6	Placed the HFS nozzle in an area where black smoke is coming out. T=6.6.
10761	2017/07/21	22:55:18	46.12069	-129.96963	207.5	0.8	1764.6	Continuing to probe around here. Lower in the hole. T=8 It's going up slightly.
10764	2017/07/21	22:56:29	46.12069	-129.96965	206.1	0.8	1764.6	Checking out another spot.
10766	2017/07/21	22:56:39	46.12069	-129.96965	206.2	0.8	1764.6	Temperature is rising T=19C now.
10768	2017/07/21	22:57:16	46.12069	-129.96966	206.3	0.8	1764.6	T=25C now.
10773	2017/07/21	22:59:23	46.12069	-129.96970	206.1	0.8	1764.6	What is that? White slimy looking stuff. Hanging on by a thread. Wispy; puffy whitish mat. Odd-looking stuff.
10775	2017/07/21	23:00:02	46.12069	-129.96970	206.2	0.8	1764.6	Dave is going to do a oxygen reading.
10779	2017/07/21	23:01:28	46.12068	-129.96971	206.1	0.8	1764.6	There is some odd stuff here.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-968 Datalogger Comment
10781	2017/07/21	23:01:53	46.12068	-129.96971	206.2	0.8	1764.6	HIGHLIGHTS: HD highlights start Weird looking white and orange mat here in this lower temperature orifice here at Prosecco area.
10787	2017/07/21	23:04:15	46.12068	-129.96970	206.2	0.8	1764.6	We're going to take another lat/long in this position: 46.12067 - 129.969673 Z=1764. We moved slightly from the hot orifice.
10789	2017/07/21	23:04:45	46.12068	-129.96970	206.2	0.8	1764.6	We're on the other side of the mound from where the last samples were taken. On the north side now in more diffuse flow.
10791	2017/07/21	23:05:34	46.12069	-129.96970	206.2	0.8	1764.6	SAMPLE: HFS O2=0.57 at 19.3C in this more diffuse sampling in a crack between the lobes.
10793	2017/07/21	23:06:02	46.12069	-129.96969	206.3	0.8	1764.6	The last entry was the oxygen reading the spot we will be sampling next.
10796	2017/07/21	23:06:56	46.1207	-129.96969	206.3	0.8	1764.6	SAMPLE: HFS J968-HFS-08 Unfiltered bag #18. Start.
10799	2017/07/21	23:07:39	46.12071	-129.96969	206.1	0.8	1764.6	NOTE: Entry at 23:05:43 was an oxygen sample (O2) - not sample 2. Sampling started at 23:07:05.
10803	2017/07/21	23:09:17	46.12072	-129.96970	206.2	0.8	1764.6	J968-HFS-8 cont. Here in diffuse flow at Prosecco diffuse venting site.
10805	2017/07/21	23:09:37	46.12072	-129.96970	206.3	0.8	1764.5	J968-HFS-8 cont. stop.
10807	2017/07/21	23:10:06	46.12072	-129.96971	206.2	0.8	1764.5	J968-HFS-8 cont. Tmax=25.2 Tavg=21.2 T2=6 Vol=475.
10809	2017/07/21	23:10:56	46.12072	-129.96971	206.1	0.8	1764.5	SAMPLE: HFS J968-HFS-09. Unfiltered bag #19. Start.
10812	2017/07/21	23:11:40	46.12072	-129.96972	205.9	0.8	1764.5	J968-HFS-9 cont. Same diffuse flow between pillow lobes with odd-looking white and orange mat.
10817	2017/07/21	23:13:39	46.12071	-129.96973	206.1	0.8	1764.5	J968-HFS-9 cont. stop.
10819	2017/07/21	23:14:17	46.12071	-129.96973	206.1	0.8	1764.5	J968-HFS-9 cont. Tmax=26.2 Tavg=23.5 T2=6 Vol=475ml.
10822	2017/07/21	23:15:20	46.12071	-129.96973	206.1	0.8	1764.5	SAMPLE: HFS J968-HFS-10. DNA filter #13. Start.
10824	2017/07/21	23:15:35	46.12071	-129.96973	206.2	0.8	1764.5	J968-HFS-10 cont. This sample will take ~ 20 minutes.
10830	2017/07/21	23:18:30	46.12071	-129.96972	206.0	0.8	1764.5	Not a whole lot to report while sitting here sampling in the diffuse flow.
10832	2017/07/21	23:18:47	46.12071	-129.96972	206.2	0.8	1764.5	Odd that the flow has a blackish tinge to it.
10835	2017/07/21	23:19:46	46.12071	-129.96971	206.1	0.8	1764.5	It could make more smoke as the fluids mix - at the same time as it mixes it could make black smoke.
10837	2017/07/21	23:20:21	46.12071	-129.96971	206.2	0.8	1764.5	The smoke has a grey-ish color so is probably some kind of iron sulfides.
10839	2017/07/21	23:20:39	46.12071	-129.96971	206.1	0.8	1764.5	Finding a smoker here means it probably has a deep reaction area.
10841	2017/07/21	23:21:07	46.12071	-129.96971	206.1	0.8	1764.5	It's hard to get those temperatures without penetrating down into the source regions where this dike came from.
10843	2017/07/21	23:21:51	46.12071	-129.96970	206.3	0.8	1764.5	This is 2 years after the eruption - so it's not cooling lava. It's tapping into some deeper heat source.

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10845	2017/07/21	23:22:23	46.12071	-129.96970	206.3	0.8	1764.5	We've never seen anything this far from the caldera this hot (except Dependable far to the east).
10848	2017/07/21	23:23:28	46.12071	-129.96970	206.3	0.8	1764.5	This could probably become a black-smoker chimney site over time.
10850	2017/07/21	23:23:51	46.12071	-129.96970	206.4	0.8	1764.5	It could possibly have been here before the 2015 eruption.
10852	2017/07/21	23:24:08	46.12071	-129.96970	206.3	0.8	1764.5	We haven't towed the NRZ for about 15 years and we could have missed it.
10856	2017/07/21	23:25:57	46.12071	-129.96970	206.1	0.8	1764.5	J968-HFS-10 cont. 10 more minutes on this DNA filter.
10862	2017/07/21	23:28:32	46.12071	-129.96971	206.2	0.8	1764.5	We're about 20 km from the center of the caldera here.
10868	2017/07/21	23:30:46	46.12072	-129.96972	206.4	0.8	1764.5	We're seeing lots of bubbles at the back side of the vehicle.
10871	2017/07/21	23:31:36	46.12072	-129.96973	206.3	0.8	1764.5	Where are the bubbles coming from that we are seeing at the back of the vehicle?
10875	2017/07/21	23:33:13	46.12072	-129.96973	206.2	0.8	1764.5	J968-HFS-10 cont. Should be time for this sample to end soon.
10877	2017/07/21	23:34:01	46.12072	-129.96974	206.1	0.8	1764.5	Little tiny orange chimney in the science cam.
10884	2017/07/21	23:36:39	46.12071	-129.96975	206.4	0.8	1764.5	SAMPLE: HFS J968-HFS-10 cont. J968-HFS-10 Stop.
10886	2017/07/21	23:37:16	46.12071	-129.96975	206.4	0.8	1764.5	SAMPLE: HFS J968-HFS-10 TMax=21.6 Tavg=19.4 T2=5 vol=2500ml. (For Julie Huber)
10889	2017/07/21	23:38:10	46.1207	-129.96975	208.2	0.8	1764.4	Putting the HFS wand back into the holster.
10890	2017/07/21	23:38:24	46.1207	-129.96975	208.2	0.8	1764.5	Next will deploy a marker at Prosecco.
10892	2017/07/21	23:38:55	46.12069	-129.96975	208.2	0.8	1764.5	Last sample was going slow so cut off at 21 minutes and did not fill to 3000ml.
10894	2017/07/21	23:39:20	46.12069	-129.96974	208.2	0.8	1764.5	Something may have clogged the filter (bacteria or iron).
10900	2017/07/21	23:42:02	46.12066	-129.96971	206.7	0.9	1764.3	DEPLOY: marker Mkr-264 will be marking the Prosecco mound at the Happy Hour vent field. Deployed just behind the hot sampled site (heading 207).
10902	2017/07/21	23:42:17	46.12065	-129.96971	206.0	0.9	1764.4	Marker near the broken tube along a crack.
10905	2017/07/21	23:43:06	46.12064	-129.96971	212.3	1.5	1763.7	Position 46.120724 -129.96966 z=1763.
10906	2017/07/21	23:43:30	46.12063	-129.96971	203.6	2.5	1762.8	Good overview of the sample site on the left and marker to the right at 211.
10908	2017/07/21	23:44:03	46.12063	-129.96971	177.4	2.8	1762.4	Good view once again.
10911	2017/07/21	23:45:01	46.12061	-129.96973	174.1	2.5	1762.7	Sampled the lower temp in the center (black smoke) and the high temp above with the remaining chimney. Mkr-264 is to the right.
10913	2017/07/21	23:45:30	46.1206	-129.96975	205.4	1.8	1763.1	Driving to the big collapse at 175deg.
10916	2017/07/21	23:46:12	46.12058	-129.96978	204.6	2.0	1764.2	Seeing patches of white hydrothermal staining. Left is not very substantial.
10917	2017/07/21	23:46:24	46.12057	-129.96979	204.0	1.7	1764.7	The patch to the right and beyond looks more promising.
10919	2017/07/21	23:46:55	46.12056	-129.96982	206.3	1.3	1765.2	Seeing some small white patches with good flow in the center of the largest white patch.
10921	2017/07/21	23:47:05	46.12055	-129.96983	207.5	0.8	1765.9	Not much flow here.

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10923	2017/07/21	23:47:42	46.12053	-129.96987	205.1	0.8	1766.1	More bags and not much biology otherwise. No wispy black material.
10926	2017/07/21	23:49:04	46.12048	-129.96996	206.4	0.8	1766.6	Going to head over to port with more staining visible. Pillow lavas with plate-skins but jumbled.
10928	2017/07/21	23:49:27	46.12046	-129.96999	206.3	1.0	1766.8	Looks like some more jumbled and jagged flow with some plates.
10930	2017/07/21	23:49:55	46.12044	-129.97002	205.4	1.7	1766.3	Going to drive ahead at 204.
10932	2017/07/21	23:50:19	46.12042	-129.97005	208.2	2.0	1767.2	A bit more staining coming up.
10934	2017/07/21	23:50:50	46.1204	-129.97008	216.7	0.8	1768.1	Fish and some more white staining.
10936	2017/07/21	23:51:32	46.12036	-129.97012	229.1	0.9	1768.0	Not a lot of flow here at the fish churning.
10940	2017/07/21	23:52:57	46.12031	-129.97017	238.8	1.3	1767.4	No more little chimlets.
10942	2017/07/21	23:53:17	46.1203	-129.97017	236.2	2.3	1766.7	A bit of a line of staining leading up to the collapse.
10943	2017/07/21	23:53:33	46.12029	-129.97017	236.4	1.5	1767.3	There is a little smoke in this patch of white staining.
10945	2017/07/21	23:53:48	46.12028	-129.97017	204.7	1.7	1766.9	Scale worms and some black smoke.
10947	2017/07/21	23:54:17	46.12027	-129.97016	173.8	1.4	1766.8	Wispy black smoke but no more chimlets.
10949	2017/07/21	23:54:49	46.12026	-129.97015	184.3	1.3	1766.8	Orange staining on the surrounding rocks.
10952	2017/07/21	23:55:37	46.12025	-129.97011	148.3	2.9	1766.2	Jumbled flow with no visible white.
10953	2017/07/21	23:55:51	46.12024	-129.97010	104.3	1.4	1767.6	Some orange staining.
10955	2017/07/21	23:56:10	46.12024	-129.97009	107.7	2.1	1767.0	White staining ahead.
10956	2017/07/21	23:56:30	46.12024	-129.97007	108.5	2.1	1767.7	Large crack in the lava with some white staining.
10958	2017/07/21	23:56:51	46.12023	-129.97005	106.3	0.8	1769.3	White patches are very small here and significant orange sediments.
10960	2017/07/21	23:57:09	46.12023	-129.97004	110.7	0.8	1769.8	Looks like a pickle but too deep for that?
10961	2017/07/21	23:57:15	46.12023	-129.97003	105.0	0.8	1769.7	Sulfur!!!
10963	2017/07/21	23:57:34	46.12023	-129.97002	100.2	0.8	1769.6	The white staining is actually molten sulfur that froze in place.
10964	2017/07/21	23:58:04	46.12022	-129.96999	103.4	0.8	1769.9	Moving in for a closer look. The orange is relatively dark compared to other hydrothermal staining.
10966	2017/07/21	23:58:13	46.12022	-129.96999	103.3	0.8	1769.9	Little snails on the molten sulfur.
10968	2017/07/21	23:58:44	46.12022	-129.96997	103.2	0.8	1769.9	Poking with the port arm (the sulfur).
10970	2017/07/21	23:59:12	46.12022	-129.96995	103.2	0.8	1769.9	The sulfur looks like it was squeezed out from a toothpaste tube.
10973	2017/07/22	00:00:06	46.12022	-129.96994	103.1	0.8	1769.9	Poke of sulfur patch with manipulator.
10974	2017/07/22	00:00:29	46.12022	-129.96993	103.0	0.8	1769.9	Poke seems to indicate it is fairly intact.
10978	2017/07/22	00:02:04	46.12022	-129.96993	103.4	0.8	1769.9	Going to use the suction sampler to obtain a piece of this sulfur.
10981	2017/07/22	00:02:41	46.12022	-129.96993	103.1	0.8	1769.9	Calling this the Liminocello Site for the yellow color of the frozen-molten sulfur.
10983	2017/07/22	00:03:20	46.12022	-129.96994	103.1	0.8	1769.9	Retrieving the suction hose from the basket.
10985	2017/07/22	00:04:03	46.12022	-129.96994	103.0	0.8	1769.9	HIGHLIGHTS: HD highlights start Pickles and Liminocello.
10988	2017/07/22	00:04:50	46.12022	-129.96994	103.0	0.8	1769.9	SAMPLE: Geo J968-GEO-11 Suction of the sulfur deposits at the Liminocello site. Getting some other sediment as

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-968 Datalogger Comment
								well.
10989	2017/07/22	00:05:02	46.12023	-129.96994	102.7	0.8	1769.9	Shaking the sample down the suction hose.
10993	2017/07/22	00:06:12	46.12023	-129.96995	103.0	0.8	1769.9	Looked in the back of the vehicle and can see the sample in the hose.
10995	2017/07/22	00:06:59	46.12023	-129.96995	102.7	0.8	1769.9	Using the arm camera to look at the suction chamber as they pump the sample back. Can see the flap but not big chunks of sulfur.
10998	2017/07/22	00:07:58	46.12023	-129.96994	103.4	0.8	1769.9	Large chunks of sulfur are still in the hose. There is a stopper to the hose so sample should be okay.
11000	2017/07/22	00:08:31	46.12023	-129.96994	103.3	0.8	1769.9	HIGHLIGHTS: HD highlights stop
11003	2017/07/22	00:09:07	46.12023	-129.96994	103.2	0.8	1769.9	SAMPLE: Geo J968-Geo-11 cont. Second suction of the site. More sulfur into the hose but it is coming back out.
11004	2017/07/22	00:09:34	46.12023	-129.96993	103.0	0.8	1769.9	SAMPLE: Geo J968-Geo-11 cont. another suction of the sulfur at the same site. Seeing large pieces in the hose.
11006	2017/07/22	00:09:36	46.12023	-129.96993	102.9	0.8	1769.9	TXT:
11007	2017/07/22	00:09:53	46.12023	-129.96993	103.2	0.8	1769.9	Tilting the hose up to get the sulfur to slide down the hose.
11009	2017/07/22	00:10:21	46.12023	-129.96993	103.1	0.8	1769.9	Stowing the suction hose and putting a stopper on it.
11012	2017/07/22	00:11:16	46.12023	-129.96992	103.3	0.8	1769.9	Position for this sample is 46.120273 -129.969889 Z=1769 Heading is 103 at the sample site.
11015	2017/07/22	00:12:18	46.12023	-129.96991	103.4	0.8	1769.9	Looks like the white ahead is some more sulfur rather than bacteria.
11017	2017/07/22	00:12:35	46.12023	-129.96992	103.4	0.8	1769.9	Strapping down the suction hose.
11020	2017/07/22	00:13:59	46.12024	-129.96995	103.2	0.8	1769.9	Should be looking directly into the crater at this heading.
11022	2017/07/22	00:14:11	46.12024	-129.96995	102.9	0.8	1769.7	Going ahead to check out the next patch of white.
11023	2017/07/22	00:14:32	46.12024	-129.96997	82.2	1.0	1769.8	Thinner lava skins with a lot of orange staining in a flatter flow.
11025	2017/07/22	00:14:58	46.12025	-129.96999	85.1	0.8	1770.6	More sulfur excretions.
11027	2017/07/22	00:15:23	46.12025	-129.97002	66.1	1.6	1769.7	Going to the west next instead of down the crater.
11029	2017/07/22	00:15:49	46.12025	-129.97005	182.6	3.4	1767.5	Bearing 263 and 75 meters to the little mound on the map.
11031	2017/07/22	00:16:28	46.12026	-129.97009	255.5	2.7	1767.3	The flat flows definitely have a lot of sediment compared to the jumbled relief.
11033	2017/07/22	00:17:01	46.12027	-129.97014	257.5	3.7	1765.5	Another area of white staining that we say before the sulfur tubelets.
11035	2017/07/22	00:17:19	46.12027	-129.97017	257.0	2.9	1765.2	Moving west. More pillow forms and less staining.
11037	2017/07/22	00:17:45	46.12027	-129.97021	258.4	3.2	1763.4	Small fish.
11038	2017/07/22	00:18:03	46.12028	-129.97023	252.6	2.5	1762.8	Collapse area with lots of smoke.
11040	2017/07/22	00:18:13	46.12028	-129.97025	253.8	1.8	1763.1	Tiny chimney on top and a lot of smoke from the crack below.
11041	2017/07/22	00:18:29	46.12028	-129.97027	262.1	1.9	1763.4	HIGHLIGHTS: HD highlights start Looks like smoke from a hole.
11044	2017/07/22	00:19:15	46.12028	-129.97034	275.0	1.9	1763.6	Can see little chimneys beyond and a small beehive chimney.

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11046	2017/07/22	00:19:35	46.12028	-129.97036	295.3	2.0	1763.4	Going over to the left to see the other chimneys.
11047	2017/07/22	00:19:49	46.12028	-129.97038	299.8	2.8	1762.7	Wow-tiny chimneys!!
11049	2017/07/22	00:20:09	46.12028	-129.97040	299.7	2.1	1763.2	These are amazing thin chimlets with a lot of black smoke.
11051	2017/07/22	00:20:40	46.12028	-129.97042	297.0	1.2	1763.8	Incredible colors and smoke. Booze bottles!
11052	2017/07/22	00:20:59	46.12027	-129.97044	296.9	1.3	1763.8	Long skinny black chimney.
11055	2017/07/22	00:21:43	46.12027	-129.97047	296.9	1.3	1763.8	Several chimlets along a pillow just beyond the smoking black hole.
11056	2017/07/22	00:21:47	46.12027	-129.97047	296.9	1.3	1763.8	HIGHLIGHTS: HD highlights stop
11057	2017/07/22	00:21:58	46.12027	-129.97047	296.9	1.3	1763.8	Kahlua Site!
11060	2017/07/22	00:23:03	46.12027	-129.97050	296.9	1.3	1763.8	Bill wants to grab one of the little chimneys with dark black smoke pouring out here at Kahlua Site!
11063	2017/07/22	00:23:51	46.12027	-129.97051	296.9	1.3	1763.8	J967-geo-12 will be the next sample here at the Kahlua Site.
11065	2017/07/22	00:24:27	46.12027	-129.97051	297.8	1.4	1763.8	This is probably not molten sulfur - it's probably iron oxide coating on the lobes.
11069	2017/07/22	00:25:44	46.12027	-129.97051	297.8	1.5	1763.8	Chimlet site. 3 smokers in a row. Trying to grab the whole chimney. It crumbled.
11073	2017/07/22	00:27:09	46.12027	-129.97050	297.7	1.4	1763.8	J967-geo-12 cont. Location: 46.120278 129.970459 Z=1764. The chimneys are way too small and friable.
11077	2017/07/22	00:28:42	46.12027	-129.97049	297.9	1.3	1763.8	CORRECTION: Could not collect the friable chimneys here so geo-12 is not a sample. Will re-use sample #12 for the next sample.
11079	2017/07/22	00:29:22	46.12027	-129.97048	298.4	1.4	1763.8	Grabbing the HFS wand to set up for water sampling here instead.
11081	2017/07/22	00:29:55	46.12026	-129.97048	299.2	1.4	1763.8	CORRECTED: So the next sample will be J967-HFS-12.
11085	2017/07/22	00:31:28	46.12026	-129.97047	299.0	1.5	1763.8	Placing the wand in the hole that is visible now that the little black friable chimney was knocked over.
11088	2017/07/22	00:32:20	46.12026	-129.97047	299.0	1.5	1763.8	The HFS wand is basically a stopper in the hole. Don't see much of the black smoke anymore - some clear liquid.
11090	2017/07/22	00:32:40	46.12026	-129.97047	299.0	1.5	1763.8	Dave thinks we may be plugging the intake on the HFS wand.
11092	2017/07/22	00:33:19	46.12026	-129.97046	299.0	1.5	1763.8	Lots of little sulfide worms here on orange iron-oxide samples.
11094	2017/07/22	00:33:44	46.12027	-129.97046	299.0	1.5	1763.8	We're getting 225C here.
11096	2017/07/22	00:34:19	46.12027	-129.97046	299.0	1.5	1763.8	Seeing black smoke pour out around the nozzle now. T=230C.
11099	2017/07/22	00:35:18	46.12027	-129.97047	299.0	1.4	1763.8	The temperature is now 240C.
11102	2017/07/22	00:36:11	46.12027	-129.97047	299.0	1.5	1763.8	Orange mat here. Is it eruptive mat? T=245C now.
11110	2017/07/22	00:39:37	46.12023	-129.97048	299.1	1.5	1763.8	We're 35m W of WP3. Temporary delay because the valve didn't move.
11112	2017/07/22	00:40:19	46.12023	-129.97048	299.1	1.5	1763.8	There are already palm worms here. Dave is amazed they have colonized so soon.
11115	2017/07/22	00:41:11	46.12022	-129.97049	299.1	1.5	1763.8	SAMPLE: HFS J967-HFS-12 Unfiltered piston #4. Start.
11116	2017/07/22	00:41:23	46.12022	-129.97049	299.1	1.4	1763.8	HIGHLIGHTS: HD highlights stop Kahlua Site.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-968 Datalogger Comment
11119	2017/07/22	00:42:25	46.12022	-129.97049	299.1	1.4	1763.8	Changing the view. Taking some super scorpio pics.
11123	2017/07/22	00:43:40	46.12023	-129.97050	299.1	1.4	1763.8	J967-HFS-12 cont. Dark black smoke is pouring out of these little spigots
11124	2017/07/22	00:43:44	46.12023	-129.97050	299.1	1.4	1763.8	J967-HFS-12 cont. stop.
11126	2017/07/22	00:44:05	46.12023	-129.97050	299.1	1.5	1763.8	J967-HFS-12 cont. Tmax=246 Tavg=244.7 T2=28 Vol=500ml.
11128	2017/07/22	00:44:36	46.12024	-129.97050	299.1	1.4	1763.8	SAMPLE: HFS J967-HFS-13 Unfiltered piston #5. Start.
11131	2017/07/22	00:45:57	46.12026	-129.97050	299.1	1.4	1763.8	J967-HFS-13 cont. In orifice where little black chimney used to reside. To the left in the view are several other chimneys.
11133	2017/07/22	00:46:11	46.12027	-129.97050	299.1	1.4	1763.8	HIGHLIGHTS: HD highlights start Kahlua site during HFS sampling.
11135	2017/07/22	00:46:43	46.12027	-129.97049	299.1	1.4	1763.8	HIGHLIGHTS: HD highlights stop
11137	2017/07/22	00:47:27	46.12028	-129.97049	299.1	1.4	1763.8	J967-HFS-13 cont. stop.
11139	2017/07/22	00:47:55	46.12029	-129.97049	299.1	1.4	1763.8	J967-HFS-13 cont. Tmax=247.7 Tavg=245.3 T2=29 Vol=500ml.
11144	2017/07/22	00:50:01	46.1203	-129.97048	299.1	1.5	1763.8	SAMPLE: GTHFS J967-GTHFS-14 GT-7 Red-green in same orifice as previous samples here at Kahlua Site.
11149	2017/07/22	00:51:45	46.12029	-129.97049	299.0	1.4	1763.8	Looking at this orangish mat on the rocks. It looks like the eruptive mat we saw in the caldera.
11151	2017/07/22	00:52:09	46.12029	-129.97049	299.0	1.4	1763.8	Probably sticking around because this flow is so thick.
11153	2017/07/22	00:52:42	46.12029	-129.97049	298.9	1.4	1763.8	Will wait on the next gastight bottle in case we find something really great.
11155	2017/07/22	00:53:07	46.12028	-129.97049	298.3	1.4	1763.8	Stowing the HFS wand.
11156	2017/07/22	00:53:29	46.12028	-129.97050	297.6	1.3	1763.8	What a beautiful site with the bright orange mat and the little black smokers poking out.
11158	2017/07/22	00:53:41	46.12028	-129.97050	297.6	1.3	1763.8	Little black smoker chimney at Kahlua site.
11160	2017/07/22	00:54:32	46.12027	-129.97050	315.0	1.4	1763.6	HIGHLIGHTS: HD highlights stop Zooming in and out with the science cam.
11163	2017/07/22	00:55:17	46.12027	-129.97050	351.2	0.8	1763.9	Shiny black basalt at the base of the skinny smoker.
11165	2017/07/22	00:55:37	46.12027	-129.97050	355.7	0.9	1763.8	There are actually 2 black smoker vents there.
11166	2017/07/22	00:55:53	46.12027	-129.97050	355.7	0.8	1763.8	Orange floc floating up in the water column.
11169	2017/07/22	00:56:43	46.12026	-129.97050	355.7	0.8	1763.8	Zooming in on the top of this little chimney.
11171	2017/07/22	00:57:10	46.12026	-129.97050	355.8	0.8	1763.9	HIGHLIGHTS: HD highlights start Little black smoker chimney and a little teeny tiny one off to the side.
11173	2017/07/22	00:57:47	46.12026	-129.97050	355.8	0.8	1763.8	HIGHLIGHTS: HD highlights start Little black smoker chimney and his little buddy.
11174	2017/07/22	00:58:02	46.12026	-129.97050	355.8	0.8	1763.9	Sulfide worms on the chimney.
11176	2017/07/22	00:58:10	46.12026	-129.97050	355.8	0.8	1763.9	HIGHLIGHTS: HD highlights stop
11178	2017/07/22	00:59:02	46.12026	-129.97050	355.8	0.8	1763.9	HIGHLIGHTS: HD highlights start Starting again - take 2. Are those little charred worms or snails to the left. Panned up the chimney.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-968 Datalogger Comment
11182	2017/07/22	01:00:06	46.12025	-129.97050	355.8	0.8	1763.9	HIGHLIGHTS: HD highlights start Resuming highlight of little black smoker. Looks like charred snails or limpets to the left of the chimney
11184	2017/07/22	01:00:46	46.12025	-129.97050	355.8	0.8	1763.9	Sulfide worms on the base of the little black smoker. The abandoned tubes are probably sulfide worm tubes.
11186	2017/07/22	01:01:17	46.12025	-129.97050	355.8	0.8	1763.9	The temperature here was 245C.
11188	2017/07/22	01:01:47	46.12026	-129.97049	355.8	0.8	1763.9	What the heck is that long stringy thing?
11191	2017/07/22	01:02:22	46.12026	-129.97049	355.8	0.8	1763.9	Zooming out just to get the area. The chimney is probably 1 foot tall.
11192	2017/07/22	01:02:27	46.12026	-129.97049	355.8	0.8	1763.9	HIGHLIGHTS: HD highlights stop
11196	2017/07/22	01:03:35	46.12026	-129.97048	355.8	0.8	1763.9	Lava flows closer to the caldera is a little methane and hydrogen. When you go farther north there is high methane and hydrogen.
11199	2017/07/22	01:04:43	46.12027	-129.97048	355.8	0.8	1763.9	It's making a pretty good plume here. Hydrogen requires a higher temperature.
11202	2017/07/22	01:05:45	46.12027	-129.97049	355.8	0.9	1763.8	We're going to put another maker here at the Kahlua site.
11204	2017/07/22	01:06:17	46.12028	-129.97050	355.8	0.8	1763.9	DEPLOY: marker Marker 241 deployed here at the Kahlua site.
11206	2017/07/22	01:06:59	46.12027	-129.97053	355.1	1.1	1763.7	Stills of the marker and black smoker. Scaleworm landing.
11209	2017/07/22	01:08:01	46.12027	-129.97058	11.5	1.3	1763.7	The scaleworm is just showing off. Moving up through the water column past the black smoker chimneys.
11211	2017/07/22	01:08:32	46.12026	-129.97061	301.5	1.9	1763.1	Next we will go west checking out the area.
11215	2017/07/22	01:09:35	46.12023	-129.97069	255.4	2.1	1762.2	Moving to the west to poke around.
11216	2017/07/22	01:09:58	46.12021	-129.97073	254.0	1.0	1763.4	We're moving toward a little nub in the bathymetry in the middle of a collapse.
11219	2017/07/22	01:10:47	46.12018	-129.97079	256.6	2.4	1762.9	Poking around here. Floc storm in the HFS cam.
11221	2017/07/22	01:11:19	46.12016	-129.97083	257.6	1.8	1763.4	Moving along to the west. Didn't see any collapse. It's more of a gradual basin here - not a drop off.
11224	2017/07/22	01:12:23	46.1201	-129.97089	187.9	2.2	1763.4	Going to jog south now - 10 to 20 meters.
11225	2017/07/22	01:12:27	46.1201	-129.97089	178.5	2.3	1763.5	Nothing to see here.
11228	2017/07/22	01:13:19	46.12006	-129.97091	179.3	2.3	1763.1	Pretty un-clear what would focus that flow.
11231	2017/07/22	01:14:18	46.12002	-129.97091	131.9	2.5	1762.1	Looking around here. Nothing out here to speak of - at least not as far as we can see.
11233	2017/07/22	01:14:52	46.11999	-129.97090	92.6	2.1	1762.7	We will head east now - back in line with the previous vents we found.
11236	2017/07/22	01:15:45	46.11997	-129.97087	90.2	0.9	1764.1	Chimneys straight ahead. Chimneys and bag creatures.
11239	2017/07/22	01:16:37	46.11996	-129.97084	91.3	1.8	1763.5	HIGHLIGHTS: HD highlights start Another area with small chimneys. Black smoker to the right. Lots of little chimlets here.
11240	2017/07/22	01:16:57	46.11995	-129.97082	91.7	1.1	1764.0	That smoker is really black. It looks charred.
11242	2017/07/22	01:17:17	46.11995	-129.97081	90.7	1.1	1764.1	Highlights are still running. Black smoker and little baby

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-968 Datalogger Comment
								chimlets.
11244	2017/07/22	01:17:42	46.11995	-129.97079	92.5	1.2	1764.1	They are all pretty small in size.
11246	2017/07/22	01:18:16	46.11995	-129.97078	91.3	1.1	1764.1	This one is really black and covered in sulfide worms. Bag creature surround the really black chimlets.
11248	2017/07/22	01:19:00	46.11995	-129.97075	94.4	1.4	1763.9	HIGHLIGHTS: HD highlights stop End highlight.
11250	2017/07/22	01:19:27	46.11995	-129.97074	93.1	1.1	1764.0	Looking around a little bit near the black smokin' chimlet.
11252	2017/07/22	01:19:42	46.11995	-129.97073	93.1	1.2	1763.9	Black smoke from the crack next to a non-smoking chimlet.
11253	2017/07/22	01:19:50	46.11996	-129.97073	80.3	1.3	1763.8	Bag creatures in the crack.
11255	2017/07/22	01:20:23	46.11996	-129.97072	82.4	1.4	1763.7	Diffuse smoke from the crack and below.
11257	2017/07/22	01:20:44	46.11996	-129.97071	82.8	1.2	1763.7	Looks like there could be smoke in the distance.
11258	2017/07/22	01:20:57	46.11996	-129.97070	81.7	1.2	1763.8	Black smoke in each depression ahead.
11260	2017/07/22	01:21:14	46.11997	-129.97069	84.0	1.3	1763.8	Black chimlets to the right.
11261	2017/07/22	01:21:22	46.11997	-129.97069	81.2	1.5	1763.5	Bag creatures growing on the chimlet.
11263	2017/07/22	01:21:42	46.11997	-129.97068	77.7	2.0	1763.4	Moving ahead along the smoke.
11264	2017/07/22	01:22:00	46.11997	-129.97068	78.0	1.5	1763.7	Flow coming out of the bag-covered chimlet (clearer flow).
11266	2017/07/22	01:22:16	46.11997	-129.97067	75.1	2.1	1763.2	No flow below just out of the top.
11267	2017/07/22	01:22:31	46.11997	-129.97066	75.1	2.5	1762.4	Yellow staining on the crack.
11269	2017/07/22	01:22:49	46.11997	-129.97066	74.6	1.3	1763.2	Moving ahead to another smoking patch. White staining with a lot of black smoke.
11270	2017/07/22	01:23:02	46.11997	-129.97065	75.1	0.8	1763.8	Black plumes coming out between the pillow and a chimney in the center.
11272	2017/07/22	01:23:08	46.11997	-129.97065	73.6	0.8	1763.9	This one has a lot of smoke.
11275	2017/07/22	01:24:20	46.11997	-129.97063	25.7	0.8	1764.2	Setting up for sampling out of this hole with black smoke.
11277	2017/07/22	01:24:55	46.11997	-129.97062	21.6	1.0	1764.1	This area will be called Sambuca (licorice liquor).
11279	2017/07/22	01:25:17	46.11997	-129.97062	26.9	0.8	1764.4	Landing in front of this smoking black hole for sampling.
11281	2017/07/22	01:25:50	46.11997	-129.97061	26.5	0.8	1764.4	Sampling the black hole of mystery at Sambuca.
11284	2017/07/22	01:26:52	46.11997	-129.97060	25.2	0.8	1764.4	Distinct chimney is beyond this smoking hole. It is white-sided.
11286	2017/07/22	01:27:11	46.11997	-129.97060	22.4	0.8	1764.4	Beast wand deployed.
11287	2017/07/22	01:27:23	46.11997	-129.97060	22.4	0.8	1764.4	Temperature was 17deg and going up.
11289	2017/07/22	01:27:38	46.11997	-129.97060	22.5	0.8	1764.4	35degC so will be a good diffuse site.
11290	2017/07/22	01:28:03	46.11997	-129.97060	22.3	0.8	1764.4	Almost looks like a line of venting.
11293	2017/07/22	01:28:59	46.11997	-129.97060	22.4	0.8	1764.4	SAMPLE: HFS J968-HFS-15 Start. Filtered Bag #23. Black Hole of mystery at Sambuca.
11295	2017/07/22	01:29:31	46.11997	-129.97060	22.3	0.8	1764.4	Position for this sample is 46.119965 -129.970595 at 1764m and heading 022.
11297	2017/07/22	01:30:02	46.11997	-129.97060	22.3	0.8	1764.4	Good exhaust from the Beast. Looks good.
11300	2017/07/22	01:30:38	46.11997	-129.97060	22.3	0.8	1764.4	Really "Black Hole of Mystery: at Sambuca. Scale worms.
11302	2017/07/22	01:31:26	46.11997	-129.97059	22.3	0.8	1764.4	Two different species of scaleworms here. The red and the orange-covered (larger) ones.

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11304	2017/07/22	01:31:41	46.11997	-129.97059	22.2	0.8	1764.4	Limpets.
11305	2017/07/22	01:31:58	46.11997	-129.97059	22.3	0.8	1764.4	J968-HFS-15 Stop.
11308	2017/07/22	01:32:36	46.11997	-129.97059	22.3	0.8	1764.4	SAMPLE: HFS J968-HFS-15 cont. Tmax=37.3 Tavg=37.0 T2=2 vol=400ml.
11309	2017/07/22	01:32:57	46.11997	-129.97059	22.3	0.8	1764.4	Resetting the flush pump on the Beast.
11311	2017/07/22	01:33:23	46.11997	-129.97058	22.2	0.8	1764.4	Not sure what the long filaments are (antennae or ?).
11313	2017/07/22	01:33:57	46.11997	-129.97058	22.2	0.8	1764.4	Flush pump may be clogged on the Beast.
11315	2017/07/22	01:34:20	46.11997	-129.97058	22.2	0.8	1764.4	Shrimp swimming about.
11316	2017/07/22	01:34:32	46.11997	-129.97058	22.2	0.8	1764.4	Flush pump turned on high to see if it makes a difference.
11318	2017/07/22	01:34:39	46.11997	-129.97058	22.2	0.8	1764.4	Close-ups of the chimney beyond.
11319	2017/07/22	01:34:52	46.11997	-129.97058	22.2	0.8	1764.4	Smaller beehive chimney in front of the larger one.
11320	2017/07/22	01:34:57	46.11997	-129.97058	22.2	0.8	1764.4	Other small chimlets.
11321	2017/07/22	01:35:01	46.11997	-129.97058	22.2	0.8	1764.4	HIGHLIGHTS: HD highlights start
11323	2017/07/22	01:35:12	46.11997	-129.97058	22.2	0.8	1764.4	Not getting warm water on the Beast and Dave not sure why.
11324	2017/07/22	01:35:16	46.11997	-129.97058	22.2	0.8	1764.4	Beehive close-up.
11326	2017/07/22	01:35:56	46.11997	-129.97058	22.2	0.8	1764.4	Beast is starting to warm up so pump may be working again. That is why the low
11328	2017/07/22	01:36:05	46.11997	-129.97058	22.1	0.8	1764.4	Reason for the low T2 on the last sample.
11330	2017/07/22	01:36:42	46.11997	-129.97058	22.1	0.8	1764.4	SAMPLE: HFS J968-HFS-16 Unfiltered Bag #20. Start. Same exact location.
11332	2017/07/22	01:37:01	46.11997	-129.97058	22.2	0.8	1764.4	Forgot to get the hotkey attached to the sample begin.
11334	2017/07/22	01:37:09	46.11997	-129.97058	22.1	0.8	1764.4	Close-up of little black chimlet.
11335	2017/07/22	01:37:33	46.11997	-129.97059	22.1	0.8	1764.4	J968-HFS-16 cont. Taking close-ups while doing the Beast samples.
11338	2017/07/22	01:38:20	46.11997	-129.97059	22.1	0.8	1764.4	HIGHLIGHTS: HD highlights stop J968-HFS-16 cont.
11340	2017/07/22	01:39:02	46.11998	-129.97059	22.1	0.8	1764.4	J968-HFS-16 cont. Stop sample.
11342	2017/07/22	01:39:12	46.11998	-129.97059	22.1	0.8	1764.4	J968-HFS-16 cont. Tmax=35 Tavg=34 T
11344	2017/07/22	01:39:37	46.11998	-129.97060	22.0	0.8	1764.4	J968-HFS-16 cont. T2=4 vol=400ml.
11345	2017/07/22	01:39:48	46.11998	-129.97060	22.1	0.8	1764.4	Taking some O2 readings with the Beast.
11348	2017/07/22	01:41:03	46.11999	-129.97060	22.1	0.8	1764.4	The amount of biology covering the area is stunning.
11350	2017/07/22	01:41:22	46.11999	-129.97060	22.0	0.8	1764.4	Scaleworms and palm worms.
11352	2017/07/22	01:41:51	46.11999	-129.97060	22.0	0.8	1764.4	Still measuring O2 from the black hole where the HFS samples were taken.
11356	2017/07/22	01:43:13	46.11999	-129.97060	21.9	0.8	1764.4	O2=0.58ml/l at 36degC from the Beast at this sampling site.
11360	2017/07/22	01:44:38	46.11999	-129.97059	22.7	0.8	1764.4	Going to take one more gas sample from that chimney just beyond.
11362	2017/07/22	01:45:07	46.11999	-129.97059	25.4	0.8	1764.4	Lots of black smoke when removed the beast wand. The wand is completely back. Tip has black filaments on it.
11365	2017/07/22	01:46:06	46.11999	-129.97059	25.5	0.8	1764.4	Grabbing the aft GTB (Nude GT-11).

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-968 Datalogger Comment
11367	2017/07/22	01:46:43	46.11999	-129.97059	25.6	0.8	1764.5	Vent just sampled is really blowing out the black smoke.
11368	2017/07/22	01:47:04	46.11999	-129.97059	25.6	0.8	1764.4	Ejecting black filaments from the hole (why not getting flow from the Beast).
11371	2017/07/22	01:47:41	46.11999	-129.97059	25.7	0.8	1764.5	Removed the bungee from the GTB.
11374	2017/07/22	01:48:39	46.11999	-129.97059	13.1	1.4	1764.0	Have the GTB in the stbd arm (GT-11 Nude). Moving toward the chimlet.
11375	2017/07/22	01:48:55	46.11999	-129.97059	346.9	1.8	1763.7	This is the tallest chimlet in this area of smoke and chimlets.
11377	2017/07/22	01:49:33	46.12	-129.97059	345.4	1.0	1764.4	Coming in for a landing with a lot of different chimlets emitting clear fluids.
11380	2017/07/22	01:50:10	46.12	-129.97059	345.4	1.0	1764.4	Would like to try to sample the tall one so will have to knock it down to get the wand directly in the flow.
11381	2017/07/22	01:50:30	46.12	-129.97059	345.1	1.0	1764.3	Timber....chimlet has fallen.
11383	2017/07/22	01:50:41	46.12	-129.97059	345.2	1.0	1764.3	Nice clear hole to sample from now.
11384	2017/07/22	01:50:55	46.12	-129.97060	345.5	1.0	1764.3	Moving tip into the orifice but made contact with the bottom.
11386	2017/07/22	01:51:27	46.12001	-129.97060	345.3	1.0	1764.3	Palm worm adjacent to the hole.
11388	2017/07/22	01:51:45	46.12001	-129.97060	345.4	1.0	1764.3	Trying to get the tip into the hole.
11390	2017/07/22	01:52:30	46.12001	-129.97060	345.4	1.1	1764.3	Hard to maneuver the tip with the Beast wand in the view.
11393	2017/07/22	01:53:05	46.12001	-129.97061	344.9	1.0	1764.4	The wand tip is bent and making this difficult.
11395	2017/07/22	01:53:55	46.12002	-129.97061	345.0	1.0	1764.4	Pilot cam close-up of the wand tip and orifice. Can not see the tip in the black smoke.
11396	2017/07/22	01:54:03	46.12002	-129.97061	345.4	1.0	1764.4	Looks like it went into the hole that time.
11400	2017/07/22	01:55:30	46.12002	-129.97062	345.1	1.1	1764.4	SAMPLE: GTB Still trying to get the tip into the hole with limited visibility.
11402	2017/07/22	01:55:41	46.12002	-129.97062	345.1	1.0	1764.4	SAMPLE: GTB J968-GTB-17 Fired Nude GT-11 at Sambuca's tallest chimlet near the previous sample site.
11404	2017/07/22	01:56:18	46.12003	-129.97062	345.0	1.0	1764.4	Done with sampling.
11406	2017/07/22	01:56:32	46.12003	-129.97062	344.9	0.9	1764.4	Need to take a temperature of that former chimney with the Jason wand.
11408	2017/07/22	01:57:03	46.12003	-129.97063	345.0	1.0	1764.4	Putting the GTB back into the basket.
11412	2017/07/22	01:58:13	46.12002	-129.97063	344.5	1.0	1764.4	Getting out the Jason temperature probe.
11414	2017/07/22	01:58:36	46.12002	-129.97063	344.5	1.0	1764.4	Getting a temperature for the last sample.
11416	2017/07/22	01:59:12	46.12002	-129.97063	344.2	1.1	1764.3	High so far was 144degC but hard to see the wand tip clearly.
11420	2017/07/22	02:00:37	46.12001	-129.97062	343.9	1.1	1764.3	Can't see the hole with the Beast in the way.
11423	2017/07/22	02:01:40	46.12	-129.97061	343.8	1.2	1764.3	Moved into position and getting high temperatures.
11428	2017/07/22	02:03:40	46.11998	-129.97059	343.1	1.1	1764.3	Jason Tmax=321degC. for J968-GTB-17 sample.
11430	2017/07/22	02:04:07	46.11998	-129.97059	343.5	1.1	1764.3	Done with this site and preparing to end the dive for our 8pm on deck date.
11432	2017/07/22	02:04:52	46.11998	-129.97059	343.6	1.1	1764.3	Bill thinks the chimneys look a bit bigger than last year. Smoke was similar and saw more venting.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-968 Datalogger Comment
11433	2017/07/22	02:05:01	46.11998	-129.97059	343.6	1.1	1764.3	Last year did not explore as much.
11437	2017/07/22	02:06:19	46.12	-129.97055	346.1	1.7	1764.0	Excellent dive here on the North Rift Zone.
11439	2017/07/22	02:06:47	46.12005	-129.97054	13.0	3.3	1762.6	JASON: Jason off bottom
11445	2017/07/22	02:09:57	46.12033	-129.96992	141.5	47.0	1721.4	Coming up through the water column.
11446	2017/07/22	02:58:26	46.12022	-129.97020	141.1	179.4	222.4	Sea pickles!
11447	2017/07/22	02:59:51	46.12028	-129.97017	149.9	185.0	177.2	There a significant amounts of sea pickles as Jason ascends.
11448	2017/07/22	03:08:03	46.12038	-129.97045	162.9	172.5	47.0	There are the floats.
11449	2017/07/22	03:13:39	46.12065	-129.97085	145.1	119.1	2.4	Jason on surface.
11450	2017/07/22	03:14:22	46.12065	-129.97085	149.5	0.8	0.9	JASON: Jason out of water
11451	2017/07/22	03:15:43	46.12065	-129.97085	342.4	191.7	0.8	JASON: Jason on deck
11452	2017/07/22	03:15:54	46.12065	-129.97085	342.4	191.7	0.8	End of J2-968 at Axial Seamount.

J2-969

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-969 Datalogger Comment
11454	2017/07/22	11:03:08			329.8	0.8	0.6	Preparing to launch Jason for our last dive this expedition: J2-969 NE caldera rim graben.
11455	2017/07/22	11:05:53			340.9	0.8	0.6	Jason off deck.
11456	2017/07/22	11:07:55			58.2	131.3	0.9	JASON: Jason in water
11457	2017/07/22	11:12:01			187.5	188.7	8.8	Deployment location: NE Caldera rim graben. -129d 59.822' 45d 58.349' Z=1529m.
11458	2017/07/22	11:13:03			190.7	177.1	10.5	Main goals: Start on caldera floor near 2015 eruptive vents; climb up caldera wall (~65 m to rim at 1463 m).
11459	2017/07/22	11:13:45			177.2	113.6	10.8	Main goals cont: Explore graben to north for ~ 2 km. Sample rocks where 2015 lava is present.
11460	2017/07/22	11:14:26			173.6	173.4	12.6	No fluid sampling or suction sampling this dive.
11461	2017/07/22	11:14:50			172.9	171.5	13.6	Basket: 2-3 milk crates for rocks. 2 markers.
11462	2017/07/22	11:15:04			172.5	169.3	14.1	On all dives: Jason high-temp probe.
11463	2017/07/22	11:15:13			173.1	166.6	15.6	Port swing arm: Tephra sampler F.
11464	2017/07/22	11:15:25			171.3	168.5	16.6	Stbd swing arm: empty.
11465	2017/07/22	11:16:16			174.6	154.7	19.1	Waypoints: WP1 45d 58.349' Z=1529 m on caldera floor near 2015 fissure.
11466	2017/07/22	11:18:11			175.1	173.1	34.9	Waypoints cont: WP2 45d 58.4' -129d 59.794'. WP3 45d 58.433' -129d 59.794'. WP4 45d 58.433' -129d 59.755'.
11467	2017/07/22	11:19:05			173.0	185.9	57.5	Waypoints cont: WP5 45d 58.538' -129d 59.795' Z=1529m caldera floor near wall.
11468	2017/07/22	11:20:37			174.9	197.3	107.9	Waypoints cont: WP6 45d 58.580' -129d 59.754' Z=1463m caldera rim in graben.
11469	2017/07/22	11:22:03			176.0	189.9	119.7	Waypoints cont: WP7 45d 58.851' -129d 59.779' along graben (tephra sampler deploy).
11470	2017/07/22	11:22:52			172.3	197.9	122.3	Waypoints cont: WP8 45d 59.171' -129d 59.859' along graben.
11471	2017/07/22	11:23:22			172.5	187.2	133.9	Waypoints cont: WP9 45d 59.380' -129d 59.935
11472	2017/07/22	11:24:03			172.8	195.8	150.1	Waypoints cont: WP9 cont. S end of 2015 lava on NE rim.
11473	2017/07/22	11:24:59			172.6	179.6	168.6	Waypoints cont: WP10 45d 59.472' -129d 59.976' S end of 2015 lava on NE rim.
11474	2017/07/22	11:25:31			171.7	178.7	166.2	Waypoints cont: WP11 45d 59.602' -129d 59.980
11475	2017/07/22	11:25:59			172.4	185.6	168.7	Waypoints cont: WP11 cont. S end of 2015 lava on NE rim.
11476	2017/07/22	11:27:03			172.3	191.4	198.9	Tasks: 1) Start on caldera floor near 2015 eruptive fissure and near base of eastern caldera wall.
11477	2017/07/22	11:27:29			172.6	199.3	211.9	Tasks: 1) cont. Drive N to where 2015 eruptive fissure intersects the caldera wall.
11478	2017/07/22	11:28:06			172.3	198.8	230.7	Tasks: 1) cont. Does the eruptive fissure climb the wall? Did 2015 lava pour down the caldera wall?

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-969 Datalogger Comment
11479	2017/07/22	11:29:29			172.3	190.0	270.0	Tasks: 2) Climb caldera wall (~65 m high in this location). Find graben (seafloor down-dropped along parallel faults) at top of caldera rim.
11480	2017/07/22	11:30:32			172.9	199.0	299.4	Tasks: 2) cont. Graben should be 20-60 m wide and a few meters deep and ~ 2km long.
11481	2017/07/22	11:31:41			172.4	196.7	329.6	Tasks: 3) Drive along graben to the north following waypoints.
11482	2017/07/22	11:37:35			172.7	199.7	498.2	Tasks: 3) cont. Look for 2015 lava in the floor of the graben. Deploy tephra sampler and marker on west rim of graben near WP7.
11483	2017/07/22	11:39:03			172.7	198.8	542.4	Tasks: 4) Drive up to 2015 lava flow on NE caldera rim. Sample 2015 lava.
11486	2017/07/22	12:14:21	45.97175	-129.99666	1.2	9.6	1521.5	We're approaching the bottom - 10m
11487	2017/07/22	12:14:28	45.97175	-129.99666	0.0	7.8	1523.6	JASON: Jason on bottom
11489	2017/07/22	12:14:38	45.97175	-129.99666	3.0	6.3	1525.2	015 lava in view.
11491	2017/07/22	12:15:09	45.97176	-129.99666	338.8	6.1	1525.4	Collapse. Bill wants a piece of the 2015 crust near a collapse - on the roof.
11493	2017/07/22	12:15:58	45.97177	-129.99667	338.9	3.2	1527.5	This sample will be J969-geo-01.
11496	2017/07/22	12:17:01	45.97179	-129.99667	333.1	3.0	1527.6	J969-geo-01 coming up. Piece of crust near the 2015 eruptive fissure. Lobate (pillow-like) flow here with collapse off to the side.
11500	2017/07/22	12:18:25	45.97182	-129.99667	334.4	3.1	1527.6	SAMPLE: Geo Will wait for doppler reset until after the sample.
11505	2017/07/22	12:20:17	45.97191	-129.99667	334.0	3.1	1527.6	SAMPLE: Geo J969-geo-01 Piece of upper crust with glassy surface. Placed in forward port side bin 5.
11507	2017/07/22	12:20:53	45.97196	-129.99667	0.8	3.5	1525.9	NAV: Doppler Reset Moving on toward WP1 driving north.
11509	2017/07/22	12:21:19	45.97198	-129.99667	359.6	3.6	1525.1	45.971829 -129.996671 Z=1527m Location for sample 1.
11512	2017/07/22	12:22:12	45.97202	-129.99668	1.6	4.9	1524.9	It's really murky down here. Can barely see the bottom.
11514	2017/07/22	12:22:50	45.97207	-129.99668	0.5	4.8	1526.4	Jumbled-looking lavas here.
11515	2017/07/22	12:23:05	45.97209	-129.99668	1.6	1.9	1528.4	Coming down closer to the bottom.
11518	2017/07/22	12:23:41	45.97216	-129.99668	1.2	2.0	1530.3	Platy-looking lavas here. Piece of pillar ahead.
11519	2017/07/22	12:23:56	45.97218	-129.99668	358.3	1.2	1529.8	This was an inflated area and has broken up.
11520	2017/07/22	12:24:06	45.97219	-129.99668	1.2	1.1	1530.8	Remnants of pillars.
11522	2017/07/22	12:24:17	45.97221	-129.99668	359.4	0.8	1531.4	Broken up platy crust.
11524	2017/07/22	12:24:44	45.97225	-129.99668	358.9	0.8	1531.3	Brittle stars on the seafloor near large lava plates.
11525	2017/07/22	12:25:04	45.97227	-129.99668	358.3	0.8	1531.3	Looks like there may be ash on the bottom here. Hard to tell. May be broken glass.
11527	2017/07/22	12:25:22	45.97231	-129.99668	0.9	2.4	1529.9	Continuing on.
11529	2017/07/22	12:25:43	45.97234	-129.99669	359.9	2.3	1529.9	This was a lobate inflated flow that drained out so the upper cruse subsided and broke up.
11530	2017/07/22	12:25:49	45.97235	-129.99669	1.0	2.5	1529.7	Small collapse feature.
11531	2017/07/22	12:26:01	45.97236	-129.99669	359.9	3.2	1529.4	Very fluid-looking near the eruptive vents.
11533	2017/07/22	12:26:19	45.97239	-129.99669	0.1	5.1	1527.1	What a broken up mess.

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11535	2017/07/22	12:26:42	45.97244	-129.99669	1.1	5.9	1525.2	High area here (little mounded up broken up crust).
11537	2017/07/22	12:27:12	45.97251	-129.99670	359.5	3.3	1525.5	Moving over a collapse now. Upper crust is all askew.
11538	2017/07/22	12:27:34	45.97255	-129.99670	1.0	3.3	1524.6	Jumbled up sheets of broken upper crust.
11540	2017/07/22	12:27:49	45.97258	-129.99670	359.0	1.3	1524.6	Fish.
11542	2017/07/22	12:28:09	45.97263	-129.99671	359.4	2.3	1525.9	Continuing on. WP1 is ~25 m to the west.
11544	2017/07/22	12:28:40	45.97267	-129.99671	359.0	1.4	1527.0	Broken up lobate lavas. Jumbled pieces of lobate flow.
11545	2017/07/22	12:29:04	45.97271	-129.99672	1.8	1.4	1526.8	Coming over another pile of broken up lobates.
11547	2017/07/22	12:29:31	45.97275	-129.99672	359.0	2.1	1526.6	Ropey lavas in the jumbled up lobates.
11549	2017/07/22	12:29:41	45.97276	-129.99672	359.6	3.1	1525.6	Pyrosome.
11550	2017/07/22	12:29:58	45.97279	-129.99673	1.0	1.2	1525.8	Shrimp.
11552	2017/07/22	12:30:34	45.97284	-129.99673	359.4	1.6	1526.4	Jumbled up lobate flow. Weird looking.
11554	2017/07/22	12:30:49	45.97286	-129.99673	357.2	1.2	1526.6	King of the hill. Spider crab.
11556	2017/07/22	12:31:24	45.97292	-129.99674	359.3	2.0	1526.5	You can see a big depression coming up on the sonar.
11558	2017/07/22	12:31:54	45.97296	-129.99674	359.1	1.6	1525.8	Making our way toward a large collapse area. Traveling over jumbled up lobate flow.
11560	2017/07/22	12:32:12	45.97298	-129.99675	359.6	1.8	1525.0	There is the collapse ahead of us.
11561	2017/07/22	12:32:19	45.97299	-129.99675	13.4	1.7	1525.2	It's jumbled all the way to the edge.
11562	2017/07/22	12:32:36	45.97301	-129.99675	46.9	1.0	1526.2	HIGHLIGHTS: HD highlights start Collapse edge.
11565	2017/07/22	12:33:24	45.97306	-129.99675	51.4	0.8	1526.7	The nav is ~ 15 m to the south of the collapse on the AUV data.
11568	2017/07/22	12:34:23	45.97311	-129.99675	50.5	0.8	1526.7	SAMPLE: Geo J969-Geo-02. Grabbing a piece of jumbled lobate from the edge of the collapse.
11571	2017/07/22	12:35:22	45.97317	-129.99675	50.4	0.8	1526.6	J969-geo-2 cont. Small fist-sized piece of thin glassy crust. Going in for another piece.
11574	2017/07/22	12:36:09	45.9732	-129.99673	50.4	0.8	1526.6	J969-geo-2 cont. Grabbing one more piece and putting it in the same compartment. Fragile.
11576	2017/07/22	12:37:06	45.97324	-129.99671	50.4	0.8	1526.6	J969-geo-2 cont. Fragile lava that wants to break up in the claw.
11578	2017/07/22	12:37:12	45.97324	-129.99671	50.4	0.8	1526.6	HIGHLIGHTS: HD highlights stop
11580	2017/07/22	12:37:48	45.97325	-129.99669	50.6	0.8	1526.6	J969-geo-2 cont. Sample from the edge of this lobate flow at the top of the collapse.
11582	2017/07/22	12:38:17	45.97327	-129.99668	50.6	0.8	1526.6	J969-geo-2 cont. Going in for another grab. Lavas look shiny.
11584	2017/07/22	12:38:53	45.97328	-129.99665	50.6	0.8	1526.6	J969-geo-2 cont. Large glassy plate. Shiny. That was a big chunk of glassy plate.
11586	2017/07/22	12:39:33	45.97331	-129.99661	14.3	1.6	1525.7	We will cross the collapse. Want to go down into the collapse.
11589	2017/07/22	12:40:12	45.97333	-129.99657	54.6	4.9	1526.3	Into the abyss. Pillar-like features on the edge of the collapse.
11592	2017/07/22	12:41:13	45.97336	-129.99650	53.0	1.9	1534.2	Depth for sample 2 was 1526. The lat long for sample 2: 45.973327 -129.996577.
11593	2017/07/22	12:41:32	45.97337	-129.99648	53.9	0.8	1535.3	HIGHLIGHTS: HD highlights start Collapse feature with chaotic jumbled lavas on the seafloor.
11596	2017/07/22	12:42:15	45.97339	-129.99643	54.4	1.6	1534.7	Same jumbled-up looking seafloor on the bottom of the collapse as on the top.

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11597	2017/07/22	12:42:32	45.9734	-129.99641	53.2	3.2	1533.5	Moving up the other side of the collapse now.
11600	2017/07/22	12:43:20	45.97342	-129.99635	53.9	9.4	1526.7	Beautiful - moving up the side of this collapse. Sheer wall with overhanging ledge.
11601	2017/07/22	12:43:34	45.97343	-129.99633	53.8	8.1	1526.3	Looks like these blocks could break off at any time.
11603	2017/07/22	12:43:49	45.97343	-129.99630	53.3	8.2	1525.9	Yellow-staining on little "ribs".
11604	2017/07/22	12:43:58	45.97344	-129.99629	55.0	7.9	1525.9	HIGHLIGHTS: HD highlights stop
11605	2017/07/22	12:44:06	45.97345	-129.99627	53.0	7.8	1525.8	Pyroosome. Yuk.
11607	2017/07/22	12:44:19	45.97345	-129.99625	54.0	3.0	1525.3	Over the top of the collapse.
11609	2017/07/22	12:44:54	45.97348	-129.99619	53.4	1.8	1525.1	Will cross the edge of the 2015 flow.
11611	2017/07/22	12:45:09	45.97349	-129.99617	53.6	1.6	1525.6	Only 2015 flow on the floor of the caldera in this area.
11612	2017/07/22	12:45:30	45.97349	-129.99614	53.0	1.6	1525.9	These lava are only 2 years old.
11614	2017/07/22	12:45:41	45.9735	-129.99613	53.5	1.7	1525.8	More jumbled up lobates here.
11615	2017/07/22	12:45:57	45.97351	-129.99611	54.7	2.7	1525.4	Some higher areas where the jumbled flow has piled up.
11618	2017/07/22	12:46:48	45.97353	-129.99606	53.7	2.1	1524.8	Unbroken shiny pillows - glassy.
11620	2017/07/22	12:47:10	45.97354	-129.99604	54.5	2.8	1523.5	Some unbroken pillows here - mainly jumbled up lava plates.
11621	2017/07/22	12:47:32	45.97354	-129.99603	54.1	2.6	1523.2	We're now into pillow lavas - Thinner here.
11623	2017/07/22	12:47:43	45.97355	-129.99601	52.7	2.4	1523.4	We're getting near the eastern edge.
11624	2017/07/22	12:48:06	45.97357	-129.99598	52.9	2.6	1522.8	HIGHLIGHTS: HD highlights start Pillow lobes with angular caldera wall talus in front of us.
11627	2017/07/22	12:48:39	45.97359	-129.99594	70.6	1.6	1523.5	Small area of unbroken pillow-like lobates.
11628	2017/07/22	12:48:55	45.9736	-129.99592	69.1	0.9	1524.3	We're probably at the edge of the 2015 lavas here.
11630	2017/07/22	12:49:30	45.97362	-129.99589	69.1	1.1	1524.2	This is an explosion pit.
11631	2017/07/22	12:49:35	45.97362	-129.99589	68.3	1.1	1524.2	Beautiful contrast.
11634	2017/07/22	12:50:30	45.97365	-129.99585	68.3	1.0	1524.3	SAMPLE: Geo J969-Geo-03 Piece of smooth pillow lobate. Small glassy lobate. Smooth exterior.
11638	2017/07/22	12:51:40	45.97369	-129.99581	68.8	1.1	1524.2	J969-geo-3. Into bin 3. 45.97361 -129.995815 Z=1525m Hdg 69.
11640	2017/07/22	12:52:09	45.97372	-129.99579	68.8	1.1	1524.2	Sample 3 was taken at the contact between 2015 lavas and the talus of the eastern caldera wall.
11641	2017/07/22	12:52:30	45.97373	-129.99578	52.2	2.0	1523.4	We are driving north from here along the contact.
11643	2017/07/22	12:52:51	45.97375	-129.99577	333.6	2.3	1522.9	The talus blocks are coming off the caldera wall.
11645	2017/07/22	12:53:16	45.97378	-129.99577	340.3	3.2	1523.1	We are at the base of the caldera wall driving north where the 2015 lava flowed up against the base of the wall.
11646	2017/07/22	12:53:26	45.97378	-129.99576	338.8	3.6	1522.9	The talus is older lava blocks.
11648	2017/07/22	12:53:49	45.9738	-129.99576	337.9	1.9	1523.4	Ash on the talus blocks. Contact of glassy lobates and talus.
11649	2017/07/22	12:53:57	45.97381	-129.99576	338.9	2.1	1523.1	Ash on the talus blocks.
11651	2017/07/22	12:54:18	45.97382	-129.99576	339.3	1.2	1524.2	Inflated 2015 lobate in contact with caldera wall talus.
11653	2017/07/22	12:54:41	45.97384	-129.99576	338.7	1.2	1524.2	Looking at ash on the talus block. Brittle stars on the talus and new lava.
11654	2017/07/22	12:54:51	45.97385	-129.99576	338.7	1.2	1524.2	Ash in the depressions on the talus.

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11655	2017/07/22	12:55:06	45.97387	-129.99576	338.7	1.2	1524.2	Can also see ash in the depressions on the 2015 lava flow.
11658	2017/07/22	12:55:55	45.97391	-129.99576	338.8	1.6	1524.0	The orange stuff is probably eruptive mat - Bill says it's along the cracks.
11660	2017/07/22	12:56:07	45.97393	-129.99576	2.6	2.1	1522.8	Driving along the contact here.
11661	2017/07/22	12:56:12	45.97393	-129.99576	15.5	2.5	1522.5	Inflated lobate.
11662	2017/07/22	12:56:27	45.97395	-129.99576	9.9	2.2	1522.5	Contact.
11664	2017/07/22	12:56:48	45.97398	-129.99576	7.8	1.4	1523.1	Inflated lobate in contact with talus. Crinoid on the talus.
11666	2017/07/22	12:57:11	45.97402	-129.99577	5.7	2.2	1521.7	Ash on the talus (and probably on the 2015 flow as well but it's harder to see).
11667	2017/07/22	12:57:23	45.97404	-129.99577	5.0	1.9	1521.6	Highlights stopped at 1251.
11669	2017/07/22	12:57:43	45.97406	-129.99578	6.3	1.3	1521.6	The talus blocks look a bit smaller here.
11671	2017/07/22	12:58:14	45.9741	-129.99579	41.9	3.7	1519.3	Sheeted-looking lavas here. Ropey 2015 sheet flow.
11672	2017/07/22	12:58:33	45.97413	-129.99579	23.0	2.5	1519.2	Back into jumbled shiny lavas.
11674	2017/07/22	12:58:43	45.97414	-129.99580	353.1	1.0	1519.9	Dropping off in front of us a bit.
11677	2017/07/22	12:59:38	45.97421	-129.99582	359.7	3.1	1522.7	The talus blocks are getting smaller - with the occasional huge block.
11678	2017/07/22	12:59:45	45.97422	-129.99582	324.9	3.5	1522.8	Octopus straight ahead.
11680	2017/07/22	13:00:09	45.97427	-129.99584	326.7	2.8	1523.8	HIGHLIGHTS: HD highlights start Dumbo octopus ahead. Showing off for the camera.
11681	2017/07/22	13:00:35	45.97431	-129.99586	348.4	3.9	1522.3	Cute little octopus floating in front of us.
11683	2017/07/22	13:01:00	45.97436	-129.99587	347.5	1.8	1524.4	What's on it's head? It's white.
11685	2017/07/22	13:01:34	45.97443	-129.99590	348.6	1.7	1524.8	He doesn't look good. He's coming this way.
11687	2017/07/22	13:01:42	45.97444	-129.99591	349.6	1.8	1524.5	HIGHLIGHTS: HD highlights stop
11688	2017/07/22	13:02:01	45.97447	-129.99592	346.5	2.9	1524.4	His head did not look good. Where were the jumbo ears?
11690	2017/07/22	13:02:31	45.97451	-129.99595	7.9	4.0	1523.1	Moving into a land of pillar-like features to the west.
11693	2017/07/22	13:03:23	45.97461	-129.99600	328.6	5.6	1519.1	Continuing along the edge. Some glassy pillow lobes on the 2015 lavas but mainly jumbled lavas.
11695	2017/07/22	13:03:48	45.97466	-129.99603	328.4	4.0	1519.1	Talus to the east. Pillow-like lobes to the west now.
11698	2017/07/22	13:04:45	45.97475	-129.99608	333.1	3.3	1519.5	Changed Jason nav to DVL on the science nav computer.
11701	2017/07/22	13:05:52	45.97484	-129.99614	339.4	2.3	1520.7	Andra fixed the sci nav computer so the donut is correct.
11703	2017/07/22	13:06:26	45.97488	-129.99617	306.4	4.2	1520.6	Jumbled up lavas on the 2015 flow. Pinnacle like features.
11705	2017/07/22	13:06:52	45.97492	-129.99620	307.6	3.2	1523.1	Continuing along the contact. Lavas are broken up.
11707	2017/07/22	13:07:08	45.97494	-129.99621	310.5	2.7	1523.3	Sheeted plate. Somewhat intact.
11708	2017/07/22	13:07:20	45.97497	-129.99623	358.5	2.9	1523.0	Larger talus blocks to the east here.
11709	2017/07/22	13:07:31	45.97498	-129.99624	1.2	3.5	1522.5	Sheeted ahead and not as broken up.
11711	2017/07/22	13:07:43	45.975	-129.99625	335.3	3.2	1522.5	More ash pockets on the talus blocks.
11712	2017/07/22	13:08:02	45.97503	-129.99627	312.3	4.5	1521.9	Ropey 2015 lavas all the way to the edge.
11714	2017/07/22	13:08:28	45.97507	-129.99630	313.3	3.7	1521.5	Obvious contact along this eastern caldera wall.
11716	2017/07/22	13:08:47	45.97509	-129.99631	318.9	3.5	1522.5	Want to grab another rock somewhere along the edge here.
11718	2017/07/22	13:09:10	45.97511	-129.99632	345.4	2.7	1524.3	Going to grab a piece of jumbled (jupey) lava here at the

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-969 Datalogger Comment
								contact.
11720	2017/07/22	13:10:04	45.97516	-129.99635	344.1	1.6	1525.3	SAMPLE: Geo J969-Geo-04. Piece of jumbled 2015 lava right at the contact with the talus.
11724	2017/07/22	13:11:31	45.97524	-129.99638	345.0	1.7	1525.2	J969-geo-4 cont. Hdg 344deg. Thin glass crust Platy. 45.97517 -129.996415 Z=1526.
11726	2017/07/22	13:11:59	45.97527	-129.99639	347.1	3.1	1523.5	Going to jump up and head north.
11728	2017/07/22	13:12:14	45.97528	-129.99639	354.9	3.7	1522.3	Lots of ash on the talus here.
11730	2017/07/22	13:12:47	45.97531	-129.99639	30.2	4.2	1521.4	We're going to cross the contact now and head toward WP6. ~130m bearing 20d.
11732	2017/07/22	13:13:11	45.97533	-129.99638	30.6	4.9	1518.6	This is all ash on the talus.
11733	2017/07/22	13:13:20	45.97534	-129.99638	26.8	5.3	1516.7	There's a lot of ash on this talus.
11734	2017/07/22	13:13:32	45.97535	-129.99638	29.1	5.8	1514.3	Heading up the eastern caldera wall over talus blocks.
11736	2017/07/22	13:14:04	45.97538	-129.99637	28.1	5.3	1508.7	HIGHLIGHTS: HD highlights start Traveling up the eastern caldera wall over talus blocks.
11739	2017/07/22	13:14:46	45.9754	-129.99635	29.3	2.7	1510.2	Close-up of the caldera wall.
11740	2017/07/22	13:14:50	45.9754	-129.99635	29.4	2.6	1510.2	HIGHLIGHTS: HD highlights stop
11742	2017/07/22	13:15:15	45.97541	-129.99634	30.0	2.8	1510.2	Blocks of talus with ash covering.
11748	2017/07/22	13:18:03	45.97551	-129.99623	30.4	2.8	1510.2	Pit stop for the pilot and Bill.
11753	2017/07/22	13:19:54	45.97559	-129.99615	29.5	5.7	1505.9	Continuing up the eastern caldera wall.
11755	2017/07/22	13:20:08	45.9756	-129.99614	31.8	5.9	1503.4	Looks at all the ash on these talus blocks.
11756	2017/07/22	13:20:15	45.9756	-129.99613	30.8	6.2	1502.4	Climbing up the wall.
11758	2017/07/22	13:20:59	45.97563	-129.99610	37.3	4.8	1496.6	Nav and map underlay disagree by ~20m.
11760	2017/07/22	13:21:09	45.97564	-129.99610	42.9	6.2	1495.5	Solid lava flows now in the caldera wall.
11761	2017/07/22	13:21:19	45.97565	-129.99609	43.2	7.6	1493.7	HIGHLIGHTS: HD highlights start Lava tube.
11762	2017/07/22	13:21:23	45.97565	-129.99608	41.3	8.2	1493.1	Flow on flow.
11763	2017/07/22	13:21:31	45.97566	-129.99608	42.3	8.9	1491.9	Thick lava flow here.
11765	2017/07/22	13:21:40	45.97567	-129.99607	43.5	9.8	1490.8	Pillow cross sections.
11766	2017/07/22	13:21:46	45.97568	-129.99606	42.0	10.8	1489.8	Chopped off pillows.
11768	2017/07/22	13:22:15	45.97571	-129.99603	42.2	13.9	1486.2	Pillow lavas stacked up. Layer on layer of lava flows.
11770	2017/07/22	13:22:43	45.97574	-129.99600	42.8	4.7	1483.2	Coming up on a ridge blanketed in ash.
11771	2017/07/22	13:22:58	45.97576	-129.99599	42.5	5.0	1480.9	We have another 20 meters to climb before we get to the top of the wall.
11772	2017/07/22	13:23:05	45.97576	-129.99598	43.5	5.1	1480.1	The slope of less here.
11774	2017/07/22	13:23:13	45.97577	-129.99598	42.8	4.6	1479.2	Mostly talus covered here.
11776	2017/07/22	13:23:44	45.9758	-129.99596	27.0	4.7	1475.0	Another steeper group of lava flows here.
11777	2017/07/22	13:23:58	45.97581	-129.99594	33.1	6.2	1473.0	Beautiful blocky lavas here.
11779	2017/07/22	13:24:20	45.97583	-129.99593	34.2	7.2	1471.1	Glassy debris on the surface.
11781	2017/07/22	13:24:42	45.97585	-129.99592	34.1	8.2	1468.4	Lava flocks here. Truncated lavas. Broken pillows as we climb up the wall.
11782	2017/07/22	13:24:54	45.97586	-129.99591	35.2	6.3	1467.2	The wall is practically vertical here.

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11783	2017/07/22	13:25:00	45.97587	-129.99590	34.3	6.2	1466.7	We should be nearing the top.
11785	2017/07/22	13:25:08	45.97587	-129.99590	34.2	5.8	1466.3	Here's the top in the brow cam.
11786	2017/07/22	13:25:20	45.97588	-129.99589	34.1	4.5	1465.3	Layers of lava.
11787	2017/07/22	13:25:33	45.97589	-129.99588	34.3	4.3	1465.0	Ash layers at the top of the caldera wall.
11789	2017/07/22	13:25:51	45.97591	-129.99587	22.0	4.1	1464.4	HIGHLIGHTS: HD highlights stop We're at the top of the eastern caldera wall.
11790	2017/07/22	13:25:58	45.97592	-129.99586	10.0	4.5	1463.9	We should be in the graben here.
11792	2017/07/22	13:26:32	45.97596	-129.99583	4.9	2.7	1462.2	Jason is ~27 meters to the south of the top of the caldera wall on the nav underlay.
11794	2017/07/22	13:26:53	45.97599	-129.99582	6.6	2.4	1462.4	Lots of ash up here.
11795	2017/07/22	13:26:59	45.976	-129.99581	6.2	2.3	1462.5	NAV: Doppler Reset
11797	2017/07/22	13:27:33	45.97604	-129.99579	4.3	0.8	1463.5	Ash-covered sediments.
11800	2017/07/22	13:28:11	45.97608	-129.99577	4.1	0.8	1463.9	Bill thinks we're in the graben.
11802	2017/07/22	13:28:37	45.97612	-129.99575	4.2	1.5	1463.3	The graben could be to the right.
11803	2017/07/22	13:28:47	45.97613	-129.99575	4.0	1.3	1463.3	Coming up on the graben now we think.
11805	2017/07/22	13:29:33	45.97617	-129.99573	4.2	1.6	1464.1	HIGHLIGHTS: HD highlights start Within the wide area of the graben (~50m wide). There are fissure in here.
11808	2017/07/22	13:30:12	45.9762	-129.99572	3.9	1.6	1464.0	This whole area is in the path of the dike from where it erupted on the caldera floor to where it erupted on the NE caldera.
11809	2017/07/22	13:30:22	45.97621	-129.99571	5.4	2.2	1463.3	There are a series of fissures within the graben.
11812	2017/07/22	13:31:07	45.97625	-129.99570	2.4	1.9	1463.3	HIGHLIGHTS: HD highlights stop
11814	2017/07/22	13:31:43	45.97628	-129.99570	2.6	1.5	1463.1	Coming upon another fissure. The dike spread the seafloor apart.
11815	2017/07/22	13:31:55	45.97629	-129.99569	4.2	2.3	1462.7	Don't see any new lava in the fissure.
11817	2017/07/22	13:32:24	45.9763	-129.99569	4.4	186.2	1464.4	The east side of the fissure is a little higher than the west side by maybe a meter or so.
11819	2017/07/22	13:33:01	45.97634	-129.99569	359.2	1.0	1464.2	Can see the upper lava flow layer.
11821	2017/07/22	13:33:09	45.97635	-129.99569	3.0	1.1	1464.1	Traveling NW now.
11822	2017/07/22	13:33:25	45.97637	-129.99569	1.3	1.3	1463.7	Broken lobate plates visible.
11824	2017/07/22	13:34:01	45.97641	-129.99568	3.1	1.6	1463.5	All ash and sediment covered up here on the rim with occasional fissures.
11826	2017/07/22	13:34:19	45.97643	-129.99569	2.5	2.7	1463.5	Plate broken here - then back to smooth lavas.
11827	2017/07/22	13:34:27	45.97643	-129.99569	4.3	2.1	1463.6	Heading more NW now.
11829	2017/07/22	13:35:02	45.97647	-129.99569	2.3	2.1	1463.4	Looks like an old lava flow here. More broken up.
11831	2017/07/22	13:35:24	45.97649	-129.99569	2.6	1.3	1463.2	This is a bit more broken up here.
11833	2017/07/22	13:35:38	45.9765	-129.99569	1.7	0.8	1462.7	More fissures through lava flows.
11835	2017/07/22	13:36:21	45.97654	-129.99569	3.6	1.2	1461.9	This area is more broken up than what we saw previously. Lava plates.
11837	2017/07/22	13:36:37	45.97655	-129.99569	2.5	1.2	1461.8	Lots of sediment and ash up here.
11838	2017/07/22	13:36:46	45.97656	-129.99570	3.6	1.2	1462.0	Heading north now.

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11840	2017/07/22	13:37:26	45.97659	-129.99570	360.0	1.1	1462.6	Lots of fish hanging out with these two in the fissure.
11842	2017/07/22	13:37:37	45.9766	-129.99570	0.7	1.3	1462.2	One fish was much larger than the other.
11843	2017/07/22	13:37:48	45.97661	-129.99570	1.2	1.4	1462.5	See sheared tubes in the fissure.
11844	2017/07/22	13:37:59	45.97662	-129.99570	1.1	1.4	1462.9	Thick ash coating on the top.
11846	2017/07/22	13:38:09	45.97664	-129.99570	0.3	1.3	1463.5	Many sea stars on the top as well.
11848	2017/07/22	13:38:54	45.97669	-129.99571	359.9	2.3	1462.2	Small divets in the flat ash surface.
11850	2017/07/22	13:39:28	45.97673	-129.99572	1.2	1.9	1462.4	Small fissures and a fish hanging in the bottom.
11852	2017/07/22	13:39:56	45.97676	-129.99573	359.2	2.5	1461.8	Another small fissure adjacent to this one first and another fish.
11853	2017/07/22	13:40:02	45.97677	-129.99573	0.9	2.8	1461.7	Three fish.
11855	2017/07/22	13:40:21	45.9768	-129.99574	358.2	3.6	1461.5	Larger fissure structure and layers of ash and pillows.
11857	2017/07/22	13:41:06	45.97684	-129.99575	0.9	2.6	1461.6	Orange staining on this fissure on the east side of the crack.
11860	2017/07/22	13:41:45	45.97688	-129.99577	0.6	2.6	1461.7	Turning back to the northwest as we continue to ping-pong north along this graben.
11862	2017/07/22	13:42:12	45.97691	-129.99577	2.9	2.3	1462.2	Fish and spider crab near a fissure.
11863	2017/07/22	13:42:31	45.97693	-129.99578	2.3	3.4	1461.7	Really nice fissure view.
11866	2017/07/22	13:43:09	45.97697	-129.99580	1.5	1.9	1462.7	Thin crusty looking surface of ash layers broken up by fissures.
11867	2017/07/22	13:43:28	45.977	-129.99581	3.1	1.8	1462.8	Good view of ash layers in fissure.
11868	2017/07/22	13:43:36	45.97701	-129.99582	2.4	1.8	1462.8	Sea star and fish.
11871	2017/07/22	13:44:12	45.97706	-129.99584	2.6	2.1	1463.4	Featureless plane.
11872	2017/07/22	13:44:27	45.97709	-129.99585	2.6	1.8	1463.8	Accumulation of orange staining in the small cracks.
11874	2017/07/22	13:44:50	45.97712	-129.99587	2.5	1.4	1464.5	These deposits look hydrothermal.
11875	2017/07/22	13:44:57	45.97714	-129.99587	6.5	1.1	1464.7	Approaching small fissure or crack.
11877	2017/07/22	13:45:20	45.97717	-129.99589	2.3	1.5	1463.9	Thicker deposit in the crack of the orange.
11879	2017/07/22	13:45:43	45.97721	-129.99591	2.6	1.2	1463.9	Coming up to a larger fissure and still seeing the orange hydrothermal deposits.
11880	2017/07/22	13:45:48	45.97722	-129.99591	2.4	0.9	1463.9	Fish.
11882	2017/07/22	13:46:09	45.97726	-129.99593	5.2	0.8	1464.1	Smaller crack with ash layers.
11883	2017/07/22	13:46:19	45.97727	-129.99593	1.4	1.1	1463.5	Small touchdown.
11885	2017/07/22	13:47:01	45.97733	-129.99595	1.3	1.5	1462.3	Fish over flat ash wasteland.
11888	2017/07/22	13:47:38	45.97737	-129.99597	4.8	1.4	1462.6	Time for a zag to the NE as we came to the west edge of the graben.
11889	2017/07/22	13:47:49	45.97739	-129.99597	3.7	1.2	1462.6	Moving NE with many fish scouring the ash.
11890	2017/07/22	13:48:06	45.97742	-129.99598	3.4	2.1	1462.6	HIGHLIGHTS: HD highlights start View of the fissures as we cross.
11892	2017/07/22	13:48:26	45.97746	-129.99600	4.2	2.5	1462.8	Going to zig-zag less and make more northern progress.
11894	2017/07/22	13:48:41	45.97748	-129.99601	4.9	2.4	1463.2	Large orange deposits in the fissure.
11895	2017/07/22	13:48:51	45.9775	-129.99601	4.4	2.1	1463.4	Going to speed up the northern progress to .5kts.
11896	2017/07/22	13:49:02	45.97751	-129.99601	5.0	2.1	1463.3	Won't be able to stop and sample at that speed.
11898	2017/07/22	13:49:20	45.97754	-129.99602	3.9	1.9	1463.5	HIGHLIGHTS: HD highlights stop

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11900	2017/07/22	13:49:57	45.97759	-129.99603	4.5	2.0	1464.2	Going to put out an ash bucket and marker before picking up speed going north.
11903	2017/07/22	13:51:00	45.97768	-129.99606	2.5	2.3	1463.3	Lots of fish up here.
11905	2017/07/22	13:51:16	45.97777	-129.99606	4.4	2.2	1464.0	Something fishy going on.
11906	2017/07/22	13:51:32	45.97773	-129.99607	357.3	2.0	1464.0	Trying to get ahead of the ship right now.
11908	2017/07/22	13:51:39	45.97774	-129.99607	3.5	2.3	1463.9	Small depression here.
11910	2017/07/22	13:52:16	45.97781	-129.99609	4.9	1.2	1465.3	Gently sloping to the west.
11911	2017/07/22	13:52:33	45.97784	-129.99609	10.8	0.8	1465.8	Looks like a good spot for a tephra sample.
11913	2017/07/22	13:52:49	45.97787	-129.99610	9.3	1.1	1465.5	A few pyrosomes here.
11915	2017/07/22	13:53:07	45.9779	-129.99611	5.1	0.8	1465.8	We've never seen pyrosomes on the bottom (or at the surface) until this year.
11917	2017/07/22	13:53:38	45.97796	-129.99612	6.0	0.8	1465.7	Retrieving the tephra sampler from the port biobox.
11919	2017/07/22	13:54:10	45.97801	-129.99613	6.2	0.8	1465.7	Seafloor is slightly broken up to the east of us - small crack in the lobate flow.
11920	2017/07/22	13:54:24	45.97803	-129.99613	6.6	0.8	1465.7	DEPLOY Tephra Sampler F.
11924	2017/07/22	13:55:39	45.97812	-129.99615	9.5	3.0	1463.6	DEPLOY: Marker 281 next to Tephra sampler F. Z=1465. 45.978001 -29.996965. Hdg 6 degrees.
11925	2017/07/22	13:55:57	45.97815	-129.99616	11.0	3.3	1463.5	Petal to the metal straight ahead.
11927	2017/07/22	13:56:17	45.97818	-129.99617	4.2	3.2	1463.6	Bill wants to drive along the whole graben so we are speeding up a bit.
11929	2017/07/22	13:56:53	45.97822	-129.99618	4.5	2.8	1463.7	Moving over sedimented and ash-covered seafloor. Some small cracks in the seafloor.
11931	2017/07/22	13:57:17	45.97826	-129.99619	6.6	2.4	1464.2	Slightly inflated area to the east.
11933	2017/07/22	13:57:38	45.9783	-129.99620	9.0	2.0	1464.6	We're in the graben area.
11936	2017/07/22	13:58:40	45.9784	-129.99622	5.5	1.6	1462.7	Continuing north over more sediment and ash.
11937	2017/07/22	13:58:58	45.97842	-129.99622	2.8	1.4	1462.9	Zig-zagging back and forth as we move north.
11939	2017/07/22	13:59:14	45.97844	-129.99623	2.7	2.5	1463.3	Yellow staining in the cracks.
11940	2017/07/22	13:59:28	45.97847	-129.99623	0.8	2.6	1463.8	The flow is more broken up here and jumbled. Not so smooth.
11942	2017/07/22	14:00:02	45.97851	-129.99624	7.9	2.4	1463.7	The lavas have changed a bit now. More jumbled up but still sedimented.
11944	2017/07/22	14:00:15	45.97852	-129.99625	9.5	1.8	1464.1	Little rubble mounds here and there.
11945	2017/07/22	14:00:32	45.97855	-129.99625	8.3	1.4	1463.6	Looks like an old jumbled flow here.
11948	2017/07/22	14:01:25	45.97862	-129.99627	4.4	1.1	1463.5	Moving north.
11950	2017/07/22	14:01:40	45.97864	-129.99627	2.9	2.7	1463.9	Large drop off to the east. Fissure here.
11951	2017/07/22	14:01:42	45.97864	-129.99627	3.1	2.7	1463.9	Wow.
11952	2017/07/22	14:02:00	45.97867	-129.99628	3.4	2.1	1464.7	Lots of orange on the west wall of the fissure and on the lavas in the center.
11953	2017/07/22	14:02:06	45.97868	-129.99628	2.8	2.2	1464.8	Jumbled up lavas here.
11955	2017/07/22	14:02:32	45.97872	-129.99629	6.9	3.6	1463.5	Lava pillar remnants? Bill thinks it's just jumbled lava sticking up.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-969 Datalogger Comment
11957	2017/07/22	14:02:40	45.97873	-129.99629	6.2	3.8	1463.2	The lavas look vesicular.
11959	2017/07/22	14:03:34	45.97883	-129.99631	9.1	4.4	1461.4	Moving over an area of high standing jumbled lavas.
11961	2017/07/22	14:03:47	45.97885	-129.99631	10.8	4.6	1461.1	Jumbled flow up here in this area.
11962	2017/07/22	14:03:52	45.97886	-129.99632	14.5	4.2	1461.2	Fish and spider crab.
11964	2017/07/22	14:04:21	45.97892	-129.99633	12.2	3.7	1460.9	The seafloor has changed quite dramatically compared to the smoother bottom we were seeing earlier.
11966	2017/07/22	14:04:41	45.97896	-129.99633	10.7	2.9	1461.7	HIGHLIGHTS: HD highlights stop Little lava "spires" sticking up here and there.
11968	2017/07/22	14:05:12	45.97902	-129.99635	6.0	1.6	1462.3	Jumbled blocks here and there.
11969	2017/07/22	14:05:29	45.97904	-129.99635	5.9	2.6	1461.7	Inflated area of jumbled lavas covered with orange sediment.
11971	2017/07/22	14:05:41	45.97905	-129.99635	7.4	1.2	1461.6	The ash is still coating everything here.
11973	2017/07/22	14:06:10	45.9791	-129.99636	5.2	2.6	1463.3	This an "untidy" lava flow here.
11974	2017/07/22	14:06:26	45.97912	-129.99637	7.8	3.2	1461.8	Large jumbled mound here that we're passing over.
11976	2017/07/22	14:06:42	45.97914	-129.99637	12.2	4.0	1461.7	Keeping Jason in the graben.
11979	2017/07/22	14:07:48	45.97924	-129.99639	8.0	2.6	1458.0	More jumbled flow with larger jumbled blocks among smaller jumbled lavas.
11981	2017/07/22	14:08:36	45.97931	-129.99640	10.1	4.1	1461.4	Changed from flat sedimented flow earlier to jagged jumbled flow.
11983	2017/07/22	14:08:48	45.97933	-129.99641	12.6	2.6	1461.7	Lots of orange sediments here on the jumbled flow.
11985	2017/07/22	14:09:14	45.97939	-129.99642	11.3	2.0	1462.2	Small collapse ahead.
11987	2017/07/22	14:09:43	45.97945	-129.99643	12.0	2.6	1462.7	Lobate flow again. Out of the jumbled flow.
11988	2017/07/22	14:09:53	45.97947	-129.99643	11.0	2.1	1462.8	Thick sediment on this flat surface.
11991	2017/07/22	14:10:40	45.97956	-129.99645	5.0	3.1	1462.3	Collapse to the west.
11993	2017/07/22	14:11:11	45.9796	-129.99646	6.2	4.3	1463.0	Moving over a fissure now to the east.
11994	2017/07/22	14:11:27	45.97963	-129.99646	7.1	3.8	1463.5	Back in jumbled flows again.
11995	2017/07/22	14:11:36	45.97965	-129.99646	3.4	3.7	1463.8	Lots of rattails here. 4 in one view.
11997	2017/07/22	14:11:47	45.97966	-129.99647	9.1	3.9	1463.6	A "school" of fish.
11999	2017/07/22	14:12:15	45.9797	-129.99647	10.3	2.8	1462.7	Mounded up jumbled flow.
12001	2017/07/22	14:12:42	45.97975	-129.99648	12.5	2.3	1462.6	Moving over a depression here.
12005	2017/07/22	14:14:07	45.97987	-129.99649	9.3	4.5	1461.4	It looks like a contact in the depression to Susan but Bill disagrees
12007	2017/07/22	14:14:48	45.97994	-129.99650	11.3	2.8	1461.3	Inflated flow again to the west. Smooth and sediment covered.
12009	2017/07/22	14:15:07	45.97998	-129.99651	10.4	1.9	1461.5	Back to the featureless plain.
12012	2017/07/22	14:15:40	45.98005	-129.99651	10.3	1.6	1462.0	Spider crab.
12013	2017/07/22	14:15:51	45.98007	-129.99651	11.4	3.4	1462.2	Another down drop area here.
12015	2017/07/22	14:16:36	45.98014	-129.99651	6.0	4.0	1461.5	More rattails here. Passing over a fracture.
12017	2017/07/22	14:16:53	45.98017	-129.99651	3.2	2.4	1461.1	Back on smooth sediment seafloor between these fractures.
12020	2017/07/22	14:17:43	45.98024	-129.99651	7.2	2.6	1462.9	Area of sedimented smooth flows and fractures.
12023	2017/07/22	14:19:06	45.98037	-129.99650	10.5	3.0	1461.6	Deep fracture here.
12026	2017/07/22	14:19:47	45.98045	-129.99649	11.0	3.0	1462.1	Passing over the fissure to the east again.

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12029	2017/07/22	14:20:55	45.98059	-129.99647	11.1	2.5	1461.1	Just passed over a deep fissure.
12032	2017/07/22	14:22:00	45.98071	-129.99644	5.4	3.1	1462.6	Odd-looking fractures cross crossing the smooth sedimented seafloor..
12034	2017/07/22	14:22:22	45.98075	-129.99643	4.7	2.5	1462.9	Pillow lavas in the fissure. Covered in sediment.
12037	2017/07/22	14:23:10	45.98082	-129.99642	10.6	1.9	1463.7	The seafloor is a bit more broken up here.
12039	2017/07/22	14:23:42	45.98088	-129.99640	5.7	3.1	1462.9	Interesting looking seafloor here - more broken up between the inflated area now.
12040	2017/07/22	14:23:50	45.98089	-129.99640	7.3	3.1	1462.9	We have reached WP7 now.
12045	2017/07/22	14:25:09	45.98106	-129.99637	8.1	3.4	1462.4	Fred is taking over as pilot. Student driver. Jimmy's teaching him.
12046	2017/07/22	14:25:34	45.98112	-129.99636	7.0	2.7	1462.1	The flow here is not as smooth.
12048	2017/07/22	14:25:54	45.98117	-129.99635	6.0	3.4	1462.9	Little collapse pits in this inflated sheet flow.
12050	2017/07/22	14:26:07	45.9812	-129.99635	8.2	3.1	1463.1	Probably sheet flow under the sediments.
12051	2017/07/22	14:26:14	45.98122	-129.99634	8.8	2.7	1463.1	Back in sediment with fissures.
12053	2017/07/22	14:26:44	45.98129	-129.99634	7.0	2.8	1463.0	Can see the layers of ash in the walls of the fissure. Ash and sediment layers visible in the top of the fissures.
12055	2017/07/22	14:27:07	45.98132	-129.99633	3.3	2.4	1462.5	Lots of fissures here - not very deep.
12057	2017/07/22	14:27:52	45.98141	-129.99633	7.9	2.5	1462.5	Driving up the deep crack. Inflated sedimented flow on either side.
12059	2017/07/22	14:28:30	45.98148	-129.99633	9.6	2.3	1462.5	The tether is pulling on the vehicle. Jimmy is fixing that.
12063	2017/07/22	14:29:48	45.98166	-129.99633	8.1	1.8	1463.4	See glassy lobate lavas on the edge of the fissure topped with layers of ash.
12064	2017/07/22	14:30:03	45.9817	-129.99634	7.0	2.1	1463.3	See broken pillow lobes in the fissure.
12067	2017/07/22	14:30:41	45.98182	-129.99635	8.3	1.9	1464.2	Moving along heading north.
12068	2017/07/22	14:30:58	45.98188	-129.99636	10.4	1.8	1464.6	Yellow sediment in the cracks in the lobate flow.
12070	2017/07/22	14:31:10	45.98192	-129.99637	9.3	2.3	1465.2	Large lava blocks.
12071	2017/07/22	14:31:27	45.98198	-129.99638	10.9	1.9	1465.6	Passing over a narrow fissure now.
12073	2017/07/22	14:31:58	45.98206	-129.99639	6.5	1.0	1466.3	More fissure through this inflated lobate flow.
12075	2017/07/22	14:32:23	45.98208	-129.99640	4.7	2.8	1465.7	Big inflated lobe to the west.
12077	2017/07/22	14:32:51	45.98214	-129.99641	4.4	2.3	1467.1	Coming upon lobate lavas on the west side of the fracture.
12079	2017/07/22	14:33:09	45.98218	-129.99643	8.1	3.3	1465.7	See the top plate of the old lava flow and small depression to west.
12080	2017/07/22	14:33:35	45.98224	-129.99644	7.7	2.2	1466.5	Coming on a small collapse pit (very small) with visible lobates in the bottom).
12082	2017/07/22	14:33:57	45.98232	-129.99646	10.2	1.1	1466.9	Spider crab and fishes.
12084	2017/07/22	14:34:22	45.98238	-129.99648	355.5	1.6	1466.4	Yellow sediment over lobate smooth lavas now.
12086	2017/07/22	14:34:52	45.98247	-129.99651	339.6	1.9	1466.0	The map says we are out of the graben now.
12087	2017/07/22	14:35:04	45.98251	-129.99652	333.2	1.8	1466.0	Approaching the eastern edge of the graben now.
12089	2017/07/22	14:35:07	45.98252	-129.99652	333.5	1.8	1466.2	Here we are.
12090	2017/07/22	14:35:32	45.98258	-129.99654	328.7	3.1	1466.6	Coming on a another small collapse.
12092	2017/07/22	14:35:53	45.98265	-129.99656	7.5	2.9	1467.0	We're in the graben now and continuing to the N/NE.

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12094	2017/07/22	14:36:26	45.98275	-129.99660	8.5	6.4	1469.7	Driving over the fissure.
12096	2017/07/22	14:36:46	45.9828	-129.99662	0.1	4.2	1467.7	We're just skirting the east edge of the graben now.
12098	2017/07/22	14:37:24	45.98296	-129.99667	330.6	4.0	1468.3	Broken up plates of sheet lava.
12100	2017/07/22	14:37:51	45.98307	-129.99671	351.5	3.6	1466.6	Coming over an inflated sheet flow now.
12103	2017/07/22	14:38:58	45.98334	-129.99682	4.1	2.7	1467.1	This part of the graben here doesn't look like it ruptured. Looks like old seafloor.
12105	2017/07/22	14:39:27	45.98346	-129.99686	1.8	2.9	1467.9	NAV: Doppler Reset
12107	2017/07/22	14:39:52	45.98354	-129.99689	4.5	2.5	1469.7	NAV: Doppler Reset
12108	2017/07/22	14:39:59	45.98356	-129.99690	4.8	2.7	1469.8	Reset the doppler twice.
12110	2017/07/22	14:40:12	45.9836	-129.99692	4.4	3.3	1469.3	The graben seems to be opening up again here.
12114	2017/07/22	14:42:00	45.9839	-129.99704	340.7	3.0	1467.4	We're on the eastern edge of the graben.
12116	2017/07/22	14:42:17	45.98395	-129.99706	325.6	1.9	1468.7	We are moving over to the west a bit to get a better look at the whole graben.
12119	2017/07/22	14:43:09	45.98414	-129.99713	344.8	2.6	1468.6	We're traveling over an inflated sheet flow with fractures.
12120	2017/07/22	14:43:26	45.98419	-129.99715	344.0	2.1	1468.8	Heading to the western edge of the graben now.
12122	2017/07/22	14:44:02	45.98431	-129.99720	336.5	1.5	1469.4	We're kind of in the center of the graben now.
12124	2017/07/22	14:44:23	45.98438	-129.99722	334.5	2.7	1469.2	Shift change.
12125	2017/07/22	14:44:33	45.98441	-129.99723	335.3	2.3	1469.5	Cracks in the sheet flow here.
12128	2017/07/22	14:45:30	45.98456	-129.99729	336.0	3.0	1469.1	We're moving at 0.5 knots.
12131	2017/07/22	14:46:08	45.98465	-129.99731	333.7	2.1	1470.2	Moving along small fractures.
12134	2017/07/22	14:47:26	45.98483	-129.99736	339.4	3.4	1468.7	Continuing up this crack - fissure between inflated lobate flow covered in sediment and ash.
12136	2017/07/22	14:47:42	45.98487	-129.99737	338.7	3.4	1469.4	Looks good traveling up a small fracture.
12139	2017/07/22	14:49:05	45.98505	-129.99740	339.4	2.0	1469.3	Crossing a big fissure here to STBD.
12141	2017/07/22	14:49:35	45.9851	-129.99741	338.5	4.2	1469.3	Going to follow this fissure north a bit.
12143	2017/07/22	14:49:56	45.98515	-129.99742	339.6	4.6	1470.4	Lost the fracture as it filled up a bit and now heading back along a crack.
12145	2017/07/22	14:50:26	45.98523	-129.99743	341.0	1.8	1470.7	Layers of broken sheet flows on the top covered with ash.
12147	2017/07/22	14:50:41	45.98526	-129.99743	341.3	1.9	1471.0	Spider crab on the wall and another.
12148	2017/07/22	14:50:54	45.9853	-129.99744	341.7	2.1	1471.4	Deep fissure but no sign of fresh lava at the bottom.
12150	2017/07/22	14:51:25	45.98537	-129.99744	342.7	1.8	1471.2	Small bridge across the fracture that doesn't go up to the rim.
12152	2017/07/22	14:51:48	45.98542	-129.99745	338.8	6.0	1469.4	Fissure deepens again.
12153	2017/07/22	14:52:02	45.98545	-129.99745	339.2	2.7	1470.3	Significant ash coating the flatter substrate.
12155	2017/07/22	14:52:24	45.98549	-129.99745	337.6	4.8	1471.5	Wider fissure.
12157	2017/07/22	14:52:48	45.98554	-129.99746	341.8	5.1	1470.0	Fissure getting shallow again.
12158	2017/07/22	14:53:05	45.98556	-129.99746	339.2	5.4	1468.8	Unfractured surface with ash deposits.
12160	2017/07/22	14:53:25	45.98561	-129.99746	341.7	2.9	1468.5	Fissure breaks to port again.
12161	2017/07/22	14:53:28	45.98561	-129.99746	342.6	2.7	1468.6	Spider crab.
12164	2017/07/22	14:54:09	45.98568	-129.99747	338.3	2.7	1468.4	Following top of fissure in a more jumbled looking flow.

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12166	2017/07/22	14:54:40	45.98576	-129.99748	339.3	3.0	1468.2	Formed a ridge on the east side and another step down on the east side of the main fissure.
12168	2017/07/22	14:55:20	45.98586	-129.99749	339.2	4.5	1468.2	The east side has opened up to a fissure.
12170	2017/07/22	14:55:40	45.98591	-129.99750	338.9	6.1	1467.1	The fissures are side by side and look like they could merge ahead.
12173	2017/07/22	14:56:43	45.98607	-129.99753	340.4	3.1	1467.9	Pillar like remnant in the fissure.
12175	2017/07/22	14:57:20	45.98616	-129.99755	338.1	3.0	1467.5	Fractured segments in the flatter ashy surface.
12177	2017/07/22	14:57:46	45.98621	-129.99756	341.5	1.4	1469.3	This fracture is opening up to be deeper and wider.
12179	2017/07/22	14:58:15	45.98627	-129.99757	341.6	3.1	1469.1	Plates of sheet flow spanning the edge of the fracture.
12181	2017/07/22	14:58:49	45.98633	-129.99759	342.4	4.3	1467.9	Fissure is getting shallower.
12183	2017/07/22	14:59:09	45.98637	-129.99761	339.1	3.0	1467.7	Fissure disappeared and flatter ash-covered surface.
12185	2017/07/22	14:59:43	45.98643	-129.99763	340.5	2.3	1467.4	Some pieces of rough substrate poking through the flat surface.
12186	2017/07/22	14:59:48	45.98644	-129.99763	338.4	2.3	1467.3	Larger fissure to port.
12188	2017/07/22	15:00:15	45.98651	-129.99765	339.0	2.3	1467.5	Driving along a small fissure that has opened up.
12189	2017/07/22	15:00:29	45.98655	-129.99767	342.3	2.3	1467.7	Sonar screen shows multiple fissures parallel to our track.
12192	2017/07/22	15:01:11	45.98665	-129.99771	340.6	2.0	1467.2	Shallow fracture here.
12193	2017/07/22	15:01:31	45.9867	-129.99774	340.6	2.5	1466.8	Losing this crack as it narrows again.
12195	2017/07/22	15:01:49	45.98674	-129.99776	339.9	2.4	1466.8	HIGHLIGHTS: HD highlights start Following the narrow fissure.
12197	2017/07/22	15:02:08	45.98678	-129.99777	342.5	1.7	1467.3	Smooth ash-covered surface to either side of the crack.
12199	2017/07/22	15:02:48	45.98684	-129.99780	341.3	2.5	1466.9	Converging fractures.
12200	2017/07/22	15:03:03	45.98686	-129.99781	340.3	2.6	1466.9	Network of small fractures.
12201	2017/07/22	15:03:06	45.98687	-129.99782	339.9	2.6	1466.8	Spider crab.
12204	2017/07/22	15:03:59	45.98699	-129.99788	338.6	2.6	1466.6	We are to the east of the graben outlines from MBARI but still following fissures.
12205	2017/07/22	15:04:05	45.98701	-129.99789	342.0	2.4	1466.9	HIGHLIGHTS: HD highlights stop
12207	2017/07/22	15:04:23	45.98705	-129.99791	342.8	2.3	1467.0	Small meandering fissures.
12209	2017/07/22	15:05:02	45.98714	-129.99797	345.8	2.7	1467.1	Going to zig-zag back over to the west as we proceed to the north.
12211	2017/07/22	15:05:20	45.98718	-129.99799	342.3	2.7	1467.5	About a third of the way between waypoints 8 and 9.
12213	2017/07/22	15:05:43	45.98724	-129.99802	344.0	2.3	1468.1	Crossing over a bit wider fracture and now following along it.
12216	2017/07/22	15:06:59	45.98739	-129.99811	340.2	1.9	1468.8	The lava at the bottom of that fissure looked more rounded and intact across instead of broken and fractured.
12218	2017/07/22	15:07:34	45.98744	-129.99814	340.6	1.6	1469.0	Zigzags across the fractures. Came back to stbd and now heading back to port.
12220	2017/07/22	15:07:42	45.98746	-129.99815	342.1	1.5	1469.2	Larger fracture opening up to port.
12221	2017/07/22	15:07:52	45.98748	-129.99816	341.5	1.5	1469.2	Deep fracture. Very deep.
12223	2017/07/22	15:08:14	45.98752	-129.99818	342.4	2.5	1468.7	HIGHLIGHTS: HD highlights start
12225	2017/07/22	15:08:40	45.98756	-129.99820	338.9	1.7	1468.7	Altimeter didn't seem to catch the depth of the fissure as it only went to 2m.
12226	2017/07/22	15:09:04	45.98762	-129.99823	339.5	6.7	1469.4	Coming back over the deep fissure again as zig to east.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-969 Datalogger Comment
12229	2017/07/22	15:09:52	45.98774	-129.99829	340.0	1.8	1469.9	Several fish on the east side of the fissure on top of the flat ash-covered surface.
12230	2017/07/22	15:10:01	45.98777	-129.99830	339.4	1.5	1469.8	Small cracks.
12232	2017/07/22	15:10:14	45.9878	-129.99831	338.8	1.6	1469.8	Zigging back to the west again.
12235	2017/07/22	15:11:23	45.98799	-129.99839	338.9	2.4	1469.5	HIGHLIGHTS: HD highlights stop Coming
12236	2017/07/22	15:11:29	45.98801	-129.99840	338.1	2.5	1469.6	Looks like fresh lava here.
12238	2017/07/22	15:11:38	45.98803	-129.99841	339.3	2.3	1469.7	Contact in the bottom of this fissure.
12239	2017/07/22	15:11:46	45.98805	-129.99841	341.0	2.0	1469.9	Slowing down the ship so we can sample some of this.
12241	2017/07/22	15:12:07	45.98809	-129.99843	340.0	2.4	1469.8	Not as much sediment and some pillow skins.
12242	2017/07/22	15:12:33	45.98816	-129.99845	340.4	2.5	1469.7	This fissure is closing up and some of the lava looks like it broke through the sediment.
12244	2017/07/22	15:12:49	45.98819	-129.99846	341.2	2.9	1469.2	See some lava at the top of the fissure.
12245	2017/07/22	15:12:59	45.9882	-129.99847	342.7	2.6	1469.7	Spider crab sitting on top of the new lava crust.
12246	2017/07/22	15:13:06	45.98822	-129.99847	344.0	2.2	1469.9	Midway between waypoints 8 and9.
12248	2017/07/22	15:13:21	45.98826	-129.99849	338.1	2.2	1470.0	New lava in the fissure and coming up in pieces of the ash sediment to each side.
12250	2017/07/22	15:13:40	45.98831	-129.99850	340.9	1.9	1470.4	Fissure closing up a bit but a small pillar.
12251	2017/07/22	15:13:50	45.98833	-129.99851	341.3	2.4	1470.2	Pillar was on the west side of the fissure.
12252	2017/07/22	15:14:04	45.98834	-129.99851	342.3	1.7	1470.3	Fissure closed up a bit.
12254	2017/07/22	15:14:16	45.98836	-129.99852	345.9	1.9	1470.6	HIGHLIGHTS: HD highlights start Fissure deepening again.
12256	2017/07/22	15:14:38	45.98839	-129.99853	341.8	2.7	1470.5	Lots of ash.
12257	2017/07/22	15:14:54	45.98842	-129.99854	341.8	2.6	1470.3	Skins of pillow and tube.
12259	2017/07/22	15:15:15	45.98846	-129.99855	336.8	1.4	1471.1	Lava drips in the pillow skin.
12260	2017/07/22	15:15:35	45.9885	-129.99856	332.0	1.5	1471.7	Setting up to sample this new lava on the fissure.
12262	2017/07/22	15:15:50	45.98852	-129.99857	332.2	1.5	1471.7	Close-up of the lava drips inside the pillow.
12264	2017/07/22	15:16:33	45.98859	-129.99859	332.8	1.7	1471.7	SAMPLE: Geo J969-Geo-05 piece of skin of newly erupted lava pillow on a fissure.
12266	2017/07/22	15:17:01	45.98867	-129.99861	332.1	1.7	1471.5	SAMPLE: Geo J969-GEO-05 Adding a second piece to this sample from the same pillow skin.
12269	2017/07/22	15:17:51	45.98871	-129.99863	337.4	2.6	1469.6	Position of this sample is 45.988521 -129.998496 as we barely stopped moving north.
12271	2017/07/22	15:18:17	45.98878	-129.99865	349.1	2.0	1470.4	Continuing north along the fissure. Hard to tell if this is new lava.
12273	2017/07/22	15:18:37	45.98884	-129.99867	344.3	3.0	1469.9	Jumbled looking lava in the fissure and can't tell if it is new here or not.
12274	2017/07/22	15:18:46	45.98886	-129.99867	349.5	4.0	1469.4	Altitude is registering 3m over this fissure.
12276	2017/07/22	15:19:31	45.98897	-129.99871	344.3	3.9	1469.2	Last sample was place in the stbd rock box in the front-port quadrant.
12278	2017/07/22	15:19:41	45.98899	-129.99871	347.5	3.9	1469.4	Deep fissure again. Can't see the bottom.
12280	2017/07/22	15:20:21	45.98908	-129.99874	348.6	2.9	1469.8	Moving along this deep fissure which now has an altitude is 4m.

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12282	2017/07/22	15:20:47	45.98915	-129.99876	345.4	8.9	1469.1	That last sample was actually about 2/3 the way between waypoints 8 and 9.
12283	2017/07/22	15:21:02	45.98918	-129.99877	346.9	4.7	1469.5	Slowing the ship's northern progress to prepare for sampling.
12285	2017/07/22	15:21:16	45.98921	-129.99878	346.0	3.9	1469.6	Some jumbled flow and remnant pillar.
12287	2017/07/22	15:21:45	45.9893	-129.99881	346.8	2.7	1469.6	Moving along the east side of the fissure to port.
12289	2017/07/22	15:22:07	45.98937	-129.99883	348.3	3.0	1469.2	On top of smoother pillow and ash flow.
12291	2017/07/22	15:22:49	45.98949	-129.99888	348.2	3.5	1469.1	Moving along smooth ash-covered surface.
12292	2017/07/22	15:23:05	45.98954	-129.99889	352.9	3.9	1469.0	Turning toward port to get back over the eruptive fissure.
12294	2017/07/22	15:23:10	45.98955	-129.99890	353.4	4.3	1469.1	Spider crab.
12296	2017/07/22	15:23:40	45.98961	-129.99892	353.5	3.4	1469.7	Crossing back over the large fissure.
12297	2017/07/22	15:23:56	45.98965	-129.99893	349.7	4.0	1469.9	Can barely see the bottom of this fissure.
12299	2017/07/22	15:24:10	45.98968	-129.99894	347.6	5.0	1469.5	Not able to determine if there is new lava at the bottom.
12301	2017/07/22	15:24:37	45.98972	-129.99896	349.1	8.7	1468.9	Murky view here.
12302	2017/07/22	15:24:50	45.98975	-129.99897	350.6	7.1	1469.4	Came a bit high off the bottom as we were following the fissure.
12304	2017/07/22	15:25:17	45.98981	-129.99899	350.3	4.6	1469.3	Fissure walls are less distinct here.
12306	2017/07/22	15:25:48	45.98986	-129.99901	353.5	5.5	1469.0	We are at the edge of the navigation safety donut.
12308	2017/07/22	15:26:11	45.98991	-129.99903	350.3	3.3	1471.3	Preparing to sample near the top of this fissure.
12310	2017/07/22	15:26:47	45.98996	-129.99905	351.1	0.8	1472.3	View of the pillow crust on the to of this fissure.
12311	2017/07/22	15:27:06	45.99	-129.99906	351.0	0.8	1472.4	Very glassy and covered with sediment.
12313	2017/07/22	15:27:30	45.99006	-129.99909	351.2	0.8	1472.4	The edge of the pillow is very glassy and probably new lava. Overflowed the fissure to the east side.
12316	2017/07/22	15:28:27	45.99017	-129.99914	351.0	0.9	1472.4	SAMPLE: Geo J969-Geo-06 piece of fresh skin on fissure overflow. In the stbd rock box front-stbd quadrant. Several pieces.
12318	2017/07/22	15:28:50	45.99021	-129.99915	350.9	0.9	1472.4	Taking a third piece of the crust and placing it in the rock box.
12320	2017/07/22	15:29:35	45.99028	-129.99918	352.5	2.6	1470.9	SAMPLE: Geo J969-GEO-06 Position is 45.990096 - 129.999086 about 50m north of waypoint 9.
12322	2017/07/22	15:29:52	45.9903	-129.99919	350.3	2.8	1471.0	Continuing along this fracture and quite a bit of sediment.
12323	2017/07/22	15:29:58	45.99031	-129.99920	350.4	1.8	1471.0	Big sheet flow overflow.
12324	2017/07/22	15:30:05	45.99031	-129.99920	345.3	1.7	1471.3	HIGHLIGHTS: HD highlights start
12326	2017/07/22	15:30:20	45.99034	-129.99921	348.2	2.5	1471.3	Either flowed out or back into the fissure here.
12327	2017/07/22	15:30:28	45.99035	-129.99922	352.5	2.7	1471.2	Striations are along the flow direction.
12329	2017/07/22	15:30:46	45.99038	-129.99923	349.7	2.8	1470.7	Back on top of sediment covered older flow.
12330	2017/07/22	15:30:49	45.99038	-129.99923	350.7	2.2	1470.7	HIGHLIGHTS: HD highlights stop
12332	2017/07/22	15:31:07	45.9904	-129.99924	351.9	2.7	1470.7	No overflow on the west side of that fissure.
12333	2017/07/22	15:31:18	45.99042	-129.99925	351.3	2.5	1470.7	Following multiple small fissures to the north.
12334	2017/07/22	15:31:33	45.99045	-129.99926	358.6	2.4	1470.9	Fish.
12336	2017/07/22	15:31:50	45.99047	-129.99927	2.0	2.3	1470.9	Multiple fish in the cracks. Each fish has its own fissures.
12338	2017/07/22	15:32:15	45.99049	-129.99928	354.3	1.8	1471.1	Moving west over the flat ash-covered substrate.
12339	2017/07/22	15:32:36	45.99051	-129.99929	354.1	2.8	1471.4	Coming over another fissure (not very deep) but jumbled flow.

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12341	2017/07/22	15:32:56	45.99053	-129.99930	352.7	1.3	1471.8	New lavas extruded to the west in a larger fissure.
12343	2017/07/22	15:33:11	45.99054	-129.99930	350.3	1.8	1471.7	Extruded a bit on the top before this fissure.
12345	2017/07/22	15:33:37	45.99058	-129.99932	21.0	1.4	1471.9	HIGHLIGHTS: HD highlights start New lavas. Going to try to sample some of this crust over topping the fissure on its east side.
12347	2017/07/22	15:34:09	45.99063	-129.99934	28.2	1.3	1472.9	A lot of ash on the top of this fissure.
12349	2017/07/22	15:35:02	45.99071	-129.99938	29.8	1.3	1472.9	SAMPLE: Geo J969-Geo-07 Piece of new flow crust a little more than halfway to waypoint 9 from #8.
12351	2017/07/22	15:35:30	45.99075	-129.99939	30.0	1.3	1472.9	Placed in the port rock box in the aft-port box. Took a second piece of the same crust.
12353	2017/07/22	15:36:02	45.99081	-129.99941	7.0	2.1	1471.4	Location for this sample is 45.990606 -129.999406.
12355	2017/07/22	15:36:18	45.99083	-129.99942	344.5	2.6	1470.7	Looks like it is spreading out under the sediment but not coming out on top.
12356	2017/07/22	15:36:20	45.99083	-129.99942	344.6	2.8	1470.6	Fish.
12358	2017/07/22	15:36:41	45.99086	-129.99943	347.1	2.2	1471.0	Heading north to waypoint 10. Last sample wat between 9 and 10 (NOT 8 and 9).
12359	2017/07/22	15:36:57	45.9909	-129.99944	356.8	2.1	1471.3	Large fish hanging out on the east rim of the fissure.
12361	2017/07/22	15:37:13	45.99093	-129.99945	356.2	3.3	1471.4	HIGHLIGHTS: HD highlights stop Deep fissure.
12362	2017/07/22	15:37:30	45.99097	-129.99947	354.6	2.6	1471.7	Heavy ash sediments covering everything.
12364	2017/07/22	15:37:48	45.99101	-129.99948	358.4	2.4	1471.6	Small collapse with layers of lava flows.
12365	2017/07/22	15:38:00	45.99104	-129.99949	351.8	2.5	1471.3	Moving north along the east side of this deeper fracture.
12368	2017/07/22	15:38:37	45.99113	-129.99951	354.7	2.3	1471.9	Broken lava crusts all along the fractures.
12369	2017/07/22	15:38:47	45.99115	-129.99952	356.1	1.9	1472.1	Very thin layers.
12370	2017/07/22	15:38:55	45.99116	-129.99952	355.7	2.4	1471.9	Sea star on the east rim.
12372	2017/07/22	15:39:08	45.99118	-129.99952	356.3	2.9	1471.7	Broken mini tubes of lava.
12374	2017/07/22	15:39:42	45.99125	-129.99954	355.0	3.1	1471.7	East side has sheared off balloons of remaining skins of tubes.
12375	2017/07/22	15:39:51	45.99127	-129.99954	358.2	2.3	1471.4	HIGHLIGHTS: HD highlights start Very deep fissure.
12376	2017/07/22	15:40:04	45.99129	-129.99955	356.1	5.7	1469.6	Small bridge across the fissure.
12379	2017/07/22	15:41:03	45.99139	-129.99957	354.2	5.5	1469.6	Back over a deep part of the fissure past the bridge.
12381	2017/07/22	15:41:16	45.99142	-129.99957	355.6	4.2	1470.1	HIGHLIGHTS: HD highlights start
12383	2017/07/22	15:41:54	45.99149	-129.99958	355.3	7.0	1469.8	Moving north but flying a bit high for visibility.
12384	2017/07/22	15:42:00	45.9915	-129.99958	355.0	5.8	1469.7	Sea star.
12386	2017/07/22	15:42:25	45.99155	-129.99959	356.2	4.7	1470.1	Fissure is narrowing.
12388	2017/07/22	15:43:00	45.99163	-129.99960	352.9	4.0	1471.0	Fissure is not that deep here.
12390	2017/07/22	15:43:15	45.99167	-129.99960	355.1	4.1	1470.6	Thin crusts layers with micro-collapse.
12391	2017/07/22	15:43:33	45.99171	-129.99961	356.8	3.6	1471.0	Still looks like new lavas with sediment near the fracture.
12393	2017/07/22	15:43:55	45.99176	-129.99961	353.9	4.2	1470.4	Moving to the east a bit as continue north (zag).
12395	2017/07/22	15:44:12	45.9918	-129.99961	7.1	3.0	1470.7	Hard to tell where new vs. old lavas are.
12397	2017/07/22	15:44:49	45.99185	-129.99962	13.3	3.9	1470.7	Zigging back over west and over a deep fissure.
12399	2017/07/22	15:45:20	45.9919	-129.99962	14.7	3.5	1472.8	East side of fissure.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-969 Datalogger Comment
12401	2017/07/22	15:45:54	45.99195	-129.99962	15.3	6.2	1471.5	East wall of fissure has layers of ash and thin flow.
12403	2017/07/22	15:46:36	45.99201	-129.99962	14.9	4.4	1470.4	Up on top of the east side some sheared off layers of flow.
12405	2017/07/22	15:47:02	45.99206	-129.99962	15.6	4.0	1471.1	Small collapses of thin flow.
12407	2017/07/22	15:47:24	45.99209	-129.99962	15.9	3.4	1470.7	This looks like 2015 flow covered in ash.
12409	2017/07/22	15:47:43	45.99212	-129.99961	17.0	3.8	1471.0	Lava on top of the sediment in this location.
12410	2017/07/22	15:48:00	45.99215	-129.99961	21.7	3.3	1471.1	This is new flow.
12413	2017/07/22	15:48:37	45.9922	-129.99961	12.7	1.5	1473.3	Preparing to sample this crust from a more significant extrusion of lava on top of the ash sediment.
12414	2017/07/22	15:48:40	45.9922	-129.99961	12.1	1.4	1473.4	HIGHLIGHTS: HD highlights start
12416	2017/07/22	15:49:19	45.99225	-129.99961	357.2	0.8	1473.9	Older substrate Kipuka with new lavas surrounding.
12419	2017/07/22	15:50:22	45.99232	-129.99960	2.6	0.8	1473.9	SAMPLE: Geo Big collapse of this pillow skin while setting up for the sample.
12422	2017/07/22	15:51:13	45.99241	-129.99960	3.2	0.8	1473.9	SAMPLE: Geo J969-Geo-08 Piece of this newly collapsed skin of the flow on top of the older sediment covered substrate.
12424	2017/07/22	15:51:42	45.99245	-129.99959	3.5	0.8	1473.9	SAMPLE: Geo J969-GEO-08 Put in aft-stbd port rock box.
12426	2017/07/22	15:52:22	45.99251	-129.99959	357.0	2.9	1472.2	Location is 45.992295 -129.999559 for J969-GEO-08.
12427	2017/07/22	15:52:28	45.99252	-129.99959	358.3	3.1	1472.4	Moving north.
12429	2017/07/22	15:52:45	45.99255	-129.99959	357.5	2.4	1473.3	About halfway between waypoints 10 and 11.
12430	2017/07/22	15:52:58	45.99257	-129.99959	1.3	2.2	1473.8	Fresh sheet flow with sediment in grooves.
12431	2017/07/22	15:53:02	45.99258	-129.99959	357.8	2.6	1473.7	Crab.
12434	2017/07/22	15:53:45	45.99263	-129.99959	9.2	4.2	1473.6	Moving back over fissure to the west. The lavas were overflowing the fissures.
12436	2017/07/22	15:54:07	45.99266	-129.99959	22.2	2.3	1475.3	Wide fissure with layers of flow on the east wall.
12437	2017/07/22	15:54:25	45.99268	-129.99959	17.1	2.8	1475.0	Heading along the fissure to the north.
12439	2017/07/22	15:55:02	45.99273	-129.99959	12.4	4.8	1473.2	Fissure closing up.
12442	2017/07/22	15:55:43	45.99277	-129.99959	13.2	3.2	1473.6	Leftover piece of multiple sheet flows thrust up.
12443	2017/07/22	15:56:04	45.9928	-129.99960	12.9	3.3	1472.5	Jumbled sheet flow with stubby pillars on the rim of the fissure.
12446	2017/07/22	15:56:40	45.99286	-129.99960	8.9	1.6	1473.8	Fish are aligned with noses to the north.
12447	2017/07/22	15:56:56	45.99288	-129.99961	10.8	2.4	1473.4	Remnant pillars. Lots of crabs up on the caldera rim (and fish).
12449	2017/07/22	15:57:19	45.99292	-129.99961	8.2	3.6	1472.8	Heavy sediments.
12451	2017/07/22	15:57:47	45.99296	-129.99962	3.6	3.8	1472.4	Collapse areas showing the multiple layers of sheet flow.
12453	2017/07/22	15:58:31	45.99303	-129.99964	346.7	1.3	1473.6	New flow on top of the fracture to the west.
12455	2017/07/22	15:58:42	45.99305	-129.99965	344.9	1.4	1473.9	Could be lava under the sediment in the crack as well.
12456	2017/07/22	15:58:47	45.99305	-129.99965	345.8	1.5	1474.0	HIGHLIGHTS: HD highlights start
12457	2017/07/22	15:59:00	45.99306	-129.99966	342.7	1.1	1474.4	Can see the crack feeding the flow on the top of the sediments.
12459	2017/07/22	15:59:15	45.99308	-129.99966	344.6	1.3	1474.3	Flowing out of the crack?
12460	2017/07/22	15:59:24	45.99309	-129.99967	344.9	1.3	1474.3	Flow is under the sediment here.
12462	2017/07/22	15:59:46	45.99311	-129.99968	9.1	0.8	1474.7	Fissure opening up on the west. New lavas overtopping.
12464	2017/07/22	16:00:13	45.99314	-129.99969	45.6	2.4	1474.7	Collapse area of sediment on top of new flow.
12465	2017/07/22	16:00:21	45.99315	-129.99969	29.2	2.8	1474.6	Crab hanging on the edge of the flow.

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12467	2017/07/22	16:00:38	45.99317	-129.99970	351.0	3.8	1473.9	Pillow on top of the sediment with a tube.
12468	2017/07/22	16:00:48	45.99318	-129.99971	21.4	3.8	1474.6	Big fissure as moved to the west.
12470	2017/07/22	16:01:08	45.99319	-129.99972	75.1	2.9	1477.1	Sheared pillows and tubes in the east wall of this fracture.
12471	2017/07/22	16:01:19	45.99321	-129.99972	72.5	3.4	1477.4	Old pillows topped with new lavas on top.
12472	2017/07/22	16:01:23	45.99321	-129.99973	72.8	3.2	1477.5	Great cross-section.
12474	2017/07/22	16:01:43	45.99324	-129.99974	5.3	1.4	1476.8	New lava on top of the fissure with sheared tubes on fissure wall.
12475	2017/07/22	16:01:48	45.99324	-129.99975	333.0	3.7	1476.2	Wow.
12476	2017/07/22	16:01:56	45.99325	-129.99975	335.2	3.9	1474.7	HIGHLIGHTS: HD highlights stop
12478	2017/07/22	16:02:13	45.99327	-129.99977	324.6	2.7	1474.6	Flows are messy mixture of thin flows interacting with the sediment.
12479	2017/07/22	16:02:23	45.99328	-129.99978	317.8	2.5	1474.9	Over fracture with less sediments.
12481	2017/07/22	16:02:39	45.9933	-129.99979	316.2	2.2	1475.2	Crab under a piece of crust just hanging on.
12482	2017/07/22	16:02:45	45.9933	-129.99979	291.5	2.0	1475.2	You are not hiding from us.
12483	2017/07/22	16:02:57	45.99331	-129.99980	253.2	2.2	1475.5	Crab holding on crust.
12486	2017/07/22	16:03:22	45.99333	-129.99981	260.4	2.5	1475.6	Looking at the western wall of this fissure.
12487	2017/07/22	16:03:31	45.99334	-129.99982	262.3	2.6	1475.4	Time for another rock sample.
12490	2017/07/22	16:04:15	45.99338	-129.99985	268.0	1.6	1475.9	Facing the western wall of this fissure. Looks like a lot of new flow with less sediment than the eastern side.
12493	2017/07/22	16:05:23	45.99346	-129.99992	263.9	0.8	1477.1	SAMPLE: Geo J969-Geo-09 Piece of collapsed pillow crust from western wall of eruptive fissure. near waypoint 11. Great drips.
12495	2017/07/22	16:05:59	45.99349	-129.99995	263.9	0.8	1477.1	SAMPLE: Geo J969-GEO-09 Very pointy drips from the underside. Going in the port rock box.
12499	2017/07/22	16:07:25	45.99357	-130.00002	268.2	3.1	1474.9	Second piece of the same pillow with drips. J969-GEO-09 cont. Placed aft of the 6-plex rock box.
12501	2017/07/22	16:07:54	45.99359	-130.00004	327.9	4.1	1473.6	Position for this sample J969-GEO-09 45.993422 -129.999957. Just west of waypoint #11.
12502	2017/07/22	16:08:04	45.9936	-130.00005	329.0	4.6	1473.6	Moving north along this fissure.
12505	2017/07/22	16:08:57	45.99365	-130.00009	329.2	4.9	1475.3	Fissure is quite deep as we continue along.
12507	2017/07/22	16:09:13	45.99366	-130.00010	323.4	4.9	1478.4	It is also wide enough to come down to the bottom a bit.
12508	2017/07/22	16:09:26	45.99368	-130.00012	327.4	4.2	1477.6	Much less sediment.
12511	2017/07/22	16:10:22	45.99375	-130.00018	324.9	4.3	1478.4	Looking at the wall of the fissure.
12515	2017/07/22	16:11:52	45.99387	-130.00028	325.1	4.4	1478.4	Checking ballast with all our new rock additions.
12517	2017/07/22	16:12:33	45.99392	-130.00031	324.9	5.0	1477.3	Decided we need to drop a weight here.
12519	2017/07/22	16:12:49	45.99394	-130.00033	325.2	4.8	1476.3	Grabbing a weight from the center basket. Tossed down to the bottom of the fissure.
12521	2017/07/22	16:13:29	45.99398	-130.00037	324.0	5.4	1476.2	Heading north (NW) again along the fissure.
12523	2017/07/22	16:13:50	45.99401	-130.00039	326.7	2.5	1478.5	Thing layers of lava.
12525	2017/07/22	16:14:07	45.99404	-130.00041	326.9	4.2	1478.7	Not much sediment.
12526	2017/07/22	16:14:27	45.99407	-130.00044	324.5	2.4	1480.3	Broken plates falling into the fissure.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-969 Datalogger Comment
12530	2017/07/22	16:15:33	45.99418	-130.00051	327.5	3.8	1477.9	New lavas on the top of this jumbled fissure structure.
12532	2017/07/22	16:15:43	45.9942	-130.00052	323.8	0.9	1478.7	This seems to be the eruptive fissure we are driving along.
12533	2017/07/22	16:15:53	45.99421	-130.00054	328.2	3.2	1479.1	Crab hanging on the west wall.
12534	2017/07/22	16:16:01	45.99423	-130.00054	325.6	3.1	1478.9	HIGHLIGHTS: HD highlights stop Crab on the east wall.
12536	2017/07/22	16:16:14	45.99425	-130.00056	324.0	5.6	1478.9	Fish in center and another crab.
12537	2017/07/22	16:16:23	45.99426	-130.00057	325.7	5.3	1478.2	Thin layers of flow on either side of the fissure top.
12539	2017/07/22	16:16:47	45.99429	-130.00059	324.0	2.3	1479.1	Broken pieces of sheets down the fissure (talus).
12542	2017/07/22	16:17:45	45.99435	-130.00063	326.4	4.3	1479.7	Following the fissure. Slight bridge across.
12544	2017/07/22	16:18:17	45.99439	-130.00065	348.0	2.9	1478.2	Layers of flow and drainout.
12545	2017/07/22	16:18:27	45.9944	-130.00066	352.8	2.2	1477.2	Smooth new lava on top of the east side of the fissure.
12548	2017/07/22	16:19:35	45.99447	-130.00069	53.0	3.5	1478.2	Looking out over the thin flow to the east on top of the fissure.
12550	2017/07/22	16:20:00	45.99449	-130.00070	55.4	1.6	1478.7	Moving back over the fissure and seeing flat (unfractured) sheet flow.
12553	2017/07/22	16:20:42	45.99451	-130.00071	52.6	2.3	1480.4	Jason is looking to the east with the sheet flow striations running perpendicular.
12555	2017/07/22	16:21:12	45.99452	-130.00071	51.7	2.5	1480.3	Broken up flow adjacent the sheet flow and a crab on top.
12556	2017/07/22	16:21:19	45.99453	-130.00071	51.2	2.2	1480.3	Jumbled flow.
12557	2017/07/22	16:21:34	45.99453	-130.00071	55.4	1.8	1480.2	Thruster dust.
12559	2017/07/22	16:21:56	45.99453	-130.00071	51.1	0.8	1481.5	Jumbled sheet flow.
12563	2017/07/22	16:23:08	45.99453	-130.00070	29.4	1.8	1479.1	Wow...ridges of jumble with adjacent sheet flow.
12565	2017/07/22	16:23:56	45.99453	-130.00069	24.0	3.6	1476.2	Coming up over the east rim of the fissure. Still glassy flows.
12568	2017/07/22	16:24:54	45.9945	-130.00067	97.6	6.4	1477.1	Going to drive a bit east (inside our safety donut) before heading north and west to cross the flow boundary.
12569	2017/07/22	16:25:04	45.9945	-130.00066	91.5	2.8	1477.6	Ship is moving north but slowing down.
12571	2017/07/22	16:25:28	45.99449	-130.00066	95.5	4.3	1477.9	All new lavas.
12573	2017/07/22	16:25:47	45.99448	-130.00065	72.5	4.8	1476.8	Smoother flows on top of the fissure.
12574	2017/07/22	16:25:55	45.99447	-130.00065	53.3	4.1	1476.8	Lining up to sample this lava.
12578	2017/07/22	16:27:30	45.99441	-130.00064	53.1	4.5	1477.2	Piece of sheet flow on top of the east-side of the fissure. A bit overhanging.
12580	2017/07/22	16:27:44	45.99441	-130.00065	53.4	4.4	1477.2	HIGHLIGHTS: HD highlights start
12582	2017/07/22	16:28:14	45.99439	-130.00065	53.1	3.3	1477.6	Trying to get a piece of the top of this crumbling glass flow.
12587	2017/07/22	16:30:15	45.99432	-130.00071	56.5	4.3	1476.8	SAMPLE: Geo Could not get a piece of that crust.
12591	2017/07/22	16:31:43	45.99427	-130.00078	357.6	5.4	1476.3	Crumbly glassy 2015 lava at the top of the fissure.
12592	2017/07/22	16:31:52	45.99426	-130.00079	321.7	4.5	1476.4	Did not get a sample there.
12594	2017/07/22	16:32:29	45.99423	-130.00084	333.5	3.5	1476.0	We have crossed to the west side of the fissure where it is more intact.
12597	2017/07/22	16:33:21	45.99421	-130.00089	333.0	4.0	1477.5	Moving over new 2015 lava here. Searching for a piece to sample.
12599	2017/07/22	16:33:39	45.9942	-130.00091	330.0	3.2	1478.5	We're driving west to see if we get to the western contact up here.

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12600	2017/07/22	16:34:02	45.99418	-130.00095	330.6	3.1	1479.6	Half the time the new lava is burrowed under the sediment.
12602	2017/07/22	16:34:34	45.99417	-130.00098	327.3	0.8	1482.4	Ropey looking lineated sheet flow here with some mat on top (deep pockets of eruptive mat)?
12604	2017/07/22	16:34:55	45.99416	-130.00101	327.8	0.8	1482.6	HIGHLIGHTS: HD highlights start J969-geo-10 pre0sample.
12607	2017/07/22	16:35:44	45.99412	-130.00111	327.2	0.8	1482.7	SAMPLE: Geo J969-Geo-10 Piece of lineated sheet flow to the west of the fissure.
12610	2017/07/22	16:36:39	45.99408	-130.00121	327.1	0.8	1482.7	J969-geo-10 cont. Going into the starboard rock box. Back right.
12612	2017/07/22	16:37:17	45.99405	-130.00128	327.9	1.2	1482.0	J969-geo-10 cont. 45.994110 -130.001095 Z=1482. Hdg 327.
12613	2017/07/22	16:37:24	45.99404	-130.00130	331.6	1.4	1481.7	HIGHLIGHTS: HD highlights stop
12615	2017/07/22	16:37:47	45.99402	-130.00134	315.5	0.8	1481.5	Continuing west - now over jumbled lavas.
12617	2017/07/22	16:38:26	45.99401	-130.00138	257.3	1.7	1480.6	The orange sediment is older stuff - not eruptive mat 0 that the lava buried or passed under.
12619	2017/07/22	16:38:48	45.994	-130.00139	228.3	1.7	1480.6	Traveling west again to find the contact.
12621	2017/07/22	16:39:09	45.99399	-130.00142	232.8	1.8	1480.3	Lineated sheet flow in the center and jumbled flow on the western edge.
12622	2017/07/22	16:39:23	45.99398	-130.00144	260.5	1.9	1480.8	HIGHLIGHTS: HD highlights start Lineated sheet flow and rattail.
12624	2017/07/22	16:39:45	45.99396	-130.00147	253.0	2.5	1480.4	HIGHLIGHTS: HD highlights stop Now getting back into more jumbled lavas with sediment.
12625	2017/07/22	16:39:58	45.99396	-130.00149	255.1	2.1	1480.4	Big rattails here.
12627	2017/07/22	16:40:11	45.99395	-130.00150	253.8	1.9	1480.6	Is the rattail grazing on the sediments?
12629	2017/07/22	16:40:54	45.99392	-130.00157	254.5	2.2	1480.1	This area is a mix of small lineated sheet flow and jumbled lavas with heavy sediment cover in places.
12632	2017/07/22	16:41:41	45.99388	-130.00164	254.3	3.5	1477.5	Coming up to a mounded area with a top shelf which is lava on top of thick sediment.
12633	2017/07/22	16:42:06	45.99387	-130.00168	267.7	3.6	1477.8	Working our way west still - moving toward the contact.
12635	2017/07/22	16:42:36	45.99385	-130.00171	317.0	2.5	1479.1	According to the map we are almost at the contact.
12637	2017/07/22	16:42:54	45.99384	-130.00173	284.2	2.9	1478.6	Anemone on the lava ledge. Spider crab above it.
12639	2017/07/22	16:43:20	45.99383	-130.00175	249.3	3.4	1477.6	Collapse area to the east.
12641	2017/07/22	16:43:46	45.99382	-130.00177	291.1	1.9	1479.0	2015 lava covered with older sediments.
12643	2017/07/22	16:44:16	45.99381	-130.00179	298.5	2.1	1479.3	HIGHLIGHTS: HD highlights start Sea pickle heaven.
12644	2017/07/22	16:44:34	45.9938	-130.00180	260.3	1.9	1479.0	Cute little tiny lava spire.
12647	2017/07/22	16:45:09	45.99379	-130.00183	262.4	0.8	1479.8	Cute little tiny lava "pillar".
12648	2017/07/22	16:45:24	45.99378	-130.00184	263.0	0.8	1479.8	Lava drips under the ledge.
12649	2017/07/22	16:45:33	45.99378	-130.00185	259.9	0.8	1480.0	Going in for a sample of this tiny pillar.
12655	2017/07/22	16:48:00	45.99375	-130.00189	266.6	1.2	1480.1	SAMPLE: Geo J969-Geo-11 tiny lava "pillar". Under a ledge. Skinny ~ 1 foot tall pillar-looking piece.
12657	2017/07/22	16:48:15	45.99375	-130.00189	266.6	1.2	1480.1	J969-geo-11 cont. Going in the dive weights box.

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12660	2017/07/22	16:49:14	45.99375	-130.00188	268.3	5.6	1475.7	J969-geo-11 cont. 45.993728 -130.001780 Z=1480 Hdg~320degrees.
12661	2017/07/22	16:49:32	45.99375	-130.00187	280.2	3.4	1476.7	Moving on now over heavily sedimented flow.
12663	2017/07/22	16:50:00	45.99376	-130.00186	275.5	4.5	1475.2	According to the map we should be at the contact. Seeing black lavas down in the depression.
12667	2017/07/22	16:51:07	45.99377	-130.00181	310.2	2.5	1476.6	Moving along to the north.
12669	2017/07/22	16:52:01	45.99378	-130.00177	343.9	2.5	1476.3	Heavy sedimented substrate on top of the caldera rim.
12671	2017/07/22	16:52:16	45.99378	-130.00176	0.3	3.0	1476.5	Ship will be heading to the NE so we can move to the east further.
12673	2017/07/22	16:52:56	45.99379	-130.00172	358.1	2.3	1477.3	Heading back east to get to the eastern edge of the flow.
12675	2017/07/22	16:53:27	45.9938	-130.00169	356.7	2.0	1478.0	Small fracture.
12677	2017/07/22	16:53:53	45.9938	-130.00167	3.6	2.3	1478.4	Older sediment contact with the new lava.
12678	2017/07/22	16:53:58	45.99381	-130.00166	2.8	2.3	1478.5	HIGHLIGHTS: HD highlights start
12679	2017/07/22	16:54:04	45.99381	-130.00165	1.8	2.8	1478.6	Highlights of the contact.
12681	2017/07/22	16:54:24	45.99381	-130.00162	0.7	3.2	1479.0	On the western side facing north heading to the east.
12683	2017/07/22	16:54:43	45.99382	-130.00159	359.4	1.2	1479.8	Seeing lobes of new flow adjacent to old sediments.
12684	2017/07/22	16:54:54	45.99382	-130.00157	359.9	1.2	1479.8	HIGHLIGHTS: HD highlights stop
12685	2017/07/22	16:55:04	45.99382	-130.00155	1.6	1.4	1479.6	Remnant pillar.
12687	2017/07/22	16:55:15	45.99383	-130.00154	34.9	1.7	1479.6	Great folds in the sheet.
12688	2017/07/22	16:55:22	45.99383	-130.00152	38.4	2.5	1478.8	Collapsed pillow.
12689	2017/07/22	16:55:30	45.99383	-130.00151	32.3	1.8	1478.2	Seeing a larger pillar in the background.
12691	2017/07/22	16:55:46	45.99383	-130.00148	358.5	1.3	1478.5	HIGHLIGHTS: HD highlights stop Really stopping now.
12692	2017/07/22	16:56:03	45.99384	-130.00145	358.3	1.0	1478.9	All new flow with a lot of thin skins that have collapsed.
12694	2017/07/22	16:56:11	45.99384	-130.00144	359.1	1.5	1478.5	Looks like a fast flow.
12696	2017/07/22	16:56:50	45.99384	-130.00137	358.8	1.3	1479.1	Looks like these pillows are hollow.
12697	2017/07/22	16:57:04	45.99385	-130.00136	358.4	1.6	1479.0	Here is lava with sediment on top as it extruded under the old sediments.
12700	2017/07/22	16:57:41	45.99385	-130.00130	17.6	1.6	1479.2	Small remnant pillars.
12701	2017/07/22	16:57:57	45.99385	-130.00128	19.1	2.2	1478.5	New lava breaking out through the sediment.
12703	2017/07/22	16:58:36	45.99385	-130.00123	19.3	1.1	1479.0	Collapsed thin sheets intermixed new flows on top with other uplifted new flow under the sediment.
12706	2017/07/22	16:59:26	45.99385	-130.00117	18.3	0.8	1479.1	Great view of collapsed flow.
12708	2017/07/22	16:59:37	45.99385	-130.00115	18.7	0.9	1479.0	Brittle stars are concentrated on the older sediments.
12709	2017/07/22	16:59:53	45.99385	-130.00112	18.2	1.1	1478.9	Lava extruding next to and under the sediments.
12711	2017/07/22	17:00:31	45.99385	-130.00106	18.4	1.6	1478.6	Edge of new flow on top of larger older ash substrate.
12713	2017/07/22	17:00:49	45.99385	-130.00104	18.9	1.0	1479.1	Sea pickles everywhere.
12715	2017/07/22	17:01:16	45.99384	-130.00099	20.5	1.2	1478.9	New lavas extruded over the sediment.
12716	2017/07/22	17:01:30	45.99384	-130.00097	18.7	1.6	1478.5	Moving along the contact edge.
12718	2017/07/22	17:01:55	45.99384	-130.00094	18.8	1.7	1478.6	New lava is winning here and completing overtopping the older sediment substrate.

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12721	2017/07/22	17:02:47	45.99383	-130.00088	19.0	1.3	1478.5	Coming up on a large fracture to the east.
12723	2017/07/22	17:03:09	45.99382	-130.00086	21.3	0.8	1479.3	Broken skin and leftover pillar.
12724	2017/07/22	17:03:30	45.99382	-130.00084	19.7	1.7	1479.7	Maybe not a fracture. Coming back over small sheet flow and jumble.
12725	2017/07/22	17:03:35	45.99382	-130.00084	30.1	1.6	1479.8	Heavy sediment.
12727	2017/07/22	17:03:47	45.99382	-130.00083	82.5	1.0	1479.9	Pillars from drain out.
12728	2017/07/22	17:03:55	45.99382	-130.00081	76.5	1.5	1479.4	Small collapse area.
12731	2017/07/22	17:04:54	45.99381	-130.00076	119.3	1.8	1478.8	Area of thin flows with collapse and pillows.
12732	2017/07/22	17:05:06	45.9938	-130.00074	111.1	0.8	1478.8	Kicking up a bunch of orange sediment.
12735	2017/07/22	17:05:43	45.99379	-130.00069	77.6	0.8	1479.1	Beautiful collapse area. Sediment on top of the new flow as it inflated.
12738	2017/07/22	17:06:40	45.99378	-130.00061	78.2	1.4	1478.8	Top of new flow looks like sturdy pillows but they are actually hollow and thin.
12739	2017/07/22	17:06:52	45.99378	-130.00060	78.4	0.9	1479.0	Hanging pillow skins.
12742	2017/07/22	17:07:41	45.99377	-130.00054	77.3	1.1	1478.5	Pillows on top of sheets on top of pillar in a collapse.
12745	2017/07/22	17:08:13	45.99377	-130.00051	76.9	1.9	1477.6	Still moving east over the new flow.
12747	2017/07/22	17:08:57	45.99376	-130.00046	53.0	1.6	1477.9	Looks like we have been drifting south vs driving east. Going to try to make eastern headway.
12748	2017/07/22	17:09:03	45.99376	-130.00046	51.7	1.9	1477.8	Shiny new lava.
12750	2017/07/22	17:09:12	45.99376	-130.00046	50.9	2.1	1477.5	Contact edge of flow here.
12751	2017/07/22	17:09:30	45.99376	-130.00044	49.6	3.2	1476.5	Older sedimented substrate with new lavas at edge.
12754	2017/07/22	17:10:09	45.99376	-130.00038	53.4	3.7	1474.5	Moving over a rise of older crust with new lava on other side.
12755	2017/07/22	17:10:19	45.99376	-130.00036	52.8	2.9	1475.4	Back in all new lava as we head east.
12757	2017/07/22	17:11:04	45.99376	-130.00029	50.4	2.7	1478.4	New lavas with some uplifted older sedimented crust.
12759	2017/07/22	17:11:13	45.99375	-130.00028	51.4	2.3	1478.5	Really mixed area.
12760	2017/07/22	17:11:26	45.99375	-130.00026	50.1	1.4	1479.0	This could be back over the eruptive fissure.
12763	2017/07/22	17:12:09	45.99375	-130.00018	51.2	3.9	1477.3	New lavas.
12764	2017/07/22	17:12:32	45.99375	-130.00015	52.4	4.9	1476.0	Coming up over the eastern side of the fissure.
12766	2017/07/22	17:12:52	45.99375	-130.00011	50.8	2.8	1475.4	New lavas on top with only pieces of remnant sedimented substrate.
12768	2017/07/22	17:13:15	45.99375	-130.00006	51.0	1.3	1476.3	Hollow pillows with many windows.
12769	2017/07/22	17:13:29	45.99375	-130.00004	47.5	0.8	1476.7	Pillow collapsed as we touched its edge with the basket.
12772	2017/07/22	17:14:04	45.99375	-129.99996	50.5	1.3	1475.9	Some pillars and a lot of jumble.
12775	2017/07/22	17:14:50	45.99374	-129.99984	52.0	2.4	1475.7	More sediment in the bottom of this collapse.
12776	2017/07/22	17:14:52	45.99374	-129.99983	49.3	2.5	1475.7	Red crab.
12777	2017/07/22	17:15:04	45.99374	-129.99980	50.2	2.0	1476.2	Seeing some sheet flows on the east side of the fissure.
12780	2017/07/22	17:15:42	45.99374	-129.99969	48.7	1.2	1477.0	Ash sediment in all the cracks and ripples of the sheet flow.
12782	2017/07/22	17:16:18	45.99374	-129.99959	46.6	0.8	1477.0	Large area of sheet flow with small pressure ridges and folds.
12784	2017/07/22	17:16:39	45.99374	-129.99953	49.6	2.1	1476.6	Pillar.
12785	2017/07/22	17:17:00	45.99374	-129.99949	49.2	3.2	1475.5	Ship is stopped its eastward movement.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-969 Datalogger Comment
12787	2017/07/22	17:17:14	45.99374	-129.99947	50.9	2.3	1475.4	Glassy lavas with some sediment patches.
12789	2017/07/22	17:17:57	45.99373	-129.99938	52.0	2.4	1474.7	Great arches along the edge of the sheet flow.
12792	2017/07/22	17:18:33	45.99373	-129.99931	49.6	2.1	1475.0	Still all new flow here.
12794	2017/07/22	17:18:45	45.99373	-129.99928	51.6	3.4	1474.5	Thin sheets that have collapsed beneath.
12797	2017/07/22	17:20:01	45.99373	-129.99911	49.3	2.6	1474.4	From this view it would appear to be an intact pillow flow but closer it is just thin skins.
12799	2017/07/22	17:20:11	45.99373	-129.99910	49.4	2.7	1474.4	More sediment pockets. Big fish.
12800	2017/07/22	17:20:29	45.99373	-129.99907	49.8	2.2	1474.8	More sediment pockets so getting near the edge of the flow.
12801	2017/07/22	17:20:33	45.99373	-129.99907	52.0	2.2	1474.9	Exploded pillow.
12803	2017/07/22	17:20:42	45.99373	-129.99906	50.7	2.1	1475.1	Anemone.
12804	2017/07/22	17:20:50	45.99373	-129.99905	55.7	2.7	1474.5	Edge of the flow. Contact!
12806	2017/07/22	17:21:19	45.99373	-129.99902	51.6	3.4	1474.2	Older flow and collapse.
12809	2017/07/22	17:22:18	45.99373	-129.99897	52.6	3.7	1473.7	Highlights were turned on a minute ago..
12810	2017/07/22	17:22:33	45.99373	-129.99896	52.1	3.5	1474.4	All older flows over here.
12812	2017/07/22	17:22:50	45.99373	-129.99895	327.6	3.3	1474.3	Going to turn around and head back to the west.
12814	2017/07/22	17:23:13	45.99374	-129.99895	336.0	3.3	1474.4	This older flow doesn't have much sediment compared to the south.
12815	2017/07/22	17:23:31	45.99374	-129.99894	336.1	3.2	1474.5	HIGHLIGHTS: HD highlights stop
12817	2017/07/22	17:24:02	45.99374	-129.99894	336.3	3.2	1474.4	Waiting for the ship to settle.
12821	2017/07/22	17:25:31	45.99377	-129.99899	315.4	2.3	1475.4	Want to head to the NW.
12823	2017/07/22	17:26:02	45.99377	-129.99901	316.5	4.9	1474.9	Big fish.
12826	2017/07/22	17:26:41	45.99379	-129.99905	307.7	2.2	1475.4	Heading to the NW over the older lava.
12827	2017/07/22	17:26:47	45.99379	-129.99906	306.8	2.3	1475.4	HIGHLIGHTS: HD highlights start New lava contact.
12830	2017/07/22	17:27:39	45.99381	-129.99913	306.8	3.3	1474.2	Looks like about 50m away from the edge of flow on the underlay map.
12831	2017/07/22	17:27:47	45.99381	-129.99914	305.9	2.8	1474.4	New flow mixed with older.
12832	2017/07/22	17:28:01	45.99382	-129.99915	307.2	2.9	1474.4	All new flow with collapsed pillows.
12834	2017/07/22	17:28:17	45.99382	-129.99918	306.3	2.6	1474.8	HIGHLIGHTS: HD highlights stop
12835	2017/07/22	17:28:32	45.99383	-129.99921	305.7	2.0	1475.2	Collapsed pillows.
12837	2017/07/22	17:28:55	45.99384	-129.99924	306.0	1.8	1475.1	Crabs on top of new flow.
12839	2017/07/22	17:29:23	45.99386	-129.99929	305.7	3.2	1475.1	Thin skin bridge.
12841	2017/07/22	17:29:54	45.99388	-129.99937	305.1	2.3	1475.1	Big fish.
12843	2017/07/22	17:30:10	45.9939	-129.99941	308.1	2.6	1475.2	Lobes of flow on top of other new flow.
12845	2017/07/22	17:30:42	45.99393	-129.99949	304.8	2.5	1475.8	Striated flow in the pillow collapse area.
12849	2017/07/22	17:32:22	45.99402	-129.99972	305.1	2.3	1475.3	Pillows and collapse with light sediment in the cracks.
12851	2017/07/22	17:32:57	45.99404	-129.99978	306.3	1.9	1475.9	Smooth lobes of new flow.
12854	2017/07/22	17:33:38	45.99408	-129.99987	306.5	2.3	1475.6	Collapse area with crab.
12855	2017/07/22	17:33:56	45.9941	-129.99991	306.4	2.4	1475.8	Pillar remnant.
12857	2017/07/22	17:34:07	45.99412	-129.99994	306.1	3.6	1475.8	Coming up on flat sheet flow.
12858	2017/07/22	17:34:34	45.99416	-130.00002	304.8	2.7	1476.1	Very flat sheet flow of new lava.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-969 Datalogger Comment
12860	2017/07/22	17:35:05	45.9942	-130.00010	309.0	3.7	1476.8	Small swirl in the sheet flow.
12863	2017/07/22	17:35:38	45.99425	-130.00019	312.0	3.4	1477.2	Good photo with superscorpio of the spiral.
12865	2017/07/22	17:36:07	45.99429	-130.00026	316.6	2.4	1477.5	Jumbled section going back into sheet flow.
12866	2017/07/22	17:36:36	45.99434	-130.00033	313.6	1.9	1477.5	Lotta lava to love.
12868	2017/07/22	17:37:06	45.99437	-130.00038	315.1	2.4	1477.9	Probably on the eastern rim of the eruptive fissure.
12870	2017/07/22	17:37:27	45.9944	-130.00043	317.0	1.9	1478.5	Lava swirl on the left.
12871	2017/07/22	17:37:30	45.9944	-130.00043	319.0	1.9	1478.8	Double swirl.
12874	2017/07/22	17:38:20	45.99446	-130.00051	313.7	2.6	1478.5	Coming up to the eastern side of the fissure.
12875	2017/07/22	17:38:25	45.99446	-130.00052	313.8	2.9	1478.2	Crab on lava.
12877	2017/07/22	17:38:59	45.9945	-130.00058	313.2	2.4	1477.5	Jumbled flow as near the edge of the fissure.
12879	2017/07/22	17:39:08	45.99451	-130.00059	313.6	2.7	1477.1	HIGHLIGHTS: HD highlights start
12881	2017/07/22	17:39:57	45.99458	-130.00069	313.9	4.1	1476.9	Crab.
12882	2017/07/22	17:40:01	45.99459	-130.00070	314.1	4.1	1476.9	Fish.
12884	2017/07/22	17:40:09	45.9946	-130.00071	314.0	3.2	1476.9	All new lava on the east side.
12885	2017/07/22	17:40:18	45.99462	-130.00073	314.4	2.6	1477.0	Coming back over sheet flow.
12887	2017/07/22	17:40:45	45.99465	-130.00078	314.4	2.4	1479.7	Following the striations of the sheet flow.
12888	2017/07/22	17:40:56	45.99467	-130.00081	314.7	3.2	1479.9	Painter's brush strokes.
12889	2017/07/22	17:40:58	45.99468	-130.00081	314.8	3.2	1479.8	Crab.
12892	2017/07/22	17:41:44	45.99474	-130.00090	313.6	3.1	1479.5	Sheet flow waving through folds of lava.
12893	2017/07/22	17:41:51	45.99475	-130.00091	314.0	2.8	1479.5	More crabs.
12895	2017/07/22	17:42:11	45.99478	-130.00094	314.8	2.8	1479.4	HIGHLIGHTS: HD highlights stop
12897	2017/07/22	17:42:39	45.9948	-130.00098	308.9	2.5	1479.9	Jumbled sheet flow.
12899	2017/07/22	17:43:33	45.99486	-130.00104	309.9	1.9	1480.1	Jumbled flow as we head NW.
12902	2017/07/22	17:44:16	45.9949	-130.00110	310.9	3.0	1480.3	Some sheet flow between the jumble.
12905	2017/07/22	17:45:08	45.99495	-130.00116	310.0	3.9	1480.5	Striated sheet flow.
12907	2017/07/22	17:45:55	45.99501	-130.00122	340.9	4.5	1480.4	Collapse area or ridge in the sheet flow.
12909	2017/07/22	17:46:24	45.99504	-130.00126	341.1	2.1	1482.4	Want to take a sample of this sheet flow crust.
12911	2017/07/22	17:47:02	45.99508	-130.00129	339.9	0.8	1483.6	Probably in the eruptive fissure.
12913	2017/07/22	17:47:21	45.9951	-130.00131	339.8	0.8	1483.6	SAMPLE: Geo In sonar can see the western edge of the fissure.
12918	2017/07/22	17:49:20	45.99521	-130.00140	339.4	0.8	1483.7	SAMPLE: Geo J969-Geo-12 Piece of crust in the sheet flow at the fissure. In the weight box with Geo-11 (pillar sample).
12919	2017/07/22	17:49:28	45.99522	-130.00141	339.3	0.8	1483.7	Removing a weight.
12922	2017/07/22	17:50:12	45.99526	-130.00144	341.5	1.9	1482.8	Position for the sample is 45.9951 -130.0013 J969-GEO-12 cont. z=1483. Heading 340.
12923	2017/07/22	17:50:29	45.99529	-130.00145	340.3	4.0	1480.9	Sheet flow collapsed as we removed the basket and pulled off.
12925	2017/07/22	17:50:41	45.9953	-130.00146	342.3	4.0	1480.5	Moving ahead NW.
12926	2017/07/22	17:51:04	45.99532	-130.00147	340.0	5.1	1479.3	Plates of sheet flow.
12928	2017/07/22	17:51:19	45.99534	-130.00148	338.0	4.3	1478.8	Room for one more sample!
12930	2017/07/22	17:51:50	45.99537	-130.00150	339.0	3.0	1480.7	Interesting broken plate sheet flows.

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-969 Datalogger Comment
12931	2017/07/22	17:51:58	45.99538	-130.00150	340.7	2.2	1481.0	Rhino skins.
12934	2017/07/22	17:52:19	45.9954	-130.00151	339.0	2.3	1481.3	Broken up plates of striated sheet flow.
12936	2017/07/22	17:52:39	45.99542	-130.00153	338.3	3.0	1480.1	Little fish.
12937	2017/07/22	17:52:58	45.99544	-130.00153	341.0	2.6	1480.4	Light sediment coating in the cracks.
12940	2017/07/22	17:53:44	45.99549	-130.00156	344.0	1.7	1480.2	Endless broken plates of sheet flow.
12941	2017/07/22	17:53:53	45.99551	-130.00157	340.9	2.0	1480.0	HIGHLIGHTS: HD highlights stop
12943	2017/07/22	17:54:27	45.99556	-130.00159	8.6	2.4	1479.4	Pillar.
12945	2017/07/22	17:54:42	45.99558	-130.00160	317.7	3.1	1478.8	Want a piece of the top of the pillar.
12947	2017/07/22	17:55:13	45.99562	-130.00162	299.1	2.2	1479.4	Landing on top of the pillar.
12949	2017/07/22	17:55:55	45.99566	-130.00164	300.9	1.1	1480.5	Pillar is collapsing as we settle on top of it.
12952	2017/07/22	17:57:04	45.99575	-130.00169	300.9	1.1	1480.5	SAMPLE: Geo J969-Geo-13 Piece of pillar top after large area of sheet flow in the 2015 lava flow. Near western edge of eruptive fissure.
12954	2017/07/22	17:57:31	45.99577	-130.00170	300.8	1.1	1480.5	J969-GEO-13 That piece didn't make it in the rock box but pieces landed on the basket.
12957	2017/07/22	17:58:23	45.99583	-130.00173	300.8	1.1	1480.5	SAMPLE: Geo J969-GEO-13cont. Getting another piece. Fits (sorta) in the aft-port quadrant of the stbd rock box.
12960	2017/07/22	17:59:14	45.9959	-130.00176	305.2	3.4	1478.6	Position of the sample J969-GEO-13 is 45.9957 -130.0016 z=1482.
12962	2017/07/22	17:59:38	45.99594	-130.00178	329.9	3.6	1479.8	Heading was 301.
12963	2017/07/22	18:00:04	45.99598	-130.00181	324.9	3.8	1479.8	About 15 minutes left.
12965	2017/07/22	18:00:35	45.99603	-130.00183	335.2	5.4	1479.0	Jumbled flow and collapse.
12969	2017/07/22	18:01:43	45.99611	-130.00187	337.6	4.7	1477.8	Moving NW over collapsed sheet flow.
12973	2017/07/22	18:03:35	45.99624	-130.00194	338.5	4.4	1478.5	Glassy surfaces on the top pillow-looking flow.
12976	2017/07/22	18:04:18	45.99629	-130.00197	338.0	1.9	1481.3	Collapse area close to or in the eruptive fissure.
12977	2017/07/22	18:04:29	45.9963	-130.00197	337.7	2.3	1481.6	Pillar.
12980	2017/07/22	18:05:07	45.99634	-130.00199	332.5	3.0	1480.5	Large pillar with a divet.
12981	2017/07/22	18:05:21	45.99636	-130.00200	333.8	2.3	1480.1	Fish near the edge of the collapse/fissure.
12983	2017/07/22	18:05:52	45.99638	-130.00201	242.9	1.9	1482.0	Great pillar view.
12984	2017/07/22	18:05:58	45.99639	-130.00201	232.1	2.7	1481.5	Pillars and arches.
12986	2017/07/22	18:06:11	45.9964	-130.00202	232.7	2.2	1482.1	Roman ruins.
12987	2017/07/22	18:06:36	45.99642	-130.00202	234.9	0.8	1483.4	Going down to the floor of the collapse.
12990	2017/07/22	18:07:08	45.99645	-130.00203	236.1	0.8	1483.4	Yellow sediments in the ledges of the pillars.
12992	2017/07/22	18:07:38	45.99648	-130.00204	258.4	2.6	1482.0	Great drips on the skin roof.
12993	2017/07/22	18:08:06	45.9965	-130.00205	330.4	2.4	1481.9	HIGHLIGHTS: HD highlights start
12995	2017/07/22	18:08:30	45.99652	-130.00206	353.6	2.2	1482.2	Some remnant thick sediment pieces of collapsed sheets.
12997	2017/07/22	18:08:51	45.99654	-130.00206	356.7	1.9	1482.1	Back into an area with thicker sediment patches.
13001	2017/07/22	18:10:18	45.99658	-130.00207	4.4	3.0	1481.0	Looking for a last piece of cruse to sample in this area of the eruptive fissure.
13002	2017/07/22	18:10:21	45.99659	-130.00207	4.6	2.9	1481.0	HIGHLIGHTS: HD highlights stop

VV	Date	Time	Latitude	Longitude	Heading	Altitude	Depth	J2-969 Datalogger Comment
13005	2017/07/22	18:11:24	45.99661	-130.00208	4.8	2.9	1481.2	Setting up for a final sample.
13007	2017/07/22	18:11:41	45.99661	-130.00208	4.4	3.0	1481.0	STBD biobox being prepared to receive the sample. Box is open.
13012	2017/07/22	18:14:18	45.99663	-130.00208	58.6	0.8	1483.2	SAMPLE: Geo J969-Geo-14 Piece of crust from bottom of the wall on edge of the collapse area. Near or in the eruptive fissure. Some sediment.
13013	2017/07/22	18:14:33	45.99663	-130.00208	59.0	0.8	1483.2	SAMPLE: Geo J969-Geo-14 in the stbd biobox.
13016	2017/07/22	18:15:29	45.99664	-130.00206	59.1	0.8	1483.2	Position of this sample is 45.996615 -130.002051 z=1483 Heading is 058.
13018	2017/07/22	18:15:40	45.99664	-130.00206	59.3	0.8	1483.2	Crab saying goodbye!
13019	2017/07/22	18:15:54	45.99664	-130.00206	59.5	1.5	1482.3	Layers within the thin crust at the top of the collapse.
13021	2017/07/22	18:16:21	45.9966	-130.00209	208.0	2.3	1481.3	Coming off the bottom at the end of this expedition RR1712 on the NE rim of the caldera!
13022	2017/07/22	18:16:28	45.99658	-130.00211	178.5	1.5	1481.6	See you next year Axial!
13024	2017/07/22	18:16:47	45.99657	-130.00211	187.6	2.2	1481.6	JASON: Jason off bottom
13026	2017/07/22	18:17:21	45.99657	-130.00211	187.9	2.4	1481.7	Dropping some weight.
13028	2017/07/22	18:17:51	45.99657	-130.00211	186.5	2.4	1481.5	Grabbing another weight and dropping it off over the collapse area.
13031	2017/07/22	18:18:38	45.99657	-130.00211	187.8	2.5	1481.4	Bringing the basket in.
13032	2017/07/22	18:19:02	45.99654	-130.00212	196.8	4.6	1479.8	Coming to the surface.
13037	2017/07/22	19:19:27	45.99823	-130.00001	210.5	174.1	44.8	JASON: Jason out of water Footballs coming up.
13038	2017/07/22	19:20:15	45.99839	-129.99989	202.9	147.3	34.1	CORRECTION: JASON IS NOT OUT OF THE WATER - BUT THE FOOTBALLS ARE COMING UP.
13039	2017/07/22	19:23:13	45.99844	-129.99989	199.8	187.8	2.2	Jason at the surface.
13040	2017/07/22	19:24:35	45.99844	-129.99989	124.7	198.2	0.6	JASON: Jason on deck

