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Figure Captions

Cover. Top: The “lost” rumbleometer deployed in August 1998 and found during dive R857. Bottom: Tubeworm bush north of Mkr-33.

Plate 1. a) Endeavour. View of black smokers at Sully Vent with hydrophone and RTH instruments on the flanks. b) Close up of funnel from 2003 RAS at Virgin Vent. c) 2004 RAS at Virgin Vent. d) View of Hell Vent. e) Chimney at Vixen. f) Pressure sensor sitting on top of Bmrk-1 at Magnesia Vent. g) Endeavour. A spider crab checking out the RTH sensor at Bastille Vent. h) Blue mat and worm colonies at Mkr-N3 Vent on the 1998 lava flow.

Figure 1. Map with all instruments currently at Axial. EM300 bathymetry data gridded at 35 meter resolution with 50 meter contour interval.

Figure 2. Map of 1998 lava flow area, vent positions, and lava flow boundaries. EM300 bathymetry data gridded at 35 meter resolution.

Figure 3. Blow-up of ASHES Vent Field showing vent locations and type. Imagenex bathymetry data gridded at 1 meter resolution with 1 meter contour interval.

Figure 4. Overall map of all EM300 bathymetry data collected near Axial Volcano. Data are gridded at a 35 meter resolution with 50 meter contour interval.

Figure 5. Nubbin area map with location of CTD tow and samples. EM300 bathymetry data subsampled at 25 meter resolution with 10 meter contour interval.

Figure 6. Data collected near recent earthquake swarm area. EM300 bathymetry data gridded at 50 meter resolution with 50 meter contour interval.

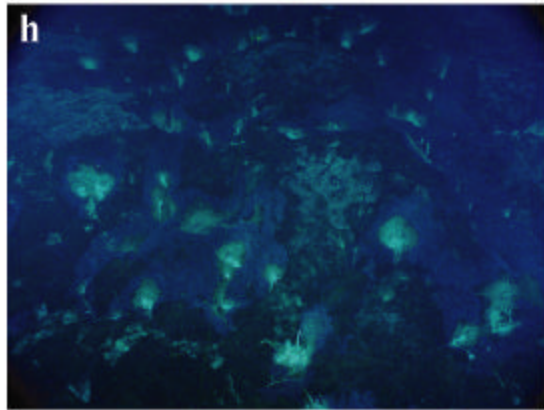
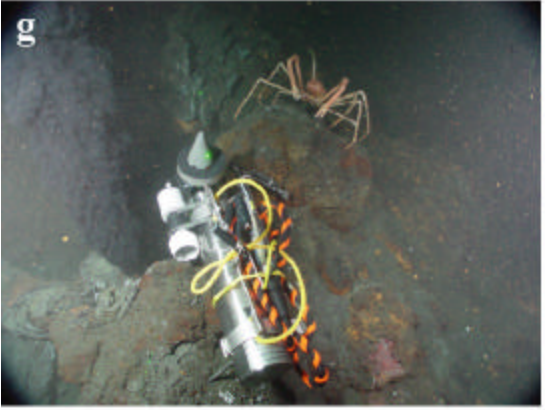
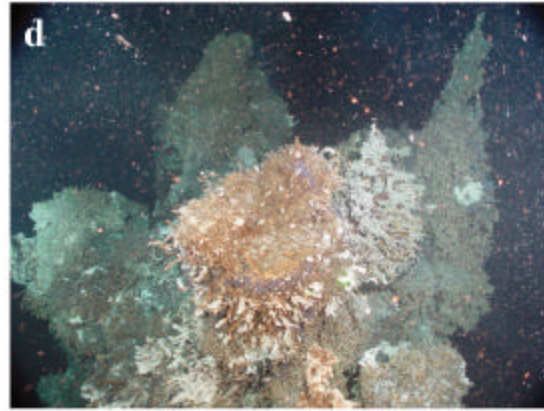
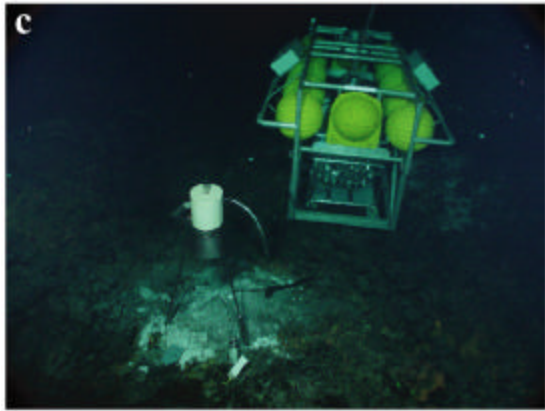
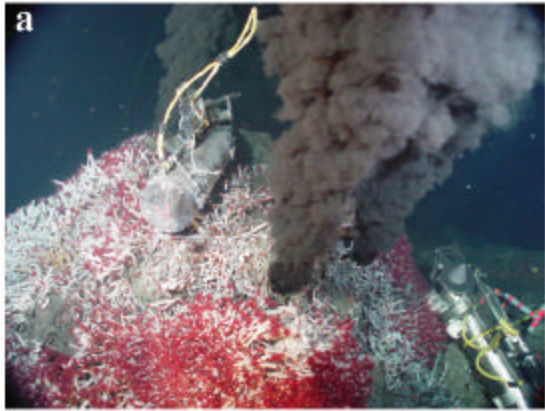


Plate 1

NeMO Instruments at Axial Volcano 2004

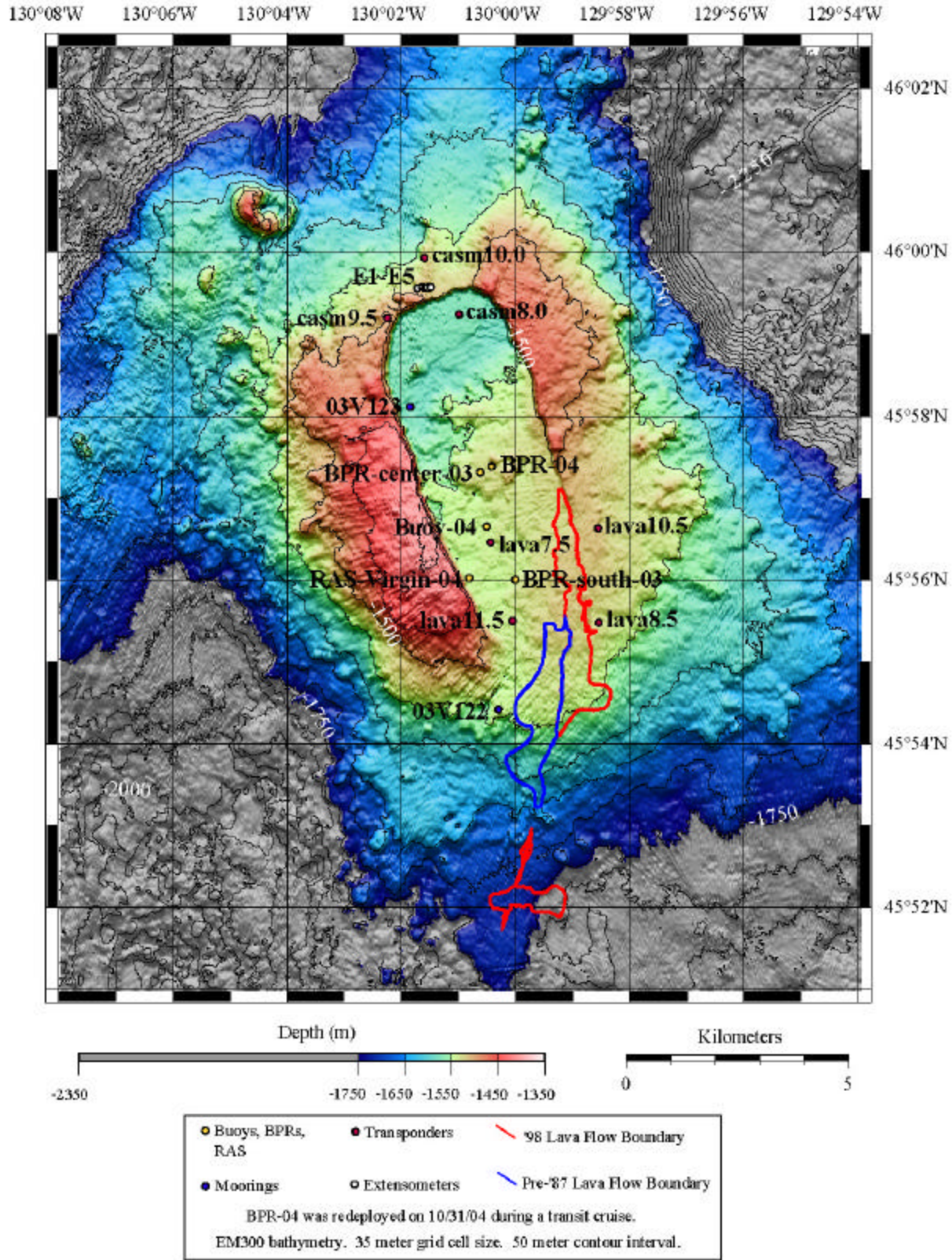
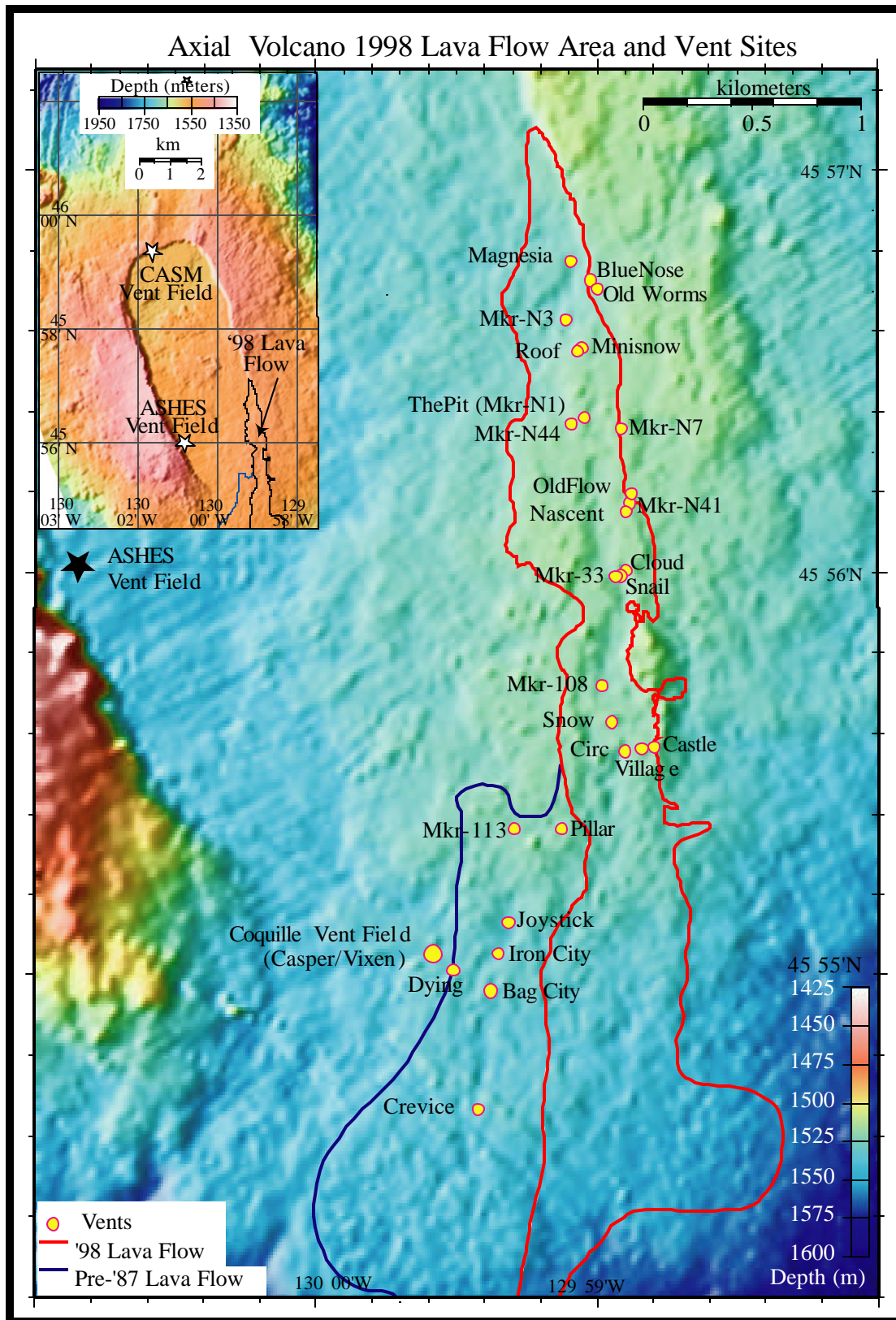


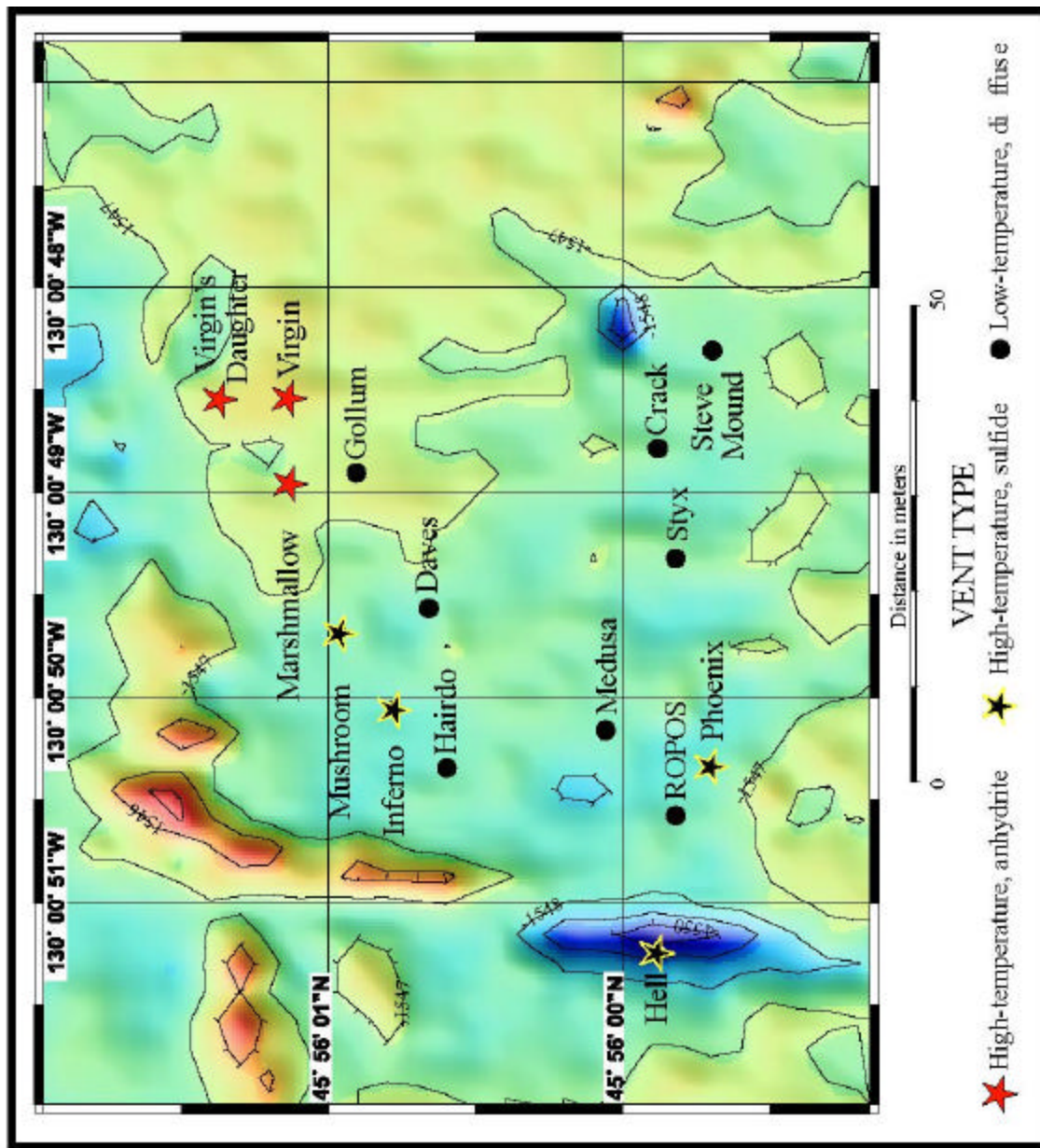
Figure 1



EM300 bathymetry. 35 meter grid cell size.

Figure 2

Axial Volcano, ASHES Vent Field



Imagenex bathymetry. 1 meter grid cell size. 1 meter contour interval.

Figure 3

1.0 NeMO 2004 SCIENCE SUMMARY

Bill Chadwick, Chief Scientist

The NeMO 2004 expedition was a great success, thanks to good weather, the hard work of the science party, and excellent support from the ROPOS group and the crew of the Thompson. Here's a brief summary of our results this year:

We made 5 ROPOS dives at Axial Volcano this year and had one full day of instrument deployments and recoveries. Between dives we conducted 6 CTD (conductivity, temperature, and depth) casts or tows to survey the hydrothermal plumes in the water above the bottom. In addition we collected EM300 multibeam sonar data to update and extend our survey of the bathymetry around the volcano.

Two of the ROPOS dives were devoted to collecting fluid samples from hydrothermal vents at Axial for chemical and microbiological analysis. We sample many of the same sites each year to look for changes that might be signal changes in the behavior of the volcano. Some of the hydrothermal vents showed temperature decreases this year. The Marker 33 vent looks about the same as last year, but nearby Cloud vent definitely had reduced temperature and flow. The ASHES vent field looks about the same, but one of the vents there, Virgin, seems to have a lower temperature than in previous years.

We made our ROV-based pressure measurements at five seafloor benchmarks again this year, in order to look for volcano inflation at Axial. This year we made some changes to the way we collected the pressure data and we were able to improve our repeatability at each site by about an order of magnitude (9 mm this year vs. 7 cm last year)! The data show that all the stations in the caldera were uplifted since last year and the center of the caldera continues to go up at a rate of about 20 cm/yr.

The NeMO Net buoy and the Remote Access Sampler (RAS) were replaced, but we took the new Bottom Pressure Recorder (BPR) back with us because it was having data transmission problems. It was fixed and will be redeployed during another expedition in November. The RAS that was put down last summer worked perfectly and was full of vent fluid samples when we recovered it.

Overall, our monitoring shows that Axial Volcano continues to gradually build up toward its next eruption, but we do not know exactly when that next eruption will happen. We continue to monitor the volcano and its hydrothermal sites with the aim of anticipating future activity and documenting the changes that occur when that eruption finally occurs.

1.0.1 Endeavour Ridge Operations

John Delaney, University of Washington chief scientist on the previous cruise (KECK 04, TN172), provided funding for ROPOS dive R852 at the Endeavour Segment of the Juan de Fuca Ridge. Cruise TN172 was plagued by bad weather and it was critical that several instruments be deployed that were already on the seafloor. Per John's request, fluid sampling, materials testing and instrument deployment and recovery were accomplished. For any questions regarding scientific operations, data distribution, or use of images from dive R852 please contact John Delaney (jdelaney@u.washington.edu).

1.1 NeMO 2004 PARTICIPATING ORGANIZATIONS

NOAA Pacific Marine Environmental Lab (PMEL)
Oregon State University (OSU)
University of Washington (UW)
University of Quebec at Montreal
Scripps Institute of Oceanography
National Institute of Oceanography, India
Canadian Scientific Submersible Facility (CSSF)

1.2 NeMO 2004 SCIENTIFIC PERSONNEL

Scientist	Affiliation	Participation
Bill Chadwick	OSU/PMEL Vents Program	Chief Scientist/Geologist
Susan Merle	OSU/PMEL Vents Program	Mapping/Data Manager
Dave Butterfield	UW/PMEL Vents Program	Chemistry
Leigh Evans	OSU/PMEL Vents Program	Chemistry
Andra Bobbitt	OSU/PMEL Vents Program	Mapping/GIS
Geoffrey Lebon	UW/PMEL Vents Program	Chemistry
Shannon Ristau	NOAA/PMEL Vents Program	Mapping/GIS
Kevin Roe	UW/PMEL Vents Program	Chemistry
Jon Bumgardner	PMEL Engineering	Engineer
John Shanley	PMEL Engineering	Engineer
Marv Lilley	University of Washington	Chemistry
Sheryl Bolton	University of Washington	Microbiology
Teegan Boruch-McDonough	University of Washington	Microbiology
Angela Kouris	University of Quebec	Biology
Scott Nooner	Scripps Inst. of Oceanography	Geophysics
Bandaru Rao	Nat. Inst. of Oceanography, India	Chemistry
Durbar Ray	Nat. Inst. of Oceanography, India	Chemistry
Keith Shepherd	CSSF	ROPOS Team Leader
Kim Wallace	CSSF	ROPOS Engineer
Dan Cormany	CSSF	ROPOS Engineer
Vincent Auger	CSSF	ROPOS Navigator
Rodger Adamson	CSSF	ROPOS Engineer
Ian Murdock	CSSF	ROPOS Engineer

1.3 NeMO 2004 R/V *THOMAS G. THOMPSON* PERSONNEL

John A. Parsons	Captain
John K. Wilson	Chief Mate
Eric T. Haroldson	2nd Mate
Jason Stephens	3rd Mate
Charles E. Ormiston	Chief Engineer
James T. Swanton	1st Assistant Engineer
Richard D. Leonard	2nd Assistant Engineer
Mark H. Johnson	3rd Assistant Engineer
David A Bartell	Oiler
Colin J. Street	Oiler
Russell R. Rowley	Oiler
Mario S. Yordan	Oiler
Anthony N. Monocandilos	Able Bodied Seaman
Brian W. Clampitt	Able Bodied Seaman
Richard P. Chase	Able Bodied Seaman
Michael A. Hansen	Able Bodied Seaman
Jeffrey R. Artingstall	Able Bodied Seaman
Frank L Spetla Jr.	Able Bodied Seaman
Shawn M. Lindenmuth	Chief Steward
Hasheem A. Bell	Steward Assistant
Victoria Simms	Steward Assistant
William Martin	Lead Marine Tech
Robert Hagg	Marine Tech

2.0 OPERATIONS LOG – Cruise TN173 (September 18 – September 29)

Date (UTC)	JD	Time (UTC)	Comments	Event	Lat N deg	Lat N min	Long W deg	Long W min
19-Sep	263	0330	Depart Seattle, WA. 2030 local time, September 18, 2004. UTC is 7 hours ahead of local time.					
20-Sep	264	0350	Begin dive R852 at Endeavour.					
		1640	End dive R852.					
		1745	Begin transit to Cobb.					
21-Sep	265	0100	Begin mooring operations at Cobb.					
		0240	Mooring operations complete.					
		0245	Begin transit to Axial.					
		1108	CTD vertical cast at ASHES. [1108-1226]	v04-e01	45	55.99	130	0.86
		1422	Deploy 2004 RAS.		45	55.97	130	0.78
		1525	Begin dive R853 at ASHES.					
22-Sep	266	0237	End dive R853.					
		0316	CTD vertical cast at Axial. [0316-0437]	v04-e02	45	55.955	129	58.963
		0604	Begin EM300 survey.					
		1127	End EM300 survey. Begin transit back to ASHES.					
		~1330	Unsuccessful attempt to acoustically release 2003 RAS.					
		1610	Deploy RAS rescue mooring.					
		1630	Begin dive R854 at ASHES.					
		1944	2003 RAS on deck.					
23-Sep	267	0312	End dive R854.					
		0408	CTD vertical cast. [0408-0525]	v04-e03	45	56.601	129	59.156
		0540	Begin transit to EM300 survey.					
		0708	Begin EM300 survey.					
		1321	End EM300 survey. Begin transit back to Caldera Center.					
		1405	Arrive at Caldera Center.					
		1559	Begin dive R855 from Caldera Center to South Pillow Mound.					
25-Sep	268	0640	End dive R855.					
		0735	CTD vertical cast at Vixen. [0735-0856]	v04-e-04	45	55.021	129	59.629
		0856	Begin transit to EM300 survey.					
		1044	Begin EM300 survey.					
		1320	End of EM300 survey. Begin transit to Rumbleometer site.					
		1410	Arrive at Rumbleometer site. Unsuccessful attempt to acoustically release it.		45	56.187	129	59.001
		1600	Deploy NeMO Net BPR.		45	57.363	130	0.603
		2100	Transit to NeMO Net Buoy deployment site.					
		2135	Deploy NeMO Net Buoy.		45	56.65	130	0.5

Date (UTC)	JD	Time (UTC)	Comments	Event	Lat N deg	Lat N min	Long W deg	Long W min
		2238	Deploy NeMO Net anchor.					
26-Sep	269	0135	Recover mooring 03V123.		45	58.2	130	1.8
		0312	Recover mooring 03V122.		45	54.41	130	0.31
		0359	CTD vertical cast at osmo. [0359-0525]	v04-e05	45	54.415	130	0.3362
		0525	Begin transit to EM300 survey.					
		0620	Begin EM300 survey.					
		1330	End EM300 survey. Begin transit to N3.					
		1437	Arrive at N3.					
		1508	Begin dive R856 at N3.					
27-Sep	270	0143	End dive R856.					
		0200	Unsuccessful attempt to acoustically release BPR.					
		0400	Start CTD tow-yo.	t04-e01	45	57.502	129	59.5009
		0720	End CTD tow-yo.		45	55.37	129	58.726
		0753	Begin EM300 survey.					
		1056	End EM300 survey. Begin Transit to BPR release site.					
		1310	Arrive on site to attempt to release BPR.					
		1350	BPR released.					
		1525	BPR recovered.					
		1605	Begin dive R857 at Mkr-113.					
28-Sep	271	0357	End dive R857.					
		0435	Disable all transponders at Axial (CASM and lava flow nets).					
		0437	Begin transit to EM300 survey line.					
		0544	Begin EM300 survey.					
		0642	End EM300 survey; start transit to Nubbin.					
		1030	Start of Dziak EM300 survey.					
		1321	End of Dziak EM300 survey. Resume transit to Nubbin; logging EM300.					
		2032	End EM300 logging.					
		2100	CTD vertical cast. [2100-2315]	v04-e06	45	3.7286	126	48.067
		2331	Resume transit and EM300 logging.					
29-Sep		0104	Begin EM300 survey of Nubbin.					
		0121	End of EM300 survey.					
		0210	Start of CTD tow-yo at Nubbin.					
		0530	End of CTD tow-yo.					
		0543	Resume transit and EM300 logging.					
		1600	Arrive in Newport, OR. End of cruise.					

3.0 NeMO 2004 DISCIPLINE SUMMARIES

3.1 CHEMISTRY and MICROBIOLOGY

3.1.1 NeMO 2004 PMEL Fluid Chemistry Summary

David Butterfield

The primary goals of the vent fluid chemistry group in 2004 were to recover the interactive sampler deployed at Virgin Mound vent for the 2003-4 period and to extend time series sampling operations at ASHES and the SE caldera to a 7th year. Both goals were met.

At the beginning of the cruise, we had the interactive sampler for the 2004-5 period ready to go in the water. A few final touches to the plumbing were made, a test of the system was done on deck, and the sampler was ready. For the new deployment, we installed a pH sensor (AMT) and an Eh electrode pair from Koichi Nakamura. The RAS used for 2004-5 was serial number 11072, with a stainless steel frame. As in previous years, positions 1 and 2 are pH buffers, position 49 is the rinse acid (5% HCl made with trace metal grade HCl and deionized water), and position 48 is DNA preservative (510 ml HG 95% EtOH, 100 ml 25x SET buffer (filter sterilized), to 1L w/ ddH₂O, store refrigerated. 25x SET buffer: 22%NaCl, 5mM EDTA, 10mM Tris-HCl). The pH buffers are Fisher Scientific 4.0 and 7.0. All water samples on the RAS are filtered. Multiples of 4 are polycarbonate membrane type gtp 0.2 micron pore size. All other filters are acid-washed GFF 0.7 micron. Bags (polyethylene-lined, laminated, with luer valve) were acid washed with 5% HCl, rinsed 3x with de-ionized water, rinsed 3x with filtered deep seawater, which was used to fill the dead volume (approximately 3-5ml). The same procedure was used in previous years. The RAS was programmed to take the first water sample one week after the deployment date, and the first sample was taken on Tuesday, September 28, 2004. The default is to take a water sample every Tuesday for 45 weeks, ending on August 2, 2005. For every sample taken on command, the end date is shortened by one week. There is no schedule yet for when to pick up the buoy in 2005, but that will be part of the NDBC/Tsunami cruise to service other buoys in the NE Pacific.

During this cruise, we documented the 2003-4 sampler at Virgin prior to recovering it. The tripod still stood in a good position, without any serious damage. The chimney was not grown into the funnel at the time of recovery, and none of the plumbing was fouled or clogged. The funnel was relatively clean with some white surface staining.

After recovering the 2003-4 sampler and removing the anchor, we spent part of two dives working on installation of the 2004-5 sampler. Taking a more aggressive approach this year, we excavated the vent in an attempt to get down to hard rock and find the main vent orifice so that we could install the temperature sensors directly in hot water. After removing the anhydrite, we encountered a thick layer of gray, hard material that was probably a combination of sulfide and altered basalt. A near-linear source of hot fluid was uncovered, and we placed the NeMO-Net temperature sensor on one end of the source and a HOBO high-T recorder on the other end. The level of venting was quite low compared to the tripod, and we spent several hours total trying to get the funnel in the right position to catch the hottest fluid. In spite of our efforts, temperatures have remained quite low (5-70°C) in the funnel.

The 2003-4 interactive sampler was set up the same as described for this year with filters, bags, and preservatives. The first sample was taken on September 7, 2003, and the last sample on June 20, 2004. Sample 12 with DNA preservative was taken 10/30/03 and sample 36 with DNA preservative was taken 4/5/04. All samples were taken on schedule, and the pump and valve were still working when the sampler was recovered. When the sampler was recovered and safely on deck, the power was disconnected and the recorded data were saved for downloading back on shore.

The water samples were processed as quickly as possible after the sampler came on deck. The RAS was removed from the instrument frame and moved into the lab. There was a delay getting the sampler into the cold room because it would not fit through the passageway doors. Ship's crew removed one of the doors from the door-frame to allow us to get the sampler through. From the time the sampler came on deck, some samples were highly pressurized with gas and were leaking gas out through the RAS valve. We identified the high-gas samples as quickly as possible and tried to process them first. The procedure was to remove the cylinder top, shut off the luer valve, and remove the bag from the cylinder if possible. In some cases bags (13, 14, and 30) ruptured from excessive gas pressure before we could get the bags out of the cylinders. In those cases, we saved the cylinder water in one large bottle, but otherwise did not process the samples. Bag 26 came up empty, as did bag 40 (puncture in bag prevented filling). In bags that were highly pressurized, we attached a digital pressure gauge directly to the bag to measure the pressure. The result will be a minimum value because of leaking out through the RAS valve prior to closing off the luer valve. Sub-samples were taken from each bag for gas analysis (both on the gas phase and the liquid phase), colorimetric H₂S, pH, alkalinity, major elements, nutrients, and trace elements. A few selected samples were preserved for S, and/or N isotopes.

Hydrothermal fluid sampling

Dive 852 at Endeavour

Took a background sterivex filter for DNA during transit from bottom landing site to Sully vent for Mausmi Mehta, 3 liters in 30 minutes. Took one unfiltered bag sample from Hulk vent. HFS intake became clogged with worms at the first sampling site on Hulk. Attempting to run pump backwards to dislodge the clog resulted in the sampler locking up for the rest of the dive. Could not reset HFS with power cycling, so no more samples were collected.

Dive 853 at ASHES

We took water and particle samples from Gollum, Marshmallow, Virgin Mound, Inferno, and Hell. Multiple large-volume sterivex samples were taken from Gollum for replicate microbiological characterization. The high-temperature vents were significantly cooler than in previous years, with the maximum recorded temperature of 204°C at Inferno. (On dive 857, we recorded 240°C at Hell vent.) The temperature probe was checked in the lab in a pot of boiling water, and gave a readout of 97°C. It is not certain if this was a real cooling or difficulty in getting good flow into the sampler. We can say that either the flow rates or the temperatures have decreased, and possibly both.

Dive 856 at SE caldera

We collected water and particle samples from marker N3 (including a temperature survey on blue mat and within active flow with white mat), Cloud 'pit' vent former location of marker N6, marker 33 near the mid-point of the crack, Village, and Castle vent (197 °C).

Dive 857 at SE caldera and ASHES

We collected water and particle samples from marker 113, Bag City, Vixen, and Hell. Made adjustments to the RAS intake funnel. This was a very fast dive covering lots of ground.

Fluid Chemistry Samples

Sample ID	Sample start time	Sample stop time	Inlet T max, °C	Inlet T avg, °C	Reported* volume, ml	Vent Site	Sample Type
R853b11	11:34:10	11:38:48	25.5	21.6	692	Gollum	filtered bag
R853b16	17:45:17	17:49:42	171.3	164	659	Hell	filtered bag
R853b9	17:53:05	17:57:19	195.1	185.4	650	Hell	bag
R853p20	13:01:44	13:09:55	39.4	37.2	1351	Gollum	piston

Sample ID	Sample start time	Sample stop time	Inlet T max, °C	Inlet T avg, °C	Reported* volume, ml	Vent Site	Sample Type
R853p22	13:28:56	13:36:23	74.4	68.2	1143	Marshmallow	piston
R853p5	15:42:31	15:47:10	173.4	170.4	760	Virgin	piston
R853p1	11:12:35	11:32:37	25.2	21.5	3041	Gollum	Large bag
R853b17	15:38:06	15:40:35	166.1	163.6	429	Virgin	filtered bag
R853b14	16:55:19	16:59:25	204.4	199.4	602	Inferno	filtered bag
R853b8	16:48:42	16:53:17	204.1	190	444	Inferno	bag
R853f24	9:44:19	10:14:02	2.3	2.1	3527	Bkgnd sw ASHES	3 micron plus sterivex
R853f2	11:40:50	11:50:13	27.9	23.4	1400	Gollum	sterivex-DNA
R853f7	12:04:33	12:35:11	39.3	32.5	4015	Gollum	sterivex-DNA
R853f4	12:36:07	12:47:09	39.7	37.7	1567	Gollum	sterivex-DNA
R853f10	12:48:33	12:59:58	39.7	37.3	1608	Gollum	sterivex-DNA
R853	13:37:18	13:57:28	74	68.2	3001	Marshmallow	sterivex-DNA
R856b16	17:27:41	17:29:48	197.9	192	387	Vixen	filtered bag, gttp
R856b17	16:41:03	16:44:29	52.1	44.2	707	Village	filtered bag, gff
R856b18	17:25:43	17:27:15	195.4	192.8	300	Vixen	filtered bag, gff
R856p1	12:42:23	12:46:06	7	6.9	705	Cloud, N6	piston
R856p22	16:18:40	16:21:20	39.6	37	634	Mkr 33	piston
R856p5	10:03:09	10:06:18	23.6	23	753	Mkr N3 area	piston
R856p6	13:28:14	13:31:13	21.7	19.8	717	Mkr 33	piston
R856f2	10:07:04	10:20:52	24.9	24.4	2000	N3	sterivex-DNA
R856f4	12:25:09	12:37:31	7	6.9	1500	Cloud, N6	sterivex-DNA
R856f7	13:32:05	13:47:15	22.2	17.4	1868	Mkr 33	sterivex-DNA
R856f10	13:56:52	14:32:16	34.5	20.4	3029	Mkr 33	sterivex-DNA
R856f21	16:22:31	16:34:44	50.1	40.3	1839	Village	sterivex-DNA
R856f24	14:36:15	15:12:46	1.9	1.9	3932	Bkgnd sw m33-Castle	sterivex-DNA
R857b6	15:01:31	15:03:04	157.1	147	348	Vixen	piston
R857b9	13:33:52	13:37:02	17.1	16.7	601	Bag City	bag
R857p20	11:08:04	11:10:55	23.7	23.1	654	Mkr 113	piston
R857p5	12:50:51	12:53:58	18	17.4	721	Bag City	piston
R857b14	15:08:20	15:09:53	186.6	176.4	300	Vixen	bag
R857b18	11:00:44	11:06:35	23.3	22.6	502	Mkr 113	filtered bag, gff
R857p1	18:04:13	18:06:06	240.5	175.9	428	Hell	piston 3micron filter
R857b11	15:04:45	15:06:56	182.5	174.7	307	Vixen	filtered bag, gttp
R857f3	13:38:58	13:51:39	17.2	16.5	1433	Bag City	sterivex-DNA
R857f12	12:55:21	13:33:01	18.5	16.7	3300	Bag City	sterivex-DNA
R857f21	11:12:27	11:28:26	23.4	22.6	2002	Mkr 113	sterivex-DNA

*pistons on dive 853 leaked, so reported volume larger than actual volume

3.1.2 NeMO 2004 PMEL CTD Operations Summary

Geoff LeBon

CTD operations for the 2004NEMO cruise consisted of 6 vertical casts and 2 CTD tows. The object of these casts was to reoccupy stations over known venting areas for chemical signatures in the non-buoyant plume and to take a quick look at Nubbin Seamount as we transited in.

The first cast was done over the Ashes Vent Field to continue monitoring of the vent field that was first started in the late 80's. Casts 2, 3, and 4 were done over known venting sites that were associated with the new lava flow from the 1998 eruption. Cast 5 was done at the site of mooring V-123 as a baseline for the osmo sampler, which was attached to the mooring. The osmo sampler sampled the hydrothermal metals output for a period of one year at the nonbouyant plume depth. T04E01 was done along the east side of the caldera over the lava flow from the 1998 eruption. The sixth vertical cast was a background cast for biological sampling and also for nutrients for Cascadia Basin to be used as a comparison for Nubbin Seamount. T04E02 was a tow exploring the possibility of hydrothermal venting at Nubbin Seamount.

CTD operations in 2004 seem to show little change from those same stations occupied during the 2003 NEMO cruise although most samples have yet to be analyzed. The Nubbin Seamount tow likewise awaits sample analysis.

CTD Casts and Tows

Cast	Station	Lat N	Long W	pH	3 He	CO2	Si	Nutrients	TDM	DM	XRF
1	V04E01	45.9332	130.0143	14	8	7	0	0	8	2	6
2	V04E02	45.9326	129.9818	17	9	0	0	0	9	3	7
3	VO4E03	45.9433	129.9859	17	9	7	0	0	9	3	8
4	V04E04	45.917	129.9938	17	9	6	0	0	9	3	7
5	V04E05	45.9069	130.0056	17	9	0	0	0	9	3	6
6	T04E01	45.9584	129.9917	16	9	0	0	0	8	0	7
7	V04E06	45.0621	126.8011	0	0	0	19	19	0	0	0
8	T04E02	45.0892	126.2936	22	10	0	14	14	12	7	7

3.1.3 NeMO 2004 PMEL Helium Summary

Leigh Evans

Samples for the Helium Isotope Laboratory were taken exclusively in the lab's titanium gastight bottles. They were all from sites that had been occupied in prior years so all will contribute to time series examination of the volcano. Samples from the Endeavor Segment of JdFR (Hulk and Bastille) are also the subject of frequent time series samples. They will provide a starting point measurement for moored instruments that were deployed by UW on this leg.

Helium Samples

Sample #	Latitude	Longitude	[Gas] (mM)	UTC	Vent
R852-GTB-15-0002	47.9499	-129.0968	22.3	10:35:21 Sep 20 04	Hulk

Sample #	Latitude	Longitude	[Gas] (mM)	UTC	Vent
R852-GTB-6-0003	47.9499	-129.0968	23.2	10:37:48 Sep 20 04	Hulk
R852-GTB-16-0006	47.9476	-129.0983	3.40	14:10:30 Sep 20 04	Bastille/Mkr-B
R852-GTB-17-0007	47.9476	-129.0983	3.47	14:11:50 Sep 20 04	Bastille/Mkr-B
R853-GTB-14-0013	45.9337	-130.0135	258	22:32:31 Sep 21 04	Virgin
R853-HFS-19-0014	45.9337	-130.0135		22:33:37 Sep 21 04	Virgin
R853-GTB-16-0018	45.9336	-130.0140	39.4	23:53:26 Sep 21 04	Inferno
R856-GTB-14-0018	45.9261	-129.9801	149	00:23:52 Sep 27 04	Castle
R856-GTB-10-0020	45.9261	-129.9801	144	00:25:37 Sep 27 04	Castle
R857-GTB-16-0009	45.9174	-129.9931	99.0	22:03:10 Sep 27 04	Vixen
R857-GTB-17-0015	45.9333	-130.0139	18.9	01:02:38 Sep 28 04	Hell

3.1.4 Hydrothermal Fluid Microbiology

Sheryl Bolton and Teegan Boruch-McDonough

The fluid microbiology sampling goals were slightly more focused this year than in previous years. In addition to continuing semi-quantitative culture enrichments (MPNs, Most-Probable Number technique) at various long term time-series vents we collected samples to help address questions of smaller scale sampling variations. Triplicate DNA samples were taken in immediate succession at Gollum vent, in the ASHES vent field, to help determine if single time point samples are representative of a site or whether there are fluctuations in the microbial population on the time scales of minutes and hours. A number of background DNA samples were also collected to help identify seawater and sediment influences in previously analyzed samples.

Fluids were collected for thermophilic and hyperthermophilic enrichment culturing from six time-series vents from the ASHES vent field (Gollum and Marshmallow) and 1998 lava flow region (Bag City, Marker 113, Marker 33 and Village) as well as a new location (Marker 52) near Marker N3. Results of semi-quantitative culturing (MPNs) are shown in the table below. Marshmallow and Village vents continue to maintain high numbers of hyperthermophilic heterotrophs relative to other vents whose populations stabilized at a lower density (Bag City and Marker 113) or nearly disappeared (Marker 33) in the first year or two following the 1998 eruption. Populations of hyperthermophilic autotrophs were very low at all vents sampled but seem to have dwindled rapidly in most of these sites soon after the eruption.

Results of Most Probably Technique

Location	Sample T (C)	Culture T (C)	Microbe Type	Microbes/L
Gollum	39	90	Hyperthermophilic heterotroph	20-720
		90	Hyperthermophilic autotroph	<60
Marshmallow	74	90	Hyperthermophilic heterotroph	720-26,000
		90	Hyperthermophilic autotroph	<10-260
Marker 52	25	70	Thermophilic heterotroph	140-4200
Marker 33	22	90	Hyperthermophilic heterotroph	10-400
		90	Hyperthermophilic autotroph	10-400
Village	50	90	Hyperthermophilic heterotroph	720-26,000
Marker 113	24	90	Hyperthermophilic heterotroph (no S)	280-4600
Bag City	18	90	Hyperthermophilic heterotroph	20-720
		90	Hyperthermophilic autotroph	10-400

This year also marked the Baross lab's return to the study of the effects of pressure on hydrothermal vent microbes. Using our recently upgraded "winerack" system we ran a high pressure, high temperature growth experiment on a sample of a sulfide chimney from Hell vent (ASHES vent field). Ground up pieces of the chimney were incubated in growth medium at 90°, 110° and 130°C under roughly ambient pressure (2500 psi). Our goal is to use the effects of pressure to extend the known upper temperature limit of life beyond the current but disputed 121°C. We are also interested in questions of survivability and community shifts that may occur at increased temperatures. The experiment revealed several problems with the current system that we are working on correcting but we expect to obtain some useful information from this experiment in spite of the problems.

Overall this was a very successful cruise in terms of continuing the fluid microbiology time-series study. In the coming months we will be implementing a molecular based fingerprinting method called Terminal Restriction Fragment Length Polymorphism (T-RFLP) to look for microbial community shifts at various vents since the 1998 eruption. This method will allow us to identify general trends and shifts in populations of certain types of organisms within and between vents.

Hydrothermal Fluid Microbiology Sample List and Analysis Overview

Dive/Cast #	Log Sample #	Description	Culture	DNA	Cell Counts
R853	R853-HFS-20-0008	HFS piston # 20 at Gollum, ASHES (Tmax=39.4)	X		X
R853	R853-HFS-2-0004	HFS Sterivex filter # 2 at Gollum, ASHES (Tmax=27.9)		X	
R853	R853-HFS-4-0006	HFS Sterivex filter # 4 at Gollum, ASHES (Tmax=39.7)		X	
R853	R853-HFS-10-0007	HFS Sterivex filter # 10 at Gollum, ASHES (Tmax=39.7)		X	
R853	R853-HFS-7-0005	HFS Sterivex filter # 7 at Gollum, ASHES (Tmax=39.7)		X	
R853	R853-HFS-22-0009	HFS piston #22 at Marshmallow, ASHES (Tmax=74.4)	X		X
R853	R853-HFS-21-0010	HFS Sterivex filter # 21 at Marshmallow, ASHES (Tmax=74)		X	
R853	R853-HFS-24-0001	HFS background Sterivex filter # 24 at ASHES (Tavg=2.2)		X	
R853	R853-HFS-24-	HFS background 3µm filter # 24 at ASHES (Tavg=2.2)		X	

Dive/Cast #	Log Sample #	Description	Culture	DNA	Cell Counts
	0001				
R853	R853-HFS-5-0016	HFS piston #5 at Virgin, ASHES (Tmax=176.4)			X
R853	R853-SF-0024	Piece of sulfide from Hell vent, ASHES	X	X	X
R854	n/a	RAS flat DNA filter #12 at Virgin, in -situ DNA preservation		X	
R854	n/a	RAS flat DNA filter #36 at Virgin, in -situ DNA preservation		X	
V04E-05	n/a	Background Sterivex filter south of the caldera, 1544 m		X	
V04E-05	n/a	Background 0.8µm filter south of the caldera, 1544 m		X	
V04E-05	n/a	Background Sterivex filter south of the caldera, 500 m		X	
V04E-05	n/a	Background 0.8µm filter south of the caldera, 500 m		X	
V04E-05	n/a	Background Sterivex filter south of the caldera, 5 m		X	
V04E-05	n/a	Background 0.8µm filter south of the caldera, 5 m		X	
R856	R856-HFS-5-0001	HFS piston #5 at Mkr. 52 (West of N3, Tmax=24.9)	X		X
R856	R856-HFS-2-0002	HFS Sterivex filter #2 at Mkr. 52 (West of N3, Tmax=24.9)		X	
R856	R856-HFS-4-0004	HFS Sterivex filter #4 at Cloud (now mkr. 69, Tmax=7.0)		X	
R856	R856-HFS-1-0005	HFS 3µm filtered piston #1 at Cloud (now mkr. 69, Tmax=7.0)	X	X	X
R856	R856-HFS-6-0007	HFS piston #6 at Mkr 33 (Tmax=22.2)	X		X
R856	R856-HFS-7-0008	HFS Sterivex filter #7 at Mkr 33 (Tmax=22.2)		X	
R856	R856-HFS-10-0010	HFS Sterivex filter #10 at Mkr 33 (Tmax=34.5)		X	
R856	R856-HFS-24-0011	HFS background Sterivex filter # 24, SE Caldera (Tavg=1.9)		X	
R856	R856-HFS-24-0011	HFS background 3µm filter # 24, SE Caldera (Tavg=1.9)		X	
R856	R856-HFS-22-0012	HFS Piston #22 at Village (Tmax=50.1)	X		X
R856	R856-HFS-21-0013	HFS Sterivex filter #21 at Village (Tmax=50.1)		X	
T04E-01	n/a	Background Sterivex filter over the SE caldera, 1000 m		X	
T04E-01	n/a	Background 0.8µm filter over the SE caldera, 1000 m		X	
R857	R857-HFS-20-0002	HFS Piston #20 at Marker 113 (Tmax=23.7)	X		X
R857	R857-HFS-21-0003	HFS Sterivex filter #21 at Marker 113 (Tmax=23.4)		X	
R857	R857-HFS-5-0004	HFS Piston #5 at Bag City (Tmax=18)	X		X
R857	R857-HFS-12-0005	HFS Sterivex #12 at Bag City (Tmax=18.5)		X	
R857	R857-HFS-3-0007	HFS Sterivex #3 at Bag City (Tmax=17.2)		X	
R857	R857-HFS-9-0006	HFS Unfiltered Bag #9 at Bag City (Tmax=17.1)			X
R857	R857-HFS-1-0014	HFS 3µm filtered piston #1 at Vixen (Tmax=240)			X

Dive/Cast #	Log Sample #	Description	Culture	DNA	Cell Counts
V04E-06	n/a	Background Sterivex filter 20 mi. W of Nubbin Seamount, 2840m		X	
V04E-06	n/a	Background 0.8µm filter 20 mi. W of Nubbin Seamount, 2840m		X	
V04E-06	n/a	Background Sterivex filter 20 mi. W of Nubbin Seamount, 2200m		X	
V04E-06	n/a	Background 0.8µm filter 20 mi. W of Nubbin Seamount, 2200m		X	
V04E-06	n/a	Background Sterivex filter 20 mi. W of Nubbin Seamount, 1603m		X	
V04E-06	n/a	Background 0.8µm filter 20 mi. W of Nubbin Seamount, 1603m		X	
V04E-06	n/a	Background Sterivex filter 20 mi. W of Nubbin Seamount, 1000m		X	
V04E-06	n/a	Background 0.8µm filter 20 mi. W of Nubbin Seamount, 1000m		X	

3.2 ENGINEERING

3.2.1 NeMO 2004 PMEL Engineering

Jon Bumgardner

The PMEL EDD personnel directly participating in the 2004 NeMO Net cruise include Jon Bumgardner, serving as lead engineer, and John Shanley, serving as mooring and equipment specialist.

The objectives set forth at the beginning of the cruise were as follows (times and dates in local time +7 UTC):

- Recover COBB Mooring: The COBB mooring was successfully recovered at 19:00 on 9/20/2004. The mooring operations took place on the starboard quarter utilizing PMEL's portable capstan and an aft adjustable davit.
- Deploy Refurbished RAS Frame: The fresh 2004 RAS frame was successfully deployed on the 9/22/2004 at approximately 07:22. The frame was placed into the water using the aft starboard crane amidships. It was sent to the sea floor with the assistance of a 400lb sink anchor. The ROPOS vehicle placed the frame near the vent and deployed the intake funnel/temp probe.
- Recover 2003 RAS Frame: The 2003 RAS frame was successfully recovered on 12:44 on 9/22/2004 with the starboard crane amidships. The RAS release was left enabled during the 2003 NeMO cruise. Hence we were not able to range or get confirmation of release signals. When ROPOS dove on the frame after our initial release attempt it became apparent that the release had functioned properly, but a small piece of twine had fouled and bound the frame to the anchor. A slight nudge from the ROPOS vehicle and the twine parted allowing the frame to ascend to the surface. Once the package was secured to the deck water samples were immediately removed and placed in a chiller.
- Attempt to Enable Rumbleometer: The Rumbleometer release remained unresponsive despite multiple attempts to enable and range. This procedure took place at approximately 07:00 on 9/25/2004. No release attempts were made.
- Deploy 2004 NeMO BPR: NeMO Net BPR was successfully deployed at 09:00 on 9/25/2004. The mooring operations took place on the starboard quarter utilizing the starboard quarter crane.

- Attempt 2003 buoy Release Recovery: An attempt was made to release the 2003 buoy mooring at 11:00 on 10/25/2004. The release did not respond so the surface floats were cut free allowing the mooring to fall to the seafloor.
- Deploy 2004 NeMO Communications Buoy/Mooring: NeMO Net Communications Buoy/Mooring was successfully deployed at 14:35 on 9/25/2004. The mooring operations took place on the starboard quarter utilizing the starboard quarter crane, PMEL's portable capstan, and aft adjustable davit.
- Recover MTR Mooring (03V123): MTR Mooring 03V123 was successfully recovered at 18:35 on 9/25/2004. The mooring operations took place on the starboard quarter utilizing PMEL's portable capstan and an aft adjustable davit.
- Recover MTR Mooring (03V122): MTR Mooring 03V122 was successfully recovered at 20:12 on 9/25/2004. The mooring operations took place on the starboard quarter utilizing PMEL's portable capstan and an aft adjustable davit.
- Recover 2004 NeMO BPR: NeMO Net BPR was successfully recovered at 08:25 on 9/27/2004 due to electronics setup errors. The mooring operations took place on the starboard quarter utilizing the starboard quarter crane.

All PMEL Engineering operational objectives listed above were successfully completed without damage to ship or science equipment. Also, there were no reported injuries from ship or science personnel.

3.3 GEOLOGY

3.3.1 NeMO 2004 Geology/Pressure Summary Scott Nooner and Bill Chadwick

Measuring the vertical deformation of a volcano can provide valuable information about its dynamics and eruptive cycles. On land, these types of measurements are made using a variety of techniques such as GPS, INSAR, and leveling. These have become well-established tools for studying volcanoes. Seafloor geodesy, however, is still a relatively new and experimental science. One method for measuring deformation of the seafloor is to track changes in water pressure at the seafloor over time. These changes can be converted to changes in height of the seafloor relative to a stable reference. Pressure measurements have been made at Axial seamount for the past 5 years in order to see if the volcano has been re-inflating since its 1998 eruption. These measurements are among the first to attempt to measure vertical deformation on a sub-sea volcano. For this reason, it has taken several years to improve the methodology and instrumentation enough to get cm level precision.

This year we made several changes in how we made the measurements and were able to improve our repeatability by about an order of magnitude. The main changes were: 1) adding a flat plate to the bottom of the pressure sensor, 2) releasing the sensor during each measurement, and 3) placing the sensor on each benchmark in the same orientation during each occupation, 4) displaying the data in real time with a Labview interface, and 5) measuring tilt of the sensor in real time. These steps were aimed at making the orientation of the sensor more repeatable from one measurement to the next. We have found that rotation of the sensor about its long axis has been one of our main sources of error. Laboratory experiments have shown that the output of the parascientific pressure gauges varies depending on their orientation in the Earth's gravitational field. Making these changes improved our repeatability at each benchmark from 5-7 cm in previous years to 9 mm this year.

The pressure measurements this year were made on dive R855 which spanned about 38 hours from 16:00 UTM on 9/23/04 to 6:00 UTM on 9/25/04. The measurements were made by placing the pressure sensor package on a seafloor benchmark and releasing it for 30 minutes during which data was recorded on a laptop in the ROPOS control room. Measurements were made on five benchmarks (AX63-Caldera Center, AX01-Magnesia, AX05-Marker 33, AX04-Bag City, and AX66-Pillow Mound). AX01, AX05, and AX04 were visited three times each, while AX63 and AX66 were visited twice each. AX66 is the reference benchmark and is outside the area of expected deformation. The results show that the center of the caldera (AX63) continues to be uplifted (relative to AX66) at a rate of about 20 cm/yr.

3.4 MACROBIOLOGY

3.4.1 Ecology and Ultra-Structure of the Blue Mats (Juniper Lab Report)

Angela Kouris

Our primary objective for the NEMO 2004 cruise was to continue our studies on the ecology of Blue Mats (colonies of *Folliculina* sp. ciliates) as well as to prepare samples for our upcoming TEM studies on their ultra-structure.

Blue Mat food web studies

Blue Mats are sessile colonial ciliates that carpet areas in the periphery of northeast Pacific hydrothermal vents (EPR, Juan de Fuca ridge, Explorer Ridge). Samples of Blue Mat collected on previous cruises (NeMO 2002-2003) revealed that a community of meiofauna and macrofauna are associated with the Blue Mats. Stable isotope studies are underway in our lab to determine the food-web structure of these Blue Mat communities. Preliminary results seem to indicate the Blue Mat ciliates themselves do not lie at the base of this food-web. A suction sample of white bacterial mat was collected on this cruise for stable isotope study. A signature for the bacterial mat that grows in proximity to the Blue Mat could show us whether it is these bacteria that are being fed on by the ciliates and other creatures within the community. This signature will also be useful to other meiofauna studies that are underway in our lab from suction samples collected in previous years.

Ultra-structure studies

The second step of our project on Blue Mats involves using transmission electron microscopy (TEM) studies to determine whether the ciliates are in a symbiotic relationship with vent bacteria. On this cruise we collected samples from N3 which were immediately fixed in glutaraldehyde for this second study.

Our secondary objective on the NEMO 2004 cruise was to continue a sulphide weathering experiment. To do so four purse size experiments were deposited at Mkr 33.

Juniper Lab Samples

Vent	Sample #	Sample Type	Frozen Material
Phoenix	R854-SS-J1	Blue Mat	1x 50ml tube: bulk blue mat, 1x 15ml tube: scale worms, 1x 15ml tube: spider crabs, 1x 15ml tube: molluscs (mostly limp ids), 1x 15ml tube: meiofauna and blue mat (rinsings)
N3	R856-SS-J2	Blue Mat	4x 50ml tubes: blue mat bulk, 7x 15ml tubes: pigments, *10x 15ml tubes: pixed in 3% glutaraldehyde
Village	R856-SS-J1	Blue Mat	2x 50ml tubes: blue mat bulk
Village	R856-SS-J3	Bacteria	1x 15ml tube: white microbial mat

3.5 MAPPING

3.5.1 NeMO 2004 PMEL Mapping Summary

Andra Bobbitt and Shannon Ristau

Using the Thompson's hull-mounted EM300 multibeam system, seafloor bathymetry data was collected nightly as time permitted between ROV and CTD operations. Bathymetry data was added to EM300 data previously collected at Axial seamount (primarily to the south of the caldera). Axial now has almost 100% EM300 coverage, replacing the 1980's data collected with the 16-beam systems.

During the transit back to Newport, EM300 multibeam data was also collected. The ship was routed through an area which has had a series of earthquakes beginning in 2000, detected by the PMEL Vents SOSUS processing system. This area had been seismically silent over a decade. The mapping revealed an area of small ridges and remnant seamount. The ship also mapped Nubbin seamount before conducting a CTD tow over the feature. This area was identified as potentially having hydrothermal activity after a prior cruise's CTD cast.

3.6 PUBLIC OUTREACH

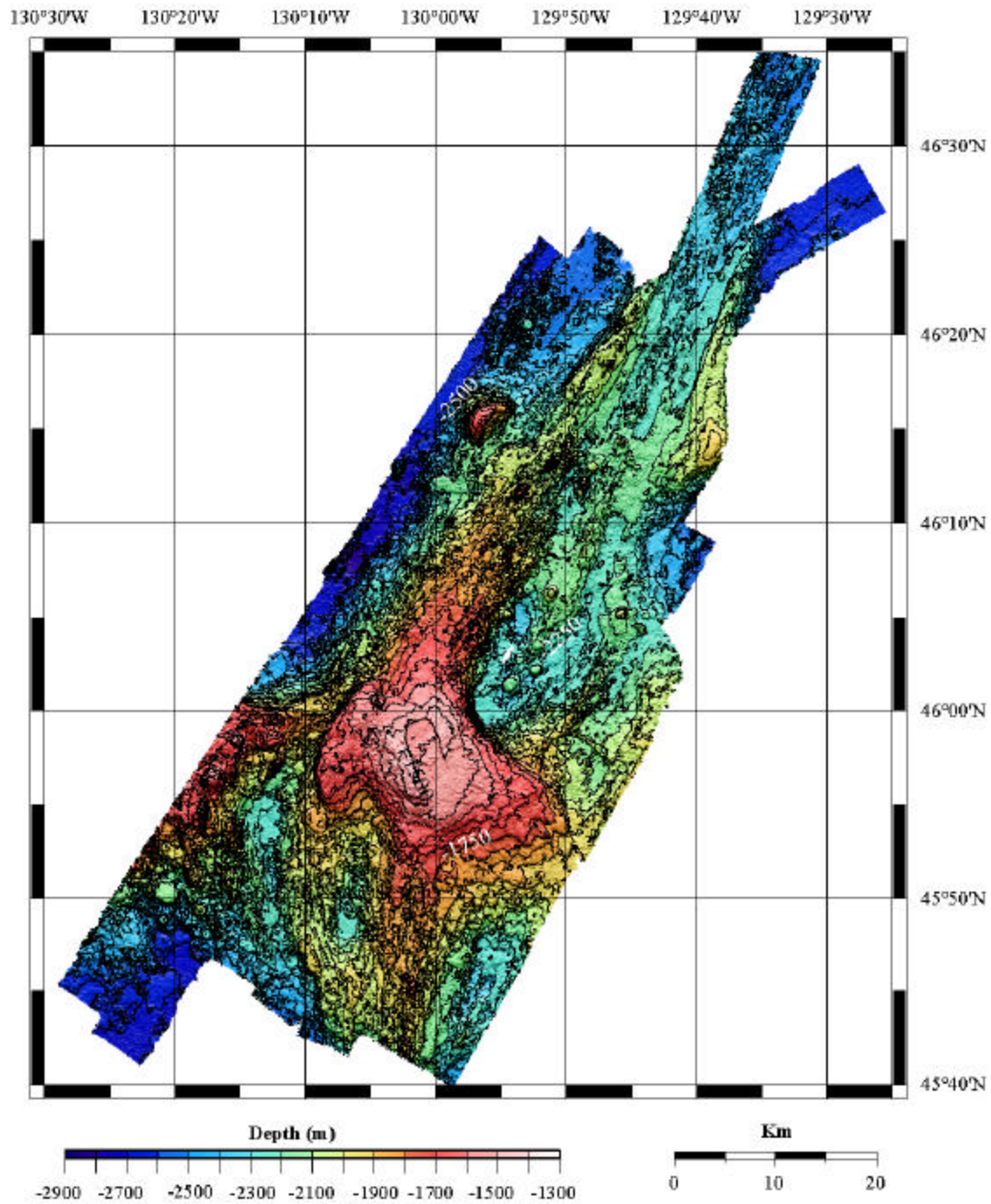
3.6.1 NeMO 2004 Website

Andra Bobbitt

Daily science logs from the NeMO 2004 expedition were posted from sea at: <http://www.pmel.noaa.gov/vents/nemo/calendar.html> Postings from sea were made possible by the real-time internet link through RoadNet. Web pages were ftp'd to the host site on PMEL's Seattle web server.

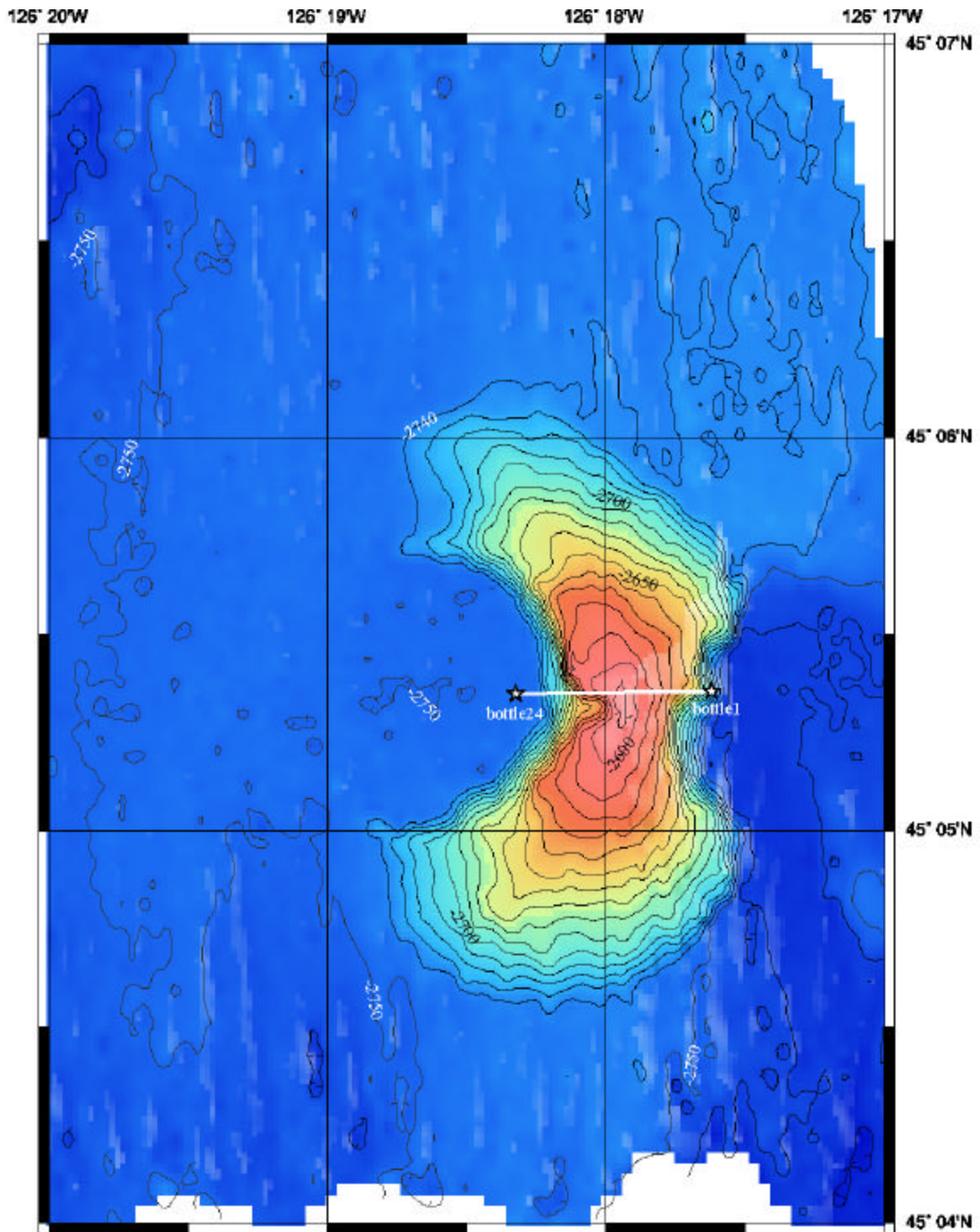
The daily log included a brief summary of the science activities with accompanying photos. Other NeMO pages were updated from sea as well, such as the NeMO Net page. The updating of the NeMO Net page to include the newly acquired temperature and pressure data plots gave scientists at sea real-time information regarding the need to reposition the NeMO Net temperature probes.

Axial Volcano EM300 Coverage Map



EM300 bathymetry data. 35 meter grid cell size. 50 meter contour interval.

Figure 4

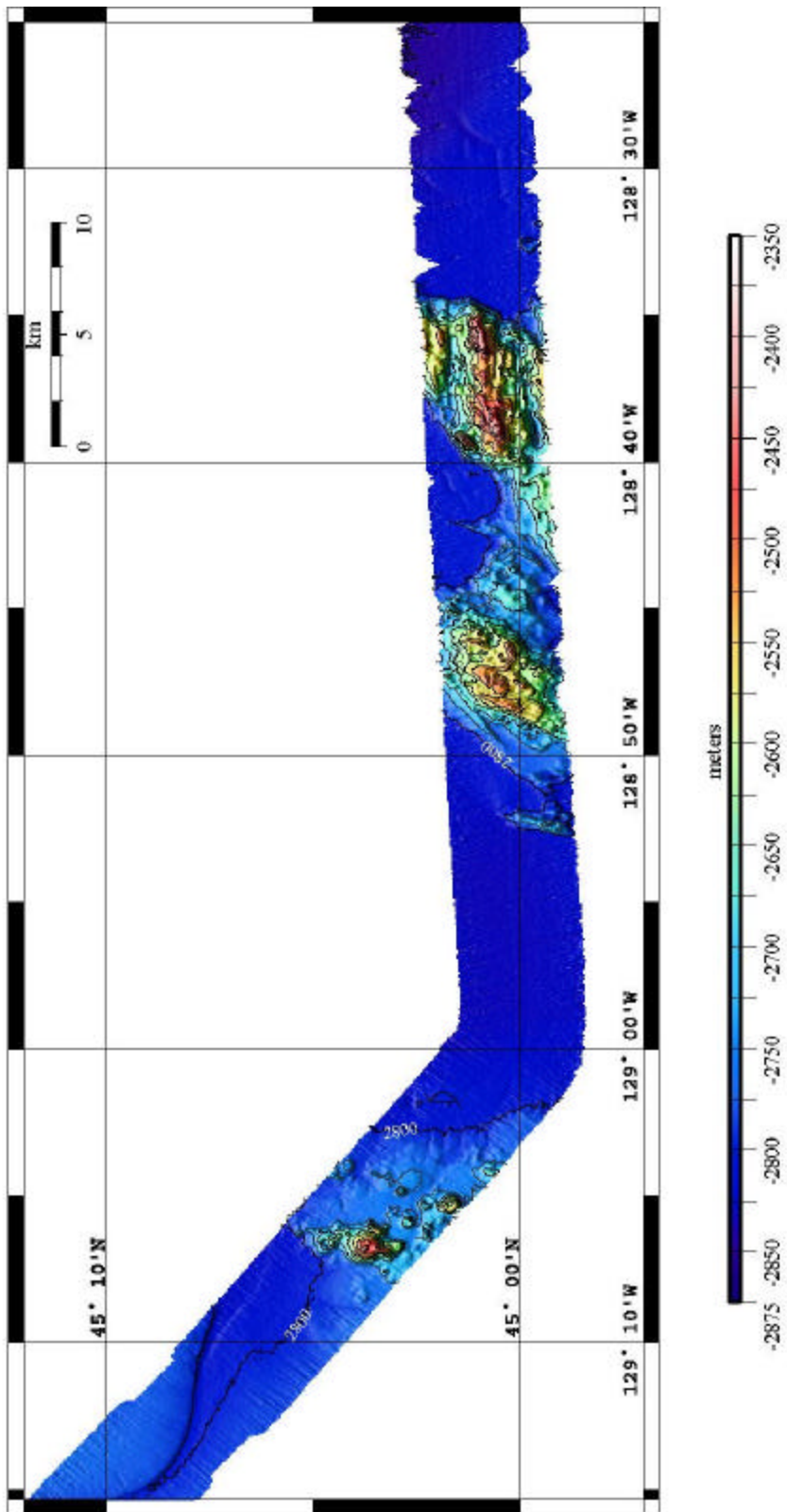


Nubbin Seamount. NeMO 2004 tow yo track overlaid on bathymetry.
 Mercator Projection. 10 meter contour interval.
 EM300 grid. 50 meter cell size (nubbin-50m-final.grd), subsampled to 25 meter cell size(nubbin-25m-ssmp-final.grd).



Figure 5

Earthquake Swarm Area



EM300 bathymetry. 50 meter grid cell size. 50 meter contour interval.

4.0 NAVIGATION

4.1 NeMO 2004 NAVIGATION SUMMARY

Susan Merle and Bill Chadwick

ROPOS uses integrated Long Baseline (LBL) navigation for underwater positioning at Axial Volcano. The two transponder nets at Axial (ASHES and CASM) were replaced in 2003. Only the ASHES net was utilized this year, as we did not have enough time for work in the CASM net area. Seascapes software was used to integrate serial data inputs for position computation. The ROPOS team also tested its new RDI Doppler Velocity Log (DVL) to compute displacements as ROPOS maneuvers along the bottom. The DVL navigation is not yet incorporated into the navigation output files. The ship was often maneuvered so that the stern was over the dive target, which also put the cage over the target. ROPOS found the dive targets with little problem when the cage was directly over a known vent position. NeMO 2004 navigation was good, as long as the cage motor was off.

4.2 VENT, MARKER, AND BENCHMARK POSITIONS

Vent/Marker	Longitude	Latitude	Depth
E1	-130.028587	45.992568	1513
E2	-130.027108	45.992815	1520
E3	-130.026405	45.992737	1517
E4	-130.025713	45.992707	1519
E5	-130.024753	45.992862	1523
91Vent	-130.012417	46.038600	1640
AX-BM1	-129.985045	45.946087	1524
AX-BM4	-129.989445	45.916133	1534
AX-BM5	-129.982443	45.933252	1523
AX-BM63	-130.010047	45.955143	1536
AX-BM66	-130.003717	45.863150	1723
Ash-11.0	-129.999088	45.941333	1330
BagCity	-129.989425	45.916167	1537
BlueNose	-129.983700	45.945440	1527
Bob	-130.012833	46.038917	1641
Casper	-129.992977	45.917370	1538
Castle	-129.980057	45.926168	1522
Flattop-Mkr-N	-129.979792	45.926075	1522
Circ	-129.981650	45.925917	1525
Cloud-Mkr-N4	-129.981670	45.933418	1523
Cloud-Mkr-N6/21	-129.981600	45.933400	1524
Coquille	-129.993058	45.917530	1537
Crack	-130.013550	45.933300	1547
Crevice	-129.990400	45.911100	1540
Daves	-130.013767	45.933517	1547
Village	-129.980597	45.926118	1520
DroopyPillar	-129.984352	45.929867	1522
Dying	-129.991850	45.916850	1536
Easy	-129.984717	45.945333	1535
FeCity	-129.989190	45.917540	1536
FeHyde	-130.013783	45.932983	1547
Gollum	-130.013583	45.933583	1547

Vent/Marker	Longitude	Latitude	Depth
Hairdo	-130.013983	45.933500	1547
Hell	-130.014227	45.933298	1550
Inferno	-130.013900	45.933550	1547
FeSulfide	-129.990738	45.916710	1535
Joystick-Mkr-42	-129.988563	45.918838	1534
Magnesia-Mkr-67	-129.984933	45.946233	1532
Marshmallow	-130.013617	45.933700	1546
Medusa	-130.013933	45.933350	1547
Milky-Mkr-N2	-129.984753	45.945142	1533
Minisnow-Mkr-N9	-129.984217	45.942617	1524
Mkr-33	-129.982200	45.933182	1524
Mkr-108	-129.983033	45.928650	1524
Mkr-113	-129.988238	45.922728	1526
Mkr-33	-129.982197	45.933177	1524
Mkr-36	-129.989333	45.916217	1534
Mkr-65	-129.989628	45.916013	1534
Mkr-N1	-129.984083	45.939800	1522
Mkr-N3	-129.985200	45.943800	1529
Mkr-N41	-129.981383	45.936217	1521
Mkr-N44	-129.984833	45.939467	1522
Mkr-N5	-129.979812	45.926097	1515
Mkr-N7	-129.981900	45.939300	1520
Mrk-113	-129.988252	45.922757	1526
Mushroom	-130.013800	45.933600	1547
Nascent [Mkr-M]	-129.981597	45.935840	1520
OldFlow	-129.981705	45.936447	1522
OldWorms	-129.983308	45.945105	1526
Ouzo	-129.984683	45.945817	1529
Oxide	-129.985083	45.945450	1533
Phoenix	-130.013983	45.933250	1547
Pillar	-129.985417	45.922700	1524
PillowMound	-130.003717	45.863150	1723
ROPOS	-130.014050	45.933283	1547
Roof	-129.984483	45.942500	1523
RumbleWeight	-129.984062	45.930150	1524
Snail-Mkr-N8	-129.981900	45.933200	1524
Snow	-129.982450	45.927117	1525
SnowBlower	-129.984067	45.939867	1522
SteveMound	-130.013417	45.933250	1547
Styx	-130.013700	45.933283	1547
ThePit	-129.984083	45.939750	1522
Tombstone	-130.011333	45.929483	
Top-Gun	-129.979635	45.926472	1520
Tunncliffe	-130.015817	45.933667	1546
Virgin	-130.013483	45.933650	1547
VirginsDaughter	-130.013400	45.933750	1547
Vixen	-129.993003	45.917280	1538
White-Mkr-I	-130.013633	45.933733	1545
BigJohnson	-130.013417	45.933363	1542
Lamphere	-130.026562	45.989337	1576

Vent/Marker	Longitude	Latitude	Depth
Shepherd	-130.027200	45.988868	1580
T&S	-130.027168	45.989153	1583

4.3 NeMO EXPERIMENTS (Deployments and Recoveries)

Vent/Marker	Experiment/ Instrument	Dive Deployed	Dive Recovered	Comments
Caldera (center)	buoy	between R855/R856 ('04)		On NeMO Net -04
Caldera (center)	BPR	between R855/R856 ('04)	before R857 ('040)	Had to retrieve it. Problem with acoustics.
Caldera (center)	BPR	between 740/741 ('03)		
Caldera (south)	BPR	between 740/741 ('03)		
Castle Vent	Hobo 152	R856 ('04)		In Anhydrite
Castle Vent	Hobo 151	R739 ('03)	R856 ('04)	Near Anhydrite
Cloud	Mkr-69	R856 ('04)		Where Mkr-N6 used to be
Cloud	Larval Array O	R659 ('02)		S/SW of N6 ~8m
Cloud/Mkr-N6/21	MTR 3173	R674 ('02)	R855 ('04)	Couldn't find on R734. Found it 2004.
Cloud/Mkr-N6/21	MTR 3041	R855 ('04)		MTRs 3041 and 3054 tied together
Cloud/Mkr-N6/21	MTR 3054	R855 ('04)		MTRs 3041 and 3054 tied together
Cloud/Mkr-N6/21	MTR 3176	R734 ('03)	R855 ('04)	MTR 3334 and 3176 tied together
Cloud/Mkr-N6/21	MTR 3334	R734 ('03)	R855 ('04)	MTR 3334 and 3176 tied together
Coquille	MTR 3317	R551 ('00)		Couldn't find in 2002. Spotted on HFS dive R741 ('03) - not picked up
Gollum Vent	Larval Array J	R632 ('01)		Didn't see it on the ASHES dives
Marshmallow	Hobo 126	R739 ('03)	R854 ('04)	
Mkr-113	MTR 1055	R627 ('01)		Couldn't find
Mkr-113	MTR 4126	R551 ('00)		Couldn't find
Mkr-33	Guccipurses	R855 ('04)		Richard's sulfide weathering experiment
Mkr-33	Growth cage	R855 ('04)		Noreen's limpet growth experiment
Mkr-33	Growth cage	R740 ('03)	R855 ('04)	Amanda's limpet growth cage
Mkr-33	MTR 3201	R743 ('03)	R855 ('04)	North-crack
Mkr-33	MTR 3282	R734 ('03)	R855 ('04)	Mid-crack
Mkr-33	MTR 4001	R734 ('03)	R855 ('04)	South-crack
Mkr-33	MTR 3049	R734 ('03)	R855 ('04)	In tubeworm bush near bmrk
Mkr-33	MTR 3026	R855 ('04)		Green tape, mid-crack
Mkr-33	MTR 3039	R855 ('04)		Yellow tape, north-crack
Mkr-33	MTR 3045	R855 ('04)		Blue tape, south-crack
Mkr-33	MTR 3196	R855 ('04)		Red tape, tubeworm bush
Mkr-33	Mkr-77	R743 ('03)		
NRZ caldera rim	Extensometers 1-5	R742 ('03)		

Vent/Marker	Experiment/ Instrument	Dive Deployed	Dive Recovered	Comments
NW of Crack	Johnson Flow/Temp Meter 2002	R663 and R672 ('02)	R853 ('04)	No time to recover in 2003 - got it in 2004
T&S Spires	MTR 3017	R497('99)		
Virgin Vent	Hobo 127	R854 ('04)		
Virgin Vent	RAS '04 (hi- temp)	R854 ('04)		
Virgin Vent	RAS '03 (hi- temp)	R737 ('03)	R854 ('04)	
Vixen (Coquille)	Hobo 128	R857 ('04)		
Vixen (Coquille)	Hobo 153	R857 ('04)		
Vixen (Coquille)	Hobo 130	R734 ('03)	R857 ('04)	
Vixen (Coquille)	Hobo 132	R734 ('03)	R857 ('04)	
Vixen (Coquille)	Mkr-57	R857 ('04)		Just off Vixen mound
West-N3	Mkr-52	R856 ('04)		~10m west of old Mkr-N3 position

4.4 NeMO NET SUMMARY

Bill Chadwick and Dave Butterfield

The 2003 NeMO Net buoy and 2003 NeMO Net BPR were recovered on July 21, 2004 (on another cruise several months before the NeMO 2004 cruise). The buoy had to be recovered early in order to refurbish it for another year-long deployment. The NeMO Net BPR was recovered at this time because PMEL engineers needed some components from it for another project. There will be no loss in monitoring continuity, however, because two other BPR instruments (without acoustic modems) that were deployed in 2003 remained deployed (and were not recovered during NeMO 2004).

During the NeMO 2004 cruise, the NeMO Net RAS that was deployed at Virgin vent in 2003 was recovered. It had performed very well and was full of water samples (see Chemistry section). The 2003 RAS was examined on the seafloor with ROPOS and prepared for recovery on dive R853. After that dive, an attempt was made to acoustically release the 2003 RAS, but it did not come to the surface. During the next dive to ASHES (R854) it was found that the 2003 RAS had indeed released but that it was hung up on a loop of parachute chord that was wrapped around the anchor. ROPOS easily released the 2003 RAS and it was recovered at the surface. The 2003 RAS anchor was then moved out of the way, and the 2004 RAS was carefully positioned at Virgin vent (it had already been lowered from the surface before the first dive at Axial). The exact position of the intake funnel and temperature probes were adjusted during a later dive to the site.

The 2004 NeMONet BPR and the 2004 NeMO Net buoy were both deployed on 9/25, but the BPR had to be recovered again on 9/28, because it was deployed with the capability to trigger on tsunami signals and the threshold had been set too low so it was continually transmitting tsunami warnings to the NeMO Net buoy. The BPR was also found to be recording intermittent spikes of noise, so it was decided that it should be returned to Seattle for evaluation and repair before being redeployed. It was later deployed on a transit cruise on 10/31/04. The 2004 BPR has a new long-life acoustic release and enough memory to stay down for 4 years (for the first time). There is only enough battery life for acoustic modem transmissions for 2 years, however. The plan next summer will be to recover the buoy and RAS, but leave the BPR in place.

In summary, the 2004-2005 NeMO Net system (the 6th such system at NeMO) consists of one BPR (near the center of the caldera) and one RAS (deployed at Virgin). The 2004 NeMO Net buoy does not have a tall tower as in previous years, and was re-designed to avoid the problems of potential hydrogen explosions in the older buoys associated with aluminum battery wells. This year's system uses Benthos ATM880/ATM408 omni-directional acoustic modems on the buoy and the seafloor instruments. Based on the data transmission performance for 2003-4, it was decided to move the buoy 100 to 150 m closer to the sampler at Virgin. The 2004 NeMO Net BPR was deployed at 45 57.363°/130 00.603' (~100 m north of the caldera center so that it would not be in the way of ROPOS pressure measurements there), and the 2004 buoy was deployed at 45 56.65°/130 00.5'.

4.5 NeMO INSTRUMENT POSITIONS

2004 instrument	Long	Lat	UTM X	UTM Y	Depth
E1 (depl '03)	-130.0285800	45.9925700	420344	5093736	1513
E2 (depl '03)	-130.0271150	45.9928200	420458	5093763	1519
E3 (depl '03)	-130.0263900	45.9927400	420514	5093753	1517
E4 (depl '03)	-130.0257200	45.9927100	420566	5093749	1519
E5 (depl '03)	-130.0247500	45.9928600	420641	5093765	1523
BPR-center-03	-130.0101667	45.9552167	421717.5	5089567.9	1534
BPR-south-03	-130.0000000	45.9333333	422474.9	5087126.5	
BPR-04*	-130.0100500	45.9560500	421727.7	5089660.3	
RAS-04 Virgin	-130.0134833	45.9336500	421430	5087174	1547
Buoy-04	-130.0083300	45.9441600	421844.3	5088337.6	

*BPR-04 was re-deployed 10/31/04 during transit cruise.

4.6 NeMO TRANSPONDER POSITIONS

Reply Frequency (kHz)	UTM X	UTM Y	Long (decimal degrees)	Lat (decimal degrees)	Depth
Lava Net					
lava10.5	424368	5088261	129.975763	45.943750	1308.21
lava8.5	424349	5086129	129.975673	45.924567	1320.87
lava11.5	422407	5086195	130.000728	45.924940	1326.71
lava7.5	421926	5087976	130.007223	45.940918	1336.26
CASM Net					
casm8.0	421279	5093140	130.016412	45.987312	1363.79
casm10.0	420510	5094426	130.026552	45.998798	1306.48
casm9.5	419661	5093074	130.037288	45.986528	1277.21

4.7 NeMO MOORING RECOVERY POSITIONS*

Moorings	Long	Lat
03V122	-130.0050	45.9069
03V123	-130.0307	45.9685
Cobb	-130.8000	46.8867

*note: No moorings were deployed on the NeMO 2004 expedition.

5.0 ROPOS DIVES: STATISTICS and SUMMARIES

5.1 ROPOS DIVE STATISTICS

6 ROPOS dives (1 at Endeavour and 5 at Axial)	R852 - R857
Total wet time	81.04 hours
Total bottom time	95.79 hours
Total number of ROPOS samples	80 samples

5.2 ROPOS DIVE SUMMARIES

R852: Endeavour
Wet time (UTC): 9/20 0539 - 9/20 1509. JD: 264. 9.5 hrs.
Bottom time (UTC): 9/20 0352 -9/20 1641. JD: 264. 12.85 hrs. [7 samples]
DSC information: 127 DSCs taken starting with R852_DSC_092004_062740_03758.jpg and ending with R852_DSC_092004_144829_03884.jpg
Dive Summary: Fluid sampling, materials testing, and instrument deploy and recover dive. Sully: deployed 1 RTH, recovered 1 RTH, 1 HFS, tested zirconium material. Hulk: deployed 1 RTH, recovered VEMCOs T3 and T4, 2 GTB, 2 HFS. Homer 23: recovered RTH. Bastille: deployed RTH (T27), 2 GTB.
R853: ASHES
Wet time (UTC): 9/21 1647 - 9/22 0140. JD: 265-266. 8.88 hrs.
Bottom time (UTC): 9/21 1526 - 9/22 0236. JD: 265-266. 11.17 hrs. [25 samples]
DSC information: 124 DSCs taken starting with R853_DSC_092104_171407_03885.jpg and ending with R853_DSC_092204_015609_04008.jpg
Dive Summary: Fluid sampling at ASHES. Background water sample SE of Virgin. Gollum: 7 HFS. Marshmallow: 3 HFS. Virgin: 2 GTB; 3 HFS. Inferno: 2 HFS; 1 GTB; 1 SS (limpets). Hell: 2 HFS; 1 GTB; 1 SF (for high P high T culturing). Crack: recovered Big Johnson. Also looked at the 2003 RAS at Virgin. Removed the funnel and temp probe from the vent and stored it on the RAS for recovery in the morning.
R854: ASHES
Wet time (UTC): 9/22 1745 - 9/23 0145. JD: 266-267. 8 hrs.
Bottom time (UTC): 9/22 1633 - 9/23 0312. JD: 266-267. 10.65 hrs. [2 samples]
DSC information: 145 DSCs taken starting with R854_DSC_092204_180556_04010.jpg and ending with R854_DSC_092304_020220_04154.jpg
Dive Summary: Went to Virgin first to recover the 2003 RAS which would not release acoustically. It was half-released but still attached by parachute cord around the anchor. Rattled the frame and it released. Moved the 2003 anchor out of the way. Positioned 04 RAS; funnel and temp probe in the vent after excavating the anhydrite. Placed hobo #127 in the vent. Took series of DSCs of new RAS. Recovered hobo-126 from Marshmallow. Took series of DSCs at Inferno; Marshmallow; Hell and Phoenix. Suctioned blue mat at Hell; although the end of the sampler was broken. Rescue floats (for 2003 RAS) were released from the bottom. Didn't need them because RAS floated to the surface on its own.
R855: Caldera Center to South Pillow Mound
Wet time (UTC): 9/23 1727 - 9/25 0526. JD: 267-269. 35.98 hrs.
Bottom time (UTC): 9/23 1559 - 9/25 0640. JD: 267-269. 38.68 hrs. [9 samples]

DSC information: 126 DSCs taken starting with R855_DSC_092304_190204_04156.jpg and ending with R855_DSC_092504_050935_04281.jpg
Dive Summary: Pressure measurement dive. 3 transects starting at the Caldera center to Magnesia; Mkr-33; Bag City and the South Pillow Mound . Then back north with measurements at all sites. Then south again with measurements at all sites. The measurements ended at the South Pillow Mound. On the third transect experiments were deployed and recovered. Mkr 33: Recovered 4 MTRs; Amanda's limpet growth cage. Deployed 4 MTRs; Noreen's limpet growth experiment; Richard's sulfide weathering experiment. Cloud: Recovered 3 MTRs - one which we couldn't find in the pit in 2003. Deployed: 2 MTRs in the pit. Running behind schedule so postponed other deployments/recoveries.
R856: 98 Lava Flow Area
Wet time (UTC): 9/26 1628 - 9/27 0127. JD: 270-271. 8.98 hrs.
Bottom time (UTC): 9/26 1508 - 9/27 0143. JD: 270-271. 10.59 hrs. [22 samples]
DSC information: 90 DSCs taken starting with R856_DSC_092604_170003_04283.jpg and ending with R856_DSC_092704_011940_04372.jpg
Dive Summary: Hot Fluid Sampling Dive on the 99 lava flow. Started in the vicinity of Mkr-N3 Vent . The original marker is gone to a new marker (Mkr-52) was deployed ~10m west of the N3 nav target at "West-N3". Deployed Mkr-69 on the mound above the pit (where N6 used to be at Cloud). West N3: 2 HFS; 1 SS for blue mat. Cloud: 3 HFS. Mkr-33: 5 HFS. Between Mkr-33 and Village: 1HFS background. Village: 3 HFS; 3 SS for blue mat and filamentous bacteria. Castle: 2 GTB; 2 HFS. Recovered 1 hobo from anhydrite chimney and deployed another in the same spot.
R857: Coquille and Mkr-113
Wet time (UTC): 9/27 1720 - 9/28 0302. JD:271-272. 9.7 hrs.
Bottom time (UTC): 9/27 1605 - 9/28 0357. JD: 271-272. 11.86 hrs. [15 samples]
DSC information: 89 DSCs taken starting with R857_DSC_092704_215221_04374.jpg and ending with R857_DSC_092804_031204_04462.jpg
Dive Summary: Fluid sampling and missing rumbleometer reconnaissance. Mkr-113: 3 HFS. Bag City: 4 HFS. Vixen: 3 HFS; 1 GTB; 2 hobos. Deployed 2 hobos in Vixen vent and Mkr-57 just off the mound at Vixen. Went to the 98 lava flow area and searched for the rumbleometer that has been missing since Aug 1998. Found it in 20 minutes. Got a good nav position and will return next year and try to recover it!

5.3 ROPOS SAMPLES

5.3.1 R852 Sample Log: Endeavour

Sample	Lat	Long	UTC	R852 Sample Description	PI	SubSmps
R852-HFS-2-0001	47.9476	-129.0983	05:40:34 Sep 20 04	HFS background sample with Sterivex filter-2. Z=2206m. Start=0541 Stop=0610. Tambient=2.0. Vol=3000ml. [East of Sully]	Butterfield	
R852-GTB-15-0002	47.9499	-129.0968	10:35:21 Sep 20 04	Gas tight bottle black (#15) fired at Hulk at 1038. Bottle fired successfully. Z=2193m. Heading 045. [Hulk]	Lilley	Evans
R852-GTB-6-0003	47.9499	-129.0968	10:37:48 Sep 20 04	Firing gas tight bottle blue (#6) at 1038. Bottle fired successfully. Z=2193m. Heading 045. [Hulk]	Lilley	Evans
R852-HFS-8-0004	47.9500	-129.0967	11:43:05 Sep 20 04	HFS unfiltered bag-8. Temp is holding steady. Start 1143 Stop 1147. Tmax=26 Tave=25 T2=11.1 Vol=712ml. Z=2192. NOTE: temperature cables for T1 and T2 are switched but temps logged with samples are corrected. [Hulk]	Butterfield	Bolton

Sample	Lat	Long	UTC	R852 Sample Description	PI	SubSmps
R852-HFS-7-0005	47.9500	-129.0967	11:48:36 Sep 20 04	HFS Sterivex filter-7. Start 1148 Stop 1158. Tmax=30 Tave=27 T2=12.8. Vol=1512ml. Z=2192. Took 2 digital images of the sampling location. Turned the flush pump off 20 seconds before the sample pump. [Hulk]	Butterfield	Bolton
R852-GTB-16-0006	47.9476	-129.0983	14:10:30 Sep 20 04	GTB orange sample (#16) in smoker near RTH T27. Stopped at 0211. Z=2201. [Bastille/Mkr-B]	Butterfield Lilley	Evans
R852-GTB-17-0007	47.9476	-129.0983	14:11:50 Sep 20 04	GTB yellow sample (#17). Stopped at 1411 - taken at same time as GTB-orange-0007. Z=2201m. [Bastille/Mkr-B]	Butterfield Lilley	Evans

5.3.2 R853 Sample Log: ASHES

Sample	Lat	Long	UTC	R853 Sample Description	PI	SubSmps
R853-HFS-24-0001	45.9334	-130.0133	16:43:37 Sep 21 04	HFS fractionated DNA filter #24. Start 1643 Stop 1713. Tave=2.2. Vol=3527 mls. Z=1515m. Filtered as we drove to Virgin and sitting as we imaged the RAS. Temp stayed fairly constant. [~30m SE of Virgin]	Butterfield	Bolton
R853-HFS-LV1-0002	45.9336	-130.0135	18:11:54 Sep 21 04	HFS large volume sample #1. Start 1811 Stop 1832. Tmax=25.2 Tave=21.2 s.d.=1.6 T2=14. Vol=3041 mls. Z=1546. Pump is slowing down as we sample. [Gollum]	Butterfield	
R853-HFS-11-0003	45.9336	-130.0135	18:33:26 Sep 21 04	HFS filtered bag #11. Start 1833 Stop 1838. Tmax=25.5 Tave=21.6 T2=13.5. Vol=692 ml. Z=1546. [Gollum]	Butterfield	
R853-HFS-2-0004	45.9336	-130.0135	18:40:13 Sep 21 04	HFS Sterivex filter #2. Start 1840 Stop 1849. Tmax=27.9 Tave=16.8 T2=14.0. Vol=1400 ml. Z=1546. ROPOS jerked off the vent. Fluid sampling interrupted.[Gollum]	Butterfield	Bolton
R853-HFS-7-0005	45.9336	-130.0135	18:53:46 Sep 21 04	HFS Sterivex filter #7. Heading 326. Start=1904 Stop=1934. Tmax=39.3 Tave=32.5 s.d.=3.4 T2=25. Vol=4015 mls. Re-positioned at Gollum. Attempting to get another large volume sample. Z=1546. [Gollum]	Butterfield	Bolton
R853-HFS-4-0006	45.9336	-130.0135	19:35:39 Sep 21 04	HFS Sterivex filter #4. Start 1935 Stop 1946. Tmax=39.7 Tave=37.7 s.d.=1.1 T2=26. Vol=1567 mls. Z=1546. [Gollum]	Butterfield	Bolton
R853-HFS-10-0007	45.9336	-130.0135	19:47:52 Sep 21 04	HFS Sterivex filter #10. Start 1947 Stop 1959. Tmax=39.7 Tave=37.3 T2=26. Vol=1608 mls. Z=1546. [Gollum]	Butterfield	Bolton
R853-HFS-20-0008	45.9336	-130.0135	20:01:30 Sep 21 04	HFS unfiltered Piston #20. Start 2001 Stop 2009. Tmax=39.4 Tave=37.2 s.d.=0.4 T2=26. Vol=~700 mls. Z=1546. [Gollum]	Butterfield	
R853-HFS-22-0009	45.9337	-130.0135	20:27:58 Sep 21 04	HFS unfiltered piston #22. Start 2028 Stop 2035. Tmax=74.4 Tave=68.2 s.d.=1.5 T2=44. Vol=~700 mls. Z=1546. [Marshmallow] Turned off the video.	Butterfield	Bolton
R853-HFS-21-0010	45.9337	-130.0135	20:36:52 Sep 21 04	HFS Sterivex #21. Start 2036 Stop 2056. Tmax=74 Tave=68.2 s.d.=2.2 T2=45. Vol=3000 mls. Z=1546. [Marshmallow] Took 1 digital image of sample intake.	Butterfield	Bolton
R853-HFS-18-0011	45.9336	-130.0135	20:57:36 Sep 21 04	HFS filtered bag #18. Start 2057 Stop 2102. Tmax=72.9 Tave=68.3 s.d.=2.3 T2=45. Vol=690 ml Z=1546. [Marshmallow]	Butterfield	

Sample	Lat	Long	UTC	R853 Sample Description	PI	SubSmps
R853-HFS-24-0001	45.9334	-130.0133	16:43:37 Sep 21 04	HFS fractionated DNA filter #24. Start 1643 Stop 1713. Tave=2.2. Vol=3527 mls. Z=1515m. Filtered as we drove to Virgin and sitting as we imaged the RAS. Temp stayed fairly constant. [~30m SE of Virgin]	Butterfield	Bolton
R853-GTB-10-0012	45.9337	-130.0134	22:30:54 Sep 21 04	GTB #10 (red) in the orifice. T=173. Z=1546. From the scraped off area. [Virgin]	Evans	Butterfield Lilley
R853-GTB-14-0013	45.9337	-130.0135	22:32:31 Sep 21 04	GTB #14. T=170. From the scraped off area. Z=1546. [Virgin]	Evans	Butterfield Lilley
R853-HFS-19-0014	45.9337	-130.0135	22:33:37 Sep 21 04	HFS Unfiltered bag #19. Start 2233 Stop 2236. Tmax=177.5 Tave=170.7 stdev=4 T2=130. Vol=425 ml. From the scraped off area. Z=1546. [Virgin]	Evans	Butterfield Lilley
R853-HFS-17-0015	45.9337	-130.0134	22:37:26 Sep 21 04	HFS filtered bag #17. Start 2237 Stop 2240. Tmax=166.1 Tave=163.6 T2=130. stdev=1.1. Vol=429 ml. Z=1546. From the scraped off area. [Virgin]	Butterfield	
R853-HFS-5-0016	45.9337	-130.0134	22:41:10 Sep 21 04	HFS piston #5. Start 2242 Stop 2246. Tmax=176.4 T2=144 Tave=170.4 stdev=1.4. Vol=350 ml. Z=1546. From the scraped off area. [Virgin]	Butterfield	
R853-HFS-8-0017	45.9336	-130.0140	23:48:04 Sep 21 04	HFS unfiltered bag #8. Start 2350 Stop 2352. Tmax=204 T2=70 Tave=190 stdev=22. Vol=444 ml. Z=1544. [Inferno]	Butterfield	
R853-GTB-16-0018	45.9336	-130.0140	23:53:26 Sep 21 04	GTB #16. Tmax=199C. Z=1544. [Inferno]	Evans	Butterfield Lilley
R853-HFS-14-0019	45.9336	-130.0139	23:54:40 Sep 21 04	HFS filtered bag #14. Start 2354 Stop 2258. Tmax=204.4 Tave=199.4 T2=20 stdev=1.9. Vol=600 ml. Z=1544. [Inferno]	Butterfield	
R853-SS-J5-0020	45.9336	-130.0140	00:04:40 Sep 22 04	Suction sample of limpets for Noreen into jar 5. She wants 500 limpets. Temperature is 5C (3-4 degrees above background temperature). Z=1544. [Inferno]	Kelley	
R853-HFS-16-0021	45.9333	-130.0142	00:44:44 Sep 22 04	HFS filtered bag #16. Start 0045 Stop 0049. Tmax=171.3 Tave=163.3 T2=133. Vol=659 ml. Z=1544m. Small spigot on the top of Hell chimney. Temperature stable. [Hell vent].	Butterfield	
R853-GTB-17-0022	45.9333	-130.0140	00:50:35 Sep 22 04	Gas-tight bottle #17 at 0051. Temperature 180. Right after last HFS sample. Z=1544. [Hell vent]. This turned out to be an empty; -ed.	Evans	Butterfield Lilley
R853-HFS-9-0023	45.9333	-130.0140	00:52:24 Sep 22 04	HFS unfiltered bag #9. Start 0052 Stop 0056. Tmax=195.1 Tavg=186.4 T2=126.4. Vol=650 ml. Z=1544m. Small spigot at top of chimney. Same as last sample [Hell vent].	Butterfield	
R853-SF-0024	45.9334	-130.0140	01:26:46 Sep 22 04	A piece of active sulfide into the purse for high pressure high temperature culturing. Z=1547.[Hell]	Bolton	
R853-BJ-0025	45.9333	-130.0137	01:33:06 Sep 22 04	Collected the Big Johnson from Crack. Can see bubbles flowing out of the hose once it was disconnected from the cement box. Z=1547.[Crack]	H P Johnson	

5.3.3 R854 Sample Log: ASHES

Sample	Lat	Long	UTC	R854 Sample Description	PI	SubSmps
R854-hobo-126-0001	45.9338	-130.0133	00:24:14 Sep 23 04	Recover hobo #126 after 1 year deployment. Z=1546. [Marshmallow]	Embley	
R854-SS-J1-0002	45.9333	-130.0140	01:08:17 Sep 23 04	Suction sample into jar #1. Suctioning blue mat. Start1=1315 Stop1=1315. Start2=1317 Stop2=1317. Z=1547. [Phoenix]	Kouris	

5.3.4 R855 Sample Log: Central Caldera to South Pillow Mound

Sample	Lat	Long	UTC	R855 Sample Description	PI	SubSmps
R855-MTR-3282-0001	45.9333	-129.9825	21:32:02 Sep 24 04	Recovering MTR-3282. This was right next to Amanda's limpet cage at the crack at Mkr-33. Z=1523. [Mkr-33]	Embley	
R855-MTR-3201-0002	45.9332	-129.9825	21:40:33 Sep 24 04	Recover MTR-3201 from the crack (north end) . Lots of floc and limpets on the instrument. Z=1523.[Mkr-33]	Embley	
R855-MTR-4001-0003	45.9332	-129.9825	21:58:28 Sep 24 04	Recovering MTR-4001 from the south end of the crack. Z=1523. [Mkr-33]	Embley	
R855-RK-0005	45.9332	-129.9825	22:37:38 Sep 24 04	Altered basalt from Mkr-33. Taken from the area of low flow and lots of fauna - at the south end of the crack Z=1523 [Mkr-33].	Butterfield	
R855-MTR-3049-0004	45.9332	-129.9825	22:17:37 Sep 24 04	Recovered MTR-3049 from the tubeworm bush north of Mkr-33. Z=1522. [Mkr-33 area]	Embley	
R855-MTR-3334-0006	45.9332	-129.9825	22:54:13 Sep 24 04	Recovered MTR-3334 (attached to 3176) from the pit. Z=1524. [Cloud]	Embley	
R855-MTR-3176-0007	45.9332	-129.9825	22:55:47 Sep 24 04	Recovered MTR 3176 (attached to MTR-3334) from the pit. Z=1524. [Cloud]	Embley	
R855-MTR-3173-0008	45.9334	-129.9817	23:06:27 Sep 24 04	Recovered the missing MTR from the hole!!! Has red tape on it. It was deployed on dive R674 in 2002. We couldn't find it in 2003. Less milky flow this year so it was visible. Z=1524.7. [Cloud]	Embley	
R855-cage-0009	45.9334	-129.9817	23:22:08 Sep 24 04	Recover Amanda's limpet cage - just off the flow near the crack. Z=1523.1.[Mkr-33]	Bates	

5.3.5 R856 Sample Log: 98 Lava Flow Area

Sample	Lat	Long	UTC	R856 Sample Description	PI	SubSmps
R856-HFS-5-0001	45.9438	-129.9852	17:02:31 Sep 26 04	HFS unfiltered piston #5. Start 1702 Stop 1705. Tmax=23.6 Tave=23.0 stdev=0.3 T2=17 Vol=750ml Z=1528m. Took 13 digital images of the sampling site. [West N3]	Butterfield	Bolton
R856-HFS-2-0002	45.9438	-129.9852	17:06:32 Sep 26 04	HFS Sterivex filter #2. Start 1706 Stop 1720. Tmax=24.9 Tave=24.4 stdev=0.3 T2=18 Vol=2000mls Z=1528m. Large cloud of floc coming out the exhaust of the fluid sampler at 1710. [West N3]	Butterfield	Bolton

Sample	Lat	Long	UTC	R856 Sample Description	PI	SubSmps
R856-SS-J2-0003	45.9438	-129.9852	17:34:53 Sep 26 04	Suction sampling of blue mat into jar #2. Sampled just above and to the left of where we did the temperature survey. Start 1738 Stop 1744 Talien=3.2. Z=1528.4. [West N3]	Kouris	
R856-HFS-4-0004	45.9333	-129.9817	19:24:56 Sep 26 04	HFS Sterivex filter #4. Start 1925 Stop 1937. Tmax=7.0 Tave=6.9 stdev=0.05 T2=5.9 Vol=1500ml. Z=1526m. Pump is slowing down a bit on this sample. Video off at 1931. [Cloud]	Butterfield	Bolton
R856-HFS-1-0005	45.9333	-129.9817	19:37:45 Sep 26 04	HFS 3micron filtered piston #1. Start 1937 Stop 1940. Tmax=7.0 Tave=6.9 stdev=0.03 T2=5.9 Vol=7.5ml Z=1526m. [Cloud]	Butterfield	Bolton
R856-HFS-8-0006	45.9333	-129.9817	19:41:35 Sep 26 04	HFS unfiltered bag #8. Start 1941 Stop 1946. Tmax=7.0 Tave=6.9 stdev=0.06 T2=5.9 Vol=700ml Z=1526m. [Cloud]	Butterfield	Bolton
R856-HFS-6-0007	45.9331	-129.9823	20:26:00 Sep 26 04	HFS unfiltered piston #6. Start 2027 Stop 2030. Tmax=21.7 Tave=19.8 stdev=0.76 T2=14. Vol=717ml. Z=1526m. [Marker 33]	Butterfield	Bolton
R856-HFS-7-0008	45.9331	-129.9823	20:31:43 Sep 26 04	HFS Sterivex filter #7. Start1 2031 Stop1 2033 Start2= 2034 Stop2 2046. Tmax=22.2 Tave=17.4 stdev=1.5 T2=13. Vol=1868ml. Z=1526m. Temperature is fluctuating a lot. [Marker 33]	Butterfield	Bolton
R856-HFS-11-0009	45.9331	-129.9823	20:49:33 Sep 26 04	HFS filtered bag #11. Start 2049 Stop 2055. Tmax=27.4 Tave=25.7 stdev=1.2 T2=18. Vol=750ml. Z=1526m. It stopped itself. The bag it too full. [Marker 33]	Butterfield	
R856-HFS-10-0010	45.9331	-129.9823	20:57:07 Sep 26 04	HFS Sterivex #10. Start1 2056 Stop1 2101 Start2 2102 Stop2 2105 Start3 2115 Stop3 2131. Tmax=34.5 Tave=20.4 stdev=5 T2=15-20. Vol=3029ml Z=1526. Large volume sample. Jerked out of the hole several times. [Mkr-33]	Butterfield	Huber
R856-HFS-24-0011	45.9331	-129.9823	21:33:37 Sep 26 04	HFS dual filter #24. Start 2135 Stop 2212. Tave=1.9 Vol=3932ml. During transit. Background plume sample. ~25m off the bottom. Z=1517.7. [Mkr-33 to Village]	Butterfield	Bolton
R856-HFS-22-0012	45.9261	-129.9805	23:16:21 Sep 26 04	HFS piston #22. Start 2316 Stop2320. Tmax=42.0 Tave=37 stdev=1.2 T2=26. Vol=630ml Z=1522. [Village]	Butterfield	Bolton
R856-HFS-21-0013	45.9261	-129.9805	23:21:38 Sep 26 04	HFS Sterivex #21. Start 1121 Stop1134. Tmax=50.1 Tave=40.3 stdev=2 T2=28. Vol=1839ml. Z=1522. Temp dropped but coming back up. We were jerked out of the vent. [Village]	Butterfield	Bolton
R856-HFS-17-0014	45.9261	-129.9805	23:40:19 Sep 26 04	HFS filtered bag #17. Start 2340 Stop2341. Tmax=52.1 Tave=44.2 stdev=4 T2=~30. Vol=707ml. Z=1522. [Village]	Butterfield	
R856-SS-J1-0015	45.9261	-129.9805	23:48:22 Sep 26 04	Suction sample into jar #1 for blue mat. Start 2353. Z=1522m. [Village]	Kouris	
R856-SS-J3-0016	45.9261	-129.9805	23:56:48 Sep 26 04	Suction sample into jar #3 for the white fuzzy stuff (probably white filamentous bacteria). Took several DSCs. Can see some in the jar - but not much. Z=1522. [Village]	Kouris	
R856-SS-J4-0017	45.9261	-129.9805	00:06:24 Sep 27 04	Suctioning blue mat into jar #4. Not much blue mat in the jar. After the dive found out there was nothing in the jar. Start 0011. Z=1521.5. [Village]	Kouris	

Sample	Lat	Long	UTC	R856 Sample Description	PI	SubSmps
R856-GTB-14-0018	45.9261	-129.9801	00:23:52 Sep 27 04	Popping GTB (white) (HIL-14). Leaving it open for at least 30 seconds. From the anhydrite chimney. Tmax=190. Z=1519.4. [Castle]	Evans	Butterfield Lilley
R856-HFS-18-0019	45.9261	-129.9801	00:25:12 Sep 27 04	HFS filtered bag #18. Start 0025. Stop 0026. Tmax=195 Tave=192 T2=119. Vol=300ml. Z=1520m. From the anhydrite chimney. [Castle]	Butterfield	
R856-GTB-10-0020	45.9261	-129.9801	00:25:37 Sep 27 04	GTB (HIL-10) Tmax=191. Leaving it open for at least 30 seconds. From the anhydrite chimney. Z=1519.5.[Castle]	Evans	Butterfield Lilley
R856-HFS-16-0021	45.9261	-129.9801	00:27:41 Sep 27 04	HFS filtered bag #16. Start 0026. Stop 0029. Tmax=197.9 Tave=192 stdev=2.5 T2=120. Vol=387ml. Z=1522. From the anhydrite chimney. [Castle]	Butterfield	
R856-hobo-151-0022	45.9261	-129.9801	00:46:32 Sep 27 04	Recovering hobo-151 from the anhydrite chimney. Measured temps of 197C from the chimney this year. Z=1519.3. [Castle]	Embley	

5.3.6 R857 Sample Log: Coquille and Mkr-113

Sample	Lat	Long	UTC	R857 Sample Description	PI	SubSmps
R857-HFS-18-0001	45.9227	-129.9883	18:03:22 Sep 27 04	HFS filtered bag #18. Start 1803 Stop 1806. Tmax=23.3 Tave=22.7 stdev=0.42 T2=16.9 Vol=502mls Z=1525m. [Marker 113]	Butterfield	
R857-HFS-20-0002	45.9227	-129.9883	18:07:10 Sep 27 04	HFS unfiltered piston #20. Start 1807 Stop 1810. Tmax=23.7 Tave=23.1 stdev=0.82 T2=16.8 Vol=654mls Z=1525m. [Marker 113]	Butterfield	Bolton
R857-HFS-21-0003	45.9227	-129.9883	18:11:30 Sep 27 04	HFS Sterivex filter #21. Start 1811 Stop 1827. Tmax=23.4 Tave=22.6 stdev=0.4 T2=17.1 Vol=2002mls Z=1525m. Temperature has been very steady. [Marker 113]	Butterfield	Bolton
R857-HFS-5-0004	45.9162	-129.9893	19:47:42 Sep 27 04	HFS unfiltered piston #5. Start 1950 Stop 1953. Tmax=18.0 Tave=17.4 stdev=0.25 T2=13 Vol=720mls Z=1536m. Took digital images of the sampling site. [Bag City]	Butterfield	Bolton
R857-HFS-12-0005	45.9162	-129.9893	19:54:06 Sep 27 04	HFS Sterivex filter #12. Start1 1954 Stop1 1956 Start2 1957 Stop2 2022 Start3 2029 Stop3 2032. Tmax=18.5 Tave=16.7 stdev=0.2 T2=13 Vol=3300mls Z=1536m. [Bag City]	Butterfield	Bolton
R857-HFS-9-0006	45.9163	-129.9893	20:32:45 Sep 27 04	HFS unfiltered bag #9. Start 2033 Stop 2036. Tmax=17.1 Tave=16.7 stdev=0.2 T2=12 Vol=600mls Z=1536m. [Bag City]	Butterfield	Bolton
R857-HFS-3-0007	45.9163	-129.9893	20:37:02 Sep 27 04	HFS Sterivex filter #3. Start 2038 Stop 2051. Tmax=17.2 Tave=16.5 stdev=1.45 T2=12 Vol=1430mls Z=1536m. [Bag City]	Butterfield	Bolton
R857-HFS-6-0008	45.9174	-129.9931	21:59:42 Sep 27 04	HFS piston #6. Start 2200. Stop2202. T2=173 Vol=348ml Z=1538m. Dave says this is the hottest he's ever seen T2 get. Cooling by 40-50C. [Vixen]	Butterfield	
R857-GTB-16-0009	45.9174	-129.9931	22:03:10 Sep 27 04	GTB-orange (HIL-16) T2=173. T1 is probably 50+ degrees higher than T2. Kept it open for 30 sec. Z=1537.5. [Vixen]	Evans	Butterfield Lilley

Sample	Lat	Long	UTC	R857 Sample Description	PI	SubSmpls
R857-HFS-11-0010	45.9174	-129.9931	22:04:51 Sep 27 04	HFS filtered bag #11. Start 2205 Stop 2206 . T1=182 (broken so probably 50+ degrees higher than this) T2=170 Vol=307ml Z=1537m. [Vixen]	Butterfield	
R857-HFS-14-0011	45.9174	-129.9930	22:07:12 Sep 27 04	HFS unfiltered bag #14. Start 2207. Stop 2209. Tmax=186 (broken so probably 50+ degrees higher than this) T2=170. Vol=300ml. Z=1537. Frame grabs of intake nozzle. [Vixen]	Butterfield	Bolton
R857-hobo-132-0012	45.9174	-129.9931	22:16:28 Sep 27 04	Recovering hobo-132. There are minerals (chalcopyrite) on the tip. Z=1537.3. [Vixen]	Embley	
R857-hobo-130-0013	45.9174	-129.9931	22:29:05 Sep 27 04	Recovering hobo-130. It's covered in bacterial floc. Chalcopyrite growing on the probe and the tip is blackened. Z=1537.2. [Vixen]	Embley	
R857-HFS-1-0014	45.9333	-130.0139	01:02:04 Sep 28 04	HFS 3 micron piston #1 Start 0102 Stop 0105 Tmax=240C (Dave still doesn't believe T1 is working correctly) T2=120C. Vol=428ml. Z=1543. [Hell]	Butterfield	
R857-GTB-17-0015	45.9333	-130.0139	01:02:38 Sep 28 04	GTB (blue) (HIL-17) at the spigot. Open for 10 sec. T2=115 and fluctuating. Tmax=231 (not sure it's working though). Fired at the peak of the T2. Z=1543.1.[Hell]	Evans	Butterfield Lilley

5.4 ROPOS DIVE LOGS

5.4.1 R852 Dive Log: Endeavour

R852: Endeavour
Wet time (UTC): 9/20 0539 - 9/20 1509. JD: 264. 9.5 hrs.
Bottom time (UTC): 9/20 0352 -9/20 1641. JD: 264. 12.85 hrs. [7 samples]
DSC information: 127 DSCs taken starting with R852_DSC_092004_062740_03758.jpg and ending with R852_DSC_092004_144829_03884.jpg
Dive Summary: Fluid sampling, materials testing, and instrument deploy and recover dive. Sully: deployed 1 RTH, recovered 1 RTH, 1 HFS, tested zirconium material. Hulk: deployed 1 RTH, recovered VEMCOs T3 and T4, 2 GTB, 2 HFS. Homer 23: recovered RTH. Bastille: deployed RTH (T27), 2 GTB.

UTC	Z(m)	Hdg	Lat	Long	R852 Comments	Samples	PI	FrGrab
03:52:48 Sep 20 04	0	169	47.9449	-129.0952	ROPOS is in the water.			
05:39:48 Sep 20 04	2207	257	47.9476	-129.0983	We're on the bottom.			
05:40:00 Sep 20 04	2210	175	47.9476	-129.0983	Dave wants a background water sample with a filter (Sterivex).			
05:40:34 Sep 20 04	2206	211	47.9476	-129.0983	HFS background sample with Sterivex filter-2. Z=2206m. Start=0541 Stop=0610. Tambient=2.0. Vol=3000ml. [East of Sully]	R852-HFS-2-0001	Butterfield	
05:44:23 Sep 20 04	2192	187	47.9476	-129.0983	Dead sulfide in front of us.			
05:46:08 Sep 20 04	2197	117	47.9476	-129.0983	On bottom east of Sully.			R852-001
05:47:10 Sep 20 04	2207	269	47.9476	-129.0983	Lasers are 10 cm apart. No navigation on this dive. Using Homer probes to find the experiments.			
05:48:54 Sep 20 04	2209	344	47.9476	-129.0983	Spinning in circles to set the compass.			
05:53:54 Sep 20 04	2210	217	47.9476	-129.0983	We're re-doing the spin.			
05:54:08 Sep 20 04	2211	292	47.9476	-129.0984	Bottom pic.			R852-002
05:58:31 Sep 20 04	2210	23	47.9476	-129.0984	The compass is calibrated. Score of 9 out of 9. ROPOS is trying to set offset on compass direction to match the terrain. Main fissure is at 020. Compass set to magnetic variation of 23.			
05:59:53 Sep 20 04	2210	44	47.9476	-129.0983	Bottom as Butterfield collects water.			R852-003
06:02:31 Sep 20 04	2211	248	47.9476	-129.0983	We're heading to the chimneys {Sully}. Dave is still collecting water. Trying to get 3 liters of water.			
06:03:27 Sep 20 04	2211	274	47.9476	-129.0983	Topography on the way to Sully. We're using the Homer to navigate.			R852-004
06:06:40 Sep 20 04	2193	257	47.9476	-129.0983	At Sully.			R852-005
06:06:41 Sep 20 04	2193	254	47.9476	-129.0983	We're at Sully. There's a marker and black smokers. Turning the tapes on.			
06:07:04 Sep 20 04	2192	330	47.9476	-129.0983	Smokers at Sully.			R852-006
06:07:37 Sep 20 04	2194	290	47.9476	-129.0983	We're putting the RTH {T27} down by the star marker at Sully.			
06:10:42 Sep 20 04	2196	253	47.9475	-129.0986	Placing of T27.			R852-007
06:11:27 Sep 20 04	2196	246	47.9475	-129.0986	In place.			R852-008

UTC	Z(m)	Hdg	Lat	Long	R852 Comments	Samples	PI	FrGrab
06:11:39 Sep 20 04	2194	249	47.9475	-129.0986	Finished placing pig near the vent. Looking around. Then we'll pick up the hydrophone and put it out of the way.			
06:12:10 Sep 20 04	2193	292	47.9475	-129.0986	Instrument near smoker.			R852-009
06:12:32 Sep 20 04	2193	271	47.9475	-129.0986	9 Digital images (DSC) of the new chimney at Sully. Sheryl may want to sample it.			
06:12:34 Sep 20 04	2193	268	47.9475	-129.0986	Smokers.			R852-010
06:13:08 Sep 20 04	2194	306	47.9475	-129.0986	Tube worms near smoker.			R852-011
06:16:42 Sep 20 04	2195	269	47.9475	-129.0986	We're testing the zirconium crystal. If it works it will be used in an optical device to test CO2.			
06:18:13 Sep 20 04	2196	253	47.9475	-129.0986	Testing experiment with the zirconium crystal.			R852-012
06:19:29 Sep 20 04	2196	258	47.9475	-129.0986	Putting instrument down to reposition grip.			R852-013
06:21:05 Sep 20 04	2194	312	47.9474	-129.0986	Smoker with instrument to right.			R852-014
06:21:28 Sep 20 04	2194	346	47.9474	-129.0986	The black smoke is spinning around.			
06:22:11 Sep 20 04	2194	353	47.9474	-129.0986	1 DSC.			
06:22:12 Sep 20 04	2194	349	47.9474	-129.0986	Instrument in flow.			R852-015
06:22:51 Sep 20 04	2194	0	47.9474	-129.0986	Marv is warming up the crystal to test it for thermal shock.			
06:25:58 Sep 20 04	2195	34	47.9474	-129.0986	Instrument in flow.			R852-016
06:27:11 Sep 20 04	2194	22	47.9474	-129.0986	We got pulled off the vent. Homer 23 was visible in the background briefly.			
06:28:09 Sep 20 04	2195	24	47.9474	-129.0986	Bottom near Mkr -23 - the marker on the homer probe.			R852-017
06:29:57 Sep 20 04	2194	20	47.9474	-129.0986	Still cooking the crystal.			
06:30:49 Sep 20 04	2195	25	47.9474	-129.0986	Switching hands.			R852-018
06:31:45 Sep 20 04	2195	329	47.9474	-129.0986	The crystal was passed from the 5 function to the 7 function to get a better grip on it. 2 DSC images.			
06:32:06 Sep 20 04	2195	2	47.9474	-129.0986	Sully shot.			R852-019
06:35:52 Sep 20 04	2195	5	47.9474	-129.0986	1 DSC. Moving files.			
06:36:33 Sep 20 04	2195	0	47.9474	-129.0986	Crystal material test.			R852-020
06:37:08 Sep 20 04	2194	0	47.9474	-129.0986	Still testing the crystal.			
06:38:53 Sep 20 04	2195	359	47.9474	-129.0986	The crystal test is out of the smoker. Cooling it off right now.			
06:39:48 Sep 20 04	2194	337	47.9474	-129.0986	Finished with the crystal materials test and putting it away. The zirconium crystal is embedded in alumina.			
06:41:29 Sep 20 04	2196	219	47.9475	-129.0986	It's going back in the holster (the yellow thing).			
06:41:43 Sep 20 04	2196	223	47.9475	-129.0985	Putting instrument (a materials test for sensors to go in high temp vents) back in the holster. Zirconium oxide material surrounded by alumina was tested. These will be used in the CO2 probe.			R852-021
06:45:10 Sep 20 04	2196	222	47.9475	-129.0985	PIG in distance.			R852-022
06:45:35 Sep 20 04	2195	301	47.9475	-129.0986	Hydrophone pig.			R852-023

UTC	Z(m)	Hdg	Lat	Long	R852 Comments	Samples	PI	FrGrab
06:45:37 Sep 20 04	2194	296	47.9475	-129.0986	Switching to the DVCam to component input (without the overlay). Also taking 5 DSC's.			
06:47:07 Sep 20 04	2195	250	47.9475	-129.0986	Transponder to be picked up.			R852-024
06:48:45 Sep 20 04	2195	268	47.9475	-129.0986	Switching the video back to composite (with overlay).			
06:49:42 Sep 20 04	2195	276	47.9475	-129.0986	Holding on to one side of the pig. Will use the other arm to pull off the wand that goes into the vent.			
06:50:55 Sep 20 04	2195	273	47.9475	-129.0986	Positioning other arm to grab instrument (the pig wand).			R852-025
06:53:11 Sep 20 04	2195	273	47.9475	-129.0986	Got it.			R852-026
06:53:13 Sep 20 04	2195	274	47.9475	-129.0986	Picking up the resistivity wand which will go into the vent. 1 DSC.			
06:58:04 Sep 20 04	2195	272	47.9475	-129.0986	The hand off.			R852-027
07:02:07 Sep 20 04	2195	271	47.9475	-129.0986	Switching the wand from the 7 function to the 5 function arm (another hand off).			
07:02:31 Sep 20 04	2195	272	47.9475	-129.0986	Another hand-off.			R852-028
07:03:03 Sep 20 04	2195	264	47.9475	-129.0986	Attempting to place the pig wand in the vent orifice.			
07:03:29 Sep 20 04	2195	263	47.9475	-129.0986	Positioning at another orifice.			R852-029
07:03:52 Sep 20 04	2195	244	47.9475	-129.0986	Moving 9 DSC images.			
07:04:54 Sep 20 04	2195	243	47.9475	-129.0986	Trying to keep the wand in the smoke (not in and out) while attempting to place the wand in the orifice.			
07:04:55 Sep 20 04	2195	247	47.9475	-129.0986	Placing the probe.			R852-030
07:06:46 Sep 20 04	2195	241	47.9475	-129.0986	The probe is in the orifice.			
07:07:00 Sep 20 04	2195	242	47.9475	-129.0986	Switching to component video (no overlay).			
07:07:25 Sep 20 04	2195	239	47.9475	-129.0986	Probe fell...repositioning.			R852-031
07:07:28 Sep 20 04	2195	239	47.9475	-129.0986	The probe tipped on its side. Attempting to reposition the probe.			
07:09:24 Sep 20 04	2195	239	47.9475	-129.0986	Grabbing with star marker in background.			R852-032
07:13:34 Sep 20 04	2195	244	47.9475	-129.0986	Lift ing the intake up a bit to rotate it to vertical. Trying to keep the tip in the flow.			
07:15:25 Sep 20 04	2195	242	47.9475	-129.0986	Turned the overlay back on the video.			
07:16:50 Sep 20 04	2195	243	47.9475	-129.0986	Looking for smoke coming out the exhaust hole in the probe to make sure it is in the flow.			
07:16:52 Sep 20 04	2195	243	47.9475	-129.0986	Attempting to place probe again.			R852-033
07:18:45 Sep 20 04	2195	243	47.9475	-129.0986	Intake lifted out again. May have to change the angle a bit to get it to sit down in the hole all the way.			
07:24:31 Sep 20 04	2195	241	47.9475	-129.0986	Let go of the intake when it was solidly in the flow. Looks like it may be pretty well situated. Check the ICL to see how the temperature looks.			
07:24:39 Sep 20 04	2195	242	47.9475	-129.0986	Probe in place.			R852-034
07:26:16 Sep 20 04	2194	241	47.9475	-129.0986	Two orifices smoking on Sully.			R852-035
07:26:27 Sep 20 04	2194	250	47.9475	-129.0986	We're going to check the temperature with his ICL link.			

UTC	Z(m)	Hdg	Lat	Long	R852 Comments	Samples	PI	FrGrab
07:28:53 Sep 20 04	2192	169	47.9476	-129.0986	The RTH instrument has an ICL (inductively coupled link) set to read every 20 minutes. We're hoping to get the ICL loop on there and pick up a measurement. We'll have to wait until 0747 to do the reading. It takes a reading every 20 minutes.			
07:30:00 Sep 20 04	2195	113	47.9476	-129.0986	View of RTH.			R852-036
07:31:10 Sep 20 04	2195	157	47.9476	-129.0986	ICL is red circular instrument. That will go on top of the cone on the pig.			R852-037
07:35:37 Sep 20 04	2195	156	47.9476	-129.0986	This main Endeavour field is 500 m long and divided into 2 halves. This is the southern half of the field.			
07:37:29 Sep 20 04	2195	161	47.9476	-129.0986	ICL is on.			R852-038
07:37:42 Sep 20 04	2196	165	47.9476	-129.0986	We're on the cone but have to wait for 10 minutes for it to take a reading.			
07:40:23 Sep 20 04	2196	164	47.9476	-129.0986	For at least a decade this was just bare sulfide with black smokers and no animals. After the earthquake in 1999 the temp dropped; H2S decreased and the animals appeared. There is a lush tubeworm community here now.			
07:45:20 Sep 20 04	2195	165	47.9476	-129.0986	9 DSC files moved.			
07:46:33 Sep 20 04	2196	166	47.9476	-129.0986	Temp is 369.6. Got the reading.			
07:47:05 Sep 20 04	2195	166	47.9476	-129.0986	Removing the ICL from the cone and returning it to the ROV. The instrument (pig) is in place and working. Next we'll recover the hydrophone and take it to the elevator - then we'll head north to Hulk.			
07:51:00 Sep 20 04	2195	174	47.9476	-129.0986	We're going to take some digitals of this site.			
07:51:30 Sep 20 04	2195	172	47.9476	-129.0986	Sully.			R852-039
07:51:39 Sep 20 04	2195	183	47.9476	-129.0986	Sully with instruments deployed.			R852-040
07:52:51 Sep 20 04	2195	263	47.9476	-129.0986	Sully with the pig hydrophone and the wand from the new pig in the center of the frame.			R852-041
07:53:36 Sep 20 04	2195	17	47.9476	-129.0986	The hydrophone pig on the top of Sully.			R852-042
07:54:08 Sep 20 04	2195	3	47.9476	-129.0986	Took 7 digital images of the instrument placement as we flew around Sully.			
07:54:54 Sep 20 04	2195	4	47.9476	-129.0986	Picking up the hydrophone pig. It's going to the elevator and coming home. It's been down there 2.5 weeks. There's bacterial mat growing on it.			
07:57:25 Sep 20 04	2196	302	47.9476	-129.0986	We're on our way to the elevator - ~150m to the NE.			
08:00:26 Sep 20 04	2186	67	47.9479	-129.0982	Moving the ship.			
08:03:03 Sep 20 04	2178	56	47.9479	-129.0982	Stop the video at 0803. On our way to the elevator.			
08:40:52 Sep 20 04	2214	54	47.9483	-129.0960	Back on the bottom again - searching for the elevator.			
08:42:01 Sep 20 04	2208	78	47.9484	-129.0960	We're off the bottom again - trying to find the elevator with the homer beacon. 77 meters away...			
08:44:42 Sep 20 04	2220	177	47.9479	-129.0959	We found the elevator!!			
08:44:42 Sep 20 04	2220	177	47.9479	-129.0959	Elevator in sight.			R852-043

UTC	Z(m)	Hdg	Lat	Long	R852 Comments	Samples	PI	FrGrab
08:48:04 Sep 20 04	2221	348	47.9477	-129.0959	Need to strap the hydrophone into the elevator so that it doesn't fall out when it reaches the surface.			
08:53:13 Sep 20 04	2221	114	47.9478	-129.0959	Placing instrument on elevator.			R852-044
08:59:31 Sep 20 04	2221	113	47.9478	-129.0959	Trying to get the hydrophone in a stable position on the elevator.			
09:02:06 Sep 20 04	2222	110	47.9478	-129.0959	Hydrophone is on the elevator. Pulling the net up over the instrument to secure it down.			
09:03:20 Sep 20 04	2222	115	47.9478	-129.0959	Securing the hydrophone.			R852-045
09:05:31 Sep 20 04	2222	113	47.9478	-129.0959	Hydrophone is secured on the elevator.			
09:06:56 Sep 20 04	2221	208	47.9478	-129.0959	Took 5 digital images of the imploded float and the instruments on the elevator.			
09:07:11 Sep 20 04	2221	220	47.9478	-129.0959	The elevator.			R852-046
09:08:43 Sep 20 04	2216	173	47.9478	-129.0959	Heading to Hulk (Homer #15) to place another RTH sensor.			
09:31:01 Sep 20 04	2137	345	47.9479	-129.0958	Ship is in position. ROPOS is heading to the bottom.			
09:32:46 Sep 20 04	2162	8	47.9479	-129.0958	Homer 15 is on the SW corner of Hulk.			
09:36:11 Sep 20 04	2218	333	47.9485	-129.0960	We are back on the bottom about 45 meters from Homer 15.			
09:38:17 Sep 20 04	2213	278	47.9502	-129.0968	Checking out the bottom.			R852-047
09:38:36 Sep 20 04	2211	245	47.9502	-129.0968	We have come to a large wall and lost the Homer signal. Need to get above it to hear the Homer.			
09:42:02 Sep 20 04	2199	216	47.9502	-129.0971	We may be passing Hulk on the north side of it. Homer range was not changing as we headed west so it may be to the south of us.			
09:44:24 Sep 20 04	2201	148	47.9499	-129.0971	Coming up off the bottom a little to avoid some of the signal bounces from the Homer.			
09:46:52 Sep 20 04	2205	102	47.9498	-129.0969	Still homing in on the Homer.			
09:47:05 Sep 20 04	2206	96	47.9498	-129.0969	Searching around Homer.			R852-048
09:47:10 Sep 20 04	2205	102	47.9498	-129.0969	Found marker H on Hulk.			
09:48:34 Sep 20 04	2194	117	47.9499	-129.0968	Looking for a couple markers up on top the structure.			
09:53:27 Sep 20 04	2202	179	47.9499	-129.0968	Found the RAS. The RTH sensor is NE of here at about 2192 meters depth.			
09:53:28 Sep 20 04	2202	183	47.9499	-129.0968	The RAS is in site.			R852-049
09:55:29 Sep 20 04	2191	53	47.9499	-129.0968	Found the RTH on Hulk. Need to ream out the orifice and take some gas tight samples before deploying the intake. Highlight video is on.			
09:55:32 Sep 20 04	2191	63	47.9499	-129.0968	Vent with RTH sensor.			R852-050
09:56:06 Sep 20 04	2191	95	47.9499	-129.0968	Vent close-up.			R852-051
09:58:28 Sep 20 04	2192	49	47.9499	-129.0968	Removing the reamer.			R852-052
10:00:18 Sep 20 04	2192	50	47.9499	-129.0968	Grabbed the reamer to open up the orifice a bit. Need to determine if this is a good location for the deployment.			
10:01:28 Sep 20 04	2192	48	47.9499	-129.0968	Reaming out the opening.			R852-053

UTC	Z(m)	Hdg	Lat	Long	R852 Comments	Samples	PI	FrGrab
10:03:21 Sep 20 04	2192	46	47.9499	-129.0968	Going to swing around and look at the other side of the orifice. Still not sure if this is a good location.			
10:03:59 Sep 20 04	2192	113	47.9499	-129.0968	Series of small vents we tried to ream out.			R852-054
10:06:01 Sep 20 04	2191	174	47.9499	-129.0968	Orifice that we reamed out probably will not work. There are several little openings on this pinnacle that may work. Try to ream out a couple more to find one that will work.			
10:10:05 Sep 20 04	2192	167	47.9499	-129.0968	Trying the reamer in another opening.			
10:12:41 Sep 20 04	2192	116	47.9499	-129.0968	None of these openings will work. We were unable to ream them out so they are not deep enough to deploy the intake into.			
10:14:59 Sep 20 04	2192	45	47.9499	-129.0968	Looking for another potential orifice near where the pig is already located.			
10:16:46 Sep 20 04	2192	52	47.9499	-129.0968	Trying the reamer in some small chimlets behind the pig.			
10:17:08 Sep 20 04	2192	53	47.9499	-129.0968	Trying another spot.			R852-055
10:20:22 Sep 20 04	2192	46	47.9499	-129.0968	This hole may work. Try to deploy the intake in this one.			
10:23:25 Sep 20 04	2192	33	47.9499	-129.0968	Stowing the reamer. We will take gas tight samples before deploying the intake wand.			
10:25:07 Sep 20 04	2192	37	47.9499	-129.0968	Transferred the reamer to the 7 function arm to stow it.			
10:25:49 Sep 20 04	2192	38	47.9499	-129.0968	Preparing to take gas tight sample.			R852-056
10:26:28 Sep 20 04	2192	39	47.9499	-129.0968	Releasing the intake for the gas tight bottles.			
10:31:18 Sep 20 04	2192	31	47.9499	-129.0968	Preparing to take gas tight sample.			
10:31:48 Sep 20 04	2192	46	47.9499	-129.0968	Positioning gas tight for sample.			R852-057
10:34:11 Sep 20 04	2192	46	47.9499	-129.0968	Trying to get the gas tight intake in a good position.			
10:34:49 Sep 20 04	2192	47	47.9499	-129.0968	Arm is locked off in sampling position.			
10:34:52 Sep 20 04	2192	44	47.9499	-129.0968	Gas tight sampling.			R852-058
10:35:21 Sep 20 04	2192	43	47.9499	-129.0968	Gas tight bottle black (#3) fired at Hulk at 1038. Bottle fired successfully. Z=2193m. Heading 045. [Hulk]	R852-GTB-3-0002	Lilley	
10:37:48 Sep 20 04	2192	44	47.9499	-129.0968	Firing gas tight bottle blue (#1) at 1038. Bottle fired successfully. Z=2193m. Heading 045. [Hulk]	R852-GTB-1-0003	Lilley	
10:39:53 Sep 20 04	2192	43	47.9499	-129.0968	Done with gas tight sampling. Now we will deploy the RTH intake in the orifice.			
10:45:34 Sep 20 04	2192	61	47.9499	-129.0968	Breaking off a small piece of sulfide so we can see to pull the release pin on the intake wand.			
10:48:08 Sep 20 04	2192	60	47.9499	-129.0968	May need to slightly reposition the pig. It is sitting too close to hot flow.			
10:50:17 Sep 20 04	2192	59	47.9499	-129.0968	Picked up the pig and moved it slightly away from the hot flow.			
10:55:53 Sep 20 04	2192	37	47.9499	-129.0968	Picking up the intake wand.			
10:55:59 Sep 20 04	2192	32	47.9499	-129.0968	Grabbing intake line.			R852-059
10:59:33 Sep 20 04	2192	41	47.9499	-129.0968	Inserting wand into hole.			R852-060

UTC	Z(m)	Hdg	Lat	Long	R852 Comments	Samples	PI	FrGrab
11:00:20 Sep 20 04	2193	43	47.9499	-129.0968	Intake is down in the orifice. Intake fell a bit when they let go but there is still hot water coming from the exhaust pipe.			
11:01:58 Sep 20 04	2193	44	47.9499	-129.0968	Tapping the intake wand down in a bit. Looks good. Should be a transmission in 4 minutes so we will take an ICL reading.			
11:02:17 Sep 20 04	2193	40	47.9499	-129.0968	Intake wand in hole.			R852-061
11:05:25 Sep 20 04	2192	42	47.9499	-129.0968	Changed the highlight tape.			
11:06:11 Sep 20 04	2193	42	47.9499	-129.0968	Moved 8 DSC files of the RTH sensor at Hulk.			
11:07:37 Sep 20 04	2193	36	47.9501	-129.0966	Switched off overlay on highlight tape.			
11:09:02 Sep 20 04	2192	20	47.9501	-129.0966	Repositioning the sub to go take the ICL reading. We missed the 1106 transmission so will have to wait until 1126.			
11:15:07 Sep 20 04	2192	156	47.9501	-129.0967	Picking up the reamer to get it out of the way to remove the ICL.			
11:18:18 Sep 20 04	2192	157	47.9502	-129.0966	Trying to break the rubber band on the ICL so it will move easier.			
11:20:35 Sep 20 04	2192	158	47.9502	-129.0966	ICL is on the sensor cone. Waiting for the next transmission.			
11:20:51 Sep 20 04	2192	158	47.9501	-129.0966	ICL loop in place for transmission.			R852-062
11:27:20 Sep 20 04	2192	156	47.9501	-129.0967	ICL moved a bit and we may have missed the transmission. Not enough time to wait for the next one. Stowing the ICL and moving on.			
11:30:42 Sep 20 04	2192	154	47.9500	-129.0967	ICL and reamer are stowed. Moving around to the other side to pick up a pair of VEMCOs. Took 3 digital images of the RTH as we pulled away.			
11:33:19 Sep 20 04	2192	324	47.9500	-129.0967	Marker T4.			R852-063
11:33:55 Sep 20 04	2192	344	47.9499	-129.0967	We will take some water samples at the T4 VEMCO before removing it from the orifice.			
11:34:57 Sep 20 04	2192	346	47.9500	-129.0967	Turned the overlay back on the highlight video.			
11:38:13 Sep 20 04	2192	336	47.9500	-129.0967	Releasing the bungee from the fluid sampler intake and removing it for sampling.			
11:41:53 Sep 20 04	2192	336	47.9500	-129.0967	Placing HFS intake down along the line from the VEMCO and monitoring the temperature.			
11:41:53 Sep 20 04	2192	336	47.9500	-129.0967	Monitoring temperature with HFS.			R852-064
11:42:45 Sep 20 04	2192	336	47.9500	-129.0967	Locking off the arm for sampling.			
11:43:05 Sep 20 04	2192	337	47.9500	-129.0967	HFS unfiltered bag-8. Temp is holding steady. Start 1143 Stop 1147. Tmax=26 Tave=25 T2=11.1 Vol=712ml. Z=2192. NOTE: temperature cables for T1 and T2 are switched but temps logged with samples are corrected. [Hulk]	R852-HFS-8-0004	Butterfield	
11:47:02 Sep 20 04	2192	338	47.9500	-129.0967	Fluid sampler exhaust looks good.			
11:48:36 Sep 20 04	2192	337	47.9500	-129.0967	HFS Sterivex filter-7. Start 1148 Stop 1158. Tmax=30 Tave=27 T2=12.8. Vol=1512ml. Z=2192. Took 2 digital images of the sampling location. Turned the flush pump off 20 seconds before the sample pump. [Hulk]	R852-HFS-7-0005	Butterfield	
11:58:20 Sep 20 04	2192	332	47.9501	-129.0967	Removing VEMCO from hole.			R852-065

UTC	Z(m)	Hdg	Lat	Long	R852 Comments	Samples	PI	FrGrab
11:59:13 Sep 20 04	2190	232	47.9501	-129.0967	Finished fluid sampling at this VEMCO (#T4) and recovered it. Going down to the other VEMCO to take fluids there as well.			
12:02:47 Sep 20 04	2203	221	47.9501	-129.0967	We seem to have picked up a lot of worms in the HFS intake tip. Trying to run the flush pump in reverse to spit them back out.			
12:04:24 Sep 20 04	2181	123	47.9501	-129.0966	Tether looks like it is tangled. Going up to the cage to fix it.			
12:12:25 Sep 20 04	2208	270	47.9501	-129.0967	Back on the bottom 30 meters from Hulk.			
12:15:06 Sep 20 04	2205	258	47.9501	-129.0967	We are at the RAS at Hulk.			
12:16:05 Sep 20 04	2208	244	47.9501	-129.0967	Location of marker T3.			R852-066
12:16:23 Sep 20 04	2208	239	47.9501	-129.0967	Fluid sampler controller has frozen up. Cycling power to the sampler.			
12:18:02 Sep 20 04	2208	226	47.9501	-129.0967	Trying to scrape the worms off the HFS intake before we do more sampling.			
12:18:38 Sep 20 04	2208	223	47.9501	-129.0966	Fluid sampler is not booting back up. Try cycling the power one more time.			
12:21:44 Sep 20 04	2208	222	47.9501	-129.0967	Fluid sampler not responding. Going to retrieve VEMCO.			
12:25:25 Sep 20 04	2208	223	47.9501	-129.0967	Removing VEMCO.			R852-067
12:25:52 Sep 20 04	2208	215	47.9501	-129.0967	Area where VEMCO was removed.			R852-068
12:27:27 Sep 20 04	2203	313	47.9501	-129.0967	T3 retrieved. Heading back to elevator to drop off VEMCOs.			
12:28:27 Sep 20 04	2196	133	47.9501	-129.0967	Video stopped.			
12:28:43 Sep 20 04	2192	138	47.9501	-129.0967	Fluid sampler is kaput. Pumps and valves stopped working.			
12:29:45 Sep 20 04	2167	120	47.9501	-129.0967	13 DSC pictures moved over.			
12:52:48 Sep 20 04	2224	147	47.9482	-129.0963	At elevator; attempting to drop VEMCOs in.			
12:55:50 Sep 20 04	2222	176	47.9480	-129.0963	VEMCOs T3 and T4 are in the elevator.			
12:55:58 Sep 20 04	2222	192	47.9480	-129.0963	VEMCOs on elevator.			R852-069
13:00:18 Sep 20 04	2223	89	47.9477	-129.0962	Securing pig in elevator.			
13:06:34 Sep 20 04	2223	249	47.9477	-129.0962	Grabbed weight from elevator to ballast ROPOS.			
13:12:02 Sep 20 04	2159	357	47.9477	-129.0963	Moving ship back to the position we started the dive at.			
13:27:48 Sep 20 04	2201	232	47.9476	-129.0984	On bottom looking for Homer 23.			
13:31:13 Sep 20 04	2197	222	47.9476	-129.0983	Homer 23 in sight!			
13:32:44 Sep 20 04	2194	201	47.9476	-129.0984	Arrive at Homer 23.			R852-070
13:33:02 Sep 20 04	2197	179	47.9476	-129.0983	Spider crab.			R852-071
13:33:21 Sep 20 04	2196	252	47.9476	-129.0983	Video on.			
13:33:46 Sep 20 04	2197	264	47.9476	-129.0983	Found RTH.			R852-072
13:33:53 Sep 20 04	2197	270	47.9476	-129.0983	Pig in sight; maneuvering to pick up.			
13:34:05 Sep 20 04	2197	268	47.9476	-129.0983	Retrieving RTH at Homer 23.			R852-073
13:34:46 Sep 20 04	2198	254	47.9476	-129.0983	Retrieving RTH.			R852-074

UTC	Z(m)	Hdg	Lat	Long	R852 Comments	Samples	PI	FrGrab
13:36:47 Sep 20 04	2198	7	47.9476	-129.0983	Transiting to Bastille with the RTH to position it there instead of Salut since we are running out of time.			
13:38:25 Sep 20 04	2190	285	47.9476	-129.0983	Turning west at Tara.			
13:39:31 Sep 20 04	2197	347	47.9476	-129.0983	In sight of a smoker near Mkr-B.			
13:40:37 Sep 20 04	2200	39	47.9476	-129.0983	Black smoker chimney.			R852-075
13:40:55 Sep 20 04	2200	38	47.9476	-129.0983	Attempting to knock over chimney and put the RTH in its place.			
13:41:12 Sep 20 04	2200	35	47.9476	-129.0983	Black smoker chimney.			R852-076
13:41:36 Sep 20 04	2201	26	47.9476	-129.0983	Chimney down!			
13:41:39 Sep 20 04	2201	28	47.9476	-129.0983	Black smoker after chimney knocked down.			R852-077
13:43:31 Sep 20 04	2201	25	47.9476	-129.0983	Placing RTH T27 where the chimney was.			
13:46:10 Sep 20 04	2201	63	47.9476	-129.0983	Placing RTH T27.			R852-078
13:47:04 Sep 20 04	2201	50	47.9476	-129.0983	The pig (T27) is in place! At Mkr-B just east of a smoker.			
13:47:12 Sep 20 04	2201	51	47.9476	-129.0983	Pig in place.			R852-079
13:47:20 Sep 20 04	2201	26	47.9476	-129.0983	Pig in place zoomed out.			R852-080
13:52:26 Sep 20 04	2201	337	47.9476	-129.0984	Trying to break rubber band holding line onto pig. Not working so far.			
13:55:15 Sep 20 04	2201	347	47.9476	-129.0983	Repositioning pig.			R852-081
13:55:44 Sep 20 04	2201	342	47.9476	-129.0983	Got the wand. Repositioning pig.			
13:59:42 Sep 20 04	2201	328	47.9476	-129.0983	Pig in final position.			R852-082
14:02:04 Sep 20 04	2201	324	47.9476	-129.0983	Wand released and being repositioned into the flow.			
14:03:22 Sep 20 04	2201	57	47.9476	-129.0983	Pig in final position zoomed out.			R852-083
14:05:59 Sep 20 04	2201	76	47.9476	-129.0983	Unholstering wand to take gas tight sample.			
14:08:47 Sep 20 04	2201	74	47.9476	-129.0983	Gas tight sampling.			R852-084
14:10:30 Sep 20 04	2201	72	47.9476	-129.0983	GTB orange sample (#?) in smoker near RTH T27. Stopped at 0211. Z=2201. [Bastille/Mkr-B]	R852-GTB-orange-0006	Butterfield/Lilley	
14:10:30 Sep 20 04	2201	72	47.9476	-129.0983	Gas sampling wand in place.			R852-085
14:11:50 Sep 20 04	2201	74	47.9476	-129.0983	GTB yellow sample (#?). Stopped at 1411 - taken at same time as GTB-orange-0007. Z=2201m. [Bastille/Mkr-B]	R852-GTB-yellow-0007	Butterfield/Lilley	
14:14:09 Sep 20 04	2201	72	47.9476	-129.0983	Gas tight wand is stowed and now we'll try to reposition the sampling wand of the pig.			
14:22:51 Sep 20 04	2201	73	47.9476	-129.0983	Putting wand into orifice.			
14:23:21 Sep 20 04	2201	70	47.9476	-129.0983	Attempting to place pig wand.			R852-086
14:24:33 Sep 20 04	2201	71	47.9476	-129.0983	Wand is secured in the vent.			
14:25:25 Sep 20 04	2201	88	47.9476	-129.0983	Pig wand in place.			R852-087
14:26:14 Sep 20 04	2201	120	47.9476	-129.0983	Pig wand in place.			R852-088

UTC	Z(m)	Hdg	Lat	Long	R852 Comments	Samples	PI	FrGrab
14:26:21 Sep 20 04	2200	118	47.9476	-129.0983	Taking pictures as we back away.			
14:27:11 Sep 20 04	2200	50	47.9476	-129.0983	Pig placement view.			R852-089
14:27:14 Sep 20 04	2201	50	47.9476	-129.0983	We're headed to the elevator.			
14:27:51 Sep 20 04	2197	157	47.9476	-129.0983	Video off (tape 2). Enroute to elevator.			
14:28:50 Sep 20 04	2194	120	47.9476	-129.0983	There's the homer on Sully.			
14:30:05 Sep 20 04	2196	178	47.9476	-129.0983	Pig placement zoomed out.			R852-090
14:30:18 Sep 20 04	2195	164	47.9476	-129.0983	DCS picture of homer and tape turned back on without overlay.			
14:31:24 Sep 20 04	2172	39	47.9476	-129.0983	Moving ship back toward elevator.			
14:31:47 Sep 20 04	2164	9	47.9476	-129.0983	Video off once again (tape 2). ROV off bottom.			
14:57:09 Sep 20 04	2217	56	47.9477	-129.0963	Elevator in sight!			
14:59:34 Sep 20 04	2222	11	47.9477	-129.0963	At elevator securing gear in order to release the elevator.			
15:00:25 Sep 20 04	2223	34	47.9477	-129.0963				R852-091
15:00:49 Sep 20 04	2222	47	47.9477	-129.0963	Video on/overlay is off.			
15:03:26 Sep 20 04	2223	336	47.9477	-129.0963				R852-092
15:08:14 Sep 20 04	2226	359	47.9477	-129.0963	Elevator is released.			
15:08:50 Sep 20 04	2225	355	47.9477	-129.0962	End of dive. ROPOS is headed back on deck.			
15:09:15 Sep 20 04	2219	359	47.9477	-129.0962	Video stopped.			
15:09:31 Sep 20 04	2216	358	47.9477	-129.0963	ROPOS is off the bottom.			
15:12:53 Sep 20 04	2173	231	47.9476	-129.0963	Trying to stow fluid sampler wand better. Heading up to the cage.			
16:16:20 Sep 20 04	638	333	47.9451	-129.0873	The elevator is at the surface.			
16:34:37 Sep 20 04	130	131	47.9449	-129.0871	The elevator is at the surface. We're going to put the vehicle on deck first so that the ship can maneuver to recover the elevator.			
16:38:53 Sep 20 04	1	98	47.9449	-129.0872	ROPOS at the surface.			
16:41:16 Sep 20 04	1	120	47.9450	-129.0874	ROPOS on deck. End of dive.			

5.4.2 R853 Dive Log

R853: ASHES
Wet time (UTC): 9/21 1647 - 9/22 0140. JD: 265-266. 8.88 hrs.
Bottom time (UTC): 9/21 1526 - 9/22 0236. JD: 265-266. 11.17 hrs. [25 samples]
DSC information: 124 DSCs taken starting with R853_DSC_092104_171407_03885.jpg and ending with R853_DSC_092204_015609_04008.jpg
Dive Summary: Fluid sampling at ASHES. Background water sample SE of Virgin. Gollum: 7 HFS. Marshmallow: 3 HFS. Virgin: 2 GTB; 3 HFS. Inferno: 2 HFS; 1 GTB; 1 SS (limpets). Hell: 2 HFS; 1 GTB; 1 SF (for high P high T culturing). Crack: recovered Big Johnson. Also looked at the 2003 RAS at Virgin. Removed the funnel and temp probe from the vent and stored it on the RAS for recovery in the morning.

UTC	Z(m)	Hdg	Lat	Long	R853 Comments	Sample	PI	FrGrab
01:18:36 Sep 21 04	1	67	46.8864	-130.7960	1525 UTC - ROPOS is off the deck. (Serial driver not working. disregard auto information)			
01:18:36 Sep 21 04	1	67	46.8864	-130.7960	1526 UTC - ROPOS is in the water. (Serial driver not working. disregard auto information)			
16:43:06 Sep 21 04	1497	130	45.9334	-130.0133	ROPOS is out of the cage.			
16:43:37 Sep 21 04	1501	173	45.9334	-130.0133	HFS fractionated DNA filter #24. Start 1643 Stop 1713. Tave=2.2. Vol=3527 mls. Z=1515m. Filtered as we drove to Virgin and sitting as we imaged the RAS. Temp stayed fairly constant. [~30m SE of Virgin]	R853-HFS-24-0001	Butterfield	
16:47:20 Sep 21 04	1538	343	45.9334	-130.0133	We are on the bottom. Heading to Virgin to look at last year's RAS.			
16:49:54 Sep 21 04	1541	16	45.9334	-130.0133	Inferno.			R853-001
16:50:30 Sep 21 04	1544	41	45.9334	-130.0133	Flag marker on Inferno.			R853-002
16:50:42 Sep 21 04	1544	4	45.9334	-130.0133	We are at a structure with a flag marker at the base. It may be Inferno.			
16:51:30 Sep 21 04	1542	348	45.9334	-130.0133	Starting the highlight tape.			
16:52:17 Sep 21 04	1544	266	45.9334	-130.0133	Stopping to look at some diffuse flow at the base of the east side of Inferno. May come back for later fluid sampling. Took 3 digital images.			
16:52:44 Sep 21 04	1545	289	45.9334	-130.0133	East of Inferno			R853-003
16:54:16 Sep 21 04	1544	25	45.9334	-130.0133	Lots of diffuse venting and anhydrite on the south side of Mushroom.			
16:54:57 Sep 21 04	1543	64	45.9334	-130.0133	RAS at Virgin is in sight.			
16:55:33 Sep 21 04	1543	77	45.9334	-130.0133	Funnel of the RAS has a small chimney growing under it but it is not up into the funnel.			
16:55:57 Sep 21 04	1544	70	45.9334	-130.0133	2003 RAS [Inferno].			R853-004
16:56:35 Sep 21 04	1543	91	45.9334	-130.0133	Can see hot water rising up in to the funnel and rising up out the top.			
16:56:38 Sep 21 04	1544	91	45.9334	-130.0133	RAS Hot water coming into funnel.			R853-005
16:57:48 Sep 21 04	1545	98	45.9334	-130.0133	Sampling funnel of the RAS at Virgin vent.			R853-006
16:58:31 Sep 21 04	1545	96	45.9337	-130.0137	Some of the hot fluid is flowing up in front of the funnel as well. Looks like most of it is actually going outside the funnel but some is going inside.			
17:00:25 Sep 21 04	1544	215	45.9337	-130.0137	RAS funnel with RAS in the background.			R853-007

UTC	Z(m)	Hdg	Lat	Long	R853 Comments	Sample	PI	FrGrab
17:01:11 Sep 21 04	1544	219	45.9337	-130.0137	Moving 17 digital files of Inferno and the RAS.			
17:02:21 Sep 21 04	1545	210	45.9337	-130.0137	Top of RAS funnel.			R853-008
17:02:37 Sep 21 04	1545	209	45.9337	-130.0137	Fluid entering RAS funnel.			R853-009
17:02:42 Sep 21 04	1545	209	45.9337	-130.0133	Structure under RAS funnel.			R853-010
17:02:45 Sep 21 04	1545	209	45.9337	-130.0133	Looks like the RAS funnel is working well.			
17:02:48 Sep 21 04	1545	209	45.9337	-130.0133	Base of RAS funnel.			R853-011
17:03:20 Sep 21 04	1545	205	45.9337	-130.0133	Taking more digital images of the base of the chimney under the funnel.			
17:03:52 Sep 21 04	1545	207	45.9337	-130.0133	Fluid coming out at base of RAS funnel.			R853-012
17:04:28 Sep 21 04	1545	208	45.9337	-130.0133	Fluid at base of RAS funnel.			R853-013
17:05:43 Sep 21 04	1545	205	45.9337	-130.0133	Fluid at the base of the RAS funnel. RAS in background.			R853-014
17:05:55 Sep 21 04	1544	204	45.9337	-130.0133	Top of RAS funnel with RAS in background.			R853-015
17:06:35 Sep 21 04	1542	187	45.9337	-130.0133	View of RAS and RAS funnel.			R853-016
17:06:50 Sep 21 04	1540	201	45.9337	-130.0133	Moving 20 more files of the RAS.			
17:07:46 Sep 21 04	1544	281	45.9336	-130.0133	Looking for a place on the sampler to place the funnel for recovery.			
17:08:41 Sep 21 04	1542	262	45.9336	-130.0132	Top view of RAS.			R853-017
17:08:49 Sep 21 04	1543	245	45.9337	-130.0133	RAS end nearest RAS funnel.			R853-018
17:09:03 Sep 21 04	1544	286	45.9337	-130.0133	RAS funnel from the side nearest the RAS. Temperature probe at the base.			R853-019
17:10:20 Sep 21 04	1545	289	45.9337	-130.0133	Looking for where the end of the temperature probe is located.			
17:10:30 Sep 21 04	1545	296	45.9337	-130.0133	Structure under RAS funnel from side nearest RAS.			R853-020
17:10:37 Sep 21 04	1544	285	45.9337	-130.0133	RAS funnel.			R853-021
17:10:44 Sep 21 04	1545	290	45.9337	-130.0133	Base of RAS funnel.			R853-022
17:11:16 Sep 21 04	1545	287	45.9337	-130.0133	Base of structure below RAS funnel.			R853-023
17:11:27 Sep 21 04	1545	285	45.9337	-130.0133	Tip of the temperature sensor is probably in the middle of the chimney.			
17:12:04 Sep 21 04	1545	286	45.9337	-130.0133	Base of RAS funnel. End of temperature probe visible.			R853-024
17:12:24 Sep 21 04	1545	287	45.9337	-130.0133	Ready to pick up the funnel and stow it on the sampler.			
17:12:36 Sep 21 04	1545	287	45.9337	-130.0133	Temperature probe under RAS funnel.			R853-025
17:15:49 Sep 21 04	1545	284	45.9337	-130.0133	Removing the HFS intake to check the temperature up in the RAS funnel.			
17:17:37 Sep 21 04	1545	290	45.9337	-130.0132	Checking temperature in the RAS funnel.			R853-026
17:18:23 Sep 21 04	1545	286	45.9337	-130.0132	Temp reading up to 11.7 in the funnel but we did not put the intake all the way up inside. We will take a better temp reading when we come back to sample.			
17:19:59 Sep 21 04	1545	283	45.9337	-130.0132	Heading to Gollum for low temp fluid sampling.			
17:22:15 Sep 21 04	1545	266	45.9336	-130.0134	Approaching Gollum.			R853-027
17:22:59 Sep 21 04	1546	355	45.9336	-130.0134	Closer view of Gollum.			R853-028

UTC	Z(m)	Hdg	Lat	Long	R853 Comments	Sample	PI	FrGrab
17:23:27 Sep 21 04	1546	10	45.9336	-130.0134	We are at Gollum looking for a good diffuse sampling site.			
17:26:13 Sep 21 04	1546	293	45.9336	-130.0135	Found a good spot to take fluid samples. Stopped the video.			
17:28:04 Sep 21 04	1546	294	45.9336	-130.0135	Having some trouble talking to the fluid sampler.			
17:29:11 Sep 21 04	1546	292	45.9336	-130.0135	Cycling power to the fluid sampler.			
17:31:02 Sep 21 04	1546	287	45.9336	-130.0135	Fluid sampler is not talking. Rebooting the computer.			
17:33:49 Sep 21 04	1546	287	45.9336	-130.0135	Taking a little digital mosaic of this area while we wait for the computer to reboot. Took and transferred 3 images.			
17:37:35 Sep 21 04	1546	291	45.9336	-130.0135	Fluid sampler computer is talking to the sampler but not getting replies back up. Try hooking up a new serial cable to the computer.			
17:41:07 Sep 21 04	1546	287	45.9336	-130.0135	Replacing the cable fixed the problem but now the sampler is not responding.			
17:43:00 Sep 21 04	1546	289	45.9336	-130.0135	Cycling the power to the sampler again.			
17:44:50 Sep 21 04	1546	287	45.9336	-130.0135	We have green lights!! Let's get some water samples!			
17:48:02 Sep 21 04	1546	291	45.9336	-130.0135	Probing around with the intake for a stable spot to sample.			
17:56:09 Sep 21 04	1546	294	45.9335	-130.0135	The monkey's fist on the purse is making it difficult to see where we want to sample. Repositioning the vehicle to get a better view.			
17:59:25 Sep 21 04	1546	287	45.9335	-130.0135	Using the right arm to adjust the angle of the grip on the intake.			
18:00:33 Sep 21 04	1546	288	45.9335	-130.0135	Positioning the fluid sampler.			R853-029
18:04:41 Sep 21 04	1546	293	45.9336	-130.0135	Still poking around with the intake to find a suitable site.			
18:08:43 Sep 21 04	1546	299	45.9336	-130.0135	Arm is locked off for sampling.			
18:08:46 Sep 21 04	1546	298	45.9336	-130.0135	Locked arm to collect fluid sample.			R853-030
18:09:22 Sep 21 04	1546	301	45.9336	-130.0135	Looking at the exhaust pipe.			
18:11:54 Sep 21 04	1546	302	45.9336	-130.0135	HFS large volume sample #1. Start 1811 Stop 1832. Tmax=25.2 Tave=21.2 s.d.=1.6 T2=14. Vol=3041 mls. Z=1546. Pump is slowing down as we sample. [Gollum]	R853-HFS-LV1-0002	Butterfield	
18:12:18 Sep 21 04	1546	298	45.9336	-130.0135	Exhaust pipe.			R853-031
18:12:34 Sep 21 04	1546	299	45.9336	-130.0135	Taking first sample.			R853-032
18:14:34 Sep 21 04	1546	303	45.9336	-130.0135	Start video 1814.			
18:22:31 Sep 21 04	1546	299	45.9336	-130.0135	Stopped video at 1822.			
18:26:50 Sep 21 04	1546	299	45.9336	-130.0135	Start video 1827. Filming some limpets.			
18:27:01 Sep 21 04	1546	302	45.9336	-130.0135	Organisms near fluid sampling site.			R853-033
18:27:49 Sep 21 04	1546	302	45.9336	-130.0135	Zoomed out view of organisms.			R853-034
18:28:31 Sep 21 04	1546	303	45.9336	-130.0135	Organisms.			R853-035
18:29:46 Sep 21 04	1546	302	45.9336	-130.0135	Tube worms and other organisms.			R853-036
18:31:23 Sep 21 04	1545	302	45.9336	-130.0135	Organisms near fluid sampler.			R853-037

UTC	Z(m)	Hdg	Lat	Long	R853 Comments	Sample	PI	FrGrab
18:31:40 Sep 21 04	1546	302	45.9336	-130.0135	Tube worms; anemone and other organisms.			R853-038
18:33:26 Sep 21 04	1546	300	45.9336	-130.0135	HFS filtered bag #11. Start 1833 Stop 1838. Tmax=25.5 Tave=21.6 T2=13.5. Vol=692 ml. Z=1546. [Gollum]	R853-HFS-11-0003	Butterfield	
18:40:13 Sep 21 04	1546	300	45.9336	-130.0135	HFS Sterivex filter #2. Start 1840 Stop 1849. Tmax=27.9 Tave=16.8 T2=14.0. Vol=1400 ml. Z=1546. ROPOS jerked off the vent. Fluid sampling interrupted. [Gollum]	R853-HFS-2-0004	Butterfield	
18:49:37 Sep 21 04	1546	319	45.9336	-130.0135	Moved off the vent briefly.			
18:53:46 Sep 21 04	1546	328	45.9336	-130.0135	HFS Sterivex filter #7. Heading 326. Start=1904 Stop=1934. Tmax=39.3 Tave=32.5 s.d.=3.4 T2=25. Vol=4015 mls. Re-positioned at Gollum. Attempting to get another large volume sample. Z=1546. [Gollum]	R853-HFS-7-0005	Butterfield	
18:56:44 Sep 21 04	1546	326	45.9336	-130.0135	Positioning to take another large HFS sample here at Gollum.			
19:00:37 Sep 21 04	1546	329	45.9336	-130.0135	Repositioning fluid sampler. [Gollum]			R853-039
19:03:14 Sep 21 04	1546	327	45.9336	-130.0135	Found the spot for sampling. Back where the last sample was taken.			
19:05:47 Sep 21 04	1546	325	45.9336	-130.0135	Sampling at Gollum. Dave says he needs a faster pump for these large samples.			R853-040
19:22:07 Sep 21 04	1546	325	45.9336	-130.0135	Tube worms near fluid sampling at Gollum.			R853-041
19:22:56 Sep 21 04	1546	326	45.9336	-130.0135	Organisms attached to rock near tube worms.			R853-042
19:23:06 Sep 21 04	1546	328	45.9336	-130.0135	Close up of organisms attached to rock.			R853-043
19:24:43 Sep 21 04	1546	330	45.9336	-130.0135	Large group of tube worms and other organisms at Gollum.			R853-044
19:25:42 Sep 21 04	1546	330	45.9336	-130.0135	Close up of sea anemones and other organisms.			R853-045
19:26:21 Sep 21 04	1546	329	45.9336	-130.0135	Another view of the sea anemones at Gollum.			R853-046
19:26:59 Sep 21 04	1546	329	45.9336	-130.0135	Video on 1926. Filming some macrofauna at Gollum while we filter.			
19:30:36 Sep 21 04	1546	332	45.9336	-130.0135	Stopped the video at 1930.			
19:35:39 Sep 21 04	1546	326	45.9336	-130.0135	HFS Sterivex filter #4. Start 1935 Stop 1946. Tmax=39.7 Tave=37.7 s.d.=1.1 T2=26. Vol=1567 mls. Z=1546. [Gollum]	R853-HFS-4-0006	Butterfield	
19:37:00 Sep 21 04	1546	327	45.9336	-130.0135	View of the bottom near fluid sampling site at Gollum.			R853-047
19:37:24 Sep 21 04	1546	326	45.9336	-130.0135	View of organisms near sampling at Gollum.			R853-048
19:37:35 Sep 21 04	1546	326	45.9336	-130.0135	Anemone; snails; and other organisms near sampler at Gollum.			R853-049
19:38:00 Sep 21 04	1546	331	45.9336	-130.0135	Close up view of organisms.			R853-050
19:41:26 Sep 21 04	1546	332	45.9336	-130.0135	Another anemone nearby with other organisms.			R853-051
19:42:39 Sep 21 04	1546	327	45.9336	-130.0135	Video on 1942. More anemones.			
19:43:35 Sep 21 04	1546	332	45.9336	-130.0135	Stop video 1943.			
19:44:19 Sep 21 04	1546	332	45.9336	-130.0135	Close up of anemone and other organisms.			R853-052
19:47:52 Sep 21 04	1546	326	45.9336	-130.0135	HFS Sterivex filter #10. Start 1947 Stop 1959. Tmax=39.7 Tave=37.3 T2=26. Vol=1608 mls. Z=1546. [Gollum]	R853-HFS-10-0007	Butterfield	
19:48:52 Sep 21 04	1546	327	45.9336	-130.0135	Fluid sampling at Gollum.			R853-053

UTC	Z(m)	Hdg	Lat	Long	R853 Comments	Sample	PI	FrGrab
19:55:33 Sep 21 04	1546	327	45.9336	-130.0135	Worms next to fluid sampler.			R853-054
20:01:30 Sep 21 04	1546	326	45.9336	-130.0135	HFS unfiltered Piston #20. Start 2001 Stop 2009. Tmax=39.4 Tave=37.2 s.d.=0.4 T2=26. Vol=~700 mls. Z=1546. [Gollum]	R853-HFS-20-0008	Butterfield	
20:02:47 Sep 21 04	1546	328	45.9336	-130.0135	Checking apparatus to continue sampling.			R853-055
20:09:31 Sep 21 04	1546	325	45.9336	-130.0135	Organism floating by ROPOS while at Gollum.			R853-056
20:09:38 Sep 21 04	1546	325	45.9336	-130.0135	Another view of the floating organism.			R853-057
20:11:31 Sep 21 04	1546	326	45.9336	-130.0135	Done water sampling here. Going to Marshmallow for more water sampling.			
20:12:10 Sep 21 04	1546	329	45.9336	-130.0135	Pulling up fluid sampler.			R853-058
20:13:36 Sep 21 04	1546	335	45.9336	-130.0135	Video on for the transit to Marshmallow. On at 2014.			
20:13:46 Sep 21 04	1546	329	45.9336	-130.0135	Bottom view near Gollum.			R853-059
20:18:52 Sep 21 04	1544	99	45.9337	-130.0135	Found marker 1. Don't think it is one of ours. This may be Marshmallow. Going in for a closer look.			
20:18:56 Sep 21 04	1544	97	45.9337	-130.0135	Marker with #1 on it; RAS at Virgin in background to the upper right.			R853-060
20:19:46 Sep 21 04	1545	70	45.9337	-130.0135	Close up to "Marker 1." Marshmallow in the background.			R853-061
20:20:56 Sep 21 04	1545	58	45.9337	-130.0135	This looks hot. This is probably Marshmallow.			
20:20:56 Sep 21 04	1545	58	45.9337	-130.0135	Marshmallow vent.			R853-062
20:23:02 Sep 21 04	1545	62	45.9337	-130.0135	There is a HOBO in the background so this is Marshmallow.			
20:23:20 Sep 21 04	1545	64	45.9337	-130.0135	Temperature reading at Marshmallow. HOBO probe in the background.			R853-063
20:23:33 Sep 21 04	1545	61	45.9337	-130.0135	Taking temperature readings with the HFS intake.			
20:26:51 Sep 21 04	1546	60	45.9337	-130.0135	The arm is locked off here for sampling.			
20:27:10 Sep 21 04	1546	61	45.9337	-130.0135	Close up of fluid sampling site at Marshmallow.			R853-064
20:27:58 Sep 21 04	1545	60	45.9337	-130.0135	HFS unfiltered piston #22. Start 2028 Stop 2035. Tmax=74.4 Tave=68.2 s.d.=1.5 T2=44. Vol=~700 mls. Z=1546. [Marshmallow] Turned off the video.	R853-HFS-22-0009	Butterfield	
20:36:52 Sep 21 04	1546	61	45.9337	-130.0135	HFS Sterivex #21. Start 2036 Stop 2056. Tmax=74 Tave=68.2 s.d.=2.2 T2=45. Vol=3000 mls. Z=1546. [Marshmallow] Took 1 digital image of sample intake.	R853-HFS-21-0010	Butterfield	
20:37:39 Sep 21 04	1546	58	45.9337	-130.0135	LBL fixes we are getting now are not accurate. When we are finished sampling we will turn off the cage motor to get a good position.			
20:38:44 Sep 21 04	1546	58	45.9337	-130.0135	Tube worms near fluid sampling at Marshmallow.			R853-065
20:45:16 Sep 21 04	1546	57	45.9337	-130.0135	Little fish comes to visit the fluid sampler.			R853-066
20:52:02 Sep 21 04	1546	58	45.9336	-130.0135	RAS funnel at Virgin visible from Marshmallow.			R853-067
20:57:36 Sep 21 04	1546	59	45.9336	-130.0135	HFS filtered bag #18. Start 2057 Stop 2102. Tmax=72.9 Tave=68.3 s.d.=2.3 T2=45. Vol=690 ml z=1546. [Marshmallow]	R853-HFS-18-0011	Butterfield	
21:00:09 Sep 21 04	1545	60	45.9337	-130.0136	HOBO in the Chimney at Marshmallow.			R853-068
21:03:14 Sep 21 04	1546	61	45.9337	-130.0136	Done fluid sampling here. Now we will go to the RAS site at Virgin.			

UTC	Z(m)	Hdg	Lat	Long	R853 Comments	Sample	PI	FrGrab
21:03:43 Sep 21 04	1546	61	45.9337	-130.0136	Turned off the cage motor to get a good fix here.			
21:06:08 Sep 21 04	1546	61	45.9337	-130.0135	We just got a nav fix and are taking 7 DSC pictures of Marshmallow area. A couple DSC of the whole site and then zoom in to where the last samples were obtained.			
21:10:33 Sep 21 04	1537	114	45.9337	-130.0135	On our way to Virgin and the RAS.			
21:12:12 Sep 21 04	1543	106	45.9337	-130.0135	The RAS in the distance.			
21:13:45 Sep 21 04	1544	109	45.9337	-130.0135	RAS at Virgin.			R853-069
21:17:12 Sep 21 04	1545	104	45.9337	-130.0134	Searching around for the perfect spot for a fluid sample here at Virgin somewhere around the top hat.			
21:21:34 Sep 21 04	1546	101	45.9337	-130.0133	We've been checking the temp from the bottom of the funnel. 23C up inside the funnel.			
21:23:02 Sep 21 04	1546	102	45.9337	-130.0133	We're stowing the HFS sampler and will then put the funnel up on top of the RAS frame.			
21:26:15 Sep 21 04	1546	99	45.9337	-130.0133	The sampling nozzle is in the holster.			
21:28:43 Sep 21 04	1546	99	45.9337	-130.0133	The plan is to grab a titanium leg on the funnel and transport it that way.			
21:32:05 Sep 21 04	1545	141	45.9337	-130.0133	Lifting the RAS funnel. Virgin			R853-070
21:32:07 Sep 21 04	1545	141	45.9337	-130.0133	The leg grab seems to be working. The funnel is on its way home (to rest on the RAS). Two of the legs will be placed behind the bumper rail; at least that's the plan.			
21:36:33 Sep 21 04	1545	97	45.9337	-130.0133	Chimney after the RAS funnel was removed. Virgin			R853-071
21:37:30 Sep 21 04	1546	67	45.9337	-130.0133	RAS temperature probe at Virgin.			R853-072
21:37:40 Sep 21 04	1546	70	45.9337	-130.0133	Took several digital images of the RAS temperature probe. ROPOS is removing it and will put it on the RAS for recovery.			
21:42:20 Sep 21 04	1545	116	45.9337	-130.0133	Next task is to take a HFS sample here at Virgin now that the RAS is out of the way.			
21:42:30 Sep 21 04	1544	94	45.9337	-130.0133	Chimney that formed beneath the RAS funnel. [Virgin]			R853-073
21:44:31 Sep 21 04	1546	293	45.9337	-130.0132	Going to use the left-over titanium tube as a scraper. That left a couple big holes of hot water gushing out. Still scraping away the anhydrite at 2148. The bottom of the chimney seems quite hard.			
21:45:16 Sep 21 04	1546	294	45.9337	-130.0132	Clearing the way for the temperature probe. [Virgin]			R853-074
21:46:06 Sep 21 04	1545	286	45.9337	-130.0132	Scraping away anhydrite at Virgin.			R853-075
21:54:35 Sep 21 04	1545	200	45.9337	-130.0132	Still working on getting down to the substrate here at Virgin. Using the titanium sheath that was lying next to the vent.			
21:56:50 Sep 21 04	1546	141	45.9337	-130.0133	Remnants of the chimney. [Virgin]			R853-076
21:58:25 Sep 21 04	1546	145	45.9337	-130.0133	Kim is still excavating. 2159 we're letting it clear. Starting to excavate again.			
21:58:32 Sep 21 04	1546	142	45.9337	-130.0133	Titanium tube scraping continued. Trying to get down to the substrate at Virgin.			R853-077
22:04:34 Sep 21 04	1546	140	45.9337	-130.0133	Enough of that for now. Time for a water sample.			

UTC	Z(m)	Hdg	Lat	Long	R853 Comments	Sample	PI	FrGrab
22:07:22 Sep 21 04	1546	137	45.9337	-130.0133	Dave is only reading 4C on his temp probe. He's not sure it's working properly at the moment.			
22:07:22 Sep 21 04	1546	137	45.9337	-130.0133	Setting up the temperature probe.			R853-078
22:08:45 Sep 21 04	1547	139	45.9337	-130.0133	Temperature probe in the former anhydrite chimney.			R853-079
22:09:11 Sep 21 04	1546	136	45.9337	-130.0133	Temp is increasing now. It appears as though the valve is not working. Temp got up to 120C. We're going to poke around some more to find the optimal spot. Going to cycle the power to the HFS so that the valve will function properly.			
22:13:53 Sep 21 04	1546	137	45.9337	-130.0133	Back in business.			
22:17:45 Sep 21 04	1546	140	45.9337	-130.0133	End of tape 1.			
22:22:59 Sep 21 04	1546	140	45.9337	-130.0134	We're not seeing the high temperatures we would expect. Did the vent cool off? Is the flow more diffuse after knocking down the chimney? 146C now. Pushing the probe farther in the hole. 180C. This vent has been consistently > 300C for years.			
22:24:31 Sep 21 04	1546	138	45.9337	-130.0134	Measuring the temperature with the HFS.			R853-080
22:30:40 Sep 21 04	1546	139	45.9337	-130.0134	Looks like we're in a good spot now.			
22:30:54 Sep 21 04	1546	139	45.9337	-130.0134	GTB #10 (red) in the orifice. T=173. Z=1546. From the scraped off area. [Virgin]	R853-GTB-10-0012	Evans	
22:32:31 Sep 21 04	1546	140	45.9337	-130.0135	GTB #14. T=170. From the scraped off area. Z=1546. [Virgin]	R853-GTB-14-0013	Evans	
22:33:37 Sep 21 04	1546	140	45.9337	-130.0135	HFS unfiltered bag #19. Start 2233 Stop 2236. Tmax=177.5 Tave=170.7 stdev=4 T2=130. Vol=425 ml. From the scraped off area. Z=1546. [Virgin]	R853-HFS-19-0014	Evans	
22:34:30 Sep 21 04	1546	140	45.9337	-130.0134	Sampling at Virgin.			R853-081
22:37:26 Sep 21 04	1546	140	45.9337	-130.0134	HFS filtered bag #17. Start 2237 Stop 2240. Tmax=166.1 Tave=163.6 T2=130. stdev=1.1. Vol=429 ml. Z=1546. From the scraped off area. [Virgin]	R853-HFS-17-0015	Butterfield	
22:41:10 Sep 21 04	1546	142	45.9337	-130.0134	HFS piston #5. Start 2242 Stop 2246. Tmax=176.4 T2=144 Tave=170.4 stdev=1.4. Vol=350 ml. Z=1546. From the scraped off area. [Virgin]	R853-HFS-5-0016	Butterfield	
22:47:40 Sep 21 04	1546	140	45.9337	-130.0134	We're finished sampling here at Virgin. Next stop Inferno. Afterthought - started video again at 2241.			
22:47:55 Sep 21 04	1546	142	45.9337	-130.0134	Removing the temperature probe. Virgin. Getting ready for a transit to Inferno.			R853-082
22:50:25 Sep 21 04	1542	233	45.9336	-130.0135	Coming up onto Inferno.			R853-083
22:51:06 Sep 21 04	1543	224	45.9336	-130.0137	Inferno facing SW.			R853-084
22:51:12 Sep 21 04	1544	229	45.9336	-130.0137	We're here at Inferno.			
22:51:57 Sep 21 04	1543	148	45.9336	-130.0139	Inferno.			R853-085
22:54:23 Sep 21 04	1539	56	45.9336	-130.0139	Took a mosaic of DSC's around Inferno Vent (~10 - 15).			
22:55:00 Sep 21 04	1542	172	45.9336	-130.0139	Billowing high temperature vent fluid at Inferno.			R853-086
22:56:08 Sep 21 04	1543	218	45.9336	-130.0139	Profile view. Top of Inferno.			R853-087

UTC	Z(m)	Hdg	Lat	Long	R853 Comments	Sample	PI	FrGrab
23:01:28 Sep 21 04	1543	308	45.9335	-130.0139	Setting up ROPOS by Inferno.			R853-088
23:03:42 Sep 21 04	1543	309	45.9335	-130.0139	Checking STS and possibly re-booting down below.			
23:05:25 Sep 21 04	1543	308	45.9336	-130.0138	Limpets; palm worms and polynoid species on Inferno.			R853-089
23:06:15 Sep 21 04	1543	307	45.9336	-130.0138	Limpet assemblage at Inferno.			R853-090
23:10:18 Sep 21 04	1543	309	45.9336	-130.0138	Had to cycle the power. The STS is up and running again.			
23:11:57 Sep 21 04	1544	299	45.9336	-130.0138	Temperature probe at Inferno.			R853-091
23:12:01 Sep 21 04	1544	301	45.9336	-130.0138	Preparing to sample in this beehive at Inferno.			
23:14:30 Sep 21 04	1544	299	45.9336	-130.0138	Setting up the temperature probe at Inferno.			R853-092
23:19:30 Sep 21 04	1542	271	45.9336	-130.0138	We're repositioning because we can't get into a good spot for sampling here.			
23:21:14 Sep 21 04	1543	145	45.9336	-130.0139	Inferno.			R853-093
23:21:24 Sep 21 04	1544	141	45.9336	-130.0139	Inferno.			R853-094
23:21:46 Sep 21 04	1544	148	45.9336	-130.0139	North side of Inferno.			R853-095
23:22:05 Sep 21 04	1544	146	45.9336	-130.0139	Took 3 DSC images (blind).			
23:24:50 Sep 21 04	1544	134	45.9336	-130.0139	Intense flow. Palm worms and limpets at Inferno.			R853-096
23:25:32 Sep 21 04	1544	132	45.9336	-130.0139	Preparing to HFS sample here at Inferno. The highest temp at the previous attempt to sample was 186C.			
23:28:36 Sep 21 04	1544	125	45.9336	-130.0139	Checking the temperature at Inferno. Looking for a hot-spot.			R853-097
23:31:28 Sep 21 04	1545	127	45.9336	-130.0139	When they pushed the wand down into the beehive the chalcopyrite lining of the beehive is evident.			
23:31:34 Sep 21 04	1545	129	45.9336	-130.0139	High temperature vent effluent jetting from a chimney at Inferno.			R853-098
23:39:02 Sep 21 04	1545	117	45.9336	-130.0140	Still trying to find a spot to sample.			
23:45:52 Sep 21 04	1544	124	45.9336	-130.0140	May have found a spot for sampling.			
23:48:04 Sep 21 04	1544	119	45.9336	-130.0140	HFS unfiltered bag #8. Start 2350 Stop 2352. Tmax=204 T2=70 Tave=190 stdev=22. Vol=444 ml. Z=1544. [Inferno]	R853-HFS-8-0017	Butterfield	
23:49:09 Sep 21 04	1544	120	45.9336	-130.0140	Fluid sampling at Inferno. Actual sampling spot.			R853-099
23:50:50 Sep 21 04	1544	119	45.9336	-130.0140	THE moment of sampling at Inferno.			R853-100
23:53:26 Sep 21 04	1544	118	45.9336	-130.0140	GTB #16. Tmax=199C. [Inferno]	R853-GTB-16-0018	Evans	
23:54:40 Sep 21 04	1544	121	45.9336	-130.0139	HFS filtered bag #14. Start 2354 Stop 2258. Tmax=204.4 Tave=199.4 T2=20 stdev=1.9. Vol=600 ml. Z=1544. [Inferno]	R853-HFS-14-0019	Butterfield	
00:00:43 Sep 22 04	1544	124	45.9336	-130.0140	End of HFS sampling here at Inferno. We're going to suction sample limpets here for Angela (Noreen's experiment - which she wants in flow and she wants a full jar).			
00:04:40 Sep 22 04	1544	84	45.9336	-130.0140	Suction sample of limpets for Noreen into jar 5. She wants 500 limpets. Temperature is 5C (3-4 degrees above background temperature). [Inferno]	R853-SS-J5-0020	Kelley	

UTC	Z(m)	Hdg	Lat	Long	R853 Comments	Sample	PI	FrGrab
00:06:54 Sep 22 04	1544	71	45.9336	-130.0140	Slurping limpets for Noreen.			R853-101
00:09:12 Sep 22 04	1543	60	45.9335	-130.0140	Slurping limpets for Noreen.			R853-102
00:12:59 Sep 22 04	1543	53	45.9335	-130.0140	Slurping limpets for Noreen.			R853-103
00:13:56 Sep 22 04	1543	57	45.9335	-130.0140	Slurping limpets for Noreen.			R853-104
00:15:13 Sep 22 04	1543	52	45.9335	-130.0140	Took lots of DSC's of the limpet collection and bunches of frame grabs.			
00:15:33 Sep 22 04	1543	46	45.9335	-130.0140	Limpets in a jar for Noreen. Once they're back on the seafloor in their cage we're going to request Noreen come out to sea with us and collect her cage and larval arrays. We miss her - and the arrays are in the way.....			R853-105
00:19:17 Sep 22 04	1538	126	45.9336	-130.0139	We're on the way to Hell.			
00:23:48 Sep 22 04	1543	175	45.9334	-130.0132	We're at Hell vent now.			
00:23:48 Sep 22 04	1543	175	45.9334	-130.0132	We're in Hell.			R853-106
00:24:37 Sep 22 04	1542	183	45.9334	-130.0132	Hell			R853-107
00:25:05 Sep 22 04	1544	199	45.9334	-130.0132	Hell.			R853-108
00:27:30 Sep 22 04	1543	226	45.9334	-130.0132	Took several DSC's of Hell.			
00:30:01 Sep 22 04	1542	174	45.9334	-130.0132	We're looking around.			
00:32:56 Sep 22 04	1543	278	45.9334	-130.0132	Setting up at Hell chimney.			
00:34:49 Sep 22 04	1543	233	45.9334	-130.0132	Got pulled off. Now back in position at Hell chimney.			
00:34:52 Sep 22 04	1543	233	45.9334	-130.0132	2 vents at Hell.			R853-109
00:36:02 Sep 22 04	1543	231	45.9333	-130.0142	Preparing to read temperature at Hell.			R853-110
00:39:02 Sep 22 04	1544	233	45.9333	-130.0142	HFS intake is in a very small spigot. Getting a temperature of about 150C. T2 is the same temperature as T1 right now which does not make sense. Checking things out.			
00:40:01 Sep 22 04	1543	234	45.9333	-130.0142	Reading temperature in vent at Hell.			R853-111
00:44:44 Sep 22 04	1544	233	45.9333	-130.0142	HFS filtered bag #16. Start 0045 Stop 0049. Tmax=171.3 Tave=163.3 T2=133. Vol=659 ml. Z=1544m. Small spigot on the top of Hell chimney. Temperature stable. [Hell vent].	R853-HFS-16-0021	Butterfield	
00:50:35 Sep 22 04	1544	235	45.9333	-130.0140	Gas-tight bottle #17 at 0051. Temperature 180. Right after last HFS sample. [Hell vent]. This turned out to be an empty; -ed.	R853-GTB-17-0022	Evans	
00:51:04 Sep 22 04	1544	232	45.9333	-130.0140	Continuing to sample at Hell.			R853-112
00:52:24 Sep 22 04	1544	232	45.9333	-130.0140	HFS unfiltered bag #9. Start 0052 Stop 0056. Tmax=195.1 Tavg=186.4 T2=126.4. Vol=650 ml. Z=1544m. Small spigot at top of chimney. Same as last sample [Hell vent].	R853-HFS-9-0023	Butterfield	
00:52:26 Sep 22 04	1544	232	45.9333	-130.0140	Blue Mat in the background at Hell?			R853-113
00:58:39 Sep 22 04	1544	233	45.9333	-130.0140	Finished with fluid sampling. Stowing HFS wand. Repositioning to try to get a sulfide sample.			

UTC	Z(m)	Hdg	Lat	Long	R853 Comments	Sample	PI	FrGrab
01:08:54 Sep 22 04	1543	209	45.9333	-130.0140	We're still trying to stow the wand.			
01:14:03 Sep 22 04	1543	203	45.9333	-130.0140	Hell.			R853-114
01:14:21 Sep 22 04	1542	203	45.9333	-130.0140	Sheryl's looking for the perfect (active - microbe happy) sulfide.			
01:15:57 Sep 22 04	1544	159	45.9334	-130.0140	Active sulfide search at Hell.			R853-115
01:18:14 Sep 22 04	1544	197	45.9334	-130.0140	Cruising Hell.			R853-116
01:19:33 Sep 22 04	1544	285	45.9333	-130.0140	ROPOS preparing to destroy a chimney off of Hell.			R853-117
01:19:56 Sep 22 04	1544	282	45.9333	-130.0140	ROPOS attempted to grab a chimney. Looks like there is nothing there but a lot of worms.			
01:21:55 Sep 22 04	1544	287	45.9333	-130.0140	Heading for the grab at Hell.			R853-118
01:22:02 Sep 22 04	1544	283	45.9333	-130.0140	Clamping down on the beehive at Hell.			R853-119
01:22:05 Sep 22 04	1544	291	45.9333	-130.0140	Grabbing a beehive at Hell. Palm worms see the light at the end of the tunnel.			R853-120
01:22:28 Sep 22 04	1544	285	45.9333	-130.0140	Grabbed a beehive. Hopefully it will make it in the purse.			
01:25:20 Sep 22 04	1547	203	45.9334	-130.0140	Hoping to put this piece of beehive/sulfide in the purse.			
01:26:24 Sep 22 04	1547	191	45.9334	-130.0140	Beehive in hand at Hell.			R853-121
01:26:27 Sep 22 04	1547	196	45.9334	-130.0140	Going for the goal at Hell.			R853-122
01:26:46 Sep 22 04	1547	196	45.9334	-130.0140	A piece of active sulfide into the purse for high pressure high temperature culturing. [Hell]	R853-SF-0024	Bolton	
01:29:11 Sep 22 04	1544	84	45.9334	-130.0139	Heading to Crack vent to pick up the Big Johnson (really).			
01:30:05 Sep 22 04	1543	144	45.9334	-130.0137	We're going to rip the hose from the box and grab the Big Johnson flow meter.			
01:31:21 Sep 22 04	1547	100	45.9333	-130.0137	Getting the Big Johnson at Crack.			R853-123
01:31:43 Sep 22 04	1547	98	45.9333	-130.0137	The Big Johnson at Crack.			R853-124
01:31:44 Sep 22 04	1547	96	45.9333	-130.0137	Detaching the flow meter from the cement box.			
01:33:06 Sep 22 04	1547	98	45.9333	-130.0137	Collected the Big Johnson from Crack. Can see bubbles flowing out of the hose once it was disconnected from the cement box. [Crack]	R853-BJ-0025	H P Johnson	
01:33:09 Sep 22 04	1547	98	45.9333	-130.0137	Preparing to lift the Big Johnson.			R853-125
01:33:17 Sep 22 04	1547	95	45.9333	-130.0137	Recovering the Big J.			R853-126
01:33:33 Sep 22 04	1547	96	45.9333	-130.0137	The Big Johnson right side up at Crack.			R853-127
01:33:46 Sep 22 04	1547	95	45.9333	-130.0137	Detached from the Big Johnson. Notice the bubbles coming out of the hose.			R853-128
01:38:02 Sep 22 04	1513	49	45.9332	-130.0137	Stopped the video at 0135.			
01:38:24 Sep 22 04	1503	49	45.9332	-130.0137	On our way to the cage.			
01:40:20 Sep 22 04	1491	281	45.9334	-130.0133	Heading to the surface.			
02:33:33 Sep 22 04	1	52	45.9333	-130.0135	ROPOS is at the surface.			
02:36:38 Sep 22 04	1	53	45.9333	-130.0136	ROPOS is on the deck. End of dive.			

5.4.3 R854 Dive Log

R854: ASHES
Wet time (UTC): 9/22 1745 - 9/23 0145. JD: 266-267. 8 hrs.
Bottom time (UTC): 9/22 1633 - 9/23 0312. JD: 266-267. 10.65 hrs. [2 samples]
DSC information: 145 DSCs taken starting with R854_DSC_092204_180556_04010.jpg and ending with R854_DSC_092304_020220_04154.jpg
Dive Summary: Went to Virgin first to recover the 2003 RAS which would not release acoustically. It was half-released but still attached by parachute cord around the anchor. Rattled the frame and it released. Moved the 2003 anchor out of the way. Positioned 04 RAS; funnel and temp probe in the vent after excavating the anhydrite. Placed hobo #127 in the vent. Took series of DSCs of new RAS. Recovered hobo-126 from Marshmallow. Took series of DSCs at Inferno; Marshmallow; Hell and Phoenix . Suctioned blue mat at Hell; although the end of the sampler was broken. Rescue floats (for 2003 RAS) were released from the bottom. Didn't need them because RAS floated to the surface on its own.

UTC	Z(m)	Hdg	Lat	Long	R854 Comments	Samples	PI	FrGrab
16:32:26 Sep 22 04	0	151	45.9314	-130.0121	ROPOS off the deck at 1630.			
16:33:28 Sep 22 04	0	154	45.9314	-130.0121	ROPOS in the water.			
17:45:14 Sep 22 04	1542	313	45.9332	-130.0130	ROPOS at the bottom.			
17:46:56 Sep 22 04	1545	299	45.9332	-130.0131	Sculpin on the bottom.			R854-001
17:47:49 Sep 22 04	1545	293	45.9333	-130.0132	Sculpin checking us out.			R854-002
17:48:11 Sep 22 04	1545	294	45.9333	-130.0132	Digital images of a Fathead Sculpin.			
17:49:33 Sep 22 04	1541	18	45.9333	-130.0132	Bacterial mat in the area as well as a chimney.			
17:50:38 Sep 22 04	1545	319	45.9334	-130.0133	Phoenix vent?			R854-003
17:51:10 Sep 22 04	1546	239	45.9334	-130.0133	Probably Phoenix vent at Ashes.			
17:51:35 Sep 22 04	1544	269	45.9334	-130.0133	Some venting at the base of the chimney.			
17:51:42 Sep 22 04	1544	275	45.9334	-130.0133	Lots of bacterial mat and biology on this chimney that is probably Phoenix.			R854-004
17:52:02 Sep 22 04	1544	240	45.9334	-130.0133	A lot of floating particulates. Bacterial mat s?			
17:53:15 Sep 22 04	1542	250	45.9334	-130.0134	Heading away from Phoenix. We're looking west at Hell which confirms that the last chimney was Phoenix.			
17:53:34 Sep 22 04	1544	281	45.9334	-130.0134	We're at Hell now - which is west of Phoenix. That confirms that the last chimney was Phoenix.			R854-005
17:54:05 Sep 22 04	1545	30	45.9334	-130.0134	Heading north to Virgin to recover the 2003 RAS.			
17:54:36 Sep 22 04	1542	62	45.9334	-130.0134	Passing Inferno. The 2003 RAS is still on the bottom!!			
17:55:00 Sep 22 04	1543	65	45.9334	-130.0134	The 2003 RAS on the bottom. It half released. Must be stuck on something.			R854-006
17:55:23 Sep 22 04	1545	59	45.9334	-130.0134	Looks like it tried to release but is stuck on something.			R854-007
17:55:42 Sep 22 04	1545	40	45.9334	-130.0134	Taking digital images of the 2003 RAS.			
17:55:59 Sep 22 04	1545	42	45.9334	-130.0134	2003 RAS appears to be caught on something.			
17:56:30 Sep 22 04	1545	347	45.9334	-130.0134	The 2003 RAS appears to be caught on a parachute cord.			
17:56:39 Sep 22 04	1545	337	45.9334	-130.0133	It's caught on parachute cord.			R854-008

UTC	Z(m)	Hdg	Lat	Long	R854 Comments	Samples	PI	FrGrab
17:57:28 Sep 22 04	1545	338	45.9334	-130.0134	Scanning around the 2003 RAS. Trying to figure out why it didn't acoustically release from the surface.			
17:58:08 Sep 22 04	1545	232	45.9334	-130.0133	2003 RAS.			R854-009
17:59:25 Sep 22 04	1545	240	45.9334	-130.0133	We may reach in from beneath it to try and pry it loose.			
17:59:58 Sep 22 04	1545	241	45.9334	-130.0134	Taking digital images of the 2003 RAS from the side.			
18:01:45 Sep 22 04	1545	242	65.5828	-116.3474	Grabbing the swiss army knife - which will be used to cut the parachute cord and release the RAS.			R854-010
18:03:18 Sep 22 04	1545	244	45.9337	-130.0133	2003 RAS release operation at Virgin.			
18:03:36 Sep 22 04	1545	244	45.9337	-130.0133	Removing safety devise from knife. The 7 function will do the cut from the looks of it.			R854-011
18:05:01 Sep 22 04	1545	240	45.9337	-130.0133	This view shows a close up view of the tilt of the RAS on the anchor.			R854-012
18:05:29 Sep 22 04	1545	241	45.9337	-130.0133	The RAS is partially released from the anchor.			R854-013
18:06:31 Sep 22 04	1545	241	45.9337	-130.0133	Video turned on.			
18:08:58 Sep 22 04	1534	158	45.9336	-130.0134	ROPOS came off the bottom. The parachute cord has not yet been cut.			
18:09:55 Sep 22 04	1522	91	45.9335	-130.0134	ROPOS is going back to the cage and then back to the bottom. Making sure they know where the tether is before they release the 2003 RAS.			
18:12:30 Sep 22 04	1501	33	45.9335	-130.0133	The bag of styrofoam cups on the cage is making the ROPOS guys nervous.			R854-014
18:13:54 Sep 22 04	1526	268	45.9335	-130.0133	Heading back to the bottom.			
18:15:18 Sep 22 04	1543	266	45.9334	-130.0133	The acoustic release did release at the surface. The 2003 RAS was caught on a parachute cord though.			
18:17:09 Sep 22 04	1541	296	45.9335	-130.0129	Approaching the RAS in order to cut it loose.			R854-015
18:17:51 Sep 22 04	1545	221	45.9337	-130.0133	Digital images were taken of the 2003 RAS. Transferring 18 DSC files.			
18:18:51 Sep 22 04	1545	210	45.9337	-130.0133	At the RAS. Examining the situation before cutting.			R854-016
18:20:38 Sep 22 04	1544	214	45.9337	-130.0133	Floating bacterial mat in the foreground (iron oxides?).			
18:21:26 Sep 22 04	1544	172	45.9337	-130.0133	RAS was bumped and just released itself. No cutting was necessary.			R854-017
18:21:29 Sep 22 04	1544	173	45.9337	-130.0133	2003 RAS is heading to the surface.			
18:21:58 Sep 22 04	1545	324	45.9337	-130.0132	Nudging the 2003 RAS must have broken the line. We didn't need to cut the parachute cord. It should be at the surface about 1250 PDT.			
18:22:31 Sep 22 04	1545	310	45.9337	-130.0132	The RAS anchor is still here.			R854-018
18:23:32 Sep 22 04	1545	305	45.9337	-130.0132	Video off.			
18:24:50 Sep 22 04	1546	285	45.9337	-130.0132	Attaching a hook onto the 2003 RAS anchor. Going to hook the anchor to drag it away.			
18:25:01 Sep 22 04	1546	284	45.9337	-130.0132	Preparing to hook the anchor in order to drag it off-site.			R854-019
18:26:24 Sep 22 04	1545	350	45.9337	-130.0133	A view of the RAS anchor before attempting to hook the line on it.			R854-020
18:26:52 Sep 22 04	1545	352	45.9337	-130.0133	The anchor is almost hooked.			R854-021
18:27:01 Sep 22 04	1545	347	45.9337	-130.0133	Anchor is successfully hooked.			R854-022

UTC	Z(m)	Hdg	Lat	Long	R854 Comments	Samples	PI	FrGrab
18:27:32 Sep 22 04	1542	317	45.9337	-130.0132	ROPOS heading back to the cage.			
18:29:20 Sep 22 04	1537	308	45.9336	-130.0132	The cage is 38m from Virgin. Heading to the cage.			
18:30:40 Sep 22 04	1537	286	45.9336	-130.0132	ROPOS grabbing onto the line coming out of a canister that is not attached to the sub.			
18:32:51 Sep 22 04	1529	134	45.9336	-130.0130	ROPOS approaching the cage.			
18:33:17 Sep 22 04	1527	68	45.9336	-130.0130	ROPOS has re-entered the cage.			
18:39:02 Sep 22 04	1498	255	45.9336	-130.0130	Ship is not moving yet. Still trying to secure the rope.			
18:40:06 Sep 22 04	1495	218	45.9336	-130.0129	ROPOS is in the cage. 2003 RAS anchor will be lifted off of the bottom. The ship will move and eventually drop the RAS anchor. Drop-off location unspecified at present.			
18:43:46 Sep 22 04	1455	312	45.9336	-130.0128	Ship will move 100m SE and pause long enough to drop the anchor.			
19:44:22 Sep 22 04	1322	326	45.9294	-130.0167	2003 RAS is on deck.			
20:05:13 Sep 22 04	1322	117	45.9315	-130.0151	We have been heading back to Virgin since the RAS came on board.			
20:24:25 Sep 22 04	1495	135	45.9333	-130.0131	ROPOS is coming out of the cage.			
20:25:19 Sep 22 04	1495	279	45.9333	-130.0131	ROPOS has left the cage and is heading to where the 04 RAS was dropped.			
20:27:37 Sep 22 04	1534	256	45.9333	-130.0131	We've spotted the rescue floats that were released earlier.			
20:28:36 Sep 22 04	1541	310	45.9333	-130.0131	Getting a position for the rescue floats.			
20:29:03 Sep 22 04	1540	300	45.9333	-130.0131	The rescue floats have been found.			R854-023
20:29:45 Sep 22 04	1543	312	45.9333	-130.0131	Iron oxide patch at the base of the floats.			
20:31:25 Sep 22 04	1540	112	45.9333	-130.0131	Video is on.			
20:31:39 Sep 22 04	1542	106	45.9333	-130.0131	We've left the rescue mooring and heading south-east towards the 04 RAS.			
20:33:48 Sep 22 04	1538	250	45.9333	-130.0132	The 04 RAS is in sight.			R854-024
20:34:06 Sep 22 04	1540	243	45.9333	-130.0132	We are approaching the 04 RAS.			R854-025
20:34:52 Sep 22 04	1545	252	45.9328	-130.0130	Getting into position to pull an anchor off.			
20:35:12 Sep 22 04	1545	251	45.9328	-130.0130	Positioning ROPOS to move the 04 RAS.			R854-026
20:36:42 Sep 22 04	1544	251	45.9328	-130.0130	Going to take off the sink weights so that the 04 RAS is buoyant enough to move with the ROPOS.			
20:37:50 Sep 22 04	1545	158	45.9328	-130.0130	Examining the 04 RAS on the seafloor.			R854-027
20:38:11 Sep 22 04	1544	79	45.9328	-130.0128	Floating bacterial mat (iron oxide?).			
20:40:57 Sep 22 04	1545	193	45.9328	-130.0128	Getting into position to pull off the extra weight.			
20:41:40 Sep 22 04	1545	204	45.9328	-130.0128	Releasing sinker weights to make the RAS buoyant enough to move with the ROPOS.			R854-028
20:42:00 Sep 22 04	1545	195	45.9328	-130.0128	Sink anchor (400lbs weight) has been released.			
20:42:42 Sep 22 04	1543	191	45.9328	-130.0128	Grabbing the 04 RAS to drag it to a different site.			
20:43:09 Sep 22 04	1543	195	45.9328	-130.0128	Preparing to move the RAS to the correct location.			R854-029
20:44:27 Sep 22 04	1539	338	45.9327	-130.0128	Moving away with the 04 RAS in hand.			

UTC	Z(m)	Hdg	Lat	Long	R854 Comments	Samples	PI	FrGrab
20:45:43 Sep 22 04	1538	338	45.9329	-130.0128	We're heading to Virgin.			
20:46:58 Sep 22 04	1539	339	45.9330	-130.0129	Last years drop anchor in sight.			
20:50:14 Sep 22 04	1543	250	45.9334	-130.0130	We're at Crack vent looking at the cement block for the Big Johnson.			
20:50:16 Sep 22 04	1543	257	45.9334	-130.0130	Crack vent with the cement box for the Johnson flow meter (minus the Big Johnson).			R854-030
20:51:19 Sep 22 04	1541	283	45.9333	-130.0133	Carrying the 04 RAS to Virgin - over Crack vent right now.			R854-031
20:53:50 Sep 22 04	1542	32	45.9333	-130.0134	Going over Crack vent. Trying to get a good navigation fix to figure out how to get to Virgin.			
20:55:40 Sep 22 04	1533	27	45.9333	-130.0134	Still at Crack.			
20:57:42 Sep 22 04	1543	15	45.9333	-130.0133	The sink anchor might still be attached.			
20:57:49 Sep 22 04	1544	12	45.9333	-130.0133	Releasing the RAS beside Crack to look at it - there may be some problem.			R854-032
20:58:41 Sep 22 04	1541	8	45.9333	-130.0134	We've let go of the 04 RAS right before Crack.			
20:59:40 Sep 22 04	1544	175	45.9334	-130.0133	We thought that the anchor may still be on the 04 RAS but it is not.			
21:00:14 Sep 22 04	1543	222	45.9334	-130.0133	They put the 04 RAS down because they thought that the line may be in the thruster. This is not the case so we are moving on.			
21:00:40 Sep 22 04	1543	221	45.9334	-130.0133	Picking the RAS back up and continuing the transit to Virgin.			R854-033
21:01:21 Sep 22 04	1542	310	45.9333	-130.0133	Video is off 21:01.			
21:01:35 Sep 22 04	1542	322	45.9333	-130.0133	Johnson cement box is in sight.			
21:02:16 Sep 22 04	1541	1	45.9334	-130.0134	04 RAS is in hand and we're moving towards Virgin.			
21:04:36 Sep 22 04	1532	1	45.9336	-130.0134	We're very close to Virgin. We're putting down the 04 RAS to get a better look.			
21:05:49 Sep 22 04	1539	295	45.9336	-130.0133	Looking for a good spot to drop the 04 RAS.			
21:06:27 Sep 22 04	1540	1	45.9336	-130.0133	There appears to be an anhydrite chimney (the one that we knocked over yesterday) below us.			
21:06:58 Sep 22 04	1539	40	45.9337	-130.0133	Searching for the correct place to put the RAS.			R854-034
21:07:29 Sep 22 04	1542	349	45.9336	-130.0133	ROPOS is putting down the 04 RAS.			
21:07:48 Sep 22 04	1543	339	45.9336	-130.0133	The RAS has been placed on the seafloor at Virgin.			R854-035
21:07:53 Sep 22 04	1543	313	45.9336	-130.0133	Anhydrite mound is still venting.			
21:08:49 Sep 22 04	1541	103	45.9337	-130.0134	We're definitely at Virgin.			
21:09:02 Sep 22 04	1541	86	45.9337	-130.0134	Video is on: 21:08			
21:09:57 Sep 22 04	1542	78	45.9337	-130.0134	Going to grab the 04 RAS and turn it around so that the sample bottles face the vent and the funnel is above the vent.			
21:12:02 Sep 22 04	1544	60	45.9337	-130.0134	ROPOS is grabbing onto the 04 RAS.			
21:14:23 Sep 22 04	1544	71	45.9337	-130.0134	ROPOS is grabbing the RAS frame in order to move it to the correct position.			R854-036
21:15:07 Sep 22 04	1544	14	45.9336	-130.0134	ROPOS is adjusting the position of the RAS.			R854-037
21:15:15 Sep 22 04	1544	350	45.9336	-130.0133	When we get RAS in place Dave wants to look at Virgin and see how much the vent has grown since yesterday - how many chimneys it's going to grow; etc.			

UTC	Z(m)	Hdg	Lat	Long	R854 Comments	Samples	PI	FrGrab
21:16:38 Sep 22 04	1544	90	45.9334	-130.0135	The RAS has been placed - viewing its position.			R854-038
21:17:44 Sep 22 04	1544	62	45.9336	-130.0133	A view of the new funnel on the RAS.			R854-039
21:19:51 Sep 22 04	1545	316	45.9336	-130.0133	Once again viewing the position of the RAS.			R854-040
21:21:55 Sep 22 04	1545	21	45.9336	-130.0133	Grabbing RAS to reposition.			R854-041
21:22:29 Sep 22 04	1545	4	45.9336	-130.0133	We're re-positioning the RAS. It was a little too close to the vent.			
21:23:19 Sep 22 04	1543	156	45.9337	-130.0133	View of the 04 RAS placement.			R854-042
21:24:13 Sep 22 04	1544	215	45.9337	-130.0133	Virgin mound with RAS in background.			R854-043
21:24:42 Sep 22 04	1545	215	45.9337	-130.0133	Close up of Virgin mound with 04 RAS in background.			R854-044
21:24:57 Sep 22 04	1545	217	45.9337	-130.0133	Close up of Virgin.			R854-045
21:25:29 Sep 22 04	1545	215	45.9337	-130.0133	1 digital of the vent and the RAS.			
21:25:56 Sep 22 04	1545	217	45.9337	-130.0133	View of 04 RAS placement near Virgin.			R854-046
21:26:16 Sep 22 04	1545	232	45.9337	-130.0133	Anhydrites like Virgin are vapor phase vents (more gas). Sulfides like Inferno are brine phase vents.			
21:27:12 Sep 22 04	1545	310	45.9336	-130.0133	04 RAS with virgin mound to the right.			R854-047
21:27:24 Sep 22 04	1545	309	45.9336	-130.0133	End of 04 RAS away from Virgin mound.			R854-048
21:27:43 Sep 22 04	1545	311	45.9336	-130.0133	Close up of end of 04 RAS away from Virgin mound.			R854-049
21:29:47 Sep 22 04	1543	99	45.9337	-130.0133	View of RAS placement with Virgin mound to the left.			R854-050
21:29:59 Sep 22 04	1543	78	45.9336	-130.0134	View of back end of 04 RAS from the other side.			R854-051
21:30:12 Sep 22 04	1543	91	45.9337	-130.0134	04 RAS with Virgin mound to the left.			R854-052
21:30:46 Sep 22 04	1541	138	45.9337	-130.0133	We're happy with the position of the frame now. Won't be moving the RAS anymore. Taking a few DSC's in this area. Hoping to get one of the RAS and the vent. Oh well - we'll get it when all is in place.			
21:32:23 Sep 22 04	1545	141	45.9337	-130.0133	Virgin mound with visible anhydrite.			R854-053
21:32:32 Sep 22 04	1545	137	45.9337	-130.0133	Virgin mound with anhydrite.			R854-054
21:32:41 Sep 22 04	1545	138	45.9337	-130.0133	We're going to scrape this vent. Center the funnel over the flow. We would like to come back on the last dive and see how it grows back.			
21:36:31 Sep 22 04	1545	131	45.9337	-130.0133	Taking Charlie's tool out to scrap anhydrite off of Virgin mound.			R854-055
21:37:03 Sep 22 04	1545	134	45.9337	-130.0133	Charlie's scraper is out and ready to clear away any anhydrite.			
21:37:39 Sep 22 04	1545	133	45.9337	-130.0133	The suction sampler is out of commission for the rest of the dive. It broke while moving the RAS.			
21:39:50 Sep 22 04	1545	135	45.9337	-130.0133	Positioning Charlie's tool for use.			R854-056
21:40:15 Sep 22 04	1545	133	45.9337	-130.0133	Using Charlie's excavator to scrape anhydrite.			R854-057
21:40:38 Sep 22 04	1545	134	45.9337	-130.0133	Excavating Virgin mound.			R854-058
21:41:38 Sep 22 04	1545	134	45.9337	-130.0133	Charlie's excavator is digging the anhydrite and substrate away from the vent. Took several DSC's and frame grabs of this. Thanks Charlie.			

UTC	Z(m)	Hdg	Lat	Long	R854 Comments	Samples	PI	FrGrab
21:43:18 Sep 22 04	1545	127	45.9337	-130.0133	Dave says get it down to bare rock - or else we're just playing in the sand box.			
21:48:29 Sep 22 04	1546	211	45.9337	-130.0133	Virgin mound after excavation.			R854-059
21:48:47 Sep 22 04	1546	211	45.9337	-130.0133	Digging a trench to lay the temperature probe.			
21:48:57 Sep 22 04	1546	198	45.9337	-130.0133	Trenching Virgin mound.			R854-060
21:50:29 Sep 22 04	1546	191	45.9337	-130.0133	The excavator rests.			R854-061
21:51:41 Sep 22 04	1545	241	45.9337	-130.0133	We're off to get the funnel (on the far side of the frame). We'll place that first. Then place the temp probe and hobo.			
21:55:19 Sep 22 04	1545	327	45.9336	-130.0133	Grabbing line on 04 RAS.			R854-062
21:59:03 Sep 22 04	1545	358	45.9336	-130.0133	Removing RAS funnel from 04 RAS.			R854-063
21:59:49 Sep 22 04	1545	310	45.9336	-130.0133	Got the funnel in hand and moving toward the vent with it.			
22:00:15 Sep 22 04	1545	335	45.9336	-130.0133	RAS funnel is out and ready to be put over Virgin mound.			R854-064
22:03:05 Sep 22 04	1545	235	45.9337	-130.0133	The tripod is over the vent. Jon and Johnny are discussing the situation.			
22:03:11 Sep 22 04	1545	250	45.9337	-130.0133	Placing the RAS funnel over Virgin mound.			R854-065
22:04:08 Sep 22 04	1545	248	45.9337	-130.0133	View of RAS funnel placement.			R854-066
22:05:12 Sep 22 04	1545	248	45.9337	-130.0133	View of the top of RAS funnel.			R854-067
22:06:04 Sep 22 04	1545	247	45.9337	-130.0133	Awaiting Dave's approval for the positioning of the funnel above the anhydrite vent.			
22:07:58 Sep 22 04	1545	247	45.9337	-130.0133	Hydrothermal fluid is flowing into the funnel as well as on the outer sides of it.			
22:08:33 Sep 22 04	1545	248	45.9337	-130.0133	Watching RAS funnel.			R854-068
22:08:42 Sep 22 04	1545	248	45.9337	-130.0133	Trying to decide whether the funnel is perfectly centered over the vent.			
22:10:53 Sep 22 04	1545	246	45.9337	-130.0133	The vent flow appears to be deflecting off of the side.			
22:11:08 Sep 22 04	1545	240	45.9337	-130.0133	View of RAS funnel in relation to 04 RAS body.			R854-069
22:12:16 Sep 22 04	1545	121	45.9337	-130.0133	Trying to decide whether the legs of the funnel can be re-positioned outside of the flow.			
22:13:57 Sep 22 04	1545	113	45.9337	-130.0133	Dave is concerned that the funnel leg directly in the hydrothermal flow may eventually be dissolved and tip over.			
22:14:23 Sep 22 04	1544	191	45.9337	-130.0133	Position of RAS funnel over Virgin mound.			R854-070
22:15:24 Sep 22 04	1545	331	45.9336	-130.0133	RAS funnel legs situated over Virgin mound.			R854-071
22:16:14 Sep 22 04	1545	334	45.9336	-130.0133	The vent flow appears to have shifted outside of the funnel.			
22:16:59 Sep 22 04	1545	335	45.9336	-130.0133	ROPOS is repositioning the funnel.			
22:17:46 Sep 22 04	1545	331	45.9336	-130.0133	Trying to reposition RAS funnel leg so that it is out of the hot vent fluid.			R854-072
22:18:35 Sep 22 04	1545	334	45.9336	-130.0133	The Raptor arm has a hold of the funnel and is pulling it away from direct hydrothermal flow.			
22:19:33 Sep 22 04	1545	327	45.9336	-130.0133	Verifying that the flow is directly beneath the 04 RAS funnel.			
22:19:42 Sep 22 04	1545	330	45.9336	-130.0133	First leg of RAS funnel in position.			R854-073
22:21:04 Sep 22 04	1545	329	45.9336	-130.0133	Repositioning second leg.			R854-074

UTC	Z(m)	Hdg	Lat	Long	R854 Comments	Samples	PI	FrGrab
22:21:42 Sep 22 04	1545	331	45.9336	-130.0133	We're continuing to reposition the funnel legs.			
22:23:12 Sep 22 04	1545	175	45.9337	-130.0133	Dave is concerned that two of the three funnel legs are too close to the flow. Funnel is not centered enough.			
22:23:43 Sep 22 04	1545	173	45.9337	-130.0133	Reposition leg of RAS funnel.			R854-075
22:24:10 Sep 22 04	1545	176	45.9337	-130.0133	Second leg in position.			R854-076
22:24:42 Sep 22 04	1545	177	45.9337	-130.0133	The funnel is on too much of an angle at this stage of the repositioning.			
22:26:05 Sep 22 04	1545	170	45.9337	-130.0133	There is less flow into the funnel now than when we started. The main question is: Is the funnel level?			
22:27:24 Sep 22 04	1545	178	45.9337	-130.0133	RAS funnel in position.			R854-077
22:27:47 Sep 22 04	1545	121	45.9337	-130.0133	ROPOS is hovering around the funnel taking a look at the entire set -up.			
22:28:21 Sep 22 04	1545	129	45.9337	-130.0133	RAS funnel in relation to RAS body.			R854-078
22:28:38 Sep 22 04	1545	172	45.9337	-130.0133	RAS funnel in relation to RAS body.			R854-079
22:28:54 Sep 22 04	1544	226	45.9337	-130.0133	The leg closest to the 04 RAS appears not level. Dave suggests placing a rock beneath it.			
22:29:04 Sep 22 04	1544	228	45.9337	-130.0133	RAS funnel in relation to RAS body.			R854-080
22:30:06 Sep 22 04	1545	304	45.9337	-130.0133	RAS funnel is a little unlevel.			R854-081
22:30:52 Sep 22 04	1545	325	45.9337	-130.0133	Bacterial mat near RAS funnel.			R854-082
22:31:42 Sep 22 04	1545	355	45.9337	-130.0133	Keith is looking for a suitable rock for the job.			
22:32:33 Sep 22 04	1545	2	45.9337	-130.0133	Getting rocks to level out RAS funnel.			R854-083
22:32:57 Sep 22 04	1545	8	45.9337	-130.0133	Picking up the chosen one.			
22:34:24 Sep 22 04	1545	353	45.9337	-130.0133	RAS funnel leg to be adjusted.			R854-084
22:35:16 Sep 22 04	1545	356	45.9337	-130.0133	Attempt #1 at placing the rock underneath the funnel leg so as to level everything off.			
22:35:30 Sep 22 04	1545	354	45.9337	-130.0133	Placing a rock under RAS funnel leg.			R854-085
22:36:20 Sep 22 04	1545	348	45.9337	-130.0133	The rock has not lived up to our expectations. It has crumbled.			
22:37:10 Sep 22 04	1545	341	45.9337	-130.0133	RAS funnel leg on top of a rock.			R854-086
22:37:13 Sep 22 04	1545	342	45.9337	-130.0133	The situation seems to have improved. ROPOS will spin around the entire setup to check how level the funnel now is.			
22:38:30 Sep 22 04	1545	187	45.9337	-130.0133	The funnel is still not level.			R854-087
22:40:31 Sep 22 04	1545	190	45.9337	-130.0133	ROPOS is using its stronger arm to push the funnel leg down into the ground.			
22:42:26 Sep 22 04	1545	190	45.9337	-130.0133	Still attempting to fix the uneven funnel problem.			
22:43:30 Sep 22 04	1546	191	45.9337	-130.0133	A shrimp floats by the action. This is not a vent shrimp.			
22:46:51 Sep 22 04	1545	189	45.9337	-130.0133	The Raptor arm is going in to reposition the funnel again.			
22:47:49 Sep 22 04	1546	191	45.9337	-130.0133	Shifting the funnel.			
22:49:59 Sep 22 04	1546	194	45.9337	-130.0133	The funnel has been shifted a bit too much.			
22:51:44 Sep 22 04	1546	184	45.9337	-130.0133	Funnel repositioned and looks more level.			R854-088

UTC	Z(m)	Hdg	Lat	Long	R854 Comments	Samples	PI	FrGrab
22:53:11 Sep 22 04	1545	186	45.9337	-130.0133	Checking to see if vent fluid is entering RAS funnel.			R854-089
22:53:49 Sep 22 04	1544	320	45.9337	-130.0133	Vent fluid appears to be missing the RAS funnel.			R854-090
22:54:17 Sep 22 04	1545	339	45.9337	-130.0133	Trying to decide whether a current is shifting the flow away from the center of the funnel.			
22:54:58 Sep 22 04	1545	334	45.9337	-130.0133	Base of funnel after being repositioned.			R854-091
22:56:57 Sep 22 04	1546	132	45.9337	-130.0133	Making another adjustment to the leg of the RAS funnel.			R854-092
22:58:05 Sep 22 04	1545	182	45.9337	-130.0133	The 04 RAS funnel is now level. We're checking to see if the fluid flow is centered.			
22:59:50 Sep 22 04	1545	198	45.9337	-130.0133	Close up of vent fluid near the RAS funnel.			R854-093
23:00:49 Sep 22 04	1546	195	45.9337	-130.0133	Trying to predict how the anhydrite chimney will eventually form.			
23:02:58 Sep 22 04	1545	178	45.9337	-130.0133	The 04 RAS funnel is in its final position.			
23:04:47 Sep 22 04	1545	169	45.9337	-130.0133	Base of RAS the funnel.			R854-094
23:05:17 Sep 22 04	1546	167	45.9337	-130.0133	Getting ready to remove the temperature sensor from the RAS and place it beneath the funnel.			
23:06:54 Sep 22 04	1545	226	45.9337	-130.0133	ROPOS is hovering around the RAS going to get the temperature sensor.			
23:08:23 Sep 22 04	1545	299	45.9336	-130.0133	Preparing to disconnect the temperature sensor from the 04 RAS.			
23:09:35 Sep 22 04	1545	302	45.9336	-130.0133	ROPOS grabbing the RAS temperature sensor.			R854-095
23:10:13 Sep 22 04	1545	286	45.9336	-130.0133	The temperature sensor came off without a hitch. ROPOS has the temperature sensor in hand and is moving towards the 04 RAS funnel.			
23:11:06 Sep 22 04	1545	238	45.9337	-130.0132	View of RAS as temperature probe is being removed.			R854-096
23:11:30 Sep 22 04	1545	253	45.9337	-130.0132	Deciding where to place the temperature sensor.			
23:14:13 Sep 22 04	1545	268	45.9337	-130.0132	Repositioning the temperature sensor after it was placed next to the funnel.			
23:15:18 Sep 22 04	1545	272	45.9337	-130.0132	Dave wants the temperature sensor jammed into one of the vent outflow points or across several fluid outflow points.			
23:18:50 Sep 22 04	1546	117	45.9337	-130.0133	Placing temperature probe underneath the RAS funnel.			R854-097
23:20:59 Sep 22 04	1546	114	45.9337	-130.0133	Still adjusting the placement of the temperature sensor.			
23:21:44 Sep 22 04	1546	106	45.9337	-130.0133	Temperature probe being placed.			R854-098
23:22:14 Sep 22 04	1546	107	45.9337	-130.0133	Dave wants the temperature sensor to be jammed into the trough of outflow points.			
23:24:27 Sep 22 04	1546	104	45.9337	-130.0133	Still placing the temp probe. It didn't end up here.			R854-099
23:24:38 Sep 22 04	1546	106	45.9337	-130.0133	Ian is trying to jam the temperature probe into the trough.			
23:28:08 Sep 22 04	1546	136	45.9337	-130.0133	Switching to tape 2.			
23:30:00 Sep 22 04	1546	139	45.9337	-130.0133	Dave is finding the Perfect spot for the temperature probe. whoops. ROPOS seems to have dropped it. Let's start again.			
23:39:22 Sep 22 04	1545	155	45.9337	-130.0133	Looking at the position of the temperature sensor.			R854-100
23:39:43 Sep 22 04	1545	174	45.9337	-130.0133	Examining the position of the temperature sensor.			R854-101

UTC	Z(m)	Hdg	Lat	Long	R854 Comments	Samples	PI	FrGrab
23:40:39 Sep 22 04	1545	277	45.9337	-130.0132	We're assessing the situation here and hoping the temp probe is in the right place. Took 9 DSC's - hoping this is the final placement of the probe.			
23:40:39 Sep 22 04	1545	277	45.9337	-130.0132	Seeing if the temperature sensor is in a good location.			R854-102
23:42:27 Sep 22 04	1545	313	45.9336	-130.0133	The temperature sensor is in its final spot.			R854-103
23:42:50 Sep 22 04	1545	313	45.9336	-130.0133	Looks like that will do it for T2. T2 is the probe on the vent. T1 is in the funnel. T3 is on the frame - on the side - in the acrylic sensor block. (When looking at the frame from the tripod the T3 is on the left side.)			
23:46:06 Sep 22 04	1545	100	45.9336	-130.0133	Removing the pin that holds the transducer gimble release fixed (want it to be able to move around).			
23:46:34 Sep 22 04	1545	102	45.9336	-130.0133	Preparing to release the gimbal pin.			R854-104
23:47:17 Sep 22 04	1545	101	45.9336	-130.0133	Releasing the gimbal pin.			R854-105
23:47:38 Sep 22 04	1545	100	45.9336	-130.0133	The gimbal pin has been released.			R854-106
23:48:25 Sep 22 04	1545	94	45.9336	-130.0133	Next task is to put the hobo in the vent.			
23:52:29 Sep 22 04	1546	163	45.9337	-130.0133	Talking robotic hands.			R854-107
23:52:49 Sep 22 04	1546	165	45.9337	-130.0133	ROPOS talking hands.			
23:53:21 Sep 22 04	1546	168	45.9337	-130.0133	Straightening one of the fingers on one of the ROPOS arms.			R854-108
23:55:01 Sep 22 04	1546	167	45.9337	-130.0133	Fingers are straightened.			R854-109
23:56:44 Sep 22 04	1545	168	45.9337	-130.0133	Preparing to grab the HOBO for deployment.			R854-110
23:57:19 Sep 22 04	1546	166	45.9337	-130.0133	Pulling HOBO from ROPOS.			R854-111
23:57:32 Sep 22 04	1546	164	45.9337	-130.0133	Shrimp in the spotlight with the HOBO on the side.			R854-112
23:57:56 Sep 22 04	1546	165	45.9337	-130.0133	The hobo is out of the holster and on the ground next to the vent.			
23:58:30 Sep 22 04	1546	166	45.9337	-130.0133	Getting the HOBO with the other arm.			R854-113
00:00:46 Sep 23 04	1546	177	45.9337	-130.0133	Placing the HOBO.			R854-114
00:00:55 Sep 23 04	1546	176	45.9337	-130.0133	Deployed hobo 127. The hobo probe seems to be in place in the vent. Lots of flow around it. So all instruments seem to be in place.			
00:01:05 Sep 23 04	1546	178	45.9337	-130.0133	The HOBO is in place on the first shot.			R854-115
00:02:23 Sep 23 04	1546	174	45.9337	-130.0133	The HOBO in place.			R854-116
00:03:28 Sep 23 04	1545	200	45.9337	-130.0133	We're taking a series of DSC's of the 04 RAS.			
00:06:24 Sep 23 04	1545	301	45.9336	-130.0132	Silvery things on the side of the frame are T3; Eh and Ph sensors. We have zoom in DSC's of the sensors. Also have 23 DSC's of the RAS setup.			
00:09:04 Sep 23 04	1545	292	45.9336	-130.0132	Homer probe is on RAS.			R854-117
00:10:25 Sep 23 04	1545	314	45.9336	-130.0132	Trying to remove the homer probe from the frame. It has 2 tie-wraps securing it.			
00:11:45 Sep 23 04	1544	356	45.9336	-130.0133	Retrieving homer probe.			R854-118
00:14:03 Sep 23 04	1546	35	45.9336	-130.0133	Kim grabbed the pull release pin and the homer fell to the seafloor. Placing it in the biobox.			

UTC	Z(m)	Hdg	Lat	Long	R854 Comments	Samples	PI	FrGrab
00:14:14 Sep 23 04	1546	28	45.9336	-130.0133	Pin pulled and homer probe released.			R854-119
00:14:36 Sep 23 04	1546	15	45.9336	-130.0133	Homer retrieved by ROPOS.			R854-120
00:15:23 Sep 23 04	1546	9	45.9336	-130.0133	Homer placed in the ROPOS biobox.			R854-121
00:17:16 Sep 23 04	1546	24	45.9336	-130.0133	Parachute cord. Making sure it will not hinder recovery next year.			R854-122
00:17:18 Sep 23 04	1546	23	45.9336	-130.0133	John wants to get a shot of the parachute cord under the RAS and make sure it's not wound around the anchor. It's not.			
00:19:50 Sep 23 04	1546	251	45.9337	-130.0133	Marker I.			R854-123
00:21:37 Sep 23 04	1541	317	45.9337	-130.0133	Done at Virgin and now we're at Marshmallow.			
00:22:15 Sep 23 04	1545	248	45.9337	-130.0133	The HOBO at Marshmallow has been located.			R854-124
00:22:45 Sep 23 04	1546	204	45.9338	-130.0133	The HOBO in Marshmallow.			R854-125
00:22:52 Sep 23 04	1546	203	45.9338	-130.0133	Ready to recover the hobo at Marshmallow.			
00:23:09 Sep 23 04	1546	206	45.9338	-130.0133	Retrieving the HOBO at Marshmallow.			R854-126
00:23:38 Sep 23 04	1546	207	45.9338	-130.0133	Retrieving the HOBO at Marshmallow.			R854-127
00:23:47 Sep 23 04	1546	205	45.9338	-130.0133				
00:24:02 Sep 23 04	1546	204	45.9338	-130.0133	Just before the Marshmallow fell off the hobo skewer.			R854-128
00:24:14 Sep 23 04	1546	204	45.9338	-130.0133	Recover hobo #126 after 1 year deployment. [Marshmallow]	R854-hobo-126-0001	Embley	
00:27:34 Sep 23 04	1546	204	45.9338	-130.0133	Toasted Marshmallow.			R854-129
00:29:02 Sep 23 04	1546	206	45.9338	-130.0133	Looking around at the seafloor near Marshmallow. ROPOS has found a few anemones.			
00:29:07 Sep 23 04	1546	202	45.9338	-130.0133	Aquatic biota.			R854-130
00:30:49 Sep 23 04	1543	219	45.9337	-130.0134	Coming up to Mushroom. Planning on doing some more digital picture mosaics.			
00:31:04 Sep 23 04	1544	215	45.9337	-130.0134	Mushroom in the distance.			R854-131
00:31:48 Sep 23 04	1546	219	45.9337	-130.0134	Hovering around Mushroom.			R854-132
00:32:11 Sep 23 04	1546	216	45.9337	-130.0134	Took 9 DSCs of Mushroom.			
00:37:06 Sep 23 04	1544	340	45.9332	-130.0132	Snowing bacteria at Mushroom.			R854-133
00:37:49 Sep 23 04	1545	186	45.9333	-130.0132	Leaving Mushroom and heading to Hell to take DSC images.			
00:39:02 Sep 23 04	1540	234	45.9332	-130.0133	Coming up close to Hell.			R854-134
00:39:05 Sep 23 04	1540	232	45.9332	-130.0132	Arriving at Hell and taking DSCs.			
00:40:01 Sep 23 04	1542	254	45.9333	-130.0132	Hell.			R854-135
00:44:30 Sep 23 04	1547	251	45.9333	-130.0140	Still at Hell. We have taken 20 DSC images.			
00:45:29 Sep 23 04	1547	251	45.9333	-130.0140	Blue Mat forming on empty tubeworms at Hell?			R854-136
00:46:01 Sep 23 04	1547	261	45.9333	-130.0140	Zooming in and taking a look at blue material on the side of Hell.			
00:47:11 Sep 23 04	1547	267	45.9333	-130.0140	Blue Mat near a vent flow at Hell.			R854-137
00:50:07 Sep 23 04	1545	0	45.9332	-130.0140	Moving around to another side of Hell to take more images.			

UTC	Z(m)	Hdg	Lat	Long	R854 Comments	Samples	PI	FrGrab
00:52:35 Sep 23 04	1543	17	45.9333	-130.0140	Leaving Hell and moving on toward Phoenix. 10 more DSC images taken at Hell.			
00:53:29 Sep 23 04	1542	83	45.9332	-130.0140	Arriving at Phoenix and preparing to take DSC images.			
00:54:03 Sep 23 04	1543	81	45.9332	-130.0139	Coming up to Phoenix.			R854-138
00:55:27 Sep 23 04	1546	67	45.9332	-130.0139	Base of Phoenix.			R854-139
00:55:48 Sep 23 04	1546	67	45.9332	-130.0139	Have taken 10 DSC images of one side of Phoenix and now moving to another side to take some more images.			
00:57:25 Sep 23 04	1543	6	45.9333	-130.0140	Top of Phoenix.			R854-140
00:58:33 Sep 23 04	1547	11	45.9332	-130.0140	Palm worms at the base of Phoenix.			R854-141
00:58:45 Sep 23 04	1547	13	45.9332	-130.0140	Taking 9 more DSC images of Phoenix.			
01:00:05 Sep 23 04	1547	19	45.9332	-130.0140	Preparing to try and suction a sample of blue mat.			
01:01:39 Sep 23 04	1547	21	45.9332	-130.0140	Attempting to break the suction hose in order to take some suction samples.			R854-142
01:02:08 Sep 23 04	1547	20	45.9332	-130.0140	Using left arm to grab onto suction hose.			
01:02:39 Sep 23 04	1547	23	45.9332	-130.0140	There is a large fish near the Phoenix chimney.			
01:03:04 Sep 23 04	1547	26	45.9332	-130.0140	Suction hose is broken.			R854-143
01:04:55 Sep 23 04	1547	18	45.9332	-130.0140	Suction hose ready to deploy - maybe.			R854-144
01:06:16 Sep 23 04	1547	9	45.9332	-130.0140	Right arm has regripped the suction hose. Moving toward sampling region.			
01:08:17 Sep 23 04	1547	9	45.9333	-130.0140	Suction sample into jar #1. Suctioning blue mat. Start1=1315 Stop1=1315. Start2=1317 Stop2=1317. Z=1547. [Phoenix]	R854-SS-J1-0002	Kouris	
01:13:14 Sep 23 04	1546	53	45.9333	-130.0140	Looking for a good place to sample.			
01:14:28 Sep 23 04	1546	51	45.9333	-130.0140	Attempting to sample with the suctioning tube.			R854-145
01:14:44 Sep 23 04	1546	50	45.9333	-130.0140	Sampling with the suctioning tube.			R854-146
01:15:58 Sep 23 04	1546	52	45.9333	-130.0140	Sampling again.			R854-147
01:16:39 Sep 23 04	1546	52	45.9333	-130.0140	Close up of the attempted sample site.			R854-148
01:18:42 Sep 23 04	1546	51	45.9333	-130.0140	Contents of the sampling jar from suctioning.			R854-149
01:18:43 Sep 23 04	1546	52	45.9333	-130.0140	Examining the sample.			
01:18:51 Sep 23 04	1546	51	45.9333	-130.0140	Another shot of the sample. Hopefully it's the blue mat that Angela wants.			R854-150
01:18:57 Sep 23 04	1546	50	45.9333	-130.0140	Upper part of the sample jar.			R854-151
01:20:22 Sep 23 04	1546	49	45.9333	-130.0140	Upper part of the sample jar.			R854-152
01:21:30 Sep 23 04	1546	50	45.9333	-130.0140	Flushing suction sampler into Jar #8.			
01:23:59 Sep 23 04	1542	152	45.9333	-130.0140	Leaving Phoenix and heading toward Fe Hyde.			
01:25:06 Sep 23 04	1546	178	45.9331	-130.0139	Bucket lid in transit to Fe Hyde.			R854-153
01:25:16 Sep 23 04	1546	196	45.9331	-130.0139	Fish in transit to Fe Hyde.			R854-154
01:25:50 Sep 23 04	1546	134	45.9330	-130.0139	We're looking for iron oxide where it is actively venting. We're turning toward Crack vent now.			

UTC	Z(m)	Hdg	Lat	Long	R854 Comments	Samples	PI	FrGrab
01:29:18 Sep 23 04	1546	339	45.9334	-130.0134	Broken sphere near Crack vent.			R854-155
01:29:44 Sep 23 04	1546	339	45.9334	-130.0134	One DSC of a broken glass sphere. There's quite a bit of trash on the bottom. Some cans and science gear.			
01:30:23 Sep 23 04	1546	4	45.9334	-130.0134	Some sort of can on the seafloor near Crack vent.			R854-156
01:31:19 Sep 23 04	1545	68	45.9334	-130.0134	Looks like we found some iron oxide near Crack vent.			R854-157
01:31:49 Sep 23 04	1546	81	45.9334	-130.0134	Iron oxide near Crack vent.			R854-158
01:32:14 Sep 23 04	1546	67	45.9334	-130.0134	3 DSC's taken (blind) of the Fe Oxide mats here near Crack vent.			
01:34:28 Sep 23 04	1546	69	45.9334	-130.0133	One of Bruce Cowden's signs.			R854-159
01:34:40 Sep 23 04	1546	96	45.9334	-130.0133	One of Bruce Cowden's lovely signs on the bottom.			
01:35:44 Sep 23 04	1546	147	45.9334	-130.0133	We're heading over to the rescue mooring to release the floats. Using the homer probe to find it.			
01:39:07 Sep 23 04	1543	318	45.9333	-130.0131	Found the mooring. Took a couple DSC's.			
01:39:07 Sep 23 04	1543	318	45.9333	-130.0131	Rescue mooring in site.			R854-160
01:39:39 Sep 23 04	1545	358	45.9333	-130.0132	This is the release for the rescue moorings.			R854-161
01:43:40 Sep 23 04	1546	9	45.9332	-130.0129	ROPOS is making a move to release the rescue mooring.			
01:45:09 Sep 23 04	1546	335	45.9332	-130.0129	The rescue moorings have been released.			R854-162
01:45:12 Sep 23 04	1546	338	45.9332	-130.0129	The mooring is heading for the surface. ROPOS has the homer probe in its claw. We're on our way to the cage.			
03:09:06 Sep 23 04	2	181	45.9346	-130.0108	ROPOS is at the surface.			
03:12:35 Sep 23 04	2	169	45.9348	-130.0109	ROPOS is on the deck.			

5.4.3 R855 Dive Log

R855: Caldera Center to South Pillow Mound
Wet time (UTC): 9/23 1727 - 9/25 0526. JD: 267-269. 35.98 hrs.
Bottom time (UTC): 9/23 1559 - 9/25 0640. JD: 267-269. 38.68 hrs. [9 samples]
DSC information: 126 DSCs taken starting with R855_DSC_092304_190204_04156.jpg and ending with R855_DSC_092504_050935_04281.jpg
Dive Summary: Pressure measurement dive. 3 transects starting at the Caldera center to Magnesia; Mkr-33; Bag City and the South Pillow Mound . Then back north with measurements at all sites. Then south again with measurements at all sites. The measurements ended at the South Pillow Mound. On the third transect experiments were deployed and recovered. Mkr 33: Recovered 4 MTRs; Amanda's limpet growth cage. Deployed 4 MTRs; Noreen's limpet growth experiment; Richard's sulfide weathering experiment. Cloud: Recovered 3 MTRs - one which we couldn't find in the pit in 2003. Deployed: 2 MTRs in the pit. Running behind schedule so postponed other deployments/recoveries.

UTC	Z(m)	Hdg	Lat	Long	R855 Comments	Samples	PI	FrGrab
15:59:09 Sep 23 04	0	105	45.9539	-130.0077	ROPOS is in the water.			
16:05:12 Sep 23 04	44	55	45.9541	-130.0081	Starting the descent.			
17:27:31 Sep 23 04	1503	7	45.9552	-130.0103	IRLS crashed so there were no log entries as we reached the bottom (at 17:12). We passed the BPR from last year (2003N) on the side of an inflation structure while looking for the first benchmark (AX63) in the center of the caldera.			
17:30:04 Sep 23 04	1520	168	45.9552	-130.0103	We can see the BPR on the sonar. It is about 30 meters off to the west from our current position.			
17:34:09 Sep 23 04	1530	129	45.9552	-130.0103	Turned on the video tapes.			
17:38:27 Sep 23 04	1533	119	45.9553	-130.0102	Found the two markers around benchmark AX63.			
17:39:24 Sep 23 04	1533	76	45.9552	-130.0102	Found benchmark AX63.			
17:41:55 Sep 23 04	1533	58	45.9552	-130.0102	Benchmark AX63 at the center of the caldera.			R855-001
17:43:41 Sep 23 04	1535	20	45.9552	-130.0102	BM63 at center of caldera before pressure sensor deployed.			R855-002
17:46:10 Sep 23 04	1536	4	45.9552	-130.0102	Grabbing pressure sensor from cradle.			R855-003
17:46:30 Sep 23 04	1535	5	45.9552	-130.0102	Picking up the pressure sensor.			
17:48:47 Sep 23 04	1536	10	45.9552	-130.0102	Placing pressure sensor on benchmark AX63. Sub sitting with a heading of about 008.			R855-004
17:48:54 Sep 23 04	1536	8	45.9552	-130.0102	Pressure sensor is on the benchmark. Took 2 digital images.			
17:51:48 Sep 23 04	1536	5	45.9552	-130.0102	Started measurement at 1749.			
17:54:28 Sep 23 04	1536	4	45.9552	-130.0102	Placement of the pressure sensor at benchmark AX63.			R855-005
18:29:12 Sep 23 04	1536	6	45.9552	-130.0102	Stopping the measurement at 18:30.			
18:31:15 Sep 23 04	1535	11	45.9553	-130.0102	Picking up the sensor and stowing it.			
18:38:49 Sep 23 04	1534	27	45.9553	-130.0102	Pressure sensor is stowed.			
18:42:50 Sep 23 04	1534	27	45.9553	-130.0102	Stowing the cable for the sensor.			
18:47:40 Sep 23 04	1531	82	45.9553	-130.0102	Took 2 more digital images of the benchmark AX63 area.			

UTC	Z(m)	Hdg	Lat	Long	R855 Comments	Samples	PI	FrGrab
18:49:01 Sep 23 04	1511	85	45.9552	-130.0102	Heading to benchmark AX01 (Magnesia). Stopping the video.			
20:19:01 Sep 23 04	1524	143	45.9463	-129.9849	On bottom near Magnesia. Benchmark is probably south of us a bit. Video on.			
20:25:48 Sep 23 04	1525	203	45.9462	-129.9849	Found marker 67 at benchmark AX01.			
20:28:31 Sep 23 04	1525	110	45.9462	-129.9849	Benchmark AX01 at Magnesia.			R855-006
20:37:23 Sep 23 04	1527	48	45.9462	-129.9849	Placing the sensor on the benchmark (AX01).			
20:39:01 Sep 23 04	1527	45	45.9462	-129.9849	Placement of the pressure sensor on benchmark AX01.			R855-007
20:40:57 Sep 23 04	1527	47	45.9462	-129.9849	Took 2 digital images. Starting measurement at 20:38. Stopping the video.			
21:08:37 Sep 23 04	1527	46	45.9462	-129.9849	End pressure measurement at Magnesia at 21:08. Heading of 046 during measurement. Video on.			
21:14:55 Sep 23 04	1509	114	45.9462	-129.9849	Off bottom going back to cage. Video off. Next stop Marker 33.			
22:26:11 Sep 23 04	1521	30	45.9333	-129.9824	ROPOS on bottom at Marker 33. Benchmark in sight. Video on. Wow, that was quick!			
22:40:19 Sep 23 04	1523	115	45.9333	-129.9824	Pressure measurement started at 22:38. Heading is 115. Marker 53 is off to our right. Video off at 22:41.			
22:41:49 Sep 23 04	1523	113	45.9333	-129.9824	Pressure sensor at Marker 33.			R855-008
23:10:32 Sep 23 04	1523	108	45.9333	-129.9824	End pressure measurement at 23:10.			
23:13:55 Sep 23 04	1523	106	45.9333	-129.9824	Pressure sensor stowed. Now getting cable stowed. Video on.			
23:15:33 Sep 23 04	1523	110	45.9333	-129.9824	Cable stowed. Going back up to the cage. Video off.			
00:29:36 Sep 24 04	1530	286	45.9165	-129.9894	On bottom near Bag City. Video on.			
00:38:24 Sep 24 04	1532	83	45.9165	-129.9895	At Bag City vent marker.			
00:41:06 Sep 24 04	1529	293	45.9166	-129.9895	From Marker 36 we turned to SW and immediately saw the marker at the benchmark AX04.			
00:53:57 Sep 24 04	1534	40	45.9166	-129.9895	Pressure sensor on benchmark AX04 (Bag City).			R855-009
00:54:45 Sep 24 04	1534	37	45.9166	-129.9895	Start of pressure measurement at 00:53. Video off at 00:54. Heading is 040.			
01:10:43 Sep 24 04	1534	36	45.9166	-129.9894	Crab.			R855-010
01:23:07 Sep 24 04	1534	38	45.9166	-129.9895	End of pressure measurement at Bag City. Video on.			
01:31:25 Sep 24 04	1485	58	45.9166	-129.9895	ROPOS up at cage. Video off. Moving ship to South Pillow Mound (benchmark AX66).			
04:17:59 Sep 24 04	1718	154	45.8627	-130.0032	On bottom near South Pillow Mound.			
04:20:35 Sep 24 04	1720	158	45.8627	-130.0033	We're at BM AX66. Video is on.			
04:21:49 Sep 24 04	1722	136	45.8628	-130.0034	Eruptive fissure site.			R855-011
04:22:07 Sep 24 04	1723	123	45.8628	-130.0034	Pressure site.			R855-012
04:40:17 Sep 24 04	1723	27	45.8631	-130.0038	Finished adjusting cage cable. Ready to start!			
04:41:29 Sep 24 04	1723	25	45.8632	-130.0038	Removing instrument.			R855-013
04:42:04 Sep 24 04	1723	22	45.8632	-130.0037	Positioning instrument.			R855-014
04:43:08 Sep 24 04	1723	22	45.8632	-130.0038	Instrument in place.			R855-015

UTC	Z(m)	Hdg	Lat	Long	R855 Comments	Samples	PI	FrGrab
04:43:11 Sep 24 04	1723	21	45.8632	-130.0037	Starting pressure sensor reading 0443. Heading 025. Video off.			
05:12:50 Sep 24 04	1723	25	45.8632	-130.0038	End of pressure sensor reading at 0512.			
05:13:50 Sep 24 04	1723	25	45.8632	-130.0038	Video on.			
05:14:32 Sep 24 04	1723	20	45.8631	-130.0038	Removing instrument.			R855-016
05:14:58 Sep 24 04	1723	23	45.8631	-130.0038	Instrument off.			R855-017
05:15:58 Sep 24 04	1723	22	45.8631	-130.0037	Instrument back with ROPOS.			R855-018
05:18:01 Sep 24 04	1723	31	45.8632	-130.0037	Moving DSC 24 pictures.			
05:19:06 Sep 24 04	1723	86	45.8631	-130.0037	Small crack - stowing to leave.			R855-019
05:19:18 Sep 24 04	1723	83	45.8631	-130.0038	Video tapes switched.			
05:23:06 Sep 24 04	1721	60	45.8632	-130.0038	Leaving the site.			R855-020
05:24:09 Sep 24 04	1718	141	45.8632	-130.0038	ROPOS headed towards cage. Video off. Next stop is Bag City for the second round of pressure measurements.			
06:33:53 Sep 24 04	1282	42	45.8829	-129.9988	Cannonball jelly coming'. This is the one that MBARI says it discovered - although we've been seeing it out here for years.			R855-021
06:33:56 Sep 24 04	1282	34	45.8829	-129.9988	closer...			R855-022
06:40:41 Sep 24 04	1289	15	45.8857	-129.9981	Beautiful jelly.			R855-023
06:52:53 Sep 24 04	1282	17	45.8907	-129.9967	Close-up of jelly.			R855-024
06:59:33 Sep 24 04	1279	31	45.8934	-129.9960	Close-up of jelly.			R855-025
07:03:57 Sep 24 04	1279	39	45.8952	-129.9954	Close-up of jelly.			R855-026
07:08:31 Sep 24 04	1278	23	45.8971	-129.9949	Jelly looks like an eyeball and eye lashes.			R855-027
07:13:09 Sep 24 04	1276	29	45.8990	-129.9944	Close-up of jelly.			R855-028
08:11:29 Sep 24 04	1530	29	45.9166	-129.9894	On bottom at Bag City. Looking for benchmark.			
08:12:45 Sep 24 04	1533	177	45.9166	-129.9895	Video on.			
08:13:57 Sep 24 04	1531	54	45.9166	-129.9895	We're here! ROPOS is lining up the PS at same heading as the first measurement.			
08:17:15 Sep 24 04	1533	344	45.9166	-129.9894	Preparing to remove instrument (Bag City).			R855-029
08:29:56 Sep 24 04	1533	336	45.9166	-129.9894	Orienting the PS.			
08:30:26 Sep 24 04	1533	336	45.9166	-129.9895	Initial placement of pressure sensor.			R855-030
08:37:42 Sep 24 04	1533	356	45.9166	-129.9894	Easing sensor into place.			R855-031
08:40:12 Sep 24 04	1533	344	45.9166	-129.9895	Begin pressure sensor measurement at 0840. Heading 040. Video off.			
08:40:23 Sep 24 04	1533	344	45.9166	-129.9895	Final sensor position.			R855-032
09:10:24 Sep 24 04	1533	342	45.9166	-129.9895	Pressure measurement complete at 0910.			
09:11:03 Sep 24 04	1533	345	45.9166	-129.9895	Video on.			
09:11:46 Sep 24 04	1533	334	45.9166	-129.9894	Removing sensor from Bag City site.			R855-033
09:17:01 Sep 24 04	1533	335	45.9166	-129.9895	Headed for Mkr-33. Video off.			

UTC	Z(m)	Hdg	Lat	Long	R855 Comments	Samples	PI	FrGrab
09:17:06 Sep 24 04	1532	338	45.9166	-129.9895	On to Mkr 33, good-bye Bag City.			R855-034
10:24:55 Sep 24 04	1516	69	45.9333	-129.9825	On bottom at Mkr-33. Video on.			
10:26:41 Sep 24 04	1517	31	45.9333	-129.9824	Approaching Mkr-33.			R855-035
10:28:23 Sep 24 04	1521	100	45.9333	-129.9824	We're at the benchmark and are setting up the pressure sensor.			
10:28:38 Sep 24 04	1522	115	45.9333	-129.9824	The site.			R855-036
10:35:23 Sep 24 04	1522	113	45.9333	-129.9825	Adjusting the sensor.			R855-037
10:36:21 Sep 24 04	1522	112	45.9333	-129.9824	Final placement Mkr 33.			R855-038
10:36:22 Sep 24 04	1522	114	45.9333	-129.9824	Begin pressure measurement at 1036. Video off.			
11:06:34 Sep 24 04	1522	110	45.9333	-129.9825	End pressure measurement at 1106.			
11:07:01 Sep 24 04	1522	109	45.9333	-129.9825	Video on. Putting PS away before beginning transit to Magnesia.			
11:15:58 Sep 24 04	1520	109	45.9333	-129.9825	Departure.			R855-039
11:16:04 Sep 24 04	1518	106	45.9333	-129.9825	Off bottom; video off.			
12:21:27 Sep 24 04	1526	49	45.9463	-129.9850	Approaching Magnesia site looking for the benchmark.			
12:23:43 Sep 24 04	1527	55	45.9463	-129.9850	Spotted benchmark.			
12:24:14 Sep 24 04	1524	49	45.9463	-129.9849	Approaching benchmark (Magnesia).			R855-040
12:25:20 Sep 24 04	1526	44	45.9463	-129.9850	Video on.			
12:26:42 Sep 24 04	1526	48	45.9463	-129.9850	The benchmark.			R855-041
12:32:23 Sep 24 04	1526	47	45.9463	-129.9849	Placing sensor on benchmark.			
12:35:39 Sep 24 04	1526	47	45.9463	-129.9849	Moving sensor into position just a nudge.			
12:36:22 Sep 24 04	1526	46	45.9463	-129.9849	Sensor adjustment.			R855-042
12:37:09 Sep 24 04	1526	48	45.9463	-129.9849	Sensor in place begin at 12:37.			
12:37:56 Sep 24 04	1526	48	45.9463	-129.9849	Sensor in place.			R855-043
12:38:07 Sep 24 04	1526	47	45.9463	-129.9849	Video off.			
13:07:21 Sep 24 04	1526	46	45.9463	-129.9849	Measurement finished at 1307. Video on.			
13:08:41 Sep 24 04	1526	46	45.9463	-129.9849	Time to go...picking up sensor.			R855-044
13:11:56 Sep 24 04	1526	34	45.9463	-129.9849	Lift off from Magnesia.			R855-045
13:12:09 Sep 24 04	1526	25	45.9463	-129.9849	ROPOS is off the bottom; moving towards Caldera Center. Video off.			
14:21:20 Sep 24 04	1526	354	45.9552	-130.0101	On bottom at caldera center. Video on.			
14:28:34 Sep 24 04	1530	33	45.9552	-130.0101	Looking around at caldera center site.			R855-046
14:34:15 Sep 24 04	1532	209	45.9552	-130.0101	Still hunting for the benchmark.			
14:44:07 Sep 24 04	1534	100	45.9552	-130.0101	Still looking for benchmark.			R855-047
14:47:47 Sep 24 04	1532	88	45.9552	-130.0101	Jumbled lava - but not the benchmark.			R855-048
14:53:25 Sep 24 04	1531	24	45.9552	-130.0101	Looking for benchmark -63.			

UTC	Z(m)	Hdg	Lat	Long	R855 Comments	Samples	PI	FrGrab
14:57:08 Sep 24 04	1530	87	45.9552	-130.0101	Looks like we've found the benchmark. Bmrk-63. Took a couple of DSCs (blind) of the benchmark.			
14:57:54 Sep 24 04	1535	57	45.9552	-130.0101	Benchmark at the center of the caldera.			R855-049
14:59:46 Sep 24 04	1534	20	45.9552	-130.0101	Marker number 63 attached to the benchmark at the caldera.			R855-050
15:04:52 Sep 24 04	1535	7	45.9552	-130.0101	Starting pressure measurement now.			
15:06:29 Sep 24 04	1535	11	45.9552	-130.0101	False start. Repositioning the sensor. Bill is taking a digital and the video is off. Starting measurement at 1507.			
15:07:29 Sep 24 04	1535	7	45.9552	-130.0101	Pressure sensor in place on the benchmark in the caldera.			R855-051
15:15:30 Sep 24 04	1535	9	45.9552	-130.0101	Started tape 3 at 1506.			
15:35:43 Sep 24 04	1535	7	45.9551	-130.0101	Finished with measurement here at Bmrk -63 - caldera center. This is the last transit.			
15:38:47 Sep 24 04	1535	10	45.9551	-130.0101	Removing the pressure sensor from the benchmark and stowing it in the cradle.			
15:42:21 Sep 24 04	1535	15	45.9551	-130.0101	We're going to look at the BPR we deployed last summer. This one will stay in. The new BPR will also be deployed in the caldera center.			
15:44:57 Sep 24 04	1520	299	45.9552	-130.0101	Video off.			
15:53:27 Sep 24 04	1523	307	45.9552	-130.0101	Video on. We've found the BPR.			
15:54:11 Sep 24 04	1522	332	45.9552	-130.0101	We've spotted the mooring (15m mooring) and we're heading to the bottom to look at the BPR.			
15:54:35 Sep 24 04	1518	254	45.9552	-130.0101	BPR mooring at the center of the caldera. [Axial]			R855-052
15:56:30 Sep 24 04	1533	255	45.9552	-130.0101	It's on the bottom looking good. We're getting a few DSCs here.			
15:56:38 Sep 24 04	1534	268	45.9552	-130.0101	BPR at the caldera center. [Axial]			R855-053
15:58:00 Sep 24 04	1529	278	45.9552	-130.0101	Video off. The BPR we just observed is not on the NeMO-Net. The one that we will deploy tomorrow will have the acoustic link.			
17:18:10 Sep 24 04	1332	122	45.9468	-129.9865	Approaching Magnesia. The ship is slowing. Not heading to the seafloor yet.			
17:32:53 Sep 24 04	1474	126	45.9464	-129.9854	ROPOS is descending. We'll head SE to Magnesia.			
17:36:41 Sep 24 04	1522	134	45.9463	-129.9852	Bottom in sight. Video on.			
17:40:23 Sep 24 04	1525	170	45.9462	-129.9849	The ship in on the mark. We're going to get under the cage and look around for the benchmark.			
17:49:02 Sep 24 04	1509	87	45.9462	-129.9849	Lots of floc in the water. Looking around trying to get our bearings so that we can find the benchmark.			
17:50:47 Sep 24 04	1526	12	45.9462	-129.9850	Video off while we search.			
17:56:18 Sep 24 04	1528	46	45.9462	-129.9850	Magnesia Area.			R855-054
18:02:20 Sep 24 04	1529	339	45.9462	-129.9850	Lava formations as ROPOS cruises around looking for Magnesia.			R855-055
18:02:40 Sep 24 04	1529	73	45.9462	-129.9850	Lava formations somewhere in the vicinity of Magnesia.			R855-056
18:03:35 Sep 24 04	1529	93	45.9462	-129.9850	Video on again. The time code has fallen behind by 2 minutes in the last 24 hours.			
18:06:35 Sep 24 04	1516	342	45.9463	-129.9850	Still searching. Several DSCs of the jumbled lava in the area of Magnesia.			
18:30:42 Sep 24 04	1528	258	45.9463	-129.9850	Video off. Still searching.....			

UTC	Z(m)	Hdg	Lat	Long	R855 Comments	Samples	PI	FrGrab
18:33:01 Sep 24 04	1528	120	45.9463	-129.9850	The cage is still east of us so still driving east.			
18:38:56 Sep 24 04	1525	114	45.9463	-129.9850	Took a couple of DSCs of a lava cave (looked like a pup tent).			
18:39:51 Sep 24 04	1528	96	45.9463	-129.9850	Lava pillars.			R855-057
18:40:44 Sep 24 04	1528	94	45.9463	-129.9850	Video back on. Feeling lucky. We're hoping we're there.			
18:41:13 Sep 24 04	1527	125	45.9463	-129.9850	We've found the benchmark. Bmrk-1 at Magnesia. Marker-67.			
18:43:47 Sep 24 04	1528	48	45.9462	-129.9850	The benchmark at Magnesia.			R855-058
18:44:33 Sep 24 04	1528	46	45.9463	-129.9850	Removing the pressure sensor from the cradle.			
18:46:22 Sep 24 04	1528	50	45.9462	-129.9850	The benchmark looks like it may have been moved when ROPOS placed the sensor down?? Hopefully it was just a bounce and back down in the same place.			
18:47:33 Sep 24 04	1528	49	45.9462	-129.9850	Starting pressure reading now.			
18:48:11 Sep 24 04	1528	49	45.9462	-129.9850	Video off.			
18:48:17 Sep 24 04	1528	51	45.9462	-129.9850	Pressure sensor on the benchmark at Magnesia.			R855-059
19:17:49 Sep 24 04	1528	51	45.9463	-129.9850	That's it here. End of measurement.			
19:18:08 Sep 24 04	1528	49	45.9463	-129.9850	That's it here.			R855-060
19:19:38 Sep 24 04	1528	52	45.9463	-129.9850	Putting the sensor in its cradle.			
19:20:44 Sep 24 04	1528	49	45.9462	-129.9850	Video on for our departure. Off at 1924.			
19:22:27 Sep 24 04	1527	56	45.9463	-129.9850	Backing out of Magnesia.			R855-061
19:23:41 Sep 24 04	1526	78	45.9463	-129.9850	The cable is in place.			R855-062
19:31:25 Sep 24 04	1478	115	45.9463	-129.9850	Reset the time code on the video. It had drifted 2 minutes in ~24 hours.			
20:28:08 Sep 24 04	1471	147	45.9332	-129.9825	We're going down. Hoping we're over Mkr-33.			
20:30:46 Sep 24 04	1521	147	45.9332	-129.9825	We're on the bottom.			
20:31:39 Sep 24 04	1520	67	45.9332	-129.9825	Verena's bag of wood on the bottom.			R855-063
20:31:50 Sep 24 04	1520	71	45.9332	-129.9825	Verena's bag of wood on the bottom on the edge of a lava swirl.			R855-064
20:33:06 Sep 24 04	1520	141	45.9332	-129.9825	Video on.			
20:34:34 Sep 24 04	1521	130	45.9332	-129.9825	We're there. Benchmark 5 north of Mkr-33. The tubeworm bush is still here.			
20:34:50 Sep 24 04	1523	112	45.9332	-129.9825	Coming up to benchmark #5.			R855-065
20:35:36 Sep 24 04	1523	111	45.9332	-129.9825	Benchmark #5.			R855-066
20:36:18 Sep 24 04	1523	110	45.9332	-129.9825	ROPOS is grabbing the pressure sensor and setting it on the benchmark.			
20:36:43 Sep 24 04	1523	110	45.9332	-129.9825	Setting down the pressure sensor on benchmark #5.			R855-067
20:37:33 Sep 24 04	1523	110	45.9332	-129.9825	The pressure sensor is in place.			
20:38:25 Sep 24 04	1523	111	45.9332	-129.9825	Time to record pressure at benchmark #5.			R855-068
20:40:28 Sep 24 04	1523	114	45.9332	-129.9825	2039 started reading. Video off now.			
20:48:31 Sep 24 04	1523	111	45.9332	-129.9825	Tubeworm bush on sheet flow - in the background at benchmark #5.			R855-069

UTC	Z(m)	Hdg	Lat	Long	R855 Comments	Samples	PI	FrGrab
20:54:41 Sep 24 04	1523	111	45.9332	-129.9825	Biomarker for hydrothermal vent activity at benchmark #5.			R855-070
20:54:54 Sep 24 04	1523	113	45.9332	-129.9825	Vent spider-crab at benchmark #5.			R855-071
21:08:27 Sep 24 04	1523	113	45.9333	-129.9825	Finished with measurement. Video back on.			
21:10:13 Sep 24 04	1523	112	45.9332	-129.9825	Finished measuring pressure at benchmark #5.			R855-072
21:10:55 Sep 24 04	1523	115	45.9332	-129.9825	Curious crab comes to take a look.			R855-073
21:11:50 Sep 24 04	1523	113	45.9333	-129.9825	Stowing away pressure sensor and cable.			
21:14:23 Sep 24 04	1523	111	45.9333	-129.9825	All's well and stored away.			
21:15:18 Sep 24 04	1523	113	45.9333	-129.9825	Cable is in place and ready to go.			R855-074
21:15:34 Sep 24 04	1523	121	45.9333	-129.9825	Heading to Mkr-33 Vent (where we have Mkr-77.) First we're going to take out a bunch of stuff that's in the biobox.			
21:16:16 Sep 24 04	1523	106	45.9332	-129.9825	Bottom view moving from pressure sensing benchmark #5 to Mkr-33.			R855-075
21:16:49 Sep 24 04	1521	178	45.9333	-129.9825	Approaching Amanda's cage and Mkr-33.			R855-076
21:17:14 Sep 24 04	1521	181	45.9332	-129.9825	Amanda's cage with an osmosampler in the background.			
21:17:24 Sep 24 04	1521	188	45.9332	-129.9825	Amanda's cage with osmo sampler in the background.			R855-077
21:18:17 Sep 24 04	1523	192	45.9332	-129.9825	Close up of the cage and the osmo sampler at Mkr-33.			R855-078
21:18:57 Sep 24 04	1523	189	45.9332	-129.9825	We are going to get 4 DSCs of Amanda's cage.			
21:20:32 Sep 24 04	1523	171	45.9333	-129.9825	Amanda's cage - right next to the vent.			R855-079
21:22:30 Sep 24 04	1523	167	45.9333	-129.9825	More DSCs of the limpet cage with osmo in background. We're using the alien to get a temp measurement here.			
21:25:30 Sep 24 04	1523	158	45.9332	-129.9825	The cage is covered with limpets and bacterial mat. Still lots of flow apparent. Talien 19; 17; 20. Temp right up against the cage 7-16C.			
21:26:32 Sep 24 04	1523	157	45.9333	-129.9825	Taking temperature reading. Tmax=20C closer to the vent.			R855-080
21:28:39 Sep 24 04	1523	155	45.9332	-129.9825	We'll be deploying Noreen's cage here with the dyed limpets. She refers to it as the "Growth Experiment Cage".			
21:28:54 Sep 24 04	1523	155	45.9332	-129.9825	Getting Noreen's new cage out of the biobox.			R855-081
21:29:28 Sep 24 04	1523	155	45.9332	-129.9825	Cage is removed from the biobox.			R855-082
21:30:33 Sep 24 04	1523	155	45.9333	-129.9825	Setting the growth experiment cage down to be placed later. It will probably go in the same place as Amanda's cage.			
21:32:02 Sep 24 04	1523	156	45.9333	-129.9825	Recovering MTR-3282 - which was right next to Amanda's limpet cage at the crack at Mkr-33. [Mkr-33]	R855-MTR-3282-0001	Embley	
21:32:10 Sep 24 04	1523	156	45.9333	-129.9825	Recovering the MTR from the vent.			R855-083
21:33:56 Sep 24 04	1523	160	45.9332	-129.9825	Old cage and new cage wait while MTR is placed in the biobox.			R855-084
21:35:38 Sep 24 04	1523	154	45.9333	-129.9825	Picking up old limpet cage to get it out of the way.			R855-085
21:35:52 Sep 24 04	1523	154	45.9333	-129.9825	Shaking the limpet cage to remove the limpets from the outside. Lots of floc and limpets are falling off the cage. 1 DSC of the cage after shaking.			
21:36:52 Sep 24 04	1523	157	45.9333	-129.9825	Shaking the cage to clean it off a bit.			R855-086

UTC	Z(m)	Hdg	Lat	Long	R855 Comments	Samples	PI	FrGrab
21:37:10 Sep 24 04	1523	153	45.9333	-129.9825	Cage has been shaken to remove some of the macrobiology on the outside.			R855-087
21:37:22 Sep 24 04	1523	154	45.9333	-129.9825	Next task to place Noreen's cage in the spot where Amanda's cage has been for the last year.			
21:38:41 Sep 24 04	1523	156	45.9333	-129.9825	Deployed Noreen's limpet growth cage experiment next to Mkr-33 vent.			
21:38:46 Sep 24 04	1523	154	45.9333	-129.9825	Cage is deployed right over the crack.			R855-088
21:39:12 Sep 24 04	1523	153	45.9332	-129.9825	Cage looks good.			R855-089
21:39:34 Sep 24 04	1523	160	45.9332	-129.9825	Old cage versus the new cage.			R855-090
21:40:33 Sep 24 04	1523	181	45.9332	-129.9825	Recover MTR-3201 from the crack (north end) . Lots of floc and limpets on the instrument. [Mkr-33]	R855-MTR-3201-0002	Embley	
21:40:35 Sep 24 04	1523	178	45.9332	-129.9825	Recovering MTR-3201.			R855-091
21:41:03 Sep 24 04	1523	176	45.9332	-129.9825	Shaking off MTR-3201 to clean it off.			R855-092
21:41:08 Sep 24 04	1523	178	45.9333	-129.9825	A lot of debris has come loose.			R855-093
21:41:23 Sep 24 04	1523	172	45.9332	-129.9825	Getting ready to place MTR in the biobox.			R855-094
21:42:19 Sep 24 04	1523	175	45.9332	-129.9825	Still appears to be a lot of diffuse flow at this vent.			
21:43:12 Sep 24 04	1523	173	45.9332	-129.9825	Grabbing the Gucci purses (sulfide weathering experiments) from the biobox for deployment. Want to get them out of the way so that we can put recovered instruments in the biobox.			
21:43:53 Sep 24 04	1523	173	45.9332	-129.9825	Pulling out sulfide weathering experiments to deploy.			R855-095
21:43:58 Sep 24 04	1523	175	45.9332	-129.9825	The purses (4 attached together by polyline) are actually "sulfide weathering experiments" for Richard Lev eille.			
21:45:02 Sep 24 04	1523	174	45.9332	-129.9825	Preparing to deploy the sulfide weathering experiments.			R855-096
21:45:52 Sep 24 04	1523	150	45.9332	-129.9825	Sulfide weathering experiments being deployed.			R855-097
21:46:14 Sep 24 04	1523	143	45.9333	-129.9825	Trying to get a picture of the sulfide weathering experiment here but all the other stuff in the biobox is in the way. We'll take images when we get all in place.			
21:47:41 Sep 24 04	1523	151	45.9332	-129.9825	Pulling new MTRout to place in the vent.			R855-098
21:47:54 Sep 24 04	1523	149	45.9332	-129.9825	Deploying MTR3026 in the flow - at about the middle of the crack (where 3282 formerly rested). In the vicinity of the growth cage.			
21:48:16 Sep 24 04	1523	148	45.9332	-129.9825	Preparing to place new MTR.			R855-099
21:50:12 Sep 24 04	1523	148	45.9332	-129.9825	Placing MTR in the vent in front of the new cage.			R855-100
21:50:14 Sep 24 04	1523	152	45.9332	-129.9825				R855-101
21:50:19 Sep 24 04	1523	149	45.9332	-129.9825	MTR 3026 (green tag) in the crack - right next to Noreen's growth experiment.			
21:50:28 Sep 24 04	1523	151	45.9332	-129.9825	MTR-3026 is now in the vent.			R855-102
21:51:27 Sep 24 04	1523	147	45.9332	-129.9825	Deploying MTR3039 (yellow tag) in the crack. In the spot where we recovered 3201... the north end of the crack.			
21:52:22 Sep 24 04	1523	150	45.9333	-129.9825	Removing MTR 3039 to deploy.			R855-103
21:55:25 Sep 24 04	1523	183	45.9332	-129.9825	Getting ready to deploy MTR-3039.			R855-104

UTC	Z(m)	Hdg	Lat	Long	R855 Comments	Samples	PI	FrGrab
21:55:58 Sep 24 04	1523	183	45.9332	-129.9825	MTR 3039 is in place.			R855-105
21:57:09 Sep 24 04	1521	144	45.9332	-129.9825	Overhead view of equipment deployed so far at Mkr-33.			R855-106
21:58:28 Sep 24 04	1523	53	45.9332	-129.9825	Recovering MTR-4001 from the south end of the crack. [Mkr-33]	R855-MTR-4001-0003	Embley	
21:59:07 Sep 24 04	1523	43	45.9332	-129.9825	Recovering MTR-4001.			R855-107
21:59:15 Sep 24 04	1523	46	45.9332	-129.9825	Removing MTR 4001 from the vent.			R855-108
22:00:17 Sep 24 04	1522	32	45.9332	-129.9825	MTR-4001 is safely in the biobox.			R855-109
22:00:36 Sep 24 04	1522	28	45.9332	-129.9825	Deploying MTR 3045 (blue) - in the same spot as former 4001 - at the south end of the crack.			
22:01:33 Sep 24 04	1519	351	45.9332	-129.9825	Deploying MTR 3045.			R855-110
22:04:35 Sep 24 04	1522	75	45.9332	-129.9825	Video is finished. Switching tape at 2204.			
22:05:36 Sep 24 04	1522	75	45.9333	-129.9825	MTR-3045 has been deployed.			R855-111
22:06:01 Sep 24 04	1521	74	45.9333	-129.9825	Heading to the tubeworm bush north of the crack where the 4th MTR needs to be changed out.			
22:06:25 Sep 24 04	1522	8	45.9333	-129.9825	Tubeworm bush north of Mkr-33.			R855-112
22:06:44 Sep 24 04	1522	33	45.9333	-129.9825	Tubeworm bush north of Mkr-33.			R855-113
22:07:10 Sep 24 04	1522	123	45.9332	-129.9825	Tubeworm bush north of Mkr-33.			R855-114
22:07:17 Sep 24 04	1522	139	45.9332	-129.9825	There's a lot more floc on the tubeworm bush this year than last. Taking some DSCs of the bush. It looks more mature this year. Our baby is growing up.			
22:07:24 Sep 24 04	1522	153	45.9332	-129.9825	Tubeworm bush and sheet flow.			R855-115
22:08:12 Sep 24 04	1522	295	45.9332	-129.9825	Tubeworm bush north of Mkr-33.			R855-116
22:08:20 Sep 24 04	1522	294	45.9332	-129.9825	Tubeworm bush north of Mkr-33.			R855-117
22:10:12 Sep 24 04	1522	115	45.9332	-129.9825	Tubeworm bush north of Mkr-33.			R855-118
22:10:31 Sep 24 04	1522	107	45.9332	-129.9825	The tubeworm bush on the sheet flow.			R855-119
22:11:36 Sep 24 04	1522	108	45.9333	-129.9825	Tubeworm bush again.			R855-120
22:13:16 Sep 24 04	1522	111	45.9333	-129.9825	Tubeworm bush north of Mkr-33.			R855-121
22:14:13 Sep 24 04	1522	116	45.9333	-129.9825	Looking for MTR in the midst of all the bacterial mat.			R855-122
22:14:26 Sep 24 04	1522	115	45.9333	-129.9825	Took 13 DSCs of the tubeworm bush. We don't see the MTR rope.			
22:16:50 Sep 24 04	1522	116	45.9332	-129.9825	Grabbing the rope to MTR 3049.			R855-123
22:16:58 Sep 24 04	1522	114	45.9332	-129.9825	We found the MTR (3049) amidst the worms.			
22:17:30 Sep 24 04	1522	115	45.9332	-129.9825	Pulling MTR 3049 up and out.			R855-124
22:17:33 Sep 24 04	1522	117	45.9332	-129.9825	MTR 3049 is out of the vent.			R855-125
22:17:37 Sep 24 04	1522	118	45.9332	-129.9825	MTR 3049 is headed toward the biobox.			R855-126
22:17:37 Sep 24 04	1522	118	45.9332	-129.9825	Recovered MTR-3049 from the tubeworm bush north of Mkr-33. [Mkr-33 area]	R855-MTR-3049-0004	Embley	

UTC	Z(m)	Hdg	Lat	Long	R855 Comments	Samples	PI	FrGrab
22:19:56 Sep 24 04	1522	110	45.9333	-129.9825	Deploying MTR3196 (red) in the tubeworm bush north of Mkr-33 vent.			
22:21:11 Sep 24 04	1523	109	45.9332	-129.9825	Deploying MTR 3196.			R855-127
22:23:31 Sep 24 04	1522	119	45.9332	-129.9825	MTR 3196 off to the edge of the tubeworm bush north of Mkr-33.			
22:23:33 Sep 24 04	1523	121	45.9333	-129.9825	MTR 3196 is in its final position.			R855-128
22:24:58 Sep 24 04	1519	141	45.9332	-129.9825	We're going back to Mkr-33 and pick up a rock in the flow. Then pick up Amanda's cage; followed by a series of digitals here.			
22:25:28 Sep 24 04	1521	124	45.9332	-129.9825	View of deployed instruments near Mkr-33.			R855-129
22:29:05 Sep 24 04	1523	64	45.9333	-129.9825	Here comes Dave for his rock.			
22:29:43 Sep 24 04	1523	27	45.9332	-129.9825	Dave wants something right in the flow with a lot of white-staining and alteration.			
22:30:39 Sep 24 04	1523	353	45.9332	-129.9825	Blue mat at Mkr-33.			
22:30:40 Sep 24 04	1523	352	45.9333	-129.9825	Blue mat near Mkr-33.			R855-130
22:31:27 Sep 24 04	1523	335	45.9333	-129.9825	A little chimney near Mkr-33.			R855-131
22:33:04 Sep 24 04	1523	312	45.9332	-129.9825	Removing the overlay from the video while we look at all the fauna near the vent.			
22:36:25 Sep 24 04	1523	347	45.9332	-129.9825	DSCs of blue mats at Mkr-33.			
22:36:52 Sep 24 04	1523	343	45.9332	-129.9825	Preparing to take a rock sample.			R855-132
22:37:22 Sep 24 04	1523	326	45.9332	-129.9825	Grasping the rock sample with left claw.			R855-133
22:37:35 Sep 24 04	1523	319	45.9332	-129.9825	Pulling rock sample up and away toward the purse.			R855-134
22:37:38 Sep 24 04	1523	322	45.9332	-129.9825	Altered basalt from Mkr-33. Taken from the area of low flow and lots of fauna - at the south end of the crack [Mkr-33].	R855-RK-0005	Butterfield	
22:38:13 Sep 24 04	1522	241	45.9333	-129.9825	Depositing rock sample in purse.			R855-135
22:39:26 Sep 24 04	1523	331	45.9333	-129.9825	Seascape near Mkr-33.			R855-136
22:39:40 Sep 24 04	1523	327	45.9333	-129.9825	DSCs of blue mat area where basalt sample was taken.			
22:39:45 Sep 24 04	1523	326	45.9333	-129.9825	More seascape near Mkr-33.			R855-137
22:39:58 Sep 24 04	1523	305	45.9333	-129.9825	Crab near Mkr-33 with blue mat in the background.			R855-138
22:40:29 Sep 24 04	1521	319	45.9333	-129.9825	Getting DSCs and frame grabs of the Crack. Amanda's cage will be picked up later (after our trip to Cloud). Lateralling along the vent for more DSCs and frame grabs. 26 DSCs moved.			
22:40:33 Sep 24 04	1521	311	45.9333	-129.9825	View of instruments deployed at Mkr-33.			R855-139
22:40:49 Sep 24 04	1521	316	45.9333	-129.9825	Crack near Mkr-33.			R855-140
22:41:17 Sep 24 04	1522	272	45.9333	-129.9825	Farther down the crack near Mkr-33.			R855-141
22:41:44 Sep 24 04	1522	253	45.9333	-129.9825	View of instruments at Mkr-33.			R855-142
22:41:54 Sep 24 04	1522	250	45.9333	-129.9825	Instruments at Mkr-33.			R855-143
22:42:05 Sep 24 04	1521	262	45.9333	-129.9825	Base of Mkr-33.			R855-144
22:44:43 Sep 24 04	1517	151	45.9333	-129.9825	Lava pillars in transit from Mkr-33 to Cloud.			R855-145
22:50:12 Sep 24 04	1517	188	45.9333	-129.9825	We're at Cloud vent- but it's awfully hard to see. Cloudy; hmmm			

UTC	Z(m)	Hdg	Lat	Long	R855 Comments	Samples	PI	FrGrab
22:51:18 Sep 24 04	1521	126	45.9333	-129.9825	Coming into Cloud.			R855-146
22:52:08 Sep 24 04	1523	211	45.9333	-129.9825	We're at the hole at Cloud Vent. It's still steaming.			
22:52:20 Sep 24 04	1523	210	45.9333	-129.9825	MTR 3334 and 3176 in Cloud vent- attached to an anchor.			R855-147
22:53:10 Sep 24 04	1523	328	45.9332	-129.9825	Looking into Cloud vent. MTR 3176 and MTR 3334 visible.			R855-148
22:53:12 Sep 24 04	1523	320	45.9332	-129.9825	Looking into Cloud vent.			R855-149
22:53:24 Sep 24 04	1524	330	45.9332	-129.9825	Looking into Cloud vent.			R855-150
22:53:26 Sep 24 04	1523	331	45.9332	-129.9825	We can actually see down into the hole this year - but not to the bottom. It's not as cloudy as in previous years.			
22:53:32 Sep 24 04	1524	317	45.9332	-129.9825	Looking into Cloud vent.			R855-151
22:53:38 Sep 24 04	1524	325	45.9332	-129.9825	Looking into Cloud vent.			R855-152
22:54:13 Sep 24 04	1524	320	45.9332	-129.9825	Recovered MTR-3334 (attached to 3176) from the pit. [Cloud]	R855-MTR-3334-0006	Embley	
22:55:31 Sep 24 04	1524	334	45.9333	-129.9825	Removing MTRs 3334 and 3176.			R855-153
22:55:44 Sep 24 04	1524	332	45.9333	-129.9825	MTR 3334 and 3176 are free and moving toward the biobox.			R855-154
22:55:47 Sep 24 04	1524	308	45.9332	-129.9825	Recovered MTR 3176 (attached to MTR-3334) from the pit. [Cloud]	R855-MTR-3176-0007	Embley	
22:57:12 Sep 24 04	1524	119	45.9333	-129.9818	MTRs 3176 and 3334 are in the biobox.			R855-155
22:59:29 Sep 24 04	1521	14.1	45.9333	-129.9818	Tipped over lava pillar with spider crab.			R855-156
22:59:33 Sep 24 04	1521	10.1	45.9333	-129.9818	Tipped lava pillar.			
23:00:16 Sep 24 04	1523	237	45.9333	-129.9818	Heading back to the pit at Cloud - after a bit of tether management.			
23:02:09 Sep 24 04	1523	205	45.9334	-129.9817	Lava formation near Cloud vent.			R855-157
23:03:55 Sep 24 04	1524	318	45.9334	-129.9817	Cloud vent surrounded by tube worms.			R855-158
23:04:11 Sep 24 04	1524	304	45.9334	-129.9817	Tube worms on the edge of Cloud.			R855-159
23:04:46 Sep 24 04	1524	297	45.9334	-129.9817	Rope of previously lost MTRs appears to be visible.			R855-160
23:05:50 Sep 24 04	1525	312	45.9334	-129.9817	We found the old MTR we lost a couple years ago. It was barely visible.			
23:06:02 Sep 24 04	1525	310	45.9334	-129.9817	Retrieving lost MTR from Cloud.			R855-161
23:06:27 Sep 24 04	1525	307	45.9334	-129.9817	Recovered the missing MTR from the hole!!! Has red tape on it was deployed on dive R674 in 2002. We couldn't find it in 2003. Less milky flow this year so it was visible. [Cloud]	R855-MTR-3173-0008	Embley	
23:07:38 Sep 24 04	1525	316	45.9334	-129.9817	Yeah! An MTR. It was lost in the hole a couple years ago. Bonus!			R855-162
23:10:13 Sep 24 04	1525	285	45.9334	-129.9817	Deploying 2 MTRs here in the pit at Cloud. MTRs 3041 and 3054 deployed. They are attached to an anchor.			
23:12:08 Sep 24 04	1525	270	45.9334	-129.9817	MTR 3041 and 3054 being deployed into the pit. They are attached to a weight.			R855-163
23:14:52 Sep 24 04	1525	268	45.9334	-129.9817	MTRs 3041 and 3054 going into Cloud vent.			R855-164
23:16:48 Sep 24 04	1525	271	45.9334	-129.9817	Placing weight for MTRs 3041 and 3054 next to Cloud vent.			R855-165
23:16:58 Sep 24 04	1525	268	45.9334	-129.9817	Took several DSCs of the pit and MTRs.			

UTC	Z(m)	Hdg	Lat	Long	R855 Comments	Samples	PI	FrGrab
23:21:05 Sep 24 04	1522	214	45.9334	-129.9817	Instruments at Mkr-33.			R855-166
23:21:50 Sep 24 04	1523	176	45.9334	-129.9817	Back at Mkr-33 to pick up Amanda's cage.			
23:22:08 Sep 24 04	1523	176	45.9334	-129.9817	Recover Amanda's limpet cage - just off the flow near the crack. [Mkr-33]	R855-cage-0009	Bates	
23:22:32 Sep 24 04	1523	176	45.9334	-129.9817	Recovering Amanda's cage from 2003 near Mkr-33.			R855-167
23:25:54 Sep 24 04	1512	253	45.9333	-129.9825	We're on our way to Castle.			
23:26:29 Sep 24 04	1496	266	45.9333	-129.9825	Stopped the video.			
23:27:20 Sep 24 04	1483	300	45.9333	-129.9825	Heading to Castle to recover one HOBO and deploy another one.			
23:43:51 Sep 24 04	1372	165	45.9292	-129.9817	Change in plans. Putting off the remaining HOBOs and suction sampling and heading to Bag City to continue the pressure measurements to end the dive on time.			
23:47:50 Sep 24 04	1374	151	45.9286	-129.9817	Little organism on our transit to Bag City.			R855-168
00:47:01 Sep 25 04	1532	289	45.9166	-129.9895	We are back on the bottom near the Bag City benchmark. Video on.			
00:48:52 Sep 25 04	1531	358	45.9166	-129.9895	Heading north to find the benchmark.			
00:54:45 Sep 25 04	1531	29	45.9166	-129.9895	Passing over lava pillars.			
00:58:40 Sep 25 04	1533	170	45.9166	-129.9895	Now we are heading south and still searching for the benchmark. Spent some time trying to locate the cage.			
01:00:24 Sep 25 04	1532	196	45.9165	-129.9895	Turned off the cage motor to get a good nav position. Bag City should be about 13 meters off to the west of us.			
01:02:57 Sep 25 04	1532	200	45.9166	-129.9895	We should be right on top of it.			
01:04:56 Sep 25 04	1532	322	45.9167	-129.9895	Still searching for the benchmark. We are close. I can smell it.			
01:05:54 Sep 25 04	1532	347	45.9167	-129.9895	We will look to see if we have a location for the Bag City marker (mkr-36) and try to find that first.			
01:07:51 Sep 25 04	1531	172	45.9166	-129.9895	Marker 36 should be 30 meters to the south.			
01:10:16 Sep 25 04	1531	188	45.9167	-129.9895	Benchmark nav target was incorrect. Oh there is marker 36!! Heading SW to the benchmark.			
01:11:50 Sep 25 04	1532	280	45.9166	-129.9895	Found the Bag City benchmark (AX04).			
01:17:21 Sep 25 04	1534	39	45.9166	-129.9895	Picking up the sensor.			
01:19:54 Sep 25 04	1534	36	45.9166	-129.9895	Sensor is on the benchmark. Giving it a little nudge into a better position.			
01:20:58 Sep 25 04	1534	39	45.9166	-129.9895	Placement of sensor at Bag City benchmark (AX04).			R855-169
01:21:07 Sep 25 04	1534	33	45.9166	-129.9895	Starting measurement (01:21) at Bag City benchmark (AX04). Video off at 01:22.			
01:52:13 Sep 25 04	1534	35	45.9166	-129.9895	Stopping the measurement at 01:51. Video back on at 01:53. Video off at 01:53.			
01:53:57 Sep 25 04	1534	43	45.9165	-129.9895	Stowing the sensor.			
01:56:55 Sep 25 04	1530	44	45.9166	-129.9895	Driving up to the cage and heading to the southernmost benchmark (AX66) on the south pillow mound.			
04:33:30 Sep 25 04	1633	189	45.8631	-130.0037	Heading to the bottom at South Pillow Mound.			
04:37:49 Sep 25 04	1716	191	45.8631	-130.0038	On bottom at South Pillow Mound.			
04:43:50 Sep 25 04	1722	130	45.8631	-130.0037	Maker 66 in sight.			

UTC	Z(m)	Hdg	Lat	Long	R855 Comments	Samples	PI	FrGrab
04:49:46 Sep 25 04	1723	30	45.8631	-130.0037	Video on. Positioning PS on benchmark.			
04:51:47 Sep 25 04	1723	32	45.8631	-130.0037	Begin pressure measurement at 0451.			
04:53:54 Sep 25 04	1724	30	45.8631	-130.0038	Video off.			
04:55:16 Sep 25 04	1724	28	45.8631	-130.0037	Last pressure measurement at South Pillow Mound.			R855-170
04:55:49 Sep 25 04	1724	33	45.8631	-130.0037	Moving 4 DSC pictures.			
05:21:08 Sep 25 04	1724	42	45.8631	-130.0037	End of pressure measurement. Video on.			
05:23:32 Sep 25 04	1723	60	45.8631	-130.0038	Video off. Tape finished.			
05:25:33 Sep 25 04	1723	57	45.8631	-130.0038	Pressure sensor secure.			
05:26:48 Sep 25 04	1717	18	45.8632	-130.0037	ROPOS off the bottom. End dive R855.			
06:37:58 Sep 25 04	2	130	45.8632	-130.0048	ROPOS at surface.			
06:40:57 Sep 25 04	1	106	45.8632	-130.0051	ROPOS on deck.			

5.4.4 R856 Dive Log

R856: '98 Lava Flow Area
Wet time (UTC): 9/26 1628 - 9/27 0127. JD: 270-271. 8.98 hrs.
Bottom time (UTC): 9/26 1508 - 9/27 0143. JD: 270-271. 10.59 hrs. [22 samples]
DSC information: 90 DSCs taken starting with R856_DSC_092604_170003_04283.jpg and ending with R856_DSC_092704_011940_04372.jpg
Dive Summary: Hot Fluid Sampling Dive on the 99 lava flow. Started in the vicinity of Mkr-N3 Vent . The original marker is gone to a new marker (Mkr-52) was deployed ~10m west of the N3 nav target at "West-N3". Deployed Mkr-69 on the mound above the pit (where N6 used to be at Cloud). West N3: 2 HFS; 1 SS for blue mat. Cloud: 3 HFS. Mkr-33: 5 HFS. Between Mkr-33 and Village: 1HFS background. Village: 3 HFS; 3 SS for blue mat and filamentous bacteria. Castle: 2 GTB; 2 HFS. Recovered 1 hobo from anhydrite chimney and deployed another in the same spot.

UTC	Z(m)	Hdg	Lat	Long	R856 Comments	Samples	PI	FrGrab
15:08:09 Sep 26 04	0	156	45.9413	-129.9832	ROPOS is off the deck.			
15:08:50 Sep 26 04	0	138	45.9413	-129.9833	ROPOS is in the water.			
15:16:02 Sep 26 04	44	256	45.9417	-129.9835	Starting the descent.			
16:28:19 Sep 26 04	1524	77	45.9443	-129.9853	We are on the bottom.			
16:30:09 Sep 26 04	1525	175	45.9443	-129.9852	Heading to Marker N3. Passing over some bacterial mat. Video started 1630.			
16:34:20 Sep 26 04	1526	163	45.9443	-129.9852	Trying to get a good nav fix on our position.			
16:35:03 Sep 26 04	1526	54	45.9443	-129.9852	Marker N3 is 42 meters away at heading 070. Passing over some hydrothermal sediments.			
16:36:06 Sep 26 04	1527	96	45.9443	-129.9852	Evidence of venting up ahead. Passed over some yellow stained areas followed by more yellow staining.			
16:36:35 Sep 26 04	1527	136	45.9443	-129.9853	Clumps of tubeworms surrounded by blue mat as we head east to N3.			R856-001
16:36:51 Sep 26 04	1526	87	45.9443	-129.9853	Approaching N3 from the west and we are already seeing blue mat with patches of tubeworms and maybe limpets mixed in.			
16:37:33 Sep 26 04	1526	106	45.9443	-129.9853	White and blue mat field near Marker N3.			R856-002
16:38:05 Sep 26 04	1526	80	45.9443	-129.9853	Took 4 digitals of the wide view of the blue mat.			
16:38:23 Sep 26 04	1527	85	45.9442	-129.9853	Blue and white mat with tube worms present.			R856-003
16:38:41 Sep 26 04	1528	92	45.9443	-129.9853	There is flow coming out in the middle of the tubeworms with the blue mat in a ring around the worms. Took 3 more digitals up close in blue mat.			
16:39:20 Sep 26 04	1528	82	45.9443	-129.9852	Venting coming out near the tube worms with limpets and blue mat around.			R856-004
16:40:27 Sep 26 04	1528	83	45.9443	-129.9853	Extensive blue mat.			R856-005
16:41:01 Sep 26 04	1528	72	45.9443	-129.9853	Continuing more east to find N3.			
16:44:22 Sep 26 04	1527	145	45.9443	-129.9852	Blue and white mat near Marker N3.			R856-006
16:45:06 Sep 26 04	1527	99	45.9443	-129.9852	Passing over a collapsed pit with more venting above and more blue mat. Took five more digitals of this area.			
16:46:31 Sep 26 04	1526	89	45.9443	-129.9853	Continuing east and passing over more patches of venting with tubeworms and blue mat.			

UTC	Z(m)	Hdg	Lat	Long	R856 Comments	Samples	PI	FrGrab
16:47:16 Sep 26 04	1527	92	45.9443	-129.9853	Blue and white mat in crevices near Marker N3.			R856-007
16:48:01 Sep 26 04	1526	122	45.9443	-129.9852	Came into the collapsed area and turned to the south.			
16:48:48 Sep 26 04	1526	203	45.9443	-129.9852	Blue and white mat near Marker N3.			R856-008
16:48:49 Sep 26 04	1526	206	45.9443	-129.9852	Found another large patch of worms and blue mat. It seems very extensive all along this transit.			
16:50:16 Sep 26 04	1527	156	45.9443	-129.9853	Blue mat and tube worms near Marker N3.			R856-009
16:51:44 Sep 26 04	1528	150	45.9443	-129.9853	Lone tube worm amidst blue and white mat near Marker N3.			R856-010
16:52:03 Sep 26 04	1528	149	45.9443	-129.9853	Up close view of blue mat near Marker N3.			R856-011
16:52:03 Sep 26 04	1528	149	45.9443	-129.9853	Sitting down in a nice area of flow surrounded by blue mat. We will check the temperature and take suction and fluid samples.			
16:52:38 Sep 26 04	1528	151	45.9443	-129.9853	Close up of blue mat near Marker N3.			R856-012
16:54:58 Sep 26 04	1528	144	45.9443	-129.9852	We are calling this area "West N3". It is about 10 meters west of where the marker should be.			
16:56:42 Sep 26 04	1528	141	45.9438	-129.9852	Checking the temperature with the fluid sampler. Repositioning the sub to get to the strongest flow.			
16:57:12 Sep 26 04	1528	142	45.9438	-129.9852	Checking temperature near vent to find a good fluid sampling location.			R856-013
17:01:05 Sep 26 04	1528	150	45.9438	-129.9852	Arm is locked off here for fluid sampling.			
17:02:31 Sep 26 04	1528	149	45.9438	-129.9852	HFS unfiltered piston #5. Start 1702 Stop 1705. Tmax=23.6 Tave=23.0 stdev=0.3 T2=17 Vol=750ml Z=1528m. Took 13 digital images of the sampling site. [West N3]	R856-HFS-5-0001	Butterfield	
17:06:32 Sep 26 04	1528	148	45.9438	-129.9852	HFS Sterivex filter #2. Start 1706 Stop 1720. Tmax=24.9 Tave=24.4 stdev=0.3 T2=18 Vol=2000mls Z=1528m. Large cloud of floc coming out the exhaust of the fluid sampler at 1710. [West N3]	R856-HFS-2-0002	Butterfield	
17:11:05 Sep 26 04	1528	147	45.9438	-129.9852	Fluid sampling at West N3.			R856-014
17:12:23 Sep 26 04	1528	149	45.9438	-129.9852	Fluid sampler exhaust began to have a lot of white debris in it. Re-checking position to make sure the sampling wand is not down into the mat.			R856-015
17:14:11 Sep 26 04	1528	148	45.9438	-129.9852	Large cloud of white material came out of the fluid sampler exhaust during sampling but nothing appears different in the vent. We may have touched the intake on the bottom.			
17:21:17 Sep 26 04	1528	148	45.9438	-129.9852	Going to do a temperature survey around the blue mat using the fluid sampler.			
17:23:30 Sep 26 04	1528	148	45.9438	-129.9852	Temperature range is 4-7C in the limpets on the edge of the rock.			R856-016
17:24:38 Sep 26 04	1528	147	45.9438	-129.9852	Reading temperatures over patches of limpets and blue mat.			
17:25:18 Sep 26 04	1528	146	45.9438	-129.9852	Temperature range is 2.2-2.5C in the blue mat touching the rock.			R856-017
17:28:13 Sep 26 04	1528	146	45.9438	-129.9852	Temperature range is 3-5C in the limpet patch on the vertical rock face above the vent.			R856-018
17:28:58 Sep 26 04	1528	144	45.9438	-129.9852	Zoom in on the tip of temperature sensor in the vertical limpet patch.			R856-019

UTC	Z(m)	Hdg	Lat	Long	R856 Comments	Samples	PI	FrGrab
17:30:41 Sep 26 04	1528	143	45.9438	-129.9852	Stowing the fluid sampler intake. Preparing to take suction sample of blue mat. Took 6 digital images of temperature survey area.			
17:34:53 Sep 26 04	1528	139	45.9438	-129.9852	Suction sampling of blue mat into jar #2. Sampled just above and to the left of where we did the temperature survey. Start 1738 Stop 1744 Talien=3.2. [West N3]	R856-SS- J2-0003	Kouris	
17:38:09 Sep 26 04	1529	127	45.9438	-129.9852	Suction sampling blue mat in West N3.			R856-020
17:43:23 Sep 26 04	1529	135	45.9438	-129.9852	After view of area where suction sampling has taken place. Most of the blue mat has been collected.			R856-021
17:44:17 Sep 26 04	1529	132	45.9438	-129.9852	Sample for West N3 in the suction jar.			R856-022
17:45:47 Sep 26 04	1529	135	45.9438	-129.9852	Took 4 digital images of suctioned area.			
17:46:23 Sep 26 04	1529	133	45.9438	-129.9852	Flushing the suction sampler.			
17:47:19 Sep 26 04	1528	134	45.9438	-129.9852	We are going to leave a marker here.			
17:49:10 Sep 26 04	1528	133	45.9438	-129.9852	Taking marker 52 out of the purse.			
17:49:49 Sep 26 04	1528	126	45.9438	-129.9852	Placing marker 52 at West N3.			R856-023
17:50:33 Sep 26 04	1527	119	45.9438	-129.9852	View of marker 52 placement.			R856-024
17:50:55 Sep 26 04	1525	113	45.9438	-129.9852	Placed marker 52 at West N3. Took 4 more digitals. Video off at 1751.			
17:50:55 Sep 26 04	1525	113	45.9438	-129.9852	Marker 52 placement at West N3.			R856-025
17:52:22 Sep 26 04	1524	114	45.9437	-129.9851	Trying to get a good fix for marker 52. Lat 45 56.618 N Long 129 59.102 W.			
17:55:47 Sep 26 04	1527	334	45.9439	-129.9852	Heading to marker 33 for more fluid sampling.			
18:56:32 Sep 26 04	1478	161	45.9332	-129.9825	We are over Marker 33. Heading to the bottom.			
18:59:26 Sep 26 04	1519	165	45.9332	-129.9825	We are back on the bottom. Video on at 1859.			
19:00:18 Sep 26 04	1520	168	45.9332	-129.9825	Heading south. Found Verena's wood experiment.			
19:01:53 Sep 26 04	1519	119	45.9332	-129.9825	Verena's wood experiment.			R856-026
19:03:47 Sep 26 04	1519	83	45.9332	-129.9824	Turned around and we are back at the wood again.			
19:04:58 Sep 26 04	1519	102	45.9332	-129.9825	Going to make a nav target here for Verena's wood. Can't get it to locate with nav. Moving on to the SE.			
19:09:22 Sep 26 04	1519	174	45.9332	-129.9825	Still trying to locate Marker 33. Continuing SE.			
19:10:32 Sep 26 04	1519	136	45.9332	-129.9824	Found the benchmark.			
19:10:34 Sep 26 04	1519	155	45.9332	-129.9824	Marker 33 from above.			R856-027
19:10:59 Sep 26 04	1519	161	45.9332	-129.9824	Sitting directly over Marker 33 to re-home the DVL.			
19:12:31 Sep 26 04	1520	53	45.9333	-129.9825	Going to Cloud first for sampling.			
19:14:42 Sep 26 04	1522	119	45.9332	-129.9821	Following the smoke to Cloud. Looking for the pit.			
19:16:15 Sep 26 04	1524	25	45.9331	-129.9820	Found the MTR we placed at Cloud on the previous dive.			
19:16:35 Sep 26 04	1524	356	45.9331	-129.9820	We have found Cloud with an MTR rope coming out of the vent.			R856-028
19:16:39 Sep 26 04	1524	356	45.9331	-129.9820	Sitting down over the pit for fluid sampling.			

UTC	Z(m)	Hdg	Lat	Long	R856 Comments	Samples	PI	FrGrab
19:19:50 Sep 26 04	1525	329	45.9332	-129.9817	Picking up the fluid sampler hose to start poking around for temperature.			
19:20:39 Sep 26 04	1525	329	45.9332	-129.9817	Checking the temperature of the vent fluid at Cloud.			R856-029
19:21:46 Sep 26 04	1526	335	45.9333	-129.9817	Flow seems less than last year. Arm is locked off for sampling.			
19:22:24 Sep 26 04	1526	336	45.9333	-129.9817	Fluid sampling at Cloud.			R856-030
19:24:56 Sep 26 04	1526	329	45.9333	-129.9817	HFS Sterivex filter #4. Start 1925 Stop 1937. Tmax=7.0 Tave=6.9 stdev=0.05 T2=5.9 Vol=1500ml. Z=1526m. Pump is slowing down a bit on this sample. Video off at 1931. [Cloud]	R856-HFS-4-0004	Butterfield	
19:35:53 Sep 26 04	1526	332	45.9333	-129.9817	Checking the fluid sampler exhaust. Looks clear.			
19:37:45 Sep 26 04	1526	329	45.9333	-129.9817	HFS 3micron filtered piston #1. Start 1937 Stop 1940. Tmax=7.0 Tave=6.9 stdev=0.03 T2=5.9 Vol=7.5ml Z=1526m. [Cloud]	R856-HFS-1-0005	Butterfield	
19:41:35 Sep 26 04	1526	330	45.9333	-129.9817	HFS unfiltered bag #8. Start 1941 Stop 1946. Tmax=7.0 Tave=6.9 stdev=0.06 T2=5.9 Vol=700ml Z=1526m. [Cloud]	R856-HFS-8-0006	Butterfield	
19:42:24 Sep 26 04	1526	335	45.9333	-129.9817	Clear exhaust from fluid sampler.			R856-031
19:47:23 Sep 26 04	1526	330	45.9333	-129.9817	Done fluid sampling here. Stowing the sampler intake then we will place a marker here since the N6 marker has disappeared.			
19:48:24 Sep 26 04	1526	327	45.9333	-129.9817	Took 2 digital images of sampling at Cloud.			
19:50:11 Sep 26 04	1526	333	45.9333	-129.9817	Video on 1950 for placement of the marker at Cloud.			
19:51:10 Sep 26 04	1526	331	45.9333	-129.9817	Turned off the cage motor and got a good nav fix here.			
19:51:32 Sep 26 04	1526	322	45.9333	-129.9817	Some organisms around Cloud.			R856-032
19:52:03 Sep 26 04	1525	339	45.9333	-129.9817	Lifting up to look for a high spot to place the marker.			
19:54:35 Sep 26 04	1524	173	45.9333	-129.9817	Placing the marker on the mound just above the pit and the MTR.			
19:55:59 Sep 26 04	1525	176	45.9333	-129.9817	Dropped marker 69 on the mound above Cloud.			
19:56:30 Sep 26 04	1524	193	45.9333	-129.9817	Marker 69 to be placed at Cloud.			R856-033
19:57:00 Sep 26 04	1524	208	45.9333	-129.9817	Best view available for the base of Marker 69 at Cloud.			R856-034
19:58:03 Sep 26 04	1522	197	45.9333	-129.9817	Heading to Marker 33. Dave says we are on schedule to the minute!!			
19:59:23 Sep 26 04	1519	345	45.9333	-129.9817	Lava pillars on transit from Cloud to Marker 33.			R856-035
20:01:53 Sep 26 04	1523	285	45.9333	-129.9817	Another lava pillar on the way to Marker 33.			R856-036
20:02:22 Sep 26 04	1524	266	45.9333	-129.9817	Tube worms on ledge above a pit near Marker 33.			R856-037
20:03:08 Sep 26 04	1523	226	45.9333	-129.9817	Changed to a new tape. End tape 1 at 20:01. Start tape 2 at 20:02.			
20:04:09 Sep 26 04	1523	216	45.9333	-129.9817	Back at Marker 33. Looking for a little spigot more on the east side of the crack that Dave saw on a previous dive .			
20:04:27 Sep 26 04	1523	207	45.9332	-129.9824	Marker 33 with instruments deployed from previous dive.			R856-038
20:04:54 Sep 26 04	1524	210	45.9331	-129.9823	View of the crack just down from Marker 33.			R856-039
20:07:04 Sep 26 04	1524	291	45.9331	-129.9823	Looking for small venting site that was found during rock sampling on a previous dive.			R856-040

UTC	Z(m)	Hdg	Lat	Long	R856 Comments	Samples	PI	FrGrab
20:07:10 Sep 26 04	1524	290	45.9331	-129.9823	Spigot was near where we took the rock sample on dive R855.			
20:07:55 Sep 26 04	1524	311	45.9331	-129.9823	Zooming in on the area to see if venting is strong.			R856-041
20:08:28 Sep 26 04	1525	314	45.9331	-129.9823	Sitting down looking for the little spigot. Facing North.			
20:10:25 Sep 26 04	1524	27.1	45.9331	-129.9823	Found the little spigot but it does not look so good for sampling. Going back up to the crack to sample.			
20:13:15 Sep 26 04	1524	176	45.9331	-129.9823	Looking for a place to sample fluid at Marker 33.			R856-042
20:13:36 Sep 26 04	1524	175	45.9331	-129.9823	Looks like there is good flow at the base of the limpet cage that we can sample. Taking out the intake to check the temperature.			
20:21:31 Sep 26 04	1524	168	45.9331	-129.9823	Checking the temperature to find a sampling spot.			R856-043
20:24:30 Sep 26 04	1524	172	45.9331	-129.9823	Arm is locked off here for sampling.			
20:25:06 Sep 26 04	1524	169	45.9331	-129.9823	Fluid sampling spot at Marker 33.			R856-044
20:26:00 Sep 26 04	1524	172	45.9331	-129.9823	HFS unfiltered piston #6. Start 2027 Stop 2030. Tmax=21.7 Tave=19.8 stdev=0.76 T2=14. Vol=717ml. Z=1526m. [Marker 33]	R856-HFS-6-0007	Butterfield	
20:30:22 Sep 26 04	1524	169	45.9331	-129.9823	The rattail for dive R856.			R856-045
20:31:43 Sep 26 04	1524	172	45.9331	-129.9823	HFS Sterivex filter #7. Start1 2031 Stop1 2033 Start2= 2034 Stop2 2046. Tmax=22.2 Tave=17.4 stdev=1.5 T2=13. Vol=1868ml. Z=1526m. Temperature is fluctuating a lot. [Marker 33]	R856-HFS-7-0008	Butterfield	
20:33:09 Sep 26 04	1524	168	45.9331	-129.9823	HFS-Sterivex #7 at Mkr-33.			R856-046
20:36:58 Sep 26 04	1524	168	45.9331	-129.9823	Thought we had come out of the flow because the temperature dropped suddenly but then it came back up.			
20:38:54 Sep 26 04	1524	168	45.9331	-129.9823	Organisms near the fluid sampler at Mkr-33.			R856-047
20:48:08 Sep 26 04	1524	169	45.9331	-129.9823	Poking the fluid sampler intake down into a little crack where we have been sampling to get better flow.			
20:49:02 Sep 26 04	1524	173	45.9331	-129.9823	Arm is locked off again for more sampling.			
20:49:33 Sep 26 04	1524	168	45.9331	-129.9823	HFS filtered bag #11. Start 2049 Stop 2055. Tmax27.4 Tave=25.7 stdev=1.2 T2=18. Vol=750ml. Z=1526m. It stopped itself. The bag is too full. [Marker 33]	R856-HFS-11-0009	Butterfield	
20:51:19 Sep 26 04	1524	167	45.9331	-129.9823	HFS filtered bag #11 with the wand jammed in a little more			R856-048
20:57:07 Sep 26 04	1524	172	45.9331	-129.9823	HFS Sterivex #10. Start1 2056 Stop1 2101 Start2 2102 Stop2 2105 Start3 2115 Stop3 2131. Tmax=34.5 Tave=20.4 stdev=5 T2=15-20. Vol=3029ml Z=1526. Large volume sample. Jerked out of the hole several times. [Mkr-33]	R856-HFS-10-0010	Butterfield	
20:58:48 Sep 26 04	1524	169	45.9331	-129.9823	A synoptic view of Mkr 33 sampling area.			R856-049
20:59:15 Sep 26 04	1524	170	45.9331	-129.9823	The camera is up a little bit during HFS Sterivex #10			R856-050
21:07:48 Sep 26 04	1524	155	45.9331	-129.9823	The wand was repositioned again for more of the same sample.			R856-051
21:12:31 Sep 26 04	1524	158	45.9331	-129.9823	A bit of tether management and repositioning while we're going for start3.			
21:15:48 Sep 26 04	1524	158	45.9331	-129.9823	The wand was repositioned again for more of the same sample.			R856-052

UTC	Z(m)	Hdg	Lat	Long	R856 Comments	Samples	PI	FrGrab
21:24:40 Sep 26 04	1524	158	45.9331	-129.9823	The crabby one arises.			R856-053
21:33:17 Sep 26 04	1520	199	45.9331	-129.9823	We're off to Castle. Video off.			
21:33:37 Sep 26 04	1518	226	45.9331	-129.9823	HFS dual filter #24. Start 2135 Stop 2212. Tave=1.9 Vol=3932ml. During transit. Background plume sample. ~25m off the bottom. [Mkr-33 to Village]	R856-HFS-24-0011	Butterfield	
22:36:57 Sep 26 04	1491	307	45.9261	-129.9800	Heading to the bottom.			
22:37:41 Sep 26 04	1505	4.7	45.9261	-129.9800	Moved 12 DSCs.			
22:38:02 Sep 26 04	1510	174	45.9261	-129.9800	We're going to Village. Not on the bottom yet.			
22:38:45 Sep 26 04	1512	279	45.9261	-129.9800	The bottom is in site.			
22:39:16 Sep 26 04	1513	352	45.9261	-129.9800	Ended up over Castle.			
22:41:24 Sep 26 04	1507	344	45.9261	-129.9801	Heading to Village after getting an LBL fix on Castle. Video on. Time code has fallen behind by about 30 seconds.			
22:44:44 Sep 26 04	1519	6.7	45.9260	-129.9801	Reset time code. Here at Village. Mkr-44 in the background.			
22:45:34 Sep 26 04	1520	320	45.9260	-129.9801	An early sighting of Mkr 44, a.k.a. Village.			R856-054
22:46:28 Sep 26 04	1519	291	45.9261	-129.9805	Took 6 DSCs of the large view here at Village.			
22:49:40 Sep 26 04	1521	324	45.9261	-129.9805	Looking around for a place to sample.			
22:50:07 Sep 26 04	1521	334	45.9261	-129.9805	Clumps of venting spots.			R856-055
22:52:06 Sep 26 04	1521	68	45.9261	-129.9805	Took 4 DSCs (blind) here at Village.			
22:52:25 Sep 26 04	1521	93.5	45.9261	-129.9805	Village panorama.			R856-056
22:52:47 Sep 26 04	1522	105	45.9261	-129.9805	Village.			R856-057
22:53:13 Sep 26 04	1522	129	45.9261	-129.9805	The base of the marker.			R856-058
23:01:19 Sep 26 04	1522	158	45.9261	-129.9805	Removing the wand from its holder.			
23:05:11 Sep 26 04	1523	172	45.9261	-129.9805	We're poking around here to find the best sampling spot.			
23:07:10 Sep 26 04	1523	161	45.9261	-129.9805	Swapping out video to tape 3 at 2307.			
23:10:46 Sep 26 04	1522	205	45.9261	-129.9805	General overview here at Village.			R856-059
23:11:17 Sep 26 04	1522	202	45.9261	-129.9805	General overview here at Village.			R856-060
23:12:29 Sep 26 04	1523	190	45.9261	-129.9805	Macrofauna at Village.			R856-061
23:14:15 Sep 26 04	1523	177	45.9261	-129.9805	I do believe we've found the spot.			
23:16:21 Sep 26 04	1523	179	45.9261	-129.9805	HFS piston #22. Start 2316 Stop2320. Tmax=42.0 Tave=37 stdev=1.2 T2=26. Vol=630ml Z=1522. [Village]	R856-HFS-22-0012	Butterfield	
23:16:22 Sep 26 04	1523	183	45.9261	-129.9805	Wand position for HFS piston 22.		Butterfield	R856-062
23:20:17 Sep 26 04	1523	179	45.9261	-129.9805	Took 2 DSCs (blind).			
23:21:38 Sep 26 04	1523	180	45.9261	-129.9805	HFS Sterivex #21. Start 1121 Stop1134. Tmax=50.1 Tave=40.3 stdev=2 T2=28. Vol=1839ml. Z=1522. Temp dropped but coming back up. We were jerked out of the vent. [Village]	R856-HFS-21-0013	Butterfield	
23:22:46 Sep 26 04	1522	180	45.9261	-129.9805	Wand position for HFS Sterivex 21.			R856-063

UTC	Z(m)	Hdg	Lat	Long	R856 Comments	Samples	PI	FrGrab
23:30:37 Sep 26 04	1523	177	45.9261	-129.9805	Moved 5 DSCs of the sampling site for HFS Sterivex #21.			
23:39:20 Sep 26 04	1522	171	45.9261	-129.9805	There's quite a lot of white floc coming out of the vent site where we're sampling - after we bumped it.			
23:40:19 Sep 26 04	1522	174	45.9261	-129.9805	HFS filtered bag #17. Start 2340 Stop2341. Tmax=52.1 Tave=44.2 stdev=4 T2=~30. Vol=707ml. Z=1522. [Village]	R856-HFS-17-0014	Butterfield	
23:40:28 Sep 26 04	1522	173	45.9261	-129.9805	After a brush with chaos the wand was repositioned for HFS filtered bag #17.			R856-064
23:42:12 Sep 26 04	1522	169	45.9261	-129.9805	While we're sampling we're looking around for some blue mat for Angela.			
23:43:10 Sep 26 04	1522	174	45.9261	-129.9805	Some mat on the floor and some really off the wall worms.			R856-065
23:45:04 Sep 26 04	1523	178	45.9261	-129.9805	Finished water sampling here at Village. Next we'll suction for Angela.			
23:46:23 Sep 26 04	1523	176	45.9261	-129.9805	Preparing to suction blue mat.			
23:48:22 Sep 26 04	1523	170	45.9261	-129.9805	Suction sample into jar #1 for blue mat. Start 2353. Z=1522m. [Village]	R856-SS-J1-0015	Kouris	
23:52:16 Sep 26 04	1522	160	45.9261	-129.9805	Blue mat suction sample			R856-066
23:52:57 Sep 26 04	1522	158	45.9261	-129.9805	Blue mat suction sample			R856-067
23:56:48 Sep 26 04	1522	156	45.9261	-129.9805	Suction sample into jar #3 for the white fuzzy stuff (probably white filamentous bacteria). Took several DSCs. Can see some in the jar - but not much. Z=1522. [Village]	R856-SS-J3-0016	Kouris	
23:59:01 Sep 26 04	1522	166	45.9261	-129.9805	White filament suction sample.			R856-068
00:01:19 Sep 27 04	1522	174	45.9261	-129.9805	White filament suction sample from the marker rope.			R856-069
00:03:23 Sep 27 04	1521	178	45.9261	-129.9805	Another patch of white filament to exploit.			R856-070
00:05:10 Sep 27 04	1521	180	45.9261	-129.9805	A view of the slurp container.			R856-071
00:06:24 Sep 27 04	1522	178	45.9261	-129.9805	Suctioning blue mat into jar #4. Not much blue mat in the jar. After the dive found out there was nothing in the jar. Start 0011. [Village]	R856-SS-J4-0017	Kouris	
00:06:53 Sep 27 04	1522	176	45.9261	-129.9805	More prospective sample of blue mat.			R856-072
00:10:53 Sep 27 04	1522	204	45.9261	-129.9805	Sampling blue mat here and around. Didn't get much of a sample.			R856-073
00:13:03 Sep 27 04	1516	102	45.9261	-129.9805	We left Village and were directly at Castle.			
00:14:58 Sep 27 04	1520	5.3	45.9261	-129.9801	Hobo probe off the beaten path of chimney growth			R856-074
00:15:30 Sep 27 04	1519	39.5	45.9261	-129.9801	Ancient bacterial traps.			R856-075
00:17:12 Sep 27 04	1519	40	45.9260	-129.9802	Anhydrite at Castle. LOTS of flow here.			R856-076
00:17:44 Sep 27 04	1519	98.5	45.9260	-129.9802	Took several DSCs of the anhydrite vent on Castle. Very vigorous flow this year.			
00:19:25 Sep 27 04	1519	103	45.9261	-129.9801	Before knocking the chimney over.			R856-077
00:19:42 Sep 27 04	1519	101	45.9261	-129.9801	Before knocking the chimney over.			R856-078
00:21:37 Sep 27 04	1519	102	45.9261	-129.9801	We need at least 150C here for the high temp measurements.			
00:23:22 Sep 27 04	1520	94.6	45.9261	-129.9801	That's the spot 170C.			R856-079
00:23:52 Sep 27 04	1519	93.8	45.9261	-129.9801	Popping GTB (white) (HIL-14). Leaving it open for at least 30 seconds. From the anhydrite chimney. Tmax=190. [Castle]	R856-GTB-14-0018	Evans	

UTC	Z(m)	Hdg	Lat	Long	R856 Comments	Samples	PI	FrGrab
00:25:12 Sep 27 04	1520	94.6	45.9261	-129.9801	HFS filtered bag #18. Start 0025. Stop 0026. Tmax=195 Tave=192 T2=119. Vol=300ml. Z=1520m. From the anhydrite chimney. [Castle]	R856-HFS-18-0019	Butterfield	
00:25:37 Sep 27 04	1520	93.9	45.9261	-129.9801	GTB (HIL-10) Tmax=191. Leaving it open for at least 30 seconds. From the anhydrite chimney. [Castle]	R856-GTB-10-0020	Evans	
00:27:13 Sep 27 04	1520	93.6	45.9261	-129.9801	The site of GTB samples was 191C.			R856-080
00:27:41 Sep 27 04	1520	94.1	45.9261	-129.9801	HFS filtered bag #16. Start 0026. Stop 0029. Tmax=197.9 Tave=192 stdev=2.5 T2=120. Vol=387ml. Z=1522. From the anhydrite chimney. [Castle]	R856-HFS-16-0021	Butterfield	
00:31:03 Sep 27 04	1519	86.5	45.9261	-129.9801	Attempting to deploy hobo -152 at Castle in the same chimney orifice where we took the gas tights and the fluid samples. It almost got away from us. Bending the end more so it will go in the vent.			
00:31:41 Sep 27 04	1519	87.3	45.9261	-129.9801	Removing the Hobo probe from the sub for deployment.			R856-081
00:33:02 Sep 27 04	1519	90	45.9261	-129.9802	Ow Ow Ow!			R856-082
00:35:09 Sep 27 04	1520	101	45.9261	-129.9801	Before remodeling by Kraft arm.			R856-083
00:35:53 Sep 27 04	1520	102	45.9261	-129.9802	After remodeling by the Kraft arm.			R856-084
00:36:36 Sep 27 04	1520	103	45.9261	-129.9802	The same 195 deg C hole the samples came from.			R856-085
00:38:28 Sep 27 04	1519	97.8	45.9261	-129.9801	Bending the end of the Hobo probe on the anhydrite vent.			R856-086
00:39:13 Sep 27 04	1519	100	45.9261	-129.9802	ROPOS using both hands			R856-087
00:39:33 Sep 27 04	1520	101	45.9261	-129.9802	Still attempting to deploy the hobo. Quite tough with so little time left.			
00:41:10 Sep 27 04	1519	99.5	45.9261	-129.9801	The anhydrite is quite hard on this chimney. The hobo did not end up in the chimney.			
00:41:45 Sep 27 04	1520	101	45.9261	-129.9802	Narf!			R856-088
00:43:14 Sep 27 04	1519	98.8	45.9261	-129.9802	Remodeling of the vent itself. Time is getting short.			R856-089
00:43:25 Sep 27 04	1519	101	45.9261	-129.9802	Knocked the chimney down and now are going to try to put it in the bigger hole.			
00:44:28 Sep 27 04	1519	99.3	45.9261	-129.9801	Maybe here?			R856-090
00:45:23 Sep 27 04	1520	102	45.9261	-129.9801	The old Hobo probe might have a little interference now.			R856-091
00:46:32 Sep 27 04	1519	100	45.9261	-129.9801	Recovering hobo -151 from the anhydrite chimney. Measured temps of 197C from the chimney this year. [Castle]	R856-hobo-151-0022	Embley	
00:46:36 Sep 27 04	1520	99.9	45.9261	-129.9801	Latter stages of the extrication of the old Hobo probe from the clutches of the new.			R856-092
00:47:11 Sep 27 04	1519	100	45.9261	-129.9801	OK - re-installation.			R856-093
00:47:34 Sep 27 04	1519	90	45.9260	-129.9802	Final position.			R856-094
00:47:48 Sep 27 04	1519	80	45.9260	-129.9802	Deployed the hobo -151 into the toppled over anhydrite chimney at Castle.			
00:48:16 Sep 27 04	1518	19.1	45.9261	-129.9801	Far off view of the final position.			R856-095
01:27:13 Sep 27 04	468	53	45.9260	-129.9802	0050 Off the bottom and heading for the cage.			
01:41:53 Sep 27 04	1.3	92	45.9260	-129.9802	ROPOS out of the water.			
01:43:11 Sep 27 04	1.7	144	45.9260	-129.9802	ROPOS on deck. End of dive.			

5.4.5 R857 Dive Log

R857: Coquille and Mkr-113
Wet time (UTC): 9/27 1720 - 9/28 0302. JD: 271-272. 9.7 hrs.
Bottom time (UTC): 9/27 1605 - 9/28 0357. JD: 271-272. 11.86 hrs. [15 samples]
DSC information: 89 DSCs taken starting with R857_DSC_092704_215221_04374.jpg and ending with R857_DSC_092804_031204_04462.jpg
Dive Summary: Fluid sampling and missing rumbleometer reconnaissance. Mkr-113: 3 HFS. Bag City: 4 HFS. Vixen: 3 HFS; 1 GTB; 2 hobos. Deployed 2 hobos in Vixen vent and Mkr-57 just off the mound at Vixen. Went to the 98 lava flow area and searched for the rumbleometer that has been missing since Aug 1998. Found it in 20 minutes. Got a good nav position and will return next year and try to recover it!

UTC	Z(m)	Hdg	Lat	Long	R857Comments	Samples	PI	FrGrab
15:10:18 Sep 27 04	1.2	204	45.9261	-129.9802	1611 UTC ROPOS in the water.			
15:10:18 Sep 27 04	1.2	204	45.9261	-129.9802	1605 UTC ROPOS off the deck. Serial driver is not updating.			
16:12:41 Sep 27 04	69	252	45.9216	-129.9885	Serial driver updating now We're at ~70m.			
17:20:24 Sep 27 04	1517	21	45.9225	-129.9882	The bottom is in site.			
17:20:55 Sep 27 04	1521	20	45.9225	-129.9882	Video on.			
17:21:22 Sep 27 04	1519	107	45.9225	-129.9882	We're searching around for the vent.			
17:21:42 Sep 27 04	1517	337	45.9225	-129.9882	Cage motor off trying to get a fix here.			
17:25:12 Sep 27 04	1523	33.9	45.9226	-129.9883	Searching around for the vent. This could be it?			R857-001
17:27:19 Sep 27 04	1521	340	45.9228	-129.9883	There's definitely venting here.			
17:34:15 Sep 27 04	1521	347	45.9228	-129.9881	Searching around for the marker.			
17:34:31 Sep 27 04	1521	14.8	45.9228	-129.9881	The DSC is not working.			
17:36:34 Sep 27 04	1521	251	45.9228	-129.9881	We are trying to determine if there was a physical marker present here last year.			
17:38:49 Sep 27 04	1522	82	45.9227	-129.9883	According to last year it should be 10m ahead at bearing 70.			
17:41:11 Sep 27 04	1522	306	45.9227	-129.9882	There is a large tubeworm bush on the edge of an overhang that we may have sampled last year. Last year's nav says this is where the marker was.			
17:41:50 Sep 27 04	1522	354	45.9227	-129.9883	Searching around this structure for venting. Nav says this is where the former Mkr 113 should be.			R857-002
17:42:35 Sep 27 04	1524	342	45.9227	-129.9883	Worms found on same structure. (This is it - after looking over last years DSCs).			R857-003
17:43:16 Sep 27 04	1525	332	45.9227	-129.9882	Dropping down in the pit below the tubeworms to see if this looks familiar.			
17:43:19 Sep 27 04	1525	339	45.9227	-129.9882	More of the same close up.			R857-004
17:44:29 Sep 27 04	1523	221	45.9227	-129.9883	The sub spinning in its graben.			R857-005
17:44:57 Sep 27 04	1523	213	45.9227	-129.9883	More views of the same depression.			R857-006
17:46:57 Sep 27 04	1525	222	45.9227	-129.9883	Checking out some good flow on the top of the ledge behind the tubeworms. Some very orange sediment on the periphery of the flow.			
17:47:02 Sep 27 04	1525	224	45.9227	-129.9883	A prospective sampling site.			R857-007
17:50:21 Sep 27 04	1525	16.7	45.9227	-129.9883	Checking the temperature here with the fluid sampler intake.			

UTC	Z(m)	Hdg	Lat	Long	R857Comments	Samples	PI	FrGrab
17:52:34 Sep 27 04	1525	15.6	45.9227	-129.9883	Checking fluid temperatures.			R857-008
17:54:19 Sep 27 04	1525	12.1	45.9227	-129.9883	Got a maximum of 15 degrees at this site. Last year's logs indicate we were more on the north side of the site so we will head there.			
17:57:30 Sep 27 04	1524	177	45.9227	-129.9883	Another possible sampling site on the north side of Marker 113.			R857-009
17:58:00 Sep 27 04	1525	186	45.9227	-129.9883	We have found a similar looking site to the north with a large patch of tubeworms on a ledge. Tubeworms look more robust here. Heading 181.			
17:58:07 Sep 27 04	1525	182	45.9227	-129.9883	Happier tube worms and more of them on the other side of the structure.			R857-010
17:58:56 Sep 27 04	1525	186	45.9227	-129.9883	HFS is sniffing temperatures.			R857-011
17:59:18 Sep 27 04	1525	184	45.9227	-129.9883	Checking the temperature down in the cluster of tubeworms.			
18:00:32 Sep 27 04	1525	184	45.9227	-129.9883	This is the spot to sample.			R857-012
18:01:17 Sep 27 04	1525	184	45.9227	-129.9883	Tried to start a fluid sample but the sample pump is not responding. Sending reboot commands.			
18:03:22 Sep 27 04	1525	182	45.9227	-129.9883	HFS filtered bag #18. Start 1803 Stop 1806. Tmax=23.3 Tave=22.7 stdev=0.42 T2=16.9 Vol=502mls Z=1525m. [Marker 113]	R857-HFS-18-0001	Butterfield	
18:03:37 Sep 27 04	1525	186	45.9227	-129.9883	HFS Filtered bag 18.			R857-013
18:07:10 Sep 27 04	1525	185	45.9227	-129.9883	HFS unfiltered piston #20. Start 1807 Stop 1810. Tmax=23.7 Tave=23.1 stdev=0.82 T2=16.8 Vol=654mls Z=1525m. [Marker 113]	R857-HFS-20-0002	Butterfield	
18:09:33 Sep 27 04	1525	182	45.9227	-129.9883	Checking the exhaust. There are some small stringy things in the exhaust to make it easier to see the outflow.			
18:11:30 Sep 27 04	1525	184	45.9227	-129.9883	HFS Sterivex filter #21. Start 1811 Stop 1827. Tmax=23.4 Tave=22.6 stdev=0.4 T2=17.1 Vol=2002mls Z=1525m. Temperature has been very steady. [Marker 113]	R857-HFS-21-0003	Butterfield	
18:11:57 Sep 27 04	1525	184	45.9227	-129.9883	View of exhaust flow indicators.			R857-014
18:12:52 Sep 27 04	1525	184	45.9227	-129.9883	Wand position for HFS Sterivex filter #21.			R857-015
18:29:13 Sep 27 04	1525	179	45.9227	-129.9883	Done fluid sampling. Stowing the fluid sampler intake and heading to Bag City.			
18:32:17 Sep 27 04	1524	177	45.9227	-129.9883	We will look for the 2 missing MTRs as we leave Marker 113.			
18:36:48 Sep 27 04	1525	357	45.9227	-129.9883	DSC is back online. Took 2 digital images of the massive expanse of limpets and 3 more images of the general Marker 113 area.			
18:38:06 Sep 27 04	1520	335	45.9227	-129.9883	Couldn't find the MTR's. Heading to Bag City for more fluid sampling.			
18:38:51 Sep 27 04	1506	186	45.9227	-129.9883	Video is off at 1839.			
19:20:34 Sep 27 04	1533	171	45.9162	-129.9895	We are back on the bottom near Bag City. Video on at 1920.			
19:20:58 Sep 27 04	1535	179	45.9162	-129.9895	The bottom near Bag City.			R857-016
19:21:27 Sep 27 04	1535	180	45.9162	-129.9895	Bag City marker (#36) should be 9 meters to the NE.			
19:24:37 Sep 27 04	1535	118	45.9162	-129.9895	We have found the benchmark near Bag City. Head SE (bearing 067) from here.			

UTC	Z(m)	Hdg	Lat	Long	R857Comments	Samples	PI	FrGrab
19:26:25 Sep 27 04	1533	22	45.9162	-129.9895	Went the wrong direction from the benchmark so we went back to it. Heading 067. Range should be 9 meters.			
19:26:29 Sep 27 04	1533	16	45.9162	-129.9895	Pressure measurement benchmark and marker near Bag City.			R857-017
19:27:04 Sep 27 04	1534	69	45.9162	-129.9895	Arrival at Bag City.			R857-018
19:27:24 Sep 27 04	1534	54.2	45.9162	-129.9893	We have found the marker at Bag City. It is in an enormous field of tubeworms.			
19:27:40 Sep 27 04	1533	54.7	45.9162	-129.9893	Official marker: downtown Bag City.			R857-019
19:28:59 Sep 27 04	1534	82.6	45.9162	-129.9893	Found the frame for the NeMOnet camera that went out in 1998 or 1999.			
19:31:02 Sep 27 04	1533	73.4	45.9162	-129.9893	Looks like there is still some pretty good flow here. Sitting down to find a good sampling site.			
19:31:18 Sep 27 04	1533	84	45.9162	-129.9893	Scoping out the area near marker 36.			R857-020
19:33:06 Sep 27 04	1534	166	45.9162	-129.9893	There is another float or marker of some sort in the background. There were some missing MTRs at this site.			
19:33:11 Sep 27 04	1534	165	45.9162	-129.9893	Massive expanse of tubeworms at Bag City.			R857-021
19:37:14 Sep 27 04	1536	201	45.9162	-129.9893	Picking up the fluid sampler intake to check temperatures in the tubeworm bush.			
19:38:08 Sep 27 04	1536	199	45.9162	-129.9893	Sniffing about for elevated temperatures.			R857-022
19:41:23 Sep 27 04	1536	204	45.9162	-129.9893	Intake is well down into the tubeworms and reading about 18 degrees.			
19:42:57 Sep 27 04	1536	202	45.9162	-129.9893	Tube worms grab back!			R857-023
19:45:26 Sep 27 04	1536	199	45.9162	-129.9893	Moving the intake around a bit but it looks like our best bet may be back in the tubeworm bush.			
19:47:24 Sep 27 04	1536	197	45.9162	-129.9893	Arm is locked off for fluid sampling.			
19:47:42 Sep 27 04	1536	200	45.9162	-129.9893	HFS unfiltered piston #5. Start 1950 Stop 1953. Tmax=18.0 Tave=17.4 stdev=0.25 T2=13 Vol=720mls Z=1536m. Took digital images of the sampling site. [Bag City]	R857-HFS-5-0004	Butterfield	
19:50:17 Sep 27 04	1536	197	45.9162	-129.9893	HFS at the start of sampling to piston #5.			R857-024
19:54:06 Sep 27 04	1536	200	45.9162	-129.9893	HFS Sterivex filter #12. Start1 1954 Stop1 1956 Start2 1957 Stop2 2022 Start3 2029 Stop3 2032. Tmax=18.5 Tave=16.7 stdev=0.2 T2=13 Vol=3300mls Z=1536m. [Bag City]	R857-HFS-12-0005	Butterfield	
20:10:02 Sep 27 04	1536	192	45.9163	-129.9893	Changed video tapes at 2010.			
20:14:03 Sep 27 04	1536	189	45.9163	-129.9893	The vicinity of the sample wand.			R857-025
20:17:35 Sep 27 04	1536	192	45.9163	-129.9893	A nice pastel view of the worms through the flow.			R857-026
20:20:25 Sep 27 04	1536	192	45.9163	-129.9893	Macrofauna near the sampling site at Bag City.			R857-027
20:21:52 Sep 27 04	1536	182	45.9163	-129.9893	Los Angeles freeway system map.			R857-028
20:23:41 Sep 27 04	1536	206	45.9163	-129.9893	Temperature dropped off to 12 degrees during sampling of filter 12. Stopped the pump and repositioned.			
20:30:38 Sep 27 04	1536	187	45.9163	-129.9893	The new spot for sampling (same Sterivex filter).			R857-029

UTC	Z(m)	Hdg	Lat	Long	R857Comments	Samples	PI	FrGrab
20:32:45 Sep 27 04	1536	184	45.9163	-129.9893	HFS unfiltered bag #9. Start 2033 Stop 2036. Tmax=17.1 Tave=16.7 stdev=0.2 T2=12 Vol=600mls Z=1536m. [Bag City]	R857-HFS-9-0006	Butterfield	
20:37:02 Sep 27 04	1536	185	45.9163	-129.9893	HFS Sterivex filter #3. Start 2038 Stop 2051. Tmax=17.2 Tave=16.5 stdev=1.45 T2=12 Vol=1430mls Z=1536m. [Bag City]	R857-HFS-3-0007	Butterfield	
20:49:09 Sep 27 04	1536	183	45.9163	-129.9893	Palm worms; tubeworms; scale worms.			R857-030
20:52:15 Sep 27 04	1536	186	45.9163	-129.9893	Done with fluid sampling. Stowed the intake.			
20:53:14 Sep 27 04	1532	189	45.9163	-129.9893	Leaving the marker float we saw in the background for lack of time to check it out. Heading to Vixen.			
20:57:48 Sep 27 04	1501	146	45.9163	-129.9893	Stopped the video at 2057.			
21:13:05 Sep 27 04	1461	296	45.9169	-129.9919	A jellyfish crosses our path in transit.			R857-031
21:22:00 Sep 27 04	1525	343	45.9172	-129.9928	We're heading to the bottom.			
21:22:25 Sep 27 04	1531	342	45.9172	-129.9928	We're on the bottom.			
21:24:43 Sep 27 04	1536	251	45.9169	-129.9928	Rat-tail fish greets us hello at the bottom.			R857-032
21:25:02 Sep 27 04	1536	149	45.9169	-129.9928	Collapse cave and deep-sea life while on our way to Vixen.			R857-033
21:25:06 Sep 27 04	1536	137	45.9169	-129.9928	Video on.			
21:25:44 Sep 27 04	1536	173	45.9169	-129.9928	Close up of the deep-sea life while looking for Vixen.			R857-034
21:28:26 Sep 27 04	1537	338	45.9170	-129.9931	We're at the Co quille area. Seeing some evidence of venting. Sparse tubeworms; lots of crabs.			
21:30:57 Sep 27 04	1535	345	45.9172	-129.9932	Lobate lava flows with some vent biology. Looks pretty cool here; as in not warm.			
21:32:34 Sep 27 04	1535	33	45.9173	-129.9931	Coming up to a chimney it appears to be Vixen.			R857-035
21:32:52 Sep 27 04	1535	25.8	45.9173	-129.9931	We're at one of the anhydrites. There's Vixen. We see the hobos.			
21:34:02 Sep 27 04	1536	39.7	45.9174	-129.9931	Coming up close and it is confirmed to be Vixen.			R857-036
21:34:16 Sep 27 04	1536	43.4	45.9174	-129.9931	Vixen and the 2003 hobo probes.			R857-037
21:34:39 Sep 27 04	1535	83.5	45.9174	-129.9931	Vixen is actually smoking this year; more so than in past years. Gray smoke is pouring out of the top. It looks hot.			
21:35:52 Sep 27 04	1534	167	45.9174	-129.9931	Vixen is darker and smoking much more than in previous years. It also looks smaller. ~7 DSCs here.			
21:38:02 Sep 27 04	1531	121	45.9174	-129.9931	3 more DSCs of Vixen.			
21:39:16 Sep 27 04	1534	3.6	45.9174	-129.9931	Casper is here just beyond Vixen.			R857-038
21:39:55 Sep 27 04	1535	1.7	45.9174	-129.9931	2 DSCs of Vixen with Casper in the background.			
21:39:59 Sep 27 04	1536	15.1	45.9174	-129.9931	Vixen pre-sampling.			R857-039
21:40:03 Sep 27 04	1536	18.7	45.9174	-129.9931	Vixen before we sample it.			R857-040
21:40:25 Sep 27 04	1537	10	45.9174	-129.9931	The base of Vixen.			R857-041
21:40:25 Sep 27 04	1537	10	45.9174	-129.9931	It turned black over the year and may be building sulfide. The mound looks larger too.			

UTC	Z(m)	Hdg	Lat	Long	R857Comments	Samples	PI	FrGrab
21:40:57 Sep 27 04	1538	10.8	45.9174	-129.9931	Vixen before sampling etc.			R857-042
21:42:00 Sep 27 04	1537	11.6	45.9174	-129.9931	3 more DSCs of Vixen.			
21:44:59 Sep 27 04	1537	18.1	45.9174	-129.9931	Preparing to sample. Dave is checking the temperature at the top of the chimney. The chimney top is falling apart a bit as we measure the temp here.			
21:45:01 Sep 27 04	1538	13.8	45.9174	-129.9931	Checking temperature at Vixen before fluid sampling.			R857-043
21:45:25 Sep 27 04	1537	13.3	45.9174	-129.9931	The chimney at Vixen begins to break when the fluid sampler is placed further into the chimney.			R857-044
21:46:48 Sep 27 04	1537	13.6	45.9174	-129.9931	Vixen continues to break.			R857-045
21:46:51 Sep 27 04	1538	18.1	45.9174	-129.9931	The chimney is obviously quite delicate. It's falling apart as we measure the temp. More DSCs.			
21:46:54 Sep 27 04	1538	18	45.9174	-129.9931	Vixen breaking.			R857-046
21:47:58 Sep 27 04	1537	13.1	45.9174	-129.9931	Vixen being demolished.			R857-047
21:48:00 Sep 27 04	1538	16.7	45.9174	-129.9931	Vixen being demolished.			R857-048
21:48:03 Sep 27 04	1538	18.5	45.9174	-129.9931	There she goes. Vixen toppled. It is really jetting out of the orifice.			
21:48:03 Sep 27 04	1538	18.5	45.9174	-129.9931	Last bits of Vixen being removed.			R857-049
21:48:31 Sep 27 04	1538	14.5	45.9174	-129.9931	The Vixen chimney is down.			R857-050
21:50:38 Sep 27 04	1537	14.3	45.9174	-129.9931	Checking temperature at Vixen before fluid sampling.			R857-051
21:53:35 Sep 27 04	1537	12.5	45.9174	-129.9931	Looks like some chalcopyrite at the base of the mound. Temp got up to 190C. We may have broke the temp probe.			
21:53:50 Sep 27 04	1538	12.3	45.9173	-129.9930	Checking temperature at Vixen. A HOBO is visible in front of the fluid sampling wand.			R857-052
21:55:21 Sep 27 04	1538	10.8	45.9174	-129.9931	Temp is going up again but Dave says the probe will probably be flaky now.			
21:56:42 Sep 27 04	1537	17.5	45.9174	-129.9931	T2 (the probe inside the beast) is working; but not so sure about the reliability of the probe on the wand.			
21:59:02 Sep 27 04	1538	13.3	45.9174	-129.9931	Locking off the arm.			
21:59:14 Sep 27 04	1538	19	45.9174	-129.9931	T1 is not any good anymore. T2 is hotter than T1 which proves that it's broken			
21:59:42 Sep 27 04	1538	13.3	45.9174	-129.9931	HFS piston #6. Start 2200. Stop 2202. T2=173 Vol=348ml Z=1538m. Dave says this is the hottest he's ever seen T2 get. Cooling by 40-50C. [Vixen]	R857-HFS-6-0008	Butterfield	
22:01:04 Sep 27 04	1537	13.1	45.9174	-129.9931	Starting to fluid sample at Vixen.			R857-053
22:03:10 Sep 27 04	1538	19.2	45.9174	-129.9931	GTB-orange (HIL-16) T2=173. T1 is probably 50+ degrees higher than T2. Kept it open for 30 sec. [Vixen]	R857-GTB-16-0009	Evans	
22:04:51 Sep 27 04	1537	18.3	45.9174	-129.9931	HFS filtered bag #11. Start 2205 Stop 2206. T1=182 (broken so probably 50+ degrees higher than this) T2=170 Vol=307ml Z=1537m. [Vixen]	R857-HFS-11-0010	Butterfield	
22:07:12 Sep 27 04	1537	18.2	45.9174	-129.9930	HFS unfiltered bag #14. Start 2207. Stop 2209. Tmax=186 (broken so probably 50+ degrees higher than this) T2=170. Vol=300ml. Z=1537. Frame grabs of intake nozzle. [Vixen]	R857-HFS-14-0011	Butterfield	
22:08:54 Sep 27 04	1538	17.2	45.9174	-129.9931	In take nozzle in Vixen during fluid sampling.			R857-054

UTC	Z(m)	Hdg	Lat	Long	R857Comments	Samples	PI	FrGrab
22:09:57 Sep 27 04	1538	14.3	45.9174	-129.9931	T2 temperature probe.			R857-055
22:11:45 Sep 27 04	1538	16	45.9174	-129.9931	Finished fluid sampling. We're stowing the HFS wand. Next we'll deploy a marker here; then retrieve the hobos.			
22:15:03 Sep 27 04	1537	12.3	45.9175	-129.9933	Deploying Mkr-57 at Vixen Vent.			
22:16:05 Sep 27 04	1537	20	45.9174	-129.9931	Placing marker 57 at Vixen.			R857-056
22:16:28 Sep 27 04	1537	18.3	45.9174	-129.9931	Recovering hobo -132. There are minerals (chalcopyrite) on the tip. [Vixen]	R857-hobo-132-0012	Embley	
22:16:42 Sep 27 04	1537	20	45.9174	-129.9931	Retrieving HOBO 132 from Vixen and placing into the purse.			R857-057
22:18:23 Sep 27 04	1537	22	45.9174	-129.9931	Lots of venting around the perimeter of Vixen blasting out white floc.			
22:19:35 Sep 27 04	1537	21.1	45.9174	-129.9930	Have to move the wand out of the way before putting the hobos in the purse.			
22:23:51 Sep 27 04	1537	20.8	45.9174	-129.9931	First hobo in the purse. Situating it.			
22:27:38 Sep 27 04	1536	257	45.9174	-129.9931	Several DSCs of the Marker.			
22:27:47 Sep 27 04	1536	235	45.9174	-129.9931	Base of marker 57 at Vixen.			R857-058
22:28:48 Sep 27 04	1537	241	45.9174	-129.9931	Recovering HOBO 130 also at Vixen.			R857-059
22:29:05 Sep 27 04	1537	246	45.9174	-129.9931	Recovering hobo -130. It's covered in bacterial floc. Chalcopyrite growing on the probe and the tip is blackened. [Vixen]	R857-hobo-130-0013	Embley	
22:29:22 Sep 27 04	1537	246	45.9174	-129.9931	Lots of bacterial mat on HOBO 130.			R857-060
22:33:01 Sep 27 04	1537	239	45.9174	-129.9931	Chalcopyrite on the end of the probe of HOBO 130.			R857-061
22:35:25 Sep 27 04	1537	240	45.9174	-129.9930	Re-stowing the HFS wand.			
22:37:12 Sep 27 04	1537	239	45.9174	-129.9930	Preparing to deploy hobos 153 and 128 back in the orifice at Vixen.			
22:39:55 Sep 27 04	1537	243	45.9174	-129.9930	Deploying hobo-128 in the flow at Vixen. Looks good.			
22:42:23 Sep 27 04	1537	242	45.9174	-129.9930	HOBO 128 deployed.			R857-062
22:43:38 Sep 27 04	1537	236	45.9174	-129.9930	HOBO 128 in Vixen vent.			R857-063
22:43:46 Sep 27 04	1537	236	45.9174	-129.9930	Took a couple of DSCs of hobo-128 in Vixen.			
22:45:59 Sep 27 04	1537	235	45.9174	-129.9930	Grabbed hobo-153 for deployment at Vixen.			
22:47:16 Sep 27 04	1537	236	45.9174	-129.9930	Because of the chalcopyrite on the tip Dave thinks it could be around 300 degrees. Seems Vixen is heating up and the flow is more vigorous. Could it be building a sulfide base?			
22:47:47 Sep 27 04	1537	237	45.9174	-129.9930	Deploying HOBO 153 at Vixen.			R857-064
22:49:05 Sep 27 04	1537	233	45.9174	-129.9930	Deployed hobo-153 at Vixen. Two hobos in the vent for the year.			
22:49:45 Sep 27 04	1537	232	45.9174	-129.9930	HOBO 153 deployed.			R857-065
22:50:05 Sep 27 04	1537	234	45.9174	-129.9930	We're going to move the marker a little farther away from the vent. We took several DSCs of the 2 hobos in place.			
22:51:53 Sep 27 04	1537	124	45.9174	-129.9930	Both HOBO 128 and 153 deployed.			R857-066
22:52:08 Sep 27 04	1537	121	45.9174	-129.9930	Moving the marker off the mound.			

UTC	Z(m)	Hdg	Lat	Long	R857Comments	Samples	PI	FrGrab
22:54:20 Sep 27 04	1538	103	45.9174	-129.9930	The marker has been moved off the mound.			
22:57:15 Sep 27 04	1536	306	45.9174	-129.9930	We're going to take a peek at Casper now.			
22:57:40 Sep 27 04	1537	321	45.9174	-129.9930	Casper now. Doesn't appear to have as much flow as Vixen - but still pouring out.			
22:58:16 Sep 27 04	1537	358	45.9174	-129.9930	Casper chimney.			R857-067
22:58:50 Sep 27 04	1536	40.9	45.9174	-129.9930	Casper chimney.			R857-068
22:59:13 Sep 27 04	1537	55.5	45.9174	-129.9930	Looks like we're finished here. Next stop ASHES.			
23:00:06 Sep 27 04	1536	58	45.9174	-129.9930	Casper chimney and mound.			R857-069
23:00:37 Sep 27 04	1536	62	45.9174	-129.9930	Moving 36 DSCs.			
23:10:44 Sep 27 04	1455	32.9	45.9171	-129.9930	We're on our way to ASHES.			
23:12:36 Sep 27 04	1420	1.6	45.9171	-129.9930	SpongeBob.			R857-070
00:25:18 Sep 28 04	1539	16.5	45.9335	-130.0136	The bottom is in site. Video on.			
00:28:09 Sep 28 04	1542	18.6	45.9335	-130.0136	Just passing sulfide chimneys at ASHES on our way to Virgin.			R857-071
00:28:42 Sep 28 04	1543	355	45.9335	-130.0136	Cruising around ASHES. There's the RAS.			
00:29:19 Sep 28 04	1542	92.1	45.9335	-130.0136	The chimneys are growing back and the temp probe looks like it's right in the chimneys.			
00:29:20 Sep 28 04	1543	91.5	45.9335	-130.0136	We have found the 2004 RAS at Virgin.			R857-072
00:29:58 Sep 28 04	1545	138	45.9335	-130.0136	A couple of new chimneys are forming under the RAS funnel.			R857-073
00:29:58 Sep 28 04	1545	138	45.9335	-130.0136	HOBO appears to be slightly out of position.			R857-074
00:30:28 Sep 28 04	1545	128	45.9337	-130.0133	Looking at the little chimneys at Virgin. Looks like 4 or 5 of them.			
00:30:46 Sep 28 04	1545	128	45.9337	-130.0133	Close up of the new chimneys under the RAS funnel. Trying to show that the fluid seems to be going up into the funnel more now. Don't want to over-compensate due to tidal fluctuations.			R857-075
00:31:23 Sep 28 04	1545	125	45.9337	-130.0133	We're going to re-position the RAS funnel to make sure the flow is actually going up the chimney. Lots of it seems to be wafting off to the side (outside the funnel).			
00:32:41 Sep 28 04	1545	215	45.9337	-130.0133	It's been going from 15C at high tide to 2C at low tide.			
00:32:42 Sep 28 04	1545	215	45.9337	-130.0133	Vent fluid coming up outside of the RAS funnel. Fluid flow is to the left of the funnel in this image.			R857-076
00:32:50 Sep 28 04	1545	213	45.9337	-130.0133	New chimneys.			R857-077
00:33:50 Sep 28 04	1545	127	45.9337	-130.0133	Chimneys are forming outside of the RAS funnel.			R857-078
00:33:52 Sep 28 04	1545	127	45.9337	-130.0133	Also plan to move the hobo more into the flow.			
00:36:09 Sep 28 04	1545	125	45.9337	-130.0133	ROPOS moved one leg a bit.			
00:37:20 Sep 28 04	1545	235	45.9337	-130.0133	View of the flow of vent fluid with respect to the RAS funnel.			R857-079
00:39:48 Sep 28 04	1544	260	45.9337	-130.0133	Looks like we'll be manipulating this for awhile.			

UTC	Z(m)	Hdg	Lat	Long	R857Comments	Samples	PI	FrGrab
00:46:34 Sep 28 04	1545	226	45.9337	-130.0133	We're picking it up by the funnel now. Let's make a major move here. Looks better but the tide is very strong and pushing it away from the tunnel.			
00:47:10 Sep 28 04	1545	229	45.9337	-130.0133	After repositioning the RAS funnel more vent fluid is going up and into the funnel.			R857-080
00:49:35 Sep 28 04	1545	230	45.9337	-130.0133	Looks like flow is coming out the hole near the top of the tunnel.			
00:50:10 Sep 28 04	1545	231	45.9337	-130.0133	More of the vent fluid is entering the funnel than was before repositioning.			R857-081
00:50:36 Sep 28 04	1545	233	45.9337	-130.0133	More of the vent fluid is entering the funnel than was before repositioning.			R857-082
00:52:16 Sep 28 04	1544	125	45.9337	-130.0133	We're gong to move around and look at the flow from all sides.			
00:54:14 Sep 28 04	1545	130	45.9337	-130.0133	Vent fluid can be seen going up towards the funnel. The chimneys are nicely located directly below the funnel as well.			R857-083
00:55:12 Sep 28 04	1545	127	45.9337	-130.0133	Took 5 DSCs of the RAS after we repositioned the funnel.			
00:56:14 Sep 28 04	1539	202	45.9337	-130.0133	We're moving to Hell now.			
00:58:41 Sep 28 04	1543	269	45.9337	-130.0133	Approaching Hell.			R857-084
00:58:59 Sep 28 04	1543	256	45.9337	-130.0133	View of the top of Hell's chimney.			R857-085
00:59:06 Sep 28 04	1543	256	45.9333	-130.0139	Close up on a small venting chimney on top of Hell.			R857-086
00:59:43 Sep 28 04	1543	241	45.9333	-130.0139	Organisms on the vertical face of Hell.			R857-087
00:59:52 Sep 28 04	1543	238	45.9333	-130.0139	We're at Hell now.			
01:01:20 Sep 28 04	1543	236	45.9333	-130.0139	Looks like a great little chimney for sampling. Gray smoke is pouring out.			
01:02:04 Sep 28 04	1543	238	45.9333	-130.0139	HFS 3 micron piston #1 Start 0102 Stop 0105 Tmax=240C (Dave still doesn't believe T1 is working correctly) T2=120C. Vol=428ml. Z=1543. [Hell]	R857-HFS-1-0014	Butterfield	
01:02:12 Sep 28 04	1543	240	45.9333	-130.0139	Preparing to take a gas tight sample from Hell.			R857-088
01:02:38 Sep 28 04	1543	240	45.9333	-130.0139	GTB (blue) (HIL-17) at the spigot. Open for 10 sec. T2=115 and fluctuating. Tmax=231 (not sure it's working though). Fired at the peak of the T2. [Hell]	R857-GTB-17-0015	Evans	
01:03:43 Sep 28 04	1543	243	45.9333	-130.0139	Taking a gas tight sample at Hell.			R857-089
01:05:43 Sep 28 04	1543	243	45.9333	-130.0139	Another view of gas tight sampling at Hell. Took a few DSCs of Hell on our way out.			R857-090
01:08:46 Sep 28 04	1513	312	45.9333	-130.0139	We're on our way to search for the missing rumbleometer. Deployed in early August 1998. It was an Ed Baker trip (the 2nd trip after the eruption - the first was the event response cruise).			
01:11:30 Sep 28 04	1497	0.3	45.9335	-130.0136	The video is off.			
01:33:56 Sep 28 04	1309	99.4	45.9335	-130.0136	THE largest jellyfish ever just went by the sit cam. Vinnie wants to call it the "bus". We didn't get a frame grab of it.			
02:22:16 Sep 28 04	1409	92	45.9189	-129.9851	We're heading down.			
02:26:07 Sep 28 04	1483	24.7	45.9361	-129.9844	We're heading to the bottom. Hoping to get very; very lucky and spot the very; very; very missing rumbleometer.			
02:27:42 Sep 28 04	1516	21.7	45.9361	-129.9844	We're on the bottom.			
02:28:27 Sep 28 04	1516	105	45.9365	-129.9834	We're right over a swirl. Bill is calling them "crop circles".			

UTC	Z(m)	Hdg	Lat	Long	R857Comments	Samples	PI	FrGrab
02:28:47 Sep 28 04	1518	113	45.9365	-129.9834	Interesting swirl patterns in the rock.			R857-091
02:30:09 Sep 28 04	1517	353	45.9362	-129.9835	We're heading north first.			
02:33:24 Sep 28 04	1517	358	45.9362	-129.9835	Lava pillars in collapse area whole searching for rumbleometer.			R857-092
02:33:34 Sep 28 04	1516	329	45.9362	-129.9835	Lava pillars and ledges in this jumbled collapse area.			
02:36:34 Sep 28 04	1517	161	45.9370	-129.9836	Turning to the south. The first traverse was to the northwest of the target.			
02:38:20 Sep 28 04	1517	171	45.9365	-129.9834	We're back at the starting position.			
02:42:34 Sep 28 04	1518	43.9	45.9361	-129.9830	Lava caves found during our search.			R857-093
02:42:39 Sep 28 04	1517	43.4	45.9362	-129.9830	Heading northeast off to the eastern edge of the circle.			
02:44:09 Sep 28 04	1515	76.9	45.9366	-129.9827	Now we're heading due east.			
02:45:09 Sep 28 04	1514	18.7	45.9366	-129.9824	Turning west now to head back to the center of the survey pattern.			
02:47:30 Sep 28 04	1517	83	45.9365	-129.9832	We found it!!!			
02:47:34 Sep 28 04	1517	54	45.9365	-129.9832	We found the rumbleometer!!			R857-094
02:47:46 Sep 28 04	1517	11.1	45.9366	-129.9832	Rumbleometer with lava pillars in the background.			R857-095
02:47:58 Sep 28 04	1518	10.3	45.9366	-129.9832	It's sitting very precariously on the top of a rubble pile. It was 22 meters NE (bearing of 50 degrees) of the original drop point.			
02:48:07 Sep 28 04	1519	351	45.9366	-129.9831	Rumbleometer. Close-up of the corroded frame.			R857-096
02:48:47 Sep 28 04	1518	259	45.9366	-129.9831	Rumbleometer. Notice the aluminum frame is corroded by biology.			R857-097
02:49:27 Sep 28 04	1518	165	45.9366	-129.9831	Rumbleometer.			R857-098
02:50:06 Sep 28 04	1519	211	45.9367	-129.9832	Rumbleometer. Looking down on the pressure cases.			R857-099
02:50:32 Sep 28 04	1518	0.3	45.9366	-129.9831	Rumbleometer.			R857-100
02:50:48 Sep 28 04	1519	19.7	45.9366	-129.9831	Rumbleometer. This is how it's actually sitting. Pretty lop-sided.			R857-101
02:51:17 Sep 28 04	1518	64.5	45.9366	-129.9832	Rumbleometer. Doesn't look as askew in this image.			R857-102
02:51:36 Sep 28 04	1518	102	45.9366	-129.9832	We're trying to get a good fix here..			
02:52:17 Sep 28 04	1519	47	45.9366	-129.9832	Rumbleometer.			R857-103
02:52:26 Sep 28 04	1519	40.9	45.9366	-129.9832	Rumbleometer. Close-up of the shackles at the top.			R857-104
02:52:31 Sep 28 04	1519	33.4	45.9366	-129.9832	We're zooming in on the lifting gear - to know what we're in for when we recover it. Lots of biology corroding the frame. Looks like it landed on the pillar stump.			
02:53:08 Sep 28 04	1519	318	45.9367	-129.9832	Close-up of the top of the rumbleometer. ROPOS guys want this info to plan how it will be released. Probably use a mooring with LOTS of flotation.			R857-105
02:56:17 Sep 28 04	1480	234	45.9367	-129.9832	Moved 31 DSC pics.			
03:00:16 Sep 28 04	1474	176	45.9367	-129.9832	Great location for the missing rumbleometer: 45 56.1980 N 129 58.9894' W. Z=1518.7m rms=1.4m			
03:02:01 Sep 28 04	1471	72.6	45.9367	-129.9832	We're on our way to the surface. We're disabling the transponders on the way up.			

UTC	Z(m)	Hdg	Lat	Long	R857Comments	Samples	PI	FrGrab
03:55:43 Sep 28 04	1.3	118	45.9367	-129.9832	ROPOS out of the water.			
03:57:13 Sep 28 04	1.8	181	45.9367	-129.9832	ROPOS on the deck. End of NeMO 2004 dive series.			