Submarine Ring of Fire 2006

Mariana Arc Submarine Volcanoes

R/V MELVILLE Cruise MGLN02MV

April 18 – May 13, 2006

Apra, Guam to Yokohama, Japan

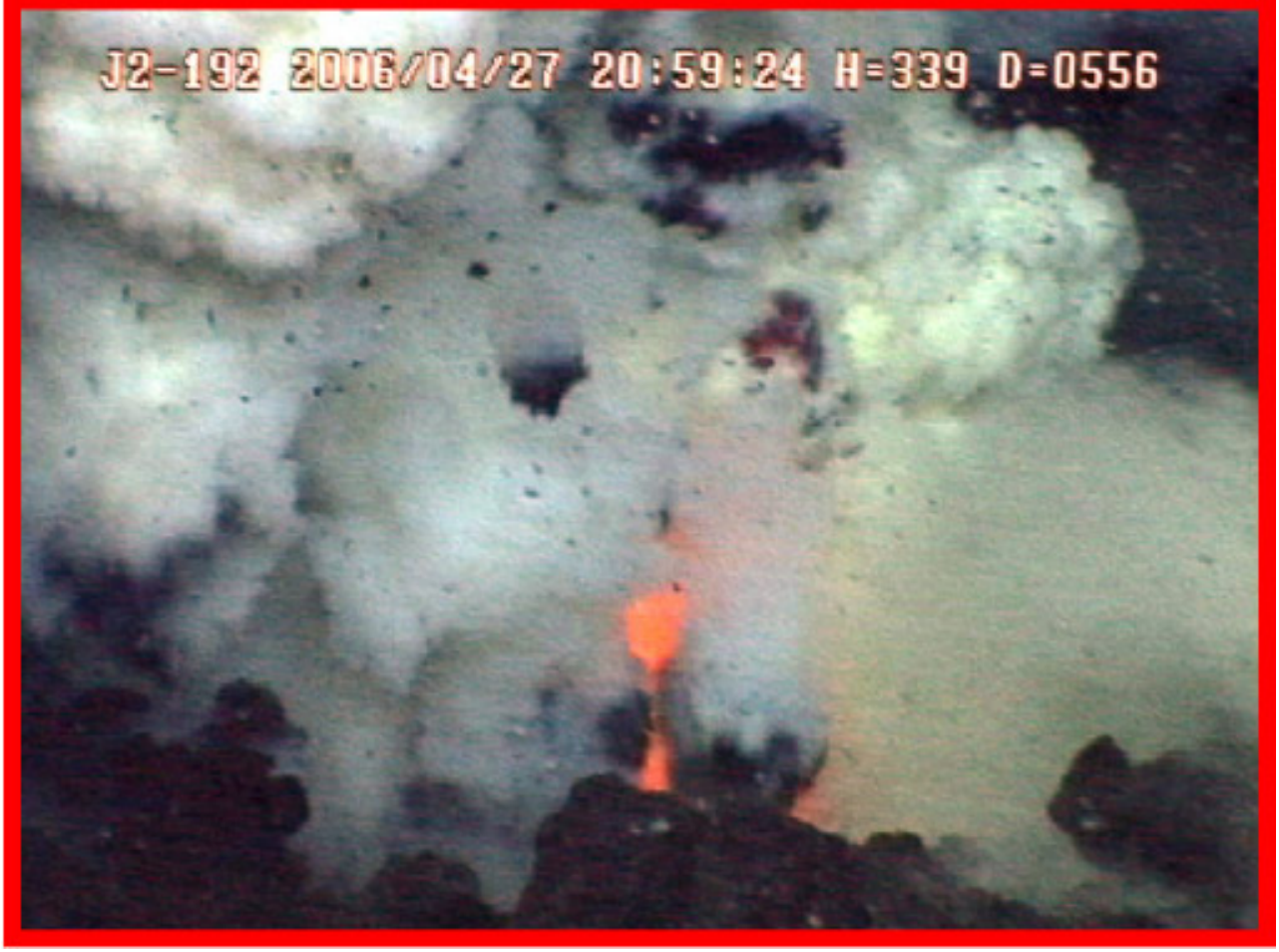
Jason-2 dives J2-184 - J2-199

Chief Scientist: Robert W. Embley

Captain: Christopher Curl

Jason Expedition Leader: Will Sellers

Major funding from the NOAA Office of Ocean Exploration



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Cruise Report compiled by: Susan Merle, Bob Embley and Bill Chadwick

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FIGURE CAPTIONS

Cover. Red flash of molten lava at Brimstone site, NW Rota-1 volcano, SRoF'06.

Figure 1. Mariana Arc bathymetry and satellite altimetry data, indicating the *Jason-2* SRoF'06 northern and southern dive areas.

Plate 1: Geology at Northwest Rota-1 and East Diamante
NW Rota-1
a) Good example of gases exsolving from lava that has just erupted on the seafloor at Brimstone Pit. Typically we see sheets of CO_2 bubbles in the foreground of the advancing hot lava, with bright yellow-colored, sulfur-rich plumes originating from the lava itself. The CO_2 bubbles would 'pulse' while the sulfur plumes were directly correlated to lava extrusion. Image ~1.5 m across.
b) Nice example of the erupting volcanic vent with abundant ash and in some cases blocks of lava (top, middle) falling out of the plume emanating from Brimstone Pit. Image ~2 m across.
c) Rock recovered from the Brimstone Pit area, NW Rota-1. Spectacular example of molten sulfur oozing out of the vesicles. Also notable in this sample, are the clasts of more hydrothermally altered material (grey) which presumably come from a deeper hydrothermal system below the volcanic vent. Rock is ~12 cm across.
d) Close-up of what was once molten sulfur that exsolved from the hot lava. Note the textures of the sulfur and how they show the sulfur originated from inside the rock, and has not coated the rock after it was formed. Image is ~2 cm across.
East Diamante
e) Top of the Five Towers vent site. The chimneys rise ~5 m above a massive sulfide mound which itself is 6 m tall. The chimneys are typically capped by beehives and expel vent fluids at the boiling point (~245°C) temperature at the depth of these chimneys (~345 m). Image is ~1.5 m across.
f) View looking down on some ~1.5 meter (5 feet) tall dead chimneys that grew out of a field of lava boulders. The chimney at the top of the photograph has grown over the boulder while at the foot of the chimneys in the foreground lies another chimney that has fallen over. Image is ~ 2 m across.
g) Section cut through a chimney collected near the base of the Five Towers site. Here, a definite zonation can be seen with Fe-oxide-rich exterior dominated by bright red hematite followed by white-colored zone dominated by barite (BaSO4), and finally a high-temperature Cu-rich zone dominated by chalcopyrite. Sample is ~20 cm long.
h) Cross-section through one of the chimneys recovered from the Black Forest vent field, East Diamante. Center of the chimney is lined by chalcopyrite (Cu-sulfide) while the outer portions are dominated by sphalerite (Zn-rich) and pyrite (Fe-rich) sulfides. The exterior of the sample is covered by silica. Image is ~0.5 m across.

Plate 2: Geology at Daikoku and Nikko

Daikoku

a) Astounding photograph of a pond of molten S (189°C) discovered near the summit of Daikoku volcano. The surface of the sulfur lake had a thin skin of brittle, rapidly quenched sulfur that was underlain by molten sulfur. Image ~2.5 m across.

b) Nice close-up of (what was molten) sulfur oozing out of the sediment. (sample width ~3cm)

c) The 'coffee can' experiment. Here, the can has been cut away so that you can see the molten sulfur that filled the can. The sulfur was quenched almost instantly as it was raised above the lake surface, causing a rapid exsolution of gases contained within the molten sulfur. The outermost part of the sample, where closest to the walls of the can, solidified first and show a fine-grained texture. Coffee can diameter was ~15 cm.

d) The interior of the 'coffee can' sample is riddled with vesicles where the various (predominantly sulfur) gases exsolved from the sample.

Nikko

e) Spectacular photograph looking down on what appear to be 'pillars' of native sulfur. These are reminiscent of lava pillars seen as remnants to lava lakes on the East Pacific Rise. The sulfur has precipitated in horizontal layers suggesting this entire area may have been filled by a molten lake of sulfur. Some of sulfur forms delicate stalactites. Tongue fish and crabs sit on top of these pillars. Image ~2 meters across.

f) Small pots of molten sulfur bubbling out of the seafloor, discovered at Naraku vent site, south of the Nikko caldera rim. Image ~2 meters across.

g) Huge tracts of tubeworms plus a diverse assemblage of other biota appears to be supported by a trapped caldera plume and flank venting. Possibly the highest single-site biomass known associated with hydrothermal venting. Image >3 meters across in foreground.

h) Jason undercarriage, coated in ~70 lbs of sulfur, after it broke through the sulfur crust at Nikko on the last dive of SRoF'06. Image ~1.5 m across.

Plate 3. Macrofauna at the Mariana Arc, 2006.

a) *Branchiostoma*-like protochordate from Daikoku.

b) Red crab from Ruby.

c) *Alviniconcha hessleri*, the hairy snail from Forecast is known only from Alice Springs in the Trough. On the Arc, another species of *Alviniconcha* is found.

d) On Eifuku, the mussel shells dissolve so fast upon death that the shell (the white material) is nearly gone before the clam meat (on right) decays. The brown organic cover protects the shell from dissolution while the mussel lives.

e) On both NW Rota-1 and Daikoku, dead and dying pelagic animas were common. In the top image, flatfish are attacking a dying myctophid from midwater.

f) Tonguefishes (genus *Symphurus*) on Nikko show a range of sizes. The black ventral region is the stomach packed with sediment.

Figure 2. NW Rota-1 plumes. Light scattering distributions define particle-rich hydrothermal plumes over NW Rota-1 volcano. In addition to the summit plume, multiple layers of turbidity were widespread down the flanks of the volcano starting at depths of 700 m and extending to > 2500 m and distances up to 18 km from the summit (as seen in casts to the NE and SW of the volcano - top and bottom images). The scale bar on the right side of the image indicates the nephelometric turbidity units, an optical measurement of the particles in the water, which indicates the location and intensity of the hydrothermal plume.

Figure 3. Esmeralda and Ruby plumes. Light scattering distributions define particle-rich hydrothermal plumes over Esmeralda Bank (top) and Ruby (bottom). The caldera at Esmeralda, below the sill depth (225 m), was filled with a plume with dNTU value up to 0.650. The scale bar on the right side of the image indicates the nephelometric turbidity units, an optical measurement of the particles in the water, which indicates the location and intensity of the hydrothermal plume.

Figure 4. NW Eifuku and Nikko plumes. Light scattering distributions define particle-rich hydrothermal plumes over NW Eifuku and Nikko volcanoes. At NW Eifuku optical and Eh anomalies (dNTU > 0.5) were strongest directly over Champagne Vent within 20-30 m of the bottom (top image). The plume over the main (west) cone at Nikko was very intense (saturating the optical sensor) within the depth range of 370-415 m over the summit (middle and bottom images). The scale bar on the right side of the image indicates the nephelometric turbidity units, an optical measurement of the particles in the water, which indicates the location and intensity of the hydrothermal plume.

Figure 5. NW Rota-1 high resolution bathymetry. a) SM2000 multibeam bathymetry data collected on SRoF'06 cruise with *Jason-2*, using LBL (Sharps) navigation. The data are preliminary and need additional processing to remove outliers, etc. These data are gridded at 2 m resolution, though ultimately SM2000 data resolution should be ~0.5 m. Data processed by Vicki Ferrini (WHOI). Mercator projection. 20 m contour interval. b) Imagenex pencil-beam bathymetry data collected on SRoF'04 cruise with *ROPOS*, using ultra-short baseline navigation. The data are final, processed by Bill Chadwick (OSU). These data are gridded at 2 m resolution, but the data resolution is ~1 m. Mercator projection. 20 m contour interval.

Figure 6. a) The west cone/caldera of Nikko Volcano. SM2000 multibeam bathymetry data collected on SRoF'06 cruise with *Jason-2* using doppler navigation. The data are gridded at 1 m gridcell size, processed by Vicki Ferrini (WHOI). Mercator projection. 10 m contour interval. b) Daikoku Summit. SM2000 multibeam bathymetry data collected on SRoF'06 cruise with *Jason-2* using doppler navigation. The data are gridded at 1 m gridcell size, processed by Vicki Ferrini (WHOI). Mercator projection. 10 m contour interval.

Figure 7. a) Overall map of Seamount X, the southernmost volcano visited during the SRoF'06 *Jason-2* dive series (dive J2-184). No hydrothermal plume casts or tows were carried out here in 2006. b) Overall map of Forecast volcano, the site of dive J2-185. No hydrothermal plume casts or tows were carried out here in 2006.

Figure 8. a) Overall map of NW Rota-1 volcano, site of six *Jason-2* dives 186-189 and 191-192. SRoF'06 hydrothermal plume studies at the summit and the flanks of the volcano consisted of 4 towyos and 2 vertical casts. b) Overall map of Esmeralda volcano indicating the track of the 2006 towyo across the caldera, site of *Jason-2* dive 190.

Figure 9. a) Overall map of East Diamante volcano, site of Jason-2 dive 193. No hydrothermal plume casts or twos were carried out here in 2006. b) Overall map of Ruby volcano, site of Jason-2 dive 194. One towyo was completed over the summit of the volcano prior to the dive.

Figure 10. a) Overall map of NW Eifuku volcano, site of SRoF'06 Jason-2 dive 196. 2 towyos and 2 vertical casts were carried out here in 2006. b) Overall map of Daikoku volcano, site of two SRoF'06 Jason-2 dives (195 and 197). 3 hydrothermal plume casts were carried out here in 2006.

Figure 11. Overall map of Nikko volcano. Two Jason-2 dives were carried out on the southwest cone/crater during SRoF'06 (198 and 199). Hydrothermal plume studies here in 2006 covered the top of the volcanic edifice consisting of 4 towyos and 3 casts.

Figure 12. Dive map of *Jason-2* dive J2-184 at Seamount X depicting the dive track, vent sites and sampling positions overlaid on EM300 and SeaBeam bathymetry. Mercator projection. 20 m contour interval.

Figure 13. Dive map of *Jason-2* dive J2-185 at Forecast depicting the dive track, vent sites and sampling positions overlaid on SeaBeam bathymetry. Mercator projection. 10 m contour interval.

Figure 14. Dive map of *Jason-2* dives J2-186 and J2-189 at NW Rota-1 volcano. Bottom time dive tracks (small circles), as well as SM2000 survey lines, vent sites, and sampling positions are overlaid on Imagenex bathymetry. Mercator projection. 20 m contour interval.

Figure 15. Dive map of *Jason-2* dives J2-187 and J2-188 at NW Rota-1 volcano. Dive tracks, vent sites and sampling positions are overlaid on Imagenex bathymetry. Mercator projection. 10 m contour interval.

Figure 16. Dive map of *Jason-2* dive J2-190 at Esmeralda Bank caldera depicting the dive track, vent sites and sampling positions overlaid on EM300 bathymetry. Mercator projection. 20 m contour interval.

Figure 17. Dive map of *Jason-2* dives J2-191 and J2-192 at NW Rota-1 volcano. Dive tracks, vent sites and sampling positions are overlaid on Imagenex bathymetry. Mercator projection. 10 m contour interval.

Figure 18. Dive map of *Jason-2* dive J2-193 at East Diamante volcano depicting the dive track, vent sites and sampling positions overlaid on EM300 bathymetry. Mercator projection. 20 m contour interval.

Figure 19. Dive map of *Jason-2* dive J2-194 at Ruby volcano depicting the dive track, vent sites and sampling positions overlaid on EM300 bathymetry. Mercator projection. 10 m contour interval.

Figure 20. Dive map of *Jason-2* dives J2-195 and J2-197 at Daikoku volcano. Dive tracks (small circles), as well as SM2000 survey lines, vent sites, and sampling positions are overlaid on EM300 bathymetry. Mercator projection. 10 m contour interval.

Figure 21. Dive map of *Jason-2* dive J2-196 at NW Eifuku volcano depicting the dive track, vent sites and sampling positions overlaid on Imagenex bathymetry. Mercator projection. 10 m contour interval.

Figure 22. Dive map of *Jason-2* dives J2-198 and J2-199 at Nikko volcano (west cone and caldera). Dive tracks (small circles), as well as SM2000 survey lines, vent sites, and sampling positions are overlaid on EM300 bathymetry. Mercator projection. 20 m contour interval.

1.0 SUBMARINE RING OF FIRE 2006 - MARIANA ARC EXPEDITION SUMMARY

Bob Embley, Chief Scientist

The Submarine Ring of Fire 2006 (SRoF'06) expedition on *R/V Melville* with the *Jason 2* remotely operated vehicle (ROV) departed Guam on the 18th of April and arrived at Yokohama, Japan on 13 May. This expedition really pushed the envelope of exploration at one of Earth's most extreme environments, the shallow submarine volcanoes of the Mariana Arc. Sixteen dives were made with the ROV at nine submarine volcanoes (Fig. 1). The highlights and key findings are summarized below.

(1) The ongoing eruption of NW Rota-1 volcano (first discovered in 2004) was the expedition's highlight. The first dive at NW Rota-1 (J2-186) could not locate the eruption site on the volcano's southwest flank because of a thick plume of white smoke enveloping the summit. When we finally reached the crater of Brimstone Pit during Dive J2-186, the activity was subdued but increased over the course of the dive. On subsequent dives over the next week (Dives J2-187-189 and J2-191-192) the activity built until it was more active than on either of our previous two trips, belching glowing lava (cover image) and sudden bursts of gas and ash particles (Plate 1-a,b) that, at times, enveloped the vehicle. The small hydrophone we deployed nearby recorded the sounds of a seafloor eruption for the first time concurrent with visual observations. Perhaps the most amazing part of the experience was the fact that we could actually observe it! It is unlikely that a similar eruption on a volcano above sea level could have been observed and sampled as thoroughly as we did. The samples and imagery we collected at the site (e.g., Plate 1-a,b,c,d) during the dives and on the CTD lowerings (Figure 2) represent a unique data set that will lead to a better understanding of how submarine arc volcanoes work. The video taken during the dives here was broadcast throughout the world in the weeks following our expedition both on the internet and on various television networks.

(2) The discovery of a molten sulfur pond (the Cauldron) on Daikoku Volcano (J2-195, 197) was the next extraordinary highlight, which took place on the second part of the expedition (Plate 2-a). The pond was found on the upper northwest flank of the volcano, just below the rim of the summit crater. Following the first observation of liquid sulfur pools on Nikko in 2005, this second discovery suggests that subsurface infiltration of molten sulfur may not be uncommon within the summits of active arc volcanoes. This was only the second time that molten sulfur has been observed on the seafloor.

(3) Liquid sulfur pools at Nikko. The first observation of molten sulfur flows on the seafloor occurred here in November 2005 during the dives with the JAMSTEC vehicle *Hyper-Dolphin* (Dr. Ko-ichi Nakamura, chief scientist). On dive J2-199 we discovered a new molten sulfur site (named Naraku) outside the crater (Plate 2-f, h). The presence of a large subsurface pool of molten sulfur was verified when Jason broke through a thin crust and instantly added 63 pounds to its weight (Plate 2-h)! Nikko's crater and upper flanks support what is probably the highest density of chemosynthetic life observed to date on any seafloor volcano (Plate 2-g).

(4) The gas-rich fluids venting from the summits of Daikoku, Nikko and other Mariana volcanoes support extensive biological communities. In addition to the focused and diffuse flow coming directly from the seafloor fractures there are other processes that can enhance the biological availability of volatile-rich fluids on arc volcanoes. Local circulation cells in the waters around a seamount can retain hydrothermal effluent near its source for significant periods. For example, enclosed craters (e.g.,

Nikko), can retain clouds of such fluids for significant periods, prolonging its availability to animals such as mussels. There may also be significant biomass fed by very diffuse, long-term outgassing of hydrogen sulfide from the extensive sulfur crusts found in places like Nikko and Daikoku that are, in turn, fed by the subsurface sulfur pools. These processes may give rise to areally extensive biological communities unique to arc volcanoes. Examples include the extensive colonies of a new species of tonguefish (Plate 3-f), tubeworms and crabs found on three of the northern Mariana submarine volcanoes, (Minami Kasuga (a.k.a. Kasuga-2), Daikoku, and Nikko), and the large mussel beds at the NW Eifuku liquid carbon dioxide site.

(5) We also explored hydrothermal vents at the summits of four new sites (Seamount X on J2-184, Forecast on J2-195, Esmeralda on J2-190 and Ruby on J2-194) and revisited two other sites discovered in 2004 (NW Eifuku on J2-196 and East Diamante on J2-193). The ecosystems at these and the other volcanoes along the arc continue to be of great interest to biologists (Plate 3). For example, Forecast and Seamount X are geographically close (10 kilometers apart), but their biological communities differ. The diversity of biology at Forecast (e.g., Plate 3c) is similar to that at other backarc spreading center sites (including Alice Springs several hundred kilometers north). The biology at Seamount X is similar to other seamounts on the frontal volcanic arc, which have a relatively lower diversity of species.

(6) Several large polymetallic sulfide chimneys were recovered from the shallow (~345 m) "smoker" site at the East Diamante volcano (J2-193). The active chimney that was recovered (Plate 1-f) is, in itself, a microbial habitat (the shallowest active chimney of this type yet recovered) that provides a unique sample suite for studies of thermophilic and hyperthermophilic microbes. The additional observations and samples from the East Diamante site are being used to evaluate ore-forming processes at shallow arc volcanoes.

(7) The geological and chemical conditions encountered in the Mariana Arc present major challenges to living systems, both micro- and macrobiological. We confirmed the persistence and expansion of animal populations on an erupting volcano and we observed how hapless pelagic animals dying in the fumes of three volcanoes provided food for hardy species on the seafloor (Plate 3-e). We have discovered over 15 new species dependent upon the volcanic venue.

(8) The mussel beds near the liquid CO_2 site at NW Eifuku volcano persist in an extreme environment. Water samples taken there show below normal ph values and we observed several animals that had recently died and the shells had almost dissolved but the organic material had not appreciably decayed (Plate 3-d). This site could be a useful natural laboratory to study the effects of decalcification in a high CO_2 environment if the activity continues.

(9) The CTD/Rosette system was again successfully used as an exploration tool during the expedition. Twenty-seven vertical casts and tow-yos were conducted. In addition to better characterizing the plumes from known active sites, at least one new active site was found. A small plume was found near the summit of Ruby volcano, which has been a site of occasional eruptive activity since the 1960s. Dive J2-194 subsequently discovered a small diffuse hydrothermal system with a unique biota near its summit (Plate 3-b).

(10) The Sea Beam 2000 multibeam system (along with 3.5 kHz seismic profiler) was used between dives and during transits to add to the existing multibeam survey of the Mariana Arc during the previous

3 years. Gravity and Acoustic Doppler Current Profiling (ADCP) data were collected continuously throughout the expedition.

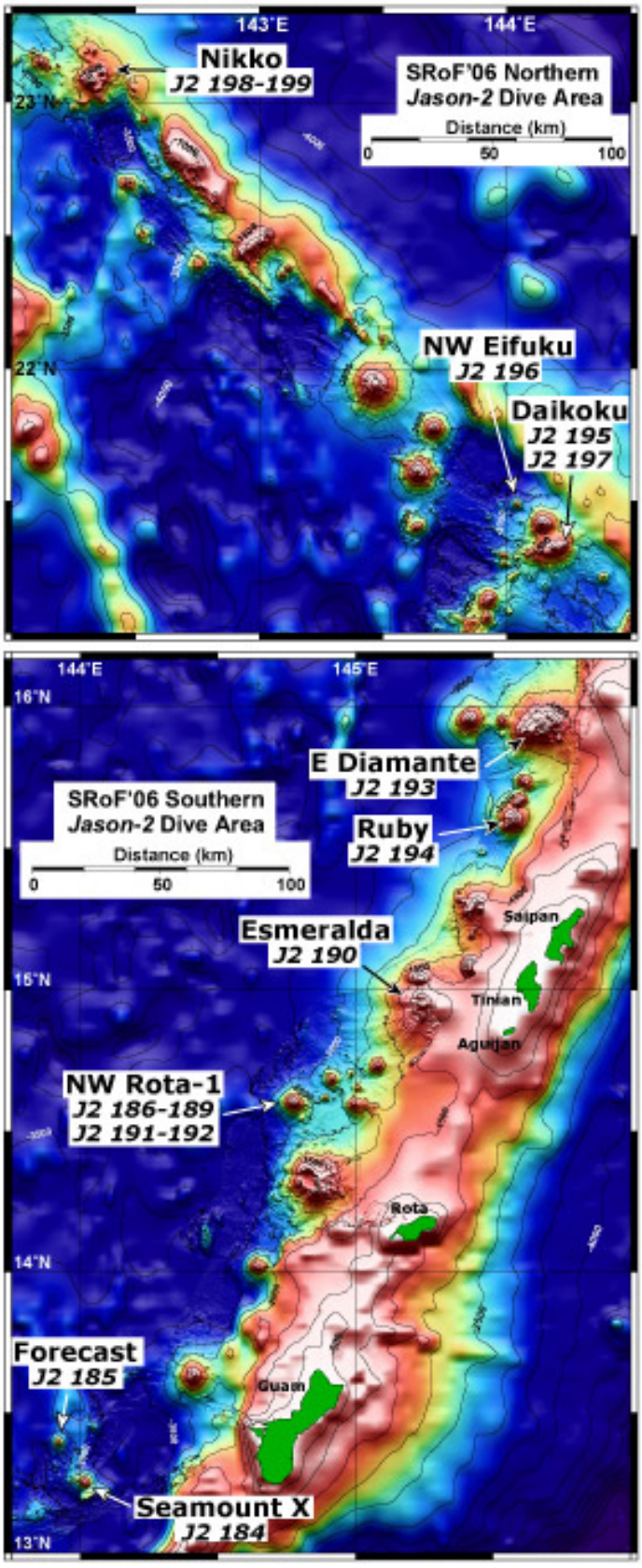
Some Thoughts for Future Explorations

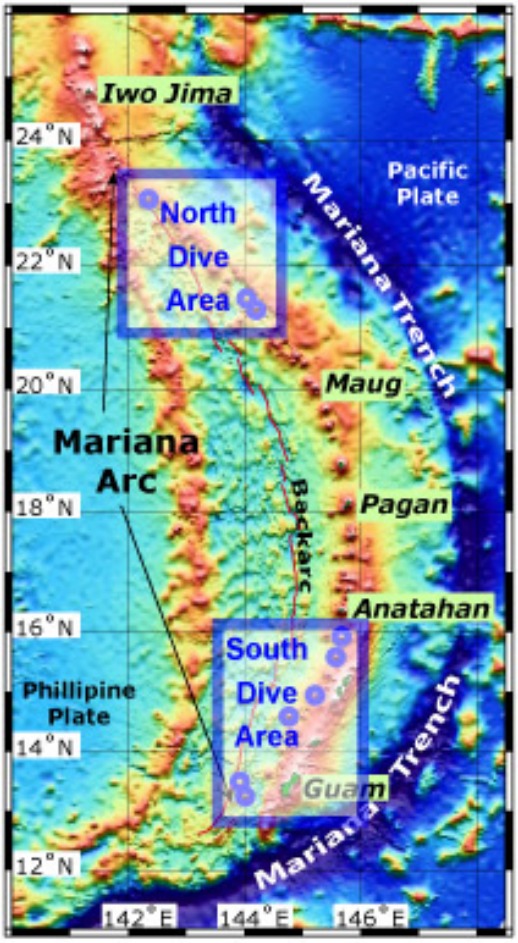
We want to return to the Mariana Arc because our brief visits to the exciting and diverse array of active sites have raised more questions than they have answered. The experience at NW Rota-1 volcano taught us that we could learn much more at such an active site if we had some other tools available to us. For example, there is still the major question of how the deep plume we have now observed around the volcano in both 2004 and 2006 is linked to the eruptions at the summit. In order to investigate such a linkage, we will have to collect data in both synoptic and time-series modes. For the former, we need to observe both the summit and flank activity at the same time. For example, if we had an autonomous undersea vehicle on board, we might have been able to conduct surveys with it on the flank concurrently with observations of the summit with *Jason 2*. Time-series measurements of seismic activity and water column properties over a period of months to years could provide linkages between the eruption processes as recorded in both the solid earth and the overlying water column. Such synoptic and time series measurements are new modes of exploration, specific to active sites such as NW Rota-1, which we hope to implement on a future expedition.

1.1 ACKNOWLEDGEMENTS

This program was generously funded by the NOAA Office of Exploration and the NOAA VENTs Program. We also acknowledge the contribution of host agencies and institutions providing support for the five PIs from New Zealand, Canada and Japan and (several) U.S. (see section 2.0) who contributed valuable expertise during the cruise and continue to work on samples collected during the expedition. The *R/V Melville's* personnel led by Captain Christopher Curl and Chief Engineer Paul Bueren provided very competent and user-friendly support for the expedition. Cambria Colt (resident technician) and Dan Jacobsen (computer technician) provided excellent liaison and operational support for the science party. The Port operations at Scripps Institution of Oceanography and the Woods Hole Deep Submergence Operations Group (DSOG) provided excellent guidance in pre-cruise planning. The seagoing *Jason 2* team, led by Will Sellers, operated the *Jason 2* and *Medea* vehicles with confidence and skill, collecting samples under some of the most extreme conditions yet encountered by an ROV.

The northern Mariana Arc submarine volcanoes visited on the SRoF'06 expedition. *Jason-2* dives at Daikoku, NW Eifuku and Nikko are indicated. Mercator projection. 500 m contour interval.





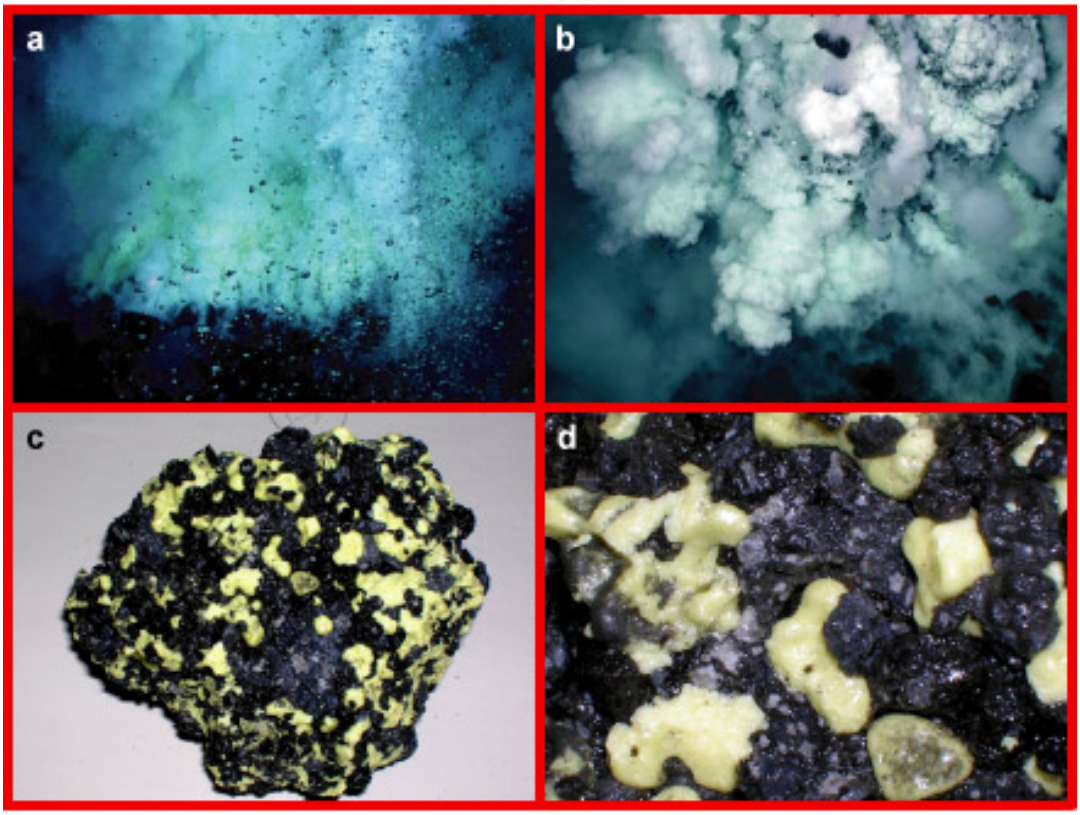
Mariana Arc bathymetry and satellite altimetry data, indicating the *Jason-2* SRoF'06 northern and southern dive areas.

The southern Mariana Arc submarine volcanoes visited on the SRoF'06 expedition. *Jason-2* dives at Seamount X, Forecast, NW Rota-1, Esmeralda Bank and E Diamante are indicated. Mercator projection. 500 m contour interval.

Figure 1

Figure 1 back

NW Rota-1



E Diamante

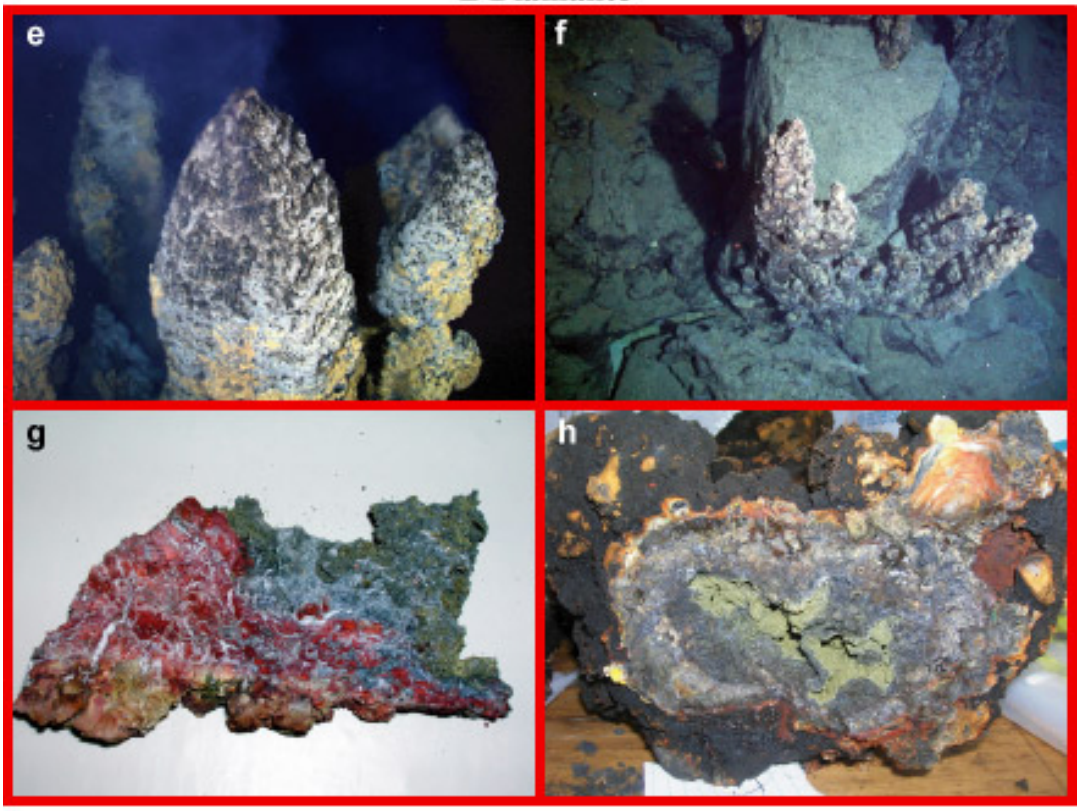
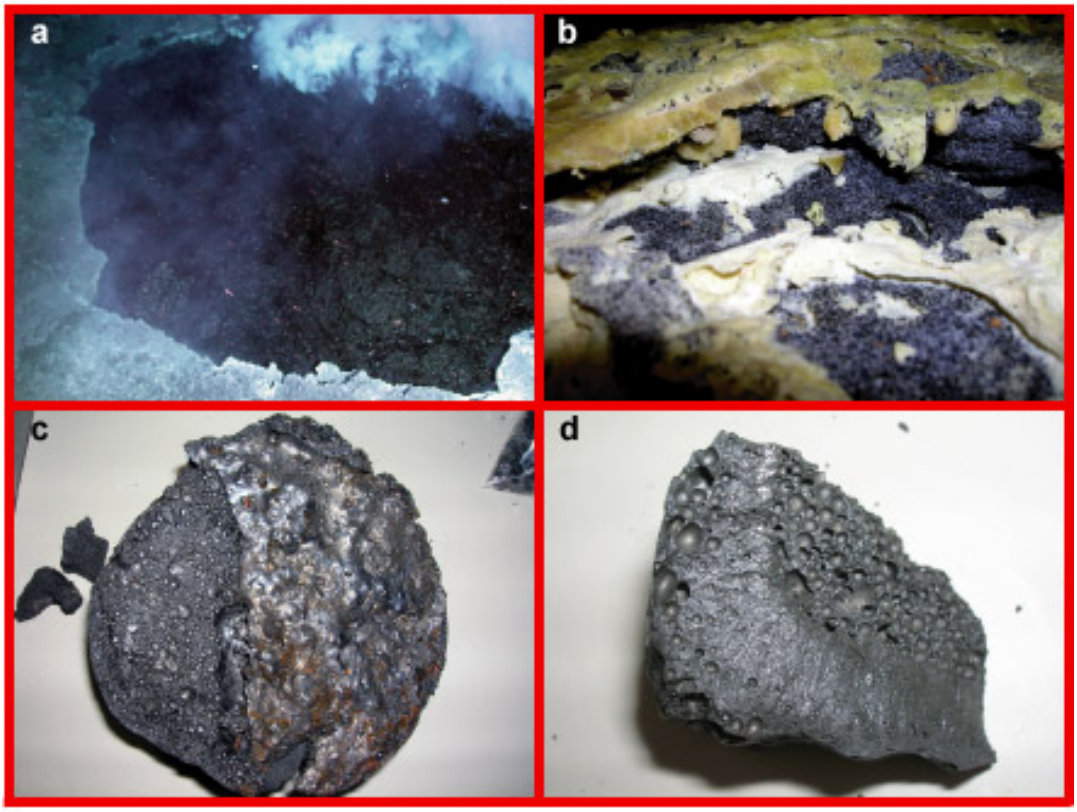


Plate 1

Plate 1 back

Daikoku



Nikko

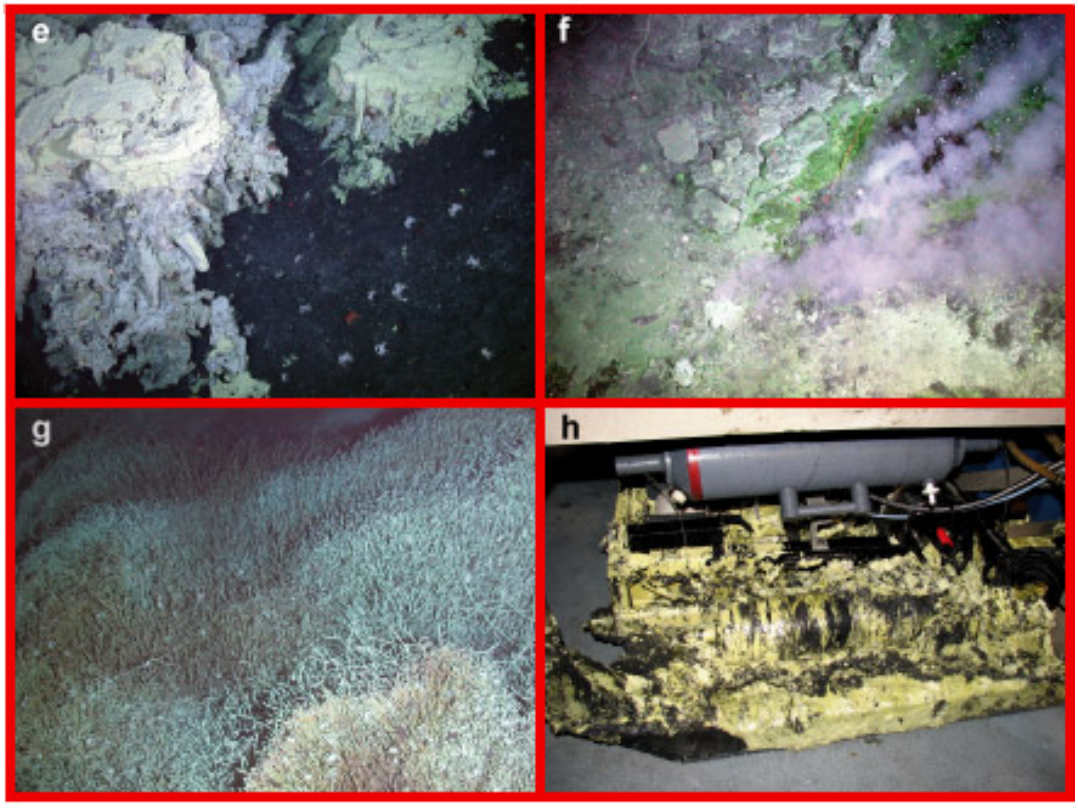


Plate 2

Plate 2 back

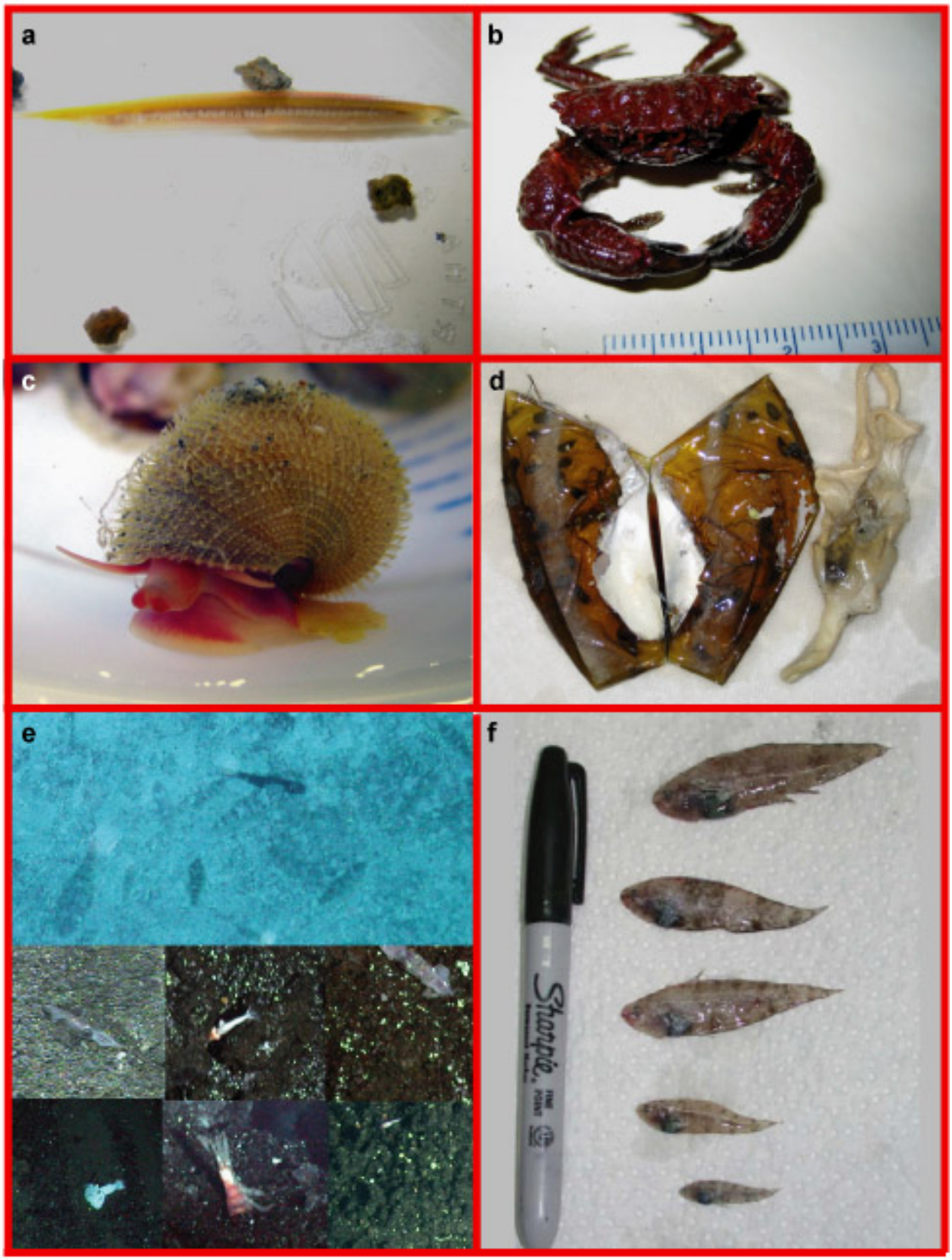


Plate 3

Plate 3 back

1.2 OPERATIONS LOG

Date UTC	Time UTC	SRoF'2006 Operations	Site	Event	btm lat°	top lat°	left long°	right long°	max Z
		Guam time was 10 hours ahead of UTC							
4/18/06	0542	Depart Apra Harbor Guam (1542 local, 0542 UTC).	Guam CNMI			13.4540		144.6267	
4/18/06	0542	Transit from Guam to Seamount X. [0542 - ~1000 UTC]	Guam to Seamount X		13.2528		144.0197		
4/18/06	0927	Collect current sound velocity profile, using an XBT, for SeaBeam data.	transit	XBT	13.2699		144.0576		1000
		SeaBeam malfunction on transit to first dive site at Seamount X. Malfunction. No data collected. VRU not recorded.	transit						
4/18/06	1017	Deployed transponders A - D at Seamount X	**Seamount X**	XP	13.2450	13.2543	144.0096	144.0258	
4/18/06	1400	Started transponder calibration	Seamount X	XP	13.2515		144.0188		
4/18/06	1900	Finished transponder calibration.	Seamount X	XP					
4/18/06	2022	Jason in the water for dive J2-184. Start of dive is engineering trials then on to exploration of the summit of Seamount X. (Medea information logged in virtual van instead of Jason.) 13 samples: bacterial mat, squat lobster, sed, rocks, crust and gastight.	Seamount X	J2-184	13.2528		144.0197		1330
4/19/06	0135	Start science part of dive J2-184	Seamount X	J2-184					
4/19/06	1829	Jason on deck. End of dive J2-184.	Seamount X	J2-184					
4/19/06	1945	CTD dip test. Problem with cable? [1945 - 2100 UTC] Re-terminating at 2120 UTC.	Seamount X	CTD test	13.2528		144.0197		
4/20/06	0500	Transponder recovery complete.	Seamount X	XP					
4/20/06	0545	CTD dip test - failed. [0545 - 0600]		CTD test	13.2528		144.0197		
4/20/06	0620	SeaBeam survey from Seamount X to Forecast. (0620 - 0735 UTC). Tried to collect 3.5 kHz data but not sure it wrote the file.	Seamount X to Forecast	Multibeam	13.2446	13.4421	143.8577	143.0409	3630
4/20/06	0648	Collect current sound velocity profile, using an XBT, for SeaBeam data.	Seamount X area	XBT	13.2897		143.9906		1000
4/20/06	0935	Jason in the water for dive J2-185 at Forecast. Explore hydrothermal sites visited by Japanese researchers. 27 samples: HFS, chimney, bio - shrimp and snails, gastights, majors.	**Forecast**	**J2-185**	13.3667	13.3955	143.8833	143.9209	1514
4/20/06	2135	Jason back on deck. End of dive J2-185 at Forecast.	Forecast	J2-185					
4/20/06	2300	CTD dip test. Failed. Problem with PMEL fish. [2300 - 2330 UTC]	Forecast	CTD test		13.3700		143.9217	
4/20/06	2359	SeaBeam survey from Forecast to Seamount W. [4/20/06 2359 - 4/21/06 ~0145 UTC]	Forecast to Seamount W	Multibeam	13.0976	13.6323	143.7985	144.6323	4109
4/21/2996	0200	CTD dip tests. [0200 - 0320 UTC]	Seamount W	CTD test	13.1400		143.8427		
4/21/06	0340	Collect current sound velocity profile, using an XBT, for SeaBeam data.	Seamount W area	XBT	13.1716		143.8715		1000

Date UTC	Time UTC	SRoF'2006 Operations	Site	Event	btm lat°	top lat°	left long°	right long°	max Z
4/21/06	0345	SeaBeam survey from Seamount W to NW Rota-1. [4/21/06 0345 - 1250 UTC]	Seamount W to NW Rota-1	Multibeam	13.1637	14.5992	143.8647	144.7734	4109
4/21/06	1235	Collect current sound velocity profile, using an XBT, for SeaBeam data.	NW Rota-1 area	XBT	14.6000		144.7700		
4/21/06	1306	Deployed transponders E - H.	NW Rota-1	XP	14.5961	14.6054	144.7689	144.7787	
4/21/06	2000	Finished transponder calibration.	NW Rota-1	XP					
4/21/06	2000	CTD dip tests. [2000 - 2130 UTC]	NW Rota-1	CTD test	14.6008		144.7753		
4/21/06	2220	Jason in the water for dive J2-186 at NW Rota-1. Initial dive at NW Rota. Find summit and note any changes from previous years. Deploy hydrophone. **SM2000**. 5 samples: rocks, crust and seds.	**NW Rota-1**	**J2-186**	14.5599	14.6024	144.7583	144.8267	838
4/22/06	1022	Jason back on deck. End of dive J2-186 at NW Rota-1.	NW Rota-1	J2-186					
4/22/06	1109	**T06A-01**: CTD tow from SW->NE up flank from 2100m, over summit at Brimstone Pit. [1109 - 1442 UTC] SW->NE	NW Rota-1	CTD towyo	14.5676	14.6098	14.6098	144.7776	
4/22/06	1629	**T06A-02**: Continuation of NW Rota tow T06A-01 from summit at Brimstone Pit towards NE down flank to ~2100m. First tow terminated due to potential wire entanglement. [1629 - 1950 UTC]	NW Rota-1	CTD towyo	14.6007	14.6448	144.7752	144.7901	
4/23/06	0233	Jason in the water for dive J2-187 at NW Rota-1. Recovery of hydrophone left on first NW Rota dive. Document changes in plume, flow and topography. 35 samples: HFS, gastights, rocks, seds, niskins.	**NW Rota-1**	**J2-187**	14.5833	14.6010	144.7583	144.7751	190
4/23/06	1820	Jason back on deck. End of dive J2-187 at NW Rota-1.	NW Rota-1	J2-187					
4/23/06	2015	SeaBeam survey of entire NW ROTA volcano to compare with previous data for surface differencing. [2015 - ~2230 UTC]	NW Rota-1	Multibeam	14.5090	14.6668	144.7253	144.8117	3494
4/23/06	2245	**V06A-01**: SW of start of T06A-01 to see how far deep particle layers can be found - flank of the volcano. [4/23 2245 - 4/24 0057 UTC]	NW Rota-1	CTD cast	14.5336		144.7507		
4/24/06	0253	**V06A-02**: SW of V06A-01 - deep particle layer absent this far away. [0253 - 0549 UTC]	NW Rota-1	CTD cast	14.3833		144.5667		
4/24/06	0807	Jason in the water for dive J2-188 at NW Rota-1. Attempted to collect bio and mat samples but suction didn't work. 12 samples: gastights, majors, rocks, niskins, sed, dead pelagic fishes and shrimp, Observe and document changes in activity at Brimstone.	**NW Rota-1**	**J2-188**	14.5999	14.6013	144.7753	144.7765	179
4/24/06	1407	Jason back on deck. End of dive J2-188 at NW Rota-1.	NW Rota-1	J2-188					
4/24/06	1500	SeaBeam survey. Adding bathymetric data to this area's bathymetry coverage. Using the 8 hours of ROV downtime before the next dive. [1500 - 2123 UTC]	Southwest of NW Rota-1	Multibeam	14.1016	14.6367	144.4176	144.7188	4103

Date UTC	Time UTC	SRoF'2006 Operations	Site	Event	btm lat°	top lat°	left long°	right long°	max Z
4/24/06	2306	Jason in the water for dive J2-189 at NW Rota-1. Attempted to collect bio and mat samples but suction didn't work. Further observations and video logging of Brimstone. **SM2000**. 8 samples: majors, gastights, niskins, seds, rock.	**NW Rota-1**	**J2-189**	14.5987	14.6009	144.7754	144.7779	676
4/25/06	0820	Jason back on deck. End of dive J2-189 at NW Rota-1.	NW Rota-1	J2-189					
4/25/06	0846	**V06A-03**: over Brimstone Pit (NW Rota). [0846 - 0945 UTC]	NW Rota-1	CTD cast	14.6009		144.7754		
4/25/06	0950	SeaBeam survey between NW Rota-1 and Esmeralda Bank. [0950 - 1340 UTC]	NW Rota-1 to Esmeralda	Multibeam	14.6713	14.9289	144.7995	145.2092	3374
4/25/06	1404	**T06A-03**: Esmeralda - tow S->N through caldera. [1404 - 1710 UTC]	Esmeralda	CTD towyo	14.9375	14.9879	145.2428	145.2458	
4/25/06	1804	SeaBeam survey. Continue mapping near Esmeralda Bank until the ROV is ready to go into the water. [1804 - 2143 UTC]	Esmeralda	Multibeam	14.9354	14.9581	145.1285	145.2744	3374
4/25/06	2210	Jason in the water for dive J2-190 at Esmeralda Bank. Exploratory dive in the caldera. Poor visibility. Discovered extensive diffuse venting on SW caldera wall. Could not reach previously reported ent at ~120m on north rim due to limitation on Medea/Jason operation. 5 samples: crust, seds, mat, 1 crab and rocks.	**Esmeralda**	**J2-190**	14.9300	14.9730	144.2427	145.2500	-519
4/26/06	1332	Jason back on deck. End of dive J2-190 at Esmeralda Bank.	Esmeralda	J2-190					
4/26/06	1440	SeaBeam survey. Add bathymetric data to database enroute from Esmeralda Bank back to NW Rota-1. [1440 - 2030 UTC]	Esmeralda to NW Rota-1	Multibeam	14.5940	14.9776	144.7923	145.2592	3676
4/26/06	2037	**T06A-04**: Map plume changes over NW Rota 1 (perpendicular to T06A-01/T06A-02 line). [4/26 2037 - 4/27 0011 UTC] NW->SE	NW Rota-1	CTD towyo	14.5938	14.6068	144.7604	144.7913	
4/27/06	0057	Jason in the water for dive J2-191 at NW Rota-1. View changes in activity at Brimstone. Deploy hydrophone to monitor activity acoustically. 7 samples: niskins, HFS, mat, shrimp and pit ejecta samples.	**NW Rota-1**	**J2-191**	14.6005	14.6160	144.7753	144.7831	594
4/27/06	0655	Jason back on deck. End of dive J2-191 at NW Rota-1.	NW Rota-1	J2-191					
4/27/06	0800	Recover transponders E - H. [0800 - 1030 UTC]	NW Rota-1	XP	14.5961	14.6054	144.7689	144.7787	
4/27/06	1139	**T06A-05**: Towyo to observe any hydrothermal plumes over a previously unexplored seamount. Winch problems on this tow. No samples taken. [1139 - 1355 UTC]	NW Rota-5	CTD towyo	14.6736	14.6933	144.9119	144.9139	
4/27/06	1432	**V06A-04**: Conduct a vertical cast over the summit of NW Rota-5 - vertical cast to fill gap from tow T06A-05. [1432 - 1530 UTC]	NW Rota-5	CTD cast	14.6795		144.9135		

Date UTC	Time UTC	SRoF'2006 Operations	Site	Event	btm lat°	top lat°	left long°	right long°	max Z
4/27/06	1801	Jason in the water for dive J2-192 at NW Rota-1. "Red Rock!" Revisit NW Rota-1 to further document eruption at Brimstone pit. Retrieve hydrophone at ridge above Brimstone. Explore ridge crest along NE side of caldera. 8 samples: shrimp, rocks, seds, major and HFS.	**NW Rota-1**	**J2-192**	14.6000	14.6024	144.7736	144.7772	193
4/28/06	0452	Jason back on deck. End of dive J2-192 at NW Rota-1.	NW Rota-1	J2-192					
4/28/06	0627	**T06A-06**: Repeat of T06A-01 and T06A-02 to look for change in deep particle layers. [0627 - 1123 UTC]	NW Rota-1	CTD towyo	14.5675	14.6247	144.7639	144.7834	
4/28/06	1125	SeaBeam survey. Adding to database and filling gaps. [1125 - 1750 UTC]	NW Rota-1 to Ruby	Multibeam	15.5714	14.8198	145.0206	145.5456	3226
4/28/06	1827	**T06A-07**: Conduct CTD tow over Ruby volcano. Have not conducted dives here yet. [1827 - 1937 UTC] SW->NE	Ruby	CTD towyo	15.6020	15.6094	145.5684	145.5808	
4/28/06	2000	SeaBeam survey. Adding to database and filling gaps between Ruby and E Diamante. [2000 - 2154 UTC]	Ruby / East Diamante area	Multibeam	15.7323	15.9428	145.6257	145.6817	3226
4/28/06	2243	Jason in the water for dive J2-193 at E Diamante. Sample chimneys from Black Forest using elevator for recovery. Explore more of the caldera cones. 28 samples: chimneys, HFS, rocks, crust, sponges, worms, snails, barnacles, limpets, crab and mat.	**East Diamante**	**J2-193**	15.8998	15.9452	145.6499	145.6828	474
4/30/06	0230	Jason back on deck. End of dive J2-193 at E Diamante.	E Diamante	J2-193					
4/30/06	0331	Collect current sound velocity profile, using an XBT, for SeaBeam data.	Diamante area	XBT	15.9421		145.5861		1000
4/30/06	0355	**T06A-08**: Evaluate Middle Diamante for hydrothermal activity. This volcano has not had a CTD tow conducted on it in the past. [0355 - 0622 UTC] SW->NE	Mid Diamante	CTD towyo	15.9420	15.9577	145.5201	145.5448	
4/30/06	0649	SeaBeam survey. Adding to database and filling gaps between Mid Diamante and Ruby. [0649 - 0727 UTC]	Mid Diamante to Ruby	Multibeam	15.8125	15.9287	145.5285	145.5285	
4/30/06	0857	Jason in the water for dive J2-194 at Ruby, which has a similar structure as NW Rota-1 but at a shallower depth. Low-level hydrothermal activity found. Weird iron oxide vents with small, red aggressive crabs. 12 samples: rocks, majors, seds, limpets, crab, mat, gastights, majors.	**Ruby**	**J2-194**	15.8999	15.9215	145.6499	145.6742	305
4/30/06	1805	Jason back on deck. End of dive J2-194 at Ruby.	Ruby	J2-194					
4/30/06	1940	SeaBeam survey. Adding to database and filling gaps between Ruby and SE Daikoku. [4/30 1940 - 5/1 2349 UTC]	Ruby to SE Daikoku	Multibeam	15.8134	20.7560	144.3532	145.5210	
5/1/06	2356	**T06A-09**: Towyo over SE Daikoku (Small seamount to the southeast of Daikoku). Previously unexplored. [5/1 2356 - 5/2 0340 UTC]	SE Daikoku	CTD towyo	21.2018	21.2248	144.3809	144.4020	

Date UTC	Time UTC	SRoF'2006 Operations	Site	Event	btm lat°	top lat°	left long°	right long°	max Z
5/2/06	0528	Jason in the water for dive J2-195 at Daikoku. Conduct **SM2000** bathymetry survey of large summit pit. Transects to observe and collect flatfish (tonguefish). Discovered the sulfur cauldron. 16 samples: tonguefish, seds, majors, niskins, gastights, rocks, small chimneys, molten sulfur on marker chain.	**Daikoku**	**J2-195**	21.3168	21.3259	144.1833	144.1945	450
5/3/06	0604	Jason back on deck. End of dive J2-195 at Daikoku.	Daikoku	J2-195					
5/3/06	0638	**V06A-05**: CTD vertical cast over sulfur cauldron at Daikoku. [0638 - 0736 UTC]	Daikoku	CTD cast	21.3250		144.1915		
5/3/06	0909	**V06A-06**: CTD vertical cast over the active (smoking) pit. [0909 - 0953 UTC]	Daikoku	CTD cast	21.3245		144.1932		
5/3/06	1005	SeaBeam survey. Fill some small bathymetry gaps during transit between dive sites. [1005 - 1130 UTC]	Daikoku to Eifuku	Multibeam	21.3236	21.4821	144.0573	144.1937	
5/3/06	1015	Collect current sound velocity profile, using an XBT, for SeaBeam data.	Daikoku area	XBT	21.3328		144.1880		1000
5/3/06	1059	Collect current sound velocity profile, using an XBT, for SeaBeam data.	NW Eifuku area	XBT	21.3861		144.1547		1000
5/3/06	1354	Jason in the water for dive J2-196 at NW Eifuku. Navigation was off by about 40 m from 2004 locations. HFS sampling in area of mussels for CO2 analysis. 25 samples: HFS, gastights, majors, niskins, bio (mussels), small chimneys.	**NW Eifuku**	**J2-196**	21.4555	21.4894	144.0332	144.0424	1716
5/4/06	0538	Jason back on deck. End of dive J2-196 at NW Eifuku	NW Eifuku	J2-196					
5/4/06	0619	**T06A-10**: Towyo over Champagne vents. [0619 - 0905 UTC] NW->SE	NW Eifuku	CTD towyo	21.4765	21.4940	144.0329	144.0549	
5/4/06	1017	**V06A-07**: Vertical cast. At first started as a tow but switched to a cast due to time constraints. [1017 - 1156 UTC]	NW Eifuku	CTD cast	21.4832		144.0355		
5/4/06	1409	Jason in the water for dive J2-197 at Daikoku. More fish transects and observations at Sulfur Cauldron. 22 samples: HFS, gastights, majors, niskins, rocks, seds, small broken sulfur chimney, flatfish, barnacles, molten sulfur in can.	**Daikoku**	**J2-197**	21.3167	21.3385	144.1900	144.1931	432
5/5/06	0035	Jason back on deck. End of dive J2-197 at Daikoku.	Daikoku	J2-197					
5/5/06	0104	**V06A-08**: CTD vertical cast over active pit vertical over active pit (to test pH sensor, altimeter at new A/D channel, sample) [0104 - 0154 UTC]	Daikoku	CTD cast	21.3242		144.1935		
5/5/06	0442	**T06A-11**: CTD tow-yo over Eifuku summit. [0442 - 0730 UTC] SW->NE	Eifuku	CTD towyo	21.4808	21.5004	144.0381	144.0483	
5/5/06	0856	**V06A-09**: Vertical cast over Champagne. [0856 - 1025 UTC]	Eifuku	CTD cast	21.4875		144.0415		
5/5/06	1205	SeaBeam survey. Map an area southwest of Eifuku while waiting for improvements in the weather which are unfavorable for both Jason and the CTD. Eventually broke off the Eifuku survey to head for Nikko. Surveyed the transit up to Nikko. [5/5 1205 - 5/6 1130 UTC]	SW of Eifuku to Nikko	Multibeam	21.4538	23.0936	142.3625	144.0213	

Date UTC	Time UTC	SRoF'2006 Operations	Site	Event	btm lat°	top lat°	left long°	right long°	max Z
5/5/06	2259	Collect current sound velocity profile, using an XBT, for SeaBeam data.	W of Eifuku	XBT	21.3731		143.8240		1000
5/6/06	1210	**T06A-12**: CTD towyo over the small NE cone on Nikko volcano. [1210 - 1339 UTC] SW->NE	NE cone on Nikko	CTD towyo	23.1094	23.1145	142.3566	142.3739	
5/6/06		**V06A-10**: CTD cast (north of towyo) over the small NE cone on Nikko volcano. No samples taken. [1419 - 1436 UTC]	NE cone on Nikko	CTD cast	23.1144		144.3632		
5/6/06		**V06A-11**: CTD cast (south of towyo) over the small NE cone on Nikko volcano. [1519 - 1609 UTC]	NE cone on Nikko	CTD cast	23.1091		142.3662		
5/6/06	1716	SeaBeam survey. Add to bathymetry to database around Nikko while waiting for the weather to subside for dive operations. [1716 - 2342 UTC]	Nikko	Multibeam	21.5016	23.3228	142.0796	143.7295	
5/7/06	0255	**T06A-13**: NE cone at Nikko. [0255 - 0441 UTC] SW->NE	NE cone on Nikko	CTD towyo	23.0836	23.0896	142.3607	142.3763	
5/7/06	0544	Jason in the water for dive J2-198 at Nikko. Located and retrieved instrument left on previous cruise for Marv Lilley. Find the sulfur site found on Japanese cruise. Map the caldera with the **SM2000**. Explore the caldera and wall. 9 samples: majors, gastights, niskin, rocks, mat, shrimp, flatfish.	**Nikko**	**J2-198**	23.0662	23.0819	142.3166	142.3278	476
5/8/06	0555	Jason back on deck. End of dive J2-198 at Nikko.	Nikko	J2-198					
		T06A-14: Nikko tow over main (SW) cone. [0706 - 0915 UTC] SW ->NE	Nikko	CTD towyo	23.0754	23.0917	142.3164	142.3451	
		T06A-15: Cross-tow over main (SW) cone. [1042 - 1243 UTC] SE ->NW			23.0712	23.0975	142.3169	142.3302	
5//8/06	1357	Jason in the water for dive J2-199 at Nikko. Used the fluid sampler at diffuse and high temperature flow sites. Return to North Vent to sample instrument recovery site. Explore caldera and summit slopes. South/southwest of the caldera rim Jason-2 broke through the sulfur crust and came up with 80 lbs of sulfur on the vehicle. 27 samples: HFS, gastights, niskins, rocks, sulfur rocks and sulfur scraped off Jason-2 after the dive.	**Nikko**	**J2-199**	23.0813	23.0813	142.3166	142.3270	-475
5/9/06	0908	Jason back on deck. End of dive J2-199 at Nikko.	Nikko	J2-199					
		V06A-12: Sample plume above the Naraku vent. Main (SW) cone - outside SSW rim of caldera where Jason got covered w/sulfur. 1052 - 1143 UTC]	Nikko	CTD cast	23.0779		142.3251		
5/9/06	1300	SeaBeam survey. Add bathymetry to database west and south of Nikko dive area. [5/9 1300 - 5/10 0200 UTC]	Southwest of Nikko	Multibeam	22.1640	23.0942	142.1748	143.0235	4761
5/9/06	1424	Collect current sound velocity profile, using an XBT, for SeaBeam data.	Nikko	XBT	22.9681		142.3375		1000
5/10/06	0200	Finished operations. Turned of SeaBeam and 3.5 kHz. Start transit to Japan.	Nikko area						
5/13/06	0000	Docked in Yokohama Japan ~0900 local time (0000 UTC).	Yokohama Japan						

2.0 CRUISE PARTICIPANTS

PARTICIPATING ORGANIZATIONS

- NOAA/PMEL - Pacific Marine Environmental Lab (Seattle WA and Newport OR, USA)
- CIMRS/OSU - Cooperative Institute for Marine Resource Studies/Oregon State University (Newport OR, USA)
- JISAO/UW - Joint Institute for Science of the Atmosphere and Ocean/University of Washington (Seattle WA, USA)
- UW - University of Washington (Seattle WA, USA)
- UVIC - University of Victoria, (Victoria BC, Canada)
- WWU - Western Washington University (Bellingham WA, USA)
- NAIST - National Institute of Advanced Industrial Science and Technology (Higashi Tsukaba, Japan)
- IGNS - Institute of Geological and Nuclear Science (Lower Hutt New Zealand)
- DSOG - Deep Submergence Operating Group/Woods Hole Oceanographic Institution (Woods Hole MA, USA)
- MBL - Marine Biological Laboratory/ Woods Hole Oceanographic Institution (Woods Hole MA, USA)
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3.0 SRoF'06 DISCIPLINE SUMMARIES

3.1 HYDROTHERMAL PLUME STUDIES

3.1.1 Mariana Arc Hydrothermal Plume Studies - 2006

Sharon Walker, Joe Resing, Ron Greene

CTD operations

A total of 27 CTD casts (12 vertical casts and 15 tows) were conducted at 9 volcanoes during the 2006 Ring of Fire expedition: NE Rota #1, NW Rota #5, Esmeralda, Ruby, Middle Diamante, SE Daikoku, Daikoku, NW Eifuku and Nikko (main W cone, NE cone and E cone). Sensors on the CTD included the standard CTD sensors (conductivity, temperature and pressure) as well as optical backscattering, oxygen, Eh, pH, and an altimeter. Due to depth limitations, the pH sensor was not included on all casts. Water was collected at each site and a total of 1585 samples were taken for the following analyses: helium (214 samples), carbon dioxide (89), pH (495 - number includes duplicates), total dissolvable metals (256), dissolved metals (70), methane (106), hydrogen (106), hydrogen sulfide (28), sulfur species (75), scanning electron microscope (43), and x-ray fluorescence (103). Some analysis of water samples was completed at sea, while others need to be analyzed in the lab on shore.

Plume distributions at each volcano are described below in terms of the optical backscatter and Eh sensors, and pH sensor where present.

NW Rota #1 (Figure 2)

NW Rota #1 was undergoing an active volcanic eruption during the 2006 survey. An optically intense plume over the summit centered at a depth of 505-530 m was somewhat deeper than in 2003 or 2004 (460 m and 485 m respectively). This plume had strong pH and Eh anomalies. In addition to the summit plume, multiple layers of turbidity were widespread down the flanks of NW Rota #1 starting at depths of 700 m and extending to > 2500 m and distances up to 18 km from the summit (as seen in casts to the NE and SW of the volcano). Similar particle layers were seen in 2004 but not in 2003. In 2004 the deep layers were composed primarily of fresh glass and were devoid of any hydrothermal signatures (helium, iron oxides, sulfur, etc). Tow T06A-06 was a repeat of the T06A-01/02 line with a time separation of about 5-6 days. The deep particle layers had significantly diminished implying they are not continuously replenished and are carried away from the volcano by local currents and/or are composed of relatively rapidly settling particles.

NW Rota #5

NW Rota #5 is approximately 18 km NE of NW Rota #1. This volcano had not been surveyed for hydrothermal plumes during the 2003 or 2004 expeditions. Particle layers at 850 m and also between 950-1140 m were observed in the one tow and one vertical cast here. These layers are significantly higher than the summit depth and no Eh anomaly was present, so the source of these layers is most likely the lateral transport of deep particles from the flanks of NW Rota #1.

Esmeralda (Figure 3)

Esmeralda volcano has a 100 m deep caldera below a sill depth of 225 m on the breached west side (the rim on the north, east and south sides rises to 100 m water depth). The caldera below the sill depth (225 m) was filled with a plume with dNTU value up to 0.650. No strong Eh anomaly was detected. The anomaly measured in 2006 was comparable to the anomaly measured during a vertical cast into this caldera in 2003.

Ruby (Figure 3)
No hydrothermal plumes were detected at Ruby in 2003 despite recent eruptive history (during the past 50 years) and similarity to NW Rota #1 in morphology. Tow T06A-07 crossed the summit from SW to NE and detected a spatially limited, but significant optical signal (dNTU ~ 0.16) with an accompanying Eh anomaly at 190-195 m water depth just after passing over the summit.

Middle Diamante
Middle Diamante was sampled in 2003 with one vertical cast showing no indication of hydrothermal activity. One tow during this cruise (T06A-08) detected a very weak (dNTU ~ 0.008) particle anomaly at 900-1000 m with no Eh anomaly. It is questionable that this anomaly originates from the 1175 m summit of Middle Diamante.

SE Daikoku
SE Daikoku had not been previously sampled during the 2003 or 2004 expeditions. One tow, T06A-09, crossed both peaks of the summit from SW to NE and did not detect any optical or Eh anomalies.

Daikoku (see Figure 4)
One CTD tow in 2003 and two more in 2004 identified optical anomalies over the summit of Daikoku volcano centered at approximately 350 m and 400 m. Jason dives identified two sources for these strong plumes - an active pit at the summit (depth ~375 m) and a site with a cauldron of liquid sulfur on the NW side of the summit at about 410 m. During this cruise, three vertical casts were completed to obtain detailed water sample profiles at these two sites. The plume saturated the optical sensor (dNTU > 5.0) in the bottom 40 m above the active pit at the summit where very strong Eh and pH anomalies were also measured. The plume over the liquid sulfur cauldron had dNTU values > 0.25 about 30 m above bottom, also accompanied by strong Eh and pH anomalies.

NW Eifuku
Two tows and two vertical casts mapped the distribution of the hydrothermal plume over NW Eifuku in 2006 and provided a detailed vertical water sample profile over Champagne Vent. Optical and Eh anomalies (dNTU > 0.5) were strongest directly over Champagne Vent within 20-30 m of the bottom.

Nikko (Figure 4)
The plume over the main (west) cone at Nikko was very intense (saturating the optical sensor) within the depth range of 370-415 m over the summit. Strong pH and Eh anomalies were also present. One vertical cast provided a detailed water sample profile over the site of liquid sulfur discovered during the last Jason dive. In addition to mapping the plumes over the active cone, tows were also done at the NE and E cones, which had never been sampled before. No evidence of hydrothermal activity was detected at these additional cones.

3.1.1a CTD Sample Descriptions

Sample Type	# of samples	CTD Sample Description
^3He	214	The helium isotope is a hydrothermal tracer signal, which is introduced into the ocean by seafloor volcanic activity.
CO_2	89	Carbon dioxide is the most abundant volcanic gas in submarine volcanoes. It dissolves in water to form carbonic acid, which lowers the pH of the water.
pH	495	A measure of acidity of a solution. Changes in pH are caused by volcanic gasses like carbon dioxide and sulfur dioxide.
TDM	256	Total dissolved metals - the total amount of metals (dissolved plus particulate) in the sample. Acid is added to the sample, which causes particulate metals to dissolve before analysis.
DM	70	Dissolved metals - the amount of dissolved metals. The sample is first passed through a filter to remove the particulate metals before analysis.
CH_4	106	Methane is another common hydrothermal tracer. Methane is also a food source and a by-product for/of microbes in hydrothermal environments.

Sample Type	# of samples	CTD Sample Description
H_2	106	Dissolved hydrogen.
H_2S	28	Hydrogen sulfide – a dissolved volcanic gas
S-spec	75	Sulfur species - to determine what different phases the sulfur is in (sulfides, sulfates, etc.)
SEM	43	Scanning electron microscopy allows one to look at the particles to identify their characteristic sizes, morphology (shape) and chemistry.
XRF	103	X-ray fluorescence determines the chemical makeup of particles found in the water column above an active volcano.
Total Samples	1585	

3.1.1b Vertical Casts and Tow-yos

Cast	Sta Name	Lat°	Lat'	Lon°	Lon'	3He	CO2	pH	TDM	DM	CH4	H2	H2S	S-spec	SEM	XRF	Comments
	T06A-01(start)	14	34.054	144	45.834												**NW Rota** - tow from SW->NE up flank from 2100m, over summit at Brimstone Pit to look for deep particles along flanks and plume at summit - tow ended at summit due to wire problems
1	T06A-01(end)	14	36.587	144	46.655	9	0	22	16	7	10	10	0	0	5	7	
	T06A-02(start)	14	36.043	144	46.512												**NW Rota** Continuation of T06A-01 from summit at Brimstone Pit towards NE down flank to ~2100m
2	T06A-02(end)	14	38.687	144	47.404	13	10	25	14	5	8	8	0	0	5	8	
3	V06A-01	14	32.014	144	45.041	12	4	25	12	4	0	0	0	0	4	5	**NW Rota** SW of start of T06A-01 to see how far deep particle layers can be found
4	V06A-02	14	22.999	144	34.000	5	7	25	5	0	0	0	0	0	0	1	**NW Rota area** SW of V06A-01 - deep particle layer absent this far away
5	V06A-03	14	36.052	144	46.526	7	5	19	7	6	7	7	0	0	3	4	**NW Rota** over Brimstone Pit
	T06A-03(start)	14	56.250	145	14.750												**Esmeralda** - tow S->N through caldera
6	T06A-03(end)	14	59.272	145	14.569	4	8	22	7	2	4	4	0	0	1	5	
	T06A-04(start)	14	36.410	144	45.624												**NW Rota** - tow NW->SE (perpindicular to T06A-01/T06A-02 line
7	T06A-04(end)	14	35.628	144	47.475	9	5	25	14	8	9	9	3	12	3	9	
	T06A-05(start)	14	40.416	144	54.836												**NW Rota #5** - this one has never been sampled before. (Winch problems during tow)
8	T06A-05(end)	14	41.597	144	54.712	0	0	0	0	0	0	0	0	0	0	0	
9	V06A-04	14	40.772	144	54.812	9	0	14	6	0	4	4	0	15	2	2	**NW Rota #5** - vertical cast to fill gap from tow (winch problems during tow)
	T06A-06(start)	14	34.052	144	45.836												**NW Rota** - repeat of T06A-01 and T06A-02
10	T06A-06(end)	14	37.482	144	47.003	9	2	25	15	3	9	9	0	12	4	8	
	T06A-07(start)	15	36.121	145	34.101												**Ruby** (tow SW->NE)
11	T06A-07(end)	15	36.562	145	34.847	7	3	15	7	1	7	7	0	0	1	1	
	T06A-08(start)	15	56.517	145	31.203												**Middle Diamante** (tow SW->NE)
12	T06A-08(end)	15	57.463	145	32.690	8	0	19	12	1	0	0	0	0	2	4	
	T06A-09(start)	21	12.106	144	22.851												**SE Daikoku**
13	T06A-09(end)	21	13.488	144	24.120	11	3	19	12	2	0	0	0	0	0	2	
14	V06A-05	21	19.501	144	11.489	8	8	19	8	3	8	8	2	4	2	6	**Daikoku** - sample over liquid sulfur cauldron
15	V06A-06	21	19.469	144	11.590	6	4	16	5	4	6	6	5	4	2	5	**Daikoku** - sample over active pit

Cast	Sta Name	Lat°	Lat'	Lon°	Lon'	3He	CO2	pH	TDM	DM	CH4	H2	H2S	S-spec	SEM	XRF	Comments
	T06A-10(start)	21	29.641	144	1.972												**NW Eifuku** - tow NW->SE over Champagne vents
16	T06A-10(end)	21	28.590	144	3.296	19	0	25	19	0	0	0	0	0	0	0	
17	V06A-07	21	28.989	144	2.130	6	0	14	3	0	0	0	0	0	0	0	**NW Eifuku** - intended to do tow, but changed to vertical mid-cast (ran out of time & other factors)
18	V06A-08	21	19.453	144	11.610	5	4	18	6	0	0	0	0	0	0	2	**Daikoku** - vertical over active pit (to test pH sensor, altimeter at new A/D channel, sample)
19	T06A-11(start)	21	28.848	144	2.286												**NW Eifuku** - tow SW->NE
	T06A-11(end)	21	30.021	144	2.899	16	0	25	13	2	5	5	0	0	0	2	
20	V06A-09	21	29.250	144	2.487	4	6	16	7	3	7	7	4	0	1	5	**NW Eifuku** - over Champagne vent
	T06A-12(start)	23	6.561	142	21.397												**Nikko** - tow over **NE cone**: SW->NE
21	T06A-12(end)	23	6.872	142	22.436	1	0	5	2	0	0	0	0	0	0	0	
22	V06A-10	23	6.862	142	21.793	0	0	0	0	0	0	0	0	0	0	0	**Nikko - NE cone**: vertical cast N of tow T06A-12
23	V06A-11	23	6.544	142	21.971	10	0	19	10	0	0	0	0	0	2	2	**Nikko - NE cone**: vertical cast S of tow T06A-12
	T06A-13(start)	23	5.018	142	21.644												**S/middle cone @ Nikko** - tow SW->NE ("the nose")
24	T06A-13(end)	23	5.377	142	22.579	6	0	17	11	0	0	0	0	0	0	3	
	T06A-14(start)	23	4.521	142	18.982												**main (W) cone @ Nikko** - tow SW->NE
25	T06A-14(end)	23	5.500	142	20.703	9	7	25	15	5	7	7	1	8	2	6	
	T06A-15(start)	23	4.274	142	19.809												**main (W) cone @ Nikko** - tow SE->NW
26	T06A-15(end)	23	5.848	142	19.011	14	8	25	19	6	10	10	8	13	2	8	
27	V06A-12	23	4.675	142	19.508	7	5	16	11	8	5	5	5	7	2	8	**Nikko - main (W) cone** - outside SSW rim of caldera where Jason got covered w/sulfur
					totals:	214	89	495	256	70	106	106	28	75	43	103	

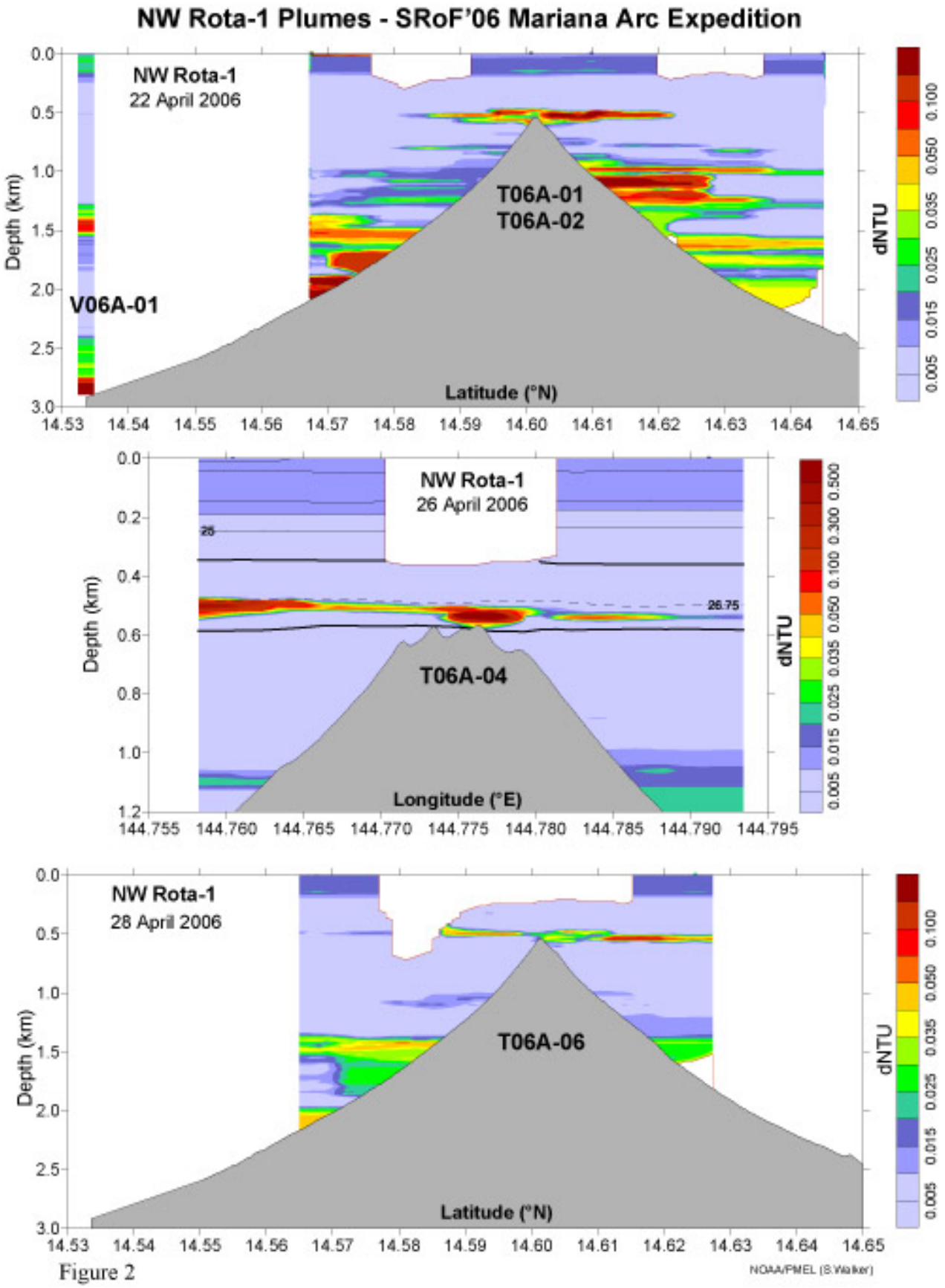
NW Rota-1 Plumes - SRoF'06 Mariana Arc Expedition
NW Rota-1
22 April 2006
T06A-01
T06A-02
V06A-01
Depth (km)
Latitude (°N)
dNTU
0.005 0.015 0.025 0.035 0.050 0.100
NW Rota-1
26 April 2006
T06A-04
25
26.75
Depth (km)
Longitude (°E)
dNTU
0.005 0.015 0.025 0.035 0.050 0.100 0.300 0.500
NW Rota-1
28 April 2006
T06A-06
Depth (km)
Latitude (°N)
dNTU
0.005 0.015 0.025 0.035 0.050 0.100
NOAA/PMEL (S.Walker)

Figure 2

Figure 2 back

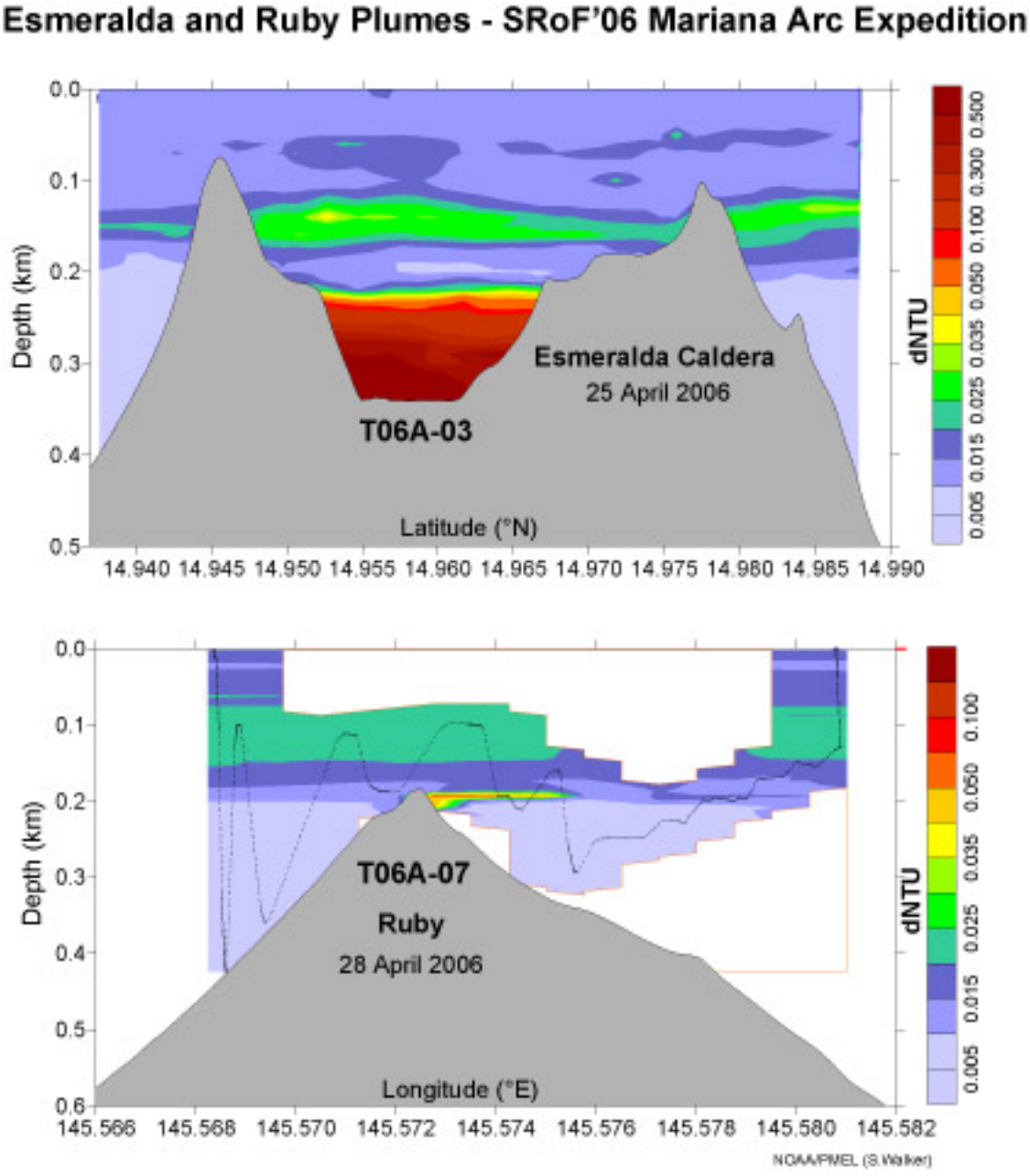
Esmeralda and Ruby Plumes - SRoF'06 Mariana Arc Expedition
Depth (km)
0.0
0.1
0.2
0.3
0.4
0.5
Esmeralda Caldera
25 April 2006
T06A-03
Latitude (°N)
14.940 14.945 14.950 14.955 14.960 14.965 14.970 14.975 14.980 14.985 14.990
dNTU
0.005 0.015 0.025 0.035 0.050 0.100 0.300 0.500
Depth (km)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
T06A-07
Ruby
28 April 2006
Longitude (°E)
145.566 145.568 145.570 145.572 145.574 145.576 145.578 145.580 145.582
dNTU
0.005 0.015 0.025 0.035 0.050 0.100
NOAA/PMEL (S.Walker)

Figure 3

Figure 3 back

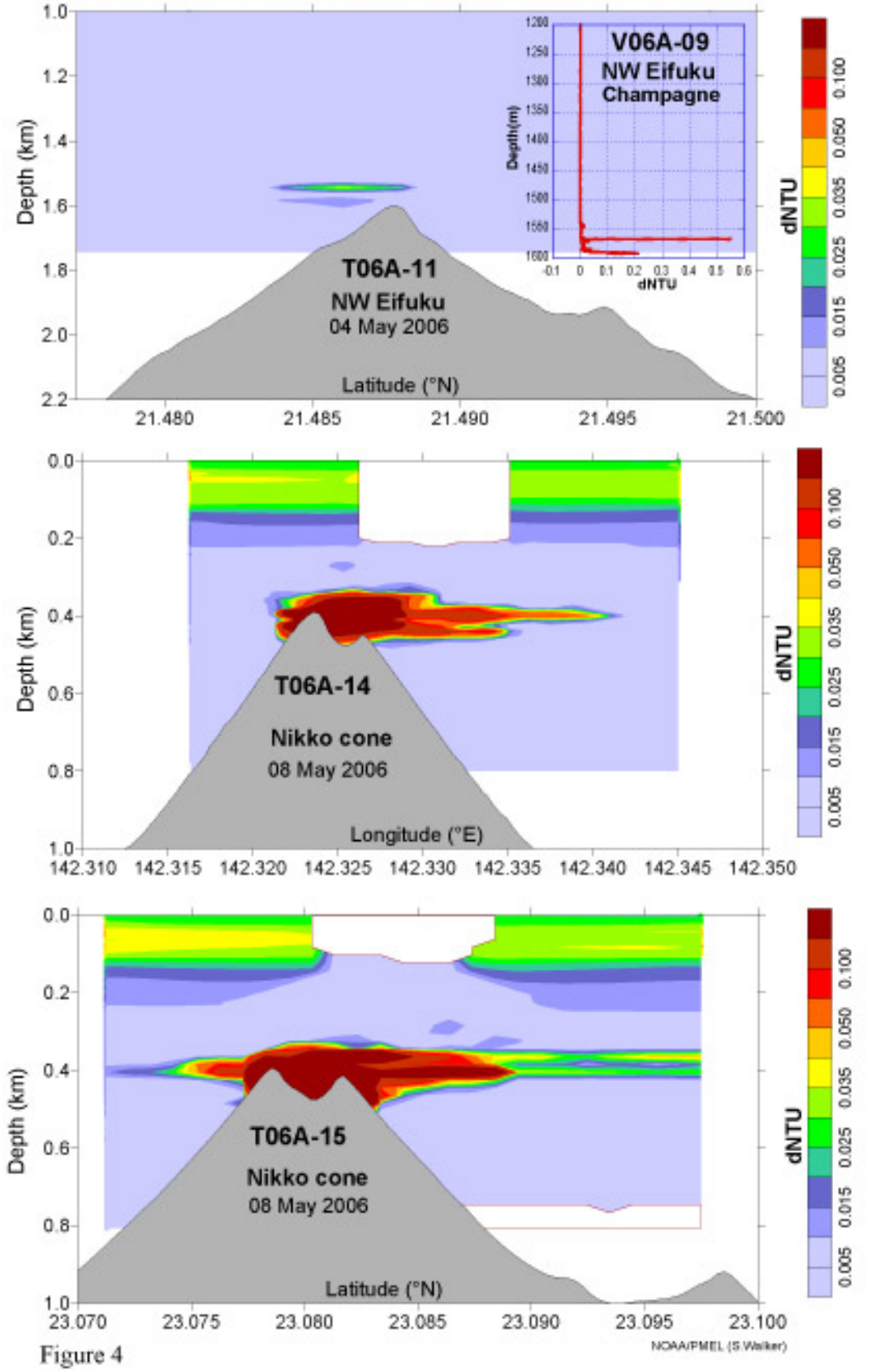
NW Eifuku and Nikko Plumes - SRoF'06 Mariana Arc Expedition
V06A-09
NW Eifuku
Champagne
Depth(m)
dNTU
T06A-11
NW Eifuku
04 May 2006
Depth (km)
Latitude (°N)
dNTU
T06A-14
Nikko cone
08 May 2006
Longitude (°E)
T06A-15
Nikko cone
08 May 2006
Latitude (°N)
NOAA/PMEL (S.Walker)

Figure 4

Figure 4 back

3.2 GEOLOGY

3.2.1 Geological Studies at the Mariana Arc Volcanoes - 2006

Cornel de Ronde (geology group also included: Bob Embley, Bill Chadwick, Nick Deardorff)

See Plate 1 (page 7), Plate 2 (page 9), and figure captions (iii - iv)

Geological objectives of the cruise included: (1) making geological traverses at all the volcanoes, (2) carrying out SM2000 multibeam surveys of the vent areas at select sites, and (3) collecting representative rock and mineralized samples, where available.

By and large, all the above objectives were achieved. We surveyed 9 volcanoes during 16 dives, including (from south to north): Forecast, Seamount 'X', NW Rota-1, Esmeralda, Ruby, East Diamante, Daikoku, NW Eifuku and Nikko (Figure 1). With the exception of Forecast, which is thought to have more affinity with the backarc, all the other volcanoes occur along the Mariana active arc front.

Forecast and Seamount 'X' each had one dive. Both of these sites were found to be hydrothermally active, dominated by diffuse venting. Vesiculated lava samples with phenocrysts of feldspar (andesite?) were collected from Seamount 'X', together with relatively fresh pieces of highly vesiculated elemental sulfur and a glassy ash-rich sediment containing small sulfur spheroids. A single, highly altered lava sample was recovered from Forecast.

NW Rota-1 was one of the most spectacular sites visited during the cruise, especially with respect to active geological processes. A total of 6 dives were done on this volcano. Impressive for its dramatic nature, several hours of video and still photographs were recorded/taken of the on-going eruptive activity at Brimstone, near the summit of the volcano (Plate 1b). Here, incandescent basaltic-andesite(?) lava was seen erupting onto the seafloor, locally forming blocky lava flows and building a small cone several meters in diameter and several meters high over the course of a 24 hour period. This location showed an unprecedented example of a degassing submarine lava flow, with sheets of CO_2-rich bubbles commonly preceding an eruptive episode and large, sulfur-rich yellow plumes accompanying the eruption (Plate 1a). A SM2000 survey was executed of the summit of NW Rota-1, including the Brimstone Pit area. Fresh pieces of erupted lava (including several volcanic bombs, some of which had an unusual disc-like morphology), numerous ash, and pieces of elemental sulfur were collected from the general area. One particularly spectacular lava sample had elemental S extruding from its vesicles, which almost certainly exsolved from the lava as it was being extruded onto the seafloor (Plate 1c and 1d).

Exploration of Esmeralda was hampered because of poor visibility within the caldera, commonly less than a few meters. One dive was made at Esmeralda. Some notable, actively venting, up to 2 meter tall Fe-oxide-rich chimneys were discovered on the southwest wall of the caldera.. They were sampled and appeared to have a strong association with microbial colonies in their interior.

We also had one dive at Ruby. Partially weathered, vesiculated lava samples (some bomb-like) were recovered from this volcano together with pieces of consolidated ash units. Evidence for local hydrothermal activity comes from alteration of some lithics, some minor sulfur staining on rock surfaces, fine-grained sulfur in the ash units, and small patches of diffuse venting with associated communities.

The longest dive of the cruise (almost 27 hours of bottom time) was at East Diamante. This volcano is the only known site along the entire Mariana arc that is host to black smoker massive sulfide chimneys (Plate 1e and 1f). Moreover, this site is unusual in that the chimney, or vent field, is located in relatively shallow water of ~350 meters. In addition, the copper-sulfide chalcopyrite is common within the chimneys (although they are dominated

by zinc– and iron-rich sulfides such as sphalerite and pyrite) which normally precipitates at temperatures <350°C, whereas the vent temperatures for the active chimneys are 240°C, or the boiling point temperature for this depth (Plate 1h). Noticeable amounts of hematite are seen co-preciptiated with the chalcopyrite, which is a usual occurrence (Plate 1g). The Five Towers chimneys are up to 5 meters tall and sit on top a 6-meter high massive sulfide mound (Plate 1e). Other interesting samples from East Diamante are the coarse-grained feldspar (and quartz?) bearing 'plutonic' rock that almost looks like a granite(!), and a slab of limestone complete with calcareous fossils recovered from near the summit of the volcanic cone.

Two dives were made on Daikoku. This volcano was spectacular for the discovery of a small pond of molten sulfur, discovered on the upper NW flank of the volcano near the summit crater (Plate 2a). The pond was approximately 5 by 3 meters across and was sloshing around as it vigorously de-gassed, with temperatures measuring up to 187°C. Pieces of ash bound by layers of sulfur were recovered from this site, while other ash layers contained small, black globules of sulfur that almost certainly were derived from fall-out from a sulfur-rich plume. One sample of highly altered lava shows the degree of alteration experienced by local rocks. A particularly spectacular sample is one of molten sulfur collected in a coffee can that was dipped into the lake and which shows abundant evidence for vigorous de-gassing as the sulfur was instantly quenched by seawater (Plate 2c and 2d). A SM2000 survey was completed at Daikoku.

NW Eifuku was also explored during the expedition on one dive. The original Champagne vent site was re-visited and was found to be noticeably less active than in 2004. However, other sites of venting, accompanied by discharge of liquid CO_2 in places, were noted in the same general vicinity and slightly deeper. A large mound (~3 meters tall and ~4 meters across at the base) of sulfur with probable silica and/or alunite was seen further down slope where ~45°C diffuse fluids were venting from a sulfur-rich chimney. A piece of this chimney/mound was sampled and shows sulfur was the matrix material and that the sulfur itself varied in color from pale white-yellow to more noticeably translucent yellow.

The final two dives of the expedition were made at Nikko volcano. Here, like at most of the volcanoes along the Mariana arc, elemental sulfur was in abundance. In fact, sulfur is by far the most voluminous substrate in the relatively small (~300 meter diameter) crater at Nikko. Vertical profiles showed that some crusts locally were >1 meter thick, indicating that substantial sulfur flows and pools have occurred in the past. Two localities of molten sulfur bubbling to the seafloor were noted (Plate 2f). At one of these localities *Jason-2* inadvertently sat down and broke through a thin sulfur crust, coating the vehicle with an estimated 60+ pounds of sulfur on its undercarriage (Plate 2h). Various pieces of sulfur were recovered from Nikko together with some ash units. Most of the crater floor and parts of its rim and upper flank is spectacularly covered by tubeworms (Plate 2g). A SM2000 survey of the crater was accomplished during one of the dives.

3.3 CHEMISTRY

3.3.1 Mariana Arc Vent Fluid Chemistry - 2006

David A. Butterfield

Team:
Dave Butterfield, sampling and shipboard water chemistry
Ben Larson, shipboard gas analysis by GC
Nathan Buck, vent fluid sampling and analysis
Boku Takano, sulfur speciation
Koichi Nakamura, molten sulfur collection and analysis
Sheryl Bolton, in-situ filtration for microbiology
Julie Huber, in-situ filtration for microbiology

Goals:
Collect detailed, coordinated samples for chemistry and microbiology from a number of hydrothermal sites.
Discover and sample new forms of venting.
Collect time-series samples/observations from NW Rota and NW Eifuku.

Operations/Procedures:
Water sampling operations on this cruise were very similar to previous ROV cruises. The Hydrothermal Fluid and Particle Sampler (HFS), was mounted in the open back section of Jason 2, with power and communication through the vehicle, a 2-meter intake line and temperature probe on the nozzle held in a holster in the front of the vehicle.

Shipboard analysis consisted of pH, automated alkalinity titration using the Brinkmann Titrino, methylene blue colorimetric hydrogen sulfide analysis, and silicomolybdate blue colorimetric analysis of dissolved reactive silicate. Ammonia analysis was not done.

Trace metal samples were acidified with ultra-pure (Seastar) HCl under clean conditions in Joe Resing's laminar flow hood.

We were fortunate to have Dr. Boku Takano on board to do intermediate sulfur species analysis. He used HPLC to measure thiosulfate and sulfite, which were highly variable among the different volcanoes and between vent sites. Some samples had very high concentrations and were analyzed by iodometric titration.

We took the following standard set of samples whenever volume permitted:
1. Gas aliquot (10-20ml in syringe).
2. H2S and Si, (20-30ml in syringe)
3. pH/alkalinity (35ml in 30ml bottle completely full no air)
4. Major elements (65ml, in-situ or syringe filtered, fill 60ml acid cleaned bottle to the top, no air)
5. Nutrients (filter 45 ml, purge with N2 to remove H2S, freeze in 60ml amber bottle)
6. Trace elements (125 ml in I-Chem bottle, acidify SeaStar HCl; may collect duplicate filtered/unfiltered cuts)
7. Microbiology (36 ml for counts preserved w glutaraldehyde; 30-90 in syringes for culture as needed)
8. S isotopes (to Chiba lab; add liquid to 40ml glass vial w 1ml 10% Cd acetate soln., no headspace.)
9. O/H isotopes (to UW lab; 15ml filtered into hdpe bottle, full- no air, refrigerate until ready to ship)
10. 13C-DIC (to Juniper lab; syringe filter with small tube outlet, fill 20ml septum-top I-Chem vial slowly from bottom, add .2ml sat'd HgCl2, cap no headspace, tape lid, pack in vial shipper box)
11. N isotopes (to M. Lehmann, UQAM. Filter, acidify, purge with N2, freeze.)
12. DOC (30-100ml in pre-cleaned glass, to S. Lang, U.W.)

Samples 10-12 are elective samples and done on subset. All others taken if volume permitted.

Summary of sampling:
Over the course of the cruise, we recovered 71 water samples in pistons and collapsible bags using the HFS, and 15 titanium major samples (see Excel spreadsheet.). Several of the HFS samples were background seawater samples taken during sampling dives. In addition, we took 30 individual in-situ filter samples for microbiology that were coordinated with fluid chemistry samples (see Huber/Bolton report), and a number of gas-tight (see Leigh Evans report) and ROV-mounted Niskin samples (see Joe Resing report).

We collected a total of 36 *in-situ* filters (associated with water samples) for chemical analysis and an additional 17 sub-sample filters in the lab, including dregs or suspended particles from unfiltered water samples.

The sampling operations were highly successful during this expedition. We obtained a small number of samples from hydrothermally active volcanoes that we had not previously sampled, including Seamount X, Forecast, Ruby, and Daikoku. Esmeralda had very low-level diffuse venting through iron-rich sediment in an enclosed caldera, but we did not get any vent fluid samples from that site.

The most impressive set of samples came from NW Rota, where we were able to observe the eruptive volcanic vent through many stages of activity ranging from quiescent venting of white smoke and warm clear water to intense venting of gas bubbles, boiling water, molten sulfur, and exploding rocks. Overall, we collected water, gas, plume particles, and all kinds of solid samples from the volcanic vent. We made temperature measurements in the volcaniclastic deposits directly next to the vent (hours to days old) and on hot rock surfaces. The integrated story of the collected samples will make a fascinating and totally unprecedented study of an active submarine eruption. Many of the water samples are unlike anything that has been sampled before anywhere.

Prior to beginning the study of the Mariana arc in 2003, we expected to see a much larger contribution of magmatic volatiles in the hydrothermal systems than in a typical mid-ocean ridge environment. This has been born out repeatedly in our plume and hydrothermal vent studies. Gas bubbles are common in the shallow volcanoes that we have examined. Molten sulfur was apparent in the first visit to NW Rota in 2004, in the Hyperdolphin dives at Nikko in November 2005, and now we have spectacular observations of molten sulfur pools at Daikoku and Nikko during this expedition. As we did in 2004, we took samples of ambient seawater around the dense mussel communities at NW Eifuku to determine the pH in which the mussels were living.

All of the instances of molten sulfur are associated with magmatic degassing, and are almost certainly the result of reaction of water with SO2 coming out of a magma chamber. The extremely low pH values and excess sulfate are strong evidence for this, but the direct measurement of greater than 0.1 mol/liter sulfite in water samples taken at the volcanic vent is irrefutable. There may be other sulfur gases present in the magma (mainly H_2S) and secondary reactions involving gas, aqueous, and molten sulfur may occur. The intermediate sulfur species data may help us to understand the details of reactions occurring between volcanic gases, molten sulfur, seawater, and rock.

The largest sample of molten sulfur (by far) collected on this expedition was associated with Jason punching through the surface of a sulfur pond, causing a wave of molten sulfur from under the crust to wash over the rear of the ROV, where the fluid sampler was mounted. Most of the fluid sampler was covered in solid sulfur when Jason returned to the surface. There was no major damage to the sampler, and samples collected during the dive remained intact.

This expedition includes time series observations at NW Rota-1, E. Diamante, NW Eifuku, Daikoku, and Nikko. We have a lot of details to examine on this, but in general it appears that the vents in 2006 are quite similar in appearance and chemical composition to 2004.

3.3.1a Hydrothermal Vent Fluid Samples

Times are UTC. Temperatures are in degrees Celsius. Volumes are in ml.

Dive#	Sample#	HFS#	type	Volcano	location	date	start	stop	Tmax	T1	T2	Vol
J2-184	5	yellow major	major	Seamount X	Seamount X	19-Apr	11:20:00		12			700
orange coating, clear fluid												
j2-185	11	1	filtered piston	Forecast	Snail Scrum	20-Apr	13:40:15	13:44:09	T1 damaged on dive 185	9.2	5.3	544
Intake down in snails about 1 m away from Bart; T2 XXX °C												
j2-185	12	5	piston		Snail Scrum	20-Apr	13:49:07	13:53:17		39.1	32.8	556
At upper right peak that was 109 °C before; T2 around 26 °C												
j2-185	8	6	piston		Snail Scrum	20-Apr	13:15:05	13:20:02		12.4	6.8	667
Intake down in snails about 1 m away from Bart												
j2-185	2	8	bag		Bart chimney	20-Apr	12:10:18	12:13:19		71.4	59.7	453
Jason temp probe got 155 °C; sampled small (25 cm) chimney; Highest on Dave's probe was 85 °C; T2 avg ~75												
j2-185	7	9	bag	broken bag	Snail Scrum	20-Apr	13:08:21	13:13:59		9.9	6.5	797
Intake down in snails about 1 m away from Bart; T2 up to 8 °C												
j2-185	6	11	filtered bag		Bart chimney	20-Apr	12:14:54	12:18:19		49.5	30.5	513
Jason temp probe got 155 °C; sampled small (25 cm) chimney; Highest on Dave's probe was 85 °C; T2 XXX °C												
j2-185	13	14	filtered bag		Snail Scrum	20-Apr	13:55:30	13:59:48		38	32.1	578
Intake down in snails about 1 m away from Bart; T2 XXX °C												
j2-185	16	16	filtered bag		Homer	20-Apr	17:54:59	18:02:38		10.9	8.4	548
In crack, lots of biota. Highest T with Jason probe was 19 °C. T2 ~ 8.3 °C												
j2-185	19	17	filtered bag		Marge	20-Apr	19:23:10	19:28:51		47.2	45.7	530
"Beer can" type structure with focused flow; Jason probe got 140 °C; T2=43 °C												
j2-185	26	18	filtered bag		Mound 1	20-Apr	21:11:00	21:14:29		136.2	37.1	504
j2-185	20	19	bag		Marge	20-Apr	19:29:55	19:33:26		46.3	44.3	508
"Beer can" type structure with focused flow; Jason probe got 140 °C; T2=42 °C												
j2-185	17	20	piston		Homer	20-Apr	18:04:19	18:10:01		10	7.6	550
In crack, lots of biota. Highest T with Jason probe was 19 °C. T2 ~ 7 °C												
j2-185	21	22	piston		Marge	20-Apr	19:34:27	19:38:14		47.5	44.9	499
"Beer can" type structure with focused flow; Jason probe got 140 °C; T2=41 °C												
j2-185	6	24	filtered piston	Forecast	Bart chimney	20-Apr	12:38:33	12:41:21		51	48.4	433
Jason temp probe got 155 °C; sampled small (25 cm) chimney; Highest on Dave's probe was 85 °C; T2 XXX °C												
j2-187	32	1	filtered piston	NW Rota-1	Brimstone later	23-Apr	16:42:44	16:45:05	79.5	70.5	60?	307
Never saw fresh water come out												
j2-187	9	5	piston		Sandy Saddle	23-Apr	07:28:55	07:33:14	32.6	27.3	20	576
519 m, within sight of summit marker												
j2-187	5	6	piston		Iceberg	23-Apr	04:16:34	04:21:32	52.9	51.3	35	663
iceberg												
j2-187	1	8	bag		Iceberg	23-Apr	03:42:41	03:46:38	51.9	49.3	35	551
iceberg, 532.5m												
j2-187	15	9	bag		Brimstone	23-Apr	09:39:03	09:43:14	28.2	25.4	20	577
559.6m bottom of brimstone pit, collapsed, quiet, some white cloudy water, some clear												
j2-187	sample2	11	filtered bag		Iceberg	23-Apr	03:47:34	03:51:21	50.2	49	34	575
iceberg, 532.5m, good flow												
j2-187	10	14	filtered bag		Sandy Saddle	23-Apr	07:34:46	07:39:09	30	26.6	20	600
519 m, within sight of summit marker												
j2-187	17	16	filtered bag	broken bag	Brimstone	23-Apr	10:07:44	10:11:40	26.4	19.7	16	619
failed due to bag breaking												
j2-187	24	17	filtered bag		Fault Shrimp	23-Apr	13:30:28	13:34:39	27.3	26.7	18	576
j2-187	28	18	filtered bag		Scarp Top	23-Apr	14:59:11	15:03:43	19.6	17.4	14	604
j2-187	25	19	bag		Fault Shrimp	23-Apr	13:36:24	13:40:25	26.5	26	18	600
j2-187	20	20	piston		Brimstone	23-Apr	10:49:40	10:51:43	44.3	40.2	30	300

Dive#	Sample#	HFS#	type	Volcano	location	date	start	stop	Tmax	T1	T2	Vol
559.6, taken later than others after system heated up and vented more gas												
j2-187	29	22	piston		Scarp Top	23-Apr	15:05:22	15:09:30	17.4	16	13	550
j2-187	33	24	filtered piston		Brimstone later	23-Apr	16:46:33	16:56:08	95.3	90.2	50	302
Started and stopped a few times because of P1 obstruction; temperature jumped around a lot												
j2-187	34	blue major	single major		Brimstone later	23-Apr	17:03:00					
Brimstone, in smoke,												
j2-188	3	yellow major	major		Brimstone	24-Apr	09:33:00					
j2-188	5	blue major	major		Brimstone	24-Apr	10:13:00					
Sampled in flow in pile of volcaniclastic pebbles with gas bubbles and white smoke												
j2-189	6	white major	major		Brimstone	25-Apr	06:26:00					
increase in bubbles. Sampling near gastight in white smoke obscuring water flow												
j2-189	8	red major	major		Brimstone	25-Apr	06:56:00		256.6			
Major is venting well												
j2-191	4	1	filtered piston uu25		Brimstone	27-Apr	03:05:26	03:05:58	41.9	37.6	?	80
Started to take white smoke sample; Had trouble getting steady smoke; were getting ready to reposition and the pit blew up												
j2-192		1	filtered piston uu32			28-Apr	03:08:00	03:11:57	7.2	7		558
j2-192	6	11	filtered bag uu23	NW Rota-1	Brimstone	28-Apr	02:13:00	02:18:15	7	6.9	6.9	625
30 M west of brimestone												
j2-193	17	1	filtered piston uu34	E. Diamante	snails base of 5 towers	29-Apr	19:57:22	20:01:10	23.1	21.8	19	593
right in snails at base of 5 towers, site of bio sample												
j2-193	7	5	piston		5m east of Gnome	29-Apr	17:01:03	17:03:46	162.8	140	72	350
Knocked off a little skinny beehive type structure to get flow- Jason probe gave temperature 225												
j2-193	23	6	piston		Barnacle Beach	29-Apr	22:32:19	22:36:05	13.6	13.5		600
Flow turned milky while sampling.												
j2-193	18	8	bag		snails base of 5 towers	29-Apr	20:02:24	20:06:03	23.8	20	18	590
in snails base of 5 towers, 348.9m, head=240												
j2-193	21	9	bag		Barnacle Beach	29-Apr	22:02:30	22:06:12	13.7	12.9	11	600
depth 458m, down in crack, thick barnacles												
j2-193	8	11	filtered bag uu33		5m east of Gnome	29-Apr	17:05:16	17:07:36	156	128.2	21	352
Knocked off a little skinny beehive type structure to get flow- Jason probe gave temperature 225												
j2-193	24	14	filtered bag uu50		Barnacle Beach	29-Apr	22:37:36	22:42:11	13.7	13.4		598
depth 458m, down in crack, thick barnacles												
j2-193	27	17	filtered bag uu22		5 Towers west face boiling vent	29-Apr	18:54:22	18:56:31	244.6	244.3	116	325
boiling vent max T 244.6 this sample, west face 5 towers, sample not put in log, added in as sample 27												
j2-193	10	18	filtered bag uu48		Gnome-Cornels Chimney	29-Apr	17:48:35	17:52:08	108.7	102.4	99	551
Jason probe got 210; actually just next door to where Cornel got his active chimney												
j2-193	12	19	bag		5 Towers west face boiling vent	29-Apr	18:46:19	18:48:31	241.2	240.3	110	398
346.1m, boiling vent 5 towers west side of structure												
j2-193	9	20	piston		Gnome-Cornels Chimney	29-Apr	17:43:29	17:47:05	108.4	105.7	99	533
Jason probe got 210; actually just next door to where Cornel got his active chimney												

Dive#	Sample#	HFS#	type	Volcano	location	date	start	stop	Tmax	T1	T2	Vol
j2-193	13	22	piston	E. Diamante	5 Towers west face boiling vent	29-Apr	18:49:31	18:52:05	239.3	214.7	100	384
346.1m boiling vent, temp fell on this sample from movement												
j2-194	3	blue major	major	Ruby	Rua vent	30-Apr	12:26:00		27			
Sampled in sediments churned up byprobe												
j2-194	6	red major	major	Ruby	Ruby	30-Apr	13:26:00		47			
site is located 10m north east of Rua. flow rate is very low												
j2-194	8	yellow major	major	Ruby	Ruby	30-Apr	14:03:00		46.6			
j2-195	6	blue major	major	Daikoku	bubble bath	2-May	10:36:00		52			
in crack												
j2-195	9	white major	major	Daikoku	smoking vent	2-May	13:31:00		211			
taken in little venting crack immediately at the base of tiny sulfur chimney												
j2-196	1	5	piston	NW Eifuku	Diffuse below Champagne	3-May	19:31:34	19:34:25	31.3	30.1	20.7	400
In mini-sulfur flow with microbial mat												
j2-196	3	9	bag		Diffuse below Champagne	3-May	20:12:24	20:14:03	44.2	41.2	28	251
Didn't move from end of Sample 2 Sterivex												
j2-196	8	11	filtered bag uu23		10m NW Champagne in mussels	3-May	21:13:09	21:16:58	2.4	2.4	2.5	551
In mussel bed where we collected first scoop of mussels												
j2-196	11	14	filtered bag uu36		Rippling Mussels	3-May	22:35:00	22:40:00	2.9	2.8	2.8	646
In mussel bed on rocks below Champagne site 1635m depth lots of shrimp and squat lobster, could not see fresh water exhaust												
j2-196	16	17	filtered bag uu37		Where? Mussel site	4-May	00:26:22	00:30:25	25	2.4	2.5	605
Second sample for Where? Mussel site with flush pump turned on.												
j2-196	15	18	filtered bag uu35		Where? Mussel site	4-May	00:07:35	00:11:41	2.5	2.4	2.5	601
Sample coordinated with mussel collection. Error: flush pump not on, took a second sample												
j2-196	12	19	bag		Rippling Mussels	3-May	22:42:00	22:46:00	2.7	2.6	2.7	604
In mussel bed on rocks below Champagne site 1635m depth lots of shrimp and squat lobster, exhaust was fine on this one												
j2-196	18	20	piston		Cliff House	4-May	02:19:31	02:22:17	40	30.6	30	401
In small sulfur/mat-covered vent at base of rock cliff. Max J2 T probe 55.												
j2-196	21	22	piston		Cliff House	4-May	03:02:42	03:05:53	46.7	41.7	28	461
In small sulfur/mat-covered vent at base of rock cliff. Max J2 T probe 55.												
j2-196		red major	major	NW Eifuku	Cliff House	4-May	04:05:00		55			
In small sulfur/mat-covered vent at base of rock cliff.												
j2-197	12	1	filtered piston uu38	Daikoku	NE pit, hdg 315 4m away	4-May	20:49:33,	20:53:43,	15.3,	15.2,		657
position stayed the same for all samples in the NE pit, but the smoke plume wafted around												
j2-197	1	5	piston		bubble bath	4-May	16:32:41	16:35:21	18.3	17.5	15.9	401
in a little hole with bubbles pouring out; hard to sample and could not see freshwater exhaust; before sampling began got up to 25 deg												
j2-197	16	6	piston		"alka seltzer"	4-May	22:10:00	22:13:00	63.4	56.1		557
near cauldron, bubbles and smoke, "alka seltzer"												
j2-197	7	8	bag		NE pit, hdg 315 4m away	4-May	20:16:00,	20:20:15,	15.4,	15.4,	564	
approx 4m away from wall, heading 315												
j2-197	8	11	filtered bag uu42		NE pit, hdg 315 4m away	4-May	20:21:38,	20:25:02,	15.6,	15.4,	623	
j2-197	13	14	filtered bag uu36		NE pit, hdg 315 4m away	4-May	20:56:38,	20:58:40,	15.9,	15.6,	363	

Dive#	Sample#	HFS#	type	Volcano	location	date	start	stop	Tmax	T1	T2	Vol
j2-197		16	filtered bag uu49		bottom sw near cauldron	4-May	23:37:47	23:41:53	13.6	13.5	13.5	722
in clear water looking down on cauldron at 410m depth, "blank" check												
j2-197	18	20	piston		near cauldron, bubbles and smoke, "alka seltzer"	4-May	22:15:00	22:17:00	53.3	40.5		504
j2-197	20	24	filtered piston uu24		near cauldron, bubbles and smoke, "alka seltzer"	4-May	22:31:21	22:33:25	19	16.4	16	302
j2-197	3	white major	major	Daikoku	bubble bath	4-May	16:54:00	16:55:40				
J2-198			red major	Nikko	Nikko							
J2-199		1	filtered piston uu46		varnum vent	9-May	23:54:30	23:58:32	78.2	61.6	23	499
ONLY 1 SAMPLE HERE												
J2-199	25	5	piston		background, end of dive	9-May	03:45:10	03:48:28	14.7	14.7	14.7	601
background seawater end of dive 343m depth south of caldera in deeper water												
J2-199	18	6	piston		cap rock yellow lips	9-May	01:02:07	01:05:45	76.3	65.2	16	600
t2 not going up, so not sure if flush pump is working. T2 rose when sample pump ran. SE caldera top of SE pit near field of tube worms												
J2-199	8	8	bag		tubeworm hangover	8-May	19:48:00	19:51:00				
altered rocks below overhanging ledge of tubeworms, low flow, tube worms, fish, shrimp												
J2-199		9	bag uu45		23 m south of North Vent Target	8-May	15:57:47	16:00:57	66.3	63.6	42	576
High volume shimmery flow with lots of crabs, on sheets of sulfur; got 88 with Jason probe; tube worms in the distant												
J2-199	17	11	filtered bag uu42		cap rock "yellow lips"							
t2 not going up, so not sure if flush pump is working. T2 rose when sample pump ran small sulfur flange, clear fluid, curly tube worm.												
J2-199	10	14	filtered bag uu44		tubeworm hangover							
altered rocks below overhanging ledge of tubeworms, low flow, tube worms, fish, shrimp												
J2-199	13	16	filtered bag uu49		Top Vent	8-May	21:44:39	21:48:23	33	31.6	25	601
clear fluid covered by crabs, intake in several cm												
J2-199	not logged	17	filtered bag uu43		background, end of dive	9-May	08:43:50, 08:47:17	08:47:17	19.5	19.4	19	606
background seawater at 100m depth end of dive; sampler covered with sulfur												
J2-199	not logged	18	filtered bag uu40		background, end of dive	9-May	03:11:15	03:15:34	15	14.9	14.9	700
background seawater end of dive 343m depth south of caldera in deeper water												
J2-199	15	19	bag		Top Vent	8-May	22:16:59	22:20:09	29.3	26.3	13	563
Temperature fluctuated a lot on this sample												
J2-199	6	20	piston		23 m south of North Vent Target	8-May	16:43:49	16:46:54	81.2	74.6	49.7	551
Same place as Sample 3												
J2-199	20		white major	Nikko	Naraku	9-May	02:28:00					
over baseketball-sized bubbling sulfur pit; dipped end in sulfur after sampling												

3.3.2 Vent Fluid Gas Analysis (Noble gases) - 2006

Leigh Evans, PMEL Helium Isotope Lab

Vent fluids and gas bubbles were collected from a variety of volcanoes. Some were new to the Helium database but others were reoccupations of those from 2004 and 2005 expeditions. The only analysis that can be presented at this time is that of total gas content of the fluids and the quantity of gas that the capture of bubbles yielded. This is presented as part of the summary table below. Speciation of the gases will happen in laboratories on land.

NW Rota-1 presented fluids and bubbles in various states of volcanic chaos, the most extreme of which could not be collected. Nonetheless, the comparison of samples gathered at the onset of an active time and in the middle may well be enlightening.

NW Eifuku volcano presented some assurances that the main flow of liquid carbon dioxide at the Champagne site had not shut off despite its decrease in flow between April 2004 and November 2005. A new, slow flow of liquid carbon dioxide was found at Cliff House. One fluid gathered there had a comparable gas concentration to some 2004 Champagne fluids.

Volcanoes and vent sites new to the PMEL Helium Isotope Lab's database include Forecast, Seamount X, Ruby, and the sulfur pots on Daikoku.

Analysis of hydrogen and methane for samples collected with gastight bottles discussed in section 3.3.3.

3.3.2a Gas Samples

Dive	Bottle	Vent	T °C	[gas] mmol/kg	gas Liters (STP)
J2-184	GT 11	Seamount X	12	12.2	
J2-185	GT 5	Forecast #3	150 ish	13.4	
J2-185	GT 15	Forecast #2	150 ish	14.4	
J2-185	GT 2	Forecast #4 mound 1	200	26.7	
J2-185	GT 6	Forecast #1	150 ish	32.9	
J2-187	GT 15	NW Rota Brimstone Pit	25-44	8.70	
J2-187	GT 5	NW Rota Brimstone Pit	70-95	21.6	
J2-187	GT 2	NW Rota Iceberg	50	21.6	
J2-188	GT 5	NW Rota Brimstone Pit 1 cm in sand	< 120	68.0	
J2-188	GT 15	NW Rota Brimstone Pit fluid S smoke	80-95	123	
J2-188	GT 2	NW Rota Brimstone Pit bubble funnel			11.8
J2-189	GT 6	NW Rota Brimstone Pit fluid		50.3	
J2-189	GT 11	NW Rota Brimstone Pit bubble funnel			12.9
J2-193	GT 7	E.Diamante, Gnome		7.44	
J2-194	GT 15	Ruby	40	11.6	
J2-195	GT 15	Diakoku, Bubble Bath	52	50.6	
J2-195	GT 2	Daikoku, white smoker 2nd orifice	210	13.6	
J2-196	GT 15	Champagne bkg 10 meters away	1.8	2.73	
J2-196	GT 11	Eifuku, Cliff House	55	272	
J2-196	GT 5	Eifuku, Sulfur Dendrite	52.7	273	
J2-196	GT 7	Eifuku, Cliff House	47	599	
J2-197	10cc#1	Daikoku, Bubble Bath gas??			0.166
J2-197	GT 2	Daikoku bubble field also near S8 Pit	55	63.8	
J2-198	GT 11	N Nikko	215	29.3	

Dive	Bottle	Vent	T °C	[gas] mmol/kg	gas Liters (STP)
J2-199	GT 2	S. Nikko above 198 deg C S8 pot		3.07	
J2-199	bag 18	S.E. Nikko diffuse	29.3	10.4	

3.3.3 Shipboard Measurements of Dissolved Hydrogen and Methane - 2006

Ben Larson

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Objective:
My objective was to characterize the gas chemistry of arc vent fluids and the overlying water column and, when possible, to compare these results to concentrations measured at the same locations in 2004. To this end, I analyzed vent fluid and water column samples for the dissolved volatile components, H_2 and CH_4. More robust measurements of these components as well as measurements of additional dissolved gases will be completed on land using samples collected with gas tight bottles.

A second objective involved the recovery of a resistivity-temperature sensor from Nikko volcano that had been deployed on the *Hyper-Dolphin* Dive HD-201 in 2005. To my knowledge, this is the first instrument to gather *in-situ* chloride data for an extended period of time (2 months) at a relatively high rate of sampling (4 measurements/hour).

Sample Collection:
Samples were collected from nearly all the bags and pistons on Dave Butterfield's fluid sampler, from titanium major samplers and from a selection of Niskin bottles fired during CTD casts. Each sample was analyzed on an SRI gas chromatograph for dissolved hydrogen and methane.

Brief Discussion of Results:
Forecast: Fluids from this site had higher concentrations of dissolved H_2 than any other site we visited with the exception of NW Rota-1. H_2 ranged up 18.7 µM while CH_4 only reached values of 2.0 µM. This pattern is consistent with a magmatic influence on the hydrothermal fluids. In all the samples analyzed, the H_2/CH_4 ratio was significantly greater than one.

NW Rota-1: The fluids sampled from Brimstone at this site were highly enriched in dissolved hydrogen, but had very low dissolved methane as was the case in 2004. The maximum dissolved H_2 measured at this site was 1.9 mM with the CH_4 concentration for this sample a paltry 129 nM. The elevated level of hydrogen in the Brimstone fluid is consistent with magmatic input to the overlying hydrothermal system. The H_2 concentration for 2006 is an order of magnitude greater than the maximum measured H_2 for 2004, however, it is unclear if this is a result of a difference in the level of magmatic activity or if the 2006 sample was taken closer to the vent orifice than in 2004. The fluids sampled at Scarp Top exhibited lower concentrations of hydrogen than at Brimstone but had fairly high concentrations of methane. Fault Shrimp fluids, less gassy than Scarp Top fluids in 2004, were now much more enriched in methane than Scarp Top with concentrations ranging up to 16.8 µM. The concentrations of hydrogen in the water column above the summit of NW Rota #1 were also elevated, though not nearly as much so as in 2004 (2.8 µM in 2006 compared to 14.9 µM in 2004). Another interesting point is that after video footage confirmed vigorous activity at Brimstone, the hydrogen values in the water column actually declined with the maximum value a mere 259 nM. This could just be due to the position of the CTD package relative to the plume or it could be the result of a lag in the water column signature with respect to activity at the vent.

E. Diamante: Several locations were sampled from this site with temperatures ranging up to 244.6 ºC. Samples collected from the high temperature sites had relatively low methane and only slightly higher concentrations of hydrogen except in the case of Gnome which had a moderately high H_2 concentration of 8.8 µM. Conversely, the low temperature sites (~13 ºC) had higher concentrations of methane than hydrogen, with the methane concentrations comparable to or higher than the hydrogen concentrations at the high temperature vents. These elevated levels of methane at the low temperature sites could be the result of microbial methane production via methanogenesis which would also result in the depletion of hydrogen. This pattern of venting is the same as was observed in 2004.

Esmeralda: No vent fluids were analyzed from this site, but samples taken in the water column exhibited higher gas content than at any other site with the exception of NW Rota. In contrast to NW Rota, however, water column samples had elevated CH_4 values but little to no hydrogen signal. The maximum measured methane concentration was 51 nM

Ruby: Fluids from this site had moderate temperatures and low levels of hydrogen but relatively high levels of CH_4 ranging up to 9.9 µM. This CH_4 concentration was higher than at any other site except NW Rota. Water column samples had very low gas concentrations with only one bottle exhibiting a noticeably elevated CH_4 concentration (10 nM). As mentioned previously, a possible source for these elevated levels of methane in the vent fluids is microbial production. Given the high CH_4 concentrations but weak plume signal here at Ruby, the stronger plume signal at Esmeralda may indicate that the methane signature in Esmeralda fluids may have been even more pronounced.

NW Eifuku: The diffuse samples from this site were relatively low in gas content compared with other sites along the arc, but we were unable to collect samples from the Champagne site which had exhibited the highest Eifuku gas concentrations in 2004. The only area sampled in both 2004 and 2006 was Cliff House. Gas concentrations for 2006 samples were comparable to 2004 samples at that site. In all cases, CH_4 was greater than H_2 as was the case in 2004. The maximum measured CH_4 was 2.4 µM.

Daikoku: Fluids here were not very gassy in general, with only methane concentrations at Bubble Bath reaching the micro molar level. At all other sites that were sampled, both hydrogen and methane fell below a few hundred nM. However, no samples of the most intense venting at the cauldron site were obtained. No water column samples were analyzed from this site.

Nikko: As with Daikoku, fluids here had relatively low levels of dissolved constituents, with all samples falling in the nano molar range. In contrast to Daikoku, however, the CH_4 concentration in nearly every sample was significantly higher than the H_2 concentration. We also recovered a chloride sensor which had been deployed at the North Vent in November. Preliminary analysis of this data suggests that the end-member fluid may be much less saline than fluid samples suggest, possibly owing to the difficulty in obtaining a pure sample for an area with such diffuse and ubiquitous venting.

3.3.3a CTD Samples Analyzed on SRI Gas Chromatograph for Dissolved Hydrogen and Methane

CTD #	Bottle #	Position #		CTD #	Bottle #	Position #
T06A01	39	17		T06A07	7	6
T06A01	42	14		T06A07	52	5
T06A01	36	13		V06A05	14	15
T06A01	51	11		V06A05	50	13
T06A01	11	9		V06A05	38	11
T06A01	19	7		V06A05	40	9
T06A01	9	5		V06A05	35	7
T06A01	13	4		V06A05	52	5
T06A01	44	1		V06A05	9	3
T06A01	17	3		V06A05	17	1
T06A02	52	7		V06A06	11	11
T06A02	7	6		V06A06	24	9

CTD #	Bottle #	Position #		CTD #	Bottle #	Position #
T06A02	35	5		V06A06	27	7
T06A02	13	4		V06A06	34	5
T06A02	38	3		V06A06	19	1
T06A02	12	8		V06A06	39	3
T06A02	5	2		T06A11	39	3
T06A02	24	1		T06A11	25	9
V06A03	40	13		T06A11	34	5
V06A03	17	11		T06A11	5	2
V06A03	9	9		T06A11	51	1
V06A03	52	7		V06A09	36	9
V06A03	35	5		V06A09	12	8
V06A03	19	3		V06A09	33	7
V06A03	36	1		V06A09	7	6
T06A03	39	7		V06A09	29	5
T06A03	24	5		V06A09	39	3
T06A03	38	3		V06A09	51	1
T06A03	34	1		T06A14	11	11
T06A04	36	5		T06A14	29	5
T06A04	11	7		T06A14	52	9
T06A04	35	1		T06A14	7	6
T06A04	9	9		T06A14	35	7
T06A04	40	13		T06A14	51	3
T06A04	17	11		T06A14	50	13
T06A04	42	14		T06A15	34	13
T06A04	27	15		T06A15	40	7
T06A04	19	3		T06A15	49	12
V06A04	24	9		T06A15	39	5
V06A04	35	5		T06A15	25	3
V06A04	13	4		T06A15	43	14
V06A04	5	2		T06A15	33	11
T06A06	9	11		T06A15	12	8
T06A06	17	9		T06A15	42	10
T06A06	43	14		T06A15	19	1
T06A06	50	13		V06A12	40	9
T06A06	13	4		V06A12	36	7
T06A06	11	7		V06A12	33	5
T06A06	36	3		V06A12	14	3
T06A06	7	6		V06A12	19	1
T06A06	27	1				
T06A07	42	10				
T06A07	12	8				
T06A07	24	1				
T06A07	35	3				
T06A07	39	7				
Total CTD Samples: 106						

3.3.5 Redox Potential (Eh) Measurements - 2006

Ko-ichi Nakamura

An Eh sensor mounted on *Jason-2* produced data on all dives! For information on these results contact Dr. Ko-ichi Nakamura. koichi.nakamura@aist.go.jp

3.4 MICROBIOLOGY

3.4.1 Hydrothermal Fluid Microbiology - 2006

Julie Huber, Sheryl Bolton

Our work along the Mariana Arc focuses on linking descriptions of microbial communities and their associated metabolic capacity with geochemical processes in low temperature (<150 °C) hydrothermal fluids. Our sampling strategy was guided by results from 2004, and our objectives for 2006 included: 1) Re-sampling of vents from 2004 for time series analyses, 2) Enrichment culturing of mesophilic, thermophilic, and hyperthermophilic anaerobic microorganisms from fluids, rocks, and sulfides, and 3) Collecting high volumes (3-4 L) of filtered vent fluids for molecular-based analyses.

Our main sampling device is David Butterfield's Hot Fluid Sampler (HFS), which allows for parallel sampling of filtered and unfiltered fluids for both chemical and microbiological analyses. The HFS was used to filter fluids through Sterivex filters for DNA extraction and 47mm polycarbonate filters for Fluorescence In-Situ Hybridization (FISH). Extracted DNA will be used to determine the range of genetic diversity and relative numbers of different microorganisms in the fluids, as well as to construct large insert DNA libraries to examine the metabolic potential of the microbial community. FISH filters will be used to quantify archaea and bacteria as a fraction of total cell numbers (determined by microscopic counts of preserved fluids).

Fluids, rocks, and sulfides were preserved for microscopy and also used for enrichment culturing. Media design was based on microbes detected in fluids in 2004, including acidophiles, anaerobic sulfur reducers, and hyperthermophilic archaea. Preliminary culturing results indicate that while we continue to struggle to isolate microbes from fluids, we were able to enrich microbes from all the target groups from the active sulfides recovered at East Diamante. Growth of cultures will be confirmed microscopically, and positive enrichments will be purified and sequenced to determine their identity and relation to isolates from other hydrothermal vent environments.

In all, we collected 74 samples for culturing, counts, and molecular analyses: 57 from the HFS, 7 from the major samplers, 6 from rocks and sulfides, 2 from the Niskins on Jason, and 2 from CTD casts. Water from CTD casts and Niskins in both hydrothermal plume and background seawater will allow us to differentiate between indigenous vent microorganisms and resident seawater or plume communities. This suite of samples and the combination of culturing and DNA-based methods along with geochemistry will allow us to closely examine the microbial ecology of the dynamic and diverse hydrothermal vent environments along the Mariana Arc.

3.4.1a Fluid Microbiology Sample List and Analysis Overview

Dive / CTD #	Log Sample #	Microbiology Sample Description	Culturing	DNA	FISH	Cell Counts
J2-184	J2-184-7/8	Iron oxide coated rock from Seamount X	X			
J2-184	J2-184-10/11	Sulfur crust from Seamount X	X			
J2-185	J2-185-2	HFS Bag #8- Forecast "Bart" vent (max J2 temp=155)	X			X
J2-185	J2-185-3	HFS Sterivex filter #10- Forecast "Bart" vent (max J2 temp=155)		X		
J2-185	J2-185-8	HFS Piston #6- Forecast "Snail Scrum" (max J2 temp=16)	X			X
J2-185	J2-185-9	HFS Sterivex filter #3- Forecast "Snail Scrum" (max J2 temp=16)		X		
J2-185	J2-185-10	HFS FISH filter #7- Forecast "Snail Scrum" (max J2 temp=16)			X	
J2-185	J2-185-12	HFS Piston #5- Forecast, peak above "Snail Scrum" (max J2 temp=109)				X
J2-185	J2-185-17	HFS Piston #20- Forecast "Homer" vent (max J2 temp=19)				X
J2-185	J2-185-18	HFS Sterivex filter #21- Forecast "Homer" vent (max J2 temp=19)		X		
J2-185	J2-185-20	HFS Bag #19- Forecast "Marge" vent (max J2 temp=140)				X
J2-185	J2-185-21	HFS Piston #22- Forecast "Marge" vent (max J2 temp=140)	X			X
J2-185	J2-185-22	HFS Sterivex filter #23- Forecast "Marge" vent (max J2 temp=140)		X		
J2-185	J2-185-23	HFS FISH filter #12- Forecast "Marge" vent (max J2 temp=140)			X	
J2-185	J2-185-27	HFS Sterivex filter #13- Forecast bkgd. Seawater		X		

Dive / CTD #	Log Sample #	Microbiology Sample Description	Culturing	DNA	FISH	Cell Counts
J2-185	J2-185-28	HFS Sterivex filter #15- Forecast bkgd. Seawater		X		
J2-187	J2-187-3	HFS Sterivex #13 at Iceberg, NW Rota (Tmax=53.8)		X		
J2-187	J2-187-4	HFS FISH filter #12 at Iceberg, NW Rota (Tmax=53.2)			X	
J2-187	J2-187-5	HFS Piston #6 at Iceberg, NW Rota (Tmax=52.9)	X			X
J2-187	J2-187-9	HFS Piston #5 at Sandy Saddle, NW Rota (Tmax=32.6)	X			X
J2-187	J2-187-11	HFS Sterivex #15 at Sandy Saddle, NW Rota (Tmax=35.6)		X		
J2-187	J2-187-15	HFS Bag #9 at Brimstone, NW Rota (Tmax=28.2)				X
J2-187	J2-187-16	HFS Sterivex #10 at Brimstone, NW Rota (Tmax=27.9)		X		
J2-187	J2-187-20	HFS Piston #20 at Brimstone, NW Rota (Tmax=44.3)	X			X
J2-187	J2-187-25	HFS bag #19 at Fault Shrimp, NW Rota (Tmax=26.5)	X			X
J2-187	J2-187-26	HFS Sterivex #21 at Fault Shrimp, NW Rota (Tmax=25.9)		X		
J2-187	J2-187-27	HFS FISH filter #7 at Fault Shrimp, NW Rota (Tmax=25.7)			X	
J2-187	J2-187-29	HFS Piston #22 at Scarp Top, NW Rota (Tmax=17.4)	X			X
J2-187	J2-187-30	HFS Sterivex #23 at Scarp Top, NW Rota (Tmax=17.6)		X		
J2-187	J2-187-34	Major blue at Brimstone while erupting, NW Rota				X
J2-188	J2-188-3	Major yellow at Brimstone while erupting, NW Rota				X
T06A-01	N/A	NW Rota, Bottle 50, 400m				X
V06A-02	N/A	NW Rota, Bottle 12, 551 m, Filtered ~4 L		X		X
J2-191	J2-191-1	Green niskin taken in a floccy looking plume above Brimstone, NW Rota		X		X
J2-193	J2-193-2	Piece of active sulfide chimney at Gnome, E Diamante (near 5 Towers)	X		X	
J2-193	J2-193-7	HFS piston #5 at 5m east of Gnome, E Diamante (Tmax=162.8)				X
J2-193	J2-193-14	Piece of active sulfide, E Diamante	X			
J2-193	J2-193-18	HFS bag #8 at Five Towers base (in snails), E Diamante (Tmax=23.8 C)	X			X
J2-193	J2-193-19	HFS Sterivex #3 at Five Towers base (in snails), E Diamante (Tmax=26)		X		
J2-193	J2-193-20	Piece of active, bubbling sulfide, E Diamante	X			
J2-193	J2-193-21	HFS bag #9 at Barnacle Beach, E Diamante (Tmax=13.7)	X			X
J2-193	J2-193-22	HFS Sterivex filter #10 at Barnacle Beach, E Diamante (Tmax=13.4)		X		
J2-194	J2-194-3	Major Blue at Rua Vent, Ruby	X			
J2-194	J2-194-6	Major Red at Ruby (36 C)	X			X
J2-194	J2-194-8	Major Yellow at Ruby				X
J2-195	J2-195-6	Major blue at Bubble Bath, Daikoku	X			X
J2-195	J2-195-9	Major white at Smoking Vent, Daikoku (Tmax=211)				X
J2-196	J2-196-1	HFS piston #5 near old Sulfur Dendrite target, NW Eifuku (Tmax=31.3)	X			X
J2-196	J2-196-2	HFS Sterivex #10 near old Sulfur Dendrite target, NW Eifuku (Tmax=52.7)		X		
J2-196	J2-196-4	HFS FISH filter #7 near old Sulfur Dendrite target, NW Eifuku (Tmax=43.6)			X	
J2-196	J2-196-18	HFS piston #20 at Cliff House, NW Eifuku (Tmax=40)	X			X
J2-196	J2-196-19	HFS Sterivex #21 at Cliff House, NW Eifuku (Tmax=54.1)		X		
J2-196	J2-196-21	HFS piston #22 at Cliff House, NW Eifuku (Tmax=46.7)				X
J2-196	J2-196-22	HFS Sterivex #23 at Cliff House, NW Eifuku (Tmax=43.6)		X		
J2-197	J2-197-7	HFS bag #8 at NE Pit, Daikoku (Tmax=15.4)				X
J2-197	J2-197-9	HFS Sterivex #10 at NE Pit, Daikoku (Tmax=15.6)		X		
J2-197	J2-197-11	HFS FISH filter #12 at NE Pit, Daikoku (Tmax=15.3)			X	
J2-197	J2-197-16	HFS piston #6 near Alka Seltzer, Daikoku (Tmax=63.4)				X
J2-197	J2-197-18	HFS piston #20 near Alka Seltzer, Daikoku (Tmax=53.3)				X
J2-197	J2-197-19	HFS Sterivex #21 at Alka Seltzer, Daikoku (Tmax=45.5)		X		
J2-199	J2-199-3	HFS bag #9, 23m south of North Vent, Nikko (Tmax=66.3)	X			X
J2-199	J2-199-4	HFS Sterivex #10, 23m south of North Vent, Nikko (Tmax=96.1)		X		
J2-199	J2-199-5	HFS FISH filter #12, 23m south of North Vent, Nikko (Tmax=26.1)			X	
J2-199	J2-199-6	HFS piston #20, 23m south of North Vent, Nikko (Tmax=81.2)				X
J2-199	J2-199-8	HFS bag #8 at Tubeworm Hangover, Nikko	X			X
J2-199	J2-199-9	HFS Sterivex #13 at Tubeworm Hangover, Nikko (Tmax=26.1)		X		
J2-199	J2-199-11	HFS FISH filter #7 at Tubeworm Hangover (Tmax=23.9)			X	
J2-199	J2-199-14	HFS Sterivex #21 at Top Vent, Nikko (Tmax=35.4)		X		
J2-199	J2-199-15	HFS bag #19 at Top Vent, Nikko (Tmax=29.3)	X			X
J2-199	J2-199-18	HFS piston #6 from Yellow Lips, Nikko (Tmax=76.3)	X			X
J2-199	J2-199-22	Red Niskin in the smoky plume over Nikko				X
J2-199	J2-199-24	HFS Sterivex #23 background seawater, Nikko		X		
J2-199	J2-199-25	HFS piston #5, background seawater, Nikko				X

3.4.2 Microbial Mat Microbiology - 2006

Richard Davis

Methodology

The goals for the microbial mat sampling for this cruise were to focus exclusively on suction sampling and to then combine both molecular microbial ecology with contemporary microscopy studies. After microbial mat samples were collected using the suction sampler on Jason 2, they were partitioned using four different protocols. The first was to quick freeze the majority of the microbial mat material so that high molecular weight genomic DNA can then be extracted upon return to the laboratory. These extractions will be analyzed using terminal restriction length fragment polymorphism or T-RFLP community genomic fingerprinting of the PCR amplified small-subunit ribosomal DNAs (SSU rDNAs) products. These fingerprints will then be compared to fingerprints from samples collected during the Ring of Fire cruise in 2004 to see how similar the microbial mat communities are and how they may be influenced by different vent chemistries. The second protocol is to preserve mat samples in an RNA stabilizing media and fast freeze these samples for later RNA extraction. The third protocol used was to cryo-preserve microbial mat subsamples so that attempts can be made for targeted culturing of any of the novel bacterial populations discovered after the T-RFLP analysis has been completed. Finally, the fourth protocol used on these mat subsamples was the initial processing required for fluorescent *in situ* hybridization (FISH) of group and gene specific oligonucleotide probes.

Initial Observations

Three types of mats were collected on this cruise. The first are from low temperature diffuse vents with high concentrations of iron, manganese, and reduced sulfur compounds. These red and yellow mats grow in thick layers over top of these vents to trap the reduced iron and sulfur compounds that they use for energy, while keeping oxygen levels low to prevent the spontaneous oxidation of these reduced nutrients. This type of mat was seen at Seamount X, Esmeralda Bank, Ruby Volcano, and NW Eifuku Seamount. The second type of mat sampled were low temperature sulfur-cycling microbial mats. These mats are highly filamentous and are found at areas with sulfide seepage though the sediments and around low temperature, low iron hydrothermal vents. These mats were observed at Seamount X, NW Rota, Daikoku, and Nikko Seamounts. The third type of microbial mat sampled were high-temperature associated white mats. These white mats were often seen around high temperature white smoker vents. These microbial mat communities are dominated by chemoautotrophic microbes that derive energy from assorted reduced gasses and fluids from these vents, such as hydrogen sulfide, methane, and hydrogen gas. These mats were seen at NW Rota 1, NW Eifuku, and at Daikoku Seamounts.

Note

Mat sampling was hampered because the new multi-jar suction sampler on *Jason-2* was on its initial expedition and only operated on some of the dives.

3.4.2a Microbial Mat Suction Sample List

Sample Key

FF gDNA = Fast Frozen samples in 50ml centrifuge tubes for direct gDNA extraction.
FF RNA = Preserved in RNA stabilizer for direct RNA extraction.
Cryo = Fast Frozen in ~30% Glycerol as preservation for culturing. Stored in 2.0ml cryovials at -80ºC.
FISH = Microscopic analysis using fluorescent in situ hybridization with group specific oligonucleotide probes.

Seamount X - Dive J2-184		**NW Rota 1 Dive J2-191**	
White Jar Sample 3		**Blue Bottle Sample 5**	
Fluffy Iron Mat		White mats from Iceberg Vent	
Temperature probe did not work		Tmax=25°C. Tamb=6.9°C	
Pos=13°15.098 N 144°1.069 E. Z=1305 m		Pos=14°36.052 N 144°46.579 E, Z=530 m	
16	50cc FF gDNA	4	50cc FF gDNA
1	50cc FF RNA	1	50cc FF RNA
4	Cryo	2	Cryo
2	FISH	2	FISH
Blue Jar Sample 4		**Daikoku Dive J2-197**	
Filamentous White Mat			
Temperature probe did not work		**White Bottle Sample 4**	
No Position, Z=1188 m		White mat from Bubble Bath Vent	
3	50cc FF gDNA	Tmax=52°C. Tamb=12.8C	
1	50cc FF RNA	Pos=21°19.505 N 144°11.488 E, Z=411 m	
2	Cryo	5	50cc FF gDNA
2	FISH	2	Cryo
		2	FISH
Esmeralda Bank Dive J2-190			
		Yellow Bottle Sample 15	
White Bottle Sample 2		White mat from wall of pit	
Crusty Iron Mounds		Tmax=15.4°C. Tamb=12.8°C	
Tmax=40.0°C. Tamb=17.4°C		Pos=21 19.484N 144 11.585. Z=411 m	
Pos=14°57.364 N 145°14.478 E. Z=291m		4	50cc FF gDNA
10+2	50cc FF gDNA	2	Cryo
1	50cc FF RNA	2	FISH
2	Cryo		
2	FISH		
Note: 2 50cc FF gDNA of Chimney Chunks			

3.5 MACROBIOLOGY

3.5.1 Macrofauna Summary - Mariana Arc 2006

Verena Tunnicliffe & John Dower

See Plate 3 and figure captions.

Our objectives on this cruise were to expand the regional characterization of the Mariana Arc vent communities and to focus on details of a few particularly unusual species. Information on the communities visited during this cruise derives from collected material and digital imagery, in conjunction with maps generated by the geological surveys.

Collections - Macrofaunal species were collected using the claw and suction sampler. Sampling was not extensive, however, as we had already sampled some of these areas during the SRoF'04 cruise and Nikko and Daikoku were well sampled by our Japanese colleagues in November 2005. Table 1 lists the collections from which organisms were preserved. Collections will be used in many ways.

The Regional Picture - We are able to extend the 2004 Arc dataset by confirmations and extended observations on revisited seamounts and the addition of two new sites. Three general observations emerge:

1. Unusually high variability in community composition among seamounts remains the most striking biological feature of the Arc. Over a similar distance on a mid-ocean ridge vent system, faunal communities would be the same (or subsets of the entire range). Not on the Arc. Although a few animals appear to have wide ranges, the overall assemblage on each seamount is generally very different from the adjacent one in terms of both the dominant organisms and in trophic base (i.e. hosts with or without symbionts). We are becoming more convinced that the topography (and possibly topographically induced recirculating currents) constrains dispersal along the arc, but that the geological setting influences how hydrogen sulphide is delivered to the seafloor and, thus, which organisms are best able to access it. Focused release, diffuse seepage on the seamount flanks and caldera trapping of vent effluents each foster a different biological response.

2. The Mariana Arc fauna is markedly different from the Trough fauna at Alice Springs (200 km to the west). Our dive on the Forecast vents confirmed that these communities are much more closely allied to Alice Springs than to nearby Seamount X and NW Rota 1 (Plate 3c). Neither geographic distance nor bathymetric depth can explain this difference. At the moment, we know little of how organisms would respond to any geochemical differences between arc and back-arc spreading settings.

3. The northern Mariana Arc seamounts (Daikoku, Kasuga-2 and Nikko) host a macrofauna that overlaps with the Izu-Bonin Arc. Here, diffuse venting through volcano flanks supports a very broad production of chemoautotrophs. Flatfish are abundant over broad areas where snails and polychaetes form a likely food source (Plate 3e, 3f). Sites of more focused flow concentrate shrimp and crabs as well. Nikko is most unusual for the tremendous extent of tubeworms and crabs both within and outside the caldera. It is possibly the largest hydrothermally supported vent community known (Plate 2g). The vestimentiferans present (a species of *Lamellibrachia*) are known to thrive in low sulphide levels. The wafting plumes trapped within the Nikko caldera may be the primary fluid source for microbial activity rather than ubiquitous seafloor seepage.

Taxonomy – All identifications made on the ship are tentative and require verification by experts. Some new species are likely present. The most interesting find of the cruise was a protochordate in the sediments of East Diamante. This small fish-like creature strongly resembles a "pre-vertebrate" called *Branchiostoma* (Plate 3a*)*. There are few records in this part of the world. As few species are known, this may well turn out to be an unusual find. In addition, both the crab and the limpet collected from Ruby Seamount may be new species (Plate 3b).

Shrimp – We are continuing work on the shrimp from NW Rota-1 and Eifuku. During this trip, we extended their range to Seamount X and Nikko. The additional material that we collected will be compared using molecular sequences (COI gene) to confirm similarity in the region and between years. Despite the eruptive nature of NW Rota-1, the shrimp are doing very well and the population may even be larger than in 2004. Recent recruitment is evident in the numbers of very small shrimp.

Fish – During this trip we made collections of a small flatfish from Daikoku and Nikko (Plate 3e, 3f). Based on a single specimen collected during the SRoF'04 cruise, this flatfish has recently been identified as a new species of tonguefish (in the genus *Symphurus*). Dense populations occurred on both seamounts. In addition to the specimens that we collected, we also conducted video transects from which we will be able to estimate density. By using otoliths (i.e. ear-bones) from the specimens that we collected, we will be able to build a length-age key, enabling us to estimate the length and age of the fish from the video transects, and to compare the age and size structure of the populations between seamounts. Of particular interest is the fact that the Nikko flatfish (Plate 3f) are substantially larger than their counterparts on Daikoku (and on Kasuga-2, which we sampled with our Japanese colleagues). We will use the otolith information to determine whether the differences in size reflect differences in age, or differences in growth between the different seamount populations.

Dead-Falls – During several dives on NW Rota-1 and on Daikoku, we observed both dead animals on the seafloor and dying animals falling from the water (Plate 3e). Age and location of some bodies eliminated ROV operations as a cause. On NW Rota-1, many alvinocarid shrimp were seen carrying or feeding on the bodies of shrimp, squid and fish. On Daikoku, we recorded several small midwater fish (lanternfish) spiraling to the seafloor where they were almost immediately attacked by the flatfish. CTD sensors did not detect a significant decrease of either pH or of oxygen to an extent that would affect pelagic animals. However, analyses of sulphite content over both seamounts (B. Takano) suggests that this compound – known to be highly toxic – may be implicated in kills of nekton and zooplankton as they migrate diurnally around the venting volcanoes.

3.6 PUBLIC OUTREACH

3.6.1 Educator at Sea - 2006

Lori Savage

The educator, Lori Savage, got involved with this expedition after learning about it as a participant of the Ocean Sciences and Math Consortium for Adult Basic Education Instructors, sponsored by NOAA, GLOBEC, NSF and OSU, and then applying for the berth. Prior to the expedition, pre-cruise activities were organized by the educator for the consortium members in the form of an expedition outline, and lesson ideas for each dive based on previous findings at the area. Including such activities as Earth Science/Plate tectonics, Math/conversion of units (temp, distance), application of the "Scientific Method," ecosystem/foodwebs, chemistry/chemosynthesis compared to photosynthesis, oceanography/zones of the ocean, physics/pressure and sound waves, and geo-chemistry/sedimentation and chimneys.

During the cruise, the educator participated in Jason control room video logging, CTD data collection, answering explorer at sea questions, writing two OE logs, Seabeam data collection, a small amount of sample preparation, and personal collection of data from the scientific community on board.

The information gathered during this expedition will be used to develop curriculum and lessons which apply to Adult basic education (ABE) in the form of science, math and life skills, which will in turn be shared with ABE instructors throughout Oregon. Already in process are Power point lessons on:
1) The Scientific Expedition - an overview of the process of scientific discovery at sea.

2) Ring of Fire 2006 - highlights of each dive done on the expedition.
Lessons being developed thus far include:

- Chemistry: *the phases of matter, using the forms of sulfur to substantiate the lesson. *pH as an indicator of hydrothermal venting, *Salinity and water temperature, and its affect on the ocean currents.
- Mathematics: *signed numbers and bathymetry, *conversion of nautical units, *coordinate grids using Latitude and Longitude.
- Life skills: * teamwork, *problem solving skills, *career choices based on interest/passion.

The educator foresees using information gathered during this experience to demonstrate innumerable other concepts covered in ABE curriculum. [Rogue Community College, K bldg Instructor]

3.6.2 NOAA Ocean Exploration Submarine Ring of Fire Website

Susan Merle, Bill Chadwick, Bob Embley, Kyle Carothers

http://oceanexplorer.noaa.gov/explorations/06fire/

The Submarine Ring of Fire 2006 website is the product of a collaborative effort between the NOAA Office of Ocean Exploration and the NOAA Vents Program. Susan Merle (NOAA/OSU) acted as the Web coordinator, serving as the central conduit for all content submissions to the website precruise, at sea, and postcruise. A series of background essays and materials were provided by several principal investigators before the cruise. Kyle Carothers (NOAA/NOS - Silver Spring, Maryland) acted as the Webmaster, the main point of contact for the web coordinator. Kyle was responsible for building and maintaining the web offering. Bill Chadwick (NOAA/OSU) provided the site with an excellent array of video clips, plus background essays, and some log entries, both pre-cruise and while at sea. Bob Embley (NOAA) contributed background essays, logs at sea and a summary log postcruise. While at sea Cornel de Ronde, Dave Butterfield, Verena Tunnicliffe, John Dower, Julie Huber, Lori Savage, Will Sellers, and Ko-ichi Nakamura also contributed by writing web logs.

Bob Embley contributed 3 podcasts to the outreach effort:
1) Pre-cruise for the OE website:
http://www.oceanexplorer.noaa.gov/explorations/06fire/background/plan/media/06fire_podcast.html

2) At-sea for the journal Nature.
http://www.nature.com/nature/podcast/v441/n7092/nature-2006-05-25.mp3

3) Post-cruise for NPR “All Things Considered”

High resolution video clips and web images can be downloaded from the photo and video log on the website.
http://oceanexplorer.noaa.gov/explorations/06fire/logs/photolog/photolog.html

3.7 NOAA Ocean Exploration Expedition Information System (EIS)

Andra Bobbitt

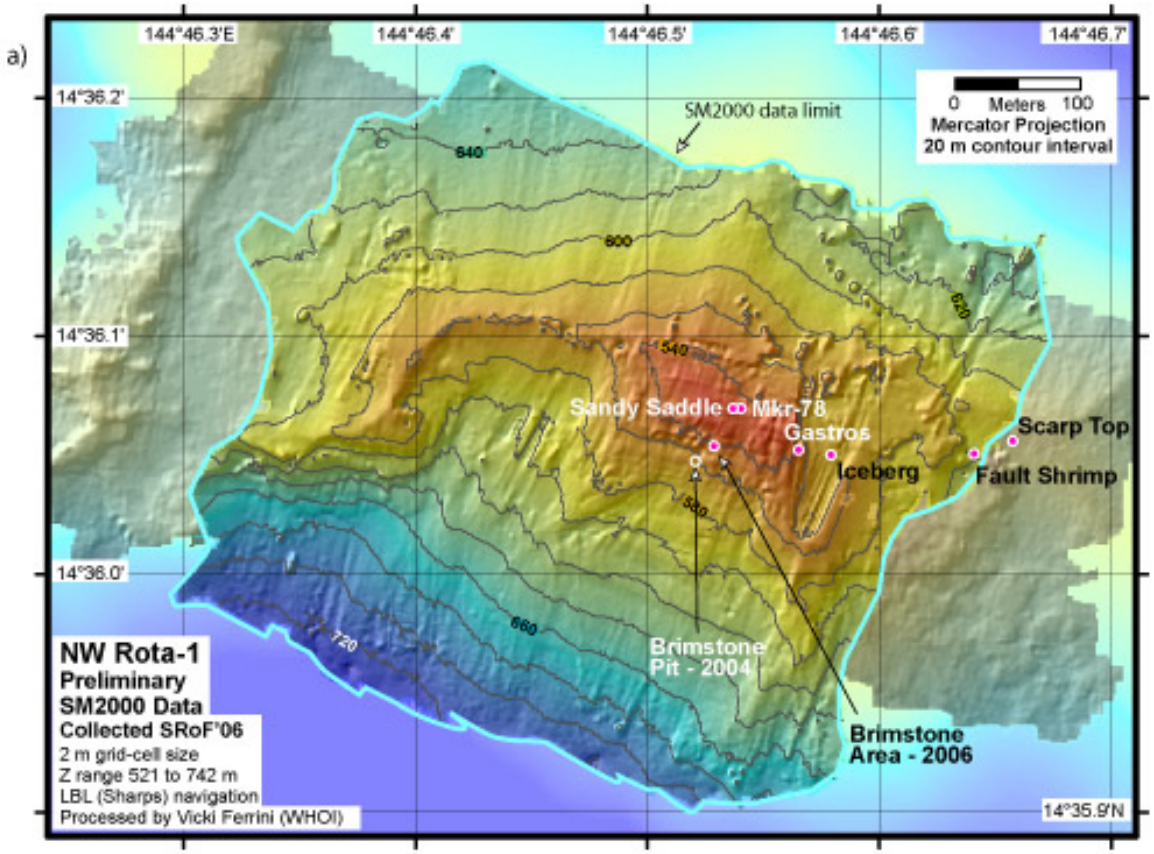
The implementation and use of the Expedition Information System, or EIS, was required by Ocean Exploration to facilitate data management on the SRoF'06 expedition. All shipboard events and their subsequent data collected were catalogued using the EIS package provided by NOAA. As part of the EIS, daily reports from sea were sent to the Office of Ocean Exploration which summarized the scientific activities aboard the ship. Post-cruise the EIS data was forwarded to OE where the metadata and data were sent and catalogued by the appropriate entities. Metadata is submitted to the metadata clearinghouse at geodata.gov for search and retrieval. The clearinghouse provides links to sites for obtaining the SRoF'06 data.

3.8 Bathymetry Mapping

Andra Bobbitt, Bob Embley, Susan Merle, Bill Chadwick

Bathymetry mapping for SRoF'06 utilized the hull-mounted SeaBeam 2000 multibeam mapping system on the *R/V Melville*. It operates at a frequency of 12 kilohertz with a 120 degree swath, providing bathymetry and sidescan survey data. The two major multibeam mapping goals of this expedition consisted of filling bathymetry gaps and extending bathymetry coverage with tracklines oriented adjacent to the EM300 bathymetry data collected on prior expeditions during 2003 and 2004. 1764 MB of multibeam data was collected. 1717 kilometers of trackline were covered with the SeaBeam system providing ~18,000 km^2 of bathymetry coverage.

The SM2000 multibeam sonar was mounted on *Jason-2* for high-resolution mapping of small areas on the seafloor. The SM2000 operates at a frequency of 200 kHz with 1.5 x 1.5 degree beams over a 150 degree swath. The summits of NW Rota-1, Daikoku, and Nikko were mapped providing ~3 km^2 of SM2000 bathymetry coverage (each survey is 300-500 m on a side). The NW Rota-1 survey was navigated with LBL/Sharps (unfortunately the Doppler was not working which limits the navigation accuracy). The Daikoku and Nikko surveys were navigated only with Doppler, which worked pretty well. Vicki Ferrini (WHOI) processed the SM2000 data. The sonar data can be gridded at 1-meter resolution.


a)
144°46.3'E
144°46.4'
144°46.5'
144°46.6'
144°46.7'
14°36.2'
14°36.1'
14°36.0'
14°35.9'N
SM2000 data limit
0 Meters 100
Mercator Projection
20 m contour interval
640
600
620
540
580
660
720
Sandy Saddle
Mkr-78
Gastros
Iceberg
Scarp Top
Fault Shrimp
Brimstone
Pit - 2004
Brimstone
Area - 2006
NW Rota-1
Preliminary
SM2000 Data
Collected SRoF'06
2 m grid-cell size
Z range 521 to 742 m
LBL (Sharps) navigation
Processed by Vicki Ferrini (WHOI)

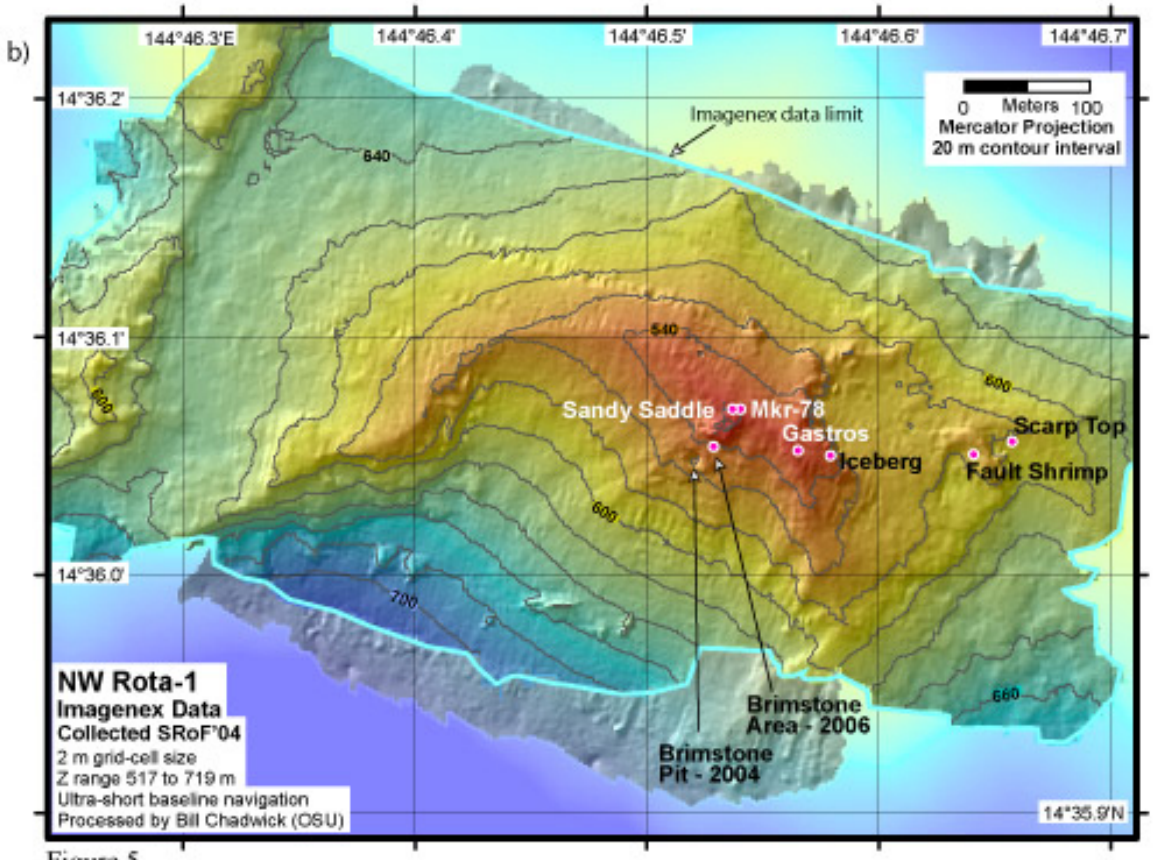

b)
144°46.3'E
144°46.4'
144°46.5'
144°46.6'
144°46.7'
14°36.2'
14°36.1'
14°36.0'
14°35.9'N
Imagenex data limit
0 Meters 100
Mercator Projection
20 m contour interval
640
600
540
700
660
Sandy Saddle
Mkr-78
Gastros
Iceberg
Scarp Top
Fault Shrimp
Brimstone
Area - 2006
Brimstone
Pit - 2004
NW Rota-1
Imagenex Data
Collected SRoF'04
2 m grid-cell size
Z range 517 to 719 m
Ultra-short baseline navigation
Processed by Bill Chadwick (OSU)

Figure 5

Figure 5 back

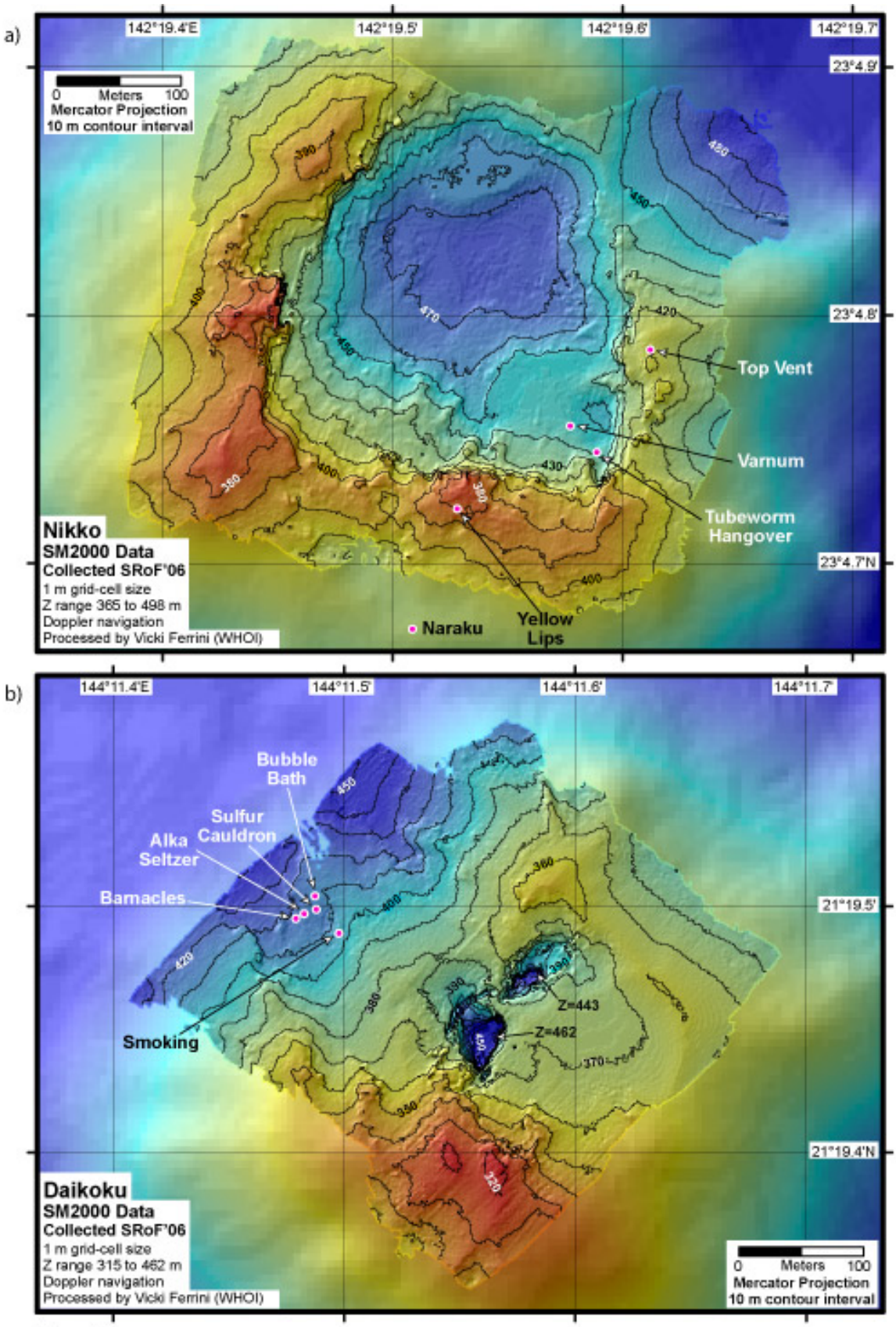

a)
142°19.4'E
142°19.5'
142°19.6'
142°19.7'
23°4.9'
23°4.8'
23°4.7'N
0 Meters 100
Mercator Projection
10 m contour interval
Top Vent
Varnum
Tubeworm
Hangover
Yellow
Lips
Naraku
Nikko
SM2000 Data
Collected SRoF'06
1 m grid-cell size
Z range 365 to 498 m
Doppler navigation
Processed by Vicki Ferrini (WHOI)
b)
144°11.4'E
144°11.5'
144°11.6'
144°11.7'
21°19.5'
21°19.4'N
Bubble
Bath
Sulfur
Cauldron
Alka
Seltzer
Barnacles
Smoking
Z=443
Z=462
Daikoku
SM2000 Data
Collected SRoF'06
1 m grid-cell size
Z range 315 to 462 m
Doppler navigation
Processed by Vicki Ferrini (WHOI)
0 Meters 100
Mercator Projection
10 m contour interval

Figure 6

Figure 6 back

4.0 NAVIGATION

4.1 *Jason-2* Navigation Summary

Susan Merle, Bill Chadwick

Long baseline navigation (LBL) was used at 2 volcanoes: Seamount X and NW Rota-1. At both sites transponders were deployed and LBL fixes were recorded for both Medea and Jason. An alternative navigation method is to use LBL + SHARPS. This method uses the LBL fixes to Medea (which are much more frequent than fixes to Jason, since it is above the seafloor) plus Sharps data (a short-range, ultra-short baseline system that gives Jason's position relative to Medea). For the LBL dives the SHARPS positions were so much better than the Jason LBL that SHARPS navigation files were used for the LBL dives. Tears in the navigation were obvious when the LBL baseline was changed from one set of transponders to another. Only 2 transponders were used at a time, which can introduce errors in the LBL navigation if not properly surveyed/calibrated.

At all the other volcanoes Doppler navigation was used, with frequent "Doppler resets" to periodically subjectively fix the position of Medea (usually when the ship was not moving so Medea was presumed to be under the ships stern). This is necessary because the Doppler drifts over time, and sometimes the bottom lock is lost. The Doppler navigation was very clean, but does have offsets in the data when the Doppler was reset (up to 35 meters when on the bottom - more when in the water column). WHOI is working on software that will merge LBL/SHARPS with Doppler data in the future, but this was not available during our cruise.

There were offsets observed between 2004 ROPOS nav and 2006 Jason nav. ROPOS and Jason were navigated using different systems (ROPOS used an Ultra-short baseline system which may not have been well calibrated and has errors that increase with depth; Jason mostly used Doppler navigation which is subject to drift and subjective resets). At the shallower volcanoes the 2004 and 2006 positions were offset by 10 - 20 meters, but at NW Eifuku (> 1 mile deep) that offset was ~50 meters and not constant.

4.1a System Used to Determine Final Navigation for Each Dive

Seamount X (J2-184)	LBL/SHARPS
Forecast (J2-185)	Doppler
NW Rota-1 (J2-186 - J2-189, J2-191)	LBL/SHARPS
NW Rota-1 (J2-192)	Doppler (the transponders were recovered before this dive)
Esmeralda (J2-190)	Doppler
E Diamante (J2-193)	Doppler
Ruby (J2-194)	Doppler
Daikoku (J2-195, J2-197)	Doppler
NW Eifuku (J2-196)	Doppler
Nikko (J2-198, J2-199)	Doppler

4.1b Long Baseline Transponder Locations

Seamount X				**NW Rota-1**		
A	13° 15.25705'N	144° 0.57617'E		E	14° 36.32594'N	144° 46.40893'E
B	13° 15.26095'N	144° 1.31145'E		F	14° 36.16563'N	144° 46.72130'E
C	13° 14.69705'N	144° 1.54933'E		G	14° 35.76574'N	144° 46.63967'E
D	13° 14.79365'N	144° 0.77563'E		H	14° 35.88906'N	144° 46.1343'1E

4.2 *Jason-2* Vent Positions (SRoF'06)

Jason-2 navigation was used to determine these vent positions. See table 4.1a above for navigation system information for each dive (LBL SHARPS or Doppler). **Note that these positions vary from 2004 positions**, which were navigated using Ultra-short baseline navigation on *ROPOS*.

Vents-2006	Volcano	Depth (m)	longitude E (dec°)	latitude N (dec°)	long°	long'	lat°	lat'
Brimstone-06-j2192	NW-Rota-1	560	144.77542	14.60088	144	0.77542	14	0.60088
Brimstone Area-06-j2189	NW-Rota-1	560	144.77548	14.600912	144	0.77548	14	0.60091
Gastros-06	NW-Rota-1	536	144.77609	14.600885	144	0.77609	14	0.60089
Marker-78	NW-Rota-1	520	144.77567	14.601177	144	0.77567	14	0.60118
Scarp Top-06	NW-Rota-1	568	144.77763	14.60095	144	0.77763	14	0.60095
Fault Shrimp-06	NW-Rota-1	586	144.77735	14.600859	144	0.77735	14	0.60086
Iceberg-06	NW-Rota-1	534	144.77632	14.60085	144	0.77632	14	0.60085
Sandy Saddle-06	NW-Rota-1	521	144.77562	14.601177	144	0.77562	14	0.60118
Bart	Forecast	1449	143.9201	13.394633	143	0.9201	13	0.39463
Snail Scrum	Forecast	1448	143.92008	13.394632	143	0.92008	13	0.39463
Homer	Forecast	1451	143.9199	13.39532	143	0.9199	13	0.39532
Marge	Forecast	1447	143.91987	13.395265	143	0.91987	13	0.39527
Mound-1	Forecast	1443	143.91996	13.39503	143	0.91996	13	0.39503
SW-caldera-wall-06	Esmeralda	323	145.24223	14.95593	145	0.24223	14	0.95593
Iron Mounds	Esmeralda	293	145.24144	14.95597	145	0.24144	14	0.95597
Old Beard Chimney-06	E-Diamante	381	145.68194	15.94289	145	0.68194	15	0.94289
Gnome Vents-06	E-Diamante	~350	145.68122	15.942719	145	0.68122	15	0.94272
Five Towers-06	E-Diamante	353 (base)	145.68141	15.942771	145	0.68141	15	0.94277
Barnacle Beach-06	E-Diamante	459	145.68278	15.943448	145	0.68278	15	0.94345
Limpets-06	E-Diamante	318	145.67673	15.939748	145	0.67673	15	0.93975
Rua	Ruby	214	145.57165	15.604656	145	0.57165	15	0.60466
Mat	Ruby	200	145.5721	15.604393	145	0.5721	15	0.60439
Bubble Bath-06	Daikoku	412	144.19147	21.32508	144	0.19147	21	0.32508
Sulfur Cauldron-06	Daikoku	413	144.19148	21.32499	144	0.19148	21	0.32499
Smoking-06	Daikoku	403	144.19163	21.32483	144	0.19163	21	0.32483
Barnacles	Daikoku	414	144.19133	21.32493	144	0.19133	21	0.32493
Alka Seltzer-06	Daikoku	414	144.19139	21.324962	144	0.19139	21	0.32496
NE Pit-j2197	Daikoku	~438 rim	144.19293	21.324536	144	0.19293	21	0.32454
Champagne-06	NW-Eifuku	~1610	144.04163	21.48742	144	0.04163	21	0.48742
Sulfur Slope-06	NW-Eifuku	1623	144.04142	21.487324	144	0.04142	21	0.48732
Rippling Mussels	NW-Eifuku	1597	144.04116	21.487351	144	0.04116	21	0.48735
Where?	NW-Eifuku	1597	144.04169	21.487647	144	0.04169	21	0.48765
Cliff House-06	NW-Eifuku	1578	144.04212	21.487248	144	0.04212	21	0.48725
Tubeworm Hangover	Nikko	445	142.32648	23.07908	142	0.32648	23	0.07908
Top Vent-aprox	Nikko	413	142.32687	23.07977	142	0.32687	23	0.07977
Varnum-j2198	Nikko	447	142.3263	23.07931	142	0.3263	23	0.07931
Varnum-j2199	Nikko	444	142.32629	23.079202	142	0.32629	23	0.0792
Yellow Lips	Nikko	489	142.32547	23.0787	142	0.32547	23	0.0787
Naraku	Nikko	427	142.32514	23.077894	142	0.32514	23	0.07789

5.0 *JASON-2* DIVES - SRoF'06

5.1 *Jason-2* DIVE STATISTICS

16 dives (J2-184 – J2-199)
Wet time: 241.86 hours
Bottom time: 219.85 hours

Samples:	**260 total**
Biology (macro and micro)	31
Biology/geology combo	8
Gas (gastight and on HFS)	27
Geology (rocks, sed, chimneys, crust)	62
Water (HFS, majors, niskins)	132

5.2 *Jason-2* DIVE SUMMARIES

***Jason-2* Dive Summaries SRoF'06 Mariana Arc**
J2-184 Bottom time: 4/18/2006 - 4/19 0135 UTC Jason Sea Trial. 4/19 0135 - 1734 UTC Science Dive. (Total bottom time 20.28 hrs)
J2-184 Seamount X Dive Summary: First 4.5 hours of the dive was set aside for engineering trials. (No science DVCam 1103 - 1410: Tape stuck.) At 0135 started the science portion of the dive. Suction sampled what looked like could be bacterial mat. Transect to the NW up a saddle between the 2 summit peaks. No signs of hydrothermal activity. Toward the NW portion of the first line encountered thick iron deposits and some grayish mat. Temp probe not working. Suctioned more mat then headed west, north of the summit. Very little macrofauna so far. Turned to SE for traverse across **summit peaks**. Near the northern summit peak suctioned bacterial mat and brown snails. Saw hydrothermal signs on the **SE peak**: diffuse flow, squat lobsters, patches of bacterial mat etc. SE Peak samples: 1 major, 1 gastight, 2 rocks, 1 shrimp suction attempt (failed). Temp probe working now. Next traveled to NE peak (across the saddle). Not much there so proceeded to the S/SW for exploration. Not much activity. Last traverse was N/NW. Discovered large white patches and extensive crabs (galatheids). Tried to scoop up shrimp but failed. [12 samples total]
J2-185 Bottom time: 4/20/2006 1028 - 2115 UTC (10.78 hours)
J2-185 Forecast Dive Summary: Exploration dive at Forecast. Traveled up the west side of the volcano to the northern summit. Sampled an old sulfide chimney and then headed southwest to the summit saddle where hydrothermal activity was found at **Bart** and **Snail Scrum** vents. Samples at Bart: 4 HFS, 1 gastight. Samples at Snail Scrum: 7 HFS, 1 gastight, 1 suction of shrimp and snails. Then continued south along the western edge of the summit traveling to the highest point on the dive at the southern summit. Continued south from there then circumnavigated the summit heading north along the eastern side of the summit. Hydrothermal activity was again found and sampled at the northernmost part of the dive on the summit at **Homer** and **Marge** vents. Samples at Homer: 3 HFS. Samples at Marge: 5 HFS, 1 gastight. Ended the dive at **Mound 1**, where the highest temperature on this dive was recorded (195.7°C). Samples at Mound 1: 2 HFS, 1 gastight. Sample summary - 27 samples total: 21 HFS, 4 gastights, 1 chimney, 1 suction (biology). [27 samples total]
J2-186 Bottom time: 4/21/2006 2345 - 4/22 0948 UTC (10.05 hrs)
J2-186 NW Rota-1 Dive Summary: Settled down into a dense plume at NW Rota-1. Had a hard time figuring out where we were and where Brimstone Pit was. Floundered for quite some time with that and never actually visited the pit on this dive, but were close by. Took a scoop sample just north of the summit then continued **searching for Brimstone while in a dense plume**. Decided to do **SM2000 survey**. Had to reboot the system. Sediment scoop sample while calibrating at NW end of SM2000 survey. SM2000 survey (5 lines). Drove down to the bottom after the survey and sampled: 1 ash scoop and 1 rock. Sample summary - 5 samples total: 3 scoops (crust, sediment, sulfur globules) and 2 rocks. [5 samples total]
J2-187 Bottom time: 4/23/2006 0312 - 1732 UTC (14.33 hrs)

***Jason-2* Dive Summaries SRoF'06 Mariana Arc**
J2-187 NW Rota-1 Dive Summary: Visibility improved from last dive. Started the dive at **Iceberg** Vent. Still lots of bacterial mat at this outcrop. Samples at Iceberg: 5 HFS, 1 gastight and 1 rock. Suction sampler did not work. Had trouble finding Brimstone Pit because of depth differences from 2004. Sampled a rock while searching. Couldn't find Brimstone so went to **Mkr-78** and recovered the hydrophone. Sampled nearby. **Sandy Saddle** samples: 3 HFS. Found **Brimstone**. Looks like the side of the pit wall collapsed. It's no longer a pit. It's a very dynamic place and activity levels vary greatly. Went to **Fault Shrimp** next. Tried to suction mat but suction sampler not working again. Samples at Fault Shrimp: 4 HFS. Next traveled to **Scarp Top** where there were lots of shrimp - collected 3 HFS samples. Continued back to Brimstone, approaching from the south and heading upslope. Samples from second visit to the Brimstone area: 2 HFS, 1 scoop volcaniclastic ash, 1 major, 1 gastight. Activity increased dramatically while we were at Brimstone. Witnessed an eruption! [35 samples total]
J2-188 Bottom time: 4/24/2006 0840 - 1330 UTC (4.83 hrs)
J2-188 NW Rota-1 Dive Summary: Started the dive in the **Brimstone area** where the mound looked larger and more vigorous today than on the last dive. Collected 8 samples in the area: 3 gastights, 2 majors, 1 sediment, 1 rock, 1 niskin. Sudden bursts of activity at Brimstone, including lots of bubbling and sulfur extruding from the plume. Moved up to the top of the volcano (**Mkr-78 area**) to look for biota. One lone crab was found. Suction sampler not working again. 2 geology samples were collected. Moved on to **Gastros** looking for biota. Quite a few shrimp (Loihi) at Gastros. Some shrimp are grazing on other dead shrimp. No gastropods here this year. Used the scoop to collect a dead squid, 1 pink shrimp and 1 decayed shrimp. The consensus is that the volcano is killing the biota. Took the final sample (niskin) on the ascent - 35 meters above the bottom. [12 samples total]
J2-189 Bottom time: 424/2006 2346 - 4/25 0749 UTC (8.05 hrs)
J2-189 NW Rota-1 Dive Summary: Started the dive at **Brimstone**. Upon arrival vigorous erupting was happening. Explosive bursts of rock and bubbles were coming out of the pit - with a new defined rim. Activity varied widely at Brimstone - from being quiet for an hour to waking up and throwing lava bombs. Took 8 samples from Brimstone area: 1 scoop of pit material, 1 rock from the rim, 2 niskins, 2 gastights, 2 majors**. SM2000 survey** followed completing 3 lines. After the survey returned to Brimstone to observe and document the activity. Amazing activity. CO2 bubbles in advance of the flow. Vigorous smoking and small explosions coming from the crater. [8 samples total]
J2-190 Bottom time: 4/25/2006 2237 - 4/26 1332 UTC (19.92 hrs)
J2-190 Esmeralda Dive Summary: Exploration dive. Visibility was poor for most of the dive due to a thick plume trapped in the caldera. Started at the SW corner of Esmeralda on the caldera floor and climbed up the wall a bit. The caldera floor is covered with a deep layer of iron sediments. Made 3 traverses up the wall in the **SW portion of the caldera**. Sampled a piece of rock/crust on the first traverse (**SE Caldera Wall** area). On second traverse came upon an area of Iron oxide mounds (chimney-like structures). Named the place **Iron Mounds** and took 1 suction sample of the mounds - Temp at the mounds was ~40C. The suction sampler worked on this dive! 1 rock was sampled on last western rim traverse. Next moved on to the southeastern caldera floor. Took 1 rock sample from the SE caldera wall. The last transect was up the **northern caldera wall**. Never reached the shallow area known to be venting because Jason/Medea would not go shallower than 120 meters. [5 samples total]
J2-191 Bottom time: 4/27/2006 0133 - 0616 UTC (4.72 hrs)
J2-191 NW Rota-1 Dive Summary: Ash was raining down when Jason landed on bottom south of **Brimstone**. Fired 2 Niskins and moved toward Brimstone. More rock and floc fallout and a smoky plume. Opened the basket and tried to sample ash south of Brimstone (failed). Had the hydrophone on Jason while observed eruptive activity including bubble curtains, lava bombs, yellow smoke and white rocks. Major eruptive activity during HFS sampling so went to ridge at the **summit** and deployed the hydrophone. Continued on just **W of Iceberg** where attempted to suction sample mat. Grabbed some shrimp in a canvas bag **E of Gastros**. Had to abort the dive because the biobox was dangling below the sub - plus the winch cable was too hot. Last sample was pit ejecta captured by Jason bottom mesh. [7 samples total]
J2-192 Bottom time: 4/27/2006 1838 - 4/28 0452 UTC (10.23 hrs)
J2-192 NW Rota-1 Dive Summary: Started the dive **S/SW of Iceberg** and attempted 2 biological samples (1 suction and one scoop of shrimp). Then proceeded downslope of **Brimstone**. The eruptive site was extremely active. Saw **red glowing rock** in the middle of the eruptive site. Observed the volcanic activity for close to 2 hours. The most dramatic visit yet to Brimstone. Ventured over to **Fault Shrimp** area and sampled shrimp west of there. Traveled north over the ridge crest then SW to the summit and sampled the surface coating. Next traveled in the water column till ascended 30 m west of Brimstone - 1 HFS sample there. Moved toward Brimstone again. The pit is still very active with rocks raining down and red flashes from eruptive site. Retrieved the hydrophone at the summit then traveled to the west along the **summit ridge**. One major sample taken at ridge, but failed to fire. The top of the sharp ridge is unstable and possibly slumping continually. [8 samples total]
J2-193 Bottom time: 4/28/1006 2316 - 4/30 0201 UTC (26.75 hrs)

***Jason-2* Dive Summaries SRoF'06 Mariana Arc**

J2-193 E Diamante Dive Summary: Longest dive of SRoF'06 (26.75 hrs). Started on **NE pinnacle** in area of **Black Forest'04** where 2 sulfide chimneys were collected - one active and one extinct. After elevator surfaced headed to **W pinnacle**, which is previously unexplored. Started at the northern base of the pinnacle and climbed up it collecting 3 rocks and 1 crust sample - plus one bio sample (sponge and worms). Found some smoke and shimmering water but no obvious venting source. The top of the ridge was a dense coverage of basket stars, crinoids and deep sea corals. After reaching the summit the area was decimated by dredging/trawling. Quite devastating to see. Next traveled up the **small knoll between the western and central domes**. Continuing on, traveling up the SW side of the **central dome** - saw a bit of bacterial mat - had trouble holding station with the current. Next proceeded back over to the eastern dome for more sampling. Collected a suite of samples on the eastern dome at **Gnome, 5 Towers** and **Barnacle Beach** including: 14 HFS, 1 gastight, 2 small chimneys, 1 biology, 2 bio-geo, and 1 niskin. At the final vent site - on the central dome - suctioned biota at the **Limpets'06** site. Proceeded to the top of the pinnacle (**Aquarium** site). The currents made it hard to hold station. Witnessed photosynthesis/chemosynthesis boundary. Just a quick glimpse at the pinnacle then end of the dive. [28 samples total]

J2-194 Bottom time: 4/30/2006 0918 - 1725 UTC (8.12 hrs)

J2-194 Ruby Dive Summary: Started the dive E/SE of the summit at 270 meters - heading W ascending to the summit. At the **summit** collected a rock sample. Next ascended the slope from the NW to the summit. Saw an outcrop covered with crinoids - also lots of red sea stars. As approached the summit ran into extensive area of diffuse venting at ~215 meters. Lots of red sediments and crabs. Named it **Rua** Vent and collected 1 rock, 1 major and 1 scoop sample. Very aggressive little red crabs here fighting over bacterial mat. Also little holes in the sediment dubbed "crop circles". Continued uphill to the east where collected a heavily oxidized piece of crust and took a major sample in an area of very little flow. Lots of big schooling fish around Medea (feeding frenzy). Collected one rock from the summit. Next did another transect from SW of the summit ascending to the summit. Came upon a large extent of white mat on the rocks. Grabbed one bio-geo sample and suctioned a crab. [12 samples total]

J2-195 Bottom time: 5/2/2006 0555 - 5/3 0524 UTC (23.48 hrs)

J2-195 Daikoku Dive Summary: Started dive NW of the summit and climbed up slope where proceeded to do **flatfish transects** looking at the size, number and location of the fish. After first transect observed flatfish and snails - snapping digital stills. Samples: 1 niskin, 2 suctions flatfish and seds, 1 scoop. Prepared to survey again - sampled piece of sulfur crust and found **Bubble Bath** Vent site - a pit with bizarre gas bubbles (possibly CO2). Samples at Bubble Bath: 1 major, 1 gastight. After left Bubble Bath discovered **Sulfur Cauldron** - a pit of undulating, smoking, molten sulfur!! Sampled molten sulfur with marker chain, and later picked up a piece of sulfur crust. Next discovered **Smoking** Vent (little white smoking chimneys). Samples at Smoking: 1 major, 1 gastight, 1 tiny white chimney. Went back to scope out the cauldron extent. Next was a **SM2000 survey** over the 2 pits at the summit and over the newly discovered vents to the NW of the summit. Next suctioned flatfish and snails at **Fish Spa**, then on to the big **NE Pit** for a Niskin and rock sample. Finished dive running another SM2000 line over both of the large pits at the summit. [16 samples total]

J2-196 Bottom time: 5/3/2006 1503 - 5/4 0423 UTC (13.33 hrs)

J2-196 NW Eifuku Dive Summary: Navigation was an issue throughout the dive. Large offset from 2004 positions so much time spent trying to find vent sites discovered then. Want to sample mussels and water at same spots for CO2 dissolution analysis. Started the dive in the area of the Bacterial Balls 2004 target. Not active if at the site. Drove around and decided to head to Cliff House. Couldn't find it so went to **Champagne** where there was only 1 small white chimney remaining. CO2 bubbles were observed. Samples at Champagne area: 5 HFS, 1 gastight, 1 scoop of mussels. 1 niskin fired just upslope. Moved ~10m NW of Champagne to a **medium mussel density site**: 1 scoop of mussels and 1 HFS. Next collected small friable chimney at **Sulfur Slope**. Next found higher density mussel site (~85% coverage) named it **Rippling Mussels**. Sampled mussels and water there (2 HFS, 1 scoop). Next picked up one dead mussel casing. Found an area dubbed **Where?** with a high concentration of mussels. Sampled mussels and water. Moved on to **Cliffhouse'06** where sampled: 4 HFS, 2 gastights, 1 major, 1 niskin. [25 samples total]

J2-197 Bottom time: 5/4/2006 1444 - 2343 UTC (8.98 hrs)

J2-197 Daikoku Dive Summary: Started the dive at **Sulfur Cauldron** - observing. Next moved to **Bubble Bath** for sampling: 1 gastight, 1 major, 1 sediment suction. Next another fish transect - sampled flat fish and sediment. After that moved to the big **NE Pit** at the summit. Went down into the pit and collected samples: 6 HFS, 1 niskin, 1 suction of bacterial mat, 1 rock with barnacles. Couldn't get pit depth - but could be greater than 50 meters deep. Next discovered a new vent with lots of gas bubbles and called it **Alka Seltzer**. Samples at Alka Seltzer: 4 HFS, 1 gastight, 1 small black chimney (pieces). At the end of the dive returned to Sulfur Cauldron and filled a can with molten sulfur. [22 samples total]

J2-198 Bottom time: 5/7/2006 0629 - 5/8 0522 UTC (22.88 hrs)

***Jason-2* Dive Summaries SRoF'06 Mariana Arc**

J2-198 Nikko Dive Summary: Started dive at the north-central portion of the crater - visibility was poor. Found Marv Lilley's **data logger at North Vent**. Went searching for the sulfur lake next (to the NW). Encountered dense tubeworm patches, white smokers, crabs, sulfur, and a very thick plume that hindered visibility. **NW crater floor** samples: 1 major, 1 gastight, 1 sulfur rock. Proceeded to the SE across the crater floor. 1 geology sample at the **crater center** then continued to the SE. Dense biota and low-level venting in many areas. 1 niskin on the way. Thick plume in the **SE section of the crater**. Smoke is pouring out of the crater wall - There is a "pit" (depression) at the SE crater location. Looked around it a bit. Suction sampled bacterial mat and shrimp at **Tubeworm Hangover (SE Vent)**. Next climbed up the SE crater wall to the top - sampled a rock. Dense biota there also and diffuse flow. Proceeded on, climbing up the **E/SE crater wall**. Sampled a rock near the top. Lots of dense biota and diffuse venting at the top too. **SM2000 survey** followed - then retrieved Marv's data logger after waiting for the plume to clear. Visibility was poor but were able to recover the instrument. [9 samples total]

J2-199 Bottom time: 5/8/2006 1423 - 5/9 0830 UTC (18.12 hrs)

J2-199 Nikko Dive Summary: Started the dive on the **east rim** and proceeded downslope to the **north central crater floor**. Grabbed 2 geo samples of sulfur chimney structure then continued to the **south of N Vent** for 4 HFS samples. Too much smoke at N Vent area to sample so proceeded toward the **SE crater area**. Observed sulfur patches and sediment depressions between them. Flatfish on the sediments mainly. Dense biota - healthy tubeworms. Sampled mussels originally attached to tubeworms. In a small area of shimmering water **near SE Vent site** collected 4 HFS and 1 rock sample. Next traveled up the SE crater rim to **Top Vent**. 4 HFS samples in area dense with crabs and diffuse flow. After Top Vent flew off the crater rim down to **Varnum Vent** where collected 1 HFS sample. Ventured up to the **southern crater rim**. Dense biomass - named the area **Yellow Lips**. 2 HFS and 1 rock sample. Continued S/SW to a small pit crater S of the main crater rim. Found small pools of bubbling sulfur (this sulfur clearer than at Daikoku - black in the middle and yellow/clear at the edges). Named the area **Naraku**. Samples: 1 major, 1 gastight, 1 niskin. The winch locked up and Medea crashed so flailed for several hours. Collected 3 HFS background samples. After fixing winch proceeded back to bottom at Naraku and picked up a sulfur rock. Broke through the sulfur crust and coated Jason's under-carriage with ~70 pounds of molten sulfur. End of dive. [27 samples total]

5.3 *Jason-2* SAMPLE LOGS

All sample positions are final, corrected based on processed navigation.
Z (m) column represents seafloor depth in meters.

5.3.1 J2-184 Seamount X Samples

sample #	type	date	hr	min	longitude	latitude	Z(m)	J2-184 Seamount X Samples	PI
no sample 1								**Corrected long/lat positions \reflect Jason position - not Medea**	
j2-184-suction-2	bio	4/19	2	42	144.020800	13.247150	1282	Suction - multiple slurps of white material (bacterial mat?) into yellow chamber.	Davis
j2-184-suction-3	bio	4/19	5	26	144.017817	13.251633	1289	Suction of thick iron mat into white jar.	geogroup / Davis
j2-184-suction-4	bio	4/19	9	30	144.017017	13.248894	1288	Suction bacterial mat plus brown snails (<1cm long) into blue jar. [near N summit peak]	Davis / Tunnicliffe
j2-184-major-5	water	4/19	11	19	144.018463	13.247574	1289	Major (yellow) in diffuse flow with lots of FeO mat and biota. Temp in this area was ~12C. [SE summit peak]	Butterfield
j2-184-gastight-6	gas	4/19	11	25	144.018463	13.247574	1288	Gastight (yellow). T~12C. [SE summit peak]	Evans
j2-184-rock-7	geo	4/19	11	35	144.018463	13.247574	1289	Rock (triangular shaped) with lots of red FeO mat on it. [SE summit peak]	geogroup
j2-184-rock-8	geo	4/19	11	39	144.018463	13.247574	1290	Rock covered with FeO. [SE summit peak]	geogroup
j2-184-suction-9	bio	4/19	11	50	144.018492	13.247559	1206	Suction small white shrimp into red chamber. Swam away. Sample failed. [SE summit peak]	Tunnicliffe
j2-184-crust-10	bio-geo	4/19	15	34	144.017208	13.246679	1207	Small piece of sulfur-like rock and squat lobster.	geogroup / Tunnicliffe
j2-184-crust-11	geo	4/19	15	40	144.017208	13.246679	1219	Large beautiful piece of sulfur crust.	geogroup
j2-184-scoop-12	bio	4/19	16	41	144.016950	13.247033	1295	Scoop - tried to get shrimp/crab and sulfur. Did not get shrimp.	Tunnicliffe / geogroup

5.3.2 J2-185 Forecast Samples

samples #	type	date	hr	min	longitude	latitude	Z(m)	J2-185 Forecast Samples	PI
J2-185-chimney-1	geo	4/20	11	12	143.92018	13.39497	1442	Chimney. Sampling old weathered chimney. Just keeping the smaller piece. The big piece was too heavy.	geogroup
J2-185-HFS-2	water	4/20	12	11	143.92010	13.39463	1449	HFS Unfiltered bag #8. T2=59.7. T1 not working properly but probably at least 100. Vol=453ml. [Bart]	Butterfield
J2-185-HFS-3	water	4/20	12	15	143.92010	13.39463	1449	HFS Filtered bag #11. T2=30.5C. Vol=513ml. [Bart]	Butterfield
J2-185-HFS-4	water	4/20	12	19	143.92010	13.39463	1449	HFS Sterivex filter #10. T2 is stable at 75C. No T1. Volume=3100ml. [Bart]	Butterfield
J2-185-gastight-5	gas	4/20	12	26	143.92010	13.39463	1449	Fired gastight on the fluid sampler. T2=75C. (T1 broken). [Bart]	Evans
J2-185-HFS-6	water	4/20	12	40	143.92010	13.39463	1449	HFS Filtered piston #24. T2=48.4C. The temp is dropping. Looks like the probe shifted. Vol=433ml. [Bart]	Butterfield
J2-185-HFS-7	water	4/20	13	8	143.92008	13.39463	1448	HFS Unfiltered bag #9. T2=6.5C Vol=797ml. In the area among the snails. [Snail Scrum - about 1 m away from Bart]	Butterfield
J2-185-HFS-8	water	4/20	13	15	143.92008	13.39463	1448	HFS Unfiltered piston #6. T2=6.8. Vol=667ml. [Snail Scrum]	Butterfield
J2-185-HFS-9	water	4/20	13	22	143.92008	13.39463	1448	HFS DNA (sterivex) filter #3. Vol=2050ml. [Snail Scrum]	Butterfield

samples #	type	date	hr	min	longitude	latitude	Z(m)	J2-185 Forecast Samples	PI
JS-185-HFS-10	water	4/20	13	39	143.92008	13.39463	1448	HFS Filter #7. Vol=103ml (no temp info). [Snail Scrum]	Butterfield
JS-185-HFS-11	water	4/20	13	40	143.92008	13.39463	1448	HFS Filtered piston #1. T2=5.3. Vol=544ml. [Snail Scrum]	Butterfield
JS-185-HFS-12	water	4/20	13	44	143.92008	13.39463	1448	HFS Unfiltered piston #5. T2=32.8C. Vol=556ml. Up on hotter chimney up above. Temp was 110. [Snail Scrum]	Butterfield
JS-185-HFS-13	water	4/20	13	54	143.92008	13.39463	1448	HFS Filtered bag #14. T2=32.1C. Vol=578ml. Temp estimate 50-60C. [Snail Scrum]	Butterfield
JS-185-suction-14	bio	4/20	14	14	143.92008	13.39463	1448	Suction. Shrimp and snails. 3 in suction hose - yellow jar. [Snail Scrum]	Tunnicliffe
J2-185-gastight-15	gas	4/20	14	35	143.92008	13.39463	1448	Fired blue gastight. Temperature 70-108C. Near HFS sample. [Snail Scrum]	Evans
JS-185-HFS-16	water	4/20	17	53	143.91990	13.39532	1448	HFS Filter bag #16. T2=8.4 Vol=548ml. [Homer]	Butterfield
JS-185-HFS-17	water	4/20	18	4	143.91990	13.39532	1448	HFS Piston #20. T2=7.6. Vol=550ml. [Homer]	Butterfield
JS-185-HFS-18	water	4/20	18	10	143.91990	13.39532	1448	HFS Sterivex filter #21. T2=6.5. Vol=2015ml. [Homer]	Butterfield
JS-185-HFS-19	water	4/20	19	4	143.91987	13.39527	1448	HFS Filtered bag #17. T2=45.7 Tmax=146C. Vol=530ml. [Marge]	Butterfield
JS-185-HFS-20	water	4/20	19	29	143.91987	13.39527	1448	HFS Bag #19. Vol=508ml T2=44.3C. [Marge]	Butterfield
JS-185-HFS-21	water	4/20	19	34	143.91987	13.39527	1448	HFS Piston #22. Vol=499ml. T2=44.9C. [Marge]	Butterfield
JS-185-HFS-22	water	4/20	19	39	143.91987	13.39527	1448	HFS Sterivex filter #23. T2=38-42C. Vol=4005ml. [Marge]	Butterfield
JS-185-HFS-23	water	4/20	20	9	143.91987	13.39527	1448	HFS Fish filter #12. T2=38-42C. [Marge]	Butterfield
J2-185-gastight-24	gas	4/20	20	11	143.91987	13.39527	1448	Gastight (black). [Marge]	Evans
J2-185-gastight-25	gas	4/20	20	47	143.91996	13.39503	1448	Gastight (white). Temp=196C earlier. [Mound 1 Vent base]	Evans
J2-185-HFS-26	water	4/20	20	52	143.91996	13.39503	1448	HFS Filtered bag #18. T2=44.3C. Vol=504ml. [Mound 1]	Butterfield
JS-185-HFS-27	water	4/20	21	17	143.91998	13.39502	1448	HFS Sterivex #13 background filter. [Collected during ascent]	Butterfield

5.3.3 J2-186 NW Rota-1 Samples

sample #	type	date	hr	min	longitude	latitude	Z(m)	J2-186 NW Rota-1 Samples	PI
j2-186-scoop-1	geo	4/22	1	14	144.775183	14.601817	548	Scoop. Orange crust and black sediment below. Green handled bag. Port bio box.	geogroup
j2-186-rock-2	geo	4/22	2	4	144.775674	14.601177	519	Rock. Picked up sample between the marker and hydrophone. Took digital photos. [Mkr-78 area]	geogroup
j2-186-scoop-3	geo	4/22	3	23	144.773717	14.603233	647	Scoop. Gray-black sediment. Black underneath and lighter on top. Light stuff could be particulate sulfur. Dark could be ash. [N/NW of summit]	geogroup
j2-186-scoop-4	geo	4/22	9	35	144.775758	14.601973	595	Scoop. Sample of ash with sulfur globules. Yellow tape on handle.	geogroup
j2-186-rock-5	geo	4/22	9	39	144.775758	14.601973	597	Rock placed in back milk crate.	geogroup

5.3.4 J2-187 NW Rota-1 Samples

sample #	type	date	hr	min	longitude	latitude	Z(m)	J2-187 NW Rota-1 Samples	PI
j2-187-HFS-1	water	4/23	3	39	144.77632	14.60085	534	HFS. Unfiltered bag #8. Tmax=51.9C Tavg=49.3 T2=35.5 Vol=550ml. [Iceberg]	Butterfield
j2-187-HFS-2	water	4/23	3	52	144.77632	14.60085	534	HFS. Filtered bag #11. Start 0347. Tmax=50.2C Tavg=49.0 T2=34. Vol=575ml. [Iceberg]	Butterfield
j2-187-HFS-3	water	4/23	3	52	144.77632	14.60085	534	HFS. Sterivex filter #13 Start 0352. Intake came out of hole and was re-adjusted. Tmax=53.8C Tavg=48.0 T2=37. Vol=3007ml. [Iceberg]	Butterfield
j2-187-HFS-4	water	4/23	4	14	144.77632	14.60085	534	HFS. Fish filter #12. Start 0414. Tmax=53.2C Tavg=51.7 T2=37. Vol=204ml. [Iceberg]	Butterfield
j2-187-HFS-5	water	4/23	4	16	144.77632	14.60085	534	HFS. Unfiltered piston #6. Tmax=52.9C Tavg=51.3 T2=35. Vol=663ml. Sediment next to sample hole is moving. [Iceberg]	Butterfield
j2-187-gastight-6	gas	4/23	4	29	144.77632	14.60085	534	Gastight (white). At same position as fluid samples - hole next to small landslide. [Iceberg]	Evans
j2-187-rock-7	geo	4/23	4	39	144.77632	14.60085	535	Rock. Small piece of rock (fist-size) taken above orifice. Next to HFS sample orifice. Second larger (melon sized) more speckled rock added. STBD biobox. [Iceberg]	geogroup
j2-187-rock-8	geo	4/23	5	27	144.77532	14.60108	556	Rock. Sample of brown-material between the older-looking gray material. Two rocks collected. Both are grapefruit sized. In port forward quadrant of basket.	geogroup
j2-187-HFS-9	water	4/23	7	28	144.77567	14.60117	521	HFS. Unfiltered piston #5. Tmax=32.6C Tavg=27.3 T2=20. Vol=576ml. [Sandy Saddle area]	Butterfield
j2-187-HFS-10	water	4/23	7	35	144.77567	14.60117	521	HFS. Filtered bag #14. Tmax=30C Tavg=26.6 T2=20. Vol=600ml. [Sandy Saddle area]	Butterfield
j2-187-HFS-11	water	4/23	7	54	144.77567	14.60117	521	HFS. Sterivex Filter #15. Tmax=35.6C Tavg=29 T2=22. Vol=1961 ml. [Sandy Saddle area]	Butterfield
j2-187-scoop-12	geo	4/23	8	27	144.77523	14.60012	622	Scoop. Sediment? In area of sulfur breccias.	geogroup
j2-187-rock-13	geo	4/23	8	37	144.77523	14.60012	621	Rock. Sulphur breccia ("vermicelli sulphur") - same position as previous sample.	geogroup
j2-187-rock-14	geo	4/23	9	1	144.77517	14.60035	603	Rock. Collecting another piece of "vermicelli sulphur".	geogroup
j2-187-HFS-15	water	4/23	9	39	144.77542	14.60088	561	HFS. Unfiltered bag #9. Tmax=28.2C. Tavg=25.4. T2=20. Vol=577ml. [Brimstone'06-j2187]	Butterfield
j2-187-HFS-16	water	4/23	9	47	144.77542	14.60088	561	HFS. Sterivex filter #10. This is a large volume filter. Tmax=27.9C Tavg=19.7. T2=16. Vol=3004ml. [Brimstone'06-j2187]	Butterfield
j2-187-HFS-17	water	4/23	10	8	144.77542	14.60088	561	HFS. Filtered bag #16. There are some bubbles that seem to be increasing near the sample area. Tmax=26.24C Tavg=19.7. Vol=619ml. Heating up to T=33. The bag broke. [Brimstone'06-j2187]	Butterfield
j2-187-gastight-18	gas	4/23	10	16	144.77542	14.60088	561	Gastight. Tmax=33C. Gastight #11 on HFS. [Brimstone'06-j2187]	Evans
j2-187-gastight-19	gas	4/23	10	32	144.77542	14.60088	562	Gastight. Tmax=33C. Attempting to sample the fluid near the bubbles (but not the bubbles). Red tape handle. [Brimstone'06-j2187]	Evans

sample #	type	date	hr	min	longitude	latitude	Z(m)	J2-187 NW Rota-1 Samples	PI
j2-187-HFS-20	water	4/23	10	52	144.77542	14.60088	562	HFS. Unfiltered piston #20. Tmax=44.3C Tavg=40.2. T2=30. Vol=300ml. [Brimstone'06-j2187]	Butterfield
j2-187-rock-21	geo	4/23	10	59	144.77542	14.60088	562	Rock. Sulfur-stained lava. Put in back rear stbd quadrant of the box. [Brimstone'06-j2187]	geogroup
j2-187-niskin-22	water	4/23	11	18	144.77542	14.60088	550	Niskin (red). Sample in the thick of the plume. [Brimstone'06-j2187]	Resing
j2-187-niskin-23	water	4/23	11	23	144.77542	14.60088	564	Niskin (orange?) . Fired the second Niskin in the plume. [Brimstone'06-j2187]	Resing
j2-187-HFS-24	water	4/23	13	31	144.77735	14.60086	586	HFS. Filtered bag #17. Tmax=27.3C Tavg=26.7 T2=18. Vol=576ml. [Fault Shrimp]	Butterfield
j2-187-HFS-25	water	4/23	13	36	144.77735	14.60086	586	HFS. Unfiltered bag #19. Tmax=26.5C Tavg=26. T2=18. Vol=600ml. [Fault Shrimp]	Butterfield
j2-187-HFS-26	water	4/23	13	43	144.77735	14.60086	586	HFS. Sterivex filter #21. Tmax=25.9C Tavg=25.0 T2=18. Vol=3010ml. [Fault Shrimp]	Butterfield
j2-187-HFS-27	water	4/23	14	5	144.77735	14.60086	586	HFS. Fish Filter #7. Tmax=25.7C Tavg=25.6 T2=17.8 Vol=152ml. [Fault Shrimp]	Butterfield
j2-187-HFS-28	water	4/23	14	59	144.77763	14.60095	568	HFS. Filtered bag #18. Tmax=19.6C Tavg-17.4 T2=14.0 Vol=604ml. [Scarp Top]	Butterfield
j2-187-HFS-29	water	4/23	15	5	144.77763	14.60095	568	HFS. Unfiltered piston #22. Tmax=17.4C Tavg=16.0 T2=13.0. Vol=550ml. [Scarp Top]	Butterfield
j2-187-HFS-30	water	4/23	15	12	144.77763	14.60095	568	HFS. Sterivex filter #23. Tmax=17.6C Tavg=15.1 T2=10. Vol=2liters. [Scarp Top]	Butterfield
j2-187-scoop-31	geo	4/23	16	19	144.77577	14.60055	575	Scoop. Volcaniclastics and ash - hopefully from the pit. Looks like Pele's tears - great spot. Softball sized clump. [South of Brimstone]	geogroup
j2-187-HFS-32	water	4/23	16	40	144.77542	14.60087	562	HFS. Filtered piston #1. Wand is in yellow part of flow. Tmax=79.5C Tavg=70.5 T2=45? Vol=307ml. [Brimstone'06]	Butterfield
j2-187-HFS-33	water	4/23	16	47	144.77542	14.60087	562	HFS. Filtered piston #24. Same spot in yellow plume. Tmax=95.3C Tavg=90.2 T2=50. Vol=302ml. [Brimstone'06]	Butterfield
j2-187-major-34	water	4/23	17	0	144.77542	14.60087	563	Major (blue). Same place as HFS samples but no longer that much yellow - a lot more bubbles coming out of cloud now. [Brimstone'06]	Butterfield
j2-187-gastight-35	gas	4/23	17	7	144.77542	14.60087	563	Gastight (black tape). Activity dying down a bit - more yellow in the back of plume and a lot of bubbles. Same sample site as major and HFS. Activity decreased since Major sample. [Brimstone'06]	Evans

5.3.5 J2-188 NW Rota-1 Samples

sample #	type	date	hr	min	longitude	latitude	Z(m)	J2-188 NW Rota-1 Samples	PI
j2-188-gastight-1	gas	4/24	9	22	144.775403	14.600923	564	Gastight with bubble collector in active plume. [Brimstone area]	Evans
j2-188-gastight-2	gas	4/24	9	29	144.775403	14.600923	564	Gastight (black handle) [Brimstone area]	Evans
j2-188-major-3	water	4/24	9	33	144.775403	14.600923	564	Major (yellow handle). [Brimstone area]	Butterfield
j2-188-scoop-4	geo	4/24	9	45	144.775403	14.600923	564	Sediment scoop. Lots of bubbles coming out of the sediments in the area. [Brimstone area]	geogroup
j2-188-major-5	water	4/24	10	13	144.775362	14.600932	563	Major (blue) in the flow near sulfur extruding from base of the plume. [Brimstone area]	Butterfield

sample #	type	date	hr	min	longitude	latitude	Z(m)	J2-188 NW Rota-1 Samples	PI
j2-188-gastight-6	gas	4/24	10	19	144.775362	14.600932	563	Gastight (red) in the same spot as the major. Temp here was 85-95C. [Brimstone area]	Evans
j2-188-rock-7	geo	4/24	10	24	144.775362	14.600932	563	Rock. Grabbing piece of sulfur-rock near the flow. [Brimstone area]	geogroup
j2-188-niskin-8	water	4/24	11	7	144.775362	14.600932	554	Niskin (green) fired in the midst of the plume. [Plume over Brimstone'06]	Resing.
j2-188-scoop-9	geo	4/24	11	24	144.775642	14.601205	520	Scoop (green) of volcaniclastic fallout [Near Shimmering Vent and Mkr-78]	geogroup
j2-188-rock-10	geo	4/24	11	45	144.775674	14.601177	520	Rock - black with reddish mat coating. Plum-sized. [Mkr-78]]	geogroup
j2-188-scoop-11	bio	4/24	12	44	144.776088	14.600885	536	Scoop. Dead squid-one pink shrimp-one decayed shrimp. [Gastros]	Tunnicliffe
j2-188-niskin-12	water	4/24	13	34	144.775764	14.600894	545	Niskin fired about 35 meters above the bottom. Near the summit.	Resing

5.3.6 J2-189 NW Rota-1 Samples

sample #	type	date	hr	min	longitude	latitude	Z(m)	J2-189 NW Rota-1 Samples	PI
j2-189-scoop-1	geo	4/25	0	33	144.77542	14.60092	560	Scoop. Fresh pit rim material. Rim is about 40 cm tall on the south side. Green tape handle into stbd biobox. [Brimstone'06 area]	geogroup
j2-189-rock-2	geo	4/25	0	41	144.77542	14.60092	560	Rock. Taken from right in front of the sub at the outer edge of the rim - which appears to be about 1.5 to 2 m wide. [Brimstone'06 area]	geogroup
j2-189-niskin-3	water	4/25	1	18	144.77542	14.60092	565	Niskin (red) fired in the plume over Brimstone. Altitude 8m. Doesn't appear to be working. [above Brimstone'06 area]	Resing
j2-189-niskin-4	water	4/25	1	22	144.77542	14.60092	565	Niskin (green) fired in the plume over Brimstone. Crater rim appears to be about 1.5 to 2 m wide. Altitude 8m. [above Brimstone'06 area]	Resing
j2-189-gastight-5	gas	4/25	6	19	144.77552	14.60093	560	Gastight with funnel in bubbles on front edge of the flow. [Brimstone'06 area]	Evans
j2-189-major-6	water	4/25	6	26	144.77552	14.60093	559	Major (white). Increase in bubbles. Sampling near gastight in white smoke. Hard to see any water flow. [Brimstone'06 area]	Butterfield
j2-189-gastight-7	gas	4/25	6	38	144.77550	14.60088	560	Gastight (black handle - blue body). In high smoking crevice of rock at another edge of flow. [Brimstone'06 area]	Evans
j2-189-major-8	water	4/25	6	56	144.77547	14.60092	560	Major (red). Area of yellow smoke at front edge of plume. Major is venting well. Tmax=256.6. [Brimstone'06 area]	Butterfield

5.3.7 J2-190 Esmeralda Samples

sample #	type	date	hr	min	longitude	latitude	Z(m)	J2-190 Esmeralda Samples	PI
j2-190-crust-1	geo	4/26	0	8	145.24223	14.95593	323	Crust (Iron oxide). It's round and about 15cm in diameter. Could be pumice. [SW caldera wall]	geogroup
j2-190-suction-2	bio-geo	4/26	1	18	145.24144	14.95597	293	Suction (white jar). Iron oxide mound. Diffuse venting here. Iron-fixing bacteria must be present. [Iron Mounds]	Davis
j2-190-scoop-3	geo	4/26	2	34	145.24097	14.95597	280	Scoop. Crust and iron oxide sediments. Sample from lineation-crack.	geogroup

sample #	type	date	hr	min	longitude	latitude	Z(m)	J2-190 Esmeralda Samples	PI
j2-190-rock-4	geo	4/26	5	36	145.24038	14.95924	251	Rock. 15x5cm orange-ish rock from altered area. Trying to get second sample at the same place - want darker piece.	geogroup
j2-190-rock-5	geo	4/26	8	27	145.25153	14.95782	253	Rock. Quite a small sample from the top of the caldera wall. [SE caldera wall]	geogroup

5.3.8 J2-191 NW Rota-1 Samples

sample #	type	date	hr	min	longitude	latitude	Z(m)	J2-191 NW Rota-1 Samples	PI
j2-191-niskin-1	water	4/27	1	29	144.775365	14.600495	595	Niskin (green) in the floc plume. 9.3 meters above the bottom. [50 m south of Brimstone]	Bolton
j2-191-niskin-2	water	4/27	1	36	144.775416	14.600510	591	Niskin (red) 40m downslope of the pit in ash plume with some floc too. Altitude ~4m.	Bolton
j2-191-ash-3	geo	4/27	1	56	144.775417	14.600833	573	Ash (sample failed). Biobox is open trying to capture large pieces of ash raining down. Falling ash into Biobox. Sample for about 15 min.	geogroup
j2-191-HFS-4	water	4/27	3	4	144.775510	14.600948	557	HFS. Filtered piston #1. Tmax=41.9C Tavg=37.6 Vol=80ml no good T2. Sample in leading edge with moving rocks and bubbles just to the left. Increase in bubbles at sample area. [Brimstone'06]	Butterfield
j2-191-suction-5	bio	4/27	4	53	144.776300	14.600867	532	Suction mat along rock face. [Near Iceberg]	Davis
j2-191-scoop-6	bio	4/27	5	36	144.776167	14.600880	533	Scoop. Attempting to scoop up some shrimp in the canvas bag. Good scoop and twirl. [E of Gastros]	Tunnicliffe
j2-191-lavabombs-7	geo	4/27	7	0	144.775510	14.600948		Pit ejecta caught by Jason bottom mesh. [Brimstone'06]	geogroup

5.3.9 J2-192 NW Rota-1 Samples

sample #	type	date	hr	min	longitude	latitude	Z(m)	J2-192 NW Rota-1 Samples	PI
J2-192-suction-1	bio	4/27	18	57	144.77629	14.60079	539	Suction sample of shrimp. Getting a wide size distribution and hopefully some of each of the 2 species here. [Iceberg Vent area]	Tunnicliffe
J2-192-scoop-2	bio	4/27	19	52	144.77629	14.60079	540	Scoop. Picked up the feeding frenzy of shrimp using a mesh scoop. At the surface all that remained was a small fish. The shrimp that had been feeding on it all escaped. [Iceberg Vent area]	Tunnicliffe
J2-192-rock-3	geo	4/27	20	20	144.77533	14.60074	564	Rock. Piece of sulphur rock. [Downslope of Brimstone]	geogroup
J2-192-scoop-4	bio	4/27	23	7	144.77717	14.60084	586	Scoop. Attempted to scoop these shrimp up (suction sampler not working). One shrimp remained at surface - so this sample was a scoop of 1 shrimp. [~20 m west of Fault Shrimp]	Tunnicliffe
J2-192-scoop-5	geo	4/28	0	24	144.77606	14.60098	523	Scoop. Ubiquitous coating all over the slope surface here. It's very loose stuff. Looks like some mineral with bacteria in it. Lapilli covered with a coating. [N of Gastros at summit]	geogroup
J2-192-HFS-6	water	4/28	2	13	144.77513	14.60090	564	HFS. Filtered bag #11. Tavg and T2=6.9C (ambient water) Vol=625ml. [30 m west of Brimstone but still in plume]	Butterfield

sample #	type	date	hr	min	longitude	latitude	Z(m)	J2-192 NW Rota-1 Samples	PI
J2-192-HFS-7	water	4/28	3	8	144.77543	14.60087	561	HFS. Filtered piston #1. Tmax=7.2C Tamb and T2=6.7. Vol=558ml. Raining black ash during sampling. [Brimstone area]	Butterfield
J2-192-major-8	water	4/28	4	11	144.77544	14.60138	531	Major (blue). In hole where temp sample taken in iron deposits. Did not fire. Sample failed. [W Summit]	Resing

5.3.10 J2-193 East Diamante Samples

sample #	type	date	hr	min	longitude	latitude	Z(m)	J2-193 E Diamante Samples	PI
j2-193-chimney-1	geo	4/28	23	50	145.68194	15.94289	381	Chimney. Extinct sulfide chimney top snapped off and fell into the basket when trying to sample. From the deepest area of the chimneys. Large intact. ~150 lbs and ~3/4 m tall. [Old Beard Chimney'06]	geogroup
j2-193-chimney-2	geo	4/29	3	53	145.68122	15.94272	348	Chimney. Active chimney. ~40cm tall and 12cm wide. Good flow at this site. Chimney still venting while placing it in basket (it split). T=340C [Gnome Vents]	geogroup
j2-193-rock-3	geo	4/29	9	1	145.66804	15.94185	280	Rock sample from the highest point for this area (small peak north of main western pinnacle).	geogroup
j2-193-rock-4	geo	4/29	9	32	145.66734	15.94146	316	Rock. Collected a piece of the tan colored highly vesiculated - almost pumice-like rock. [W peak saddle area]	geogroup
j2-193-crust-5	geo	4/29	10	50	145.66651	15.93967	245	Crust. Small piece of crust (layered in this area). [N of peak - but near top of W pinnacle]	geogroup
j2-193-bio-6	bio	4/29	11	13	145.66654	15.93927	232	Bio-macro. Sponge with embedded worms. [west cone on the north part of the summit dome].	Tunnicliffe
j2-193-HFS-7	water	4/29	17	2	145.68134	15.94272	352	HFS. Unfiltered piston #5. Tmax=162.8C Tavg=140 T2=72. Vol=350ml. [between Gnome and 5 Towers]	Butterfield
j2-193-HFS-8	water	4/29	17	4	145.68134	15.94272	352	HFS. Filter Bag #11. Same orifice as #7. Tmax=156C Tavg=128 T2=21. Vol=352ml. [between Gnome and 5 Towers]	Butterfield
j2-193-HFS-9	water	4/29	17	43	145.68128	15.94272	351	HFS. Unfiltered piston #20. Tmax=108.4C Tavg=105.7 T2=99. Vol= 533ml. Same pos as sample#2 active chimney - doppler shift. [Gnome area]	Butterfield
j2-193-HFS-10	water	4/29	17	48	145.68128	15.94272	351	HFS. Filtered bag #18. Tmax=108.7C Tavg=102.4 T2=99. Vol= 551ml. Same pos as sample#2 active chimney - doppler shift. [Gnome area]	Butterfield
j2-193-gastight-11	gas	4/29	17	54	145.68128	15.94272	351	HFS. Gastight on the HFS fired. Tmax=108.7C. Same pos as sample#2 active chimney - doppler shift. [Gnome area]	Evans
j2-193-HFS-12	water	4/29	18	46	145.68132	15.94277	349	HFS Unfiltered bag #19 Tmax=241.2C Tavg=240.3 T2=110. Vol=398ml. [upslope of Five Towers]	Butterfield
j2-193-HFS-13	water	4/29	18	49	145.68132	15.94277	349	HFS Piston #22. Tmax 239.3C Tavg=214.7 T2=100. Vol=384ml. [upslope of Five Towers]	Butterfield
j2-193-HFS-27	water	4/29	18	54	145.68132	15.94277	349	HFS (SAMPLE-27) SAMPLE # OUT OF ORDER. MISSED THIS EARLIER. Time was 1854. Filter bag #17. Tmax=244.6C Tavg=244.3. T2=116. Vol=325ml. [upslope of Five Towers]	Butterfield
j2-193-chimney-14	geo	4/29	19	4	145.68132	15.94277	348	Chimney. Another small chimney. Max temp from vent is 195.4C [upslope of Five Towers]	geogroup

sample #	type	date	hr	min	longitude	latitude	Z(m)	J2-193 E Diamante Samples	PI
j2-193-scoop-15	bio	4/29	19	25	145.68141	15.94277	354	Scoop. Hairy snails in area of diffuse venting. [base of Five Towers]	Tunnicliffe
j2-193-biogeo-16	bio-geo	4/29	19	36	145.68141	15.94277	352	Bio/geo. Two rocks (could be a sulfide rather than lava) with barnacles and limpets on it. [base of Five Towers]	Tunnicliffe / geogroup
j2-193-HFS-17	water	4/29	19	58	145.68141	15.94277	353	HFS. Filtered piston #1. Tmax=23.1C Tavg=21.8 T2=19 Vol=593ml. [base of Five Towers]	Butterfield
j2-193-HFS-18	water	4/29	20	2	145.68141	15.94277	353	HFS. Unfiltered bag #8. Tmax=23.8C Tavg=20 T2=18. Vol=590ml [base of Five Towers]	Butterfield
j2-193-HFS-19	water	4/29	20	7	145.68141	15.94277	353	HFS. Sterivex filter #3. Tmax=26.0C Tavg=22.5 T2=18. Vol=3004ml [base of Five Towers']	Butterfield
j2-193-chimney-20	geo	4/29	20	35	145.68141	15.94277	353	Chimney. Small chimney that was spewing bubbles. [base of Five Towers]	geogroup
j2-193-HFS-21	water	4/29	21	59	145.68278	15.94345	459	HFS. Unfiltered bag #9. Tmax=13.7C Tavg=12.3 T2=11.3. Vol=600ml. Temp anomaly is 3 - 4 degrees above background in area of barnacles and anemones. [Barnacle Beach area]	Butterfield
j2-193-HFS-22	water	4/29	22	8	145.68278	15.94345	459	HFS. Sterivex filter #10. Tmax=13.4C Tavg=12.5 T2=12. Vol=3002ml. [Barnacle Beach area]	Butterfield
j2-193-HFS-23	water	4/29	22	32	145.68278	15.94345	459	HFS. Unfiltered piston #6. Tmax=13.6C Tavg=13.5 T2=12. Vol=600ml. Looks like we're seeing more milky water here. [Barnacle Beach area]	Butterfield
j2-193-HFS-24	water	4/29	22	37	145.68278	15.94345	459	HFS. Filtered bag #14. Tmax=13.7C Tavg=13.3 T2=12. Vol=598ml. [Barnacle Beach area]	Butterfield
j2-193-biogeo-25	bio-geo	4/29	22	46	145.68278	15.94345	459	Bio/geo. Small rock (about fist sized) covered with barnacles. [Barnacle Beach area]	Tunnicliffe / geogroup
j2-193-niskin-26	water	4/29	23	25	145.67748	15.94038	357	Niskin (red) fired in the plume. Eh is plummeting here (0.09). Fired at 2325.	Resing
j2-193-suction-28	bio	4/30	0	0	145.67673	15.93975	318	Suction. Red snails; pointy white snail; hermit crabs; sponges; anemone and lots of rock. At Limpets but there are no limpets. There are snails anemones and mat here. Tamb=12.4C. Eh=-40 [Limpets'06]	Tunnicliffe

5.3.11 J2-194 Ruby Samples

sample #	type	date	hr	min	longitude	latitude	Z(m)	J2-194 Ruby Samples	PI
j2-194-rock-1	geo	4/30	10	31	145.57233	15.60460	188	Rock. Looks like basalt. [Just north of summit - on summit ridge]	geogroup
j2-194-rock-2	geo	4/30	12	18	145.57165	15.60466	215	Rock with red oxidized sediment coating on top side. This rock is larger than the first sample and black on the bottom - the part not exposed to the plume. [Rua]	geogroup
j2-194-major-3	water	4/30	12	26	145.57165	15.60466	214	Major (blue) in the seds stirred up by the temp probe. Tamb=~18C. Tmax=~27 in the seds. [Rua]	Butterfield
j2-194-scoop-4	bio	4/30	12	35	145.57165	15.60466	214	Scoop. Open mesh scoop of the crop circles (little white and brown holes in the sediment). A couple crabs too if possible? [Rua]	Tunnicliffe
j2-194-crust-5	geo	4/30	13	12	145.57176	15.60471	215	Crust. Thin piece of crust (red on top). Once Jason grabbed it it just crumbled. [heavily oxidized area E of Rua]	geogroup

sample #	type	date	hr	min	longitude	latitude	Z(m)	J2-194 Ruby Samples	PI
j2-194-major-6	water	4/30	13	26	145.57176	15.60471	215	Major (red) here at the same spot as the previous crust sample. There's a little flow here. Not much but some. [heavily oxidized area E of Rua]	Butterfield
j2-194-gastight-7	gas	4/30	13	37	145.57176	15.60471	215	Gastight (red-handle) in same spot as Major. [heavily oxidized area E of Rua]	Evans
j2-194-major-8	water	4/30	14	3	145.57182	15.60471	214	Major (yellow) in same hole as temperature reading.	Butterfield
j2-194-gastight-9	gas	4/30	14	17	145.57182	15.60471	214	Gastight (black on handle-blue/white everywhere else). Same hole as yellow Major. Tip just off the rock.	Evans
j2-194-rock-10	geo	4/30	14	29	145.57226	15.60474	191	Rock. Orange 8-10 inches long. [northern summit area]	geogroup
j2-194-biogeo-11	bio-geo	4/30	16	52	145.57213	15.60439	200	Bio/geo. 2 tennis ball-sized rocks with limpets. [Mat]	Tunnicliffe / geogroup
j2-194-suction-12	bio	4/30	17	4	145.57213	15.60439	200	Suction. Bio-macro. Found another crab...got it! [Mat]	Tunnicliffe

5.3.12 J2-195 Daikoku Samples

sample #	type	date	hr	min	longitude	latitude	Z(m)	J2-195 Daikoku Samples	PI
j2-195-niskin-1	water	5/2	8	15	144.19222	21.32473	381	Niskin (red) tripped immediately above the flat fish where temperature probe was placed. Tamb=13.8C. Temp 10cm into seds is 14.0.	Resing
j2-195-suction-2	bio	5/2	8	24	144.19222	21.32473	381	Suction. Sampling flat fish into yellow jar. (same spot as sample 1 and temp reading Tamb=13.8)	Dower
j2-195-suction-3	geo	5/2	8	44	144.19222	21.32473	380	Suction. Sediment sample into white jar.	Dower
j2-195-scoop-4	bio	5/2	9	19	144.19222	21.32473	380	Scoop. Dark patches of sediment - with lots of fish in area. Into fine mesh bag. Starboard bio box.	Dower
j2-195-crust-5	geo	5/2	10	3	144.19149	21.32513	409	Crust. Grabbed a piece of sulfur crust. This area looks very much like the sulfur lake at Nikko. Lots of crabs and flat fish. Tamb=13.8C	geogroup
j2-195-major-6	water	5/2	10	37	144.19147	21.32508	410	Major (blue). In the crack where we just took the temp here at Bubble Bath. Tmax=52C. [Bubble Bath]	Butterfield
j2-195-gastight-7	gas	5/2	10	47	144.19147	21.32508	411	Gastight (red-tape) here at same spot where we took the major. Tmax=52C. [Bubble Bath]	Evans
j2-195-molten-sulfur-8	geo	5/2	12	0	144.19148	21.32499	413	Molten sulfur. Collected by dunking the marker chain into Sulfur (Devil's) Cauldron. This sample is not crust - at least not yet. The sulfur looks black. [Sulfur Cauldron]	geogroup
j2-195-major-9	water	5/2	13	31	144.19163	21.32483	403	Major (white) taken in the little venting crack immediately at the base of the tiny sulfur chimney. Tmax=211C. [Smoking Vent]	Butterfield
j2-195-gastight-10	gas	5/2	13	36	144.19163	21.32483	403	Gastight (white tape). Tmax=211C. Sampled directly in the tiny chimney. [Smoking Vent]	Evans
j2-195-chimney-11	geo	5/2	14	26	144.19163	21.32483	404	Scooping up the tiny chimney. Tmax=211C. [Smoking Vent]	geogroup
j2-195-suction-12	geo	5/2	15	12	144.19205	21.32440	382	Suction sample (blue cylinder) of sediment patch around tongue fish.	Tunnicliffe / Dower
j2-195-rock-13	geo	5/3	3	16	144.19148	21.32499	413	Rock (sulfur crust). Piece from edge of sulfur lake - fist-sized. [Sulfur Cauldron area]	geogroup
j2-195-suction-14	bio	5/3	4	10	144.19223	21.32465	383	Suction (red). A number of fish and possibly snails.	Tunnicliffe / Dower

sample #	type	date	hr	min	longitude	latitude	Z(m)	J2-195 Daikoku Samples	PI
j2-195-niskin-15	water	5/3	4	42	144.19287	21.32445	405	Niskin. Triggered at 377m from plume over the big NE Pit. T=14.8C.	Resing
j2-195-rock-16	geo	5/3	4	48	144.19287	21.32445	381	Rock from west edge of pit (non-plume pit). Round grapefruit size. A second piece on top of round rock - slabby piece broke up when placed in basket.	geogroup

5.3.13 J2-196 NW Eifuku Samples

sample #	type	date	hr	min	longitude	latitude	Z(m)	J2-196 NW Eifuku Samples	PI
j2-196-HFS-1	water	5/3	19	35	144.04168	21.48736	1612	HFS. Unfiltered piston #5. Tmax=31.3C Tavg=30.1 T2=20.7. Vol=400ml. [Below Champagne vents on sulfur flow]	Butterfield
j2-196-HFS-2	water	5/3	20	5	144.04168	21.48736	1612	HFS. Sterivex filter #10. Tmax=52.7C Tavg=42.9 T2=27. Vol=4000ml. [Below Champagne vents on sulfur flow]	Butterfield
j2-196-HFS-3	water	5/3	20	12	144.04168	21.48736	1612	HFS. Unfiltered bag #9. Tmax=44.2C Tavg=41.2 T2=28. Vol=251ml. [Below Champagne vents on sulfur flow]	Butterfield
j2-196-HFS-4	water	5/3	20	15	144.04168	21.48736	1612	HFS. Fish filter #7. Tmax=43.6c Tavg=41.9 T2=29. Vol=201ml. [Below Champagne vents on sulfur flow]	Butterfield
j2-196-gastight-5	gas	5/3	20	25	144.04168	21.48736	1612	Gastight (black). Tmax~43C? [Below Champagne vents on sulfur flow]	Evans
j2-196-niskin-6	water	5/3	20	45	144.04162	21.48742	1605	Niskin (green) fired. [just upslope of Champagne site]	Resing
j2-196-scoop-7	bio	5/3	21	9	144.04157	21.48745	1610	Scoop (net) 5-6 mussels at 'medium mussel density' site. [About 10m NW of Champagne]	Tunnicliffe
j2-196-HFS-8	water	5/3	21	13	144.04157	21.48745	1610	HFS. Filtered bag #11 just above mussels (sample #7). All temps ambient (no anomaly) at 2.4C. Vol=551ml. [~10m NW of Champagne]	Butterfield
j2-196-chimney-9	geo	5/3	21	58	144.04142	21.48732	1623	Chimney. Mainly sulfur (probably some silica too) covered with shrimp. Diffuse venting area. Mound is ~2m across and 4m tall. Tmax=22.4C. [Sulfur Slope'06]	geogroup
j2-196-bio-macro-10	bio	5/3	22	31	144.04116	21.48735	1638	Bio-macro. Scooping mussels (mesh bag). Great sample. [Rippling Mussels'06]	Tunnicliffe
j2-196-HFS-11	water	5/3	22	35	144.04116	21.48735	1638	HFS. Filtered bag #14 in this area on rock with ~85% mussel coverage. Tmax=2.9C Tavg=2.8. Vol=646ml. [Rippling Mussels'06]	Butterfield
j2-196-HFS-12	water	5/3	22	43	144.04116	21.48735	1638	HFS. Unfiltered bag #19 here in the mussels. Tmax=2.7 Tvg=2.6. Vol=604ml. [Rippling Mussels'06]	Butterfield
j2-196-bio-macro-13	bio	5/3	23	5	144.04134	21.48743	1620	Bio-macro. One dead mussel casing with no calcium carbonate. Periostricum is all that is left of these dead mussels.	Tunnicliffe
j2-196-bio-macro-14	bio	5/4	0	0	144.04169	21.48765	1597	Bio-macro. Scooping up (black bag) healthy looking mussels (~8 of them). Area with the largest concentration of mussels so far. [Where?]	Tunnicliffe
j2-196-HFS-15	water	5/4	0	9	144.04169	21.48765	1597	HFS. Filtered bag #18. Tiny temp anomaly. Tamb=1.8C on Jason probe. Tmax=2.5 Tavg=2.4. Vol=601ml. In the area of the mussels. Sample failed. [Where?]	Butterfield
j2-196-HFS-16	water	5/4	0	29	144.04170	21.48761	1595	HFS. Filtered bag #17. Sample for the mussel info. Sample 15 didn't work - the flush pump was not on. T=2.5C Tamb=2.4. Vol=605ml. [Where?]	Butterfield

sample #	type	date	hr	min	longitude	latitude	Z(m)	J2-196 NW Eifuku Samples	PI
j2-196-gastight-17	gas	5/4	0	45	144.04160	21.48731	1614	Gastight. Firing gastight (red) in water column within sight of Champagne plume (for background). Tamb=1.8C. Z=1601. Alt=7.1.	Evans
j2-196-HFS-18	water	5/4	2	19	144.04212	21.48725	1578	HFS. Unfiltered piston #20. Tmax=40C Tavg=30.6 T2=30. Vol=401ml. [Cliff House'06]	Butterfield
j2-196-HFS-19	water	5/4	2	23	144.04212	21.48725	1578	HFS. Sterivex #21. Same location as previous sample. Tmax=54.1C Tavg=45.1. Vol=5 liters. [Cliff House'06]	Butterfield
j2-196-gastight-20	gas	5/4	2	26	144.04212	21.48725	1578	Gastight same hole and time as sample 19. Tmax=54.1C. [Cliff House'06]	Butterfield
j2-196-HFS-21	water	5/4	3	6	144.04212	21.48725	1578	HFS. Unfiltered piston #22. Same spot. Tmax=46.7 Tavg=41.7 T2=28. Vol=461ml. [Cliff House'06]	Butterfield
j2-196-HFS-22	water	5/4	3	7	144.04212	21.48725	1578	HFS. Sterivex filter #23. This is a large volume sample. Tmax=43.6C Tavg=33.7. Vol=3021ml. [Cliff House'06]	Butterfield
j2-196-major-23	water	5/4	4	5	144.04212	21.48725	1578	Major (red.) Same hole as all the other samples here. Tmax=~43C. [Cliff House'06]	Butterfield
j2-196-gastigt-24	gas	5/4	4	18	144.04212	21.48725	1577	Gastight (white). Same spot as previous samples. Tmax=~43C. [Cliff House'06]	Evans
j2-196-niskin-25	water	5/4	4	21	144.04212	21.48725	1579	Niskin (red). Pulled off of wall at depth 1571m. [Cliff House'06 area]	Resing

5.3.14 J2-197 Daikoku Samples

sample #	type	date	hr	min	longitude	latitude	Z(m)	J2-197 Daikoku Samples	PI
j2-197-HFS-1	water	5/4	16	30	144.19148	21.32508	412	HFS Unfiltered piston #5. Tmax=18.3C Tavg=17.5 T2=15.9. Vol=401ml. [Bubble Bath area]	Butterfield
j2-197-gastight-2	gas	5/4	16	47	144.19148	21.32508	412	Gastight. Funnel gastight over bubbles - very near sample 1 position. [Bubble Bath area]	Evans
j2-197-major-3	water	5/4	16	53	144.19148	21.32508	412	Major (white). [Bubble Bath area]	Butterfield
j2-197-suction-4	geo	5/4	17	25	144.19148	21.32508	411	Suction sediment below rock. Good sample. [Bubble Bath area]	Davis
j2-197-suction-5	bio	5/4	19	14	144.19195	21.32472	392	Suction flat fish into green jar.	Dower
j2-197-suction-6	geo	5/4	19	33	144.19195	21.32472	392	Suction sediment beneath where fish were collected into blue fine mesh jar.	Dower
j2-197-HFS-7	water	5/4	20	16	144.19293	21.32454	437	HFS Unfiltered bag #8. T=15.4C. Vol=564ml. [in NE Pit]	Butterfield
j2-197-HFS-8	water	5/4	20	22	144.19293	21.32454	440	HFS. Filtered bag #11 Tmax=15.6C Tavg=15.4. Vol=623ml. [in NE Pit]	Butterfield
j2-197-HFS-9	water	5/4	20	26	144.19293	21.32454	440	HFS Sterivex filter #10. Tmax=15.6C Tavg=15.3 Vol=3029ml. [in NE Pit]	Butterfield
j2-197-niskin-10	water	5/4	20	30	144.19293	21.32454	440	Niskin (green). [in NE Pit]	Resing
j2-197-HFS-11	water	5/4	20	47	144.19293	21.32454	441	HFS FISH filter #12. Tmax=15.3C Tavg=15.2. Vol=167ml. [in NE Pit]	Butterfield
j2-197-HFS-12	water	5/4	20	49	144.19293	21.32454	442	HFS Filtered piston #1. Tmax=15.3 Tavg=15.2 Volume=657ml. [in NE Pit]	Butterfield
j2-197-HFS-13	water	5/4	20	56	144.19293	21.32454	441	HFS. Filtered bag #14 Tmax=15.9C Tavg=15.6. Volume=363ml. [in NE Pit]	Butterfield
j2-197-biogeo-14	bio-geo	5/4	21	6	144.19293	21.32454	441	Bio/geo. Barnacle covered rock from north face of pit wall. [in NE Pit]	Tunnicliffe / geogroup
j2-197-suction-23	bio	5/4	21	14	144.19293	21.32454	440	Suction of bacterial mat from pit wall into yellow suction jar. Sample number changed to 23 due to mix up. [in NE Pit]	Davis

sample #	type	date	hr	min	longitude	latitude	Z(m)	J2-197 Daikoku Samples	PI
j2-197-biogeo-15	bio-geo	5/4	21	53	144.19133	21.32493	414	Bio/geo. Small rock covered with barnacles. Can't even see the large rock nearby - just a mass of barnacles with their cilia out. [Barnacles]	Tunnicliffe / geogroup
j2-197-HFS-16	water	5/4	22	9	144.19139	21.32496	414	HFS. Unfiltered piston #6. Tmax=63.4C Tavg=56.1. Vol=557ml. [Alka Seltzer]	Butterfield
j2-197-gastight-17	gas	5/4	22	12	144.19139	21.32496	414	Gastight in same spot as sample 16. Tmax=55C. [Alka Seltzer]	Evans
j2-197-HFS-18	water	5/4	22	15	144.19139	21.32496	414	HFS. Unfiltered piston #20. Tmax=53.3C Tavg=40.5. Vol=504ml. [Alka Seltzer]	Butterfield
j2-197-HFS-19	water	5/4	22	23	144.19139	21.32496	414	HFS. Sterivex filter #21. Tmax=64.5C Tavg=45.5. Vol=1317ml. [Alka Seltzer]	Butterfield
j2-197-HFS-20	water	5/4	22	33	144.19139	21.32496	414	HFS. Filtered piston #24. Tmax=19C Tavg=16.4. Vol=302ml. [Alka Seltzer]	Butterfield
j2-197-chimney-21	geo	5/4	22	41	144.19139	21.32496	414	Chimney. Scooping up part of the little black (sulfur) chimney. Little black piece fell in. Mostly ash here bound by sulfur. Getting ash; sediment; sulfur globules etc. [Alka Seltzer]	geogroup
j2-197-molten-sulfur-22	geo	5/4	23	16	144.19148	21.32499	413	Molten Sulfur. Scoop molten sulfur into coffee can. First attempt on the edge proved the crust is hard. Broke crust and filled the can with sulfur. Temp here last night was 187C. [Sulfur Cauldron]	geogroup / Takano

5.3.15 J2-198 Nikko Samples

sample #	type	date	hr	min	longitude	latitude	Z(m)	J2-198 Nikko Samples	PI
j2-198-major-1	water	5/7	8	28	142.32509	23.08101	457	Major (red) sampler. Tmax=216C. Site with active venting and some bubbling. No obvious sulphur flows. [NW crater floor]	Resing
j2-198-gastight-2	gas	5/7	8	36	142.32509	23.08101	457	Gastight fired. Tmax=216C. Site with active venting and some bubbling. No obvious sulphur flows. [NW crater floor]	Evans
j2-198-rock-3	geo	5/7	8	38	142.32509	23.08101	457	Rock. Yellow sulphurous rock with the triangular scoop (into biobox). Lots of vigorous white smoking action but no active sulphur flow visible. [NW crater floor]	geogroup
j2-198-rock-4	geo	5/7	9	29	142.32568	23.08020	470	Rock. Piece of odd looking sulphur structure (yellow sulfur chimney or spire). [crater center]	geogroup
j2-198-niskin-5	water	5/7	10	3	142.32615	23.07942	444	Niskin (green). Could possibly have fired the red one too. Area of dense biology.	Resing
j2-198-suction-6	bio	5/7	10	56	142.32648	23.07908	445	Suction of white mat. Area of dense biology; mat; and diffuse flow. [Tubeworm Hangover]	Davis
j2-198-suction-7	bio	5/7	11	14	142.32648	23.07908	447	Suctioned up quite a few shrimp here (loihi). [Tubeworm Hangover]	Tunnicliffe.
j2-198-rock-8	geo	5/7	12	9	142.32673	23.07966	428	Rock. Small rounded rock from near the top of the east/southeast crater rim.	geogroup
j2-198-suction-9	bio	5/8	3	25	142.32570	23.08115	460	Suction. Sampling flat fish (tongue fish). Got at least 5. Also got a crab; a mussel shell and sediment. [N crater floor]	Dower

5.3.16 J2-199 Nikko Samples

sample #	type	date	hr	min	longitude	latitude	Z(m)	J2-199 Nikko Samples	PI
j2-199-scoop-1	geo	5/8	14	46	142.32617	23.08085	469	Scoop. Dark and light (layered) sulfur sediments.	geogroup
j2-199-rock-2	geo	5/8	14	55	142.32617	23.08085	469	Rock. Yellow sulfur piece - irregular shaped (broke up).	Nakamura / geogroup
j2-199-HFS-3	water	5/8	15	58	142.32548	23.08102	460	HFS unfiltered bag #9. Tmax=66.3C Tavg=63.6 T2=42. Vol=576ml. Area of shimmering water and biota. [20m S of North Vent]	Butterfield
j2-199-HFS-4	water	5/8	16	2	142.32548	23.08102	460	HFS Sterivex Filter #10 Tmax=96.1C Tavg=80.2 T2=51. Vol=4liters. Area of shimmering water and biota. [20m S of North Vent]	Butterfield
j2-199-HFS-5	water	5/8	16	40	142.32548	23.08102	460	HFS Fish Filter #12. Tmax=74.8C Tavg=72.1 T2=48.8. Vol=200ml. Area of shimmering water and biota. [20m S of North Vent]	Butterfield
j2-199-HFS-6	water	5/8	16	42	142.32548	23.08102	460	HFS unfiltered piston #20. Tmax=81.2C Tavg=74.6 T2=49.7. Vol=551ml. Area of shimmering water and biota. [20m S of North Vent]	Butterfield
j2-199-scoop-7	bio	5/8	18	44	142.32626	23.07959	446	Scoop. 8-10 mussels that were originally attached to tubeworms. T=11.4C.	Tunnicliffe / Dower
j2-199-HFS-8	water	5/8	19	48	142.32643	23.07913	447	HFS Unfiltered bag #8. Tmax=25.6C Tavg=24.9 T2=20. Vol=511ml. In small area of shimmering water. [Near SE Vent site]	Butterfield
j2-199-HFS-9	water	5/8	19	52	142.32643	23.07913	447	HFS Sterivex filter. Tmax=26.1C Tavg=24.1 T2=20. Vol=3522ml. In small area of shimmering water. [Near SE Vent site]	Butterfield
j2-199-HFS-10	water	5/8	20	19	142.32643	23.07913	447	HFS Filtered bag #14. Tmax=24.5C Tavg=23.6 T2=20. Vol=554ml. In small area of shimmering water. [Near SE Vent site]	Butterfield
j2-199-HFS-11	water	5/8	20	24	142.32643	23.07913	447	HFS FISH filter #11. Tmax=23.9C Tavg=22.9. Vol=201ml. In small area of shimmering water. [Near SE Vent site]	Butterfield
j2-199-rock-12	geo	5/8	20	32	142.32643	23.07913	446	Rock. Small rock with sulphur inclusions placed in front center basket. In small area of shimmering water. [Near SE Vent site]	geogroup
j2-199-HFS-13	water	5/8	21	45	142.32687	23.07977	413	HFS Filtered bag #16. Tmax=33 Tavg=31.6 T2=25. Vol=601ml. Eh -92. [Top Vent aprox.]	Butterfield
j2-199-HFS-14	water	5/8	21	50	142.32687	23.07977	413	HFS Sterivex filter #21. Tmax=35.4C Tavg=32.5 Vol=3069ml. [Top Vent aprox.]	Butterfield
j2-199-HFS-15	water	5/8	22	17	142.32687	23.07977	413	HFS Unfiltered bag #19. Tmax=29.3C Tavg=26.3 T2=13. Vol=563ml. [Top Vent aprox.]	Butterfield
j2-199-HFS-16	water	5/8	23	15	142.32629	23.07920	444	HFS Filtered piston #1. Looks like a bit of sulfur on the intake. Tmax=78.2C Tavg= 61.6 T2=23. Vol=499ml. [Varnum Vent]	Butterfield
j2-199-HFS-17	water	5/9	0	45	142.32547	23.07870	478	HFS Filtered bag #11. Tmax= 67.9C Tavg=62.8 T2=14-16.9. Vol=601ml. [Yellow Lips]	Butterfield
j2-199-HFS-18	water	5/9	1	2	142.32547	23.07870	489	HFS Unfiltered piston #6. Tmax=76.3C Tavg=65.2 T2=16. Vol=600ml. [Yellow Lips]	Butterfield
j2-199-rock-19	geo	5/9	1	16	142.32547	23.07870	489	Rock. Round rock about 3 inches wide. Exposed sulfur on the bottom - whole thing may be sulfur. From Yellow Lips directly below fluid sampling orifice. [Yellow Lips]	geogroup
j2-199-major-20	water	5/9	2	23	142.32514	23.07789	427	Major (white). At sulfur pool in smoke. Snout dipped in sulfur. [Naraku]	Butterfield

sample #	type	date	hr	min	longitude	latitude	Z(m)	J2-199 Nikko Samples	PI
j2-199-gastight-21	gas	5/9	2	29	142.32514	23.07789	427	Gastight (red). Same pool as previous major sample. [Naraku]	Evans
j2-199-niskin-22	water	5/9	2	49	142.32514	23.07789	427	Niskin (red) taken in all this white smoke. [Naraku]	Takano / Resing
j2-199-HFS-23	water	5/9	3	11	142.32515	23.07780	407	HFS Background Filtered Bag #18 Tmax=15.0C Tavg=14.9. Vol=700ml. Z=343.7. Not in any visible plume. Winch problems. [No Nav: ~10m S of Naraku]	Butterfield
j2-199-HFS-24	water	5/9	3	17	142.32515	23.07780	441	HFS Background sterivex #23. Tmax=14.0 Tavg=14.7 T2=14.8 vol=4001. Depth is 343.7. Not in any visible plume. Winch problems. [No Nav: ~10m S of Naraku]	Butterfield
j2-199-HFS-25	water	5/9	3	45	142.32515	23.07780	453	HFS unfiltered piston #5. Background. Tmax=14.8C Tavg=14.7 T2=14.7. Vol=601ml. Depth is 343.7. Not in any visible plume. Winch problems. [No Nav: ~10m S of Naraku]	Butterfield
j2-199-rock-26	geo	5/9	7	51	142.32510	23.07794	428	Rock. Grabbed a piece of new sulfur. [Naraku area]	geogroup
j2-199-sulfur-27	geo	5/9	7	51	142.32510	23.07794	427	Molten sulfur. ROV dipped in sulfur while attempting to retrieve piece of crust. ~80 pounds of sulfur was coating the carriage of Jason when it was recovered. [Naraku area]	geogroup etc.

5.4 *Jason-2* DIVE LOGS

All dive log latitude/longitude positions are preliminary and uncorrected, except those listed in brackets with sample entries which were corrected after reviewing the navigation. Dive log depths and altitudes are inaccurate at times, especially noticeable when the altitude is a high number (often times when sitting on the bottom).

5.4.1 J2-184 Seamount X Dive Log

time	medea hdg	medea alt	medea Z	J2-184 Seamount X - Dive Log Comments
J2-184 Seamount X Dive Summary: First 4.5 hours of the dive was set aside for engineering trials. (No science DVCam 1103 - 1410: Tape stuck.) At 0135 started the science portion of the dive. Suction sampled what looked like could be bacterial mat. Transect to the NW up a saddle between the 2 summit peaks. No signs of hydrothermal activity. Toward the NW portion of the first line encountered thick iron deposits and some grayish mat. Temp probe not working. Suctioned more mat then headed west, north of the summit. Very little macrofauna so far. Turned to SE for traverse across summit peaks. Near the northern summit peak suctioned bacterial mat and brown snails. Saw hydrothermal signs on the SE peak: diffuse flow, squat lobsters, patches of bacterial mat etc. SE Peak samples: 1 major, 1 gastight, 2 rocks, 1 shrimp suction attempt (failed). Temp probe working now. Next traveled to NE peak (across the saddle). Not much there so proceeded to the S/SW for exploration. Not much activity. Last traverse was N/NW. Discovered large white patches and extensive crabs (galatheids). Tried to scoop up shrimp but failed. 12 samples total.				
J2-184 Bottom time: 4/18/2006 - 4/19 0135 UTC Jason Sea Trial. 4/19 0135 - 1734 UTC Science Dive. (Total bottom time 20.28 hrs)				
Note: No raw latitudes and longitudes listed for this dive. The virtual van was only recording Medea positions for this dive. Navigation on divemaps is Jason nav - provided after the dive.				
20:22	70	-999	-1004	**Jason in water**
20:34	6	-999	-942	This is primarily an engineering dive
20:50	59	-999	-466	Passing 550 m depth
21:17	136	32	1279	Touchdown at 1290m - on bottom
21:24	16	27	1281	Broken rock. Not massive lavas. Possibly Fe-oxide staining.
21:37	333	26	1282	Galatheid crab.
21:38	142	7	1262	Crab sitting on what appears to be blocky lava that is strongly weathered/oxidized.
21:51	337	22	1280	Still running through engineering checks.
21:54	347	23	1281	Unloading weights.
22:37	303	19	1272	Virtual van data not correct. Akel is correcting.
22:38	310	9	1264	Verena took 8 digital images for a test.
22:47	85	24	1277	Still sitting on the bottom in one place.
22:51	211	23	1277	Still sitting here in same position. Sounds like we will be moving a bit soon. Looks like we will move about 100 meters.
22:51	235	-999	255	We're looking at a beautiful weathered outcrop.
22:53	330	23	1276	Zooming in on a little squat lobster.
22:59	309	-999	255	**Testing the suction sampler. (no sample 1)**
23:27	357	27	1280	Rotating the suction sampler away from the green jar.
23:29	314	27	1280	Suction sampler intake is above the yellow jar.
23:32	339	26	1281	Lasers are 10 cm apart and are on the 3 chip camera.
01:00	33	-999	254	This is dive J2-184.
01:05	294	-999	252	Dive J2-184 started at 0620 local - 4/18/06. UTC 2020 4/17/06.
01:35	295	-999	255	**Finished with sea trials. Starting our science part of the dive now.**
01:37	343	8	1261	We're going to drive north now. Will drive up saddle between the peaks east of the summit.
01:51	320	25	1278	We're not moving yet. Still getting our bearings etc.
01:53	314	26	1283	Change of watch.
01:54	256	-999	259	Heading for start of line will be 353.
01:57	214	32	1289	Moved closer to bottom at less than 1meter.
02:03	241	33	1290	Ridge in view is not more than 5 or 10 meters.
02:06	273	13	1271	Lasers are 10 cm apart in the view.
02:08	259	30	1287	Navigator not available at present so no lat/long.
02:11	288	30	1284	Some sand between gnarly lava.
02:12	284	29	1282	Small yellow objects visible and evidence of currents.
02:13	304	32	1284	Some mat through the sediment (the white material).
02:14	281	33	1286	Going to try to stop to sample with the slurp suction.
02:15	277	31	1284	Position 13° 14.833N 144° 1.254E (LBL good position) at the sampling site.
02:16	259	29	1282	Vehicle being pulled off the sampling site.
02:18	296	31	1283	Going back to bottom as Medea no longer pulling on vehicle.
02:22	320	31	1287	Sediment was stirred up and will probably not sample after all. Taking a look at the bottom before deciding to continue transiting.
02:24	333	27	1288	Embley has requested an attempt at a rock sample.

time	medea hdg	medea alt	medea Z	J2-184 Seamount X - Dive Log Comments
02:28	346	24	1285	The white material in view is now the target for sampling instead of a rock.
02:30	295	19	1282	Crab in view to right of white material.
02:32	293	24	1283	Digital picture of white mat material.
02:36	341	24	1282	Not sure if white material is mineral or mat.
02:37	346	24	1282	Rattail swam through view.
02:38	345	23	1283	Stable at sampling position. Latitude 13° 14.829N Longitude 144° 1.248E depth 1298.1 meters.
02:39	343	24	1283	Shrimp next to crab getting digital images. Looks like crab was trying to capture shrimp.
02:40	0	24	1282	**SAMPLE-2 Suction - multiple slurps of white material (bacterial mat?) into yellow chamber. [144.0208E/13.24715N] PI Davis**
02:43	7	25	1283	Moving vehicle onward.
02:47	24	24	1282	Off bottom heading with a desired heading of 357. Shrimp came into view.
02:56	350	25	1282	A lot of sand in area and pillow lavas.
02:57	333	22	1281	Planned to move along about 80 meters. Lines appear to be E-W.
02:58	358	23	1282	Went over a saddle with altitude of 5 meters and depth of 1298.
02:59	49	23	1281	Bottom back in view with altitude of 1.9 meters.
03:00	70	30	1281	Came over saddle with depth now 1308 meters. Nothing looks very fresh - younger lava is probably west of us.
03:01	73	26	1283	Ripple marks visible.
03:06	62	28	1290	Video tapes being changed.
03:07	43	31	1291	At end of transect target - moving to new target toward NE.
03:09	10	31	1293	Next move at 332 deg and 300 meters.
03:09	0	31	1294	Transect between two small peaks of about 1300 meters. Change of current and ripple mark patterns.
03:12	44	34	1296	Pretty much all sand on bottom and not much rock outcrop with changes in ripple pattern.
03:12	31	34	1297	Some rock outcrops visible but mostly sand.
03:14	69	33	1297	Will try to drive over the shadows on the forward sonar enroute to target.
03:14	29	29	1294	Seeing more outcrop and some pillows visible.
03:18	69	12	1279	Some staining on rocks and fish. Definite pillow lavas.
03:21	45	29	1297	Something not working properly on videos.
03:22	42	27	1294	Videos recording - the problem is with the finalizing procedure.
03:24	31	4	1270	More hard structure visible (talus) and less sand.
03:26	31	32	1298	Looks like a talus slope.
03:27	42	32	1298	Moving along talus with 200 meters to go before target.
03:28	30	27	1294	No signs of hydrothermal activity - all talus.
03:28	37	29	1293	Coming up to a crack against wall.
03:31	16	28	1294	Going over edge of crack - depth is 1307 meters.
03:31	27	5	1271	Some alteration visible.
03:34	34	6	1272	Coming over solid outcrop. Cross structure and ridges.
03:35	19	10	1277	Back into talus with a ridge NE to SW trend.
03:38	21	19	1285	Moving along talus again.
03:39	30	31	1289	NOTE - all housekeeping data (position; alt; hdg; depth etc.) is incorrect for this dive in the virtual van data. Data was setup to record Medea only and will be fixed for next dive.
03:40	25	-999	256	Sand on top of outcrops.
03:44	285	27	1293	Stained rock in area.
03:45	302	28	1294	Rat tail fish near piece of outcrop. Broken pieces of rock.
03:48	19	32	1294	Some alteration in the rocks.
03:48	32	31	1293	Going over an outcrop with alteration between rocks (also a fish).
03:49	35	30	1293	Looks like some more white material.
03:51	33	30	1289	Bedrock looks highly hydrothermally altered.
03:51	16	25	1281	*Navigation is down - Embley would like a marker.*
03:52	49	22	1271	Going over a steeper slope to the north.
03:52	37	28	1268	Target 9 going back down slope from the altered area.
03:53	40	29	1265	Came up quite a ways here - about 10 meters from 1282 meters. Calling target 9 the altered zone.
03:54	11	27	1264	Sediment stirred up quite a bit.
03:54	31	23	1266	More outcrop ahead of us.
03:56	22	27	1278	Down to 1300 meters again.
03:57	34	29	1280	At 1306 meters a lot of outcrop with yellow staining material.
03:58	19	25	1276	Coming up over another ridge. Flat flows with material underneath that slumped away and crust on top - almost like a sheet flow.
03:59	288	33	1284	Depressions next to hills could be lava ponds that drained out and now looking at side of them.
04:00	247	27	1287	Getting deeper at 1312 meters.
04:02	251	25	1286	Fish going by.
04:02	272	33	1293	Reached our intended target on this line.
04:03	243	27	1299	New target is 314 degrees at 204 meters. Going a bit more NW.
04:04	229	20	1293	Deepest depth so far is at 1315 meters.

time	medea hdg	medea alt	medea Z	J2-184 Seamount X - Dive Log Comments
04:04	267	21	1292	Big yellow objects - uncertain what they are.
04:06	274	25	1297	Seeing some iron change in rocks.
04:06	257	25	1297	*Doing doppler reset with navigation.*
04:08	281	30	1302	Going through trough and looks like deepest part of this NW sector.
04:08	273	29	1302	Fish in view.
04:09	216	16	1288	Quite a bit more yellow staining in this area.
04:10	250	26	1301	Big outcrop next to vehicle and there is a crab crawling in the suction sampler.
04:11	275	25	1302	Fairly fresh iron material here.
04:12	248	26	1302	Another eel-like fish.
04:12	224	-999	279	Seeing a lot of yellow material between rocks. No evidence of flow - if there is it is very low temperature.
04:14	260	25	1301	A lot of yellow material in this outcrop. About 1318 meters and probably deepest will get.
04:15	260	22	1299	Discrepancy between depth gauge and map.
04:17	243	-999	277	Way off the bottom with altitude of 14-15 meters.
04:17	251	25	1301	Eel-like fish again.
04:18	275	28	1299	Embley would like to go down to bottom - obstacle nearby so going for quick look.
04:20	276	32	1296	More staining here on bottom.
04:20	360	32	1295	Went down into a hole but looks like much of the same yellow material.
04:21	339	21	1297	Coming back up again.
04:21	342	20	1296	Went down in probably deepest area and not much different.
04:22	13	21	1296	Looks like low-level hydrothermal activity (very low).
04:22	12	27	1296	Looking at top of this pond at 1304 meters.
04:23	338	40	1304	Cruising toward waypoint to NW on top of old pond. Seeing nothing but iron-rich material and no sign of flow.
04:24	352	37	1297	Looks like deposits getting thicker- - maybe something here.
04:25	353	7	1267	Surfaces completely covered with iron deposits.
04:27	15	32	1289	Not many animals here - seen very few soft ones.
04:27	9	28	1289	Looks like a lot more iron here so may getting close to something. Not seeing any active mat or grayish material.
04:28	359	29	1288	Fish swimming by at 1304 meters.
04:29	20	29	1289	Another white patch so getting toward something more active.
04:30	15	27	1287	Appears to be gradient here - be on the lookout for activity.
04:30	18	27	1286	Eh meter still at 174 - higher than before.
04:30	358	28	1289	A lot more white coming up.
04:31	23	27	1288	Moving again and looks like it could be active mat but not sure.
04:31	12	27	1287	Marking a target here of "white mats and heavy iron". Target 10
04:32	11	27	1288	Target 10 position 13 15.072M 144 1.103 E good LBL position.
04:33	358	30	1290	Eh dropped to 128.
04:34	330	26	1286	We have gotten out of the yellow mat area.
04:35	352	27	1286	At end of transect and will now go up the hill toward the south.
04:35	349	26	1286	A lot more of this iron material again.
04:35	348	27	1286	Eh is now down to 117.
04:37	21	30	1290	Looks like some old chimneys or something and thick material.
04:38	358	30	1290	Looking around to see if we want some mat slurp sample.
04:39	322	-999	254	Not sure if its active or not but it is extensive.
04:40	239	32	1289	Eh back up to 150.
04:41	257	34	1289	Could be edge of something so we should look around before moving ahead.
04:42	273	28	1289	Filmy white-gray material looks like active stuff.
04:42	280	29	1290	Rick does want a sample so looking for thickest area.
04:43	275	23	1284	**White filmy stuff on top of yellow material.**
04:44	282	26	1286	No change in EH.
04:46	247	25	1286	Looks like an anemone.
04:47	269	27	1289	Will try to sit down gently to sample the gray material.
04:47	243	29	1290	Will wait for water to clear at sample site.
04:47	247	29	1290	Not much current here while waiting for water to clear.
04:49	284	26	1288	Position is 13 15.097N 144 1.072E and depth 1305.9 meters.
04:49	286	25	1287	EH has dropped down to 117.
04:52	309	24	1290	Bringing hydraulics online and extending the drawer.
04:55	60	20	1288	Embley would like temperature of the mat as well.
04:56	63	21	1288	Moving arm for temperature probe.
04:59	327	23	1290	*Doppler fixes are bad here with all the sediment in the water.*
05:02	356	24	1290	ICL is now on.
05:05	340	23	1291	Temperature probe now on.
05:05	338	24	1290	Moving vehicle off to a new location and try to hover for sample taking.
05:06	274	24	1290	*Doppler reset.*

time	medea hdg	medea alt	medea Z	J2-184 Seamount X - Dive Log Comments
05:07	253	24	1291	*Doppler reset to LBL*.
05:09	239	25	1291	Changing video tapes.
05:09	245	25	1290	Temperature probe does not appear to be working.
05:10	247	27	1290	Shrimp went by.
05:12	215	27	1290	Can't resolve temperature probe problem - will not be able to get probe to work.
05:12	214	28	1290	Storing probe.
05:13	228	21	1285	Re-indexing sampler suction for next sample - it has been flushed.
05:16	241	-999	264	Moved to red position.
05:17	239	26	1290	Target 11 "Thick Iron Mat".
05:17	231	-999	263	Trying for hover sample.
05:18	222	28	1290	**Target 11 position 13 15.098N 144 1.069E** depth is 1305 and altitude is 1.7m
05:19	201	13	1275	Hydraulics turned on for slurp.
05:19	205	18	1282	**SAMPLE-3 Suction of thick iron mat into white jar. [144.017817E/13.251633N] PI geogroup / Davis**
05:20	223	27	1289	SAMPLE-3 Suction. Visibly getting mat. Depth 1305m Altitude .8m
05:25	196	23	1289	SAMPLE-3 Suction Doesn't seem to be slurping too hard but can see it going up tube.
05:26	194	21	1288	Finished slurping.
05:26	203	22	1289	SAMPLE-3 Suction Flushing hose. Sample is in the white container (NOT RED). Sampler turned off.
05:26	210	20	1287	Extra material left in the hose got flushed into the green container.
05:27	203	22	1289	Not seeing the material getting flushed.
05:30	299	27	1290	Stowing starboard manipulator.
05:30	334	27	1290	Can see material flushed out of hose now.
05:33	33	27	1290	Securing vehicle after sampling.
05:34	42	27	1290	Next plan is to do a search pattern from north then west then south.
05:35	338	27	1291	*Doppler reset to LBL*.
05:36	358	26	1290	Trying to do search without having to reposition ship and Medea.
05:38	359	26	1290	Fish went by - another eel like one.
05:38	359	18	1284	Lots of sediment here.
05:39	328	29	1290	Extensive iron mat.
05:40	188	24	1290	Went to end of tether to the north-will head to west next.
05:42	200	27	1290	Not as thick here as we move south.
05:42	198	27	1290	EH at 158.
05:43	201	28	1289	Moving a little SW.
05:46	163	27	1290	Starting to move.
05:47	178	27	1291	The J-2 readings that are working - DegC Cond Salin SVel MagX MagY MagZ MagT.
05:49	150	27	1290	Those readings are from the Jason CTD.
05:50	152	26	1290	Preparing to sample orange crust.
05:54	209	26	1289	We will sample this FeO crust eventually.
05:54	194	26	1289	We've decided not to sample the crust after all.
06:00	210	28	1291	Continuing to move west and downslope.
06:01	224	30	1292	Bottom material appears quite flocculent.
06:09	344	33	1296	Very hummocky bottom topography.
06:13	340	-999	273	Preparing to try collecting another piece of crust.
06:14	344	27	1300	Sampling aborted - arm unable to reach the crust.
06:16	351	24	1295	Continuing on toward next target area.
06:18	7	25	1297	Trying for a crust sample again.
06:25	322	24	1296	Unable to collect sample - crust too tough to break off .
06:26	325	24	1296	Starting to see very weathered "mushroom lavas".
06:31	324	28	1297	Continuing downslope to the west.
06:36	311	23	1295	Ascending scree slope of blocky weathered lava.
06:37	305	23	1295	Heading toward target 13.
06:38	6	28	1296	Old looking pillow lavas.
06:48	21	27	1294	Seeing some altered material here.
06:59	206	27	1309	At 1335 meters and still going down.
07:01	186	26	1313	Reddish looking altered rocks that look thin.
07:02	158	27	1315	Driving due west with about 100 meters to go for target 13.
07:02	165	27	1316	Lots of ridges and structure as we move over something.
07:04	179	28	1320	Not as much iron material here at 1340 meters (dropped off)
07:05	215	29	1321	Moving across this small depression.
07:07	196	28	1321	Video tape changing.
07:09	196	25	1322	Continuing west down the depression we've been following.
07:12	182	27	1325	*Changed baseline to AB - resulted in a 30m jump.*
07:12	182	27	1326	Embley back in hotseat.
07:16	173	29	1328	Seems to be absolutely no visible macrofauna anywhere.
07:16	190	30	1328	Still heading westward.

time	medea hdg	medea alt	medea Z	J2-184 Seamount X - Dive Log Comments
07:22	345	26	1329	Blocky lavas.
07:31	20	26	1329	Ripples in sediment.
07:38	5	28	1327	White flecks in sediment - small shells?
07:41	314	25	1323	Looks like small shell debris.
07:43	16	28	1327	Shell debris was at 1345m.
07:44	8	29	1328	Ascending slope of weathered lavas.
07:46	31	30	1330	More white debris- not certain whether they are shells or not.
07:49	24	27	1327	Shells or not?
07:55	255	24	1328	Ascending a slope of pillows.
07:56	226	24	1327	Pillows appear much less weathered than others seen to date on this dive.
07:56	229	24	1327	Crossing what look like toothpaste lava flows.
07:59	305	21	1323	Preparing to turn SE and follow the slope to the highest peak.
08:00	302	24	1322	Beginning our turn to the SE.
08:01	311	23	1322	More toothpaste flows.
08:02	321	22	1322	Climbing slope of highly weathered lavas.
08:06	187	27	1325	Crossing sheet flow. Changed course and now heading SE. Will pass over the summit peaks on this traverse.
08:07	190	27	1325	Crossing broken sheet flows - lots of fractures.
08:11	203	25	1322	Descending into a small collapsed pond.
08:16	182	31	1328	Looks like we might have some small areas of microbial mat.
08:22	192	28	1326	Crossing some sort of drainage feature.
08:24	199	32	1329	Still no signs of any sort of macrofauna.
08:27	157	30	1329	Digital still camera set to auto-fire once per minute.
08:28	185	30	1329	Becoming blockier.
08:28	215	30	1328	Climbing scree slope.
08:30	228	29	1326	Still heading up the slope to the SE.
08:32	187	29	1327	Appear to be entering an area with more frequent white patches - mat?
08:35	149	27	1324	No visible macrofauna associated with mat patches.
08:37	202	20	1318	Mat patches becoming larger and more frequent
08:41	158	30	1316	Crossing toothpaste flows again.
08:43	149	29	1315	Several small white galatheid crabs.
08:44	166	26	1313	White patches decreasing in frequency again.
08:47	187	23	1307	Mats appear focused around margins of pillows. No obvious fractures.
08:49	164	20	1303	Mat coverage increasing again.
08:54	181	26	1294	White galatheids near mats.
08:54	195	27	1292	Continue to see blocky lava upslope on eastern side of depression as we traverse up NW slope of cone.
08:59	187	26	1284	See more bacterial mat here at 1280 m.
09:02	89	24	1270	Often see mat associated with pillow margins.
09:02	89	24	1270	Do not appear to see the mat at this depth (1260 m).
09:05	101	29	1261	Slope dominated by blocky lavas which are stained.
09:07	71	27	1258	Back into mat again plus single crab seen.
09:11	139	31	1241	Near the top of the NW cone see some bacterial mat but no obvious flow.
09:12	66	27	1238	Will investigate one of the mats to see if can detect any flow.
09:13	62	27	1235	See shrimp; crab and possibly a snail??
09:22	25	37	1222	See brown snail in center of mat patch.
09:29	51	-999	187	Will suction mat as see brown snails there too.
09:29	56	24	1209	Snails appear to be <1 cm in size.
09:30	50	23	1207	**SAMPLE-4 Suction bacterial mat plus brown snails (<1cm long) into blue jar. [near N summit peak 144.017017E/13.248894N] PI Davis / Tunnicliffe**
09:36	145	18	1207	Starting to move to the top of the peak.
09:43	42	18	1206	Leaving the sampling site and following the sonar to the top.
09:45	109	19	1207	Bacterial mat among the talus.
09:53	107	18	1207	We're at the top of this cone. 1223 meters. We're at the top!
09:53	122	17	1206	We will drop down this peak and then go up the peak to the southeast.
09:56	130	26	1206	Still seeing scattered bacterial mat as we descend from the summit.
09:56	158	26	1206	Doing a system check.
09:58	156	26	1206	We're at 1219 meters. The shallowest spot so far.
10:01	222	27	1205	We're heading downslope now.
10:03	206	25	1205	We've been flying in the water column for about the last 5 minutes.
10:05	207	23	1202	Bottom in sight again. Starting to level off a bit.
10:05	211	27	1206	Still evidence of diffuse venting. Some mat and lots of crabs.
10:11	205	13	1221	SE/NW trending fractures.
10:12	226	-999	210	Steeper slopes. Still some mat. Pillows.
10:12	225	27	1236	The Eh is now at 75 - that's the lowest we've seen.

time	medea hdg	medea alt	medea Z	J2-184 Seamount X - Dive Log Comments
10:13	224	17	1226	There are lots of galatheids here (squat lobsters).
10:15	198	28	1245	Also seeing holes in the lavas with yellow seds and some white mat.
10:17	212	22	1246	Jason has stirred up a bit of muck.
10:19	250	19	1243	In a layer of ponded lavas. More particulate matter in the water than before.
10:19	244	19	1243	The Eh is 114 now so it has gone up. The lower the Eh number the higher the possibility there is venting in the area.
10:20	226	24	1246	Lots of red staining between mineralized talus.
10:21	251	22	1244	Climbing up the southeastern peak.
10:22	253	20	1242	Lots of alteration here. Dark reds are probably hematite.
10:24	230	23	1234	A section of this outcrop has fallen off here. Must have been a big slide.
10:24	232	23	1233	Not as much white mat now. Mostly just altered rock and squat lobsters (galatheid crabs as Bob calls them).
10:25	216	19	1228	More white mat here. Not extensive but in small patches.
10:26	198	22	1223	Not a lot of action.
10:27	217	27	1226	The mat density is increasing slightly as we approach the top.
10:30	213	24	1218	There are some shrimp and bubbles in the area.
10:30	207	23	1218	There is a bit of shimmering water here. Also some squat lobsters and shrimp.
10:31	182	15	1210	We're at the top right here. Little patches of fluid leakage.
10:31	178	-999	196	More life here than we've seen in a while
10:32	158	27	1222	The F-stop on the digital camera is bothering Verena.
10:33	172	31	1223	The digital images could be overly exposed.
10:33	183	33	1222	There's warm water coming out in this area.
10:34	199	33	1223	The Eh is at 140 but there is shimmering water.
10:35	190	32	1222	Verena is manipulating the digital camera.
10:35	178	31	1221	She's afraid the images have been over-exposed.
10:36	215	31	1220	The strobe is off now.
10:37	225	-999	192	1231 meters. Lots of shimmering water. No real white mat but lots of iron mats.
10:37	236	31	1221	Bob is calling these albino shrimp.
10:38	239	32	1221	Cliff-dwelling albino shrimp and "funky" crabs. Quoting Bob and Verena.
10:38	241	30	1221	Eh is 142.
10:38	238	-999	191	TEMPERATURE degrees C Manipulating the vehicle so that we can find the most flow. We'll take a temp reading when we find it.
10:41	121	29	1219	Not very much flow here.
10:42	118	29	1219	TEMPERATURE degrees C 9.0. Ambient was about 2.8
10:45	27	27	1217	Verena is panning around here looking at the biota.
10:54	133	26	1216	TEMPERATURE degrees C 12.4
10:56	122	25	1216	Iron coating on the carapace of the shell. *Bythograea yunahana*.
10:59	139	28	1218	The crabs are probably all white but some have an iron coating.
10:59	140	27	1217	The shrimp is probably the same as at W Rota.
11:01	122	27	1217	This is the *Alvinocaris* sp.
11:01	131	26	1217	That's a carnivore with a great big schnoz. They are about 2.5 inches long.
11:01	152	27	1216	The pale white shrimp is another species - probably *Opaepele loihi*.
11:02	155	26	1216	Swapping out DVDs and DVCam at 1104 UTC.
11:03	148	26	1217	The female here has eggs. She's aerating them - "bum in the air".
11:03	147	27	1217	**DV Cam is not working after we put the tape it. It won't eject.**
11:05	134	26	1217	So for now there is no DVCam.
11:11	128	28	1218	**SAMPLE-5 Major (yellow) in diffuse flow with lots of FeO mat and biota. Temp in this area was ~12C. [SE summit peak 144.018463E/13.247574N] PI Butterfield**
11:18	113	28	1219	SAMPLE-5 Major Firing the Major sampler.
11:19	111	28	1218	Stowed the major.
11:19	111	9	1199	We will take a gastight in the same spot next.
11:20	110	28	1218	**SAMPLE-6 Gastight (yellow). T~12C. [SE summit peak 144.018463E/13.247574N] PI Evans**
11:22	107	27	1217	SAMPLE-6 Gastight Firing the gastight now.
11:23	121	-999	190	**SAMPLE-7 Rock (triangular shaped) with lots of red FeO mat on it. [SE summit peak 144.018463E/13.247574N] PI geogroup**
11:25	88	10	1201	Placing the rock in the basket. Rock is triangular shaped and covered in red mat.
11:35	128	27	1217	Opening the biobox . Will put another rock in there.
11:37	117	27	1217	**SAMPLE-8 Rock covered with FeO. [SE summit peak 144.018463E/13.247574N] PI geogroup**
11:38	131	20	1211	Akel has removed the DVCam. He will try to fix it. No DVCam for now.
11:39	143	27	1217	We will try to get a shrimp sample for Verena.
11:39	171	27	1217	We have one more cylinder in the suction sampler.
11:42	150	14	1202	We will be taking a suction (sample 9) into the red cylinder.
11:42	156	25	1216	Looking around for shrimp to suction. May not be possible with the big hose.

time	medea hdg	medea alt	medea Z	J2-184 Seamount X - Dive Log Comments
11:43	164	27	1216	**SAMPLE-9 Suction small white shrimp into red chamber. Swam away. Sample failed. [SE summit peak 144.018463E/13.247574N] PI Tunnicliffe**
11:47	163	14	1205	SAMPLE-9 Suction Poised to suction.
11:50	196	25	1214	SAMPLE-9 Suction We will attempt to sample the pregnant shrimp. Right now we are observing her.
11:51	162	24	1214	SAMPLE-9 Suction Sample swam away. Try for another shrimp nearby.
11:53	160	23	1214	Still attempting to sample some shrimp.
11:56	183	25	1215	SAMPLE-9 Suction NO SAMPLE. SHRIMP WOULD NOT COOPERATE.
12:02	196	-999	191	New DVcam is hooked up and recording.
12:05	155	7	1198	Discussing where to go from here.
12:09	344	26	1216	Pulling back and doing a turn to manage the tether.
12:15	329	24	1214	Heading to the next peak off to the NE. Heading 050.
12:23	258	29	1218	Ambient temperature here is 2.8 degrees.
12:26	277	29	1219	Passing over some pillow lavas.
12:27	261	27	1218	Continuing area of pillow lava tubes.
12:30	84	26	1241	Still heading to the NE over areas of pillow lavas.
12:33	125	25	1260	Crossed over a boundary between pillow lavas and brecciated lavas. Showed up well on the sonar.
12:35	126	22	1261	Still proceeding on heading 050.
12:38	161	27	1266	We have lost sight of the bottom.
12:42	147	22	1262	The bottom is in sight again.
12:45	130	25	1262	There is more jumbled lava here.
12:47	159	-999	246	We are down in the valley between the 2 peaks now. Still heading NE.
12:49	128	24	1286	Now we are approaching a talus slope.
12:50	120	25	1288	Stopped to do something with the starboard arm.
12:54	129	26	1297	Continuing on to the NE. Heading 046.
12:56	129	28	1299	We are approaching a fault oriented perpendicular to us.
12:58	117	27	1297	Cooling joints. This may be a large dike sticking out of the wall.
12:59	119	22	1291	Lost sight of the bottom.
13:00	118	25	1273	Back on the bottom.
13:00	127	23	1270	Passing over a finer talus slope.
13:02	130	26	1272	Still moving to the NE.
13:02	104	25	1277	Turning and looking around to see if we are at the top of this peak.
13:03	110	18	1273	Continuing on to the NE a little farther.
13:10	122	22	1217	Stopping again and looking around.
13:12	113	23	1202	There is some staining on the rocks.
13:13	98	-999	180	There appear to be 2 small peaks here. We are going to the north peak first.
13:15	130	23	1206	We are on the northern small peak.
13:16	141	22	1205	There does not appear to be much here. Discussing where to go next.
13:17	110	22	1205	Leaving this peak and going 500 meters to the SW. Heading 198.
13:18	124	24	1204	Correction. Heading 199.
13:21	137	28	1207	Still heading to the SW.
13:26	126	27	1208	Still traversing 1.3 meters off the bottom.
13:26	161	29	1207	Sand ripples on the bottom with few dispersed rocks.
13:39	264	24	1257	Might have bottomed out in the saddle between the peaks after the talus slope.
13:50	247	23	1292	Less sediment.
13:50	279	23	1292	Eel fish in front.
13:52	265	23	1292	Another fish.
13:55	275	25	1291	Moving down slope.
13:58	250	27	1288	Mixed sediment and rock outcrops.
13:58	238	27	1288	White spots between rocks could be mat.
13:59	266	-999	263	Less sediment and more white pockets.
14:00	250	29	1293	White pockets are isolated but speculate the texture looks like cream cheese.
14:03	264	27	1292	Yellow patch adjacent to the white material.
14:03	268	27	1292	White patches still appear isolated from one another.
14:05	274	25	1284	Still heading down hill with slightly more white patches. Depth is 1302.
14:05	286	27	1287	Looks more like solid rock (lava) and no sediment with the white.
14:06	270	18	1277	Changing the DV Cam recorder (repaired).
14:07	241	30	1289	More jumbled appearing.
14:08	243	29	1289	White patches continue with depth now 1307 meters. Some alteration in the rocks.
14:08	279	31	1289	*Doppler reset to LBL*.
14:10	255	25	1295	**Recording on DV cam again.**
14:11	264	27	1294	Patches of white are a bit more extensive.
14:12	267	-999	266	White is gradually becoming more extensive and coating the rocks.
14:13	275	28	1295	White material not discrete patches - more of a coating.
14:13	280	29	1296	Moving downslope.

time	medea hdg	medea alt	medea Z	J2-184 Seamount X - Dive Log Comments
14:14	281	32	1298	White patches look a bit more patchy again but we are 8.2 meters off the bottom.
14:15	297	31	1299	Bottom rocks look more pillow-like. Rocks before appeared jagged.
14:16	296	34	1301	Looks like patches of white and maybe some coating but 13.3 meters off bottom.
14:18	317	28	1296	Ship is at southern end of the traverse and stationary as vehicles are coming along.
14:18	297	28	1297	Medea is now stationary so want a closer look at this area around the white patches.
14:19	250	35	1311	As vehicle turns the slope is clearly seen.
14:21	283	21	1309	Rocks less pillow-like and more ropey.
14:22	305	-999	287	White coating looks like rotten snow.
14:22	316	23	1309	White material does not look like mat but more like an accumulation of material.
14:23	342	23	1309	Moving a little more upslope.
14:23	350	18	1304	Turning right more perpendicular to the slope.
14:23	4	23	1310	Old pillows with the white deposits located in small lows.
14:24	13	24	1310	Turning around to go under Medea.
14:24	20	32	1318	Turning around back into the slope.
14:25	39	34	1318	Getting Jason situated under Medea before heading off the N/NWn next traverse.
14:26	87	-999	283	*Doppler reset to LBL*.
14:28	334	17	1320	Ok to move at 362 deg and 700 meters.
14:30	348	25	1320	Interesting bio floated by.
14:31	39	21	1311	White deposits in the older pillows.
14:31	51	21	1311	Elongated pillows.
14:32	51	21	1311	Rocks are long tubes down slope.
14:33	53	20	1310	White material a bit more extensive in the long pillows.
14:34	51	28	1319	The ship is now in front of us and we are just really beginning to traverse.
14:34	62	28	1317	Less pillows and more sheet-like appearing with large pockets of white material.
14:37	19	29	1313	Long tubes again.
14:39	23	23	1307	Long pillow between other rocks.
14:40	23	21	1305	We are only 30 minutes from the surface and ship wants an hour notice for surfacing.
14:41	31	20	1304	Crab near the pillows.
14:43	12	21	1302	More jumbled flow and less pillows.
14:43	23	21	1301	Back into distinct pillows.
14:44	11	21	1302	Larger pockets of brighter white material.
14:44	2	19	1296	Smooth spot adjacent to jagged flow. Smooth area has large accumulation of white crust.
14:45	5	21	1294	Crabs near the white material.
14:46	9	24	1293	Going over jagged ridge with smoother flow on other side.
14:46	354	25	1295	White material more extensive in flat-smooth flows.
14:47	345	26	1296	More crabs in this area - something changing.
14:47	337	25	1295	Much more extensive crabs and more white patches.
14:48	340	22	1293	Very flat area with extensive white patches and crabs.
14:48	358	22	1291	Crabs appear to be small.
14:48	350	24	1294	Coming up on big patch of white material.
14:49	6	24	1293	Slope ahead with very large covering of white. Looks like sediment. and more crabs.
14:51	336	28	1292	Crabs seem to be off of white but could be just easier to see them on bare rocks.
14:51	333	26	1290	White looks like thin crust on the sediment.
14:52	54	20	1285	White elongated bio that could be a worm or barnacle.
14:52	10	36	1295	Looks like the tube animals are attached at one end.
14:53	356	35	1292	No obvious flow anywhere.
14:53	5	31	1289	Heavy white patches as we move upslope.
14:54	359	30	1287	White is cover over 80% of bottom.
14:54	338	26	1284	Slope pointing away from us and still a lot of white coating.
14:55	344	31	1284	White material looks more like discrete pockets again and less like heavy coating. Still a lot of crabs.
14:55	350	34	1285	Large white patch - not as extensive as before.
14:55	304	30	1280	Extensive amount of crabs in this area
14:56	291	37	1290	White material has bumpy structure and a few crabs but most appear to be off of the white material.
14:58	299	13	1267	Heavy white area.
14:59	325	32	1287	Changing video tapes (not DV Cam). Numbers are increasing
14:59	302	6	1260	Crab city. Extensive concentration of crabs.
15:00	305	23	1278	Boulders of white material.
15:00	320	24	1278	Would like to get a sample of one of these white rocks. Will have to stop ship and forward motion.
15:01	342	21	1276	Very thick area of white material.
15:02	21	30	1284	Ship is stopped.
15:03	13	32	1282	Positioning vehicles for taking a sample of a white rock.
15:03	25	32	1281	Crabs on the bare rock between patches.
15:03	20	31	1282	Target 20 White Boulders. EH down to 075 and dropping.
15:05	1	26	1274	EH is now down to 40.

time	medea hdg	medea alt	medea Z	J2-184 Seamount X - Dive Log Comments
15:06	2	22	1273	Target 20 position 13 14.818 144 1.1012 with baseline BC.
15:07	351	20	1271	Positioning vehicle to get to the white boulders which were behind Jason.
15:07	352	15	1266	Backing Medea down to get position.
15:08	355	16	1266	EH is down to 10.
15:08	342	-999	248	Many crabs and a shrimp.
15:08	344	19	1266	Many shrimp and an anemone.
15:09	342	22	1271	White material is covered in crabs and there may be shimmer in water.
15:09	354	23	1271	Waking up Verena - lots of bio here.
15:10	353	25	1271	Bio along distinct lines. A hairy looking crab among other shrimp and crabs.
15:10	354	25	1274	Can see shimmering water but appears to be very slight.
15:11	354	25	1272	Vehicle still moving into position to get white rocks.
15:13	359	25	1272	Putting target at the shrimp and bio area.
15:13	358	26	1272	Target 21 Shrimp position baseline BC 13 14.802 144 1.029
15:14	6	26	1271	Check notes to see if last target was really number 20 and not 14 (the navigator's list had some discrepancy).
15:15	9	21	1269	17 meters at 332 back to the white boulder target #20.
15:16	351	28	1274	Looks like the crusty plate area.
15:17	349	28	1274	Coming back to the white boulder target to do rock sampling.
15:17	335	27	1275	Looking around area for boulders - vehicle was moving quickly and target may be off a bit from actual site.
15:18	343	27	1274	Went through some haze (not close enough to bottom to have stirred anything up)
15:18	351	28	1274	Searching for a good rock.
15:20	337	23	1273	Trying to grab that stump in view.
15:22	349	20	1274	Crabs swam off the stump as we approached. Flying crabs.
15:22	350	19	1275	Extensive crabs flying off the sample target.
15:24	353	23	1280	Crabs are flying all over the place.
15:24	354	22	1280	Attempting to sample rocks. Touched the site and it crumbled with the crabs swimming up and shrimp.
15:25	356	22	1282	Material could be sulfur crust as it is a little bit yellow.
15:25	358	21	1281	Verena and pilot Will have never seen this extensive amount of crabs.
15:27	358	22	1283	These crabs are actually squat lobsters.
15:27	356	23	1283	White rock material is breaks off very easily.
15:27	355	23	1283	Material could all be sulfur and not a coating.
15:28	352	22	1283	EH is at 30.
15:28	353	22	1283	Incredible amount of crabs flying up from structures as we attempt to sample.
15:29	353	22	1283	Crabs are thickly coating all the surfaces.
15:29	355	21	1283	Got a piece of rock and will try to put in Biobox.
15:29	350	21	1283	**SAMPLE-10 Crust. Small piece of sulfur-like rock and squat lobster. [144.017208E/13.246679N] PI geogroup / Tunnicliffe**
15:30	350	22	1284	SAMPLE-10 Crust Sample also has squatty crab.
15:34	352	26	1282	Incredible shower of crabs.
15:34	351	26	1282	Attempting to take another sample of sulfur-like rock.
15:35	351	24	1282	Position arm for another sample.
15:36	351	25	1282	Sulfur rocks are difficult to collect due to fragility.
15:38	338	21	1282	Great sample.
15:39	352	22	1283	**SAMPLE-11 Crust. Large beautiful piece of sulfur crust. [144.017208E/13.246679N] PI geogroup**
15:39	352	22	1283	SAMPLE-11 Crust Sample not fitting in box-having to use manipulator to force into box.
15:40	354	21	1282	SAMPLE-11 Crust Biobox is full with samples 9-10-11.
15:41	352	22	1282	Every time surface is touched a tremendous amount of crabs swim up.
15:41	353	21	1282	After stowing biobox-we want to observe the crabs for a bit.
15:42	350	15	1275	Crab observing.
15:44	354	21	1282	Crabs are all furry - there is another type of crab.
15:44	356	-999	262	These crabs are different than Eifuku crabs.
15:45	351	23	1280	Crabs are just sitting and not moving.
15:46	355	16	1274	Deposits are definitely sulfur with small pillow structure of the sulfur deposits.
15:46	352	-999	257	Sulfur had flowed to form the rivulets.
15:48	352	23	1280	Scale worms under furry crab.
15:49	352	4	1262	Depth is 1298 meters.
15:49	353	-999	258	Did not see this many crabs on the other traverse earlier in the dive.
15:50	348	6	1262	Crabs are apparently on sulfur but not grazing on it.
15:51	350	26	1283	Big shrimp is the same seen at Rota.
15:51	349	26	1283	Taking biological observations with the DV Cam.
15:52	347	27	1283	Will try to get a shrimp with the suction sample again at Target 21 Shrimp site.
15:55	353	25	1283	That is-we will try to suction sample a shrimp.
15:55	349	-999	260	Would like to move off bottom and go to target 21 site.
15:58	350	26	1283	*Doppler reset LBL baseline BC.*

time	medea hdg	medea alt	medea Z	J2-184 Seamount X - Dive Log Comments
15:58	345	27	1283	46 meters at 306 degrees to target 21.
15:58	350	26	1284	Going back NW where the high concentration of shrimps to get a sample.
15:59	352	-999	258	Moving the ship a little bit to get into position.
16:00	353	27	1284	Huge concentration of crabs and shrimp.
16:00	353	25	1283	Appears to be cracks in the sulfur.
16:01	207	27	1283	EH is down to 9 climbing back to 16.
16:02	64	26	1283	We should be about 2/3 the ways there but are seeing large concentrations of the crab/shrimp mats.
16:08	13	29	1274	Biomass is incredible.
16:08	13	25	1269	Very close to target with lots of shrimp and crabs.
16:10	20	4	1248	Changing DV Cam tape.
16:11	54	27	1273	Will be placing the sample (if successful) in the red chamber.
16:13	189	27	1273	DV Cam recording.
16:13	211	27	1272	Before sampling would like to rotate vehicle around a bit for a look.
16:14	239	27	1272	Rotating vehicle to the right.
16:14	232	27	1271	Rotating further to the right.
16:15	263	27	1271	Now looking back to the left.
16:16	280	26	1271	Would like to drive to the SE a bit (believe target was placed after we drove past it a bit).
16:17	303	26	1271	Moving along 149deg.
16:17	304	26	1272	Moving further SE of Target 21.
16:19	12	26	1271	Looking to the right now at the SE location from the target.
16:20	346	25	1271	Moving Medea NE to get Jason in a better position.
16:21	358	13	1259	Not the same area as before with a lower shrimp concentration but will try to get a sample anyhow.
16:22	31	27	1272	There are some distinct lines of animals.
16:23	24	25	1272	Trying to land the vehicle here. Anemone on the rock.
16:25	183	23	1271	Vehicle on bottom in position. Powering up suction sampler.
16:25	247	20	1272	Globules of sulfur in DV Cam.
16:26	278	22	1272	Suction on full power - trying to get a shrimp.
16:27	287	21	1271	Moving arm around trying to get shrimp into suction.
16:27	279	21	1271	At position 13deg 14.822N 144 deg 1.017E
16:28	273	21	1271	A shrimp was observed inside the tube but not clear if it was swimming out or in.
16:29	245	21	1271	Not getting a lot of suction pressure - could be clogged.
16:31	301	21	1271	Slurp secured.
16:33	323	21	1271	Will try to use scoop bag to get a shrimp and possibly some sulfur and/or crab.
16:33	297	21	1271	Retrieving scoop from basket.
16:34	287	22	1272	EH is reading -1 here.
16:36	359	20	1271	Retrieved the oval bag from the basket.
16:37	307	21	1271	SAMPLE-12 Scoop. Using scoop to try to get shrimp/sulfur/crab sample.
16:38	279	21	1271	SAMPLE-12 Scoop Depth is 1288.7
16:40	240	21	1271	**SAMPLE-12 Scoop - tried to get shrimp/crab and sulfur. Did not get shrimp. [144.01695E/13.247033N] PI Tunnicliffe / geogroup**
16:41	258	22	1271	Target rich environment with upslope deposit. Arm can not reach bottom still.
16:42	316	20	1271	SAMPLE-12 Scoop Another attempt. Big scoop of material.
16:43	329	22	1271	Second scooping of material-a lot of material.
16:45	264	22	1271	SAMPLE-12 Scoop Unlikely there is any shrimp in the sample.
16:46	268	22	1271	SAMPLE-12 Scoop Placing the scoop in the basket and will place a major on top before surfacing.
16:47	283	20	1271	308deg at 386 meters to go along this transect. Ship is already moving.
16:47	294	20	1271	Heading NW on course 308.
16:48	297	21	1271	Large covering of white material and crabs/shrimp.
16:49	315	21	1271	Need to index slurp jars to secure in case there is a shrimp inside.
16:51	298	23	1269	Shrimp and crab in tube.
16:53	30	21	1267	Can see shrimp in jar.
16:54	355	19	1265	Looks like the shrimp that was in the red jar escaped to the tube then went into the yellow jar while rotating. Check yellow jar for shrimp.
16:55	11	7	1252	Came up about 5 meters to top of scarp.
16:56	5	31	1276	Bottom is covered with sulfur crust on surface. Coverage is about 60-80%.
16:59	311	15	1270	Caught up with Medea and can finish indexing the suction sampler.
17:00	305	15	1270	Had to stop indexing before as the vehicle was getting too far away from Medea.
17:01	318	26	1274	Shrimp still visible in the tube can be seen swimming out of tube. Suction indexed to green.
17:01	349	-999	245	Back to driving.
17:01	342	28	1272	Bottom is falling off and trying to stow arm - lost visuals.
17:02	4	31	1275	Altitude is 12 meters and depth is 1283.5meters.
17:02	7	23	1267	About 30 minutes to end of target.
17:03	355	11	1255	Giving bridge an hour's notice for a 4-4:30 recovery.
17:03	2	-999	244	Less white crust and more bare rock here - about 50/50.

time	medea hdg	medea alt	medea Z	J2-184 Seamount X - Dive Log Comments
17:05	327	27	1279	Not much white crust at all - just little patches.
17:06	352	-999	257	Not sure if the white patches are the same sulfur material or not.
17:06	17	25	1285	Taking out a wrap of wire-spinning in a circle.
17:07	15	14	1274	Less white material - only pockets visible. Going downslope.
17:08	357	21	1283	Few crabs but not as many as before. Less sulfur mats as well.
17:08	357	22	1282	Going over a small ridge.
17:11	330	30	1290	Rocks have jagged appearance. Altitude is 4 meters.
17:13	24	24	1291	Moving over small ridge as we head downslope. Depth is 1322 meters.
17:14	337	26	1297	White patches look like they formed in place and not sediment deposited.
17:15	11	26	1303	Still moving downslope.
17:17	356	21	1307	Fewer and fewer patches as we move downslope. Eel-like fish but not seeing crabs.
17:18	350	28	1313	Pockets of white in low areas. Bottom is rough.
17:20	14	27	1315	*Changed nav baseline to AB.*
17:22	28	29	1321	About 10 meters from end of transect.
17:24	344	26	1325	Site does not look very active. Will try to cruise around the perimeter of our watch circle tether with Medea.
17:25	354	28	1327	Moving closer to bottom and some iron staining on the rocks (yellow).
17:27	359	29	1328	Rock staining similar to that seen on the beginning of the dive.
17:28	348	30	1328	Were driving SW and turning SE.
17:28	330	31	1329	Thin patches of white deposits scattered around rock outcrops.
17:29	314	31	1330	Heading east as we go around the circle. Rocks look like big pillows.
17:29	320	-999	304	Heading more north-another eel-like fish.
17:30	21	25	1329	Taking the last wrap out of the line.
17:31	45	24	1328	Preparing to surface.
17:33	226	24	1328	Ending the dive. Securing the vehicle to prepare for surface.
17:33	238	26	1329	Putting major on top of scoop sampler for surfacing.
17:33	259	21	1325	Heading up.
17:34	211	21	1325	End of dive JS-184.
17:35	234	22	1324	Video off
17:55	87	-999	-156	Jason at 25 m. Getting ready to recover.
17:56	86	-999	-172	Jason at the surface.
17:56	84	-999	-193	Medea on deck.
18:29	56	-999	-997	**Jason on deck.**
18:33	95	-999	-1008	It took longer to come up this time because of a problem with the winch.
18:35	82	-999	-1007	End of dive J2-184.

5.4.2 J2-185 Forecast Dive Log

time	raw long	raw lat	hdg	alt	Z	J2-185 Forecast - Dive Log Comments
J2-185 Forecast Dive Summary: Exploration dive at Forecast. Traveled up the west side of the volcano to the northern summit. Sampled an old sulfide chimney and then headed southwest to the summit saddle where hydrothermal activity was found at Bart and Snail Scrum vents. Samples at Bart: 4 HFS, 1 gastight. Samples at Snail Scrum: 7 HFS, 1 gastight, 1suction of shrimp and snails. Then continued south along the western edge of the summit travelling to the highest point on the dive at the southern summit. Continued south from there then circumnavigated the summit heading north along the eastern side of the summit. Hydrothermal activity was again found and sampled at the northernmost part of the dive on the summit at Homer and Marge vents. Samples at Homer: 3 HFS. Samples at Marget: 5 HFS, 1 gastight. Ended the dive at Mound 1, where the highest temperature on this dive was recorded (195.7°C). Samples at Mound 1: 2 HFS, 1 gastight. Sample summary - 27 samples total: 21 HFS, 4 gastights, 1 chimney, 1 suction.						
J2-185 Bottom time: 4/20/2006 1028 - 2115 UTC (10.78 hours). **Z column represents seafloor depth in meters.**						
09:23	143.88333	13.36669				Preparing to deploy Jason for dive J2-185.
09:24	143.88331	13.36668				This will be dive J2-185. UTC 0924. April 20th right now. Vehicle still on deck.
09:34	143.88331	13.36668				**Start of dive J2-185. Jason in the water.**
09:37	143.88331	13.36668				Preparing to launch Medea.
09:38	143.88332	13.36669				Medea in the water.
10:28	143.88362	13.36696	32	11	1525	**Jason is at the bottom.**
10:29	143.88367	13.36695	32	9	1522	We are about 100m to the west of the vent field.
10:30	143.88367	13.36695	32	9	1522	Talus slope.
10:31	143.88367	13.36695	69	9	1522	Slope is steep off to the east of us.
10:31	143.91903	13.39467	73	9	1522	*Doppler reset.*
10:34	143.91909	13.39469	72	15	1518	Target site is 100m away.
10:37	143.91915	13.39471	73	10	1514	Moving east on heading 073 to target site.
10:40	143.91932	13.39476	75	9	1502	Some dark staining on the rocks that could be manganese.
10:43	143.91944	13.39476	71	9	1493	We have come to a gentler slope with a lot of pillow lavas.
10:45	143.91971	13.39491	69	11	1470	Some yellow oxides are visible.
10:47	143.91986	13.39500	73	9	1456	More yellow staining on the rocks.
10:49	143.91991	13.39504	73	7	1453	There is a small pinnacle with an oxide crust.
10:53	143.92003	13.39508	124	4	1446	We may have spotted a structure off in the distance.
10:54	143.92006	13.39505	131	6	1443	There is some shimmering water and a marker here.
10:54	143.92006	13.39505	131	6	1443	There is a cluster of hairy snails.
10:55	143.92007	13.39504	132	5	1443	There is definitely some good diffuse venting here.
10:58	143.92007	13.39503	139	8	1442	We are exploring around to see how extensive this area is.
10:59	143.92007	13.39503	139	7	1442	Is this pinnacle rock or sulfide?
11:00	143.92009	13.39505	108	7	1442	Sonar shows another high point north of here.
11:02	143.92018	13.39499	162	2	1438	This pinnacle looks more lava-like.
11:03	143.92018	13.39500	160	4	1441	Could be oxide covered in manganese.
11:05	143.92018	13.39500	160	4	1441	We will try to sample a piece of this pinnacle.
11:08	143.92018	13.39497	172	4	1442	The positions that are updating in the virtual van are Jason positions provided by the navigator.
11:09	143.92018	13.39497	172	4	1442	The navigator is getting the positions from Medea which is getting its position from the ship.
11:09	143.92018	13.39497	172	4	1442	The positions should be accurate to within 10 meters or so Dara says.
11:11	143.92018	13.39497	173	4	1442	Attempting to sample an old weathered chimney.
11:12	143.92018	13.39497	173	4	1442	**SAMPLE 1. Chimney. Sampling old weathered chimney. Just keeping the smaller piece. The big piece was too heavy. [143.92018E/13.394971N] PI geogroup.**
11:13	143.92018	13.39497	173	4	1442	Large piece of weathered sulfide. Black crust and red inside.
11:16	143.92018	13.39497	173	4	1442	Small piece of the sample placed in stbd biobox.
11:18	143.92018	13.39497	172	4	1442	Sample broke in half. All of it is in the biobox.
11:19	143.92018	13.39497	171	4	1442	We're close to or at the top. Depth is 1438m.
11:23	143.92020	13.39500	192	1	1442	We're circling around this large old sulfide and heading down to the base.
11:24	143.92006	13.39500	192	6	1442	The old weathered sulfide is about 5 meters tall.
11:27	143.92008	13.39503	192	9	1445	The plan is to drive a bit to the southeast and look at the summit. We will have to move Medea for that. Right now we're securing the biobox.
11:30	143.92013	13.39503	191	14	1450	We're getting rid of the big piece and keeping the smaller piece. Too heavy.
11:32	143.92007	13.39495	273	9	1445	We're starting to move around the structure now. Heading back under Medea.
11:39	143.92001	13.39488	143	1	1439	The bottom is back in view. Heading bearing 143 towards the SE part of the summit.
11:40	143.92012	13.39480	143	1	1444	We're driving south/southeast along the top of the seamount. Simple cone slightly elongate.
11:41	143.92014	13.39478	142	2	1446	Looking around to see if there is evidence of venting at the top.
11:41	143.92017	13.39473	141	4	1449	The water seems pretty murky here.
11:42	143.92018	13.39470	222	6	1451	Looks like little chimneys??
11:43	143.92017	13.39471	224	6	1451	There is fluid flow. The chimneys are small with white mat covering.
11:43	143.92015	13.39472	217	6	1450	The chimneys look to be about 30 cm high and ~12 cm wide.
11:44	143.92011	13.39470	216	1	1448	There's quite a bit of flow here.
11:46	143.92012	13.39468	218	2	1449	We're calling this area **Bart Vent** because the chimney looks like Bart Simpson. **[143.920096E/13.394633N]**
11:46	143.92012	13.39468	218	2	1449	There are several small chimneys here.
11:47	143.92011	13.39468	218	2	1449	We are going to sample here.
11:48	143.92011	13.39467	218	1	1449	Lots of shrimp here and big hairy snails (alvino concha).
11:52	143.92010	13.39466	218	2	1449	TEMPERATURE. Taking the temp here with the Jason probe. Ambient was about 4C. Jason's temp probe is reading 155C.
11:54	143.92009	13.39465	218	2	1449	Stowing the Jason temp probe.
11:54	143.92009	13.39465	218	2	1449	Lots of shimmering water in the area.

time	raw long	raw lat	hdg	alt	Z	J2-185 Forecast - Dive Log Comments
11:56	143.92009	13.39465	218	2	1449	Dave is preparing to take fluid samples here.
11:56	143.92009	13.39465	218	1	1449	The HFS wand is out already.
11:59	143.92009	13.39465	218	1	1449	TEMPERATURE. 43 C is where it leveled off. Going up slowly. The pump quit working but Dave is on it.
12:00	143.92009	13.39464	218	1	1449	The pump is "doing some weird stuff that Dave has never seen before".
12:01	143.92009	13.39464	218	1	1449	Dave's going to re-start .
12:02	143.92009	13.39464	218	1	1449	Jason is doing a system check.
12:03	143.92009	13.39463	218	1	1449	Dave is re-starting.
12:05	143.92009	13.39463	218	2	1449	Seems to be working now. They moved the tip of the nozzle.
12:06	143.92009	13.39463	218	2	1449	TEMPERATURE. Dave is measuring the temp here. It is varying. From 45 to 80 so far.
12:08	143.92009	13.39463	218	2	1449	Dave turned the speed up and the temp is rising. Now at 85C.
12:10	143.92009	13.39464	218	1	1449	Looks like we may have a temp problem now. It's up to 85 now.
12:11	143.92009	13.39464	218	1	1449	**SAMPLE 2. HFS Unfiltered bag #8. T2=59.7. T1 not working properly but probably at least 100. Vol=453ml. [Bart 143.920096E/13.394633N] PI Butterfield**
12:15	143.92008	13.39462	218	1	1449	**SAMPLE 3. HFS Filtered bag #11. T2=30.5C. Vol=513ml. [Bart 143.920096E/13.394633N] PI Butterfield**
12:19	143.92008	13.39462	218	1	1449	**SAMPLE 4. HFS Sterivex filter #10. T2 is stable at 75C. No T1. Volume=3100ml. [Bart 143.920096E/13.394633N] PI Butterfield (subsamples Huber/Bolton)**
12:20	143.92008	13.39462	218	1	1449	SAMPLE-4 HFS T1 is reading negative temps. Obviously broken.
12:26	143.92007	13.39460	218	1	1449	**SAMPLE 5. Fired gastight on the fluid sampler. T2=75C. (T1 broken). [Bart 143.920096E/13.394633N] PI Evans**
12:27	143.92007	13.39459	218	1	1449	SAMPLE-4 HFS Need to get at least 2 liters for DNA analysis. Still sampling.
12:31	143.92007	13.39458	218	1	1449	Still taking a filter sample for DNA. [For the DNA filters the PIs are Huber/Bolton].
12:35	143.92006	13.39458	218	2	1449	Sheryl has explained that the PI is Butterfield and the subsamples will go to Bolton/Huber.
12:40	143.92006	13.39459	218	1	1449	**SAMPLE 6. HFS Filtered piston #24. T2=48.4C. The temp is dropping. Looks like the probe shifted. Vol=433ml. [Bart 143.920096E/13.394633N] PI Butterfield**
12:43	143.92011	13.39468	218	2	1449	Samples 2 - 6 were from Bart Vent.
12:44	143.92011	13.39468	218	2	1449	We're going to sample another chimney in this area. There are several of these small chimneys in the area of Bart vent.
12:45	143.92010	13.39467	218	1	1449	We're going to look around this area for a bit.
12:46	143.92010	13.39467	218	1	1449	Lots of hairy snails in the area.
12:48	143.92010	13.39464	206	2	1448	Shrimp and snails here.
12:48	143.92010	13.39463	206	2	1448	We're trying to get closer to the snails to do a bit of sampling for Verena. Squat lobsters and shrimp in the area too.
12:52	143.92008	13.39463	138	2	1448	Temp probing - water sampling and biology sampling.
12:52	143.92008	13.39463	140	2	1448	Preparing to take a temperature reading.
12:53	143.92007	13.39464	138	2	1448	Taking a temp with Jason's probe right in the center of snails and shrimp. We've only moved about a meter or so.
12:56	143.92006	13.39466	138	2	1448	Temps are 109 C.
12:58	143.92006	13.39466	138	2	1448	TEMPERATURE. Continuing to probe. Last temp maxed at 110C.
13:04	143.92006	13.39466	138	2	1448	TEMPERATURE. 10 to 16C at the base where the snails live. 110 at the top.
13:07	143.92006	13.39466	138	2	1448	SAMPLE-7 HFS. Bag 9.Unfiltered. In the area among the snails.
13:08	143.92006	13.39466	138	2	1448	We're naming this spot **Snail Scrum [143.920083E/13.394632N]**. About 1 m away from Bart in this area of snails.
13:11	143.92006	13.39467	138	2	1448	**SAMPLE-7 HFS Unfiltered bag #9. T2=6.5C Vol=797ml. In the area among the snails - about 1 m away from Bart. [Snail Scrum 143.920083E/13.394632N] PI Butterfield**
13:14	143.92007	13.39465	138	2	1448	**SAMPLE-8 HFS Unfiltered piston #6. T2=6.8. Vol=667ml. [Snail Scrum 143.920083E/13.394632N] PI Butterfield**
13:21	143.92010	13.39462	138	2	1448	**SAMPLE-9 HFS DNA (sterivex) filter #3. Vol=2050ml. [Snail Scrum 143.920083E/13.394632N] PI Butterfield (subsamples Huber/Bolton)**
13:22	143.92010	13.39462	138	2	1448	SAMPLE-9 HFS Stop Vol=2050ml. [Snail Scrum]
13:38	143.92011	13.39465	138	2	1448	**SAMPLE-10 HFS Filter #7. Vol=103ml (no temp info). [Snail Scrum 143.920083E/13.394632N] PI Butterfield**
13:39	143.92011	13.39465	138	2	1448	SAMPLE-10 HFS [Snail Scrum].
13:40	143.92011	13.39465	138	2	1448	**SAMPLE-11 HFS Filtered piston #1. T2=5.3. Vol=544ml. [Snail Scrum 143.920083E/13.394632N] PI Butterfield**
13:44	143.92011	13.39465	138	2	1448	SAMPLE-12 HFS. Up on hotter chimney up above. Temp was 110. Waiting to sample. Dave is equilibrating. T2=25.
13:49	143.92012	13.39464	138	2	1448	**SAMPLE-12 HFS Unfiltered piston #5. T2=32.8C. Vol=556ml. Up on hotter chimney up above. Temp was 110. [Snail Scrum 143.920083E/13.394632N] PI Butterfield**
13:54	143.92014	13.39461	138	2	1448	**SAMPLE-13 HFS Filtered bag #14. T2=32.1C. Vol=578ml. Temp estimate 50-60C. [Snail Scrum 143.920083E/13.394632N] PI Butterfield**
13:56	143.92011	13.39465	138	2	1448	SAMPLE-13 HFS. Finished. Est.~50-60° on intake.
14:00	143.92012	13.39464	138	2	1448	Fluid sampling complete here.
14:01	143.92011	13.39464	138	2	1448	Can put fluid sampler away. Want gas tight and biological suction sample.
14:01	143.92011	13.39465	138	2	1448	Moving drawer out to store fluid sampler.
14:07	143.92011	13.39465	139	2	1448	Fluid sampler stored.
14:12	143.92011	13.39465	139	2	1448	Preparing to use suction sampler.
14:14	143.92011	13.39465	139	2	1448	**SAMPLE-14 Suction. Shrimp and snails. 3 in suction hose - yellow jar. [Snail Scrum 143.920083E/13.394632N] PI Tunnicliffe**
14:18	143.92011	13.39465	139	2	1448	Suction over snails and shrimp. Using 3in hose.

time	raw long	raw lat	hdg	alt	Z	J2-185 Forecast - Dive Log Comments
14:20	143.92011	13.39465	139	2	1448	Repositioned intake. Can't see any intake.
14:21	143.92010	13.39466	139	2	1448	Can see sample intake to tube. Shrimp and snails.
14:22	143.92010	13.39466	140	2	1448	Repositioned to sample more. Believe a few types of shrimp were sampled.
14:24	143.92010	13.39467	140	2	1448	Changed video tapes.
14:24	143.92010	13.39467	163	1	1448	SAMPLE-14 Suction. Repositioned intake. Suctioning more.
14:25	143.92010	13.39467	195	1	1448	SAMPLE-14 Suction. Snails included in sample.
14:27	143.92010	13.39467	194	1	1448	SAMPLE-14 Suction. More snails. Sampling complete. New intake hose size worked better than yesterday.
14:28	143.92010	13.39467	194	1	1448	Stowing suction sampler.
14:29	143.92010	13.39467	194	1	1448	Re-indexing sampler. Flushing to green.
14:29	143.92011	13.39467	194	1	1448	Before moving want gas tight in a hot location.
14:30	143.92011	13.39466	194	1	1448	Set on the green container for flushing.
14:31	143.92011	13.39466	193	1	1448	Next preparing for gas tight sample.
14:32	143.92011	13.39467	193	1	1448	Retrieved the blue gas tight (does have red on T-handle)
14:34	143.92012	13.39466	193	1	1448	SAMPLE-15 Gastight. Blue gastight . Positioning arm.
14:35	143.92012	13.39467	192	2	1448	Changing DV cam (may have lost a few minutes)
14:35	143.92012	13.39467	186	1	1448	**SAMPLE-15 Fired blue gastight. Temperature 70-108C. Near HFS sample. [Snail Scrum 143.920083E/13.394632N] PI Evans**
14:36	143.92013	13.39467	188	1	1448	SAMPLE-15 Gastight Placing intake in good flow.
14:37	143.92013	13.39467	187	1	1448	SAMPLE-15 Gastight Triggered. gas tight near where HFS were taken.
14:38	143.92013	13.39467	188	1	1448	SAMPLE-15 Gastight Triggered again for good measure.
14:39	143.92013	13.39467	188	1	1448	SAMPLE-15 Gastight Temperature should be a little less than the 109deg taken earlier.
14:40	143.92013	13.39467	188	1	1448	Would like temperature reading at the gas tight sample site.
14:41	143.92013	13.39467	189	1	1448	Retrieving temperature probe from basket.
14:42	143.92013	13.39467	188	1	1448	TEMPERATURE. Sample 15 temperature between 70 and 108.
14:45	143.92013	13.39467	188	1	1448	Looking for any mat areas for Rick samples.
14:46	143.92013	13.39467	188	1	1448	Looking for bacterial mat.
14:47	143.92013	13.39466	188	1	1448	Coming off the bottom for repositioning and looking for mat.
14:49	143.92014	13.39465	188	5	1448	Would like to go back to the Bart site - a few meters to the NE.
14:51	143.92024	13.39463	51	5	1451	Looking for microbial mats that were on a chimney at the Bart site.
14:52	143.92025	13.39462	44	6	1452	Can see the white chimney ahead.
14:53	143.92024	13.39464	296	5	1449	Bart chimney straight ahead.
14:53	143.92022	13.39464	296	5	1449	Can't put the suction sampler in the hot water.
14:55	143.92020	13.39469	269	5	1449	Would like to sit down next to Bart - visible mat.
14:56	143.92017	13.39472	232	7	1451	Looking for live mat. Orange doesn't look alive.
14:59	143.92015	13.39470	170	147	1595	At Bart Vent. Doesn't look like any live mat available. No sampling here.
14:59	143.92018	13.39469	170	173	1620	Going to explore to the south and SE from here.
15:00	143.92022	13.39469	170	199	1646	Going on a drive to the SE about 40 meters from Bart.
15:03	143.92023	13.39486	170	1	1449	*Doppler reset.*
15:04	143.92012	13.39472	229	4	1448	Moving to SE. Altitude 4.7. Want to drive about 130deg.
15:05	143.92010	13.39469	223	4	1448	Would like to move closer to the bottom.
15:09	143.92015	13.39468	132	1	1445	Rough terrain and still 5 m off bottom.
15:11	143.92022	13.39469	126	5	1451	Pillar or chimney - can't tell.
15:13	143.92012	13.39457	130	3	1448	Lava looks like broken-up pillows.
15:13	143.92011	13.39455	129	4	1449	Seeing target 10m ahead on the sonar. Ridges ahead.
15:14	143.92018	13.39447	130	7	1451	Lava is dark and not much growing on it - could be young. Like A'a.
15:15	143.92032	13.39435	131	6	1453	10 meters above bottom.
15:15	143.92044	13.39425	128	13	1460	Coral-stalked.
15:16	143.92033	13.39433	300	8	1458	Lava looks older and corals. Looks very different.
15:17	143.92029	13.39437	328	3	1453	Drove SE and overshot-drove back NW under Medea. Depth 1450.
15:17	143.92032	13.39441	41	2	1452	Pillows with sediment.
15:17	143.92036	13.39444	44	3	1454	Looking NE and slope is going off to right which is SE.
15:18	143.92039	13.39446	47	4	1457	Under target so now move ship and vehicles to south.
15:18	143.92048	13.39447	114	5	1459	Large soft coral.
15:19	143.92049	13.39446	218	5	1461	Lots of pillows. Ship moving south 40m. We will zigzag in that direction.
15:19	143.92041	13.39442	254	4	1459	In older pillows-heading W.
15:19	143.92038	13.39442	253	6	1458	Not much sediment on these pillows.
15:19	143.92036	13.39440	236	5	1458	Another stalked coral-now facing S with slope going down in front of us.
15:20	143.92035	13.39436	195	3	1456	Heading is E.
15:21	143.92047	13.39432	91	3	1459	Turning back to south as zigzag south toward ship. More sediment here.
15:22	143.92052	13.39430	253	5	1462	Turning back to west.
15:22	143.92053	13.39430	273	5	1462	Lava with sediment.
15:23	143.92048	13.39433	269	3	1461	Jagged lava. Stalked corals and sea pens.
15:24	143.92040	13.39432	270	5	1461	Sediment in water is probably from us crossing our path again.
15:25	143.92031	13.39431	269	1	1454	No signs of hydrothermal activity since leaving Bart and Snail Scrum.
15:25	143.92028	13.39431	269	4	1456	Turning south-we were heading west.
15:26	143.92026	13.39429	173	2	1454	Heading down slope.
15:26	143.92026	13.39426	168	1	1456	A lot of sediment while facing East.

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15:27	143.92050	13.39419	95	4	1461	Big stalked corals. Squid.
15:28	143.92052	13.39418	148	3	1460	Turning back to the west.
15:29	143.92053	13.39416	313	4	1461	Heading north.
15:29	143.92052	13.39423	322	3	1460	Driving south-lots of sediment.
15:31	143.92042	13.39414	208	4	1461	Bottom less rugged-pretty smooth and sedimented. Stalked corals on bottom.
15:32	143.92038	13.39417	226	4	1461	Caught up with ship. Move SE another 40m.
15:33	143.92034	13.39410	177	5	1461	More stalked corals-a few pillows.
15:33	143.92048	13.39405	148	4	1461	Medea has caught up.
15:39	143.92051	13.39403	146	2	1461	Stalked log corals growing everywhere.
15:41	143.92052	13.39392	236	5	1465	Growing in sediment-like bottle brushes.
15:42	143.92052	13.39390	236	4	1465	Continue SE. and move another 40m.
15:44	143.92054	13.39389	203	5	1466	Moving at 135deg.
15:44	143.92059	13.39386	137	5	1467	Some pillows with a lot of sediment and biology.
15:47	143.92075	13.39384	339	3	1472	Want to now move to NE.
15:47	143.92075	13.39386	280	3	1471	Want to head 020 from here.
15:47	143.92073	13.39386	284	2	1471	Bottle brush animals again.
15:48	143.92065	13.39386	276	3	1471	Beautiful soft coral.
15:50	143.92067	13.39377	275	3	1471	A lot of corals and sea fans.
15:52	143.92064	13.39374	275	4	1468	Not making much progress to the north.
15:53	143.92062	13.39378	291	6	1467	Moving ship up to .2knts.
15:58	143.92072	13.39386	5	8	1472	Lot of sediment and only a few pillows.
16:00	143.92077	13.39394	19	5	1469	Facing back 220 but moving upslope.
16:00	143.92078	13.39399	19	4	1469	Trash.
16:01	143.92081	13.39400	19	3	1468	Head NW. Broken pillows and stalked corals growing on them.
16:01	143.92082	13.39402	22	3	1467	Ship has come around to 315.
16:03	143.92081	13.39418	27	1	1464	Another piece of trash-could be dive weight since the same shape. Maybe just retracing our path.
16:05	143.92081	13.39406	181	1	1466	Want to head NW.
16:05	143.92081	13.39404	227	1	1465	Must be same piece of trash.
16:05	143.92079	13.39405	358	4	1468	More pillows here than before.
16:07	143.92088	13.39419	290	3	1465	Heading 287 and altitude 4.9m. Less distinct pillows and more sediment. Flatter looking area.
16:10	143.92069	13.39430	335	4	1463	Caught up with ship. Moving ship again NW.
16:12	143.92071	13.39441	310	4	1463	More jagged lava and lots of sediment.
16:15	143.92059	13.39448	293	2	1460	Caught up with ship again. We are a bit east of the summit contour on our map.
16:17	143.92050	13.39457	294	3	1461	Pillows and stalked corals and no signs of hydrothermal activity.
16:17	143.92048	13.39457	294	3	1461	Activity may be limited to the NW part of the summit.
16:17	143.92047	13.39458	294	4	1461	Less sediment.
16:21	143.92038	13.39471	294	5	1455	Heading NW getting near the start of the dive.
16:26	143.92022	13.39494	296	4	1449	Pillows and less sediment.
16:26	143.92021	13.39495	295	5	1449	White in pilot's camera.
16:27	143.92012	13.39496	296	6	1446	Going down for a look at white staining. We are near Mound 1 and 2. Targets were put down at beginning of dive.
16:28	143.92010	13.39497	295	4	1446	Area does not look very much alive-deposits of something. No active looking venting.
16:28	143.92011	13.39497	295	4	1446	Changed video tapes a few minutes ago.
16:30	143.92009	13.39510	304	8	1448	Lots of black lava and not much else.
16:30	143.92009	13.39511	304	8	1448	At 1440 meters-shallowest part of summit is at NE end.
16:31	143.92008	13.39518	311	4	1444	Looking at the staining on the rocks.
16:34	143.91995	13.39520	308	3	1443	Can see white patches down the slope.
16:34	143.91995	13.39521	309	2	1442	Venting and small chimney below.
16:35	143.91996	13.39525	309	3	1444	Turning around for a better look.
16:35	143.91996	13.39525	309	3	1444	Moving down to small venting area.
16:37	143.91996	13.39529	237	6	1449	On a little ridge.
16:37	143.91996	13.39528	237	6	1449	Putting target here. Calling target 7 Marge Vent.
16:38	143.91995	13.39528	234	5	1449	**Marge Vent [143.919873E/13.395265N]**
16:40	143.92006	13.39534	284	6	1452	Another chimney-like structure area (but not active) and large fish.
16:42	143.91988	13.39550	288	3	1460	Back under Medea-will head back south at 151 to the Marge target.
16:43	143.91985	13.39543	235	2	1457	White material could be mat. in jumbled flow.
16:44	143.91985	13.39542	235	3	1456	Depth 1452 sediment slope with pillows and lots of crabs (squat lobsters).
16:45	143.91992	13.39535	185	8	1454	Patch of snails and anemone.
16:45	143.91992	13.39533	180	5	1452	Snails in patches.
16:46	143.91990	13.39532	184	5	1452	Shrimp - crabs. Under Medea and ship is stopped.
16:46	143.91990	13.39532	189	5	1451	Placing target here.
16:46	143.91990	13.39533	188	6	1452	Target 8 Homer on basalt lava ridge-no sulfide.
16:47	143.91990	13.39533	188	6	1452	Area of warm water and crabs-shrimp and rattail.
16:47	143.91990	13.39533	188	6	1452	**Homer Vent [143.919902E/13.39532N]**
16:48	143.91990	13.39533	188	6	1452	Want to get temperature of snail patch.
16:48	143.91990	13.39533	188	6	1452	Retrieving temperature probe and pulling basket in.
16:51	143.91990	13.39533	188	6	1452	Want temperature of lightest area with good flow.
16:52	143.91990	13.39533	188	6	1452	Attempting to get into crack for temperature reading.
16:55	143.91990	13.39532	185	5	1452	Flat snail or limpets stacked up around crack with active flow.
16:57	143.91990	13.39533	188	5	1452	Trying to store temperature probe.

time	raw long	raw lat	hdg	alt	Z	J2-185 Forecast - Dive Log Comments
16:58	143.91990	13.39533	188	5	1452	Probe dropped in basket and trying to pickup and place back into holster.
16:59	143.91990	13.39533	188	5	1452	Probe is stored. Repositioning arm for a better angle to sample.
17:03	143.91990	13.39533	188	6	1452	TEMPERATURE. At Homer. Tmax=14 for this attempt.
17:05	143.91990	13.39532	188	5	1452	Going to try another reading from a different position.
17:06	143.91990	13.39532	199	4	1451	TEMPERATURE. 19.3 high. Probe in crack getting attacked by squat lobsters.
17:10	143.91990	13.39532	205	3	1451	TEMPERATURE. 16.1 in new position (logging not getting temp tag).
17:10	143.91990	13.39532	206	3	1451	TEMPERATURE. 14.2 along crack.
17:11	143.91990	13.39532	206	3	1451	Looks like a good place to sample shrimp.
17:11	143.91990	13.39532	206	3	1451	Also would like a fluid sample at the highest temperature spot.
17:11	143.91990	13.39532	206	3	1451	Retrieving fluid sampler intake.
17:13	143.91990	13.39532	206	3	1451	Placing fluid sampler in crack.
17:15	143.91990	13.39532	206	3	1451	SAMPLE-16 HFS In part of crack where temperature probe read 19
17:15	143.91990	13.39532	206	3	1451	SAMPLE-16 HFS Earlier temperature reading was 19.3deg.
17:16	143.91990	13.39532	206	3	1451	Holding here-no sample-not sure if system is waking up.
17:23	143.91990	13.39532	206	3	1451	Stowing probe to turn off hydraulics.
17:28	143.91991	13.39533	205	5	1452	While waiting for probe to get fixed-using 3chip to view biology.
17:32	143.91991	13.39533	204	5	1452	HFS ready to work.
17:34	143.91991	13.39533	204	5	1452	Retrieving wand from basket for sampling again.
17:36	143.91991	13.39533	204	5	1452	Wand dropped after arm started spinning it. Retrieving again.
17:38	143.91990	13.39532	217	3	1451	Spinning wand in other direction to get kinks out of line.
17:41	143.91990	13.39532	217	3	1451	Trying to position wand back into 19.3deg hold for HFS sample.
17:42	143.91990	13.39532	213	4	1451	Fluid sampler is now in the vent
17:50	143.91990	13.39532	211	3	1451	Repositioning fluid sampler
17:53	143.91990	13.39532	211	3	1451	**SAMPLE-16 HFS Filter bag #16. T2=8.4 Vol=548ml. [Homer 143.919902E/13.39532N] PI Butterfield**
18:04	143.91990	13.39532	211	3	1451	sample stopped Vol 548
18:04	143.91990	13.39532	211	3	1451	**SAMPLE-17 HFS Start Piston 20**
18:05	143.91990	13.39532	212	3	1451	Start Piston Sample 20
18:06	143.91990	13.39532	212	3	1451	SAMPLE-17 HFS Stopping piston 20
18:10	143.91990	13.39532	211	3	1451	**SAMPLE-18 HFS Sterivex filter #21. T2=6.5. Vol=2015ml. [Homer 143.919902E/13.39532N] PI Butterfield (subsamples Huber/Bolton)**
18:11	143.91990	13.39532	212	3	1451	SAMPLE-18 HFS Samples 16 17 and 18 have all been collected at exactly the same location.
18:19	143.91990	13.39532	212	3	1451	SAMPLE-18 HFS Stopping.
18:28	143.91990	13.39531	212	3	1451	Still sitting here trying to break off rocks.
18:37	143.91989	13.39531	200	5	1451	Taking digital still photos of rock for Cornel.
18:40	143.91989	13.39531	200	5	1451	Departing Homer and heading SE toward Marge.
18:41	143.91989	13.39531	200	5	1451	Looking for a high flow area at Marge
18:50	143.91992	13.39526	257	1	1446	Moving around to investigate whether there is a smoker on the other side of the mound before deciding where to sample
18:56	143.91988	13.39527	92	2	1447	Preparing to sit Jason down to begin sampling
18:57	143.91988	13.39527	92	2	1447	Positioning temperature probe
19:01	143.91988	13.39527	90	2	1447	TEMPERATURE 146
19:10	143.91988	13.39527	90	2	1447	SAMPLE-19 HFS Repositioning vehicle to get better flow before starting sample
19:11	143.91988	13.39526	79	3	1447	Still fiddling with the probe to find higher temperature before beginning to sample
19:20	143.91989	13.39526	102	2	1447	**SAMPLE-19 HFS Filtered bag #17. T2=45.7 Tmax=146C. Vol=530ml. [Marge 143.919873E/13.395265N] PI Butterfield**
19:24	143.91989	13.39526	102	2	1447	SAMPLE-19 HFS Max temp recorded here was 146C
19:24	143.91989	13.39526	102	2	1447	Stopping sample Vol = 530ml
19:29	143.91989	13.39526	102	2	1447	**SAMPLE-20 HFS Bag #19. Vol=508ml T2=44.3C. [Marge 143.919873E/13.395265N] PI Butterfield**
19:30	143.91989	13.39526	102	2	1447	SAMPLE-20 HFS Sample collected at exact same site as Sample 19
19:33	143.91989	13.39526	102	2	1447	SAMPLE-20 HFS Sample stopped
19:34	143.91989	13.39526	102	2	1447	**SAMPLE-21 HFS Piston #22. Vol=499ml. T2=44.9C. [Marge 143.919873E/13.395265N] PI Butterfield**
19:38	143.91989	13.39526	102	2	1447	SAMPLE-21 HFS Piston sample stopped
19:40	143.91989	13.39526	102	2	1447	**SAMPLE-22 HFS Sterivex filter #23. T2=38-42C. Vol=4005ml. [Marge 143.919873E/13.395265N] PI Butterfield (subsamples Huber/Bolton)**
19:40	143.91989	13.39526	102	2	1447	SAMPLE-22 HFS Sample stopped
20:10	143.91987	13.39527	102	2	1447	**SAMPLE-23 HFS Fish filter #12. T2=38-42C. [Marge 143.919873E/13.395265N] PI Butterfield (subsamples Huber/Bolton)**
20:11	143.91987	13.39527	102	2	1447	**SAMPLE-24 Gastight (black tape on handle). [Marge 143.919873E/13.395265N] PI Evans**
20:25	143.91987	13.39527	92	1	1446	Departing Marge and heading SE toward Mound 1
20:27	143.91987	13.39527	91	2	1447	Arriving back at Mound 1 (new position is ~16 km NW of original position at 1627. **Mound 1 final position [143.919963E/13.39503N]**
20:36	143.91998	13.39504	284	4	1442	Getting set up for water sampling
20:38	143.91998	13.39504	298	4	1443	Max=193C
20:43	143.91996	13.39503	295	2	1442	TEMPERATURE. 195.7 is the new max temp
20:45	143.91995	13.39503	295	2	1442	Preparing to fire gastight
20:47	143.91996	13.39503	295	3	1443	**SAMPLE-25 Gastight (white handle). Temp=196C earlier. [Mound 1 Vent base 43.919963E/13.39503N] PI Evans**
20:51	143.91995	13.39503	295	3	1443	SAMPLE-25 Gastight Temp probe measured 196 degrees here earlier.

time	raw long	raw lat	hdg	alt	Z	J2-185 Forecast - Dive Log Comments
20:52	143.91995	13.39503	295	3	1443	SAMPLE-26 Major At Mound 1
20:56	143.91995	13.39503	294	2	1442	Tried to take major sampler but missed trigger
21:03	143.91996	13.39503	295	2	1442	SAMPLE-26 Major Spring on blue major is not releasing. Aborting this sample.
21:04	143.91996	13.39503	295	2	1442	SAMPLE-26 HFS Starting
21:11	143.91997	13.39503	295	2	1442	**SAMPLE-26 HFS Filtered bag #18. T2=44.3C. Vol=504ml. [Mound 1 Vent base 43.919963E/13.39503N] PI Butterfield**
21:12	143.91997	13.39502	295	2	1442	SAMPLE-26 HFS Sample complete
21:15	143.91998	13.39502	295	2	1442	**Lifting off for the surface**
21:17	143.91998	13.39503	298	3	1442	**SAMPLE-27 HFS Sterivex #13 background filter. [Collected during ascent] PI Butterfield (subsamples Huber/Bolton)**
21:23	143.91978	13.39531	319	24	1449	SAMPLE-27 HFS Sample collected during ascent
21:24	143.91973	13.39537	318	35	1445	Background DNA sample stopped at 1260m.
21:32	143.91973	13.39537	315	74	1326	Sample 27 intended as cross-contamination check
21:33	143.91973	13.39537	315	74	1311	**Jason on deck**

5.4.3 J2-186 NW Rota-1 Dive Log

time	raw long	raw lat	hdg	alt	Z	J2-186 NW Rota-1 - Dive Log Comments
J2-186 NW Rota-1 Dive Summary: Settled down into a dense plume at NW Rota-1. Had a hard time figuring out where we were and where Brimstone Pit was. Floundered for quite some time with that and never actually visited the pit on this dive, but were close by. Took a scoop sample just north of the summit then continued searching for Brimstone while in a dense plume. Decided to do SM2000 survey. Had to reboot the system. Sediment scoop sample while calibrating at NW end of SM2000 survey. SM2000 survey (5 lines). Drove down to the bottom after the survey and sampled: 1 ash scoop and 1 rock. Sample summary - 5 samples total: 3 scoops (crust, sediment, sulfur globules) and 2 rocks.						
J2-186 Bottom time: 4/21/2006 2345 - 4/22 0948 UTC (10.05 hrs). **Z column represents seafloor depth in meters.**						
21:56	144.75833	14.58336	354	1	3	Preparing to launch Jason for dive J2-186.
22:28	144.75833	14.58336	234	1	31	**Jason was in the water at 22:20.**
22:28	144.75833	14.58336	233	1	34	This is Jason dive J2-186.
22:49	144.75831	14.58332	236	125	614	Passing through a large smoke cloud.
22:52	144.75831	14.58332	236	154	693	Descending through lots of wafting plume.
22:53	144.75831	14.58328	236	132	682	Plume has diminished again.
22:55	144.75831	14.58327	235	123	673	Plume was above the summit depth.
22:55	144.75831	14.58327	234	116	665	We are holding here to clean up the front basket a bit.
23:02	144.75832	14.58324	234	95	645	Still trying to adjust the suction hose out of the pilot's view.
23:09	144.75832	14.58322	233	94	644	We are going to put a weight on the suction hose.
23:12	144.75832	14.58324	234	93	643	Putting another weight on the suction hose.
23:13	144.75832	14.58324	233	94	644	Just moved the other weight to a better location in the basket.
23:14	144.75832	14.58325	233	95	645	Eh has gone negative.
23:17	144.75833	14.58330	252	79	645	Done with basket housekeeping. Continuing down now.
23:18	144.75839	14.58327	48	50	629	We are heading NE at 580 m. Eh is positive again.
23:21	144.75838	14.58331	49	15	625	We are back into some smoke again.
23:22	144.75838	14.58331	51	2	626	Holding position. We are in an intense plume.
23:24	144.75839	14.58330	48	28	636	Bringing the vehicle back up to reposition for better visibility.
23:26	144.75840	14.58329	44	36	627	We are going to try to approach more from the E/SE.
23:26	144.75841	14.58331	45	49	627	Moving north to approach along the contour rather than across it.
23:29	144.75843	14.58331	45	108	628	More intense plume in the Medea camera.
23:37	144.75842	14.58333	9	41	582	Autosnap has stopped taking frame grabs.
23:39	144.75842	14.58333	8	30	571	Eh is negative again.
23:39	144.75842	14.58333	8	29	570	Autosnap only happens within 30 meters of the bottom.
23:45	144.75846	14.58329	11	2	567	**Bottom is in sight.**
23:45	144.75846	14.58329	18	3	567	Depth is 564m.
23:46	144.75848	14.58328	53	3	567	There are bits of rock in the water here.
23:47	144.82670	14.55990	52	2	566	Ambient temperature is 6.2 degrees.
23:49	144.77583	14.60060	298	4	568	Top of Brimstone was at 550m in 2004 and 530m in 2005. We are too deep.
23:50	144.77575	14.60065	299	2	566	Current is 15 cm/sec to the SE from the ADCP.
23:52	144.77571	14.60063	298	3	566	Coming up a bit again to move to the west side of Brimstone.
23:53	144.77571	14.60061	305	8	568	We want to approach upwind for better visibility.
23:55	144.77576	14.60056	306	36	554	Eh drops down when we rise through the intense plume.
23:56	144.77575	14.60056	306	86	567	Rose up into the intense plume again at 500m.
00:09	144.75831	14.58335	301	111	562	We are passing right over the position of Brimstone but we don't see any plume.
00:15	144.75836	14.58334	67	3	561	We are heading back down. Still poor visibility here.
00:17	144.75836	14.58334	68	34	561	Coming back up again.
00:18	144.75836	14.58334	66	72	555	Trying to decide how to approach Brimstone.
00:20	144.75836	14.58334	68	95	553	We are going to the summit instead.
00:20	144.75836	14.58333	79	89	546	The summit is 50 m to the east.
00:27	144.75832	14.58335	295	80	538	We are about 60 m over the summit.
00:29	144.75836	14.58334	52	53	534	Going back down through an intense plume.
00:30	144.75836	14.58334	56	45	527	We are looking NE and seeing a large defined plume.
00:30	144.75836	14.58334	50	20	500	There are bubbles rising too.
00:31	144.75836	14.58334	61	24	502	We are SW of the summit. Plume is really stable and barely wafting.
00:32	144.75836	14.58333	73	55	533	Brimstone is behind us so we are not sure where this plume is coming from.
00:35	144.75838	14.58332	73	56	534	We are debating whether the rising things are bubbles or not.
00:39	144.75837	14.58332	72	69	548	The plume does not seem to billow at all. It is very stable.
00:40	144.75837	14.58332	73	66	555	Heading down to track along the edge of the plume.
00:42	144.75838	14.58331	82	64	553	Definitely bubbles rising now.
00:44	144.75838	14.58331	73	68	557	Still tracking the edge of the plume down.
00:48	144.75838	14.58331	72	58	560	Eh is -170 here.
00:49	144.75838	14.58331	74	66	561	Changed DVCam tape.
00:50	144.75838	14.58331	73	79	560	Coming back up and moving the ship 100 m north.
00:51	144.75836	14.58333	2	83	563	There are bits of sulfur sticking on the camera lens.
00:52	144.75836	14.58333	3	4	470	Tons of bubbles here.
01:04	144.75836	14.58329	178	36	551	We are on station and heading down again.

time	raw long	raw lat	hdg	alt	Z	J2-186 NW Rota-1 - Dive Log Comments
01:06	144.75836	14.58328	171	2	550	**We are on the bottom again.**
01:06	144.75832	14.58327	170	3	550	Lots of orange staining
01:07	144.75831	14.58326	171	3	550	Going to take a scoop sample.
01:11	144.77518	14.60180	169	2	548	Dropping a weight.
01:11	144.77519	14.60180	169	2	548	*Reset the doppler but it has not been very good with all the plumes.*
01:12	144.77519	14.60180	169	2	548	Picking up the scoop.
01:14	144.77516	14.60180	170	2	548	SAMPLE-1 Scoop.
01:16	144.77512	14.60180	168	2	548	**SAMPLE-1 Scoop. Orange crust and black sediment below. Green handled bag. Port bio box. [144.775183E/14.601817] PI geogroup**
01:24	144.77518	14.60180	193	2	548	Heading upslope and tracking along the ridge.
01:27	144.77512	14.60170	202	3	542	We have reached a spur ridge. Not the summit. (actually very near the summit and NW of Brimstone'06 - everything just looks so different this year...)
01:28	144.77513	14.60158	182	1	544	We are back to the plume again.
01:29	144.77515	14.60158	75	3	546	Turning to track along slope to the summit.
01:32	144.77517	14.60157	135	1	544	Heading SE along the contour.
01:33	144.77517	14.60157	90	2	543	Orange sediment here is fluffy.
01:36	144.77528	14.60147	146	3	535	Turned off Medea's lights to see if it helped Jason's visibility.
01:39	144.77537	14.60134	143	2	531	Tons of large particles in this plume. May have been stirred up by Jason.
01:40	144.77538	14.60135	123	5	536	We are trying to back away from the plume for the watch change.
01:43	144.77539	14.60139	40	8	539	Are we at the summit?
01:44	144.77539	14.60138	41	8	539	Taking a closer look at the large rock face ahead of us.
01:44	144.77539	14.60139	40	8	538	If this is the summit it looks very different than 2 years ago.
01:45	144.77539	14.60138	40	7	538	There was not a distinct rock peak before. All the loose material may have fallen away.
01:47	144.77539	14.60138	46	8	538	We will take a rock sample here and potentially place the hydrophone as well.
01:52	144.77539	14.60138	47	8	538	Watch change.
01:53	144.77539	14.60138	47	8	538	Trying to decide where to sample with such poor visibility.
01:54	144.77539	14.60138	47	8	538	Instead of sampling would like to get top of summit to deploy the hydrophone.
01:54	144.77539	14.60139	38	3	531	Leaving bottom.
01:55	144.77539	14.60139	41	2	531	No visibility-looking at forward sonar.
01:55	144.77539	14.60138	42	8	535	In the plume near the top of NW Rota.
01:56	144.77538	14.60138	41	6	529	Cliff right in front of us-on the sonar it looks like a wall - sub heading 040 at 520 meters.
01:56	144.77539	14.60138	44	6	529	Peak before was at 517m with ROPOS depth sensor.
01:57	144.77536	14.60137	35	14	534	Want to deploy hydrophone at summit so we can later find more easily.
01:57	144.77536	14.60137	40	8	526	Looks like we are at highest point on the sonar at 519m.
01:58	144.77536	14.60137	40	2	520	Sonar is at 10m so could be higher peak nearby if had longer range.
01:58	144.77534	14.60139	33	3	520	Can see another peak on science cam and now at 517m. We are at very top with same depth as ROPOS.
01:58	144.77534	14.60138	31	2	519	Going to deploy hydrophone here.
01:59	144.77533	14.60138	34	1	519	Brimstone Pit is south of us and is not on the summit.
01:59	144.77531	14.60137	32	1	519	Trying to park at this peak.
02:00	144.77531	14.60137	33	1	519	**Want to also deploy a marker here.**
02:00	144.77531	14.60137	33	1	519	Hydrophone will record for 30 hours and was turned on at 0900 this am.
02:00	144.77531	14.60137	32	1	519	0900 am local time.
02:01	144.77531	14.60137	32	1	519	**Hydrophone and Marker 78 position [144.775674E/14.601177N]**
02:02	144.77531	14.60136	32	1	519	Placed hydrophone on surface.
02:02	144.77531	14.60136	32	1	519	Putting down Target 10 Hydrophone.
02:02	144.77531	14.60136	32	1	519	Marker 78 is being deployed - we are stationary.
02:03	144.77531	14.60136	32	1	519	Marker is deployed. Depth 517.
02:03	144.77531	14.60136	32	1	519	Depth is actually 518 meters.
02:04	144.77532	14.60137	32	1	519	**SAMPLE-2 Rock. Picked up sample between the marker and hydrophone. Took digital photos. [Mkr-78 area 144.775674E/14.601177N] PI geogroup**
02:04	144.77532	14.60137	32	1	519	SAMPLE-2 Rock. Getting still photo in front of still camera.
02:07	144.77533	14.60135	32	1	519	SAMPLE-2 Rock. Rock is in FWD STBD quadrant of basket.
02:07	144.77533	14.60136	31	3	520	Trying to get some still images of the site - ROV coming in for a closeup.
02:08	144.77532	14.60136	28	4	521	Photo of marker and hydrophone.
02:08	144.77532	14.60135	22	4	521	Next on the agenda is to do a SM2000 survey.
02:09	144.77537	14.60131	17	16	524	Will drive to start of SM2000 lines to the NW of this site.
02:11	144.77537	14.60132	145	19	525	Jason is driving mid-water to target of survey start.
02:14	144.77526	14.60123	312	29	527	Driving mid-water to target.
02:18	144.77526	14.60123	311	34	531	Akel is coming to calibrate the SM200.
02:20	144.77526	14.60124	310	27	525	Ship is moving to NW.
02:28	144.77526	14.60124	311	50	547	WE are 58m above bottom and temp is 6.7deg and driving through 'smoky' water.
02:28	144.77526	14.60124	311	66	564	SM2000 system will take 30 minutes to calibrate.
02:28	144.77526	14.60124	311	46	543	Decided to fly higher and do every other planned line - 5 instead of 9. 45 min/line.
02:31	144.77526	14.60124	311	30	527	About half way there.

time	raw long	raw lat	hdg	alt	Z	J2-186 NW Rota-1 - Dive Log Comments
02:33	144.77526	14.60124	311	53	550	Great smoky water images.
02:34	144.77526	14.60124	312	94	591	Wispy smoke.
02:38	144.77526	14.60124	318	31	529	Turning off altimeter.
02:42	144.77526	14.60124	321	31	529	Changing video tapes.
02:44	144.77526	14.60124	330	31	529	Fog seems to have cleared a bit.
02:45	144.77526	14.60124	326	31	529	Ship is going to turn off their ADCP as we are getting some interference on the SM2000.
02:47	144.77526	14.60124	324	31	529	Now changing tapes.
02:48	144.77526	14.60124	324	31	529	Turning off Medea's altimeter.
02:49	144.77526	14.60124	324	31	529	Still doesn't help.
02:55	144.77526	14.60124	324	31	529	Still trying to figure out noise problem-sharps-altimeter-adcp off.
02:55	144.77526	14.60124	324	31	529	Going to try turning off forward sonar.
02:55	144.77526	14.60124	324	31	529	Sonar did not make a difference.
02:58	144.77526	14.60124	324	31	529	Sharps going back on.
02:59	144.77526	14.60124	324	31	529	Rebooting SM2000.
03:02	144.77526	14.60124	325	31	529	Cycling power to SM2000.
03:09	144.77526	14.60124	323	31	537	Going down to the bottom for a scoop sample while fixing SM2000.
03:13	144.77526	14.60124	324	41	640	Holding at 40m.
03:16	144.77526	14.60124	324	39	641	Coming down to 30m.
03:17	144.77526	14.60124	324	30	641	Alt 30m.
03:19	144.77526	14.60124	321	28	642	Going down to sample then will try SM2000 at 60m.
03:22	144.77526	14.60124	322	150	797	**Back on the bottom.**
03:22	144.77526	14.60124	322	150	797	Squid.
03:23	144.77526	14.60124	322	179	826	May seem some particulate sulfur here.
03:23	144.77526	14.60124	322	178	824	Going to attempt a scoop sample of sediment.
03:23	144.77526	14.60124	322	178	825	9cm shrimp in pilot's view.
03:24	144.77526	14.60124	323	178	825	Picking up a scoop bag.
03:25	144.77526	14.60124	323	191	647	**SAMPLE-3 Scoop. Gray-black sediment. Black underneath and lighter on top. Light stuff could be particulate sulfur. Dark could be ash. [144.773717E/14.603233N] PI geogroup**
03:26	144.77526	14.60124	328	131	647	SAMPLE-3 Scoop. We are on an upslope so need to reposition to reach the seafloor. Retracting drawer.
03:27	144.77526	14.60124	30	1	647	SAMPLE-3 Scoop. Some ripples or ridges in sediment. Depth is 646.
03:28	144.77526	14.60124	30	1	647	SAMPLE-3 Scoop. Taking sample. Black underneath sample. Taking a second scoop not getting very deep before hitting surface of black.
03:29	144.77526	14.60124	52	1	647	SAMPLE-3 Scoop. Repositioning a bit. Light layer on top-darker on bottom. Good scoop this time.
03:31	144.77526	14.60124	52	1	647	SAMPLE-3 Scoop .Full sample. Light stuff could be particulate sulfur and dark ash.
03:32	144.77526	14.60124	51	1	647	SAMPLE-3 Scoop .Having to do bag exchange to use manipulator for pulling out biobox.
03:35	144.77526	14.60124	51	1	647	Placing scoop bag in STBD biobox. Eel in view.
03:37	144.77526	14.60124	51	1	647	Closing and stowing biobox.
03:39	144.77526	14.60124	50	1	647	We are going to do a patch test of a few lines at different altitudes for SM2000.
03:40	144.77526	14.60124	50	1	647	Verena is taking stills of sediment.
03:41	144.77526	14.60124	101	1	646	View of sediment and black surface where scooped.
03:43	144.77526	14.60124	105	1	643	Heading 104 with slope off to STBD.
03:46	144.77526	14.60124	104	1	644	**Here we go with SM2000 calibration.**
03:46	144.77526	14.60124	105	1	644	5m off bottom.
03:47	144.77526	14.60124	184	1	643	Went 20m and now turning.
03:47	144.77526	14.60124	285	1	642	Starting second run of calibration.
03:49	144.77526	14.60124	286	1	644	End run.
03:50	144.77526	14.60124	131	1	643	Next line at 15m. altitude.
03:52	144.77526	14.60124	293	1	632	Turning.
03:53	144.77526	14.60124	273	1	629	Starting second run
03:54	144.77526	14.60124	275	1	632	End of second run
03:54	144.77526	14.60124	264	1	631	*Moving up 50-60 meters to check out doppler and SM2000*
03:54	144.77526	14.60124	264	1	629	**Ends calibration**
03:56	144.77526	14.60124	278	1	603	Altitude approx 45 meters
04:00	144.77526	14.60124	278	1	592	SM2000 line start. Initiating SM2000 survey
04:02	144.77526	14.60124	108	1	592	**SM2000 line start. running at 60m altitude**
04:07	144.77526	14.60124	106	1	587	Water is cloudy
04:07	144.77526	14.60124	108	1	586	... but we're not in the thick plume
04:09	144.77526	14.60124	109	1	576	*LBL nav is a bit noisy to start (that's the understatement of the year!)*
04:10	144.77526	14.60124	108	1	574	Nav is using the BC baselines.
04:16	144.77526	14.60124	110	1	551	Water is increasing murkiness
04:16	144.77526	14.60124	110	1	546	Can still see Jason from Medea
04:17	144.77526	14.60124	106	1	539	More smoke from Medea camera

time	raw long	raw lat	hdg	alt	Z	J2-186 NW Rota-1 - Dive Log Comments
04:26	144.77526	14.60124	109	1	555	Less murky at end of line
04:36	144.77526	14.60124	111	1	566	SM2000 line end. end of line 1
04:48	144.77526	14.60124	210	1	530	SM2000 line end. moving to second line - murkiness increasing
04:58	144.77526	14.60124	209	1	523	SM2000 line start. 2 after long interval with no nav.
04:59	144.77526	14.60124	329	1	523	SM2000 line start. Start of line 2 going east to west.
04:59	144.77526	14.60124	290	1	523	Using BC transponder baseline (same as last line).
05:07	144.77526	14.60124	309	1	513	Interesting profile on SM2000.
05:08	144.77526	14.60124	284	1	512	Location 14 36.088 144 46.568.
05:10	144.77526	14.60124	291	1	490	Plume is getting thicker.
05:11	144.77526	14.60124	288	1	477	Great plume.
05:19	144.77526	14.60124	290	1	500	Smoke.
05:22	144.77526	14.60124	289	1	514	Plumes again.
05:23	144.77526	14.60124	289	1	522	Murky.
05:25	144.77526	14.60124	289	1	532	Really thick - losing sight of Medea.
05:27	144.77526	14.60124	289	1	538	More plume.
05:29	144.77526	14.60124	286	1	551	End of line.
05:30	144.77526	14.60124	296	1	554	SM2000 line end. Position nav reset 4.36.150 144 46.395.
05:32	144.77526	14.60124	234	1	557	Moving ship to start next line.
05:51	144.77294	14.60169	117	1	532	SM2000 line start line 3. West to east.
06:02	144.77307	14.60167	107	1	529	Can see plume here.
06:06	144.77516	14.60102	104	1	523	Thick plume.
06:08	144.77516	14.60103	85	1	522	Thick plume IS near Brimstone Pit.
06:08	144.77516	14.60103	84	1	524	Very thick plume.
06:10	144.77516	14.60103	95	1	524	Very thick plume. Bottom topography very rugged.
06:12	144.77517	14.60101	117	1	520	Thick plume.
06:14	144.77520	14.60102	113	1	520	Wafting thick smoke plume.
06:17	144.77534	14.60104	111	1	515	Thick plume.
06:21	144.77531	14.60095	225	1	515	SM2000 line end. End of line 3.
06:24	144.77533	14.60091	206	1	514	Thick plume.
06:34	144.77528	14.60097	207	1	525	Quite a few zooplankton in the plume here
06:47	144.77527	14.60099	290	1	526	SM2000 line start. Starting Line 4 - 14 35.99 144 46.595
06:51	144.77529	14.60101	291	1	530	Plume not very thick here
07:07	144.77495	14.60104	298	1	553	Quite a bit of plume here
07:19	144.77492	14.60104	285	1	526	SM2000 line end. End Line 4 - 14 36.075 144 46.345
07:22	144.77496	14.60105	197	1	526	Much less zooplankton here than at the start of Line 4
07:22	144.77496	14.60106	197	1	527	Plume barely visible at all
07:33	144.77500	14.60107	112	1	564	Plume becoming thicker here
07:33	144.77500	14.60107	108	1	566	A lot more zooplankton again
07:36	144.77499	14.60106	109	1	572	SM2000 line start. Start Line 5 - 14 36.022 144 46.345
07:40	144.77279	14.60032	106	1	597	Plume thickness has diminished again
07:56	144.77283	14.60034	107	1	601	Plume not very strong at all
07:57	144.77283	14.60034	109	1	593	But still a lot of krill-like zooplankton
08:07	144.77287	14.60035	108	1	569	SM2000 line end. End Line 5 - 14 35.934 144 46.582
08:14	144.77283	14.60037	293	1	569	Plume intensity increasing
08:22	144.77283	14.60037	298	1	569	Preparing to run a line across Brimstone orthogonal to the main survey lines
08:35	144.77286	14.60038	16	1	569	SM2000 line start. Start of line 6. Lat 14 35.973 Long 144 46.482.
08:36	144.77286	14.60038	19	1	568	Cross tow at right angles to previous survey lines also over top Brimstone Pit.
08:39	144.77286	14.60038	19	1	569	Water relatively clear here SW of Brimstone.
08:49	144.77285	14.60041	7	1	534	Still see evidence of plume in the water column but nowhere near as thick as when surveying NW to SE.
08:54	144.77285	14.60041	7	1	505	Roughly over old (2004) Brimstone Pit crater.
08:55	144.77285	14.60041	7	1	502	Noticeably less smoke seen during this traverse.
08:57	144.77285	14.60041	7	1	494	See thick smoke at this point.
09:00	144.77287	14.60043	8	1	470	Saw interesting small ridge as we went to NW of Brimstone.
09:00	144.77288	14.60043	8	1	470	Plume seems to have dissipated here.
09:10	144.77288	14.60043	9	1	524	Thick plume seen here.
09:12	144.77287	14.60043	7	1	527	**SM2000 line end. Survey finished as nav dropped out - but end of line near anyway.**
09:15	144.77285	14.60040	234	1	534	Diving down to bottom to get scoop sample of ash.
09:18	144.77284	14.60041	278	44	596	Thick smoke as we descend to bottom.
09:21	144.77637	14.60103	217	6	599	See the bottom which is mostly ash.
09:22	144.77634	14.60101	214	2	597	See some buried rock and a long eel-like fish.
09:23	144.77634	14.60101	213	3	597	See lots of small sulfur globules interspersed with the ash.
09:35	144.77596	14.60234	227	2	597	**Sample 4. Scoop. Sample of ash with sulfur globules. Yellow tape on handle. [144.775758E/14.601973N] PI geogroup**
09:37	144.77596	14.60234	226	2	597	Sample 4 placed in right front division of milk crate.

time	raw long	raw lat	hdg	alt	Z	J2-186 NW Rota-1 - Dive Log Comments
09:39	144.77596	14.60234	227	2	597	**Sample 5. Rock placed in back milk crate. Same location as sample 4. [144.775758E/14.601973N] PI geogroup**
09:42	144.77596	14.60234	230	4	597	**Deployed weights and off bottom.**
09:48	144.77597	14.60241	230	28	601	**Now we are really leaving the bottom.**
09:55	144.77586	14.60234	239	166	580	Stopping the tapes.
10:11	144.77588	14.60234	212	134	136	We are on the surface.
10:13	144.77588	14.60234	239	134	136	Medea is on deck.
10:22	144.77588	14.60234	260	154	155	**Jason is on deck. End of dive J2-186.**

5.4.4 J2-187 NW Rota-1 Dive Log

time	raw long	raw lat	hdg	alt	Z	J2-187 NW Rota-1 - Dive Log Comments
J2-187 NW Rota-1 Dive Summary: Visibility improved from last dive. Started the dive at Iceberg Vent. Still lots of bacterial mat at this outcrop. Samples at Iceberg: 5 HFS, 1 gastight and 1 rock. Suction sampler did not work. Had trouble finding Brimstone Pit because of depth differences from 2004. Sampled a rock while searching. Couldn't find Brimstone so went to the marker and recovered the hydrophone. Sampled nearby. Sandy Saddle samples: 3 HFS. Found Brimstone. Looks like the side of the pit wall collapsed. It's no longer a pit. It's a very dynamic place and activity levels vary greatly. Went to Fault Shrimp next. Tried to suction mat but suction sampler not working again. Samples at Fault Shrimp: 4 HFS. Next traveled to Scarp Top where there were lots of shrimp - collected 3 HFS samples. Continued back to Brimstone, approaching from the south and heading upslope. Samples from second visit to the Brimstone area: 2 HFS, 1 scoop volcaniclastic ash, 1 major, 1 gastight. Activity increased dramatically while at Brimstone. Witnessed an eruption!!! 35 samples total.						
J2-187 Bottom time: 4/23/2006 0312 - 1732 UTC (14.33 hrs). **Z column represents seafloor depth in meters.**						
00:43	144.75831	14.58333	245	154	155	Jason off the deck.
00:43	144.75831	14.58333	296	154	156	Jason in the water. Start of dive J2-187.
00:44	144.75831	14.58333	317	154	155	*Ground fault on the doppler. Bringing Jason back on deck.*
00:45	144.75831	14.58333	317	154	155	Ground fault on the DSC strobe as well.
00:46	144.75831	14.58333	317	154	155	Jason back on deck.
01:04	144.75831	14.58333	4	154	155	Jason off the deck.
01:05	144.75831	14.58333	310	154	155	Jason in the water. There is still a ground fault on the DSC.
01:08	144.75831	14.58333	304	154	155	Jason back on deck.
02:38	144.75833	14.58333	279	0	2	**Jason in water. J2-187.**
02:39	144.75833	14.58333	285	0	2	J2-187 is the dive-not JS.
02:40	144.75833	14.58333	283	0	2	Jason holding on surface.
02:43	144.75833	14.58333	276	0	43	Jason is going down.
02:45	144.75833	14.58333	267	0	85	Jason has been cleared to dive.
02:48	144.75833	14.58333	265	0	130	Jason already obscured by smoke-depth is 129m.
02:49	144.75833	14.58333	265	0	145	Bottom should be at 530m-start to watch out at 525m.
02:56	144.75833	14.58333	265	0	325	So far only one fish seen on the way down - 325m.
03:00	144.75833	14.58333	252	137	575	Getting altimeter readings.
03:01	144.75833	14.58333	253	133	576	Depth is 440m.
03:02	144.75833	14.58333	257	93	575	Starting video tapes-depth 478 and alt. less than 100m.
03:03	144.75833	14.58333	259	79	574	First target is Iceberg to do some fluid sampling.
03:03	144.75833	14.58333	257	53	573	Seeing some smoke.
03:04	144.75833	14.58333	258	47	572	Less than 50m. off bottom.
03:04	144.75833	14.58333	259	42	571	We are 78m from the target. We are on top of Brimstone at the moment.
03:05	144.75833	14.58333	258	41	570	Iceberg is at 529 meters.
03:05	144.75833	14.58333	257	37	566	Visibility is pretty good so far.
03:06	144.75833	14.58333	243	27	556	Driving Jason under Medea.
03:07	144.75833	14.58333	104	8	537	Bottom in sight-murky.
03:08	144.75833	14.58333	104	7	536	White globules suspended in water.
03:08	144.75833	14.58333	111	7	537	Jason now under Medea.
03:08	144.75833	14.58333	110	7	537	Altitude is 7m.
03:10	144.75833	14.58333	109	7	537	Cycling Medea again - not seeing all transponders.
03:10	144.75833	14.58333	109	7	536	Seeing all 4 transponders now.
03:11	144.75833	14.58333	114	10	539	Still holding above bottom at 9 meters.
03:11	144.75833	14.58333	115	9	538	Going down to bottom.
03:12	144.75833	14.58333	115	1	539	**On bottom dive J2-187. No accurate lat/long in being displayed (same fix over and over).**
03:12	144.75833	14.58333	113	1	539	Seeing mat and shrimps.
03:13	144.75833	14.58333	115	2	540	Lots of shrimp in water. Smoke as well.
03:13	144.75833	14.58333	114	2	540	Swarm of something.
03:13	144.75833	14.58333	114	2	540	Big swarm of shrimp in water.
03:13	144.75833	14.58333	19	2	539	*Doppler reset.*
03:14	144.75833	14.58333	332	2	539	Lots of shrimp plus white mat/sediment.
03:14	144.75833	14.58333	310	5	541	Outcrop should be above us - pretty clear here.
03:15	144.75833	14.58333	315	3	539	Got a yellow button on the video display.
03:15	144.75833	14.58333	315	3	539	Looking upslope. White sediment on surface.
03:15	144.75833	14.58333	315	3	539	Lots of shrimp congregating on surface.
03:16	144.75833	14.58333	319	2	539	Outcrop with white staining - hence the name Iceberg.
03:17	144.75833	14.58333	318	2	539	*Doppler not working but LBL is ok.*
03:17	144.75833	14.58333	318	2	538	A lot clearer than yesterday - a different site but not too far away.
03:18	144.75833	14.58333	318	2	538	Shrimp have white material all over them.
03:18	144.75833	14.58333	318	2	538	Water in the science cam.
03:18	144.75833	14.58333	318	2	538	This is **Iceberg** but we are 7m deeper than 2 years ago.
03:18	144.75833	14.58333	318	2	538	Lasers not working yet.
03:19	144.75833	14.58333	318	2	538	Lasers are up now.
03:19	144.75833	14.58333	318	2	538	Looks the same as last time we visited here. With some venting around rocks and shrimp. We are deeper.
03:20	144.75833	14.58333	318	2	538	Japanese did put a marker down slope somewhere around here.
03:20	144.75833	14.58333	318	2	538	Not many recent volcanics here.
03:21	144.75833	14.58333	318	2	538	Is it ash or mat? Volcanic or crust?
03:22	144.75833	14.58333	318	2	538	Want HFS samples here.
03:22	144.75833	14.58333	318	2	538	Zooming in on fluid sample site.

time	raw long	raw lat	hdg	alt	Z	J2-187 NW Rota-1 - Dive Log Comments
03:23	144.75833	14.58333	318	2	538	*Working on navigation-doppler. Don't have an LBL lat/long right now.*
03:24	144.75833	14.58333	318	2	538	Sediment looks like combo of ash and rock.
03:24	144.75833	14.58333	318	2	538	Visibility is remarkably good.
03:26	144.75833	14.58333	318	2	538	Sediment is black ash and white sulfur combo. Sulfur is lighter - it's on the surface.
03:26	144.75833	14.58333	318	2	538	Found a great crack for sampling.
03:27	144.75833	14.58333	317	2	538	We are nose-in to the slope here.
03:27	144.75833	14.58333	317	2	538	**Still no accurate lat/long.** Nav team is working on it. Lat longs are being logged in the virtual van but they are all the same. Obviously not correct.
03:28	144.75833	14.58333	314	3	539	Repositioning for fluid sampling.
03:28	144.75833	14.58333	315	9	541	Grabbing the fluid sampler with the arm.
03:30	144.75833	14.58333	315	5	534	ROV has a power supply problem.
03:30	144.75833	14.58333	315	6	535	Lot of water coming out of here.
03:31	144.75833	14.58333	314	7	535	We are now at the depth of last year's Iceberg after repositioning.
03:32	144.75833	14.58333	338	5	535	Getting signal from only 2 sharps-need all 4 for nav.
03:32	144.75833	14.58333	338	3	535	First landing site was 7m lower than here.
03:33	144.75833	14.58333	338	3	534	Getting all 4 transponders/sharps now.
03:33	144.75833	14.58333	340	2	534	Looking for a vigorous sampling site.
03:34	144.75833	14.58333	340	2	534	Looking around with cameras for best flow.
03:35	144.75833	14.58333	340	2	534	Positioning fluid sampler.
03:36	144.75833	14.58333	335	2	534	**Position at this site: [Iceberg Vent 144.77632E/14.60085N]**
03:37	144.75833	14.58333	335	2	534	Bumped bottom and waiting for it all to settle out.
03:37	144.75833	14.58333	335	2	534	Cleared up pretty quickly.
03:38	144.75833	14.58333	335	2	534	Zoom-in on the potential sampling site.
03:39	144.75833	14.58333	336	2	534	SAMPLE-1 HFS. Positioning intake into hole.
03:42	144.75833	14.58333	336	2	534	**SAMPLE-1 HFS. HFS. Unfiltered bag #8. Tmax=51.9C Tavg=49.3 T2=35.5 Vol=550ml. [Iceberg 144.77632E/14.60085N] PI Butterfield**
03:44	144.75833	14.58333	336	2	534	SAMPLE-1 HFS. Sample could take 40 minutes.
03:46	144.75833	14.58333	336	2	534	SAMPLE-1 HFS. Stopping.
03:47	144.75832	14.58335	336	2	534	**SAMPLE-2** HFS Filtered Bag #11 Start
03:48	144.77631	14.60084	336	2	534	**SAMPLE-2. HFS. Filtered bag #11. Start 0347. Tmax=50.2C Tavg=49.0 T2=34. Vol=575ml. [Iceberg 144.77632E/14.60085N] PI Butterfield**
03:48	144.77631	14.60084	336	2	534	*Doppler reset.*
03:49	144.77631	14.60084	336	2	534	*SAMPLE-2 HFS. Same location as sample-1. Doppler reset was to LBL.*
03:52	144.77631	14.60084	336	2	534	SAMPLE-2 HFS. Stop.
03:52	144.77631	14.60084	336	2	534	**SAMPLE-3** HFS. Sterivex #13 Starting.
03:52	144.77631	14.60084	336	2	534	**SAMPLE-3 HFS. Sterivex filter #13 Start 0352. Intake came out of hole and was re-adjusted. Tmax=53.8C Tavg=48.0 T2=37. Vol=3007ml. [Iceberg 144.77632E/14.60085N] PI Butterfield (subsamples Huber/Bolton)**
04:06	144.77631	14.60084	338	2	534	Watching shrimp behavior during sampling.
04:07	144.77631	14.60084	338	2	534	SAMPLE-3 HFS. Same position as #1.
04:07	144.77631	14.60084	338	2	534	SAMPLE-3 HFS. Getting drop in temperature-zooming in on probe.
04:08	144.77631	14.60084	338	2	534	SAMPLE-3 HFS. Intake came out of hole a bit-will try to push it in further.
04:08	144.77631	14.60084	338	2	534	SAMPLE-3 HFS. Into the hole-temperature is climbing.
04:13	144.77631	14.60084	338	2	534	SAMPLE-3 HFS. Stop.
04:14	144.77631	14.60084	338	2	534	**SAMPLE-4** HFS. Fish filter #12. Start.
04:14	144.77631	14.60084	338	2	534	**SAMPLE-4 HFS. Fish filter #12. Start 0414. Tmax=53.2C Tavg=51.7 T2=37. Vol=204ml. [Iceberg 144.77632E/14.60085N] PI Butterfield (subsamples Huber/Bolton)**
04:15	144.77631	14.60084	338	2	534	SAMPLE-4 HFS. Stop.
04:16	144.77631	14.60084	338	2	534	**SAMPLE-5** HFS. Start.
04:17	144.77631	14.60084	338	1	534	Same location at Iceberg.
04:18	144.77631	14.60084	338	1	534	**SAMPLE-5 HFS. Unfiltered piston #6. Tmax=52.9 Tavg=51.3 T2=35. Vol=663ml. Sediment next to sample hole is moving. [Iceberg 144.77632E/14.60085N] PI Butterfield**
04:22	144.77631	14.60084	338	1	534	SAMPLE-5 HFS. Stop.
04:22	144.77631	14.60084	338	1	534	Done with HFS sampling and want a gastight.
04:23	144.77631	14.60083	339	3	534	ROV will have to back off just to stow wand and get gastight.
04:23	144.77632	14.60083	341	5	536	Gastights should be named by the color of their handle.
04:24	144.77632	14.60083	340	5	536	Wand is stowed.
04:24	144.77632	14.60083	340	5	536	Picking up gastight.
04:26	144.77632	14.60083	340	5	536	Picked up white gastight (white on handle)
04:27	144.77631	14.60085	340	3	535	Had to pull off and now repositioning to find the same orifice.
04:29	144.77632	14.60086	337	2	534	**SAMPLE-6 Gastight (white). At same position as fluid samples - hole next to small landslide. [Iceberg 144.77632E/14.60085N] PI Evans**
04:32	144.77632	14.60086	337	2	534	SAMPLE-6 Gastight. Repositioning arm to hit trigger.
04:33	144.77632	14.60086	337	2	534	SAMPLE-6 Gastight. Fired white.
04:34	144.77632	14.60086	337	2	534	SAMPLE-6 Gastight. Finished.
04:36	144.77632	14.60086	337	2	534	Stowing gastight in basket stbd box in port division.
04:37	144.77632	14.60086	335	2	534	Preparing to take suction sample of white microbial mat around orifice that we just fluid sampled from. Single chamber on.
04:39	144.77632	14.60086	335	2	534	Start slurp of microbial mat around orifice.
04:40	144.77632	14.60086	335	2	534	Trying to sample but not sucking.
04:40	144.77632	14.60086	335	2	534	Temperature of ROV probe was over 9C. Lots of diffuse flow all around the site.

time	raw long	raw lat	hdg	alt	Z	J2-187 NW Rota-1 - Dive Log Comments
04:47	144.77632	14.60086	340	4	535	**Suction sampler not going to work - hydraulic problem. No suction sample.**
04:48	144.77632	14.60086	340	3	535	J2-187 Dive configuration: Single chamber suction sampler The Beast. 3 Gas-tights. 1 Major. 5 scoops
04:49	144.77632	14.60086	340	3	535	**SAMPLE-7** Rock. Switched to rock sample at same location next to HFS sample orifice.
04:49	144.77632	14.60086	340	3	535	**SAMPLE-7 Rock. Small piece of rock (fist-size) taken above orifice. Next to HFS sample orifice. Second larger (melon sized) more speckled rock added. STBD biobox. [Iceberg 144.77632E/14.60085N] PI geogroup**
04:59	144.77632	14.60086	347	3	535	SAMPLE-7 Rock. This sample is bigger and more speckled than first sample. In STBD biobox - melon sized.
04:59	144.77632	14.60086	347	3	535	We are done sampling here. Stowing biobox.
05:00	144.77632	14.60086	348	3	535	Onward to Brimstone Pit. Want to see what the activity level is.
05:01	144.77631	14.60085	271	3	535	Brimstone is about 100m due W and this same depth of 531.
05:01	144.77625	14.60084	259	5	532	530m is the rim depth last October - we are at 527m.
05:02	144.77626	14.60083	261	6	533	Underlay map is from 2004 and depths don't match…
05:02	144.77623	14.60082	262	5	532	On the south-facing slope of NW Rota-1 driving along this depth for 100m.
05:03	144.77622	14.60082	261	5	532	Slope covered with white deposits-maybe sulfur. Visibility is a bit murkier than at Iceberg. Can see plume material going by.
05:03	144.77622	14.60082	261	5	532	Waiting for ship and Medea to start moving.
05:06	144.77604	14.60080	263	1	539	Going over a ridge so will be downslope will go down to the right.
05:06	144.77596	14.60079	261	4	549	Smoky.
05:10	144.77589	14.60088	261	3	549	Waiting for everything to catch up. Nice rocks.
05:10	144.77586	14.60088	263	5	549	On the move west. Lots of white coating on rocks.
05:11	144.77576	14.60087	262	3	551	Another outcrop through the haze.
05:12	144.77569	14.60086	261	4	553	This outcrop is more orange instead of white. Pos: 14deg 36.052N 144deg 46.542.
05:12	144.77563	14.60085	262	7	563	Stopping to hover while waiting for Medea.
05:13	144.77563	14.60085	261	6	562	Definitely clearer than Iceberg here but murkier as soon as headed west. But better than yesterday.
05:13	144.77564	14.60085	260	2	563	At 560m - we have come downslope a bit.
05:14	144.77558	14.60081	262	2	567	On bottom - white rock in view.
05:15	144.77553	14.60081	265	1	567	Seems clearer here. 14deg 36.049N 144deg 46.533E.
05:15	144.77549	14.60078	262	2	569	Big pieces of white rock - some sulfur on the rock - yellow.
05:16	144.77548	14.60079	261	2	569	Should be just East of cone. This sediment looks fairly coarse.
05:16	144.77548	14.60079	262	2	569	Slope has coarse rocks on it - boulders as big as .5 meters.
05:17	144.77541	14.60077	264	4	569	Depth at rim was 530m in October. We are at 566m with altitude 4.0m.
05:18	144.77533	14.60081	292	2	568	Either navigation is off or something has happened.
05:18	144.77532	14.60082	350	4	569	Turning upslope to N to see what happens.
05:19	144.77533	14.60087	12	3	565	Clear again as move upslope.
05:19	144.77533	14.60090	7	3	563	Lots of yellow on slope - sulfur.
05:19	144.77533	14.60090	5	3	564	Little balls (BB's) of sulfur. Still at 560m.
05:20	144.77533	14.60090	6	3	564	Waiting for Medea to catch up - at end of tether.
05:20	144.77533	14.60090	6	3	564	Vehicle facing into slope while waiting.
05:21	144.77538	14.60095	6	4	560	Moving up again.
05:21	144.77539	14.60099	6	3	558	Lot of sulfur on rocks - depth at 555. Diffuse flow from slope.
05:22	144.77539	14.60099	1	2	557	Older rock outcrop.
05:22	144.77539	14.60101	6	4	556	We are quite a bit north of where Brimstone was. Maybe on slope going up to summit.
05:23	144.77539	14.60102	5	4	555	Looks more massive (lava) than loose like before.
05:23	144.77538	14.60102	5	4	556	Still sulfur balls on surface. 14deg 36.063N 144deg 46.520E.
05:23	144.77538	14.60102	6	4	556	Looks like lava flow over gray material to the sides.
05:24	144.77538	14.60102	6	5	556	Want to grab a piece of darker material in front of ROV.
05:27	144.77537	14.60102	8	4	556	SAMPLE-8 Rock. Sample of brown-material between the older-looking gray material.
05:27	144.77538	14.60102	8	4	556	**SAMPLE-8 Rock. Sample of brown-material between the older-looking gray material. Two rocks collected. Both are grapefruit sized. In port forward quadrant of basket. [144.775317/14.601083N] PI geogroup**
05:29	144.77538	14.60102	8	4	556	SAMPLE-8 Rock. Another piece of the same area of rock - in same place of basket. Both pieces grapefruit sized.
05:30	144.77538	14.60104	5	4	554	Brown stuff looks like it is burying gray outcrops.
05:30	144.77540	14.60106	36	3	550	Gray material more massive and blocky. Brown more fragmented.
05:30	144.77541	14.60106	37	4	550	Looks like lava to Chadwick.
05:31	144.77543	14.60108	36	5	547	Brown looks like flowed in place - gray looks older and breaking up.
05:31	144.77544	14.60109	36	6	546	At 540m. Slope is fairly vertical.
05:31	144.77545	14.60110	37	6	544	Getting cloudier as move upslope.
05:31	144.77546	14.60110	36	7	544	Getting drip textures on slope.
05:31	144.77547	14.60111	36	6	542	Big deposit of sulfur on science cam.
05:31	144.77547	14.60111	36	5	541	Looks like we are top of ridge here.
05:32	144.77547	14.60111	36	5	541	Could be iron deposits and not sulfur.
05:32	144.77547	14.60111	36	5	541	Need to go up a little more.
05:32	144.77547	14.60111	36	5	541	Pos: 14deg 36.067N 144deg 46.525E. We are far from where Brimstone should be.
05:33	144.77547	14.60111	36	5	541	We are near where the hydrophone location is - should pick it up while we are here.
05:33	144.77547	14.60111	36	5	541	If this was a cone we should see it on the sonar but we don't.
05:33	144.77547	14.60111	36	5	541	Looks like iron deposits - the rock we picked up near the rim was coated with this stuff.
05:34	144.77547	14.60111	36	5	541	Waiting for Medea.

time	raw long	raw lat	hdg	alt	Z	J2-187 NW Rota-1 - Dive Log Comments
05:35	144.77547	14.60111	36	5	541	At 536m. We are close to the summit and should grab hydrophone.
05:36	144.77550	14.60113	53	7	537	Moving upslope. We are 40m from the Brimstone target.
05:36	144.77553	14.60112	46	6	535	Iron coating as we go upslope - total coating.
05:37	144.77553	14.60113	46	6	536	Kind of looks like rim. Gently sloping on the left and abrupt on the right.
05:38	144.77557	14.60112	0	6	536	Jason is moving toward hydrophone target.
05:38	144.77558	14.60113	28	4	530	Want to look toward right to see if this is the rim of Brimstone Pit. Turn 090 to right.
05:38	144.77560	14.60110	62	6	534	Looks like a vertical cliff. Looking NE.
05:39	144.77561	14.60110	44	13	535	Looking NE with Jason. Back up a bit. We are at 520m
05:40	144.77559	14.60109	47	13	536	Good nav 14deg 36.06444deg 46.532E
05:41	144.77559	14.60109	47	13	536	Think we were on rim with pit to right. Need to back off here.
05:41	144.77559	14.60109	47	13	536	Change of watch - very busy in the van.
05:43	144.77559	14.60109	47	13	536	Getting our bearing after watch change. At 523m with altitude of 12.6m.
05:46	144.77558	14.60108	47	18	545	Going to drop down here and face the wall.
05:47	144.77558	14.60108	45	4	539	We are at 530m. Taking a look at the topography/geology.
05:47	144.77558	14.60108	358	7	541	Do not want to go deeper. Turn to left and go up. Follow wall up to 530m.
05:48	144.77558	14.60110	352	8	540	Moving up slope.
05:48	144.77558	14.60111	0	8	539	Pos: 14deg 36.067N 144deg 56.531E
05:49	144.77558	14.60111	19	8	538	Orange coating-want to go to orange and turn right 090 to look around.
05:49	144.77559	14.60111	178	2	532	Looking east - sonar showing a semi-circular feature. Can't really see anything.
05:50	144.77558	14.60111	178	5	535	Believing the nav and that we are not at Brimstone here.
05:50	144.77558	14.60111	154	4	534	Want to go get the hydrophone due E about 10m from here.
05:51	144.77562	14.60111	90	6	536	Target is 20m. Depth of target is 517 and should be highest point and visible on the sonar.
05:53	144.77564	14.60111	84	6	534	Going to get hydrophone then go back down to find Brimstone.
05:53	144.77566	14.60111	62	10	535	Climbing up.
05:54	144.77566	14.60111	46	12	536	*Losing doppler - jump in nav but back in place again.*
05:55	144.77568	14.60112	21	9	529	At 521m. A few more meters to go.
05:56	144.77567	14.60114	344	8	527	At 518m looking for marker and hydrophone.
05:57	144.77568	14.60115	19	1	519	Much clearer and shimmering water at top.
05:59	144.77571	14.60118	42	1	520	Marker at shimmering water **[Marker 78 and hydrophone position: 144.775674E/14.601177N]**
05:59	144.77572	14.60119	43	1	519	Offset in navigation of 10 meters since yesterday.
05:59	144.77572	14.60119	45	1	519	Our marker is visible and hydrophone.
06:00	144.77573	14.60119	39	1	519	Marker number 78 at the hydrophone site.
06:05	144.77572	14.60120	28	2	520	**Recovered hydrophone** successfully.
06:07	144.77567	14.60115	33	15	533	Dropping a weight to adjust Jason's buoyancy
06:12	144.77572	14.60117	40	2	520	Looking for a water sampling location
06:17	144.77574	14.60115	302	3	522	Deploying temp probe to check temperature of shimmering water over sand
06:20	144.77574	14.60115	304	3	522	Still getting set up with temp probe
06:22	144.77574	14.60115	304	3	522	Measuring temp in sand
06:23	144.77574	14.60115	305	3	522	TEMPERATURE 26C.
06:25	144.77573	14.60115	305	3	522	Taking a 2nd reading just a few meters away
06:26	144.77573	14.60115	306	3	522	TEMPERATURE 57C here.
06:27	144.77573	14.60115	305	3	522	Temp just above surface reading about 51C. Looks like a good place to sample
06:30	144.77574	14.60115	305	3	522	Preparing for water sampling.
06:34	144.77572	14.60114	331	2	520	Nav target 25 is called **[Sandy Saddle 144.775618E,14.601177N]**
06:37	144.77573	14.60115	291	3	522	Waiting for temperature to stabilize before commencing water sampling
06:40	144.77573	14.60115	284	3	522	Still waiting for temp to stabilize
06:46	144.77574	14.60118	270	2	521	Still looking for a place to sample water
06:51	144.77574	14.60118	270	2	521	Measuring temperature again
06:53	144.77572	14.60114	311	4	523	Still looking for a good spot to sample here in the shimmery sand saddle.
07:00	144.77575	14.60123	67	2	521	Changing DVCAM tape
07:03	144.77577	14.60119	312	5	523	Repositioning for a better HFS sample site near marker.
07:05	144.77576	14.60121	312	2	522	ROV temp is over 8°C.
07:06	144.77576	14.60121	312	3	522	Doesn't look like as much water source on this side as the other.
07:07	144.77576	14.60121	310	3	522	Positioning wand in sediment looking for a good sample site.
07:08	144.77576	14.60121	311	3	522	Small movement to left for a better temperature reading.
07:10	144.77576	14.60121	310	3	522	Not a good spot here. Will try to get a little closer.
07:11	144.77576	14.60122	311	2	521	Looking around for some shimmer.
07:12	144.77576	14.60122	311	2	521	ROV temp up to 8.4C
07:13	144.77576	14.60122	312	2	521	T1 temp not very warm.
07:14	144.77576	14.60122	312	2	521	New spot - in sediment. Very diffuse. In between 2 rocks.
07:15	144.77576	14.60122	311	2	521	Seems to be a lot of flocculent material in the water here - bacterial mat perhaps?
07:18	144.77576	14.60122	311	2	521	Still picking a spot for water samples
07:21	144.77576	14.60122	311	2	521	Visibility has improved quite a bit in the past 10 minutes
07:28	144.77576	14.60122	312	2	521	SAMPLE-9 HFS. Start Piston #5
07:29	144.77576	14.60122	312	2	521	**SAMPLE-9 HFS. Unfiltered piston #5. Tmax=32.6C Tavg=27.3 T2=20. Vol=576ml. [Sandy Saddle area 144.775618E,14.601177N] PI Butterfield**
07:34	144.77576	14.60122	312	2	521	SAMPLE-9 HFS. End Sample.
07:35	144.77576	14.60122	312	2	521	**SAMPLE-10 HFS. Filtered bag #14. Tmax=30C Tavg=26.6 T2=20. Vol=600ml. [Sandy Saddle area 144.775618E,14.601177N] PI Butterfield**
07:39	144.77576	14.60122	312	2	521	SAMPLE-10 HFS. Ending sample.

time	raw long	raw lat	hdg	alt	Z	J2-187 NW Rota-1 - Dive Log Comments
07:40	144.77576	14.60122	312	2	521	**SAMPLE-11 HFS. Sterivex Filter #15. Tmax=35.6C Tavg=29 T2=22. Vol=1961 ml. [Sandy Saddle area 144.775618E,14.601177N] PI Butterfield (subsamples Huber/Bolton)**
07:54	144.77568	14.60118	310	2	521	SAMPLE-11 HFS Stopping sample.
07:56	144.77567	14.60119	314	2	521	Departing water sampling site - heading downslope.
07:58	144.77554	14.60115	210	9	527	Heading downslope to a final depth of 600m.
08:09	144.77532	14.60086	200	33	590	Passing through 550 m and still going down.
08:14	144.77534	14.60063	9	6	613	Bottom coming into view at 607m - looks like a talus slope.
08:17	144.77548	14.60044	20	10	624	Looking for a place to collect a scoop sample.
08:19	144.77549	14.60047	20	2	621	Looks like a sulphur breccia at 619m.
08:27	144.77549	14.60046	20	2	621	**SAMPLE-12 Scoop. Sediment? In area of sulfur breccias. [144.775233/14.600117] PI geogroup**
08:32	144.77549	14.60047	355	3	622	Preparing to collect a piece of the sulphur breccia.
08:37	144.77550	14.60047	352	3	621	**SAMPLE-13 Rock. Sulphur breccia ("vermicelli sulphur") - same position as previous sample. [144.775233/14.600117] PI geogroup**
08:46	144.77551	14.60045	355	3	622	Moving Jason to get some good digital still photographs of the sulphur breccias.
08:51	144.77547	14.60051	352	7	619	Heading upslope again - now at 613m.
08:58	144.77543	14.60075	14	2	603	Ascending talus slope at 600m.
09:01	144.77543	14.60075	14	2	603	**SAMPLE-14 Rock. Collecting another piece of "vermicelli sulphur". [144.775167E/14.60035N] PI geogroup**
09:04	144.77544	14.60075	14	2	603	Beginning to move upslope again.
09:08	144.77548	14.60082	13	3	599	Climbing a talus slope with some hydrothermally altered rocks.
09:08	144.77524	14.60045	13	3	596	Absolutely no macrofauna whatsoever.
09:10	144.77524	14.60051	13	3	592	Passing what appear to be some very fresh boulders - quite white in appearance.
09:11	144.77525	14.60054	13	3	590	Passing over that looks like a very active slope.
09:12	144.77526	14.60063	13	4	583	Some evidence of slope failure here.
09:13	144.77528	14.60065	14	4	582	Now at 580m.
09:14	144.77527	14.60076	13	4	575	Starting to see some evidence of the plume.
09:14	144.77529	14.60078	13	4	573	We're now at 569 m.
09:15	144.77519	14.60086	13	3	569	Now transiting across the slope looking for the plume.
09:17	144.77538	14.60096	8	4	559	Now at 555m and the plume has just appeared below us.
09:19	144.77535	14.60089	11	12	564	Approaching a large piece of what appears to have been part of the old pit wall.
09:21	144.77544	14.60089	357	4	563	**We're at 557m. Looks as if the side of the pit wall has collapsed. Looks like we've found Brimstone.**
09:21	144.77545	14.60090	321	2	562	Amount of material coming up from the pit is greatly reduced relative to what we've seen before.
09:23	144.77545	14.60090	318	2	561	Zooming in reveals shimmering water and bubbles coming up out of the bottom.
09:24	144.77545	14.60090	317	2	561	Preparing to check temperature and collect some water samples.
09:31	144.77545	14.60091	317	2	561	Still measuring temperatures before deciding where to collect water.
09:39	144.77544	14.60091	323	2	561	**SAMPLE-15** HFS. Starting unfiltered bag #9.
09:40	144.77544	14.60091	323	2	561	**SAMPLE-15 HFS. Unfiltered bag #9. Tmax=28.2C. Tavg=25.4. T2=20. Vol=577ml. [Brimstone'06-j2187 144.77542E/14.60088N] PI Butterfield**
09:43	144.77544	14.60091	323	2	561	Stopping sample 15.
09:45	144.77543	14.60091	323	2	561	**SAMPLE-16 HFS. Sterivex filter #10. This is a large volume filter. Tmax=27.9C Tavg=19.7. T2=16. Vol=3004ml. [Brimstone'06-j2187 144.77542E/14.60088N] PI Butterfield (subsamples Huber/Bolton)**
09:47	144.77544	14.60091	323	2	561	SAMPLE-16 HFS. Sterivex filter #10. this is a large volume filter.
09:48	144.77544	14.60091	323	2	561	Bottom of Brimstone Pit.
09:50	144.77544	14.60091	323	2	561	Eh has dropped to -140.
09:57	144.77543	14.60091	322	2	561	The pit fell apart and collapsed from what we gather. Why is the flow diminished?
10:04	144.77543	14.60091	322	2	561	There's a bit of a yellow cloud puffing in the background.
10:07	144.77543	14.60091	322	2	561	SAMPLE-16 HFS. Finished.
10:08	144.77543	14.60091	322	2	561	**SAMPLE-17** HFS start
10:09	144.77543	14.60091	322	2	561	**SAMPLE-17 HFS. Filtered bag #16. There are some bubbles that seem to be increasing near the sample area. Tmax=26.24C Tavg=19.7. Vol=619ml. Heating up to T=33. The bag broke. [Brimstone'06-j2187 144.77542E/14.60088N] PI Butterfield**
10:12	144.77543	14.60090	322	2	561	SAMPLE-17 HFS. Stopping.
10:13	144.77543	14.60090	322	2	561	Seems to be picking up here. More bubbles and smoke.
10:16	144.77543	14.60090	321	2	561	**SAMPLE-18 Gastight. Tmax=33C. Gastight #11 on HFS. [Brimstone'06-j2187 144.77542E/14.60088N] PI Evans.**
10:17	144.77544	14.60090	323	6	562	**The vehicle has not stirred this up. It's just getting more active. Obviously a dynamic place. We watched the activity increase.**
10:18	144.77551	14.60086	327	6	563	We're backing up to see if we can get a better look.
10:19	144.77552	14.60086	324	6	563	The pit is to our left about 5 meters east / southeast.
10:20	144.77552	14.60086	323	6	563	During the last couple samples it went from clear to totally smoky.
10:21	144.77552	14.60086	323	4	563	We're back down on the bottom.
10:22	144.77550	14.60085	324	4	564	What now is the question? Let's see if we can see the wall. Lateralling left.
10:24	144.77547	14.60083	324	5	566	That was really neat.
10:27	144.77542	14.60090	11	2	562	What's this? Is this the pit again? Probably the same place.
10:28	144.77541	14.60090	10	2	562	Zooming in with the pilot camera. Lots of bubbles and smoke.
10:32	144.77541	14.60091	9	2	562	**SAMPLE-19 Gastight. Tmax=33C. Attempting to sample the fluid near the bubbles (but not the bubbles). Red tape handle. [Brimstone'06-j2187 144.77542E/14.60088N] PI Evans**

time	raw long	raw lat	hdg	alt	Z	J2-187 NW Rota-1 - Dive Log Comments
10:33	144.77541	14.60091	9	2	562	The bubbles have really increased. It's boiling up everywhere. An impressive amount of gas there.
10:33	144.77541	14.60091	9	2	562	The gas is probably CO2.
10:35	144.77541	14.60091	9	2	562	The gas is just streaming out of here. Bubbles everywhere. The size of the bubbles is increasing.
10:36	144.77541	14.60091	9	2	562	The overlay is not recording on the DVCam.
10:37	144.77540	14.60091	9	2	562	Doesn't seem to be updating the events.
10:38	144.77540	14.60091	9	2	562	More of the bubbles.
10:39	144.77540	14.60091	9	2	562	The virtual van doesn't seem to be autosnapping pictures.
10:40	144.77540	14.60091	9	2	562	Big bubbles here. We're going to take a temperature now.
10:42	144.77540	14.60091	8	2	562	Preparing to measure temperature.
10:45	144.77541	14.60091	8	2	562	J2 temp probe. Ambient was ~7 C. In the flow the temp is 52 C.
10:52	144.77541	14.60091	9	2	562	**SAMPLE-20 HFS. Unfiltered piston #20. Tmax=44.3C Tavg=40.2. T2=30. Vol=300ml. [Brimstone'06-j2187 144.77542E/14.60088N] PI Butterfield**
10:54	144.77540	14.60092	10	2	562	We're moving the arm away from the 3chip so that we can get some good video here. The smoke looks more yellow.
10:55	144.77540	14.60092	11	2	562	**We're calling this target Brimstone'06. (Later called Brimstone'06-j2187 because Brimstone position varied from dive to dive).**
10:55	144.77540	14.60092	11	2	562	We're getting more footage of the bubbling and smoke with no overlay.
10:56	144.77540	14.60092	11	2	562	Swapping out the tapes and DVDs within the next few minutes.
10:57	144.77541	14.60092	11	2	562	The bubbles seem to be emerging from a bit different spot than previously.
10:59	144.77540	14.60092	11	2	562	**SAMPLE-21 Rock. A sulfur-stained piece of lava. Put in back rear stbd quadrant of the box. [Brimstone'06-j2187 144.77542E/14.60088N] PI geogroup**
11:02	144.77540	14.60091	11	2	562	Trying to get some good digital images.
11:03	144.77540	14.60091	11	3	562	We're trying to get a decent digital still image.
11:05	144.77539	14.60093	11	3	561	The wall is in the background.
11:05	144.77538	14.60095	11	3	560	Sheryl is getting digitals of the wall.
11:06	144.77538	14.60095	11	3	560	This is a massive wall that's probably the back of the old crater.
11:06	144.77538	14.60095	12	3	560	Backing up a bit to get a larger view here.
11:08	144.77540	14.60099	6	6	560	**Depth of Brimstone'06 is 559 meters.**
11:10	144.77541	14.60100	7	8	561	The top of this old crater wall is about 551 meters. It's about 8 meters tall.
11:11	144.77542	14.60097	18	5	563	So the overlay was turned on before on the DVCam. We are turning it off now.
11:12	144.77542	14.60098	18	4	562	The overlay is off on the DVCam now.
11:13	144.77542	14.60098	18	3	562	It is bubbling to beat the band.
11:16	144.77542	14.60098	18	5	562	We're hanging out here getting some video with no overlay.
11:16	144.77542	14.60099	18	6	562	Thinking of getting into the cloud and taking a Niskin.
11:17	144.77541	14.60100	18	5	561	There's a plume coming out of the wall on the left hand side..
11:18	144.77541	14.60105	22	1	550	SAMPLE-22 Niskin. Going to get a Niskin in the smoke of the plume. We're in the thick of the plume.
11:19	144.77541	14.60104	11	1	550	**SAMPLE-22 Niskin (red). Sample in the thick of the plume. [Brimstone'06-j2187 144.77542E/14.60088N] PI Resing**
11:23	144.77545	14.60107	12	4	564	**SAMPLE-23 Niskin (orange?). Fired the second Niskin in the plume. [Brimstone'06-j2187 144.77542E/14.60088N] PI Resing**
11:23	144.77546	14.60106	10	7	564	We're at the base of the pit again.
11:23	144.77546	14.60105	12	8	565	Putting the overlay back on the 3-chip.
11:24	144.77546	14.60104	12	8	566	We're finished here at Brimstone'06.
11:25	144.77545	14.60104	12	7	566	We did see a small fish in the cloud earlier. That's the only biota we have seen.
11:28	144.77546	14.60106	12	8	565	**We're heading to Fault Shrimp for Verena.**
11:30	144.77549	14.60103	123	5	563	We're going to come back here before the end of the dive. We're heading to diffuse venting.
11:32	144.77575	14.60077	129	4	572	Heading down to the bottom again.
11:33	144.77578	14.60074	128	2	571	Only the 1 jar suction is on the vehicle and it's not working.
11:35	144.77585	14.60055	129	1	571	We were just at Brimstone and saw a rapid change in level of venting over a period of 5 or 10 minutes.
11:36	144.77589	14.60053	129	2	572	We are now on our way over to the east side of the ridge to do some sampling there. Then we will return to the pit and observe the level of venting here.
11:39	144.77607	14.60040	128	2	575	We are probably going to try to fill up the fluid sampler.
11:43	144.77618	14.60034	101	11	571	We're moving to Fault Shrimp. Quite a spectacular outcrop here. Weathered.
11:45	144.77640	14.60029	106	4	558	We're moving along here. Nearly vertical slope here at this huge outcrop. The summit at the east side is directly ahead.
11:46	144.77642	14.60035	100	3	553	The navigation seems to be overlaying on the map and agreeing with what we are seeing on the science cam. **(processed nav is very noisy here and jumps around a lot. 114656-120213 very noisy nav)**
11:47	144.77648	14.60035	101	1	553	The top is accumulating with sulfur and the darker area has sloughed off.
11:54	144.77685	14.60022	101	2	576	Looking for venting.
11:56	144.77691	14.60022	22	4	580	Small slide on slope.
11:58	144.77693	14.60026	308	7	581	Dead fish.
12:00	144.77689	14.60027	311	4	579	Fish are not dead.
12:02	144.77696	14.60026	298	7	584	Outcrop at about 580.
12:03	144.77698	14.60032	302	7	582	Still looking for venting .
12:07	144.77696	14.60018	299	6	589	Looking for Fault Shrimp Site.
12:07	144.77697	14.60018	302	6	589	Lots of Rattail fish in area.

time	raw long	raw lat	hdg	alt	Z	J2-187 NW Rota-1 - Dive Log Comments
12:08	144.77697	14.60021	303	6	586	Contouring north.
12:09	144.77695	14.60024	303	4	584	Area is covered with sediments.
12:09	144.77693	14.60019	306	4	585	Lava outcrop.
12:11	144.77693	14.60016	322	4	586	Trying to go a little deeper to find Fault Shrimp Site.
12:12	144.77689	14.60018	352	4	584	Still looking for venting.
12:14	144.77690	14.60018	345	2	583	Loose sediment on slope.
12:15	144.77694	14.60021	263	5	585	Anemone on rock.
12:16	144.77693	14.60023	268	4	584	More loose sediment on slope.
12:19	144.77698	14.60029	28	1	582	We were at Snowcone not at Fault Shrimp.
12:20	144.77699	14.60029	28	1	582	Now heading to Fault Shrimp.
12:22	144.77707	14.60046	28	1	584	In transit to Fault Shrimp Vent Site.
12:23	144.77709	14.60050	27	2	584	White sediment on slope.
12:24	144.77710	14.60060	20	2	584	**Overlays on video are wrong**
12:25	144.77711	14.60061	19	2	584	This is dive 187 not 186
12:25	144.77715	14.60067	34	5	586	**VIDEO OVERLAY IS INCORRECT. SAYS ITS DIVE 186 BUT IT IS DIVE 187.**
12:26	144.77716	14.60071	27	4	587	Lots of white sediment.
12:27	144.77722	14.60077	27	4	587	This slope may be more stable.
12:28	144.77723	14.60079	26	4	587	May be sulphur oxides or microbial mat material.
12:28	144.77723	14.60081	27	4	587	Shrimp in white material.
12:29	144.77723	14.60085	26	4	586	Lots of shrimp on the white material.
12:31	144.77724	14.60088	35	4	583	Shrimp are an indicator of microbial mats.
12:33	144.77727	14.60082	26	8	587	Looking for active venting.
12:33	144.77727	14.60083	27	8	587	Looking for an outcrop.
12:34	144.77723	14.60087	346	4	584	Lots of shrimp here.
12:35	144.77724	14.60088	282	5	585	**This is Fault Shrimp Vent Site.**
12:35	144.77724	14.60088	282	4	585	Looking for shimmering water.
12:36	144.77724	14.60089	258	3	584	More shrimp than we have seen anywhere else on NW Rota-1.
12:36	144.77725	14.60088	274	4	585	The orange shrimp are stained with iron.
12:37	144.77725	14.60088	276	4	585	Shrimp cover the outcrop.
12:37	144.77725	14.60088	271	2	585	Milky vent in rock outcrop.
12:39	144.77724	14.60087	298	5	586	Looking for more active venting.
12:43	144.77723	14.60084	306	4	587	We're here at **Fault Shrimp** and there is a plethora of shrimp here. Beautiful. We're seeing the 2 species that we saw here before.
12:45	144.77723	14.60085	328	3	586	One shrimp is carrying another? Eating the other?
12:46	144.77723	14.60086	326	3	586	The big ones are the most numerous.
12:49	144.77723	14.60086	329	2	586	Alvino caris (sp?) are the big shrimp we are seeing the most here. Lots of them are more orange. The older ones probably are the orange ones with iron deposits on the outside.
12:50	144.77723	14.60086	328	2	586	Verena can differentiate the species by the eyeballs.
12:51	144.77723	14.60086	329	2	586	As they grow into the adult stage the claws get larger and larger.
12:54	144.77723	14.60086	329	2	586	There's a white crab in the mix. austrophins...(sp?).
12:59	144.77723	14.60086	329	3	586	The shrimp are getting a little shrimpy while sitting on the hose on the arm.
13:01	144.77723	14.60086	328	3	586	Last time we were here we hardly saw any of the adults. Now it looks like they're mostly adults.
13:05	144.77723	14.60086	328	3	586	We're still observing the shrimp.
13:05	144.77723	14.60086	328	3	586	Preparing to do some fluid sampling here.
13:06	144.77723	14.60086	328	3	586	The pump doesn't appear to be working right now.
13:08	144.77723	14.60086	328	3	586	The pump appears to be working now.
13:09	144.77723	14.60086	328	3	586	SAMPLE-24 HFS Pump not ready.
13:10	144.77723	14.60086	328	3	586	The shrimp are all in a huddle.
13:11	144.77723	14.60086	328	3	586	The pump is not happy right now.
13:13	144.77723	14.60086	328	3	586	The pump is not working.
13:14	144.77723	14.60086	328	3	586	Last time we were here the shrimp were almost all the Loihi (smaller whiter ones). Now they're almost all the big red ones.
13:20	144.77723	14.60086	328	2	586	We're waiting on the HFS. Not sure if it's working or not.
13:21	144.77723	14.60086	328	2	586	SAMPLE-24 HFS. Still haven't collected any fluids here.
13:24	144.77723	14.60086	328	2	586	Rebooting the HFS .
13:24	144.77723	14.60086	328	2	586	Shrimp eating a shrimp.
13:24	144.77723	14.60086	328	2	586	Now they're fighting for it.
13:25	144.77723	14.60086	328	2	586	We're continuing to watch one shrimp eat another.
13:28	144.77723	14.60086	328	2	586	Running up hill with a huge shrimp.
13:29	144.77723	14.60086	328	2	586	Close up of one crab eating another.
13:31	144.77723	14.60086	328	2	586	SAMPLE-24 HFS. Sampler working now. Started filtered bag #17.
13:35	144.77723	14.60086	328	2	586	**SAMPLE-24 HFS. Filtered bag #17. Tmax=27.3C Tavg=26.7 T2=18. Vol=576ml. [Fault Shrimp 144.777349E/14.600859N] PI Butterfield**
13:36	144.77723	14.60086	328	2	586	**SAMPLE-25 HFS. Unfiltered bag #19. Tmax=26.5C Tavg=26. T2=18. Vol=600ml. [Fault Shrimp 144.777349E/14.600859N] PI Butterfield**
13:41	144.77723	14.60086	328	2	586	SAMPLE-25 HFS. Stopped.
13:41	144.77723	14.60086	328	2	586	Verena is watching the other species of shrimp (smaller white ones). They are feeding on bacterial mat. (loihi..)
13:43	144.77723	14.60086	328	2	586	**SAMPLE-26 HFS. Sterivex filter #21. Tmax=25.9C Tavg=25.0 T2=18. Vol=3010ml. [Fault Shrimp 144.777349E/14.600859N] PI Butterfield (subsamples Huber/Bolton)**
13:45	144.77723	14.60086	328	2	586	Smaller shrimp eat the bacteria and the bigger shrimp eat the smaller ones.

time	raw long	raw lat	hdg	alt	Z	J2-187 NW Rota-1 - Dive Log Comments
13:56	144.77723	14.60086	328	3	586	Change of watch.
13:58	144.77723	14.60086	328	3	586	Been watching shrimp eat shrimp-can't tell if eating same species or not.
14:02	144.77723	14.60086	328	3	586	Watching shrimp and crab. Big shrimp seem to be carnivores. Small shrimp feeding in the flow and prey to larger shrimp.
14:03	144.77723	14.60086	328	3	586	SAMPLE-26 HFS Stopped.
14:04	144.77723	14.60086	328	3	586	Going to do one more short HFS.
14:05	144.77723	14.60086	328	3	586	**SAMPLE-27 HFS. Fish Filter #7. Tmax=25.7C Tavg=25.6 T2=17.8 Vol=152ml. [Fault Shrimp 144.777349E/14.600859N] PI Butterfield**
14:06	144.77723	14.60086	328	3	586	SAMPLE-27 HFS. Stop.
14:06	144.77723	14.60086	328	3	586	Done fluid sampling here.
14:08	144.77723	14.60086	328	3	586	Going to stow wand and get ready to suction sample here.
14:10	144.77724	14.60086	326	4	587	Want to get just above the crack where we have been sampling.
14:10	144.77724	14.60086	326	4	587	Repositioning to move drawer and secure wand.
14:11	144.77723	14.60086	326	3	587	Picking up suction sampler.
14:14	144.77723	14.60086	326	3	587	Hand-off of the suction sampler between manipulators.
14:15	144.77723	14.60086	326	4	586	Want to get the white in between the crack. Shrimp would be a nice by-catch.
14:20	144.77723	14.60087	317	3	586	Moving to get hose into the crack.
14:20	144.77723	14.60087	318	3	586	Bumped rock below and white bacteria is streaming out of the crack.
14:21	144.77723	14.60087	317	3	586	Tried to do a suction sample here .Keep running out of hose. Each bump brings more mat out of crack.
14:22	144.77723	14.60087	318	3	586	Hose in crack. No evidence of slurping yet.
14:25	144.77723	14.60087	319	2	586	**Suction sampler not working.**
14:26	144.77723	14.60086	320	3	586	No slurp. Stowing hose. Want some digital stills of the crack.
14:28	144.77723	14.60086	328	2	586	Still at Fault Shrimp. Moving vehicle to get digital stills.
14:29	144.77723	14.60087	341	2	586	Taking stills of Fault Shrimp.
14:30	144.77724	14.60087	341	3	586	107deg 24 meters to Scarp Top.
14:31	144.77734	14.60089	3	3	584	Leaving rock outcrop facing upslope to north. Slope of clastic debris covered with mat or something.
14:32	144.77735	14.60089	119	4	582	15m at 113° to target.
14:32	144.77736	14.60088	124	3	581	Scarp Top is 565m and Fault Shrimp was at 580. Above us about 10 meters.
14:33	144.77736	14.60086	123	4	582	Moving the ship just a little bit.
14:35	144.77739	14.60085	140	4	582	Driving 133 to target.
14:36	144.77748	14.60080	137	3	581	Going across a bowl.
14:36	144.77751	14.60079	100	4	581	Need to climb these cliffs and it is up on the top.
14:37	144.77753	14.60080	67	8	581	14deg 36.046N 144deg 46.659E good nav and spaghetti sulfur.
14:37	144.77757	14.60082	35	7	576	Lots of sulfur. Depth is 569.
14:37	144.77757	14.60082	39	7	576	Looking for some venting.
14:38	144.77757	14.60088	35	6	573	Venting is probably on the ridge.
14:38	144.77755	14.60089	301	6	572	According to nav we are off target. Eel.
14:39	144.77749	14.60090	349	5	575	First visit to this site on this dive. Facing west. Must be offset in nav of 10m.
14:39	144.77749	14.60091	15	9	576	Bumped a lot of shrimp while turning back around.
14:40	144.77750	14.60095	13	11	576	We are at the correct depth of 565 meters.
14:41	144.77753	14.60093	47	5	570	Lots of shrimp here so should be some flow.
14:42	144.77753	14.60093	42	6	571	**Good flow at top of scarp. Hence Scarp Top.**
14:42	144.77753	14.60093	42	6	571	Going to get some fluid samples here.
14:43	144.77753	14.60093	42	6	571	**Scarp Top [144.77763E/14.60095N]**
14:43	144.77753	14.60093	42	6	571	Retrieving wand from basket.
14:44	144.77754	14.60096	51	3	568	Flying shrimp - covering all surfaces.
14:47	144.77754	14.60096	52	3	569	Placing wand. Only 9deg here.
14:48	144.77754	14.60096	52	3	568	Good temp 17..18...climbing.
14:48	144.77754	14.60096	53	3	568	Wants to reposition -l lousy geometry.
14:50	144.77754	14.60097	86	3	568	Trying a new position. Temp is climbing.
14:51	144.77754	14.60097	87	2	568	Tape change.
14:53	144.77754	14.60097	88	2	568	Moving wand to another spot.
14:54	144.77755	14.60099	154	1	566	Everything started to slide on the slope when touched.
14:56	144.77755	14.60098	117	2	568	Positioning wand into small crack.
14:57	144.77755	14.60098	118	2	568	Temp climbing 18....19.
14:57	144.77755	14.60098	118	2	568	Going to sample here due to time constraints.
15:00	144.77755	14.60098	117	2	568	**SAMPLE-28 HFS. Filtered bag #18. Tmax=19.6C Tavg-17.4 T2=14.0 Vol=604ml. [Scarp Top 144.77763E/14.60095N] PI Butterfield**
15:02	144.77755	14.60098	117	2	568	SAMPLE-28 HFS. Temp. dropping a lot-wand has not moved.
15:03	144.77755	14.60098	117	3	568	SAMPLE-28 HFS. Temp is going back up. Small shrimp and crab near intake.
15:04	144.77755	14.60098	117	3	568	SAMPLE-28 HFS. Stop
15:05	144.77755	14.60098	117	2	568	**SAMPLE-29 HFS. Unfiltered piston #22. Tmax=17.4C Tavg=16.0 T2=13.0. Vol=550ml. [Scarp Top 144.77763E/14.60095N] PI Butterfield**
15:10	144.77755	14.60098	117	2	568	**SAMPLE-29** HFS. Stop.
15:10	144.77755	14.60098	117	2	568	Strobe is in exact same place for these samples.
15:12	144.77755	14.60098	117	2	568	**SAMPLE-30 .HFS. Sterivex filter #23. Tmax=17.6C Tavg=15.1 T2=10. Vol=2liters. [Scarp Top 144.77763E/14.60095N] PI Butterfield (subsamples Huber/Bolton)**
15:17	144.77755	14.60098	117	2	568	Upwelling in background and cloudier as we have sat here.
15:22	144.77755	14.60098	117	2	568	Clearing up again as cloud is passing through.
15:29	144.77755	14.60098	118	2	568	SAMPLE-30 HFS. Stop.

time	raw long	raw lat	hdg	alt	Z	J2-187 NW Rota-1 - Dive Log Comments
15:29	144.77755	14.60098	118	2	568	Done fluid sampling. Will go to the next site.
15:31	144.77771	14.60091	113	4	569	LBL position is 20m NE of prior year position.
15:31	144.77771	14.60093	113	3	568	*Doppler reset.*
15:32	144.77769	14.60092	113	5	570	Now we are 25m ENE of prior year's position. 31m at 242deg.
15:32	144.77768	14.60093	113	5	570	Going to Brimstone.
15:33	144.77770	14.60093	158	6	567	Plan is to go south of Brimstone and work way up to it with scoop sampling.
15:34	144.77770	14.60087	230	15	565	255deg at 200 meters of **mid-water transit to next site**.
15:39	144.77726	14.60078	255	25	576	Few fish swimming by.
15:48	144.77653	14.60061	257	22	544	*Baseline change to FG.*
15:49	144.77611	14.60058	255	20	542	*Doppler reset to LBL.*
15:51	144.77591	14.60055	255	25	546	Getting close...lots of smoke.
15:56	144.77584	14.60052	255	49	571	About at the target.
15:59	144.77583	14.60052	255	64	586	At target-going down to bottom. At 60m altitude.
16:00	144.77583	14.60052	256	44	587	Smoke at 45 meters.
16:01	144.77582	14.60049	249	11	591	We are 60 m south of Brimstone..downslope.
16:01	144.77583	14.60050	256	4	590	Went through a plume but not too bad here.
16:02	144.77534	14.60027	300	3	589	*Doppler reset. (~30 meter shift)*
16:02	144.77536	14.60025	300	4	589	A lot of white material on the rocks here-presumably sulfur.
16:02	144.77536	14.60025	300	4	590	Sulfur balls.
16:03	144.77538	14.60027	325	6	588	Depth is 580m.
16:04	144.77542	14.60032	329	4	584	A lot of these pieces are rounded not angular.
16:05	144.77571	14.60040	329	6	584	*Doppler reset to same baseline as when we were here earlier. Doppler reset GH baseline.*
16:06	144.77572	14.60039	330	7	585	First will go due N about 32m.
16:07	144.77577	14.60040	5	7	585	Lots of white coating.
16:08	144.77578	14.60046	5	5	581	Lots of smoke...moving closer to bottom.
16:08	144.77583	14.60049	6	4	577	Slope looks more fragmented.
16:09	144.77580	14.60050	6	5	577	Want to move laterally left.
16:10	144.77574	14.60053	2	4	576	Looks more promising for sampling. Scoop to right of outcrop
16:11	144.77574	14.60053	5	4	577	No rock samples allowed - no remaining weights to drop. Edge of buoyancy.
16:14	144.77574	14.60053	5	4	577	Grabbing canvas scoop bag. It is yellow.
16:20	144.77577	14.60056	8	2	575	**SAMPLE-31 Scoop. Volcaniclastics and ash - hopefully from the pit. Looks like Pele's tears - great spot. Softball sized clump. [South of Brimstone 144.775767E/14.60055N] PI geogroup**
16:20	144.77577	14.60056	8	2	575	SAMPLE-31 Scoop. Depth is 572. m. Volcaniclastic and ash -hopefully from pit.
16:21	144.77577	14.60056	7	3	575	SAMPLE-31 Scoop. Putting sample in STBD aft gray milk crate. Softball sized clump.
16:23	144.77577	14.60056	7	3	575	Stowing arm.
16:24	144.77577	14.60056	8	2	575	Heading for Brimstone with an hour on bottom left.
16:25	144.77577	14.60055	286	3	575	Going west to get south of Brimstone before driving up to it.
16:26	144.77572	14.60055	286	3	575	Moving west.
16:31	144.77551	14.60055	287	3	585	Now starting to move north.
16:31	144.77550	14.60056	286	3	585	Target at 560m and we are at 582m now.
16:33	144.77541	14.60062	328	3	585	Getting chunky. Looks like talus.
16:33	144.77538	14.60068	356	4	582	Half rock look coated with white. Some .5m sized rocks.
16:34	144.77538	14.60072	355	3	578	Looks like broken up and slid down slope. Good visibility.
16:34	144.77543	14.60077	357	5	574	570m. Ground fog--could be a bit of heat coming up.
16:35	144.77544	14.60081	351	4	571	Looks like landslide debris. Left is slide - right looks in place.
16:35	144.77544	14.60082	354	4	570	About 10 meters away. Need to bring Medea up 10m.
16:35	144.77544	14.60083	355	3	569	Sulfur globules from flows.
16:36	144.77544	14.60086	352	5	567	Looking up. Look at smoke.
16:36	144.77544	14.60088	356	5	566	Awesome view looking up. WOW.
16:36	144.77543	14.60089	356	6	565	Great photos.
16:36	144.77543	14.60090	352	5	564	No rim to it at all. 1 meters across. Bubbles behind.
16:37	144.77542	14.60091	352	4	563	Yellow from sulfur in plume.
16:37	144.77542	14.60091	354	3	562	Great position for sampling then would like to go around to one side.
16:37	144.77542	14.60091	354	3	562	One part of the vent is much yellower than the rest.
16:38	144.77542	14.60091	353	3	562	Getting fluid sampler. At **Brimstone'06 144.77542E/14.60088N J2-187 position.**
16:40	144.77542	14.60092	353	3	562	**SAMPLE-32** HFS. Positioning wand in yellow part of flow.
16:42	144.77542	14.60092	353	3	562	SAMPLE-32 HFS. In yellow cloud. 2 meters wide area of plume.
16:43	144.77542	14.60092	353	3	562	**SAMPLE-32 HFS. Filtered piston #1. Wand is in yellow part of flow. Tmax=79.5C Tavg=70.5 T2=45? Vol=307ml. [Brimstone'06-j2187 144.77542E/14.60088N] PI Butterfield**
16:45	144.77542	14.60092	353	3	562	SAMPLE-32 HFS. Stop.
16:47	144.77542	14.60093	353	3	562	**SAMPLE-33 HFS. Filtered piston #24. Same spot in yellow plume. Tmax=95.3C Tavg=90.2 T2=50. Vol=302ml. [Brimstone'06-j2187 144.77542E/14.60088N] PI Butterfield**
16:47	144.77542	14.60092	353	3	562	**Brimstone is no longer a pit. It's an eruptive vent.**
16:47	144.77542	14.60093	353	3	562	Intensity is varying - moderate phase. Earlier not much white plume but more bubbles.
16:48	144.77542	14.60093	353	3	562	Yesterday this site we couldn't even approach due to vigorous activity.
16:48	144.77542	14.60093	353	3	562	Plume is variable. Right side has molten sulfur. Rest is more white. Back left has bubbles.
16:49	144.77542	14.60093	353	3	562	SAMPLE-33 HFS. Obstruction in pump on this sample. Pulling it out.
16:50	144.77542	14.60094	353	3	563	Intake looks clean. Put it back in plume. No pumping so far due to obstruction message.
16:50	144.77542	14.60095	353	3	562	SAMPLE-33 HFS. Intake looked clean and put back in plume. Not pumped before this due to error message.

time	raw long	raw lat	hdg	alt	Z	J2-187 NW Rota-1 - Dive Log Comments
16:51	144.77542	14.60095	353	3	563	SAMPLE-33 HFS. Putting wand back in...getting temps in 90s...a 100 and climbing.
16:52	144.77542	14.60095	353	3	563	SAMPLE-33 HFS. Pulled out because arm was in plume with intake.
16:54	144.77542	14.60095	353	3	563	SAMPLE-33 HFS. Working on the Beast laptop...still no sample.
16:56	144.77542	14.60095	353	3	563	SAMPLE-33 HFS. Stopped
16:57	144.77542	14.60095	353	3	563	SAMPLE-33 HFS. **The Beast is full**--going to do a gas tight.
16:58	144.77542	14.60095	354	3	563	Stowing wand for Beast and then a gas tight.
16:59	144.77542	14.60095	354	3	563	Front part of plume that was yellow has died down and less bubbles.
17:00	144.77542	14.60095	354	3	563	**SAMPLE-34 Major (blue). Same place as HFS samples but no longer that much yellow - a lot more bubbles coming out of cloud now. [Brimstone'06-j2187 144.77542E/14.60088N] PI Butterfield**
17:01	144.77542	14.60095	354	3	563	SAMPLE-34 Major. Placing it in same place as HFS samples but no longer that much yellow.
17:02	144.77542	14.60094	353	3	563	SAMPLE-34 Major. A lot more bubbles coming out of cloud now.
17:03	144.77542	14.60094	353	3	563	SAMPLE-34 Major. Blue major fired.
17:03	144.77542	14.60094	353	3	563	More bubbles. Stowing major.
17:04	144.77542	14.60094	354	3	563	Next want a gas tight then some digital stills.
17:06	144.77542	14.60094	354	3	563	T-handle on Beast wand came off while placing major in basket.
17:06	144.77542	14.60094	354	3	563	Handle is in basket.
17:07	144.77542	14.60094	355	3	563	**SAMPLE-35** Gastight. black tape on handle.
17:07	144.77542	14.60094	354	3	563	**SAMPLE-35 Gastight (black tape). Activity dying down a bit - more yellow in the back of plume and a lot of bubbles. Same sample site as major and HFS. Activity decreased since Major sample. [Brimstone'06-j2187 144.77542E/14.60088N] PI Evans**
17:11	144.77542	14.60094	353	3	563	SAMPLE-35 Gastight. Position looks good. Triggering.
17:12	144.77542	14.60094	353	3	563	All samples in same position.
17:13	144.77542	14.60094	354	3	563	More smoke and fewer bubbles than first visit on this dive. First dive began with very low activity.
17:13	144.77542	14.60094	354	3	563	Going to observe vent for 10 minutes then some good digitals on our way out.
17:14	144.77542	14.60094	352	4	563	Current looks like coming from west so we should be up-current as we come around for photos.
17:14	144.77543	14.60094	352	5	563	Coming off bottom and looking north right now.
17:15	144.77542	14.60094	358	5	563	Going to fly around to the west side after stills.
17:15	144.77541	14.60095	22	4	561	Sulfur flow on wall in back.
17:15	144.77541	14.60094	22	6	563	Smoke and gas coming out of 2m diameter area.
17:15	144.77541	14.60094	22	5	562	Lots of gas bubbles.
17:15	144.77541	14.60095	22	3	560	Head 020 now.
17:16	144.77541	14.60095	20	4	562	Lot of bubbles now coming out in front.
17:16	144.77541	14.60093	22	6	564	A lot of bubbles.
17:17	144.77541	14.60092	22	7	564	Not coming from white smoke-below plume.
17:17	144.77541	14.60092	22	6	564	Bubbles just started happening again.
17:17	144.77541	14.60092	22	7	565	Bubbles coming out of discreet places.
17:17	144.77541	14.60092	21	5	565	Pit is rubble mound. Gas on fringes. Smoke in middle.
17:18	144.77541	14.60092	22	6	564	Wow..it is growing and belching while we were sitting.
17:18	144.77541	14.60092	22	6	564	Volume of smoke has gone way up.
17:18	144.77541	14.60092	22	6	564	Smoke was preceded by the bubbles.
17:21	144.77541	14.60088	21	7	568	6m off bottom as we backed off while smoke increased.
17:21	144.77541	14.60088	21	5	568	Going back down below plume.
17:21	144.77544	14.60087	16	7	568	Moving back to where we started sampling.
17:23	144.77553	14.60092	346	3	564	Bottom doesn't look like fluid bombs.
17:23	144.77553	14.60092	347	3	564	Pit is no longer a pit--all collapsed.
17:23	144.77553	14.60093	348	3	563	It is 10m deeper than 2004 at the rim. Now there is no rim and the crater has fallen off.
17:24	144.77550	14.60091	340	5	565	Brimstone should be 10m to left.
17:25	144.77547	14.60092	340	5	565	Moving laterally left - vent is at this depth.
17:25	144.77544	14.60091	349	4	565	Vent is right in front now. Lots more smoke.
17:26	144.77542	14.60092	343	1	564	Very vigorous flow now.
17:26	144.77542	14.60092	346	2	564	Rock being extruded.
17:27	144.77542	14.60091	349	2	564	There are definitely chunks of rock being generated.
17:28	144.77542	14.60091	349	2	564	Black flakes were coming off suggesting that it was moving.
17:29	144.77542	14.60092	349	2	564	Watching flow and have lasers on rock in center part of plume.
17:31	144.77542	14.60092	349	2	564	One fast temperature and then gotta run..we are past lift off time.
17:32	144.77542	14.60091	348	2	565	Slope is moving a bit. This is an eruption.
17:32	144.77546	14.60088	340	10	567	Lifting off. No temperature...rocks were moving.
17:32	144.77546	14.60084	231	12	567	**Coming off bottom.**
17:32	144.77545	14.60082	263	16	569	ROV was stationary when those rocks started moving.
17:33	144.77539	14.60083	281	21	571	Going to surface.
17:40	144.77512	14.60095	296	142	550	**J2-187 ending...on way to surface.**
17:40	144.77512	14.60095	292	165	555	**J2-187...overlay on video tapes was not changed. [Says it is dive J2-186]**
18:20						**J2 end of dive. On deck**

5.4.5 J2-188 NW Rota-1 Dive Log

time	raw long	raw lat	hdg	alt	Z	J2-188 NW Rota-1 - Dive Log Comments
J2-188 NW Rota-1 Dive Summary: Started the dive in the Brimstone area where the mound looked larger and more vigorous today than on the last dive. Collected 8 samples in the area: 3 gastights, 2 majors, 1 sediment, 1 rock, 1 niskin. Sudden bursts of activity at Brimstone, including lots of bubbling and sulfur extruding from the plume. Moved up to the top of the volcano (Mkr-78 area) to look for biota. One lone crab was found. Suction sampler not working again. 2 geology samples were collected. Moved on to Gastros looking for biota. Quite a few shrimp (Loihi) at Gastros. Some shrimp are grazing on other dead shrimp. No gastropods here this year. Used the scoop to collect a dead squid, 1 pink shrimp and 1 decayed shrimp. The consensus is that the volcano is killing the biota. Took the final sample (niskin) on the ascent - 35 meters above the bottom. 12 samples total.						
J2-188 Bottom time: 4/24/2006 0840 - 1330 UTC (4.83 hrs). **Z column represents seafloor depth in meters.**						
08:07	144.77559	14.59994	296	1	4	**Jason is in the water for dive J2-188.**
08:14	144.77559	14.59994	320	1	75	Medea going in the water .
08:27	144.77559	14.59997	262	121	595	Plume coming into view at 460m.
08:31	144.77645	14.60080	271	51	584	533m - Lots of particulates.
08:40	144.77646	14.60082	21	5	591	**On bottom for J2-188 at 586m .**
08:40	144.77646	14.60082	11	5	591	Beginning to head upslope toward Brimstone Pit .
08:45	144.77649	14.60095	13	4	581	Climbing a talus slope of andesitic lava boulders (5-50 cm in size).
08:46	144.77650	14.60101	355	4	575	Quite a few lava bombs here at 571m.
08:49	144.77645	14.60114	1	4	566	Getting close to the plume from the pit.
08:50	144.77645	14.60116	356	4	565	Encountering larger lava blocks.
08:52	144.77648	14.60121	5	4	563	Approaching the plume at Brimstone Pit .
08:53	144.77648	14.60122	5	4	563	Lots of smoke but not a lot of bubbles
08:54	144.77648	14.60122	22	4	564	Wait - there are lots of bubbles after all.
08:56	144.77650	14.60123	347	4	564	Consensus seems to be that the mound looks both larger and more vigorous than yesterday.
09:01	144.77641	14.60120	338	4	564	Preparing to measure temperature before taking gastight samples.
09:03	144.77640	14.60119	19	4	563	Plume is considerably more yellow than yesterday.
09:06	144.77640	14.60119	18	4	564	TEMPERATURE. Max temp at surface was 59C.
09:08	144.77639	14.60119	18	4	564	TEMPERATURE. Subsurface temp max was 125C.
09:10	144.77639	14.60119	18	4	564	Plume is becoming more active. No ash however.
09:14	144.77639	14.60119	19	4	564	Preparing to deploy gastight with bubble catcher funnel.
09:15	144.77639	14.60119	19	4	564	Now collecting gas bubbles in funnel.
09:19	144.77639	14.60119	19	4	564	Bubbles seem to have stopped. Looking about to see if we can find more.
09:20	144.77639	14.60119	19	4	564	Bubble catcher seems to have leaked.
09:22	144.77639	14.60119	19	4	564	**SAMPLE-1 Gastight with bubble collector fired in active plume. [Brimstone area 144.775403E/14.600923N] PI Evans**
09:25	144.77639	14.60121	19	4	563	Position for samples 1 - 4 is [Brimstone area 144.775403E/14.600923N]
09:27	144.77638	14.60122	19	4	563	Visibility is deteriorating.
09:29	144.77638	14.60124	19	4	564	**SAMPLE-2 Gastight fired (black handle). [Brimstone area 144.775403E/14.600923N] PI Evans**
09:33	144.77637	14.60126	19	4	564	**SAMPLE-3 Major (yellow handle). [Brimstone area 144.775403E/14.600923N] PI Butterfield**
09:40	144.77639	14.60121	19	4	564	Preparing to collect a scoop sample
09:45	144.77640	14.60122	19	4	564	**SAMPLE-4 Sediment scoop. Lots of bubbles coming out of the sediments in the area. [Brimstone area 144.775403E/14.600923N] PI geogroup**
09:47	144.77637	14.60122	20	4	564	Lots of bubbles coming out of the sands. Was measured at 125 C.
09:48	144.77541	14.60091	20	4	564	Scoop sample is finished. We're going to sit here for a few minutes and check out the scene.
09:49	144.77541	14.60091	19	4	564	Consensus is to move over to the left and look around here a bit.
09:49	144.77541	14.60091	19	4	564	We're seeing a lot of change.
09:51	144.77541	14.60091	19	4	564	We're moving a bit to the left to look at the pit from another angle.
09:52	144.77538	14.60091	19	4	563	Beautiful view of the plume.
09:52	144.77537	14.60092	16	4	562	Looks like several small openings.
09:53	144.77537	14.60092	46	4	562	Looks like lots of spots where flow is coming.
09:53	144.77537	14.60092	44	4	562	Sulfur is coming out of the plume here.
09:54	144.77538	14.60092	44	4	562	Zoomed in on the sulfur rocks at the base of this venting.
09:55	144.77538	14.60092	44	4	562	Contemplating trying to get a water sample here.
09:55	144.77538	14.60092	44	4	562	Overlay is going off again.
09:56	144.77538	14.60092	45	4	562	Putting on the lasers so get a scale on this. They're on at center screen. The view is a couple meters across here.
09:56	144.77538	14.60092	44	4	562	About a 3 meter diameter active spot here.
09:56	144.77538	14.60092	44	4	562	The plume is much yellowier than yesterday.
09:58	144.77538	14.60092	44	4	562	Bob wants to see the sulfur extruding from the plume. Some ash has been extruding.
09:59	144.77537	14.60092	44	4	562	Zoomed in looking for sulfur extrusions. Zoomed on the yellow at the base of the plume.
10:03	144.77537	14.60092	40	4	563	Quite a color difference in color in the gray smoke and yellow smoke from the 2 different venting sites.
10:04	144.77537	14.60092	40	4	563	The slurp sampler body would start to melt at 100C.
10:05	144.77537	14.60092	40	4	563	Preparing to measure the temperature.
10:06	144.77537	14.60092	41	4	563	TEMPERATURE. Probe is near the orifice is 110 C.

time	raw long	raw lat	hdg	alt	Z	J2-188 NW Rota-1 - Dive Log Comments
10:07	144.77537	14.60092	41	4	563	TEMPERATURE. Right near the sulfur it was 94 but not directly in the flow. Near the sulfur drips on the rock.
10:08	144.77537	14.60092	41	4	563	The sulfur looks like it was oozed out of the hole. Position for samples 5 - 8 is: [Brimstone area 144.775362E/14.600932N]
10:13	144.77536	14.60093	41	4	563	**SAMPLE-5 Major (blue) in the flow near sulfur extruding from base of the plume. [Brimstone area 144.775362E/14.600932N] PI Butterfield**
10:15	144.77536	14.60093	41	4	563	Major is stowed. Going to do a gastight next.
10:17	144.77536	14.60093	41	4	563	**SAMPLE-6 Gastight (red) in the same spot as the major. Temp here was 85-95C. [Brimstone area 144.775362E/14.600932N] PI Evans**
10:17	144.77536	14.60093	41	4	563	SAMPLE-6. Gastight fired.
10:19	144.77536	14.60093	41	4	563	Stowing the gastight.
10:24	144.77536	14.60093	43	4	563	**SAMPLE-7** Rock. Grabbing piece of sulfur-rock near the flow. Can't seem to reach it. [PI Embley]+I32
10:24	144.77536	14.60093	44	4	563	Overlay back on.
10:25	144.77536	14.60094	46	4	563	SAMPLE-7 Rock. Still thinking about this sample
10:28	144.77536	14.60093	48	4	563	**SAMPLE-7 Rock. Grabbing piece of sulfur-rock near the flow. [Brimstone area 144.775362E/14.600932N] PI geogroup**
10:29	144.77535	14.60092	48	4	563	SAMPLE-7 Rock is covered in yellow sulfur.
10:31	144.77536	14.60093	49	4	563	SAMPLE-7 Rock. Grabbing the rock from the bottom. It has a dusting of sulfur on it. Into the stbd biobox.
10:34	144.77537	14.60093	49	4	563	Going for another piece too. The last one was ~fist sized - with sulfur dusting. Still trying for another rock. Don't have one yet.
10:35	144.77538	14.60093	49	4	564	Inching forward a hair to reach another piece of rock.
10:37	144.77537	14.60093	50	4	563	Giving up on the second piece of sulfur here. Can't reach it and the place is kicking up.
10:38	144.77537	14.60092	48	4	562	Quite a bit of action going on now. It's really bursting here now. Lots of sulfur in the cloud.
10:39	144.77537	14.60092	49	4	562	Incredible plume coming out of there.
10:40	144.77536	14.60091	46	4	562	Wow this thing is huge.
10:41	144.77536	14.60091	43	4	562	Nice image of the area. Can't get it all in one image. It's too big. We're looking at about 4 meters across here.
10:42	144.77536	14.60091	43	4	562	Sudden burst.
10:43	144.77536	14.60091	43	4	562	Get rid of the laser for better footage.
10:46	144.77537	14.60092	43	4	562	That's a nice shot on the science cam.
10:47	144.77537	14.60092	43	4	562	The science cam shot looks great.
10:49	144.77537	14.60091	41	4	562	Lots of bubbling going on. Zoomed in on the sulfur rocks and bubbles right now. .
10:50	144.77538	14.60091	38	4	561	We're really not getting any good digitals of the plume.
10:52	144.77539	14.60091	25	4	561	Trying to get a decent digital image of the plume for the web.
10:54	144.77538	14.60090	28	4	558	The strobe isn't firing. Not getting what we need with the digital.
10:55	144.77538	14.60090	27	4	558	We tried but we're not getting what we want for the web.
10:58	144.77534	14.60092	27	21	563	Verena wants to know if there is anything else here.
11:01	144.77527	14.60091	27	34	564	Putting the overlay back on.
11:02	144.77526	14.60090	34	31	561	We will be moving north now to the summit.
11:04	144.77529	14.60094	35	29	560	The plume is barely moving. Almost seems to be stuck in one place. Bizarre.
11:05	144.77534	14.60097	356	29	559	Now it's moving. We're moving now.
11:06	144.77535	14.60098	38	28	558	Eh here in the plume is 36.
11:07	144.77539	14.60095	36	24	554	**SAMPLE-8 Niskin (green) fired in the midst of the plume. [Plume over Brimstone'06 144.775362E/14.600932N] PI Resing.**
11:07	144.77549	14.60105	39	29	559	SAMPLE-8 Niskin TXT Green Niskin sample in the plume.
11:09	144.77547	14.60104	26	35	565	We're heading to the top now to High Flow / Shimmering Vent.
11:13	144.77533	14.60091	25	2	511	Heading to Shimmering. It's at 519 m.
11:13	144.77534	14.60092	26	1	509	We just went through the top of the plume.
11:13	144.77534	14.60092	32	16	523	507 meters is the top of the plume.
11:16	144.77535	14.60096	81	13	531	We're looking for something living - preferably with legs.
11:16	144.77537	14.60095	73	8	530	Back down at 519 meters and we're in the haze of the plume.
11:17	144.77538	14.60096	67	2	524	We just want to look around here.
11:18	144.77538	14.60100	68	5	526	Now we're seeing outcrop here where 2 years ago this was covered with sand. There was outcrop here in '04 but it was covered with more detritus.
11:19	144.77554	14.60121	68	5	526	Where is the iron coming from? The sulfuric acid is ripping these rocks apart and sucking the iron out etc..
11:19	144.77554	14.60123	93	5	526	It's so acidic here. Don't remember seeing all these iron deposits last time we were here.
11:20	144.77559	14.60121	96	3	523	We're zooming in here on the surface. Iron floc or iron oxyhydroxide covering the slope.
11:21	144.77561	14.60120	96	4	522	We see some shimmering water in the sci-cam.
11:21	144.77562	14.60120	96	2	521	We are at the shallowest point here. The basket temp went up to 8.2C.
11:22	144.77562	14.60120	97	3	521	We're at the marker here. Depth here is 518 m.
11:24	144.77562	14.60120	94	1	520	SAMPLE-9 Scoop. Took a rock sample here the other day. Now will take a scoop.
11:27	144.77562	14.60120	96	4	521	**SAMPLE-9 Scoop (green) of volcaniclastic fallout [Near Shimmering Vent and Mkr-78 144.775642E/14.601205N] PI geogroup**

time	raw long	raw lat	hdg	alt	Z	J2-188 NW Rota-1 - Dive Log Comments
11:29	144.77563	14.60120	99	3	521	SAMPLE-9 Scoop. Haven't collected the sample yet. Deciding where to put it.
11:32	144.77562	14.60120	99	3	521	SAMPLE-9 Gastight Scoop. Green handled scoop. Took a digital. Into the weight milk crate.
11:34	144.77562	14.60120	99	3	521	SAMPLE-9 Scoop into the milkcrate it went.
11:39	144.77563	14.60120	97	2	520	Verena wants us to mosey up and check out the outcrop beneath the marker.
11:40	144.77564	14.60120	97	3	520	Zooming in here on the outcrop.
11:41	144.77564	14.60121	96	2	520	Digital of outcrop covered with old mat.
11:42	144.77564	14.60120	95	3	520	Lots of mat here. There's a shrimp here. A few lost little shrimp here that are hiding out in little holes in the rock.
11:44	144.77564	14.60120	95	3	520	All of 2 shrimp and 1 crab here so far.
11:45	144.77564	14.60120	95	3	520	SAMPLE-10 Rock. Grabbing white stained altered rock here from the summit outcrop.
11:47	144.77564	14.60120	94	3	520	SAMPLE-10 Rock is black with reddish mat coating. Plum-sized.
11:49	144.77564	14.60121	95	2	520	**SAMPLE-10 Rock. Black with reddish mat coating. Plum-sized. [Mkr-78 144.775674E/14.601177N] PI geogroup**
11:50	144.77564	14.60121	95	3	520	We will head to Gastros next. In search of elusive biology.
11:54	144.77564	14.60121	95	2	520	The lone crab at the top. It's lonesome up at the top. He's depressed looking.
11:54	144.77564	14.60121	95	3	520	Now he's a bit friskier.
11:55	144.77564	14.60121	95	2	520	Just a little guy. His claws are really small. He's hoping Jason is food.
11:58	144.77564	14.60121	95	2	520	Digital of the lone crab on the outcrop.
11:58	144.77562	14.60119	139	3	521	Going to head along the bottom towards Gastro.
11:59	144.77561	14.60118	137	3	521	Lots of murky water here.
12:01	144.77572	14.60105	138	2	533	In transit to Gastro
12:03	144.77579	14.60098	138	1	536	White sediments on rockface
12:04	144.77589	14.60090	138	2	544	Periodic slope failure here
12:05	144.77591	14.60084	89	5	549	Fresher slide area
12:06	144.77593	14.60086	64	8	550	Looking for vents
12:07	144.77595	14.60088	64	9	547	Lots of white material on the rocks
12:07	144.77600	14.60091	66	6	541	One shrimp seen so far
12:08	144.77601	14.60091	64	6	541	Shimmering sediments
12:09	144.77602	14.60088	41	6	541	We're at **Gastros**. Just come up from a bluff below.
12:09	144.77602	14.60088	8	5	540	Verena is just interested in the extent of the habitat. Quite a few shrimp here.
12:11	144.77603	14.60090	358	4	539	The shrimp appear to be the Loihi shrimp. He's got one. He was munching on a dead one and is walking away from it.
12:12	144.77604	14.60091	13	3	537	It's a bit like the Donner party Rick says.
12:14	144.77604	14.60091	16	3	537	Looks like the little ones are eating a big one now. Looks like an unnatural death here. Death by volcano.
12:15	144.77604	14.60091	16	3	537	The grazing shrimp is not trying to eat the dead one but maybe grazing on the bacteria on it??
12:16	144.77604	14.60091	16	3	537	We saw gastropods here in '04 but not seeing any now.
12:18	144.77604	14.60091	16	3	537	The one in the middle is staggering around. Doesn't look very healthy either. It's falling over. The Eh is -163.
12:20	144.77604	14.60091	16	3	537	There's a little bit of agression. The coloration on them is also odd.
12:22	144.77604	14.60092	26	2	536	Perhaps it was heat that killed them? The color is a bit weird too.
12:23	144.77603	14.60092	25	2	536	Preparing to sample a dead shrimp.
12:24	144.77603	14.60092	25	2	536	Looks like the rocks here have an iron oxide coating.
12:26	144.77606	14.60088	25	2	536	Preparing to suction shrimp here at Gastros
12:29	144.77606	14.60088	25	2	536	SAMPLE-11 Suction. Cushioning the dead shrimp into yellow jar.
12:33	144.77606	14.60088	24	2	536	SAMPLE-11 Suction. Looks like there is a problem with the suction sampler. Trying again.
12:35	144.77606	14.60088	24	2	536	A gas release could have killed these guys. There are at least 3 dead within the field of view.
12:36	144.77606	14.60088	24	2	536	Doesn't look like the suction sampler is working.....
12:36	144.77606	14.60088	24	2	536	Is there a break in the hose?
12:38	144.77606	14.60088	23	2	536	Going to try a different jar.
12:39	144.77606	14.60088	24	2	536	SAMPLE-11 Suction. Trying this sample again into the blue cylinder.
12:42	144.77606	14.60088	24	2	536	SAMPLE-11 Suction. Another attempt. **Unsuccessful again. The sampler is not working. Suction sample aborted.** We will take a scoop of the dead bodies instead.
12:44	144.77606	14.60088	25	2	536	**SAMPLE-11 Scoop. Dead squid - one pink shrimp - one decayed shrimp. [Gastros 144.776088E/14.600885N] PI Tunnicliffe**
12:45	144.77606	14.60088	25	2	536	The dead body of a squid just came rolling down hill. Consensus is that the volcano has killed these animals.
12:50	144.77605	14.60088	24	2	536	Want to scoop up the dead squid and dead shrimp here. The deaths could be from the event two days ago.
12:53	144.77605	14.60088	24	2	536	The dead squid is in the bag. One pink shrimp one decayed shrimp and a squid.
12:58	144.77606	14.60088	24	2	536	Scoop sample into the biobox.
12:59	144.77606	14.60088	23	4	537	The shrimp may have been a different species. We'll find out.
12:59	144.77606	14.60088	23	3	536	Traveling up slope to see if we see more dead animals.
13:01	144.77607	14.60086	23	5	538	Last time we were here in '04 we saw lots of flat white limpets that turned out to be a new species.
13:01	144.77607	14.60086	23	6	539	Don't see any limpets now.

time	raw long	raw lat	hdg	alt	Z	J2-188 NW Rota-1 - Dive Log Comments
13:02	144.77608	14.60085	23	4	537	Seeing quite a bit of water flow here.
13:04	144.77608	14.60085	23	4	537	Wandering shrimp and lots of sulfur deposits. Looks like lots of organic material around the edge of this opening.
13:04	144.77608	14.60085	23	3	536	A couple of little snails!!
13:05	144.77609	14.60085	23	3	536	Snails will persist. What is that stuff? Mat of some type?
13:06	144.77609	14.60085	23	3	536	Trying to get the suction sampler lined up. May not have been completely in line.
13:08	144.77609	14.60085	23	4	536	Attempting to make the suction sampler work. We have our fingers crossed.
13:08	144.77609	14.60085	23	3	536	Shinkai lipas (gastropods) are here on the rocks.
13:10	144.77609	14.60085	23	3	536	This turned out to be a new species. At east Diamante we saw the other species in this genus.
13:11	144.77608	14.60085	23	3	536	All the little white blobs on the rock are the egg cases.
13:11	144.77609	14.60085	23	3	536	Gastros is still Gastros.
13:12	144.77609	14.60085	23	3	536	Maybe the dead shrimp were not vent shrimp? We'll find out. They did look a little different.
13:13	144.77609	14.60085	23	3	536	The Jason guys are trying to get the suction sampler up and working. So far not working...
13:15	144.77609	14.60085	23	3	536	Still testing the suction sampler. Verena is looking around the area.
13:18	144.77609	14.60085	23	3	536	Jason conference about the suction sampler.
13:20	144.77609	14.60085	23	3	536	Still testing the suction sampler.
13:22	144.77609	14.60085	23	3	536	Phil doesn't know what to say. The sampler is not working.
13:23	144.77609	14.60085	23	3	536	So we would like to look upslope for a few more minutes.
13:26	144.77610	14.60088	50	4	532	Going to take a quick look at the summit and then will call it quits for this dive.
13:27	144.77612	14.60090	54	6	532	Traveling up slope. Depth is 525 here.
13:27	144.77612	14.60093	55	8	529	Large boulders and outcrop areas. All is covered in this mat material.
13:28	144.77614	14.60097	42	5	523	The steepness of this volcano is amazing and the top of this area is covered by the plume.
13:28	144.77615	14.60099	44	4	522	We're at the top of this ridge here.
13:29	144.77613	14.60098	44	5	523	Getting ready to leave the bottom.
13:30	144.77608	14.60097	256	5	523	Will take a niskin about 50 m above the bottom.
13:31	144.77576	14.60090	272	25	530	Marking this sight as "Snow Slope" [14 36.0587 144 46.5668]
						Off bottom ~1330
13:34	144.77576	14.60089	255	43	545	**SAMPLE-12 Niskin fired about 35 meters above the bottom. Near the summit. [144.775764E/14.6008935] PI Resing**
13:57	144.77580	14.60093	252	56	57	Jason at the surface.
14:07	144.77584	14.60101	256	19	19	**Jason on deck. End of Dive J2-188.**

5.4.6 J2-189 NW Rota-1 Dive Log

time	raw long	raw lat	hdg	alt	Z	J2-189 NW Rota-1 - Dive Log Comments
J2-189 NW Rota-1 Dive Summary: Started the dive at Brimstone. Upon arrival vigorous erupting was happening. Explosive bursts of rock and bubbles were coming out of the pit - with a new defined rim. Activity varied widely at Brimstone - from being quiet for an hour to waking up and throwing lava bombs. Took 8 samples from Brimstone area: 1 scoop of pit material, 1 rock from the rim, 2 niskins, 2 gastights, 2 majors. SM2000 survey followed completing 3 lines. After the survey returned to Brimstone to observe and document the activity. Amazing activity. CO2 bubbles in advance of the flow. Vigorous smoking and small explosions coming from the crater. 8 samples total.						
J2-189 Bottom time: 424/2006 2346 - 4/25 0749 UTC (8.05 hrs). **Z column represents seafloor depth in meters.**						
23:05	144.77542	14.60045	336	0	1	Jason off the deck.
23:06	144.77541	14.60043	275	0	2	**Jason in the water. Start of dive J2-189.**
23:09	144.77540	14.60042	267	0	3	Medea is in the water.
23:10	144.77540	14.60042	267	0	2	Jason is diving.
23:19	144.77543	14.60043	325	0	170	Stopping here to test a few things.
23:23	144.77547	14.60042	284	0	170	Testing the suction sampler.
23:28	144.77551	14.60043	273	0	170	Results were inconclusive. Proceeding down.
23:39	144.77557	14.60045	217	93	610	Starting the video tapes.
23:46	144.77544	14.60051	23	5	589	**We are on the bottom.**
23:52	144.77539	14.60064	1	5	581	Areas of altered rock.
23:52	144.77540	14.60068	2	5	578	We have reached the plume
23:53	144.77540	14.60078	358	6	571	Slope looks like it is covered with debris that has slid down.
23:54	144.77539	14.60084	352	5	567	Water is more murky here.
23:54	144.77539	14.60085	352	5	566	Pit is straight ahead.
23:55	144.77538	14.60088	349	4	563	There seems to be a bit of rim forming around the vent.
23:55	144.77538	14.60089	348	4	562	FrameGrab
23:56	144.77539	14.60087	342	5	564	Vigorous erupting happening. Rocks are popping out.
00:00	144.77540	14.60087	338	8	566	Explosive bursts of rock and gas.
00:01	144.77540	14.60087	338	8	566	The cone has built up from 12 hours ago.
00:05	144.77539	14.60086	341	8	567	Plume is wafting towards us obscuring the base.
00:06	144.77536	14.60087	15	6	565	FrameGrab
00:07	144.77536	14.60087	13	6	565	Moved around to the left to see the source again.
00:07	144.77536	14.60087	13	6	565	Lots of rock being spewed out.
00:09	144.77536	14.60087	13	6	565	Can see bubbles rising in front of the plume.
00:12	144.77536	14.60087	13	6	565	Lots of rock raining down from the plume.
00:18	144.77536	14.60087	13	6	565	Activity abruptly diminished.
00:21	144.77536	14.60087	13	6	565	Preparing to take a scoop of the fresh material while the activity is diminished.
00:27	144.77536	14.60087	13	7	565	Rim is about 40 cm tall on the south side.
00:31	144.77537	14.60090	14	8	563	FrameGrab
00:32	144.77537	14.60093	13	1	560	Can really see the defined rim.
00:33	144.77537	14.60093	14	2	560	SAMPLE-1 Scoop. Fresh rim material.
00:34	144.77537	14.60093	14	2	560	Started a second DVcam to record the view from the pilot's camera.
00:36	144.77537	14.60093	15	2	560	**SAMPLE-1 Scoop. Fresh pit rim material. Rim is about 40 cm tall on the south side. Green tape handle into stbd biobox. [Brimstone'06 area 144.775417E/14.600917N] PI geogroup**
00:41	144.77537	14.60093	15	2	560	**SAMPLE-2 Rock. Taken from right in front of the sub at the outer edge of the rim - which appears to be about 1.5 to 2 m wide. [Brimstone'06 area 144.775417E/14.600917N] PI geogroup**
00:42	144.77537	14.60093	15	2	560	Crater rim appears to be about 1.5 to 2 m wide.
00:44	144.77539	14.60094	13	3	560	Flying over the pit to take digital photos.
00:48	144.77543	14.60091	346	2	562	Turning off the pilot's DVcam.
00:50	144.77543	14.60091	345	2	562	Selecting suction jar before moving on to Iceberg.
00:51	144.77543	14.60091	345	3	562	Testing the suction sampler.
00:55	144.77543	14.60090	345	3	562	Pit is waking up again.
00:56	144.77545	14.60085	344	12	567	We are backing away. Got engulfed by the plume.
00:57	144.77548	14.60078	317	5	570	Pit was quiet for about an hour before waking up again.
00:59	144.77547	14.60074	314	4	573	Moving back down to the base again.
01:01	144.77550	14.60074	297	16	573	Verena is seeing pelagic shrimp dying and falling over the pit.
01:04	144.77544	14.60076	344	3	572	We have moved off the pit and are heading back.
01:12	144.77542	14.60084	346	7	567	We are working on video issues.
01:15	144.77541	14.60084	356	7	567	Pit may have settled down again. There is just a wispy plume now.
01:16	144.77542	14.60084	356	8	567	Going to fire a niskin bottle in the plume over the pit.
01:18	144.77540	14.60087	342	7	565	**SAMPLE-3 Niskin (red) fired in the plume over Brimstone. Altitude 8m. Doesn't appear to be working. [above Brimstone'06 144.775417E/14.600917N] PI Resing**
01:20	144.77540	14.60087	339	8	565	SAMPLE-3 aborted because red niskin is not working. Trying the green niskin.
01:22	144.77540	14.60086	338	8	565	**SAMPLE-4 Niskin (green) fired in the plume over Brimstone - same place as previous sample. Crater rim appears to be about 1.5 to 2 m wide. Altitude 8m. [above Brimstone'06 144.775417E/14.600917N] PI Resing**

time	raw long	raw lat	hdg	alt	Z	J2-189 NW Rota-1 - Dive Log Comments
01:25	144.77543	14.60081	280	5	569	Suction sampler is not working so we are going to do an SM2000 survey.
01:25	144.77546	14.60078	151	4	568	Starting at the eastern end of line 2 and running lines 2 - 4 and 6.
01:26	144.77549	14.60074	146	7	570	Correction. Starting at the eastern end of line 8.
01:28	144.77553	14.60064	143	23	574	Further correction. We will be running lines 2 4 and 8.
01:40	144.77598	14.60011	138	39	589	DVcam tape is finished and we will not start another one for SM2000.
01:50	144.77594	14.60007	203	45	605	**Starting SM2000 survey.**
01:53	144.77664	14.59933	212	58	619	*Doppler reset to lbl.*
01:55	144.77663	14.59936	291	67	627	This survey will do summit lines 8-6-4-2. Last survey did the odd-lines.
01:55	144.77662	14.59936	291	64	625	Turning ofJason's altimeter.
01:57	144.77661	14.59936	293	64	626	Going to lateral over to the start of line.
01:57	144.77661	14.59936	291	64	626	Finished lateral move. SM2000 looks good.
01:58	144.77661	14.59936	290	64	626	Everything ready-going to survey at .5knts.
01:59	144.77660	14.59936	291	64	630	Starting line 8.
02:04	144.77655	14.59937	294	64	619	*Some bad nav fliers-back on the line again. Maybe not.*
02:57	144.77678	14.60061	104	64	612	Starting Line 4
03:09	144.77687	14.60057	102	64	573	Minor data logging glitch - saw some smoke.
03:10	144.77688	14.60057	104	64	575	Smoke.
03:14	144.77696	14.60054	106	64	572	We see a big plume in the Medea camera.
03:14	144.77697	14.60054	106	64	571	Getting close to Brimstone.
03:19	144.77710	14.60051	108	64	538	Getting some weird returns over Brimstone.
03:26	144.77720	14.60048	95	64	547	*Changed nav baselines to FG from GH. (caused a big gash in the nav)*
03:33	144.77723	14.60044	257	64	579	SM2000 line end End line 4.
03:34	144.77722	14.60046	297	64	578	Turning to go to east end of line 2.
03:57	144.77733	14.60051	298	64	593	SM2000 line start Start of line 2. East to west.
03:57	144.77733	14.60051	291	64	593	*Changed nav baselines again from FG to EF.*
03:58	144.77733	14.60052	299	64	593	Jason fixes jumped about 25 m to 135 with the baseline change.
04:01	144.77734	14.60052	298	64	593	We are going to run this line from where we are (which is now offset from the line) so that it will be consistent with the others (even if the nav isn't).
04:02	144.77734	14.60052	298	64	593	After much fussing now we are really starting the line.
04:24	144.77714	14.60058	281	64	581	Smoke.
04:31	144.77705	14.60058	275	64	616	Floc in water.
04:31	144.77705	14.60058	275	64	616	Smoke too.
04:33	144.77700	14.60059	273	64	621	End of line.
04:33	144.77699	14.60059	274	64	619	Staying at this altitude to drive over to Brimstone.
04:35	144.77702	14.60057	161	64	620	Aiming for 30 m south of Brimstone to drive up it.
04:42	144.77701	14.60054	139	71	626	Moving at .3knts and speeding up to .5knts.
04:43	144.77701	14.60053	139	67	622	*Changed to baseline GH 1 minute 36sec ago.*
04:44	144.77701	14.60052	139	56	611	Seeing smoke.
04:55	144.77703	14.60050	135	70	625	Clouds.
04:56	144.77701	14.60048	166	65	621	More smoke.
04:57	144.77701	14.60046	202	51	606	Smoke.
04:59	144.77707	14.60046	181	43	598	Smoke.
05:01	144.77714	14.60038	225	32	586	Smoke again.
05:01	144.77716	14.60039	145	31	585	Smokey all over.
05:02	144.77719	14.60027	295	16	570	Big plumes. 156m from target (ship)
05:03	144.77721	14.60026	153	20	575	Lots of plume.
05:03	144.77729	14.60015	156	12	566	**Bottom**
05:04	144.77731	14.60013	154	12	564	Still 139m. of water
05:04	144.77732	14.60011	152	10	562	At 10m altitude.
05:04	144.77733	14.60009	154	9	561	Going over a ridge.
05:04	144.77734	14.60007	204	8	558	Starting video tapes.
05:04	144.77730	14.60004	211	6	557	Distinct ridge/line and sand.
05:05	144.77731	14.59995	118	6	558	120 meters to go.
05:05	144.77743	14.59995	75	5	555	8 meters off bottom. Lots of sand and fish.
05:06	144.77747	14.59996	100	4	552	This is the iron coating on the slope as seen on the north side.
05:06	144.77738	14.59992	253	7	557	Back off bottom and in the plume.
05:07	144.77749	14.59972	115	14	563	85m to go.
05:08	144.77756	14.59970	124	12	561	Lots of plume in Medea camera.
05:09	144.77761	14.59974	123	8	558	Jason has 135 meters to (last positions for ship).
05:10	144.77749	14.59939	113	18	568	Barely see bottom when at 15m above bottom-pulling up to 20m.
05:11	144.77755	14.59930	187	15	565	Jason has 80m to go.
05:12	144.77741	14.59901	177	32	582	FrameGrab
05:13	144.77751	14.59900	150	28	578	50m to target.
05:14	144.77757	14.59889	145	27	577	Ship is at target-waiting for Medea and Jason.
05:14	144.77757	14.59884	139	30	580	Lots of plume in Medea cam.

time	raw long	raw lat	hdg	alt	Z	J2-189 NW Rota-1 - Dive Log Comments
05:17	144.77751	14.59872	195	37	586	35m to target due East.
05:19	144.77755	14.59876	229	32	581	10 meters from target.
05:21	144.77765	14.59880	237	30	579	Believe we are 30 meters south of Brimstone.
05:22	144.77773	14.59876	154	28	579	Seeing plume in camera-going down to 20m off bottom.
05:23	144.77775	14.59884	21	8	579	Can't see Jason on Medea cam. There's the bottom. Talus rubble.
05:23	144.77777	14.59888	20	7	576	19m due north.
05:23	144.77777	14.59892	21	6	572	Approaching Brimstone from south. Lots of particles in water.
05:24	144.77779	14.59895	20	3	569	See slides of debris.
05:24	144.77779	14.59895	47	2	569	Need to wait for Medea to catch up. 7m to go but Medea is 22 meters out.
05:26	144.77780	14.59896	48	2	569	Here comes Medea-is close enough White stuff is a coating of cooked sulfur maybe.
05:26	144.77781	14.59896	48	3	568	Here we go up.
05:26	144.77783	14.59898	41	3	567	Facing NE of the pit.
05:26	144.77783	14.59898	23	3	567	Turning a bit left.
05:27	144.77780	14.59897	326	5	568	Depth is 562 as we go up.
05:27	144.77776	14.59899	351	3	566	Finished turn to left and should be at the top of this hill.
05:28	144.77777	14.59901	4	4	565	There it is - not smoking too bad at 560m.
05:28	144.77774	14.59903	6	4	564	A few meters away - looks like 2 plumes.
05:28	144.77773	14.59904	5	4	564	Don't see the ash ring anymore - maybe too far away.
05:28	144.77773	14.59905	5	4	563	Ash ring is gone.
05:28	144.77774	14.59906	6	3	563	Ring was not very big - looks like new lava.
05:29	144.77773	14.59906	6	3	563	Don't see bubbles either.
05:29	144.77777	14.59902	4	5	564	This may be a different plume - it is a secondary one. Can see another plume - the main one.
05:30	144.77779	14.59902	12	5	564	Plumes show up on sonar. Second plume site is new.
05:30	144.77779	14.59903	7	5	563	There's the rim and more venting to side.
05:30	144.77780	14.59903	8	4	563	New plume is to the SW.
05:31	144.77785	14.59906	5	3	561	The plume has broken out and see the bubbles coming out the front.
05:31	144.77785	14.59906	7	3	561	Amazing - cool.
05:31	144.77784	14.59906	5	3	561	Must be a flow front -look at the bubbles. Lava flow front.
05:31	144.77785	14.59906	5	3	561	The other one is a lobe of lava that came out of here.
05:31	144.77784	14.59906	5	3	561	Need to document this better.
05:31	144.77784	14.59906	5	3	561	It may be moving
05:32	144.77784	14.59906	5	3	561	First time anyone has ever seen this!!!!
05:32	144.77784	14.59906	5	3	561	Putting tape in second camera
05:32	144.77784	14.59906	5	3	561	Need to document this.
05:33	144.77785	14.59906	5	3	561	Must stay here to see if front moves here at all.
05:34	144.77785	14.59906	5	3	561	Nav is good - distinct yellow part of plume.
05:34	144.77785	14.59906	5	3	561	Degassing along the edge of the lava flow.
05:34	144.77784	14.59906	4	3	561	Stable hovering. Looking for movement of front.
05:35	144.77785	14.59906	5	3	561	Pilot sees new bubbles on the front edge.
05:35	144.77784	14.59906	5	3	561	Gas separates from the lava and comes up on the edge.
05:36	144.77784	14.59906	5	3	561	Overlay is off the 3-chip and recording on everything.
05:37	144.77784	14.59906	4	3	561	Pilot/Nav feel we were set down a bit to the left of this location.
05:38	144.77784	14.59906	4	3	561	Water is getting murkier.
05:40	144.77785	14.59907	6	2	561	More bubbles. Incredible.
05:40	144.77784	14.59907	4	2	561	Current is cooperating for a good view.
05:41	144.77785	14.59907	4	3	561	It is really important to see if we can document moving.
05:43	144.77785	14.59907	4	2	561	Just watching.
05:44	144.77785	14.59907	4	2	561	Pilot has to use camera for a second.
05:45	144.77785	14.59907	4	3	561	Camera back in view of front.
05:45	144.77785	14.59907	4	3	561	If it was moving fast you may see some red-don't expect it hee.
05:46	144.77785	14.59907	4	3	561	On the sitcam can see the bubbles moving.
05:46	144.77785	14.59907	5	3	561	We are going to set here for 15 minutes or so.
05:47	144.77785	14.59907	5	3	561	Bubbles are reducing.
05:47	144.77785	14.59907	5	2	561	Definitely less bubbles.
05:48	144.77785	14.59907	4	2	561	Bubbles are increasing.
05:49	144.77785	14.59907	4	3	561	Still hovering and bubbles are increasing again.
05:50	144.77784	14.59907	4	3	561	Getting harder to see with haze.
05:50	144.77785	14.59907	4	3	561	Seems to have yellow core. Bubbles are moving further to the front.
05:51	144.77785	14.59907	4	3	561	More bubbles in front.
05:53	144.77785	14.59907	5	3	561	Bubbles reduced.
05:54	144.77785	14.59907	5	3	561	Bubbles increasing again.
05:55	144.77785	14.59907	5	3	561	Mesmerizing.
05:56	144.77785	14.59907	4	3	561	Bubbles reducing again.
05:57	144.77784	14.59907	5	3	561	Going to move over left-another front.
05:57	144.77784	14.59907	5	3	561	Very few bubbles.

time	raw long	raw lat	hdg	alt	Z	J2-189 NW Rota-1 - Dive Log Comments
05:58	144.77780	14.59908	4	2	560	Going further left to the new area.
05:59	144.77781	14.59907	4	2	560	Base of wall and sulfur flow down side.
05:59	144.77781	14.59907	4	1	560	This is the cinder rim. Another plume below.
06:00	144.77781	14.59907	5	1	560	This cinder rim is new-not here before.
06:00	144.77778	14.59907	2	2	560	Turning left around this rim-another edge on steep flow.
06:01	144.77775	14.59907	18	3	561	On steep wall here.
06:01	144.77775	14.59908	38	3	562	Can see crater on the sonar very distinctly.
06:01	144.77777	14.59906	30	3	561	Looks like a steaming pile of sand near this cinder cone.
06:01	144.77778	14.59905	13	2	561	Moving back to right
06:02	144.77781	14.59906	348	3	561	1.5-2m crater.
06:02	144.77782	14.59906	360	3	561	Crater measured from sonar.
06:02	144.77782	14.59906	350	3	561	Ash rim with venting to the back edge.
06:02	144.77783	14.59906	356	3	561	Sand flowing and ash explosions.
06:03	144.77782	14.59906	354	3	561	Lava flow coming at us.
06:03	144.77784	14.59906	355	3	562	Bubbles on edge.
06:04	144.77785	14.59907	359	3	561	Explosions on 3 chip advancing flow front.
06:04	144.77785	14.59907	354	3	561	Can see it on pilot camera as well.
06:04	144.77785	14.59907	354	3	561	Seeing small explosions in steam with ash.
06:05	144.77785	14.59907	354	3	561	Surprised not moving more must be viscous.
06:06	144.77785	14.59907	354	3	561	Increase in bubbles.
06:07	144.77785	14.59907	354	3	561	More smoke in water-harder to see.
06:08	144.77785	14.59907	354	3	562	Butterfield theory is that the CO2 bubbles come first before the flow.
06:08	144.77785	14.59907	354	3	562	Haze obscuring the view a bit.
06:10	144.77785	14.59907	354	3	562	Visibility is getting bad-still hovering in the same place.
06:11	144.77784	14.59908	14	2	561	Moving the pilot cam view.
06:11	144.77787	14.59907	341	3	562	bubbles increasing again. Good view of flow front.
06:12	144.77788	14.59908	328	3	561	Moving around a bit to get view of flow.
06:12	144.77788	14.59908	337	3	562	Zooming in to part of front.
06:13	144.77788	14.59909	325	3	561	Want to try to sample bubbles on edge of flow.
06:13	144.77788	14.59909	322	2	560	Straight elongated front.
06:13	144.77787	14.59910	314	2	560	Plume is yellowing again.
06:14	144.77788	14.59910	314	2	560	Very yellow.
06:14	144.77788	14.59910	315	2	560	More bubbles as well.
06:15	144.77787	14.59909	314	2	560	Preparing to sample with gastight that has funnel.
06:16	144.77787	14.59909	314	2	560	It has been different every time we have visited here.
06:17	144.77786	14.59909	314	2	560	Sampling the bubbles from the edge of the flow - bubbles are increasing.
06:17	144.77786	14.59910	314	2	560	Lots more bubbles on edge front.
06:18	144.77785	14.59910	314	2	560	Positioning for sample.
06:19	144.77784	14.59910	314	2	560	**SAMPLE-5 Gastight with funnel in bubbles on front edge of the flow. [Brimstone'06 area 144.775517E/14.600925N] PI Evans**
06:19	144.77784	14.59910	314	2	560	SAMPLE-5 Gastight Will wait until funnel overflows with gas.
06:20	144.77783	14.59910	314	2	560	Getting smoke in funnel.
06:20	144.77782	14.59910	314	2	560	SAMPLE-5 Gastight Can see gas oveflow funnel when jostled.
06:20	144.77782	14.59910	314	2	560	SAMPLE-5 Gastight Fired.
06:21	144.77782	14.59910	314	2	560	Stowing sampler and saw gas escape from funnel.
06:22	144.77781	14.59910	314	2	560	Preparing for Major sampler.
06:26	144.77780	14.59910	316	1	559	Positioning for sample-increase in bubbles.
06:27	144.77781	14.59912	316	1	559	**SAMPLE-6 Major (white). Increase in bubbles. Sampling near gastight in white smoke. Hard to see any water flow. [Brimstone'06 area 144.775517E/14.600925N] PI Butterfield**
06:27	144.77781	14.59912	316	1	559	SAMPLE-6 Major sample back in smoke near surface.
06:28	144.77782	14.59913	316	1	559	Do not see water flowing.
06:28	144.77783	14.59914	316	1	559	Can't see water flowing - just bubbles and smoke.
06:29	144.77784	14.59914	316	1	559	SAMPLE-6 Major Wand in position and small amount of smoke on valve.
06:30	144.77785	14.59915	316	1	559	SAMPLE-6 Major Tapping the sampler lightly-it is moving.
06:30	144.77785	14.59915	316	1	559	SAMPLE-6 Major Moving sampler back into smoke.-bubbles increasing again.
06:31	144.77785	14.59916	316	1	559	SAMPLE-6 Major All done filling.
06:32	144.77786	14.59916	316	1	559	Lava infiltrated with sulfur in 3-chip.
06:32	144.77786	14.59916	316	1	559	Stowing major sampler.
06:33	144.77784	14.59914	311	4	561	Moving to look left downslope. Looked like something was going on there.
06:34	144.77784	14.59915	340	2	561	Looking at another edge of bubbles and gas.
06:35	144.77784	14.59915	337	2	561	Want to sample at this front in the yellow smoke.
06:36	144.77784	14.59915	335	2	560	Increase in bubbles while getting sampler.
06:37	144.77784	14.59916	335	1	560	Getting increase in yellow.
06:38	144.77784	14.59915	335	1	560	**SAMPLE-7 Gastight (black handle - blue body). In high smoking crevice of rock at another edge of flow. [Brimstone'06 area 144.775517E/14.600925N] PI Evans**

time	raw long	raw lat	hdg	alt	Z	J2-189 NW Rota-1 - Dive Log Comments
06:40	144.77784	14.59915	335	1	560	SAMPLE-7 Gastight Placing in high smoking crevice of rock.
06:41	144.77784	14.59915	335	2	560	SAMPLE-7 Gastight Having problem keeping arm in position.
06:44	144.77784	14.59915	335	2	560	3-chip has view of a big plume while preparing gastight sample and it is also yellower.
06:45	144.77784	14.59915	334	2	560	SAMPLE-7 Gastight Triggered.
06:46	144.77784	14.59915	333	2	560	Want to move over left of the sample site.
06:46	144.77784	14.59915	333	2	561	Looks like more plume and yellow smoke.
06:46	144.77783	14.59915	333	2	560	Yellow smoke does not last long in any given spot.
06:47	144.77781	14.59916	23	1	559	Smoke more billowing vs. steady flow.
06:47	144.77781	14.59917	13	1	559	Heavy plume with big puffs of smoke.
06:47	144.77781	14.59917	12	1	559	Plume is exploding here.
06:50	144.77781	14.59917	12	1	560	Preparing for temperature in plume.
06:50	144.77781	14.59917	12	1	560	TEMPERATURE degrees C 53.60..76...82...84...94.9...101...103...107..112...120.5...
06:51	144.77781	14.59916	12	1	560	TEMPERATURE degrees C 120...123...126....128...135...136..
06:51	144.77781	14.59916	12	1	560	In yellow vigorous smoke.
06:52	144.77781	14.59917	12	1	560	144.9...206.7...213...222...235...240...247...250...253...256...high 256.6
06:53	144.77781	14.59917	13	1	560	Only a meter across-maybe a few in other direction.
06:54	144.77781	14.59916	13	1	559	Not seeing anything move -- very hot.
06:55	144.77781	14.59917	13	1	559	Stowing probe. Preparing for red Major sample.
06:56	144.77781	14.59917	14	1	560	**SAMPLE-8 Major (red). Area of yellow smoke at front edge of plume. Major is venting well. Tmax=256.6. [Brimstone'06 area 144.775467E/14.600917] PI Butterfield**
06:57	144.77781	14.59917	14	1	559	Getting ready to sample.
06:57	144.77781	14.59917	14	1	560	Major is sampling where temperature reading of 256.6.
06:58	144.77781	14.59917	14	1	559	Triggering.
07:00	144.77781	14.59917	14	1	559	Very yellow now - entire edge of front in pit.
07:00	144.77781	14.59917	14	1	559	Bubbles coming out of yellow smoke.
07:01	144.77781	14.59917	14	1	560	Inside crater vigorous smoking and small explosions.
07:01	144.77781	14.59917	15	1	559	Crater plume is very yellow.
07:02	144.77781	14.59917	15	1	559	Was decrease in activity and now it is coming back within a few moments.
07:02	144.77781	14.59917	15	1	559	Can see smoke coming up through sediment.
07:02	144.77781	14.59917	15	1	559	Gas coming out of the cloud and more explosions with rocks.
07:03	144.77782	14.59917	15	1	559	Really yellow and explosions.
07:03	144.77782	14.59917	15	1	559	Look at the rocks....wow.
07:04	144.77782	14.59917	15	1	559	Puffs of black smoke within yellow.
07:04	144.77783	14.59917	15	1	559	Need to change videos.
07:04	144.77783	14.59917	15	1	559	Plume is coming toward us-changing DVCam.
07:05	144.77784	14.59917	15	1	559	Clearing - large chunks of rocks in crater.
07:05	144.77784	14.59917	15	1	559	Pilot camera has lots of rocks - 3 chip has yellow and puffy explosions.
07:06	144.77785	14.59917	15	1	559	Vigorous plume explosions.
07:07	144.77785	14.59917	15	1	559	Testing suction sampler.
07:07	144.77785	14.59918	15	1	559	3 chip still has vigorous yellow plume explosions.
07:09	144.77786	14.59918	15	1	559	Boiling on top of rocks.
07:09	144.77787	14.59918	15	1	559	Double pit now...bubbling up and boiling.
07:10	144.77787	14.59919	15	1	559	Sulfur is splattering on edge.
07:10	144.77788	14.59919	15	1	559	Large lava bombs exploding back into crater.
07:10	144.77788	14.59919	15	1	559	Pieces of rock falling into pit.
07:12	144.77789	14.59920	15	1	559	Getting smoky again - poor visibility.
07:12	144.77789	14.59920	11	2	560	Move out a bit to see whole pit.
07:12	144.77788	14.59919	13	3	560	Lateralling around left.
07:12	144.77787	14.59919	8	3	560	Getting very obscured. Hard to see pit anymore.
07:16	144.77790	14.59914	358	2	564	Finished all of our sampling. Jason crew is testing the suction sampler before ending the dive.
07:23	144.77790	14.59914	0	2	564	Finished testing suction sampler. Still not working properly.
07:31	144.77791	14.59918	327	2	560	Preparing to pick up one final rock before we leave the bottom.
07:33	144.77790	14.59918	327	2	560	Plume is becoming very active again.
07:33	144.77790	14.59918	327	2	560	Plume becoming explosive.
07:36	144.77790	14.59918	327	1	560	Seems to have quite a lot of yellow
07:37	144.77790	14.59917	327	2	561	Plume is starting to envelope Jason - visibility going down
07:41	144.77786	14.59916	4	5	560	Moving Jason to get some good digital stills
07:43	144.77780	14.59915	40	6	563	Plume still quite strong but no longer yellow or explosive.
07:47	144.77791	14.59913	340	5	564	Still looking around at the plume from different angles.
07:49	144.77787	14.59910	360	15	567	**End of dive - preparing to leave the bottom.**
07:52	144.77790	14.59913	19	56	559	Emerging through the top of the plume at 500m. Jason on deck at ~0820.

5.4.7 J2-190 Esmeralda Dive Log

time	raw long	raw lat	hdg	alt	Z	J2-190 Esmeralda - Dive Log Comments
J2-190 Esmeralda Dive Summary: Exploration dive. Visibility was poor for most of the dive due to a thick plume trapped in the caldera. Started at the SW corner of Esmeralda on the caldera floor and climbed up the wall a bit. The caldera floor is covered with a deep layer of iron sediments. Made 3 traverses up the wall in the SW portion of the caldera. Sampled a piece of rock/crust on the first traverse (SE Caldera Wall area). On second traverse came upon an area of Iron oxide mounds (chimney-like structures). Named the place Iron Mounds and took 1 suction sample of the mounds. Temp at the mounds was ~40C. The suction sampler worked on this dive!. 1 rock was sampled on last western rim traverse. Next moved on to the southeastern caldera floor. Took 1 rock sample from the SE caldera wall. The last transect was up the northern caldera wall. Never reached the shallow area known to be venting because Jason/Medea would not go shallower than 120 meters. 5 samples total.						
J2-190 Bottom time: 4/25/2006 2237 - 4/26 1332 UTC (19.92 hrs). **Z column represents seafloor depth in meters.**						
22:04	145.22500	14.93000	0	0	0	Preparing to launch for dive J2-190 at Esmeralda Bank
22:05	145.22500	14.93000	0	0	0	Powering up the vehicle.
22:10	145.24267	14.94633	247	0	1	Launching Jason for dive J2-190 at Esmeralda Bank. In the water now.
22:10	145.24266	14.94634	293	0	1	**Jason in the water now.**
22:14	145.24264	14.94632	286	0	2	Medea in the water.
22:15	145.24265	14.94632	306	0	11	Jason is diving. We're heading down to 335 meters in the southwestern part of the caldera.
22:24	145.24267	14.94631	288	60	325	There's a plume coming up.
22:25	145.24269	14.94630	287	63	328	We're going through a bit of a plume here. Water is hazy.
22:30	145.24269	14.94630	286	56	327	The buzz is that Medea can't dive above 100 meters and Jason can't go above 135 meters.
22:31	145.24279	14.94627	111	40	330	The Eh is 81 and going down.
22:36	145.24294	14.94628	105	5	333	There is a problem with the overlay on the science cam. Looks fine on the little monitor but on the big one all we're seeing is the temperature.
22:37	145.24329	14.95500	203	1	333	**We're on the bottom. Now at 190 meters.**
22:38	145.24329	14.95500	203	1	332	Lots of fish down here. Beautiful little tropical stuff.
22:40	145.24324	14.95499	203	1	332	We're messing with all of the cameras here and overlays.
22:41	145.24319	14.95499	202	1	331	We're sitting in one place. The range on the sonar is about 20 meters.
22:42	145.24318	14.95498	204	1	331	We're looking at some weird skinny fish.
22:42	145.24316	14.95497	210	2	330	They look eel-like and have their heads pointed upward towards the surface.
22:44	145.24328	14.95496	226	2	331	We're at the southwest corner of the caldera. We can't see a thing. But the good news is there are living things here. Going to head southwest towards the wall.
22:45	145.24328	14.95496	225	3	332	What's all the cloudiness coming from?
22:45	145.24332	14.95498	225	1	332	The southern part of the caldera seemed to be the source of the plume.
22:46	145.24331	14.95497	226	1	332	Akel is messing around with broadcasting the Eh so that we can see it all the time. Background temp is 17.3.
22:46	145.24330	14.95497	226	1	332	Eh is 85.
22:47	145.24329	14.95495	227	1	331	It's really murky here.
22:50	145.24316	14.95487	225	1	328	We're heading southwest to the caldera wall.
22:51	145.24313	14.95485	225	1	327	Based on the wall that a caldera wall is a fault we're traveling toward it to try to find a vent. Eh is 101.
22:51	145.24313	14.95485	226	1	327	Very murky here.
22:53	145.24313	14.95481	226	1	326	We're looking at iron cover on the seafloor.
22:56	145.24311	14.95475	225	1	325	Eh below 80 could be an indicator of venting. Right now it is 110.
22:59	145.24311	14.95468	226	1	324	We're very slowly making our way to the southwest.
23:01	145.24301	14.95464	224	2	321	The sediment is covered with white silt clay (Verenas guess). Medea can't see Jason.
23:04	145.24299	14.95462	227	1	320	We're not taking a sample. We're prodding the seafloor. It's really a deep sediment layer. Basalt (?) underneath and iron sed. on top.
23:04	145.24299	14.95462	226	1	320	That stirred it up.
23:05	145.24301	14.95460	181	2	320	Eh 125 here. It has come up.
23:06	145.24304	14.95461	170	1	319	This is a test.
23:07	145.24304	14.95461	179	2	319	We're going a little farther toward the wall.
23:08	145.24302	14.95460	225	1	319	We're heading to the next contour and then may turn north.
23:09	145.24300	14.95458	226	2	318	No change in the bottom character. No outcrop evident. No talus. Just the same sediment.
23:11	145.24297	14.95451	223	2	316	We're going to try to use the Eh as a way of tracking the vents.
23:13	145.24288	14.95447	236	1	313	Come to a stop here.
23:14	145.24289	14.95448	360	9	312	We're going to come up in the water column. Head to a point north of here in the caldera 170 m north. Then drop down to bottom and head west to the caldera wall.
23:14	145.24289	14.95448	358	9	312	Eh=127 now.
23:15	145.24289	14.95448	357	10	311	Looks like a bunch of ash particulates in the water column here.
23:15	145.24289	14.95448	357	10	312	10 meters off the bottom.
23:17	145.24288	14.95449	352	19	311	Coming up more so that Medea can see the vehicle. That's the plan.
23:17	145.24289	14.95446	181	21	313	Eh 124/
23:20	145.24281	14.95408	180	30	300	We're pulling Medea with the ship and will be pulling Jason with Medea.
23:20	145.24281	14.95407	181	31	299	That will speed this up.
23:21	145.24281	14.95409	193	30	300	Eh has been holding pretty steady.
23:24	145.24283	14.95428	183	37	306	No whining. That's Verena's rule.
23:26	145.24284	14.95433	181	46	315	Eh is 130.
23:32	145.24284	14.95440	171	61	331	Eh is 133
23:39	145.24286	14.95445	154	57	337	Medea is staying here and Jason is coming under Medea. Eh is 143.

time	raw long	raw lat	hdg	alt	Z	J2-190 Esmeralda - Dive Log Comments
23:40	145.24283	14.95450	343	47	337	We're heading down.
23:42	145.24281	14.95443	343	13	337	We're at a spot in the SW caldera away from the wall. Heading to the bottom then will go west to the wall.
23:44	145.24278	14.95444	342	1	338	Eh has dropped to 123. The bottom is in sight.
23:46	145.24275	14.95594	270	1	338	We're heading due west until we get to the outcrop. We're seeing sediment being stirred up from the thrusters?
23:49	145.24259	14.95594	270	2	334	If this was easy anybody could do it says Embley
23:49	145.24257	14.95594	269	2	334	We are going to find some outcrop.
23:50	145.24248	14.95592	270	1	332	The tip of the tail moves this long skinny fish around. It's about as thick as a knife.
23:51	145.24243	14.95595	266	1	331	Watching this unidentified long skinny fish. It has a little "hat" on its head.
23:52	145.24239	14.95594	269	1	330	Eh is 127. Top of rim should be 235 meters. Should be the sill depth at 235.
23:53	145.24228	14.95595	268	1	327	The sediments look redder but that could be our imagination.
23:54	145.24223	14.95594	270	2	325	Consensus is that the sediments are redder. Eh is 130.
23:55	145.24218	14.95594	269	2	324	We're seeing outcrop here. Eh is 131. Stopping here for a bit.
23:56	145.24217	14.95594	275	2	323	Eh is dropping. Eh is 118
23:57	145.24217	14.95594	275	1	323	Eh is 100 because we just stirred up the bottom.
23:57	145.24217	14.95594	275	1	323	Eh is 63 and going back up.
23:59	145.24217	14.95594	275	1	323	Waiting for the muck to clear. Lots of iron seds in the water.
00:02	145.24217	14.95594	275	1	323	Jason is picking up a rock.
00:04	145.24217	14.95594	275	1	323	We will try to sample this iron crust. Could be a piece of pumice. We will put it in the biobox and see if it survives.
00:04	145.24217	14.95594	275	1	323	Eh is 119.
00:08	145.24217	14.95594	275	1	323	**SAMPLE-1 Crust (Iron oxide). It's round and about 15 cm in diameter. Could be pumice. [SW caldera wall 145.242232E/14.955933N] PI geogroup**
00:09	145.24217	14.95594	275	1	323	Looks like little chimneys.
00:10	145.24223	14.95595	275	1	323	Looking at the pieces of crust here. Eh is 100.
00:11	145.24224	14.95595	276	1	323	Zooming in on a rock here. We hope to find something better than this. Eh is 50.
00:13	145.24216	14.95594	267	2	322	May have seen some tiny spots of vents. Lots of iron coating around here. Eh is down to 12.
00:14	145.24212	14.95596	268	1	320	We're moving up the western caldera "wall" but don't see much outcrop.
00:14	145.24210	14.95597	268	1	320	This looks like its all iron oxide. Eh is 35.
00:17	145.24187	14.95595	266	2	312	The bottom is covered with iron oxide. The caldera rim at the saddle is 240m.
00:19	145.24179	14.95596	260	2	309	The Eh is 60 now but may go down when we set down. Verena suspects it could be height above bottom. T ambient=17.3C.
00:23	145.24170	14.95594	260	2	310	Temp has gone up to 18.5 C.
00:25	145.24170	14.95594	259	2	309	Trying the temp again in the bright orange stuff. Poke it down deep. It's 18.7 here. Eh is 61. Probe is in sed about 25 cm. 18.8 in seds. Ambient if 17.4.
00:26	145.24170	14.95594	260	2	310	TEMPERATURE Probe in all the way. It reads 19.4. It's up 2.5 degrees down about 30 cm in the seds.
00:28	145.24170	14.95594	260	2	309	TEMPERATURE 20.5. So temp in seds is about 3 degrees warmer than ambient.
00:28	145.24170	14.95594	260	2	309	20.6 deep in seds.
00:30	145.24170	14.95594	260	2	310	TEMPERATURE All the heat is definitely coming out of the bottom. The tip was only in there 30 cm as stated earlier. Tip barely in the seds now and the reading is 17.8.
00:31	145.24170	14.95594	260	2	310	Holding up the probe to get a look at the probe.
00:32	145.24170	14.95593	260	2	310	Stowing the probe and preparing to move on.
00:33	145.24170	14.95593	260	2	309	The heat must be seeping out right here.
00:34	145.24169	14.95594	267	2	309	We are going to continue with the original plan climbing up the "wall". Here the Eh is 104. Moving on westward.
00:37	145.24150	14.95593	271	2	301	We're checking the virtual van numbers.
00:39	145.24140	14.95598	272	2	297	Seems that the virtual van numbers are lagging behind real-time display.
00:39	145.24140	14.95601	272	2	298	We're on a steeper slope and seeing patches of black interspersed with the iron oxide seds.
00:39	145.24140	14.95601	271	2	298	Eh is 111.
00:40	145.24138	14.95600	263	2	297	We are seeing some outcrop here and a lot of cloudy water in front of us.
00:41	145.24138	14.95600	259	2	297	We're looking at some altered crust.
00:41	145.24138	14.95600	246	3	297	The brightest orange is the most recent.
00:42	145.24136	14.95602	248	2	297	The virtual van depth etc. is lagging behind the actual events.
00:42	145.24136	14.95603	247	2	297	Eh is 117.
00:43	145.24135	14.95602	247	2	296	Could possibly be a bit of biology on these blocks of "rock". Look like fingers on these rocks.
00:43	145.24134	14.95602	248	2	295	We are seeing some smoke here. We're climbing slowly. We're seeing blocks of crust here.
00:44	145.24132	14.95602	249	2	295	There's a nice linear structure in the pilot cam.
00:45	145.24132	14.95601	250	2	295	We're definitely looking at some type of chimneys here. Eh is 122. The chimneys are getting larger and larger. They are in a linear pattern.
00:46	145.24132	14.95601	250	2	294	Depth is 298. Cornel thinks they are iron oxide chimneys/mounds. These are lineated east/west.
00:47	145.24132	14.95601	249	2	294	**[14 57.3580/145 14.4862] Iron mounds**. Fall apart when the arm touches them.
00:49	145.24132	14.95601	249	2	295	Chimneys are 30 cm to 50 cm tall. About 25 cm wide. Eh is 32 now. Target here is called **Iron oxide mounds**.
00:50	145.24132	14.95601	249	2	294	**Iron Mounds 145.24144E/14.95597N**
00:55	145.24132	14.95602	250	2	294	Rick seems to believe that these chimneys are dead. The temp shot right up to 33.3 and climbing. Temp is now 42.7. Rick wants a suction. We hit 46C with temp probe in about 20 cm.

time	raw long	raw lat	hdg	alt	Z	J2-190 Esmeralda - Dive Log Comments
00:56	145.24132	14.95602	250	2	294	Looks like there is flow there. Iron oxide is flowing out. We punctured the mound and stuff is pouring out.
00:57	145.24132	14.95602	250	2	294	Lots of iron oxide mounds here. Temp went up to 46C and flow was created when the temp probe punctured it.
00:57	145.24131	14.95602	250	2	294	There is flow coming out.
00:59	145.24131	14.95602	250	2	294	The whole western flank is covered in these low temp diffuse oxides. The flow is not obvious. There's a little bit of flow here.
01:00	145.24131	14.95602	250	2	294	We're going to have a look around.
01:00	145.24131	14.95602	250	2	294	When we put the probe in the mound the temp escalates. It's now over 30C when the probe is pushed in.
01:01	145.24131	14.95602	250	2	294	The temp is creeping up towards 40 again.
01:01	145.24131	14.95602	250	2	294	The "flow" could just be flocculent material.
01:02	145.24131	14.95602	250	2	294	We are calling this place Iron Mounds.
01:03	145.24131	14.95602	250	2	294	We're going to survey around this Iron Mounds area. There are several chimneys in this area that look taller than the two in front of us.
01:04	145.24131	14.95602	250	2	294	The structures are irregular with almost tubular structures on the outside. The chimneys are falling in an east west line. Don't know the extent of them in a north south line.
01:05	145.24131	14.95601	250	3	295	Going up towards the bigger shadow. Hoping to find more of that along the wall. Leaking fluids along the wall?
01:05	145.24130	14.95601	250	3	294	The structure in the background is larger than the ones we've been looking at.
01:07	145.24128	14.95600	251	2	293	A number of mounds around here. It's more of a patch ahead. The whole slope here probably has these mounds on it. The exterior almost looks like drips.
01:07	145.24128	14.95600	251	1	293	This one is several meters in diameter and 1.5 meters across. Look like bio/mineral structures. Little finger-like structures on the surface.
01:09	145.24128	14.95600	252	2	293	We're going to take a temp here in this mound.
01:10	145.24128	14.95600	252	2	293	The surface of this mound is covered in fishing line. The most recent precipitate from these things is a light orange color. There is a very weak flow.
01:10	145.24128	14.95600	252	2	293	Looking at finger chimneys. The Eh here is 103.
01:13	145.24128	14.95601	252	2	293	TEMPERATURE Weak diffuse flow coming out of the top of this mound. Taking the temp here. Ambient is 17.4.
01:15	145.24128	14.95602	252	2	293	TEMPERATURE trying to take the temp in the flow - what little there is. Probe is in about 1 inch. Temp went up to 30C.
01:16	145.24131	14.95605	251	2	293	TEMPERATURE Shoving the probe down deep in the mound. The temp is climbing up at 40. T ambient=17.4.
01:18	145.24130	14.95606	251	2	293	Going to try to suction up this iron mound here at Iron Mounds field.
01:20	145.24130	14.95607	251	2	293	**SAMPLE-2 Suction (white jar). Iron oxide mound. Diffuse venting here. Iron-fixing bacteria must be present. [Iron Mounds 145.24144E/14.95597N] PI Davis**
01:23	145.24130	14.95607	251	2	293	SAMPLE-2 We have suction!! Sucking up this mound here. Some of the iron oxide material is going up the hose.
01:25	145.24129	14.95607	251	2	293	Some diffuse venting going on here.
01:26	145.24129	14.95607	251	2	293	SAMPLE-2 Suction Finishing up the sample. Iron-fixing bacteria here.
01:28	145.24130	14.95607	251	2	293	Flushing the system.
01:29	145.24129	14.95608	251	2	293	There is some flow coming out of the mound. Contemplating doing a fluid sample here.
01:32	145.24130	14.95608	251	2	293	Iron Mounds area here.
01:33	145.24130	14.95608	251	2	293	Taking a temp here We're seeing more flow at the bottom.
01:34	145.24130	14.95608	251	2	293	We're going to look down in front.
01:35	145.24131	14.95604	251	2	293	Trying to see a temp anomaly.
01:37	145.24131	14.95605	251	2	293	The discussion is to excavate the mound so that we can get at the source of the flow.
01:38	145.24130	14.95605	251	2	293	Extensive area here with a lot of heat coming out here.
01:39	145.24130	14.95605	251	2	293	Watch change is coming up so we think this is a good time to stir things up.
01:40	145.24130	14.95605	251	2	293	Jim says that Julie needs to have patience.
01:43	145.24131	14.95603	251	2	293	The area is clearing here after our excavation.
01:49	145.24132	14.95604	247	2	294	Big fish.
01:50	145.24132	14.95604	247	2	294	Waiting for visibility.
01:55	145.24132	14.95604	250	2	294	Still waiting for dust to settle.
01:58	145.24133	14.95604	251	2	294	Not seeing any water to sample here - need to move to next site.
02:01	145.24133	14.95604	251	2	294	Looking at sonar to find some target mounds.
02:02	145.24133	14.95604	249	3	294	Going over toward left following sonar.
02:03	145.24132	14.95604	212	3	293	Sonar shows something behind us as well and going downslope. Range 37m behind us.
02:04	145.24132	14.95600	184	2	292	Another big fish. Heading 183.
02:05	145.24132	14.95599	188	2	292	Getting into bigger mounds - ended up driving south instead of going upslope left.
02:05	145.24132	14.95599	255	3	292	Turning back around to go west.
02:06	145.24132	14.95599	260	3	292	Want to go up wall.
02:06	145.24130	14.95600	271	3	292	Heading up to flat part of rim which is the deepest part of rim on this caldera.
02:07	145.24129	14.95600	271	3	291	Ship is moving 270deg at .2knts.
02:07	145.24129	14.95600	271	2	291	Looks like a depression here.
02:08	145.24128	14.95604	271	2	291	Want to investigate sonar targets. E-W lineations through the caldera and the iron coming up through.
02:10	145.24125	14.95599	271	5	290	Subtle ridges all lined up. Driving 271.

time	raw long	raw lat	hdg	alt	Z	J2-190 Esmeralda - Dive Log Comments
02:11	145.24120	14.95599	271	2	288	Continue west. Lines on sonar are just mounds on cracks.
02:12	145.24107	14.95598	271	1	283	Losing the big mounds. Mounds lined up EW - subtle lineations. Regular crack here.
02:12	145.24107	14.95598	271	1	283	Big fish too.
02:12	145.24106	14.95598	270	2	283	Trying to look at this crack.
02:13	145.24107	14.95598	270	2	283	Moving too fast to stop at crack-keep going west.
02:13	145.24100	14.95597	270	2	281	More cracks. Some not EW.
02:14	145.24097	14.95597	268	2	280	Stop at one of these cracks - ship is all stopped.
02:14	145.24097	14.95597	272	2	280	May be a crust that fractures run through.
02:15	145.24096	14.95596	269	1	280	Position 14deg 57.358N 145deg 14.457E.
02:15	145.24096	14.95596	269	1	280	Stopping at a crack and will try to poke it.
02:16	145.24096	14.95596	270	1	280	Want to see if this material is crust or sediment with the manipulator.
02:16	145.24096	14.95596	270	1	280	Could just be sand in a crack.
02:18	145.24096	14.95597	215	1	280	Carefully positioning so sediment is stirred up for sampling view.
02:18	145.24096	14.95597	215	1	280	Brittle star in 3-chip.
02:18	145.24096	14.95597	215	1	280	Lots of brittle stars.
02:19	145.24096	14.95597	215	1	280	Brittle stars are moving.
02:19	145.24096	14.95597	215	1	280	Big fish.
02:20	145.24096	14.95597	215	1	280	Substance is hard when hit by manipulator.
02:20	145.24096	14.95597	215	1	280	Try scratching. Iron is floating away but seems to have some chunks underneath when scratched.
02:21	145.24096	14.95597	215	1	280	Soft underneath - crust on top iron seems to be under black.
02:21	145.24096	14.95597	216	1	280	Crust pulls away in chunks with iron underneath.
02:22	145.24096	14.95597	215	1	280	Crust is about .5in thick - sci cam has close-up of chunks.
02:23	145.24097	14.95597	215	1	280	Want to sample the crust.
02:24	145.24097	14.95597	215	1	280	Breaking up crust with manipulator to then sample with scoop.
02:24	145.24097	14.95597	215	1	280	Manganese crust seen also in the Kermadecs.
02:25	145.24097	14.95597	215	1	280	Probably manganese. Want to sample with canvas bag.
02:26	145.24097	14.95597	215	1	280	This crust formation is very common on these volcanoes.
02:31	145.24097	14.95597	215	1	280	Retrieving canvas bag.
02:33	145.24097	14.95597	215	1	280	Got the bag.
02:34	145.24097	14.95597	215	1	280	**SAMPLE-3 Scoop. Crust and iron oxide sediments. Sample from lineation-crack. [145.240967E/14.955967N} PI geogroup**
02:34	145.24097	14.95597	216	1	280	SAMPLE-3 Going for second scoop in exactly same spot.
02:38	145.24097	14.95597	215	1	280	Want to put temperature probe into undisturbed crack nearby.
02:41	145.24098	14.95597	215	1	280	Tapes changed 15 minutes ago.
02:41	145.24097	14.95597	215	1	280	Trying temp in front of basket.
02:42	145.24097	14.95597	215	1	280	TEMPERATURE 17.7....17.8...17.9...18.0...18.1 18.2
02:42	145.24098	14.95597	215	1	280	TEMPERATURE going deeper..3 inch...18.5 18.8...19.1...19.3
02:44	145.24098	14.95597	214	1	280	TEMPERATURE Pushing a little deeper...19.5 19.7...19.9....20.1....20.3 Cooler area - just oozing iron oxides under this crust. Crust forming on top.
02:44	145.24098	14.95597	214	1	280	Not far from where we disturbed the crust.
02:44	145.24098	14.95597	214	1	280	Going to try to move a meter up to try another location.
02:46	145.24097	14.95597	214	2	280	Moving forward a few meters for another temp sample.
02:46	145.24097	14.95597	214	1	280	Moved up slope and going to see if it is the same temp where we disturbed the crust.
02:47	145.24097	14.95597	214	1	280	TEMPERATURE Background 17.7
02:48	145.24097	14.95597	214	1	280	TEMPERATURE Probe in.....8in deep. 18.1...19.2..19.3
02:49	145.24097	14.95597	214	1	280	Okay to move on to the west to the top.
02:50	145.24097	14.95597	214	1	280	Stowing wands.
02:50	145.24097	14.95597	214	1	280	Retracting basket.
02:50	145.24097	14.95597	214	1	280	Shallowest allowed for Medea is 100m That means Jason at 120m.
02:52	145.24097	14.95597	214	1	280	Banded brittle stars..ophiuroid.
02:52	145.24097	14.95597	215	2	280	Ship is moving - here we go to the west.
02:53	145.24096	14.95600	268	2	280	Cracks through crust.
02:53	145.24095	14.95602	267	1	279	Area is warm underneath by a few degrees.
02:55	145.24090	14.95602	283	3	278	Moving again due west.
02:55	145.24086	14.95607	290	2	277	Dark iron-manganese crust. Iron mounds poking through but no big ones.
02:55	145.24084	14.95612	292	3	277	Out of that area of curst.
02:56	145.24080	14.95614	307	3	276	Looks like we are out of the hydrothermal stuff.
02:56	145.24077	14.95619	316	2	275	Ship just took off and we are doing a walkabout.
02:57	145.24076	14.95620	315	1	275	Stopping now waiting for ship to stop moving.
02:57	145.24076	14.95620	316	1	275	Crust is broken up here.
02:57	145.24074	14.95617	316	2	274	Wind is up to 20 knts and affecting ship position.
02:58	145.24071	14.95613	309	1	273	Winds over 25kts harder to hold position.
02:58	145.24075	14.95610	296	3	274	Starting to move ship again.
02:59	145.24077	14.95607	266	4	275	Murky off the bottom.
02:59	145.24072	14.95600	262	2	273	Seeing more yellow again.
02:59	145.24071	14.95599	262	2	273	Driving 271.
03:00	145.24067	14.95596	260	2	272	Anemone along black-orange line...no its a crinoid.
03:01	145.24062	14.95597	261	1	271	Orange coating more scattered.

time	raw long	raw lat	hdg	alt	Z	J2-190 Esmeralda - Dive Log Comments
03:01	145.24061	14.95598	263	2	270	More yellow material.
03:02	145.24058	14.95600	263	2	270	Getting more stalked animals on this substrate.
03:02	145.24056	14.95601	263	2	270	Could be currents; depth or substrate as to why more animals.
03:02	145.24054	14.95602	262	2	269	Looks like more current and flow and seeing filter feeders.
03:03	145.24049	14.95602	263	2	268	Less to zero orange material.
03:03	145.24045	14.95599	263	2	266	Corals.
03:04	145.24040	14.95600	263	2	265	Seawhips.
03:04	145.24038	14.95600	263	2	264	Only 20 more meters to crest.
03:05	145.24037	14.95600	263	1	264	At 262 meters.
03:06	145.24029	14.95601	263	2	262	Anemones. Seawhips.
03:08	145.24019	14.95599	263	2	258	Lots of seawhips on this type of crust.
03:09	145.24015	14.95598	259	2	256	Plan is to get on rim then drive north to highest point. From there go down slope which is the steepest part of wall anywhere around.
03:10	145.24008	14.95597	263	2	253	Driving 262.
03:12	145.23995	14.95595	264	2	248	Seawhips or gorgonians.
03:12	145.23992	14.95595	263	2	246	Maybe just anemones. Soft corals.
03:12	145.23991	14.95594	262	2	246	A lot more animals on this slope now.
03:14	145.23987	14.95594	262	3	244	Lots of animals.
03:14	145.23985	14.95593	262	2	243	Visibility is improving.
03:14	145.23984	14.95592	261	3	242	Some kind of soft corals.
03:16	145.23977	14.95594	263	2	240	We are at the target. We need to go further west to get to top.
03:17	145.23970	14.95595	261	3	238	Slowing down to take pictures here.
03:18	145.23964	14.95592	262	1	239	Trying not to disturb bottom but observe animals.
03:18	145.23962	14.95599	262	1	239	*Doppler reset.*
03:18	145.23961	14.95599	264	1	239	Good to go north now. We were at 263deg.
03:21	145.23973	14.95600	47	1	238	Target is 400m at 003. Moving along.
03:22	145.23972	14.95604	9	1	238	If we don't see much here we will drive to the deep slope and work up.
03:22	145.23974	14.95605	7	1	238	More of the same substrate and animals here. Will go another 100 meters. Can see current as animals are bent to one side away from the caldera.
03:23	145.23972	14.95607	7	1	239	Animals bent to west.
03:26	145.23978	14.95620	8	1	241	Still the same stuff.
03:27	145.23981	14.95621	7	1	242	Big seawhip.
03:28	145.23982	14.95625	7	1	243	More seawhips - higher current. Seeing red and white ones.
03:31	145.23982	14.95640	354	1	243	Wander a bit to the left as we go along to stay up on the shallow.
03:31	145.23980	14.95641	354	1	244	Beautiful umbrella shaped animal.
03:32	145.23980	14.95642	354	1	243	Stalked animals are all on pieces of crust.
03:33	145.23979	14.95651	358	1	244	Going to go a little further then go down so we can climb up the wall.
03:33	145.23981	14.95657	358	1	245	Before we drive to deep part we want temperature reading from up on top.
03:33	145.23982	14.95658	358	1	246	Some crust here.
03:35	145.23980	14.95659	357	1	245	Stopping here for temperature where there is no evidence of hydrothermal activity for a background measurement.
03:37	145.23980	14.95659	358	21	266	Waiting for dust to settle and grabbing temp probe.
03:37	145.23980	14.95659	358	119	364	Edible fish.
03:40	145.23981	14.95659	358	1	245	Placing probe in sediment.
03:40	145.23981	14.95659	358	1	245	TEMPERATURE Same as ambient water...18.0
03:41	145.23980	14.95659	358	1	245	Position 14 57.396N 145deg 14.388E
03:41	145.23980	14.95660	358	1	245	TEMPERATURE Temp is going down...17.9.
03:42	145.23980	14.95660	358	1	245	TEMPERATURE Probe about half its length in sediment.
03:42	145.23980	14.95660	358	1	245	Stowing wand and then out to the bottom of the caldera.
03:44	145.23982	14.95662	357	1	245	284 meters at 044deg to next target.
03:44	145.23982	14.95662	357	115	360	Ship is moving.
03:45	145.23985	14.95662	40	2	245	Coming off bottom as we drive to target.
03:45	145.23984	14.95666	41	2	246	Moving up to .5knts with ship to target.
04:12	145.24089	14.95738	333	30	321	Hydrothermal water at 33 m above bottom.
04:13	145.24090	14.95739	335	27	322	Position not good.
04:13	145.24150	14.95860	333	20	321	*Doppler reset.*
04:13	145.24153	14.95854	334	18	324	Position good now. 14deg 57.514 145deg 14.492E
04:14	145.24153	14.95852	335	11	324	Going to bottom.
04:14	145.24150	14.95860	334	8	325	*Doppler reset 9m off bottom.*
04:14	145.24151	14.95857	333	6	326	Better position now.
04:14	145.24151	14.95856	334	6	326	14deg 57.514N 145 14.491E
04:14	145.24151	14.95855	335	4	326	Visibility is poor at 5m off bottom
04:15	145.24149	14.95857	335	2	326	Want to drive upslope.
04:15	145.24148	14.95860	335	2	325	On bottom lots of iron coating.
04:15	145.24146	14.95863	335	2	324	Lots of little fish.
04:17	145.24146	14.95870	335	2	322	At 321m depth. At base of slope which is about 7.5 meters - not a wall - slopes up at 45deg or so.
04:17	145.24147	14.95870	335	2	322	Lots of little fish.

time	raw long	raw lat	hdg	alt	Z	J2-190 Esmeralda - Dive Log Comments
04:18	145.24149	14.95865	334	5	324	Came down through heavy smoke but was clearer on the bottom.
04:20	145.24145	14.95867	300	4	323	Going to have to fly by instrument while moving at .2knts.
04:20	145.24146	14.95870	301	3	322	Going to try auto-altitude.
04:20	145.24146	14.95871	301	3	322	Going to set altimeter at 2m.
04:21	145.24146	14.95873	300	2	322	Auto depth is off.
04:21	145.24146	14.95873	301	2	322	Still lots of little blue fish.
04:23	145.24136	14.95877	312	5	317	No auto-altitude. Coming up to 4m off bottom to get out of ROV-generated plume.
04:24	145.24136	14.95876	214	4	317	Can not touch bottom here - fine sediment.
04:25	145.24134	14.95878	306	3	316	Below highest part of the rim on the west side - we are on east side of the western rim.
04:25	145.24131	14.95880	304	3	315	Lots of fine sediment in water from ROV.
04:25	145.24127	14.95883	304	2	313	Out in clear water.
04:26	145.24125	14.95885	303	3	312	Up at 2.4m off bottom out of cloud.
04:26	145.24116	14.95885	304	3	308	Looks maybe hydrothermal but could be collapsed mounds on bottom.
04:27	145.24109	14.95883	304	3	306	Mounds don't grow too high because the material is so fragile.
04:27	145.24104	14.95887	302	2	303	Was a crinoid off to the side on some harder substrate.
04:28	145.24109	14.95891	295	4	304	Would like a temperature reading here.
04:29	145.24130	14.95885	303	4	314	Preparing for temperature sample even though there is no visibility.
04:30	145.24131	14.95884	306	3	314	Ambient water is 17.3deg.
04:31	145.24128	14.95883	303	4	313	Retrieving probe from basket.
04:39	145.24121	14.95873	305	1	312	TEMPERATURE Background is 17.3deg. Waiting for visibility to clear.
04:42	145.24121	14.95873	305	1	312	TEMPERATURE Taking temp.....18.6.....19.4...20.9....21.1
04:42	145.24121	14.95873	304	1	312	TEMPERATURE Pushing in further.
04:43	145.24121	14.95873	304	1	312	TEMPERATURE Now 21.71....22.1...22.4...22.6
04:44	145.24121	14.95873	304	1	312	TEMPERATURE 14 deg 57.524N 145deg 14.473E
04:44	145.24121	14.95873	304	1	312	TEMPERATURE 22.8C with probe about 30cm down.
04:44	145.24121	14.95873	305	1	312	Storing wand.
04:46	145.24121	14.95873	305	2	312	Wand stored. Basket retracting.
04:49	145.24121	14.95873	305	1	312	Will continue up slope. No suction sample wanted here.
04:50	145.24121	14.95873	305	1	312	Heading 299deg upslope at .2knts.
04:50	145.24121	14.95873	303	2	312	Target is 136meters at the top.
04:50	145.24121	14.95873	303	2	312	Seeing mounds in the sonar.
04:51	145.24112	14.95878	304	3	308	Starting to clear our sediment cloud.
04:52	145.24111	14.95878	304	2	307	Some structure seen on sonar.
04:52	145.24107	14.95880	304	3	306	Mound in front of us. at 302m with 3m alt.
04:53	145.24106	14.95881	304	3	305	Pilot cam has the best view right now.
04:53	145.24105	14.95882	304	3	304	That is best view.
04:53	145.24104	14.95883	304	4	303	Still can't see much of anything.
04:53	145.24101	14.95885	304	2	301	Pilot cam is more light sensitive but less resolution.
04:54	145.24099	14.95887	304	2	300	Bottom - moved into redder zone. Depth 298m
04:54	145.24099	14.95888	304	3	300	Looking for biggest mounds.
04:54	145.24098	14.95889	304	2	300	Looks like all diffuse heat.
04:55	145.24096	14.95892	304	2	298	Mounds before were at 285m.
04:56	145.24093	14.95895	304	2	297	Crust was at 275m - before.
04:56	145.24092	14.95897	304	3	296	Bottom looks fairly smooth - not a lot of relief.
04:58	145.24086	14.95902	304	3	292	Some small rocks in pilot cam.
04:58	145.24085	14.95903	304	3	291	Could be outcrop - this is where you'd get it if there is going to be any.
04:59	145.24084	14.95903	304	3	291	Visibility getting better.
04:59	145.24080	14.95907	304	2	287	More mounds at 285m depth.
05:01	145.24076	14.95911	304	3	285	Want to stop here and do another temp. probe.
05:01	145.24076	14.95912	304	3	284	Stopping.
05:03	145.24063	14.95912	303	3	278	Retrieving wand.
05:03	145.24063	14.95912	303	3	278	Water is at 17.3deg ambient.
05:05	145.24071	14.95903	303	2	277	*Doppler reset.*
05:05	145.24071	14.95903	304	2	277	Good pos: 14deg 57.542N 145deg 14.442E
05:05	145.24071	14.95903	304	2	277	Linear feature in front of basket-orange line.
05:07	145.24071	14.95903	304	2	278	TEMPERATURE Probe in sediment. Temp. 17.5....not main zone we saw earlier.
05:07	145.24071	14.95903	304	2	277	At 330m we got higher temp than this at 275m.
05:10	145.24071	14.95903	304	2	278	Stowing wand and dropping a weight.
05:12	145.24071	14.95902	304	2	278	Ready to go up to the top of the ridge.
05:13	145.24071	14.95902	303	3	278	Head 299deg up slope.
05:17	145.24051	14.95916	303	4	264	Driving.
05:18	145.24046	14.95914	304	3	261	Visibility has improved a bit.
05:18	145.24045	14.95915	304	4	260	Looks like getting into crust area again.
05:20	145.24037	14.95912	303	4	256	Hole to the right on the sonar.
05:21	145.24035	14.95919	303	4	254	Dip in the sonar.
05:22	145.24034	14.95920	280	5	253	Anemone and outcrop.
05:22	145.24034	14.95920	280	6	253	Ledge has bluish color or gray.
05:22	145.24034	14.95920	281	5	253	Is this outcrop or crust.

time	raw long	raw lat	hdg	alt	Z	J2-190 Esmeralda - Dive Log Comments
05:22	145.24034	14.95920	280	5	253	Going to gently probe with temp wand.
05:23	145.24034	14.95920	281	4	253	Looks like something has collapsed here.
05:23	145.24034	14.95920	281	4	253	Going to use the manipulator instead to probe.
05:23	145.24034	14.95920	281	4	253	Ship is backing up.
05:23	145.24033	14.95920	281	4	253	Crack could be something old.
05:24	145.24032	14.95920	280	4	252	Looks like piece collapsed.
05:25	145.24032	14.95920	281	4	252	Not going to hurt the crinoid.
05:26	145.24032	14.95920	282	4	252	Manipulator is finding surface to be fairly solid.
05:26	145.24032	14.95920	281	4	252	When tried to grab the crust it crumbled.
05:26	145.24032	14.95920	280	4	252	Old mound or outcrop sticking out of slope. Crust looks partially collapsed. Heavily oxidized.
05:27	145.24032	14.95920	280	4	252	Too close to wall to get temp probe without repositioning.
05:28	145.24040	14.95928	280	4	252	*Doppler reset*
05:28	145.24040	14.95928	280	4	252	Good pos: 14deg 57.557N 145deg 14.424E
05:29	145.24040	14.95928	280	4	252	Seeing gray oxidation and alteration. Looks like clay.
05:29	145.24040	14.95928	280	4	252	Highly altered. Would like a piece but don't need a temperature.
05:30	145.24040	14.95928	280	4	252	Used to be rocks that have been highly hydrothermally altered.
05:30	145.24042	14.95928	280	4	253	Seeing psuedomorphs of pillows...highly altered.
05:31	145.24042	14.95926	303	4	253	Round forms that could have once been pillow lavas.
05:31	145.24040	14.95926	311	4	252	Looking for a good sample.
05:31	145.24040	14.95925	322	4	251	Think whole slope has been altered and mostly gone now.
05:32	145.24039	14.95926	322	3	251	Positioning for sampling. Looking for altered rock sample.
05:36	145.24039	14.95927	321	3	251	**SAMPLE-4 Rock. 15x5cm orange-ish rock from altered area. Trying to get second sample at the same place - want darker piece but it crumbled. [145.240383E/14.959237N] PI geogroup**
05:36	145.24039	14.95927	320	3	251	In milk crate on top of canvas bag.
05:37	145.24039	14.95927	312	4	251	Second piece not going to happen. Crumbled when tried to grab.
05:37	145.24041	14.95926	308	5	253	Need to move back under Medea.. getting pulled.
05:38	145.24054	14.95935	26	3	256	Lots of little fish..big fish went by as well. Pulled away from surface.
05:38	145.24058	14.95943	17	1	256	Bottom fairly smooth.
05:39	145.24064	14.95954	24	3	256	Heading NW to get to top of the hill in a moment.
05:40	145.24062	14.95957	25	3	254	Shark.
05:40	145.24061	14.95956	336	4	255	Target is 270deg 95m.
05:41	145.24044	14.95941	272	5	252	Fish again.
05:41	145.24043	14.95941	273	5	251	Not a shark.
05:44	145.24034	14.95940	273	4	245	We are on a cobble-sized talus slope. The first time we've seen talus on this dive. Not hydrothermally active.
05:47	145.24019	14.95935	267	1	234	Approaching an outcrop. Lots of crinoids and a small school of fish.
05:48	145.24015	14.95935	280	3	234	Still climbing the slope. Now at 231m.
05:50	145.23999	14.95939	289	4	225	Slope has become a mixture of gravel and sand. No signs of hydrothermalism.
05:51	145.24005	14.95937	286	10	228	Nearing the top of the slope.
05:55	145.23981	14.95937	273	5	221	Back on bottom at 217m. Mostly gravel and cobbles.
05:58	145.23972	14.95946	288	4	213	Just about at the top of the rim. Lots of crinoids. Must be a high flow area.
06:00	145.23962	14.95964	291	2	203	We're at the top of the western rim of the caldera at 205m.
06:02	145.23963	14.95972	16	2	202	Preparing to tow Jason across the caldera to explore the eastern side.
06:04	145.23962	14.95974	274	2	201	Departing for the eastern part of the caldera
06:06	145.23937	14.95970	274	35	210	Transit across the caldera will take about 45-60 minutes. We will be high enough in the water that we won't be able to see bottom.
07:12	145.24050	14.95937	294	107	333	Driving down to bottom and then will drive up to target.
07:13	145.24050	14.95937	292	102	333	Turning on video tapes not DVCam
07:13	145.24050	14.95937	294	95	333	Less than 100m off bottom.
07:14	145.24050	14.95937	289	59	334	At 60m.
07:14	145.24050	14.95937	289	50	335	Will stop at 50m and get under Medea.
07:14	145.24053	14.95936	272	42	336	Cloudy visibility
07:15	145.24061	14.95936	179	36	335	Depth is 300m altitude is 35m.
07:16	145.24078	14.95930	116	24	333	Under Medea want to drive 110m.
07:20	145.24097	14.95926	265	5	328	About to touch down at about 325m on the east side of the caldera.
07:20	145.24924	14.95761	265	5	328	Very poor visibility upon touchdown.
07:23	145.24925	14.95762	265	191	519	Preparing to take a temperature reading to compare with the west side of the caldera.
07:27	145.24954	14.95766	264	192	519	TEMPERATURE 17.3C which is the same as the overlying water.
07:31	145.24921	14.95767	101	1	330	Starting to head upslope from 325m on the east wall of the caldera.
07:33	145.24925	14.95763	98	2	329	Visibility is still very poor. We can hardly see the bottom.
07:37	145.24942	14.95760	86	2	325	Bottom covered by orange colored sediment like on the west side of the caldera (where we started the dive).
07:39	145.24963	14.95762	86	2	319	Evidence of sediment winnowing parallel to the slope.
07:43	145.24991	14.95764	84	2	310	Still climbing the slope. Now at 308m.
07:47	145.25023	14.95768	83	2	299	Several sea urchins visible on the sediment.
07:49	145.25032	14.95769	83	2	296	Looks like some sort of burrow in the sediment.
07:51	145.25040	14.95770	84	2	294	Visibility is starting to improve slightly.

time	raw long	raw lat	hdg	alt	Z	J2-190 Esmeralda - Dive Log Comments
07:52	145.25049	14.95769	84	4	290	Preparing to take another temperature reading of the sediments.
07:57	145.25062	14.95766	81	1	285	TEMPERATURE sediment temperature is the same as the overlying water - 17.4C.
08:00	145.25064	14.95766	83	2	284	Continuing our climb up the east wall of the caldera. No temperature anomalies detectable on this side.
08:03	145.25077	14.95767	86	3	280	Visibility deteriorating again.
08:12	145.25131	14.95771	86	2	261	We're at 260m. Starting to see crinoids again.
08:17	145.25145	14.95765	83	2	257	Nearly at the top of the caldera wall. Lots of very small (juvenile?) fish plus some anemones.
08:20	145.25154	14.95781	81	2	253	We're at the top of the caldera wall at 251m. About to collect a rock.
08:22	145.25154	14.95781	86	1	253	Visibility is quite a bit better here.
08:27	145.25153	14.95782	87	1	253	**SAMPLE-5 Rock. Quite a small sample from the top of the caldera wall. [SE caldera wall 145.240383E/14.959237N] PI geogroup**
08:28	145.25153	14.95782	82	2	253	Preparing to head NW to the base of the north wall of the caldera (in the water column) . Will take about 45 minutes to get there.
09:23	145.24906	14.96498	10	2	300	**Back on the bottom again.** This time we're at 297m on the N/NE side of the caldera.
09:23	145.24906	14.96498	163	2	299	Visibility is pretty poor.
09:26	145.24908	14.96490	339	3	302	We're now starting to head northward up the caldera wall.
09:32	145.24892	14.96499	339	2	301	Several long silver fish that "stand" vertically in the water.
09:35	145.24887	14.96515	337	2	296	Don't know what species the fish are but they look like long serrated bread knives!
09:38	145.24886	14.96521	339	2	294	Lots of small (juvenile?) fish here too.
09:40	145.24875	14.96536	339	2	289	See the Sci-Cam (3-chip) camera for some neat video of these fish. Look to be about 20-30cm long.
09:42	145.24869	14.96553	339	2	283	Still climbing the slope of the caldera wall. Now at 282m. Bottom still mostly orange sediments.
09:49	145.24846	14.96609	338	2	264	Lots of urchins
09:50	145.24846	14.96608	338	2	264	Correction. These are all anemones not urchins.
09:54	145.24838	14.96630	338	2	257	Crinoids.
09:56	145.24832	14.96644	338	2	252	Density of anemones is increasing.
10:03	145.24821	14.96670	338	2	243	We are seeing some little mounds of disturbed sediment.
10:15	145.24793	14.96739	339	3	221	Soft coral.
10:16	145.24792	14.96743	339	2	220	More soft corals. Alcyonaceans.
10:22	145.24780	14.96766	338	2	214	There is likely a solid base under the sediment for the soft corals to attach to.
10:30	145.24752	14.96810	336	2	204	More soft corals.
10:37	145.24734	14.96850	336	2	194	Snail
10:48	145.24716	14.96888	10	2	189	We think we may some shimmering here.
10:49	145.24716	14.96889	25	2	188	Going to measure the temperature above the sediment.
10:49	145.24716	14.96889	24	2	188	Ambient temperature is 20.2.
10:50	145.24716	14.96889	24	2	188	Eh is 145.
10:51	145.24716	14.96889	24	2	188	There is a huge school of juvenile fish congregating around us.
10:53	145.24715	14.96889	25	2	188	Temperature is creeping up as we sit here.
10:56	145.24715	14.96889	26	2	188	TEMPERATURE 22.1 degrees with the probe jammed down in the sediment.
10:58	145.24715	14.96891	19	2	188	Water seems a bit murky here.
11:01	145.24723	14.96895	24	2	184	We have moved further upslope and will check the temperature again.
11:02	145.24722	14.96895	25	2	184	TEMPERATURE 22.3 degrees in the sediment.
11:03	145.24722	14.96896	5	2	185	Ambient is up to 21.9 degrees.
11:06	145.24721	14.96895	327	1	185	Dropped the temperature probe. Going back to pick it up.
11:08	145.24721	14.96895	332	1	185	Sea wasp.
11:11	145.24714	14.96896	338	2	187	It's a swam of juvenile fish.
11:15	145.24709	14.96919	338	2	182	Continuing upslope.
11:18	145.24705	14.96942	336	3	176	There are a few small white patches on the sediment.
11:20	145.24700	14.96951	334	3	175	More light material here. Keep moving.
11:22	145.24692	14.96967	332	3	174	Water is murkier here.
11:55	145.24618	14.97139	344	2	161	Coming to the saddle. Smoke in the water.
11:58	145.24613	14.97154	343	2	157	Stingray.
12:08	145.24603	14.97204	343	3	146	*Resetting the Doppler.*
12:09	145.24606	14.97204	54	3	145	Turning northeast to heading 068.
12:10	145.24605	14.97210	67	3	144	Huge school of tiny fish swimming around the vehicle.
12:31	145.24737	14.97252	69	2	143	Eh has dropped from 150 to 130.
12:32	145.24737	14.97252	69	2	143	Eh is still dropping.
12:37	145.24760	14.97262	68	2	139	There is a crack ahead that we want to have a look at.
12:37	145.24762	14.97263	69	2	139	It is nothing interesting. Keep moving.
12:39	145.24776	14.97268	68	2	137	Eh is 87.
12:44	145.24785	14.97275	69	1	135	Setting down at another white stained area to take temperature.
12:44	145.24785	14.97275	69	1	135	TEMPERATURE Ambient is 25.4
12:45	145.24785	14.97275	69	1	135	TEMPERATURE No temperature anomaly.
12:51	145.24807	14.97284	80	2	133	Some new strange blue schooling fish?
13:03	145.24844	14.97286	90	1	128	Turning back around to go to deeper waters and prepare to end the dive.
13:07	145.24859	14.97283	76	1	129	Eh is down to 42.
13:10	145.24879	14.97285	99	2	135	There is something on the bottom but we can't see through all these fish.

time	raw long	raw lat	hdg	alt	Z	J2-190 Esmeralda - Dive Log Comments
13:11	145.24882	14.97284	140	1	135	Looks like another iron mound.
13:12	145.24882	14.97284	142	1	136	Checking the temperature.
13:12	145.24882	14.97284	142	1	136	TEMPERATURE Ambient is 25.2
13:16	145.24887	14.97283	142	1	136	Temperature down in the iron sediments was 28.4.
13:18	145.24887	14.97283	142	1	135	Eh is 66.
13:21	145.24895	14.97277	29	1	132	We want to see how extensive this area is.
13:27	145.24919	14.97303	63	2	132	We are discussing how and when to recover.
13:29	145.24916	14.97300	254	2	131	We are driving back to deeper depths to recover Jason.
13:32	145.24890	14.97298	257	2	136	**Bill says call it end of dive J2-190.**
14:04	145.24692	14.97250	6	138	141	Jason at the surface.
14:13	145.24687	14.97246	288	139	140	**Jason on deck.**
14:14	145.24687	14.97246	288	139	140	End of dive J2-190

5.4.8 J2-191 NW Rota-1 Dive Log

time	raw long	raw lat	hdg	alt	Z	J2-191 NW Rota-1 - Dive Log Comments
J2-191 NW Rota-1 Dive Summary: Ash was raining down when Jason landed on bottom south of Brimstone. Fired 2 Niskins and moved toward Brimstone. More rock and floc fallout and a smoky plume. Opened the basket and tried to sample ash south of Brimstone (failed). Had the hydrophone on Jason while observed eruptive activity including bubble curtains, lava bombs, yellow smoke and white rocks. Major eruptive activity during HFS sampling so went to ridge at the summit and deployed the hydrophone. Continued on just W of Iceberg where attempted to suction sample mat. Grabbed some shrimp in a canvas bag east of Gastros. Had to abort the dive because the biobox was dangling below the sub - plus the winch cable was too hot. Last sample was pit ejecta captured by Jason bottom mesh. 7 samples total.						
J2-191 Bottom time: 4/27/2006 0133 - 0616 UTC (4.72 hrs). **Z column represents seafloor depth in meters.**						
00:56	144.78291	14.61588	273	0	1	Jason off the deck for Dive J2-191 at NW Rota-1.
00:57	144.78291	14.61588	275	0	1	**Jason-2 in the water.**
00:58	144.78291	14.61588	275	0	2	Vehicle configuration: Suction sampler. The Beast. Gastights. Majors. Scoops.
00:59	144.78292	14.61587	275	0	3	Medea in the water.
01:00	144.78292	14.61587	274	0	3	Jason is diving
01:25	144.78311	14.61599	46	48	591	Heavy floc in the water.
01:27	144.78309	14.61599	47	48	591	50 meters off the bottom and we are still in heavy floc.
01:29	144.78308	14.61600	48	51	594	**SAMPLE-1 Niskin (green) in the floc plume. 9.3 meters above the bottom. [50 m south of Brimstone 144.775365E/14.600495N] PI Bolton**
01:32	144.78313	14.61600	48	9	591	SAMPLE-1 50m south of Brimstone.
01:32	144.78312	14.61599	49	6	591	Ash plume in the water 5m above the bottom.
01:33	144.78313	14.61599	356	5	592	**We are on the bottom.**
01:33	144.78312	14.61599	10	4	592	Ash is raining down below the pit.
01:34	144.77544	14.60051	10	4	592	*Resetting the doppler.*
01:36	144.77545	14.60053	10	3	591	**SAMPLE-2 Niskin (red) in ash plume with some floc too. Altitude ~4m. [40m downslope of the pit 144.775416E/14.60051N] PI Bolton**
01:38	144.77545	14.60053	5	4	590	Ash and bigger rock falling as we head uplope towards the pit.
01:40	144.77546	14.60065	356	5	582	Floc fallout is getting very thick.
01:40	144.77546	14.60067	355	5	581	Entering the smoky plume.
01:40	144.77546	14.60069	355	4	580	More rock in the plume too.
01:43	144.77543	14.60077	353	4	575	Visibility is minimal. We may be unable to get to the pit.
01:44	144.77543	14.60078	352	3	574	Ash has diminished. Now it is just a smoke plume.
01:45	144.77542	14.60080	352	4	572	Lots of rock in the water again.
01:46	144.77542	14.60081	355	3	572	Tons of rock and ash falling.
01:50	144.77542	14.60083	354	3	572	We are going to open the starboard biobox to catch ash
01:50	144.77543	14.60083	353	4	573	We are now opening the box
01:51	144.77542	14.60083	353	4	573	The box is now open
01:53	144.77543	14.60083	353	4	573	Have the rain of ash on the video. Biobox is open to do some passive sampling.
01:54	144.77543	14.60083	353	4	573	Planning on 15 minutes of passive sampling.
01:55	144.77543	14.60083	353	4	573	Not sure how clean the biobox was prior the dive.
01:56	144.77542	14.60083	353	4	573	**SAMPLE-3** Rock. Falling ash into Biobox. Sample for about 15min.
01:57	144.77542	14.60083	353	4	573	**SAMPLE-3 Ash (sample failed). Biobox is open trying to capture large pieces of ash raining down. Falling ash into Biobox. Sample for about 15min. [S of Brimstone 144.775417E/14.600833N] PI geogroup**
01:58	144.77542	14.60083	353	4	573	Biobox is open trying to capture large pieces of ash raining down.
02:00	144.77542	14.60083	353	4	573	About 7-8 minutes of sampling now.
02:02	144.77542	14.60083	353	4	573	Visibility has improved substantially.
02:02	144.77542	14.60083	353	4	573	SAMPLE-3 End of passive rock sample.
02:03	144.77542	14.60083	353	4	573	Closing biobox.
02:04	144.77542	14.60083	353	4	573	Everything in the basket is covered in ash.
02:05	144.77542	14.60083	353	4	573	Going up the slope now to Brimstone.
02:05	144.77542	14.60085	353	6	571	Ash still raining down and seems to be increasing.
02:06	144.77542	14.60077	351	6	571	Gray area does look like a lava flow.
02:06	144.77542	14.60079	354	7	569	Ash is definitely increasing.
02:07	144.77543	14.60084	354	8	566	Plume straight ahead.
02:07	144.77542	14.60084	356	8	566	*Doppler reset to LBL.*
02:07	144.77543	14.60084	358	8	566	Plume has diminished from the beginning of dive.
02:07	144.77542	14.60084	352	10	568	Look at the cinder cone.
02:08	144.77543	14.60085	349	9	567	Visibility obscured by all the ash particles in water.
02:08	144.77545	14.60085	354	8	566	Cone is tossing out big rocks.
02:08	144.77545	14.60085	354	8	566	Lava flows right in front of us.
02:08	144.77545	14.60086	354	8	565	The channels are between lobes.
02:08	144.77545	14.60086	354	7	565	Solid rock in front of us.
02:08	144.77545	14.60088	353	6	564	Ash is covering the flows...ash is raining down.
02:08	144.77545	14.60088	353	6	563	WOW.
02:09	144.77544	14.60089	352	6	563	Flow looks younger than one underneath with rocks embedded in it or fragmented.

time	raw long	raw lat	hdg	alt	Z	J2-191 NW Rota-1 - Dive Log Comments
02:09	144.77544	14.60090	353	7	562	Rocks came out of sky look like bread crust bombs. They are big.
02:10	144.77544	14.60090	353	7	561	Holy cow. Look at the sulfur wall and how big the cone is.
02:10	144.77545	14.60091	353	7	561	Bottom used to be 560 and now is 554m.
02:10	144.77546	14.60092	354	7	560	Cone may be 5m taller using sub depth.
02:11	144.77548	14.60093	353	7	559	Bubble curtain and lots of plume coming out. Poor visibility.
02:12	144.77547	14.60093	353	6	559	Hydrophone on Jason.
02:12	144.77547	14.60093	353	6	559	Dramatically changed landscape.
02:13	144.77548	14.60093	352	5	559	Coming closer to plume. White rock - what is it?
02:13	144.77548	14.60094	351	4	558	Bubble curtain between white rock and plume.
02:14	144.77549	14.60094	352	5	558	Lasers on.
02:14	144.77550	14.60091	337	7	561	Moving to right around white rock. Big burst right in front of us with rocks moving...we are backing up.
02:14	144.77551	14.60089	350	8	562	WOW.
02:15	144.77551	14.60089	345	9	563	Just saw a big burst.
02:15	144.77550	14.60089	346	8	563	Check hydrophone for that time of burst.
02:16	144.77551	14.60092	334	5	560	Burst from eastern flank of cone.
02:16	144.77551	14.60092	327	5	560	Looking at ash sediment...everything just got covered in it.
02:17	144.77551	14.60092	320	5	560	Activity died down again.
02:17	144.77551	14.60091	319	6	561	Another burst coming down the channel.
02:17	144.77552	14.60091	319	6	561	WOW.
02:17	144.77554	14.60089	298	8	562	Backing up.
02:19	144.77545	14.60091	23	6	561	Waiting for visibility. Clearing a bit.
02:19	144.77541	14.60091	33	7	561	Need to back Medea up.
02:19	144.77541	14.60092	33	9	561	Sulfur wall is getting buried.
02:20	144.77538	14.60094	33	10	561	Looking at sulfur wall.
02:20	144.77536	14.60096	54	9	561	Looking for any place to set hydrophone down that won't get buried or lost.
02:22	144.77537	14.60093	53	10	562	Looks like plume is blowing to the west.
02:22	144.77536	14.60094	56	10	562	Good nav.
02:22	144.77533	14.60095	57	10	561	Moved Medea 10m south.
02:23	144.77535	14.60092	46	12	563	Hovering above plume.
02:23	144.77535	14.60092	53	12	564	Jason is lateralling side to side.
02:24	144.77535	14.60092	53	11	563	Want to go to east side of plume for a view.
02:25	144.77539	14.60088	47	12	565	Moving east to get clear view for laser measurements.
02:25	144.77544	14.60085	24	14	566	Also looking for good place for hydrophone placement and observations.
02:25	144.77546	14.60088	20	11	563	Moving to east as plume is to the west.
02:25	144.77546	14.60089	19	10	563	Rocks falling out of plume.
02:26	144.77549	14.60091	349	8	561	Lots of rocks in plume.
02:26	144.77550	14.60091	334	8	561	Exploding again.
02:26	144.77553	14.60093	318	7	559	Plume is coming toward us. Big rocks in plume.
02:26	144.77553	14.60094	325	6	559	WOW.
02:27	144.77553	14.60096	317	5	558	Moving Medea another 10m est.
02:27	144.77555	14.60097	301	5	557	Plume starting to get yellow tinge.
02:28	144.77555	14.60096	318	6	557	At wall on right.
02:28	144.77552	14.60093	311	8	559	Looking 312deg and backed into a wall moving east.
02:29	144.77549	14.60091	345	9	560	We are on upslope side so want to move away from the wall to south.
02:29	144.77545	14.60090	350	10	561	Looking straight at it...sulfur wall on lower left.
02:30	144.77542	14.60090	358	11	561	Heading 359 looking down at cone with sulfur wall and cone.
02:31	144.77539	14.60091	8	12	562	Looking north.
02:32	144.77538	14.60093	83	9	560	Looking east.
02:32	144.77538	14.60094	44	10	561	Want to move east but continue to face north with vent in front of us.
02:32	144.77538	14.60091	54	11	562	This is the west end of the vent at the sulfur wall.
02:32	144.77537	14.60092	53	12	562	At this view can clearly see the 2 sources.
02:33	144.77532	14.60096	52	10	561	Too far back and visibility is poor.
02:34	144.77532	14.60096	52	10	561	Want to look east of it to look for a hydrophone place.
02:35	144.77535	14.60092	54	12	563	Moving east but looking at plume to find a good spot.
02:36	144.77545	14.60088	31	12	562	Medea cam is showing the sulfur wall and Jason lateralling around to the east....great shot.
02:37	144.77549	14.60089	357	13	563	We are on east side. Looks like plume is coming out of different hole. Multiple holes.
02:37	144.77549	14.60086	358	14	564	Hole near sulfur wall ..not much plume.
02:38	144.77551	14.60089	346	12	562	Approaching the vent.
02:38	144.77553	14.60090	350	11	561	View of wall in middle of plume.
02:38	144.77554	14.60090	352	11	561	Vent on either side of wall.
02:38	144.77556	14.60093	319	9	559	Lots of bubbles coming out on the front.
02:39	144.77557	14.60094	319	8	558	Another cone right here.
02:39	144.77557	14.60095	319	8	558	Looking for a hydrophone place.
02:42	144.77557	14.60095	319	8	558	Looks very steep here.

time	raw long	raw lat	hdg	alt	Z	J2-191 NW Rota-1 - Dive Log Comments
02:43	144.77557	14.60095	319	8	558	Would like to water sample here first to try out the sampler.
02:44	144.77557	14.60095	319	8	558	Preparing the fluid sampler and temp probe.
02:47	144.77557	14.60095	319	8	558	Retrieving wand out of basket.
02:54	144.77556	14.60095	318	8	558	Got the wand.
02:55	144.77552	14.60093	319	9	559	Looking for sample area near vent...going southwest.
02:55	144.77552	14.60093	316	9	559	Just moved off the wall.
02:57	144.77551	14.60095	318	4	557	Want to sample on leading edge of bubbles in front then some of the yellow on the left with the vigorous boiling wall.
02:57	144.77550	14.60096	319	2	557	Look at all the bubbles.
02:57	144.77550	14.60096	319	2	557	Vehicle in front of the bubble curtain.
02:59	144.77549	14.60096	319	1	556	We are in the middle of the 3 venting areas. Bubble curtain under basket.
02:59	144.77550	14.60096	319	4	557	Rocks in plume to left of basket.
02:59	144.77550	14.60095	319	3	557	Moving off of bubbles.
03:00	144.77551	14.60095	319	3	557	Seeing plume expand toward the vehicle on the surface in front of us coming up through the rocks.
03:01	144.77551	14.60096	320	2	556	Lava is coming out in front of us. Rocks are moving in the expanding white plume.
03:01	144.77551	14.60096	320	2	556	Plume is obscuring view. Rocks are pushing up.
03:02	144.77551	14.60096	313	2	556	Intense yellow is in the back of this lava front.
03:02	144.77552	14.60095	320	3	557	Here comes a plume on the left.
03:03	144.77551	14.60095	322	2	557	Big rocks moving out of plume.
03:03	144.77550	14.60095	321	2	557	Big rocks coming out of smoke...on 3 chip.
03:03	144.77550	14.60095	321	2	557	Positioning wand.
03:04	144.77550	14.60095	319	2	557	**SAMPLE-4 HFS. Filtered piston #1. Tmax=41.9C Tavg=37.6 Vol=80ml no good T2. Sample in leading edge with moving rocks and bubbles just to the left. Increase in bubbles at sample area. [Brimstone'06 144.77551E/14.600948N] PI Butterfield**
03:05	144.77550	14.60095	318	2	557	Moving wand again into white smoke.
03:05	144.77550	14.60095	318	2	557	SAMPLE-4 HFS. Increase in bubbles at sample area.
03:05	144.77550	14.60095	318	2	557	Wand in smoke.
03:06	144.77550	14.60095	318	2	557	SAMPLE-4 Stopping pump for a minute. Looks like it is getting more active. Pulled wand out and watching.
03:06	144.77550	14.60095	319	3	557	Rocks in background extruded from plume.
03:06	144.77549	14.60095	319	2	556	More plume coming from where we first had wand.
03:07	144.77549	14.60095	319	2	556	SAMPLE-4. Putting it in smoke.
03:07	144.77550	14.60095	319	2	556	Everything is moving right now...next to flow. WOW.
03:08	144.77553	14.60094	322	7	559	SAMPLE-4 HFS Having to back off. Pump was back on for a bit...80ml.
03:09	144.77553	14.60094	321	7	559	Look at rocks in plume.
03:09	144.77553	14.60094	321	7	559	Waiting for it to settle.
03:10	144.77553	14.60094	321	5	559	SAMPLE-4 HFS Still waiting to complete sample.
03:11	144.77553	14.60094	321	6	559	SAMPLE-4 HFS Lots of bubbles.
03:11	144.77553	14.60094	321	6	559	Intense rocks coming out of plume.
03:11	144.77553	14.60094	321	6	559	White rock is moving and shaking in view...brow cam.
03:12	144.77553	14.60094	321	6	559	Bubbles coming out end of wand -.not bubbles but something coming out of wand.
03:13	144.77553	14.60094	321	6	559	White rock is moving and sediment is tumbling.
03:13	144.77553	14.60094	321	6	559	Look at white rock move...COOL.
03:13	144.77553	14.60094	321	6	559	Flow is right next to rock.
03:14	144.77553	14.60094	321	6	559	Rock is moving.
03:14	144.77553	14.60094	321	6	560	Look at hydrophone during this tremor.
03:15	144.77558	14.60097	321	3	558	SAMPLE-4 HFS Will try to add to this sample.
03:15	144.77558	14.60097	321	3	558	Looking at flow front on chip.
03:16	144.77558	14.60098	316	3	558	SAMPLE-4 HFS Going back closer to try to sample more into sample 4.
03:17	144.77557	14.60100	349	2	556	SAMPLE-4 HFS Big plume ...backing off.
03:17	144.77558	14.60099	1	4	557	Major explosion.
03:17	144.77558	14.60098	357	5	558	Plume covering basket.
03:18	144.77559	14.60096	342	10	560	Backing off...see big plume on Medea cam.
03:19	144.77562	14.60089	341	21	565	Stowing wand and going to go deploy hydrophone up on top while waiting for visibility to clear.
03:20	144.77562	14.60089	341	21	566	SAMPLE-4 HFS Closing off this sample to go deploy hydrophone.
03:21	144.77562	14.60089	342	21	565	Stowed wand.
03:21	144.77562	14.60089	341	20	565	Plume view in Medea is very large.
03:22	144.77562	14.60089	341	20	565	Changing video cams.
03:26	144.77567	14.60103	10	5	550	Moving toward ridge to deploy hydrophone through this big plume. Driving with the sonar.
03:27	144.77567	14.60104	11	6	549	Rock outcrop.
03:29	144.77570	14.60110	11	11	540	Lots of ash.
03:29	144.77570	14.60111	11	11	539	517 is the summit...we are at 527
03:29	144.77571	14.60114	12	5	529	Moving up...some visibility.
03:30	144.77570	14.60115	10	16	534	Looking down a bit on ridge.

time	raw long	raw lat	hdg	alt	Z	J2-191 NW Rota-1 - Dive Log Comments
03:31	144.77570	14.60115	12	17	534	There's the marker ahead.
03:31	144.77572	14.60119	27	1	519	Slope is shimmering with water.
03:31	144.77573	14.60120	78	4	521	Clearer up here.
03:32	144.77573	14.60120	82	4	521	Dark ash on top here.
03:32	144.77573	14.60120	82	4	521	Move marker...deploy hydrophone...take temp.
03:32	144.77575	14.60120	82	3	520	Marker had slid off top since it was deployed...noticed it was moved when we picked up the hydrophone the first time.
03:32	144.77575	14.60120	82	3	520	We are at 517m.
03:33	144.77575	14.60120	82	3	520	Grabbing marker base.
03:34	144.77575	14.60121	82	3	520	Got it...moving it back on to the top.
03:35	144.77574	14.60121	107	2	520	Looking around for a flat spot for hydrophone.
03:36	144.77574	14.60122	106	3	520	Getting hydrophone out of basket.
03:37	144.77574	14.60122	106	3	521	Making a flat spot to drop it and it is deployed.
03:38	144.77574	14.60122	106	3	521	Going to move hydrophone off sediment and looking for solid rock.
03:38	144.77575	14.60122	106	2	520	Picked up hydrophone from sediment.
03:41	144.77578	14.60122	201	1	518	Trying to put hydrophone on top of spine....looks great on top.
03:41	144.77578	14.60122	201	1	518	14deg 36.072N 144deg 46.541E
03:42	144.77578	14.60122	201	1	518	Position of the hydrophone.
03:42	144.77570	14.60119	201	1	518	*Doppler reset.*
03:42	144.77570	14.60119	201	1	518	*Reset to LBL.*
03:42	144.77569	14.60120	207	4	521	Backing off to get find temp. site.
03:42	144.77568	14.60120	178	3	520	Very clear up here.
03:43	144.77566	14.60119	152	3	520	Retrieving temperature probe.
03:44	144.77566	14.60119	151	3	520	Very little current right now.
03:45	144.77565	14.60118	139	3	520	Looking for shimmering water.
03:48	144.77564	14.60117	120	3	521	TEMPERATURE degrees C Ambient water is 8.3....Unstable slope...
03:51	144.77564	14.60116	121	3	521	TEMPERATURE Ambient temp dropping to 7.9...24.7...28.000...30.6...33.6.....37.1....40.1...42...4.4...
03:52	144.77564	14.60116	121	3	521	TEMPERATURE Still climbing. ...45.6...47.0....48.9....49.5....50.0
03:52	144.77564	14.60116	120	3	521	TEMPERATURE Probe is only a inch in sed on rock where shimmering water was sighted...50.8...
03:53	144.77564	14.60116	121	4	521	TEMPERATURE 51.4...max but was still climbing...
03:54	144.77564	14.60116	121	3	521	Need to cool cable down...shutdown hydraulics...need to cool the cable down.. dangerous level.
03:54	144.77564	14.60116	121	4	521	35m above the vent waiting to cool down...very sunny outside and wire is hot.
03:56	144.77564	14.60116	121	4	522	Would like to traverse to Iceberg. 302deg 90+meters away.
03:59	144.77564	14.60116	121	4	522	Rigging tarps outside and hosing down the wire.
03:59	144.77564	14.60117	44	3	521	302deg and 95m to Iceberg...moving at .2knts.
04:00	144.77564	14.60116	169	2	520	Would like to go on bottom.
04:02	144.77566	14.60112	125	1	520	Moving along to Iceberg.
04:03	144.77568	14.60105	126	5	527	Plume is obscuring bottom.
04:05	144.77568	14.60104	125	5	527	In plume with eH dropping to -130.
04:06	144.77568	14.60101	126	9	532	Working way down to bottom and moving toward Iceberg.
04:08	144.77576	14.60096	125	1	533	Seeing bottom at 1.7m alt.
04:08	144.77577	14.60095	125	1	533	Moving down ridge ESE .
04:08	144.77577	14.60095	123	1	533	Visibility is poor even 1 meter off bottom.
04:11	144.77591	14.60086	125	5	540	White outcrop through the haze and steep wall to our left.
04:12	144.77601	14.60078	126	4	539	Lots of white coating and some black outcrops.
04:12	144.77611	14.60083	126	4	538	*Doppler reset to LBL.*
04:12	144.77613	14.60081	126	2	537	Lots of shrimp here.
04:13	144.77612	14.60082	125	2	537	Just past edge of white stuff. Shrimp hard to see on white.
04:13	144.77612	14.60082	111	3	538	Wire temp down to 117deg...threshold at 120deg.
04:14	144.77616	14.60080	112	5	533	Solid outcrop with white coating.
04:15	144.77622	14.60077	111	5	532	Much clearer.
04:15	144.77626	14.60076	112	2	532	Linear features on surface.
04:18	144.77628	14.60074	112	3	534	We are at the target… need to look for the active venting scarp.
04:18	144.77628	14.60074	112	3	534	Venting is on edge of the scarp.
04:19	144.77629	14.60073	69	4	535	Turning vehicle around to face scarp.
04:20	144.77630	14.60073	9	4	534	Looking for active water flow and will do suction sample.
04:20	144.77630	14.60075	9	4	534	Scarp should be ahead of us (from sonar) Heading is 009.
04:21	144.77629	14.60083	9	5	532	Large rock scarp in front of us. Last time we were at 532m...now at 527m.
04:22	144.77629	14.60085	9	4	531	See some shimmer along crack.
04:22	144.77629	14.60085	9	4	531	Surface is bathed in hydrothermal fluid.
04:22	144.77629	14.60085	9	4	531	Good source at base of crack.
04:23	144.77629	14.60085	9	4	531	No shrimp here...there's one.
04:25	144.77629	14.60085	9	4	531	Bringing up hydraulics for temp. probe.

time	raw long	raw lat	hdg	alt	Z	J2-191 NW Rota-1 - Dive Log Comments
04:25	144.77629	14.60085	9	4	531	Basket out to retrieve wand.
04:28	144.77629	14.60085	9	4	531	Hovering for sample.
04:29	144.77629	14.60086	12	1	530	Seeing shrimp around shimmering water.
04:30	144.77629	14.60086	16	1	531	Positioning wand.
04:32	144.77630	14.60086	10	2	531	TEMPERATURE degrees C Moving wand into position...ambient is 6.9.
04:33	144.77630	14.60086	12	2	531	TEMPERATURE degrees C In crack..temp moving up a bit...9.3..
04:34	144.77630	14.60086	12	2	531	TEMPERATURE degrees C Bunch of grazer shrimps here...temp 25.2....
04:35	144.77630	14.60086	12	2	531	TEMPERATURE degrees C Taking out probe. Tmax=25
04:35	144.77630	14.60086	12	2	531	Stow probe then index suction sampler.
04:38	144.77630	14.60086	9	2	531	Wand stowed.
04:39	144.77630	14.60086	9	2	531	Indexing suction sampler to Blue.
04:40	144.77630	14.60086	9	2	531	Preparing for suction sample.
04:40	144.77630	14.60086	8	2	531	A lot of water coming out of here.
04:42	144.77630	14.60086	10	2	531	Retracting drawer and deploying suction intake arm.
04:42	144.77630	14.60086	10	2	531	Target is mat above the flow on the rock face.
04:43	144.77630	14.60086	10	2	531	Repositioning vehicle to get the intake at the right position.
04:45	144.77630	14.60086	10	2	532	Hoping the white mat comes off the rock.
04:49	144.77631	14.60086	9	2	532	Repositioning to get a better angle.
04:52	144.77631	14.60087	10	2	532	SAMPLE-5 Suction is on ..now suctioning but a bit of rock.
04:53	144.77631	14.60087	11	2	532	**SAMPLE-5 Suction mat along rock face. [Near Iceberg 144.77630E/14.600867N] PI Davis**
04:54	144.77631	14.60087	10	2	532	SAMPLE-5 Suction Dragging intake along rock face to loosen mat for suction.
04:55	144.77631	14.60087	11	2	532	SAMPLE-5 Suction Broke off piece of crust..want to suction above.
04:57	144.77631	14.60087	10	2	532	SAMPLE-5 Suction Something is clogging suction..not sucking anymore.
04:58	144.77631	14.60087	10	2	532	Index to green jar and flush it out.
05:07	144.77631	14.60087	10	2	532	Indexed to green. Nothing sucking into flush jar.
05:08	144.77631	14.60087	10	2	532	Trying to get it to suction...not working.
05:11	144.77631	14.60087	10	2	532	Hydraulics off...wire temp went over 120deg.
05:13	144.77631	14.60087	10	2	532	Slurp is off right now. Jars do turn.
05:14	144.77631	14.60087	10	2	532	Valve may be stuck.
05:15	144.77631	14.60087	10	2	532	Can't get it to work.
05:15	144.77631	14.60087	10	2	532	Should have 2 canvas and 2 mesh scoops in basket.
05:16	144.77631	14.60087	10	2	532	Stowing suction intake.
05:17	144.77631	14.60087	10	2	532	Mat could be where the shrimp are.
05:17	144.77631	14.60087	10	2	532	Shrimp are eating mat.
05:18	144.77631	14.60087	10	2	532	Going to try to mesh sample the shrimp.
05:20	144.77631	14.60087	10	2	532	Looking for a mesh net in the basket.
05:20	144.77631	14.60087	10	2	532	Changing DV-Cam tape
05:24	144.77631	14.60087	10	2	532	Changing DVDs.
05:25	144.77631	14.60087	10	2	532	Going to use a canvas bag instead.
05:27	144.77631	14.60087	10	2	532	Getting a better grip on the sample bag handle.
05:27	144.77631	14.60087	10	2	532	Nice handoff and grip.
05:29	144.77631	14.60087	10	2	532	Bringing drawer in.
05:29	144.77632	14.60087	11	3	533	Lateralling to right for position over shrimp.
05:31	144.77632	14.60087	10	2	533	Still stowing arm with bag before moving over.
05:34	144.77633	14.60088	340	3	533	Gently moving into position.
05:34	144.77633	14.60088	340	4	533	The shrimp area is to the right of the suction sample site. Suction site did not have shirmp..may not be mat but sulfur.
05:35	144.77633	14.60088	340	4	533	Lots of shrimp at this area.
05:36	144.77633	14.60088	340	4	533	Sweeping rock face with bag.
05:36	144.77633	14.60088	340	4	533	**SAMPLE-6** Scoop. Some shrimp are coming out of bag...try again.
05:37	144.77633	14.60088	340	4	533	**SAMPLE-6 Scoop. Attempting to scoop up some shrimp in the canvas bag. Good scoop and twirl. [E of Gastros 144.776167E/14.60088N] PI Tunnicliffe**
05:37	144.77633	14.60088	340	4	533	SAMPLE-6 Scoop Sweeping down again.
05:38	144.77633	14.60088	339	4	533	SAMPLE-6 Scoop Trying a third sweep of the rock.
05:39	144.77633	14.60088	340	4	533	SAMPLE-6 Scoop Shrimp are coming out of bag...will try another scoop up the rock.
05:42	144.77633	14.60087	340	4	533	Stow bag in biobox.
05:43	144.77633	14.60087	340	4	533	Change of the watch...Jason watch will try to repair the suction sampler.
05:51	144.77633	14.60085	341	2	534	Struggling with getting canvas bag into bio box.
05:53	144.77633	14.60085	341	2	535	See slopes of white which are sulfur whereas grey looking coating has bacterial mat which shrimps are feeding off.
05:54	144.77633	14.60083	217	1	535	Mini avalanche created by sub on ash slope.
05:55	144.77632	14.60079	176	1	535	Ash covered slope where has surficial coating of sulphur texture is often motley.
05:57	144.77631	14.60082	257	7	535	Continue to have trouble with bio box on starboard side as not sure if stowed away or not?
06:02	144.77615	14.60084	270	4	531	Bio box cannot be stowed as is broken. May have to recover and bring back onboard and fix.

time	raw long	raw lat	hdg	alt	Z	J2-191 NW Rota-1 - Dive Log Comments
06:07	144.77616	14.60083	259	2	529	Plan now is to terminate dive as cannot stow starboard side bio box as is dangling beneath the sub.
06:11	144.77624	14.60083	264	1	529	Will attempt to secure the bio box with one of the manipulators.
06:16	144.77623	14.60093	281	17	524	Coming to surface Had to terminate dive. Bio box held by manipulator arm to secure while coming up.
06:48	144.77625	14.60106	281	99	101	JASON is at the surface
06:55	144.77639	14.60105	23	178	179	**JASON on deck. Jason secure at 0657.**
06:57	144.77639	14.60105	20	178	180	**SAMPLE-7 Pit ejecta caught by Jason bottom mesh. [Brimstone'06] PI geogroup**

5.4.9 J2-192 NW Rota-1 Dive Log

time	raw long	raw lat	hdg	alt	Z	Dive J2-192 NW Rota-1 - Dive Log Comments
J2-192 NW Rota-1 Dive Summary: Started the dive S/SW of Iceberg and attempted 2 biological samples (1 suction and one scoop of shrimp). Then proceeded downslope of Brimstone. The eruptive site was extremely active. Saw red glowing rock in the middle of the eruptive site. Observed the volcanic activity for close to 2 hours. The most dramatic visit yet to Brimstone. Ventured over to Fault Shrimp area and sampled shrimp west of there. Travelled north over the ridge crest then SW to the summit and sampled the surface coating. Next traveled in the water column till ascended 30 m west of Brimstone - 1 HFS sample there. Moved toward Brimstone again. The pit is still very active with rocks raining down and red flashes from eruptive site. Retrieved the hydrophone at the summit then traveled to the west along the summit ridge. One major sample taken at ridge, but failed to fire. The top of the sharp ridge is unstable and possibly slumping continually. 8 samples total.						
J2-192 Bottom time: 4/27/2006 1838 - 4/28 0452 UTC (10.23 hrs). **Z column represents seafloor depth in meters.**						
18:00	144.77639	14.60106	8	0	1	JASON preparing for 4am launch dive 192
18:01	144.77639	14.60106	7	0	1	Dive J2-192 configuration includes 3 gas tights one with funnel one major two mesh scoop bags one canvas scoop bag suction sampler and the fluid sampler
18:06	144.77637	14.60104	280	0	3	**JASON is in the water**
18:07	144.77637	14.60103	252	0	3	JASON is moving to stern
18:09	144.77635	14.60105	282	0	3	MEDEA is in the water
18:10	144.77635	14.60107	287	168	171	JASON is diving
18:11	144.77636	14.60106	252	197	220	note: Bio box has been repaired and is back on JASON
18:20	144.77643	14.60113	220	166	365	Descending through 200m
18:29	144.77649	14.60120	268	133	543	Passing 400m on our way to Iceberg
18:30	144.77649	14.60121	271	121	547	*Note: The transponders were recovered before this dive so we don't have LBL (just Doppler).*
18:33	144.77651	14.60122	300	46	549	Passing 500m.
18:36	144.77695	14.60118	89	22	532	Starting to see lots of particulates in the water at about 500m.
18:38	144.77693	14.60113	108	2	536	**On bottom in the area of Iceberg at 534m.**
18:39	144.77690	14.60114	109	1	534	A mix of grey and white sediments.
18:41	144.77625	14.60077	121	1	533	Trying to find the outcrop where we were sampling at the end of the last dive.
18:43	144.77627	14.60076	121	3	537	Eh dropped from about 140 to 0 almost instantly.
18:44	144.77629	14.60075	63	3	538	Since there doesn't seem to be any strong hydrothermal activity it my mean it isn't working.
18:45	144.77631	14.60077	41	2	540	We're trying to find a place with lots of shrimp.
18:47	144.77630	14.60078	9	1	540	We can see both species of shrimp.
18:48	144.77630	14.60078	9	1	540	There is a lot of sulphur in the sediment.
18:48	144.77630	14.60078	8	1	540	Preparing to suction sample the shrimp.
18:57	144.77628	14.60079	320	2	539	SAMPLE-1 Suction Beginning suction sample of shrimp
18:59	144.77628	14.60079	320	2	539	Ignore previous entry - suction sampler does not appear to be working.
18:59	144.77628	14.60079	320	2	539	Seeing some very small shrimp here. Looks like there's been a recent recruitment event.
19:00	144.77628	14.60079	320	2	539	Previous observations here were dominated by larger individuals. Size range is broader this time.
19:02	144.77628	14.60079	320	2	539	SAMPLE-1 Scoop Suction sampler just kicked in - we are collecting shrimp
19:04	144.77628	14.60079	321	2	539	Suction sampler working intermittently. Not sure how many shrimp we're getting.
19:08	144.77628	14.60079	321	2	539	We're making slow but steady progress....one shrimp at a time.
19:12	144.77628	14.60079	321	2	539	We're observing the two species of shrimp while Jason continues suction sampling.
19:19	144.77628	14.60079	321	2	539	Still sampling shrimp. Getting a wide size distribution.
19:22	144.77628	14.60079	320	2	539	*Doppler position is Iceberg Vent area 14° 36.04734 144° 46.5773*
19:22	144.77628	14.60079	320	2	539	We're still collecting Sample 1 but have switched to a second suction sample jar.
19:23	144.77628	14.60079	320	2	539	**SAMPLE-1 Suction sample of shrimp into red jar. Getting a wide size distribution and hopefully some of each of the 2 species here. [Iceberg Vent area 144.776289E/14.600789N] PI Tunnicliffe**
19:32	144.77628	14.60079	319	3	539	Suction sampler not working again.
19:39	144.77628	14.60079	319	3	539	We're observing a "feeding frenzy" as the shrimp tear apart a small fish that fell to the bottom.
19:40	144.77628	14.60079	319	3	539	Both shrimp species seem to be participating. We'd thought only the larger species was carnivorous.
19:43	144.77628	14.60079	319	3	539	Sample 1 is in yellow jar only.
19:44	144.77629	14.60079	320	4	540	We're going to try collecting a mesh scoop sample of the shrimp that were feeding (since suction sampler not working).
19:52	144.77630	14.60079	320	5	540	SAMPLE-2 Scoop We just picked up the "feeding frenzy" of shrimp using a mesh scoop.
19:53	144.77630	14.60079	320	5	540	**SAMPLE-2 Scoop. Picked up the feeding frenzy of shrimp using a mesh scoop. At the surface all that remained was a small fish. The shrimp that had been feeding on it all escaped. [Iceberg Vent area 144.776289E/14.600789N] PI Tunnicliffe**
19:55	144.77630	14.60079	320	4	540	Mesh scoop sample stored in the stbd biobox.
19:57	144.77629	14.60079	320	4	540	Preparing to depart Iceberg to go check out what Brimstone is doing today.
19:59	144.77628	14.60078	286	5	540	On our way to Brimstone.
20:02	144.77618	14.60068	285	3	537	Starting to see smoky water from Brimstone (presumably).
20:04	144.77615	14.60069	285	3	538	Heading west.
20:09	144.77577	14.60067	308	9	561	Approaching Brimstone.
20:09	144.77571	14.60068	309	10	562	Plume becoming thicker.
20:13	144.77549	14.60070	309	6	571	We're on the bottom at 564m near Brimstone. Heading upslope.
20:15	144.77530	14.60068	343	4	576	Crossing a field of lava. Looks like a flow.
20:16	144.77530	14.60068	354	4	575	Lava flow looks pretty thin and not very wide either.
20:18	144.77528	14.60073	358	2	572	Preparing to collect a piece of sulphur.
20:20	144.77528	14.60073	357	2	572	**SAMPLE-3 Rock. Piece of sulphur rock. [Down slope of Brimstone 144.775332E/14.600743N] PI geogroup**
20:21	144.77528	14.60073	358	2	572	Lava rock placed in front center basket (in front of the red funnel).

time	raw long	raw lat	hdg	alt	Z	Dive J2-192 NW Rota-1 - Dive Log Comments
20:22	144.77525	14.60074	27	4	573	Heading uplsope again toward Brimstone pit.
20:23	144.77525	14.60075	38	4	572	Crossing another lava flow.
20:24	144.77532	14.60079	13	3	569	Plume is thickening as we approach Brimstone.
20:25	144.77532	14.60080	12	4	568	We're seeing fresh lava.
20:29	144.77541	14.60083	11	6	562	We've just arrived near the eruptive site at Brimstone.
20:30	144.77543	14.60086	10	4	560	Crater is fairly active. Some explosions with small rocks being ejected.
20:31	144.77544	14.60087	11	3	559	Eruption becoming quite vigorous. Water appears to be "pulsing".
20:32	144.77544	14.60087	11	3	559	Large rocks around the crater rim are shuddering.
20:32	144.77544	14.60087	11	3	559	Eruption stopped quite suddenly followed by a burst of bubbles.
20:33	144.77544	14.60087	11	3	559	Eruption picking up again. Small rocks being ejected.
20:34	144.77544	14.60087	11	3	560	Lots of bubbles. Ejected rocks getting larger as eruption gets stronger.
20:35	144.77545	14.60087	358	4	560	Starting to see some larger rocks rolling downslope. We're going to back up a little.
20:37	144.77545	14.60086	351	5	560	Turned off the overlay on the 3-chip Sci-Cam.
20:39	144.77545	14.60086	353	5	561	Becoming more explosive. Fist-sized rocks being ejected.
20:40	144.77545	14.60086	353	5	561	Smoke is turning more yellow.
20:42	144.77545	14.60086	353	5	560	Plume is wafting back in front of the eruption site and is obscuring the view.
20:44	144.77545	14.60086	352	5	561	Sci-Cam overlay is back on.
20:45	144.77545	14.60086	352	5	561	Eruption increasing again.
20:45	144.77545	14.60086	352	5	561	Quite a lot of rock being ejected.
20:46	144.77545	14.60086	352	5	561	Eruption stopped again quite suddenly.
20:47	144.77547	14.60087	354	3	559	A cloud of bubbles followed the last eruption. Now the eruption has started again.
20:49	144.77547	14.60087	352	3	559	Eruption is becoming quite vigorous again.
20:52	144.77547	14.60087	339	4	559	Sci-Cam overlay off.
20:52	144.77547	14.60087	339	4	560	Eruption just increased quite dramatically. Also turning quite yellow.
20:55	144.77547	14.60087	339	4	560	Very strong eruption with lots of lava coming up. Looked like a bomb forming.
20:57	144.77547	14.60087	339	4	560	Eruption just shut off again.
20:57	144.77547	14.60087	339	4	560	Sci-Cam Overlay back on again.
20:58	144.77547	14.60087	339	4	560	Lots of bubbles appearing.
20:59	144.77547	14.60087	339	4	560	**The plume is glowing red!**
20:59	144.77547	14.60087	339	4	560	Very explosive!
20:59	144.77547	14.60087	339	4	560	Continuing to see red flashes - presumably molten lava?
21:00	144.77547	14.60087	339	4	559	Water almost seems to be pulsing.
21:01	144.77547	14.60086	340	6	562	Eruption continues to be quite vigorous. Lots of rock and lots of gas
21:03	144.77549	14.60087	324	4	560	Repositioning Jason to get some digital stills.
21:04	144.77549	14.60087	324	4	560	Large rocks on the crater rim are visibly shaking.
21:05	144.77549	14.60087	324	4	560	Plume is pulsing again.
21:06	144.77549	14.60087	324	4	560	Just saw several large rocks begin to slide down the slope below the rim.
21:07	144.77549	14.60087	323	4	560	Large lump of lava forming and degassing at the rim.
21:08	144.77549	14.60087	323	4	560	This is the most active we've seen it today. Large rocks being ejected. Lots of flat bombs.
21:09	144.77549	14.60087	323	4	560	Plume turning quite yellow again.
21:10	144.77549	14.60087	323	4	559	Gas and bubbles pulsing visibly near the lower rim of the crater.
21:10	144.77549	14.60087	323	4	560	Eruption has stopped again.
21:12	144.77549	14.60087	324	4	560	Side of crater is bulging and pulsing. Very explosive. **Flashes of red again!**
21:14	144.77549	14.60087	324	4	560	Ejected rocks appear to be falling back into the crater.
21:15	144.77549	14.60087	323	4	560	Plume pulsing visibly near the crater rim.
21:16	144.77544	14.60087	319	4	560	Plume is very explosive. Lots of rock and ash.
21:18	144.77544	14.60087	323	4	559	Plume becoming very yellow again.
21:19	144.77544	14.60087	323	4	559	Activity increasing again.
21:20	144.77544	14.60087	324	4	559	Just saw a big pulse of bubbles. Things have calmed down a bit.
21:21	144.77544	14.60087	324	4	559	Activity picked up suddenly again.
21:22	144.77544	14.60087	324	4	559	Quite large rocks (pillow sized) being pushed out.
21:23	144.77544	14.60087	324	4	559	Large rocks can be seen tumbling away from the crater rim.
21:24	144.77544	14.60087	324	4	560	Base of plume is very yellow again.
21:25	144.77544	14.60087	324	4	560	Large bursts of rock and ash.
21:25	144.77545	14.60087	324	4	560	Jason backing off as plume begins to grow dramatically.
21:28	144.77545	14.60087	324	6	560	Still sitting at Brimstone - moved slightly as it increased in vigor.
21:29	144.77545	14.60087	323	6	560	Now much smaller plume - quieter
21:30	144.77545	14.60087	323	6	560	Vibrating rocks on edge
21:30	144.77545	14.60087	323	6	560	Gas explosion
21:31	144.77545	14.60087	323	6	560	Only about 0.5m across now
21:33	144.77545	14.60087	323	6	560	Increasing cloud volume
21:34	144.77545	14.60087	323	6	560	Pulsating cloud
21:34	144.77545	14.60087	323	6	560	Now bubbles
21:35	144.77545	14.60087	323	6	560	Increasing volume - flying rocks
21:36	144.77545	14.60087	323	6	560	Explosive pulse
21:37	144.77545	14.60087	323	6	560	Ejections preceded by gas - discus-shaped bombs
21:37	144.77547	14.60086	313	7	561	Now large explosion approaching sub. Ejecta raining out.
21:38	144.77547	14.60086	303	7	560	**Largest explosion we've seen now. Massive ash outpouring.**
21:39	144.77547	14.60086	303	7	561	Cone building with ejecta blocks onto rim.
21:39	144.77547	14.60086	303	7	560	White plume sinking to floor around vent.. Explosions stopped.
21:42	144.77546	14.60087	303	6	560	Explosions ramping up again.

time	raw long	raw lat	hdg	alt	Z	Dive J2-192 NW Rota-1 - Dive Log Comments
21:42	144.77547	14.60087	303	6	560	Overlay off.
21:42	144.77547	14.60087	303	6	560	Base of plume is pulsing again.
21:44	144.77546	14.60087	303	5	559	Increasing activity again.
21:44	144.77546	14.60087	303	5	559	More pulsing.
21:45	144.77546	14.60087	303	5	559	Lava extruding.
22:02	144.77547	14.60087	292	6	559	We're debating whether or not we can do any fluid sampling here right now. Seems to be too much action to get too close.
22:03	144.77548	14.60087	292	6	559	Don't want to be downhill if the rocks are rolling down hill.
22:04	144.77548	14.60087	292	6	559	Debating about the suction sampler.
22:04	144.77548	14.60087	292	6	559	We're heading over to Fault Shrimp.
22:04	144.77548	14.60087	292	5	559	The overlay is back on the DVCam.
22:05	144.77548	14.60087	292	6	559	We're going to drive along the bottom to Fault Shrimp site.
22:05	144.77548	14.60087	292	5	559	Look at all the bubbles here.
22:05	144.77548	14.60087	292	6	559	Ooh red pulses. The cloud and lava bombs are pretty big.
22:07	144.77548	14.60087	292	6	559	Bill is discussing all the different events we have seen here. Lots of stuff to explain.
22:09	144.77548	14.60087	293	6	560	**There was a red glow in the middle of the cloud. It must be magma plugs coming right up to the top.**
22:09	144.77548	14.60086	292	7	560	This is different than the ashing we've seen before.
22:09	144.77548	14.60086	297	7	561	We've seen so many different styles of eruption activity.
22:11	144.77551	14.60085	301	8	562	We're getting ready to move. At least that's what we say. Let's go. Hdg 091.
22:11	144.77551	14.60084	62	7	560	Looks like the extension on the fluid sampler was bent.
22:13	144.77566	14.60079	92	11	561	Facing east and are still at the pit depth. Z=555
22:14	144.77568	14.60078	89	11	559	There's a vent at the base of the wall there.
22:15	144.77571	14.60078	90	7	555	Target here at the base of the wall. [East'oPit] 14 36.047 144 46.542
22:18	144.77587	14.60073	91	5	552	We're looking around. Trying to determine where the plume here is coming from. The Beast is hungry and needs to be fed says Dave.
22:18	144.77589	14.60072	94	7	554	Continuing east.
22:19	144.77597	14.60070	97	6	551	Seeing a couple shrimp here.
22:21	144.77619	14.60067	97	6	539	Slowly moving along
22:22	144.77627	14.60073	94	3	535	At the ridge now. Fault Shrimp is to the east.
22:23	144.77631	14.60077	93	4	536	Moving over the ridge crest. Now we're going down the side.
22:26	144.77642	14.60071	92	4	544	We're moving through the flock and fog.
22:28	144.77650	14.60072	95	10	550	Off the bottom now and can't see anything.
22:29	144.77651	14.60072	95	9	551	We're probably waiting for the vehicle now.
22:35	144.77688	14.60070	97	4	570	Still transiting. We're following the bottom and going down slope.
22:35	144.77692	14.60070	94	4	572	The bottom is coming in sight.
22:35	144.77694	14.60071	97	5	573	The suction hose seems to be a little singed.
22:36	144.77697	14.60072	92	2	573	We're now looking at the bottom.
22:37	144.77698	14.60073	95	2	574	We're looking at something on the seafloor.
22:38	144.77707	14.60070	313	9	580	Looking at something on the surface. It's a little slide?
22:38	144.77707	14.60070	303	9	580	Looking at something along the bottom here.
22:38	144.77707	14.60070	323	9	580	What is all the fluff here?
22:39	144.77711	14.60071	81	6	580	It's not bacterial mat. It's mineral "crud" says Verena. She has looked at it under the microscope.
22:40	144.77714	14.60078	63	3	579	The sample site was at 583 meters. There's a little outcrop to our left.
22:41	144.77714	14.60077	339	2	580	It may be that outcrop to our left? It's a 583 meters. There are shrimp on the rock here. All Verena's friends are here.
22:41	144.77714	14.60078	338	2	580	This isn't exactly the same spot.
22:42	144.77714	14.60077	338	2	580	Rick wanted to suction in the crack.
22:43	144.77716	14.60077	336	5	584	We're looking around for the crack for Verena to sample.
22:44	144.77717	14.60077	336	5	584	Want the lasers back on.
22:45	144.77718	14.60076	325	3	586	Lots of stuff in the water.
22:46	144.77717	14.60075	329	3	585	Somewhere in this neighborhood.
22:47	144.77715	14.60082	329	2	585	Looking at the pillows here.
22:48	144.77715	14.60082	333	2	585	The flock is calming down a bit.
22:49	144.77717	14.60084	330	3	586	We're moving around this outcrop looking for the correct sampling sight.
22:50	144.77717	14.60084	322	3	586	There's some mat here. Verena thinks that this is the spot.
22:51	144.77717	14.60084	324	2	586	Verena is in the hot seat and is wearing the tiara (head set).
22:52	144.77717	14.60084	321	3	586	These are the guys that Verena wants.
22:53	144.77717	14.60084	321	3	586	The two main types we see here are: the small ones are Loihi; the larger ones are the alvino carid (beady eyed).
22:54	144.77717	14.60084	322	3	586	The shrimp are all huddled up here. They look like they're all holding hands in a circle.
22:55	144.77717	14.60084	322	3	586	Rick has returned. His mesh is on the white and the blue.
22:55	144.77717	14.60084	322	3	586	The big claws on the front of that guy are sitting on top of a carcass or a molt.
22:56	144.77717	14.60084	322	3	586	We're watching the shrimp here.
22:57	144.77717	14.60084	322	3	586	They have 3 sets of antennae. The long ones are tactile. She knows the others are olfactory.
22:58	144.77717	14.60084	322	3	586	We're preparing to sample here.
22:58	144.77717	14.60084	322	3	586	They look like they're hanging out.
22:59	144.77717	14.60084	322	3	586	Looks like an iron-oxide crust they're hanging out on. The orange shrimp could possibly have NOT molted for awhile and are accumulating iron.
23:01	144.77717	14.60084	322	3	586	The suction sampler attempt so far doesn't look good.
23:03	144.77717	14.60084	322	3	586	We don't see it working.

time	raw long	raw lat	hdg	alt	Z	Dive J2-192 NW Rota-1 - Dive Log Comments
23:03	144.77717	14.60084	322	3	586	Doesn't appear to be working.
23:06	144.77717	14.60084	322	3	586	We have decided the sampler is not working. We've decided to go to for the scoop with a mesh bag.
23:07	144.77717	14.60084	322	3	586	**SAMPLE-4 Scoop. Attempted to scoop these shrimp up (suction sampler not working). One shrimp remained at surface - so this sample was a scoop of 1 shrimp. [~20 m west of Fault Shrimp 144.777174E/14.600843N] PI Tunnicliffe**
23:08	144.77717	14.60085	322	3	586	SAMPLE-4. Probably only have one shot at it and then they will all swim away. Jim is preparing to sample.
23:10	144.77717	14.60085	322	3	586	Jim attempted the scoop sample. Like netting butterflies.
23:11	144.77717	14.60085	322	3	586	The first attempt failed. He's trying again.
23:12	144.77717	14.60085	322	3	586	Another attempt here. Pretty much waiting for the shrimp to crawl in the bag.
23:13	144.77717	14.60085	321	3	586	SAMPLE-4 Scoop. There's one in the bag. A shrimp in the bag is worth 2 in the bush.
23:14	144.77717	14.60085	322	3	586	Didn't open the biobox so he might get away.
23:15	144.77717	14.60085	322	3	586	Maneuvering to open the biobox and hoping the shrimp stays in the bag.
23:15	144.77717	14.60085	323	3	586	We see a scale worm that has made it here.
23:16	144.77717	14.60085	323	3	586	Opening the lid of the biobox to store the shrimp scoop.
23:18	144.77717	14.60085	322	3	586	SAMPLE-4 These are the wily guys (alvino carid). Where did the net go? He found it.
23:20	144.77717	14.60085	322	3	586	Zooming in to see if the shrimp is still in the bag. The shrimp is sitting on the edge of the bag but won't go in.
23:21	144.77717	14.60085	322	3	586	Wiley little critters. They don't want to budge. Jimmy is trying to net them.
23:24	144.77717	14.60085	321	3	586	The bag is being maneuvered into the biobox. There are 2 in there now.
23:27	144.77717	14.60085	321	3	586	Trying to cram the mesh bag in the biobox so that they don't get out.
23:28	144.77717	14.60085	321	3	586	A couple of shrimp are in the bag. We just hope they are still there when we get to the surface.
23:29	144.77717	14.60085	321	3	586	We're hoping to do a bit of fluid sampling but Dave has been holding off so that he doesn't break the temp probe.
23:29	144.77717	14.60085	321	3	586	We're trying to decide what to do next.
23:31	144.77717	14.60085	321	3	586	Taking a little break here. Then will head off somewhere new we hope.
23:40	144.77717	14.60085	322	3	586	We're going to follow the bottom here and are heading north.
23:40	144.77717	14.60085	322	3	586	We're going to do these bottom traverses to look at the distribution of dead animals (and live animals too). Also looking for the distribution of fallout from the explosions.
23:42	144.77718	14.60084	323	6	586	We're all the way zoomed out here getting a final look at Fault Shrimp site.
23:42	144.77716	14.60086	323	9	585	We're going to go over the ridge and look at the north slope. Don't think we've seen that yet.
23:43	144.77715	14.60089	322	6	580	Leaving Fault Shrimp.
23:43	144.77715	14.60089	322	5	580	Will go over the summit ridge and then head down the north slope of the volcano.
23:44	144.77715	14.60089	322	6	580	Rock outcrops are covered with a brown staining. Sedimented slopes are grey with a lot of white coating.
23:45	144.77715	14.60089	323	5	580	There's an outcrop here with a cave in the bottom with lots of shimmering water here. We are still here at Fault Shrimp just a little upslope of where we were at 575 meters.
23:45	144.77716	14.60089	353	5	580	Moving along at a heading of 348 now.
23:46	144.77715	14.60095	349	6	577	Nice shot of the slope here. There are more rock outcrops in the distance.
23:46	144.77714	14.60098	348	6	577	The white appears to be only on the sediments. The darker stuff is rock outcrops.
23:47	144.77711	14.60101	351	4	575	Beautiful up here at the top. Looks like a little saddle in here.
23:48	144.77709	14.60108	349	3	576	The top of this volcano is spectacular. Lots of ups and downs. Mostly the bottom is sediment covered here.
23:48	144.77710	14.60113	350	3	576	Some of that brown iron staining in places. Lots of ripple marks in the sediment.
23:50	144.77710	14.60123	347	85	660	There is a ridge line here. It should be downhill from here. We're going over the top.
23:52	144.77708	14.60131	349	1	578	Life!! There's a rattail here.
23:54	144.77706	14.60143	1	4	579	There are a lot of fish here. We haven't seen much so far.
23:55	144.77708	14.60150	4	3	580	This morning we saw dead fish at Iceberg.
23:57	144.77704	14.60158	4	3	581	We're in the water column right now. Can't really see the bottom here.
23:58	144.77701	14.60159	315	6	581	The bottom is in sight. sort of.....
00:00	144.77700	14.60171	346	6	588	Seeing a bit of the bottom on and off. Going downslope.
00:03	144.77692	14.60171	241	9	585	We are at the target. We're turned around heading 240 and driving SW back up the north slope towards the summit.
00:04	144.77688	14.60168	246	ing	581	We want to be close to the bottom on this transect.
00:05	144.77670	14.60171	241	5	571	Moving up here. Some ripples on the slope here. Some chutes from slope failures and some rock outcrops.
00:06	144.77667	14.60170	242	7	571	The slope is variable but always very steep.
00:07	144.77663	14.60168	242	4	565	Want to go southwest of Brimstone and then head upslope.
00:08	144.77655	14.60168	241	5	563	Pausing to zoom in on these white dots. They look like pieces of rock. They could be pieces of sulfur that has rained down.
00:10	144.77647	14.60164	241	1	558	Beautiful outcrops here. Lots of white staining. It looks like bacterial mat.
00:11	144.77641	14.60160	241	2	561	The white material is really thick here on the ridge crest.
00:12	144.77640	14.60149	220	5	566	The slope here is completely white. What is this? Is it all sulfur? Is it white mat or sulfur? Bob wants to look at this outcrop.
00:13	144.77641	14.60145	221	10	568	It has shrimp on it. Looks like Bag Creatures here. (muco polysaccharides?)
00:13	144.77640	14.60142	222	10	568	Continuing on.
00:15	144.77631	14.60132	220	4	565	Zooming in on a molted crab.
00:15	144.77631	14.60131	220	4	564	The shrimp are nearby for a feast.
00:16	144.77630	14.60128	219	3	562	Up at the base of this wall and moving up slope.
00:17	144.77633	14.60121	221	11	562	Depth is 555. We don't have a sample of this white material here from this year.
00:19	144.77622	14.60119	222	15	549	Still heading up slope. Looking much hazier here.

time	raw long	raw lat	hdg	alt	Z	Dive J2-192 NW Rota-1 - Dive Log Comments
00:20	144.77617	14.60114	222	6	532	Very steep slopes here and poor visibility.
00:20	144.77614	14.60111	223	4	530	Extremely steep here.
00:21	144.77611	14.60107	222	7	526	Bill is passing the hot seat to Bob.
00:22	144.77607	14.60105	219	6	524	Getting to the crest of this at 518 meters. This is the top. This slope looks unstable too.
00:22	144.77605	14.60102	220	3	521	Not much flat area here. It's incredibly steep.
00:22	144.77605	14.60101	224	3	520	Heading 224 from here.
00:23	144.77607	14.60100	254	3	521	We're going to stop and get some of the white material in the scoop bag.
00:24	144.77605	14.60098	32	1	523	Plan to scoop up the ubiquitous coating all over the slope here. It's very loose stuff here.
00:26	144.77605	14.60098	34	3	524	Looks like some mineral with bacteria in it. Lapilli covered with a coating. We're going to tuck the bag in a pocket here.
00:27	144.77605	14.60098	34	3	524	There is shimmering flow here.
00:27	144.77606	14.60098	34	3	524	We're right at the summit here. Flow is coming out here. Tamb is 7.3.
00:28	144.77606	14.60098	34	3	524	SAMPLE-5 Scoop White material that is covering most of the slope around here. It's ubiquitous here at the top. It is everywhere on the surface.
00:29	144.77606	14.60098	34	3	524	If it's aluminum coating it's a pH change that creates it as it percolates up.
00:29	144.77610	14.60101	34	3	524	**SAMPLE-5 Scoop. Ubiquitous coating all over the slope surface here. It's very loose stuff. Looks like some mineral with bacteria in it. Lapilli covered with a coating. [N of Gastros at summit 144.776055E/14.600977] PI geoteam**
00:31	144.77610	14.60101	34	3	524	SAMPLE-5 Scooped up the surface stuff. Lots of white stuff. Stowing it in the aft basket. PI Embley.
00:34	144.77610	14.60101	34	3	524	Successful sample here.
00:38	144.77610	14.60101	34	3	524	TEMPERATURE Still at the sample site. Tambient=7.1. T in shimmering sediments is 26.6. We're over 70 meters from the pit.
00:39	144.77610	14.60101	34	3	524	TEMPERATURE 30.1. Dave's hypothesis is that this is an aluminum coating.
00:40	144.77610	14.60101	34	3	524	There are shrimp along here. They are grazing on something. Verena says there are some bacteria here.
00:41	144.77610	14.60101	34	3	524	TEMPERATURE 7 degrees above ambient. 31.3 was Tmax.
00:44	144.77614	14.60100	20	3	524	We are done here and continuing on our traverse.
00:45	144.77615	14.60095	228	6	526	We are in a smoke plume.
00:52	144.77595	14.60083	227	67	567	Moving to the southwest.
00:53	144.77594	14.60083	227	74	575	Driving through the plume at 68m above the bottom. Lots of ash in the plume.
00:54	144.77593	14.60082	226	82	582	There is no nav here because we are too far off the bottom.
01:05	144.77586	14.60085	20	149	650	We are 126 m southwest of Brimstone and coming back down to the bottom. We will traverse upslope back to the pit.
01:09	144.77586	14.60090	21	7	636	**We are back on the bottom.**
01:10	144.77586	14.60090	20	4	636	The bottom is very sediment covered.
01:13	144.77499	14.59998	20	5	638	We are starting uphill heading 021.
01:13	144.77501	14.59999	21	4	636	There is some staining on the rocks.
01:14	144.77501	14.59999	20	4	636	There is a lone rock covered in ash with some sulfur bits.
01:15	144.77502	14.60002	21	4	634	These may have been ejected from the pit and slid downslope.
01:16	144.77503	14.60003	20	4	634	These may be from the big slide when the pit wall collapsed.
01:17	144.77510	14.60010	23	6	627	Continuing upslope. More stained material and sulfur globules.
01:19	144.77510	14.60031	21	4	613	Slope is mostly extruded rock with a light ash covering.
01:20	144.77512	14.60034	20	4	611	There is really no ash in the water now so it could be from an earlier event.
01:20	144.77514	14.60035	19	3	610	We are still about 50m below the pit.
01:20	144.77516	14.60036	21	4	609	Dead pelagic shrimp.
01:21	144.77518	14.60038	21	3	607	There is definitely ash on the rocks.
01:22	144.77520	14.60042	21	6	604	Large piece of outcrop of older lava.
01:23	144.77522	14.60049	22	7	600	There is more outcrop covered in recent fallout from the pit.
01:25	144.77524	14.60062	21	7	591	There is some sulfur on the outcrop.
01:25	144.77524	14.60063	21	7	589	Increasing amount of ash that is more coarse.
01:25	144.77526	14.60067	20	7	587	This may be some old lava flow.
01:27	144.77533	14.60073	21	7	580	This looks like an old lava flow.
01:28	144.77534	14.60077	18	6	576	Bottom is more white and the pieces are larger as we get closer to the pit.
01:28	144.77536	14.60080	19	7	575	We are 10m downslope from the pit and the water is getting murkier.
01:30	144.77539	14.60085	50	4	569	We're heading up slope. Less than 20 meters ahead is the pit. Not seeing the ashing down here. Seeing the plume.
01:30	144.77540	14.60085	36	6	570	It looks like a plume is leaking out of the slope right here. We see the most recent material from the pit ahead.
01:31	144.77540	14.60087	25	6	568	There's a chute of lar material that has recently come down slope.
01:31	144.77542	14.60087	35	6	568	A lot of white smoke in the area.
01:32	144.77543	14.60089	2	5	567	A chute here. Looking for the base of the pit.
01:34	144.77541	14.60088	9	4	565	Nick is contemplating which rock he wants. Brimstone was 556 meters yesterday.
01:34	144.77541	14.60088	11	4	565	It's right upslope.
01:35	144.77545	14.60089	9	4	564	Rocks are covered with ash from the pit. Rubble-like rocks all around. No ash falling right now.
01:36	144.77547	14.60081	77	5	567	Now we're getting ash.
01:37	144.77547	14.60081	96	6	566	The visibility is not good here.
01:39	144.77549	14.60081	351	5	569	Virtual van nav is doppler fixes. Jason is under Medea and move the doppler from that. The fixes recorded are doppler because we don't have LBL now (the transponders are recovered).
01:41	144.77543	14.60087	313	4	565	Medea is in the fog now. Lots of smoke in this area.
01:41	144.77542	14.60086	310	3	566	Maybe we need to go up a bit higher so that we can see the pit.
01:42	144.77536	14.60085	344	7	567	This area is all covered in white material. Extremely steep. Lots of strewn lava blocks.
01:42	144.77535	14.60086	354	6	566	The pit is in the upper left.

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01:43	144.77532	14.60087	2	6	565	We're looking at the pit. We're south of it.
01:43	144.77533	14.60088	5	6	564	Another dead shrimp.
01:43	144.77530	14.60089	3	6	564	What's coming down slope?
01:44	144.77529	14.60090	15	6	563	We just arrived at the pit. We see the smoke pouring down hill.
01:45	144.77536	14.60086	15	5	562	Great view from the southwest watching the smoke and lava bombs roll down slope.
01:45	144.77542	14.60088	348	6	562	Shift change.
01:47	144.77544	14.60086	313	7	563	Overlay off.
01:47	144.77544	14.60086	312	7	563	Can't see the activity with the wall of smoke in the way.
01:48	144.77544	14.60086	312	7	563	Need to find best way to view this.
01:48	144.77544	14.60086	312	6	563	Change of watch.
01:50	144.77541	14.60084	355	6	565	Visibility poor. Trying to look NW..slowly turning.
01:51	144.77539	14.60084	7	5	564	Big landside.
01:51	144.77538	14.60085	9	5	564	Sand flow. We were looking down on it before.
01:52	144.77538	14.60085	8	6	564	Not sure if we are high enough.
01:52	144.77536	14.60085	8	6	563	Active area is on upper left on science cam.
01:53	144.77529	14.60088	46	8	563	Turning toward active flow. Lateraling around west for better view. See large rocks tumbling and lots of smoke.
01:53	144.77529	14.60089	51	8	563	Looking 045 with a good view...very active.
01:53	144.77529	14.60089	66	7	562	Showering volcaniclastics. Sand flows and surges.
01:54	144.77529	14.60092	83	5	560	Once we get into good view will stop to observe.
01:54	144.77529	14.60092	83	6	561	Big piece coming out.
01:55	144.77529	14.60092	84	6	561	Big plume going up and pushing material out and ash flows going down slope.
01:55	144.77529	14.60092	84	6	561	Hard to see in the pit so haven't really seen any extrusions.
01:55	144.77529	14.60092	83	6	561	Seems more like a continual state now whereas pulsing before.
01:55	144.77529	14.60092	83	6	561	Seeing a collapse of an ash cloud.
01:56	144.77529	14.60092	83	6	561	Density of material is carrying it down.
01:56	144.77529	14.60092	84	6	561	Not seen that before...ash collapse and flow.
01:56	144.77529	14.60092	84	6	561	Collapse of ash cloud and density flow to the seafloor.
01:57	144.77529	14.60092	83	6	561	Little less active.
01:59	144.77529	14.60092	84	6	561	Looking east...heading is 083.
01:59	144.77529	14.60092	84	6	561	Cloud coming a bit toward us.
02:00	144.77529	14.60091	84	6	561	Ash falling down over Jason.
02:00	144.77529	14.60092	84	6	561	Ash/rocks from the plume.
02:01	144.77529	14.60092	83	6	561	Another pulse coming toward us...poor visibility.
02:01	144.77528	14.60091	83	6	561	Moving backward and down a little bit.
02:02	144.77528	14.60091	84	6	561	Lots of ash/rock raining down on us.
02:02	144.77525	14.60091	84	6	562	Looked like rain was combo of black particles and maybe white round objects.
02:03	144.77520	14.60090	83	7	564	Backing up.
02:04	144.77516	14.60090	83	6	564	Facing 083 still but backing away.
02:04	144.77516	14.60090	83	6	564	Waiting for view to clear.
02:05	144.77516	14.60090	83	6	564	Turning on overlay.
02:07	144.77514	14.60090	84	6	564	Can't see anything but no rocks raining down on us.
02:08	144.77514	14.60090	84	6	565	Can see the edge of the plume on the rear camera.
02:08	144.77514	14.60091	83	6	564	Just latereled left a bit.
02:08	144.77514	14.60091	84	5	564	Lots of plume everywhere.
02:09	144.77514	14.60091	84	6	564	Moving Medea west a bit for more line.
02:10	144.77514	14.60091	83	6	564	We are 30m west of Brimstone and still in plume.
02:13	144.77514	14.60091	84	5	564	**SAMPLE-6 HFS. Filtered bag #11. Tavg and T2=6.9C (ambient water) Vol=625ml [30 m west of Brimstone but still in plume 144.775133E/14.60090N] PI Butterfield**
02:18	144.77514	14.60091	84	6	564	SAMPLE-6 HFS Stop.
02:19	144.77514	14.60091	84	5	564	Tavg and T2 should have been ambient.
02:20	144.77514	14.60091	84	6	564	Going in for a closer look.
02:21	144.77517	14.60091	85	3	563	Angling back in to see if there is visibility.
02:22	144.77517	14.60091	82	3	564	Hydrophone is still in water with all this activity.
02:22	144.77521	14.60089	67	5	565	Can see some bottom below the plume.
02:23	144.77525	14.60090	71	5	563	Moving up again looking N which is ENE of target.
02:23	144.77526	14.60091	70	4	563	Don't see ash in water.
02:23	144.77526	14.60091	70	3	563	Just smoke.
02:24	144.77529	14.60093	70	4	561	Plume is visible and some ash flow.
02:24	144.77529	14.60093	71	5	561	Lot of material falling down slope . Density plumes.
02:25	144.77528	14.60094	93	3	559	Different mode? So dense just falling downslope.
02:25	144.77528	14.60098	88	5	557	White out again. Try look from E.
02:26	144.77521	14.60099	94	5	558	Need to move Medea a bit.
02:26	144.77521	14.60098	94	6	558	Have to drive south due to tether pull.
02:27	144.77521	14.60098	56	7	559	Changing DVCam.
02:27	144.77521	14.60098	44	7	560	Ship has come 5m north.
02:28	144.77519	14.60100	41	6	558	Looking NE and wall could be behind us.
02:29	144.77523	14.60083	56	16	568	Looking for good view without smoke.
02:29	144.77522	14.60084	61	14	567	Looking 015.
02:30	144.77520	14.60091	63	11	564	We have moved back to SW position.
02:30	144.77523	14.60092	56	11	563	Need to move to East so plume will go away from us.

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02:30	144.77522	14.60092	54	11	563	Pilot cam with big plume.
02:32	144.77528	14.60086	55	13	565	Plume is blowing toward west.
02:32	144.77528	14.60086	53	12	565	Active area to the right.
02:33	144.77528	14.60087	56	12	564	Very active and picking up. Lots of rocks in plume raining down.
02:33	144.77528	14.60087	56	12	565	Turning overlay off.
02:33	144.77528	14.60087	56	13	565	Turning lasers off.
02:34	144.77528	14.60087	56	12	565	Lots of rocks raining down.
02:34	144.77528	14.60087	56	12	564	Can we lateral around right while keeping it in view.
02:34	144.77531	14.60085	35	12	565	Plume is straight up.
02:35	144.77542	14.60085	342	11	564	Can see wall behind now.
02:35	144.77543	14.60085	352	12	563	Wall is getting buried by ash.
02:35	144.77542	14.60084	343	11	564	Looking 345 and above plume.
02:35	144.77542	14.60085	345	10	563	Looks small from here...only a meter or two across.
02:36	144.77542	14.60087	320	10	563	See lots of rocks out of plume and raining down.
02:37	144.77543	14.60087	324	9	562	There's the wall getting buried by ash.
02:37	144.77543	14.60087	317	9	562	Continuous now.
02:39	144.77543	14.60086	317	10	563	Slowed down again....bubbles.
02:39	144.77542	14.60086	317	10	563	Pulsing.
02:40	144.77542	14.60086	317	10	563	Here we go again.
02:40	144.77543	14.60086	317	10	563	Turning yellow...then throwing rocks.
02:40	144.77543	14.60086	317	10	563	Extruding now.
02:40	144.77543	14.60086	317	10	563	Wow. Lots of rocks extruding.
02:41	144.77542	14.60086	317	10	563	**Saw some red flash.**
02:41	144.77543	14.60086	317	10	563	Going again with yellow preceding.
02:41	144.77543	14.60086	317	10	563	See the base puff in and out.
02:42	144.77543	14.60086	317	10	563	Extruding rocks again.
02:42	144.77543	14.60086	317	10	563	Another big plume of ash raining down.
02:42	144.77543	14.60086	317	10	563	Big extrusion. and bombs.
02:43	144.77542	14.60086	317	10	563	Retrieving wand from basket.
02:43	144.77543	14.60086	317	10	563	Going to try temp first and be prepared for water.
02:44	144.77543	14.60086	317	10	563	Been doing this all day.
02:46	144.77543	14.60086	317	10	563	Observing while retrieving wand.
02:46	144.77543	14.60086	317	10	563	Starting to get ash at Jason now.
02:48	144.77543	14.60086	317	10	563	Need to get a better grip on wand.
02:49	144.77543	14.60086	317	10	563	Ash raining down again.
02:49	144.77543	14.60086	317	10	563	Yellow smoke again in the 3chip.
02:50	144.77543	14.60086	317	10	563	Plume explosions on 3chip and throwing stuff out fairly far away.
02:51	144.77543	14.60086	317	10	563	Gotta a good grip now.
02:53	144.77543	14.60086	316	8	561	Going to maneuver in for a temp sample once the view clears.
02:54	144.77543	14.60086	349	8	561	Big plume again and poor visibility.
02:55	144.77543	14.60086	347	8	562	Need some new tools to study this.
02:56	144.77543	14.60086	347	8	562	Ash raining down on us now.
02:58	144.77544	14.60086	347	8	561	We are not moving with the ash raining down and plume all around.
02:58	144.77544	14.60086	347	8	561	Big ash rain.
03:00	144.77544	14.60086	347	7	561	Yellowish cast to plume...passive ash sampling.
03:03	144.77544	14.60086	347	7	561	Ash raining down in front of us now. Plume in view.
03:04	144.77544	14.60086	347	8	561	Ash rain now moving on to vehicle.
03:04	144.77544	14.60086	347	8	561	Putting overlay on.
03:05	144.77544	14.60086	347	8	561	Using vehicle for scale to view particle size of ash rain on 3chip camera.
03:05	144.77544	14.60086	347	8	561	Putting lasers back on. Overlay back on.
03:06	144.77545	14.60086	347	7	561	More ash rain.
03:06	144.77544	14.60086	347	6	561	Larger pieces of ash rain...scale with lasers on 3chip.
03:07	144.77544	14.60086	347	7	561	Seeing white balls falling down in ash rain.
03:08	144.77545	14.60086	347	7	561	Going to go ahead with a fluid sample here.
03:08	144.77544	14.60086	346	7	561	Piston filter #1 HFS [Brimstone Pit area 14° 36.0519 144° 46.5255]
03:08	144.77544	14.60086	346	7	561	**SAMPLE-7 HFS. Filtered piston #1. Tmax=7.2C Tamb and T2=6.7. Vol=558ml. Raining black ash during sampling. [Brimstone area 144.775425E/14.600865N] PI Butterfield**
03:09	144.77545	14.60086	346	7	562	Ambient water is 6.7.
03:11	144.77544	14.60086	347	7	561	Lots of ash rain right now.
03:12	144.77544	14.60086	346	7	561	Totally raining black. Could be affecting buoyancy.
03:13	144.77544	14.60086	346	6	561	Checking buoyancy with going to auto-depth mode.
03:14	144.77544	14.60086	347	7	561	Looks like we are fairly neutral.
03:15	144.77544	14.60086	347	6	561	Thinking we should back away and go do traverse to let visibility improve.
03:16	144.77545	14.60083	346	8	563	Backing out. Ash falling off of vehicle into basket and view.
03:18	144.77544	14.60079	17	11	565	One more traverse but going for hydrophone first.
03:19	144.77544	14.60079	17	11	566	Medea is on edge of plume...see Jason one minute then not.
03:19	144.77544	14.60079	17	11	565	Going to traverse to the west after picking up hydrophone.
03:20	144.77544	14.60079	17	11	566	Stowing wand.
03:22	144.77544	14.60079	17	11	565	Wand stowed.
03:23	144.77544	14.60079	16	11	565	Going 025 for 52 meters to get hydrophone.
03:24	144.77545	14.60078	128	8	562	On the move...ash coming off vehicle.

time	raw long	raw lat	hdg	alt	Z	Dive J2-192 NW Rota-1 - Dive Log Comments
03:24	144.77549	14.60077	128	8	563	Suction sampler top is totally coated in ash.
03:25	144.77557	14.60070	126	12	566	Driving midwater to hydrophone.
03:27	144.77558	14.60070	31	17	569	Depth of hydrophone is 517m...drove a bit on wrong heading..back on track now.
03:27	144.77561	14.60070	31	23	569	Vehicle ash coming down as we drive up.
03:28	144.77565	14.60070	30	30	566	Driving back into plume as hear north.
03:28	144.77565	14.60070	32	40	568	Temp. is going up here in the plume.
03:29	144.77570	14.60076	6	50	557	Top of plume at 511m. Impressive plume
03:29	144.77570	14.60077	6	44	551	All stop with Jason for tether management.
03:30	144.77571	14.60083	7	40	548	Go due north about 60 meters.
03:30	144.77572	14.60084	8	30	540	Edge of plume.
03:30	144.77566	14.60087	318	24	536	Another edge of the plume.
03:31	144.77564	14.60093	322	14	531	At the correct depth. Driving north.
03:33	144.77562	14.60119	316	16	534	*Doppler reset.*
03:33	144.77562	14.60121	316	17	532	Can see marker in Medea video.
03:34	144.77561	14.60123	315	17	531	Should be peak just in front of us.
03:34	144.77562	14.60126	316	10	524	Great view of marker and hydrophone.
03:34	144.77563	14.60126	315	12	526	Extending basket for hydrophone.
03:35	144.77563	14.60127	315	14	528	Recovering hydrophone.
03:35	144.77563	14.60127	315	13	526	Dropping weight first.
03:36	144.77563	14.60127	315	12	526	Weight away.
03:38	144.77559	14.60132	142	1	518	Very clear here. Hydrophone still sitting on top of ridge. Looks like ash rain on instrument. 40m up from source.
03:39	144.77559	14.60132	138	2	518	Placing Marker weight further on top of ridge.
03:39	144.77559	14.60133	136	3	520	Grabbing hydrophone...backing up to extend basket.
03:39	144.77559	14.60133	135	4	520	RECOVER Hydrophone Picked it up and now placing it in basket.
03:41	144.77562	14.60117	135	4	520	*Doppler reset.*
03:41	144.77562	14.60118	133	4	520	Going to go along ridge to the west to see how far this extends.
03:42	144.77561	14.60116	338	2	519	Turning around to get a wrap out of the line.
03:42	144.77560	14.60119	319	2	519	Head 307deg to go along ridge.
03:42	144.77560	14.60118	306	2	518	Looking along a crack on the ridge..head 310.
03:43	144.77559	14.60120	307	3	519	Jellyfish or something going by.
03:45	144.77557	14.60125	306	4	521	Crest of ridge has linear feature.
03:45	144.77556	14.60126	307	2	521	Biology on top...shrimp up here.
03:45	144.77555	14.60127	306	2	522	Yellow sulfur on top. Big shrimp.
03:46	144.77555	14.60127	306	2	522	Lots of shrimp. See water shimmering with shrimp all over.
03:48	144.77554	14.60128	307	2	522	Can see slump in ash to right in 3chip.
03:48	144.77552	14.60130	307	1	522	Maybe flow leaks out of top of slump.
03:49	144.77551	14.60131	306	1	522	Ridge from things sliding off on each side?
03:49	144.77551	14.60131	307	1	522	Moving ship.
03:50	144.77551	14.60131	307	2	522	No venting here...just at top.
03:50	144.77551	14.60131	307	1	522	No shrimp here.
03:51	144.77551	14.60131	307	2	522	Not a furrow just a little high and the ash slumping away to either side.
03:51	144.77551	14.60131	306	2	522	Jason getting yanked.
03:51	144.77551	14.60131	307	1	522	Medea needs to come closer.
03:56	144.77548	14.60134	296	131	653	Ship has been moved.
03:56	144.77547	14.60134	296	2	523	On our way again.
03:57	144.77544	14.60138	295	1	525	Small holes on surface. Almost looks like forming in situ and not a deposit.
03:57	144.77543	14.60139	299	1	526	Touch down...auto-altitude not working too great for going downslope.
03:58	144.77542	14.60141	329	2	527	Out of yellow deposit here.
03:58	144.77540	14.60142	330	2	528	Going downslope makes it hard to see bottom.
03:59	144.77538	14.60145	331	1	529	Want to stop and take temp probe in the iron deposits to see if possible to form in situ.
04:00	144.77538	14.60145	330	1	529	Retrieving wand from basket.
04:01	144.77538	14.60146	330	1	530	Might not be forming in place now.
04:02	144.77538	14.60147	326	94	624	TEMPERATURE degrees C Very soft here..probe in.
04:02	144.77538	14.60147	326	102	632	Temp is going up...7.3...7.9...8.4...9.0...
04:03	144.77538	14.60147	326	181	711	TEMPERATURE 9.7....10.0
04:03	144.77538	14.60147	326	189	719	TEMPERATURE 0.5...10.8....10.9...11.0
04:04	144.77538	14.60147	326	1	531	TEMPERATURE 1.3...11.8...12.0...12.2...12.3
04:05	144.77540	14.60146	326	1	530	Can't see any flow where probe was removed....looking.
04:06	144.77537	14.60156	322	1	531	Ambient water was 6
04:06	144.77533	14.60160	321	1	530	Going to poke at bottom again to see if create any flow.
04:07	144.77534	14.60150	320	1	530	Temp going up faster at this hole in the blue stripe.
04:08	144.77553	14.60127	321	1	531	Temp slowing down at 12.8....13.5
04:09	144.77556	14.60132	322	1	531	Getting a major out of the basket.
04:11	144.77558	14.60097	322	1	530	**SAMPLE-8 Major (blue). In hole where temp sample taken in iron deposits. Did not fire. sample failed. [W summit 144.775438E/14.601378N] PI Resing**
04:11	144.77544	14.60150	322	15	545	Major In hole where temp sample taken in blue substance.
04:11	144.77544	14.60146	322	16	546	Major is not filling.
04:12	144.77545	14.60136	322	15	544	*Doppler reset. (70 meter offset)*
04:12	144.77546	14.60129	322	20	550	Major Ram fully extended...problem with trigger.
04:14	144.77551	14.60089	322	1	531	SAMPLE-8 Major Not triggering. Good pos from cursor 14deg. 36.091 144 deg 46.5260E

time	raw long	raw lat	hdg	alt	Z	Dive J2-192 NW Rota-1 - Dive Log Comments
04:15	144.77548	14.60063	322	1	531	SAMPLE-8 Major Did not fire...no sample.
04:16	144.77543	14.60152	325	2	530	Taking off again...very diffuse flow on top but couldn't get sample of water.
04:17	144.77543	14.60153	325	2	531	Continuing along ridge...this yellow material was not here in 2004.
04:17	144.77542	14.60156	324	2	531	2004 only ripple marks and caving away.
04:17	144.77539	14.60162	326	2	532	Iron oxide deposit not seen in 2004.
04:18	144.77536	14.60164	8	2	534	Need Medea to catch up.
04:19	144.77532	14.60164	294	2	534	Need to head more 270 to go along ridge.
04:19	144.77529	14.60164	294	1	536	If it changes from orange to white need to take a temp sample.
04:21	144.77522	14.60166	295	2	538	Thick deposit here.
04:21	144.77520	14.60166	288	1	538	Cloud from vehicle.
04:21	144.77516	14.60168	293	1	539	Currents blowing over this ridge creating the roadway on top.
04:22	144.77511	14.60171	295	3	540	Following the orange road.
04:23	144.77510	14.60172	294	3	541	Waiting for Medea.
04:25	144.77510	14.60174	294	3	541	Time for a DVCam tape change.
04:26	144.77505	14.60175	294	2	543	Driving again.
04:27	144.77495	14.60178	294	2	547	Thick here.
04:27	144.77487	14.60178	264	1	548	Plume here not from us...from pit probably.
04:27	144.77484	14.60179	269	1	549	Heavy hugging bottom.
04:28	144.77485	14.60179	273	1	549	Back camera has great view of ridge.
04:28	144.77478	14.60180	280	2	550	Whole thing is leaking fluids...distance to pit is 121 meters.
04:29	144.77478	14.60180	275	1	550	DVD change.
04:29	144.77475	14.60180	273	1	550	Yellow substance confined to top...now seeing to side.
04:31	144.77469	14.60181	269	1	552	Driving at 276dg. Plume coming from bottom?
04:31	144.77468	14.60182	269	1	553	Coating pretty thick here.
04:31	144.77468	14.60181	282	1	552	Stopping here for a temp. sample. Stopping ship.
04:33	144.77468	14.60180	275	1	554	Really thick coating here.
04:34	144.77470	14.60181	275	1	555	Touched down and made a big plume of material.
04:36	144.77472	14.60179	276	1	554	Swing arm is out on stbd.
04:36	144.77472	14.60179	276	1	554	Probe is in
04:36	144.77470	14.60177	276	1	554	TEMPERATURE degrees C Probe in...not climbing fast...8.7
04:37	144.77467	14.60170	276	1	555	*TEMPERATURE degrees C Pos 14deg 36.103 144deg 46.481 good doppler*
04:37	144.77466	14.60166	276	1	555	TEMPERATURE degrees C 10.2....all the ways in...more mat but less temp...10.4
04:37	144.77465	14.60164	276	1	555	Stowing wand.
04:39	144.77466	14.60161	274	3	554	Stowing biobox.
04:39	144.77468	14.60183	274	3	554	*Doppler reset.*
04:40	144.77463	14.60186	275	2	554	Looks like Brimstone again...lots of plume/smoke.
04:41	144.77456	14.60188	276	2	556	Need to head west...plume more likely from us. General snow is not from Jason.
04:41	144.77452	14.60188	277	2	556	There is the ridge..ready to go.
04:41	144.77448	14.60189	273	2	556	Waiting for Medea.
04:42	144.77448	14.60189	275	2	556	We are on crest but not the crest on the map.
04:43	144.77448	14.60189	275	2	556	Nav could be off assuming Medea is just below us but southerly current could make it off.
04:43	144.77448	14.60189	275	1	556	Crest probably did not move...nav offset.
04:43	144.77447	14.60189	274	1	557	Very smoky up here.
04:44	144.77444	14.60189	274	2	557	Brimstone is to SE of us.
04:45	144.77439	14.60189	274	2	558	Is this lava here...surface has changed. Outcrops.
04:45	144.77436	14.60189	276	1	559	Pillow lava covered with ash.
04:45	144.77435	14.60189	274	1	559	Thick coating of ash...some fish.
04:46	144.77433	14.60188	258	1	558	Rock outcrops and yellow stuff is gone and no diffuse venting.
04:46	144.77430	14.60188	255	1	558	Looks like fallout...sulfur globules in 3chip.
04:46	144.77428	14.60187	257	1	558	White down there...is it a vent?? Don't think so.
04:46	144.77426	14.60187	256	1	558	Drove along this in 2004...good comparison.
04:47	144.77419	14.60184	254	2	559	Fish are alive...just a little yellow on top now.
04:47	144.77417	14.60184	252	2	559	Crest is very sharp and almost looks like cracked or separating.
04:47	144.77410	14.60183	248	1	559	More lava flows.
04:48	144.77406	14.60181	251	2	560	Driving fast...lava flows.
04:48	144.77401	14.60180	252	1	559	Big slide.
04:48	144.77399	14.60179	251	2	559	All slid down here.
04:48	144.77395	14.60178	253	3	559	Top is sharp edge...more yellow stuff right after rocks go away. Stopping waiting for Medea.
04:49	144.77395	14.60178	252	3	559	Slumping everywhere so maybe offset in nav could be real. 20meters offset in nav.
04:49	144.77396	14.60176	252	4	560	Slumping is probably continual.
04:50	144.77395	14.60177	251	2	558	Big pillows falling off to port...heading 250.
04:50	144.77391	14.60180	251	6	560	At end of our planned transect.
04:51	144.77389	14.60181	251	6	562	Ready to recover.
04:51	144.77388	14.60182	216	7	564	Science done for J2-192....End of dive. CTD Tow next.
04:52	144.77383	14.60190	150	19	572	Ship heading is good for recovery....J2-192 ending.
04:52	144.77382	14.60192	265	14	570	**Jason off bottom...End of dive J2-192.**
05:32	144.77390	14.60234	237	157	160	Jason on the surface.
05:41	144.77399	14.60241	278	1	2	**Jason on deck.**

5.4.10 J2-193 East Diamante Dive Log

time	raw long	raw lat	hdg	alt	Z	Dive J2-193 E Diamante - Dive Log Comments
J2-193 E Diamante Dive Summary: Longest dive of SRoF'06 (26.75 hrs). Started on NE pinnacle in area of Black Forest'04 where 2 sulfide chimneys were collected - one active and one extinct. After elevator surfaced headed to W pinnacle, which is previously unexplored. Started at the northern base of the pinnacle and climbed up it collecting 3 rocks and 1 crust sample - plus one bio sample (sponge and worms). Found some smoke and shimmering water but no obvious venting source. The top of the ridge was a dense coverage of basket stars, crinoids and deep sea corals. After reaching the summit the area was decimated by dredging/trawling. Quite devastating to see. Next traveled up the small knoll between the western and central domes. Continuing on, traveling up the SW side of the central dome - saw a bit of bacterial mat - had trouble holding station with the current. Next proceeded back over to the eastern dome for more sampling. Collected a suite of samples on the eastern dome at Gnome, 5 Towers and Barnacle Beach including: 14 HFS, 1 gastight, 2 small chimneys, 1 biology, 2 bio-geo, and 1 niskin. At the final vent site - on the central dome - suctioned biota at the Limpets'06 site. Proceeded to the top of the pinnacle (Aquarium site). The currents made it hard to hold station. Witnessed photosynthesis/chemosynthesis boundary. Just a quick glimpse at the pinnacle then end of the dive. 28 samples total.						
J2-193 Bottom time: 4/28/1006 2316 - 4/30 0201 UTC (26.75 hrs). **Z column represents seafloor depth in meters**.						
22:22	145.65000	15.90000	0	0	0	Deploying the elevator here at East Diamante. Will be used on this dive (J2-193) to recover chimneys for Cornel.
22:28	145.65000	15.90000	0	0	0	The elevator is in the water.
22:28	145.65000	15.90000	0	0	0	Will deploy Jason next.
22:40	145.65000	15.90002	2	0	1	J2-193 Dive Configuration: Jason configuration: the beast. single chamber suction. gastight on beast.
22:42	145.64998	15.89999	259	0	1	Jason off the deck.
22:43	145.64998	15.90001	310	0	2	**Jason is in the water.**
22:45	145.64997	15.89999	314	0	3	Medea is in the water.
22:47	145.64997	15.89996	294	0	4	Jason is diving. Start of dive J2-193.
22:59	145.65002	15.89992	13	76	370	Passing through a hydrothermal plume at 293m.
23:09	145.65002	15.89985	219	73	402	Smoky plume.
23:13	145.65003	15.89993	36	63	407	We are heading down to a spot 20-40m east of the chimney field.
23:16	145.64997	15.89992	245	13	413	**On the bottom.**
23:22	145.68208	15.94296	261	10	412	Basket is all cleaned up. Heading 258 to the '04 target called sulfide chimney.
23:22	145.68202	15.94297	259	7	409	Bottom is covered in blocky lavas and oxidized sediments.
23:23	145.68197	15.94293	249	9	405	Could be some sulfur-material here. Slope dominated by sediment. ash mostly probably.
23:23	145.68196	15.94291	253	6	403	Pretty massive lavas here.
23:24	145.68195	15.94289	253	6	402	Planning to pick up an extinct chimney first.
23:26	145.68185	15.94288	258	6	397	A whole lot of sediment probably dominantly ash. The ash is covering the lava blocks where they protrude through. Looks reasonably old. No glass reflections.
23:27	145.68181	15.94288	257	6	394	Size limit for ash is about 3mm. Cornel says Nick should know.
23:28	145.68175	15.94288	257	7	390	We're moving towards the target called Sulfide Chimney'04. At the bottom of the field. Now we're coming into really coarse talus. Some are almost the size of a small car.
23:29	145.68172	15.94287	257	6	387	Massive looking lavas here.
23:29	145.68170	15.94288	256	4	385	Big lavablocks. Not seeing much biology here.
23:30	145.68169	15.94288	256	4	385	Massive lavas no obvious pillows.
23:30	145.68168	15.94287	256	4	384	We're trying to find the field of old chimneys.
23:31	145.68168	15.94288	255	6	383	Massive lavas.
23:31	145.68167	15.94288	318	4	381	We see the chimneys straight ahead. We're there. Depth is 378.
23:31	145.68166	15.94289	290	5	382	We have a couple of old looking chimneys here.
23:32	145.68166	15.94290	295	6	381	The navigation seems to agree with 2004.
23:33	145.68166	15.94290	295	6	381	That's a beautiful extinct chimney. The chimneys are about 2 meters tall.
23:33	145.68166	15.94290	295	5	381	Maybe the little one in the front is 1 meter and the back one is 2 meters.
23:33	145.68166	15.94291	295	5	381	Want to preserve the center of the chimney.
23:34	145.68166	15.94291	295	5	381	We want to get one of these guys here.
23:34	145.68166	15.94291	295	5	381	Jim is going to practice first.
23:35	145.68165	15.94291	296	4	381	These chimneys do change from top to bottom. We may want to get the one that's laying in the front here.
23:35	145.68165	15.94291	295	4	381	They butt up against each other.
23:36	145.68165	15.94291	295	4	381	The chimneys are coming right out of these coarse talus/boulders. Would like to follow this right up the slope eventually.
23:36	145.68164	15.94291	299	2	380	There's a beautiful little tropical fish swimming around the chimney. It's pretty small.
23:38	145.68164	15.94291	299	2	380	Position here is 15 56.5732 145 40.9162. We see bacterial mat here on this old chimney.
23:39	145.68164	15.94291	299	2	380	We see the water shimmering here..
23:39	145.68164	15.94291	299	2	380	These chimneys have manganese coating so they are pretty old. Dated one and it was 850 years old.
23:40	145.68164	15.94291	299	2	380	Going to check the temperatures.
23:42	145.68164	15.94291	298	2	380	TEMPERATURE degrees C Tamb is about 10 but it is fluctuating. There are some critters on the chimney and lots of manganese.
23:43	145.68164	15.94291	297	2	380	No temp anomaly here.
23:44	145.68164	15.94291	296	2	380	Jimmy is going to practice on this chimney.
23:47	145.68163	15.94291	295	4	381	We're going to call this SulfideChimney'06 - nix that….. It's in the same place as the nav in 2004. Old Beard Chimney'06 Cornels name for this chimney. (Was Sulfide Chimney'04). Same position.
23:48	145.68163	15.94291	293	4	381	Jimmy is maneuvering around this chimney trying to find the right spot to sample.
23:49	145.68163	15.94291	293	3	381	Jimmy knocked it against the sub bar.
23:49	145.68163	15.94291	292	3	381	We're tilting the science camera down so that it doesn't hurt it.
23:50	145.68163	15.94291	292	3	381	**SAMPLE-1 Chimney. Extinct sulfide chimney top snapped off and fell into the basket when trying to sample. From the deepest area of the chimneys. Large intact. ~150 lbs and ~3/4 m tall. [Old Beard Chimney'06 145.681937E/15.942887N] PI geogroup (de Ronde)**
23:50	145.68163	15.94291	292	4	381	It's lying on top of the camera.

time	raw long	raw lat	hdg	alt	Z	Dive J2-193 E Diamante - Dive Log Comments
23:51	145.68163	15.94291	292	4	381	There is discussion about whether or not there is flow her. It's pretty old and no apparent flow.
23:52	145.68163	15.94297	292	4	381	Unfortunately it buried all of our weights so we're sitting here with a big chimney on top of the suction sampler trying to get at the weights.
23:53	145.68163	15.94297	295	4	381	Able to remove one of the weights.
23:53	145.68163	15.94296	296	4	381	Sheryl is trying to get some digitals here.
23:58	145.68163	15.94294	295	4	380	Sitting here deciding what to do.
23:59	145.68163	15.94294	295	4	380	Trying to remove another weight. Got it.
00:01	145.68163	15.94294	295	4	380	It looks pretty old. Oxidized outer surface is a couple cm thick.
00:01	145.68163	15.94294	296	9	380	We plan to go to the elevator now.
00:02	145.68162	15.94295	283	14	380	Lifting off and heading there. Won't be hugging the bottom. Elevator is about 200 meters from us.
00:02	145.68162	15.94295	263	15	381	Elevator depth is 350 - 360 meters depth.
00:02	145.68163	15.94295	263	22	382	We have a rather large (understatement) chimney sample in the basket.
00:07	145.68163	15.94292	256	59	378	We're not moving.
00:07	145.68163	15.94293	258	67	385	We're starting to move toward the elevator.
00:08	145.68162	15.94294	261	66	385	This is the deepest of the chimneys.
00:09	145.68159	15.94295	263	59	378	They grow and die within a number of years. That's what we'll find out. The active one we dated from here was 2 years old.
00:33	145.68011	15.94288	302	8	348	We see the elevator in the distance on the pilot cam.
00:34	145.68008	15.94290	302	7	348	The bottom is in sight..
00:34	145.68005	15.94290	299	6	348	Those look like corals.
00:35	145.68003	15.94292	299	6	347	The elevator is sitting in the distance. Looks like lots of basket stars in the area.
00:36	145.67998	15.94292	301	3	348	Zooming in on some basket stars here.
00:37	145.67993	15.94292	354	4	350	Basket stars are a type of star fish with branching arms. They're actually modified brittle stars.
00:39	145.67994	15.94294	351	2	350	Lots of these brittle stars here.
00:40	145.67991	15.94295	359	3	351	Going to land first - obviously.
00:42	145.67987	15.94291	360	2	351	This may take a while. Something about having to take off the half weights first.
00:43	145.67989	15.94293	0	2	351	Placing the weight he took off the elevator on the Jason frame.
00:44	145.67989	15.94293	1	2	351	The top of the chimney snapped off first and rolled off the basket in the front. The big boy just fell on top of it.
00:45	145.67989	15.94292	21	4	351	The top is there too. We have the whole thing.
00:46	145.67988	15.94294	78	2	352	Looks like putting this chimney in that box will be a challenge.
00:47	145.67988	15.94294	78	3	352	The box is about a half meter wide.
00:47	145.67988	15.94294	78	2	352	The chimney is about a meter long and about 40 cm wide at the widest point. That's just a guess.
00:50	145.67988	15.94294	78	3	352	Attempting to pick up the large chimney. Worried about it busting.
00:51	145.67988	15.94294	79	2	352	Discussing different options here.
00:54	145.67988	15.94293	80	3	352	Trying it with the other arm. Hoping to sort of nudge it into the box.
00:55	145.67988	15.94294	79	3	352	Jimmy is going to try using two arms.
00:56	145.67988	15.94294	77	3	352	Delicate operation here. The silence in the room is deafening.
00:57	145.67988	15.94294	77	3	352	Still nudging it. The chimney is too long for the box so trying to upright it. Now it's just laying along the lid top. Partly in the box.
00:58	145.67988	15.94294	77	3	352	SAMPLE-1 Chimney The chimney is in the box. Sitting there at an angle. He's now picking up the top part and setting it to the side.
01:01	145.67988	15.94294	78	3	352	Seems to be a bit more on the sub yet. Could be just dust.
01:01	145.67988	15.94294	75	2	351	We're just going to put the smaller one in the other box.
01:03	145.67988	15.94294	74	2	351	Attempting to secure the box by stretching the bungee. Nicely done Jim.
01:04	145.67988	15.94294	74	2	351	Frame grab of the box
01:04	145.67988	15.94294	74	2	351	Quite a sample there.
01:06	145.67989	15.94296	76	3	351	These things are ephemeral. They're not active for long. The oldest one that was ever preserved was 1200 years old for the Arc Volcanoes. One from the Galapagos was 4000 years old. They are only active for a few years but the structure can last for awhile.....
01:07	145.67989	15.94297	97	4	352	Going to put the top part in one of the smaller black boxes on the elevator.
01:08	145.67989	15.94296	132	2	351	Aside: The depth listed on the overlay is Jason depth - obviously.
01:13	145.67989	15.94296	124	2	351	Still attempting to put the top of this chimney in the elevator.
01:15	145.67989	15.94296	119	2	351	Still trying to put the top in a black box. If the white on is 1200 (o clock). The black box with the chimney top is at 500 (o clock)
01:16	145.67987	15.94295	91	5	353	Successful recovery. Cornel is happy with that.
01:16	145.67985	15.94294	73	5	354	We plan to go back to where we recovered this chimney and then head up the slope.
01:22	145.67985	15.94294	75	5	353	We've just finished stowing the chimneys. Short break here and then back to the chimney field.
01:22	145.67985	15.94294	74	5	353	He wants to figure out the evolution of this system. How long they've been going. Use radiogenetic isotopes to date them.
01:23	145.67985	15.94294	75	5	353	Use different isotopes to date them. Gap between 150 and 250 years is a hard time range to judge.
01:23	145.67985	15.94294	74	6	353	Jim's back.
01:24	145.67984	15.94293	74	8	353	We're going to head 090. Back to the chimney field.
01:27	145.67994	15.94309	77	11	348	There's a problem with the winch. It's making a loud noise. Staying put right here.
01:31	145.68003	15.94318	62	9	351	Trying to bring in the winch very slow.
01:31	145.68003	15.94316	71	8	349	Holding it for now.
01:35	145.67993	15.94321	71	15	356	Looks like things aren't going well here. The ship seems to be moving away from us too. We can't start drifting any more than this.
01:35	145.67994	15.94320	76	13	354	Lots of action here in the van.
01:36	145.67994	15.94324	77	16	357	The wind has picked up.
01:36	145.67996	15.94325	74	16	357	Having trouble staying under Medea.

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01:37	145.67997	15.94326	73	16	358	Can pay in or pay out now.
01:37	145.67998	15.94324	73	14	356	That's much better. It's nice and quiet now.
01:37	145.67997	15.94319	63	11	353	Looks good now. Cable wire looks good. Whew. We have the winch back.
01:38	145.67994	15.94316	79	11	352	Things are looking up here.
01:38	145.67993	15.94315	75	16	351	We're gonna catch our breath.
01:40	145.67994	15.94314	104	38	352	We're going to head back to the Sulfide Chimney target.
01:41	145.67993	15.94315	100	39	353	We're ready to start moving. Hdg 097.
01:41	145.67992	15.94315	92	39	353	The brake on the winch was squeaking a bit. And the ship did a 25 m wander. All at the same time. All is well now.
01:44	145.67992	15.94314	98	25	339	Shift change for the Jason guys.
01:44	145.67994	15.94314	98	28	342	We're heading to the site.
01:45	145.68003	15.94312	94	38	351	Heading toward the chimney site again. This time we want to get an active chimney.
01:56	145.68027	15.94326	332	47	361	FrameGrab
02:09	145.68009	15.94337	331	65	379	Ship is at target.
02:11	145.68007	15.94338	329	48	382	Jason going down.
02:13	145.68168	15.94317	260	16	394	*Doppler reset.*
02:13	145.68168	15.94315	218	15	394	Target is 197 at 30m.
02:13	145.68168	15.94314	217	16	394	Bottom in view
02:14	145.68173	15.94306	323	16	395	Depth is 325 and alt is 17m.
02:14	145.68175	15.94305	323	16	394	Moving ship south and putting Jason under Medea.
02:17	145.68180	15.94297	315	19	397	Go 249 at 22m to target.
02:17	145.68180	15.94297	313	20	398	Waiting for Medea.
02:17	145.68180	15.94296	314	19	397	We have been off the bottom again.
02:20	145.68178	15.94302	317	18	397	Jason has moved away from the wall...heading down again (and west)
02:21	145.68177	15.94301	315	19	397	Heading now 238 to target.
02:22	145.68179	15.94295	316	18	396	Target 11m at 238deg.
02:22	145.68179	15.94295	316	18	396	Waiting for Medea to come SSE.
02:23	145.68180	15.94293	222	15	399	Going to the bottom...Medea is trying to catch up.
02:25	145.68177	15.94291	226	12	396	Blocky lava with a lot of sediment - probably ash. As go upslope more blocky lava and less ash.
02:25	145.68176	15.94291	224	12	396	Very steep slope ahead of us. Chimneys are in a lot of blocky lava.
02:25	145.68175	15.94292	253	11	395	Target 240 at 11m. Target depth is
02:26	145.68174	15.94292	249	14	395	Target depth is 378m.
02:27	145.68170	15.94292	234	12	392	More lava and a bit less sediment.
02:28	145.68169	15.94290	232	13	391	Visibility obscured and appears to be a good current.
02:29	145.68166	15.94285	231	9	387	Very steep slope with blocky lava.. looks old.
02:31	145.68174	15.94292	223	16	394	Ship is having DO problems...waiting for things to settle down.
02:40	145.68168	15.94315	298	17	393	Still trying to get the ship settled...took off on a 35m excursion.
02:41	145.68181	15.94296	217	19	392	*Doppler reset*.
02:43	145.68176	15.94295	242	13	388	Sediment and white staining in the lavas.
02:44	145.68170	15.94293	244	9	382	There are the chimneys. The ones we broke off.
02:44	145.68170	15.94293	244	9	382	This chimney has grown up and over the rock.
02:45	145.68172	15.94295	246	11	385	Nav thinks we are 7 meters away...this not where we broke the chimney off...another one.. old one.
02:45	145.68175	15.94298	244	12	389	We are within a couple of meters of last site. Signs of hydrothermal activity..old activity.
02:46	145.68177	15.94299	244	13	390	At the correct depth now...looking for the chimneys.
02:47	145.68167	15.94291	275	8	386	*Doppler reset.*
02:47	145.68168	15.94291	268	9	387	Very rocky/blocky lava and staining.
02:48	145.68169	15.94291	265	10	388	This is where we started. There is the old chimney. We are going to start here and drive up.
02:48	145.68171	15.94291	218	11	389	This is where we started this dive.
02:49	145.68169	15.94288	223	10	387	Want to head for the target of sulfide #4 … heading is 225 and 5m to go.
02:49	145.68168	15.94287	224	8	385	Going to go upslope.
02:51	145.68172	15.94279	251	10	387	Ship is moving … 11 meters to target.
02:53	145.68170	15.94294	309	11	387	Seeing white staining - old chimney area - heading to where the active chimneys are.
02:53	145.68167	15.94299	312	8	385	Driving up steep wall.
02:53	145.68163	15.94303	310	7	382	Less sediment..hardly any...blocky lava.
02:54	145.68162	15.94304	301	8	382	Transition zone at 378.6 meters of lava and less sediment.
02:54	145.68157	15.94298	211	12	379	White patches from time to time… Some sort of hydrothermal manifestation.
02:55	145.68156	15.94296	217	11	378	We are 366m going upslope.
02:55	145.68154	15.94291	216	11	375	Difficult to spot - here are fallen down chimneys.
02:55	145.68155	15.94289	218	12	376	Old chimneys at 364m. All down at right angles from slope - grown out of blocky lava.
02:57	145.68156	15.94288	216	12	376	Heading for 5 chimney target. Blocky lava with white staining.
02:57	145.68155	15.94287	219	11	376	Changing DVCam tape.
02:57	145.68154	15.94284	217	11	374	Not obvious there is any active venting.
02:57	145.68154	15.94281	217	9	373	Lots of sediment...looks like pelagic sediment coating everything.
02:58	145.68152	15.94279	220	8	371	Sediment about 2cm. thick.
02:58	145.68152	15.94278	224	8	371	At 363 m no chimneys evident.
02:58	145.68151	15.94278	250	7	370	Mostly rock with coating of pelagic sediment.
02:58	145.68152	15.94279	230	9	371	Lava looks more ropey and massive...less blocky.
02:58	145.68152	15.94279	217	8	371	Old pillows. Not obvious flows.
03:00	145.68151	15.94278	235	16	371	Lot more white material here … 361.9 meters - visibility is not great - off bottom at 10m
03:00	145.68145	15.94278	237	10	366	Poor visibility due to being off bottom.. Can see overview of white staining.
03:00	145.68143	15.94280	273	7	364	Probably diffuse stuff at one point. Visibility not great.

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03:00	145.68145	15.94283	275	9	366	Another dead chimney at 357m. Probably 1.5m high.
03:01	145.68145	15.94283	273	10	366	Want to go a bit left.
03:01	145.68144	15.94282	275	8	365	Lot of dead chimneys here.
03:01	145.68142	15.94282	276	8	363	Big nice chimney here.
03:01	145.68141	15.94281	277	7	362	Couple of meters tall.
03:02	145.68141	15.94281	276	8	363	Hard to distinguish against lava.
03:02	145.68142	15.94282	277	10	363	This chimney has white staining...a big chimney.
03:03	145.68140	15.94282	276	12	362	Really big chimney… could be 5 chimneys site but nav has us at 7m away.
03:03	145.68139	15.94282	278	14	361	This chap is over 3 m but less than 5m.
03:03	145.68139	15.94282	278	13	360	Has beehives on top and is venting at the staining.
03:03	145.68140	15.94282	278	16	362	Whole thing is venting.
03:04	145.68136	15.94279	271	14	359	Mark this spot. It is the 5 chimney site (Actually the correct name in 2004 was 5 Towers chimney site) and we want to come back after getting the active one.
03:04	145.68138	15.94274	184	13	360	Now want to go to 5 towers target.
03:05	145.68142	15.94267	211	8	362	*Heading to 5 Towers just a bit south of where we were at 5 Meters complex....getting poor doppler right now.*
03:05	145.68144	15.94269	219	9	364	Here's another chimney… all over the place but hard to see against the lava.
03:05	145.68146	15.94269	221	11	365	A funny looking chimney Could have been a flange in previous life.
03:05	145.68146	15.94270	239	11	366	All venting and some snails here.
03:06	145.68144	15.94271	278	11	364	Most white patches appear to be venting.
03:06	145.68142	15.94272	272	10	362	Depth was correct at the 5 Meter site.
03:06	145.68140	15.94273	272	9	361	Lots of chimneys to left on 3chip.
03:06	145.68139	15.94272	272	7	360	All growing out of this massive lava pile.
03:06	145.68137	15.94272	272	6	360	Lot of snails around staining.
03:07	145.68138	15.94271	281	5	357	A lot of chimneys fallen down… another one hard to distinguish against lava.
03:07	145.68138	15.94273	283	6	358	Huge sulfide field here. There are the hairy snails.
03:07	145.68139	15.94274	282	6	358	Shimmering water
03:07	145.68138	15.94275	282	6	357	Unusual white structure with shimmer.
03:08	145.68139	15.94275	272	8	359	Never seen a structure like this.
03:08	145.68139	15.94274	271	8	358	Interesting fluid sampling target.
03:08	145.68138	15.94273	268	10	358	Put a mark here and call it the White Chimney.
03:08	145.68136	15.94272	272	8	357	.5 meters tall.
03:09	145.68134	15.94270	269	9	357	Target 9 White Chimney at 348.7 meters.
03:09	145.68133	15.94269	290	8	355	Lots of chimneys while panning right.
03:09	145.68131	15.94270	286	9	355	Venting at these chimneys.
03:09	145.68129	15.94270	305	8	355	Huge smoking one here… a big boy.
03:09	145.68129	15.94269	315	9	356	One massive big chimney.
03:10	145.68130	15.94270	332	12	356	Big chimney..huge....3meters tall...taller 4-5 m easy.
03:10	145.68132	15.94270	332	12	355	Huge chimney at least 5 meters.
03:11	145.68133	15.94269	332	13	355	*Doppler not very good...nav is off..hard to see if we are at target or not.*
03:11	145.68132	15.94269	334	15	355	Want to find out how tall it is then fly around.
03:11	145.68131	15.94269	335	15	356	Lot of sediment in water.
03:11	145.68130	15.94269	337	15	356	Lots of smoke here.
03:11	145.68130	15.94269	339	15	356	Active beehives at the top.
03:12	145.68128	15.94272	342	15	353	Lots of venting at top of beehive.... seeing the smoke.
03:12	145.68128	15.94271	325	16	355	Venting gray smoke.. one at back most vigorous.
03:13	145.68129	15.94271	306	16	354	Trying to estimate the total height of the chimney.
03:13	145.68132	15.94273	279	15	355	Peculiar shape with an S-bend. Unusual.. would tend to collapse.
03:13	145.68133	15.94275	270	14	354	Possibly bent by current.
03:13	145.68133	15.94278	264	14	354	Smoke doesn't look like it is coming from this chimney.. maybe just downwind.
03:14	145.68133	15.94277	263	15	354	Depth is 339.5 meters.
03:14	145.68133	15.94277	265	15	354	Switching pilots.
03:14	145.68130	15.94277	265	12	352	If really fragile we'll leave it alone but if not we will sample it.
03:15	145.68128	15.94278	253	11	352	Looking for a sample piece.
03:15	145.68128	15.94279	235	11	352	Active venting from top beehives.
03:16	145.68127	15.94280	196	10	351	More chimneys growing in middle.
03:16	145.68127	15.94280	204	10	351	This is 5 TOWERS. Only Cornel calls it 5 Brothers.
03:16	145.68127	15.94280	204	10	351	May try to slip a bag over it.
03:17	145.68127	15.94280	203	11	351	Nav is good now **[5 TOWERS'06 15° 56.568 145° 40.876]**
03:17	145.68127	15.94280	203	11	351	Preparing for sample of chimney.
03:18	145.68127	15.94280	204	11	351	Retrieving canvas bag.
03:18	145.68127	15.94280	204	11	351	Depth is 340.6.
03:19	145.68126	15.94280	204	10	351	All the beehives are venting.
03:20	145.68126	15.94280	204	9	351	Positioning for the sample.
03:20	145.68127	15.94279	204	9	350	Ambient water is at 12.7deg.
03:22	145.68126	15.94279	204	9	350	Trying to place bag over vent.
03:22	145.68126	15.94279	204	9	350	Bag looks smaller than chimney.
03:23	145.68126	15.94279	204	9	350	Crumbled as bag went over… completely fragile.
03:23	145.68126	15.94279	204	9	350	Not an obvious orifice.... too soft.
03:23	145.68126	15.94278	205	10	350	Look for other chimneys at base.
03:24	145.68130	15.94279	239	11	353	Top 1 meter of beehive looks distinct .

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03:24	145.68131	15.94277	257	9	354	Number of chimneys around here… not small.. 2m. tall.
03:24	145.68131	15.94276	257	10	354	All are pretty big.
03:25	145.68129	15.94280	231	9	353	Swinging around base of chimney looking for a sample.
03:25	145.68128	15.94282	210	10	353	Swinging counter-clockwise.
03:26	145.68129	15.94283	219	10	354	That chimney has yellow coating and some shimmering water at tops.
03:26	145.68128	15.94281	233	7	353	Quite a big clump - mound with several chimneys growing from it. Tallest is over 5m.
03:27	145.68128	15.94280	240	6	352	Usually orange-yellow is silica and can be quite soft. Not always.
03:27	145.68128	15.94281	239	8	353	Looking at another potential chimney sample.
03:27	145.68128	15.94280	239	6	352	This is the base of the really big chimney.
03:27	145.68128	15.94280	239	6	352	Barnacles here.
03:28	145.68128	15.94280	239	7	352	Mat and barnacles.
03:28	145.68128	15.94280	239	7	352	Trying to place bag over another chimney.
03:28	145.68128	15.94280	239	7	352	Mat and barnacles.
03:29	145.68128	15.94280	239	6	352	Trying to get this smaller chimney. 40cm tall and 12cm wide.
03:29	145.68128	15.94280	239	6	352	Top is beehive which will probably break off… sulfides in center.
03:29	145.68128	15.94280	239	6	352	Looks distinctly sulfide.
03:29	145.68128	15.94280	239	6	352	Chimney is bigger than bag. Will try to break off top with manipulator first.
03:30	145.68128	15.94280	239	6	352	Beehive should break away.. stowing bag.
03:30	145.68128	15.94280	239	6	352	Barnacles and mat.... mat and barnacles.
03:31	145.68127	15.94280	239	6	352	Trying to sample with manipulator
03:34	145.68127	15.94281	240	4	351	Tapping with arm… broke to pieces.
03:34	145.68127	15.94281	240	4	351	Sample is gone.. crumbled completely.
03:35	145.68127	15.94281	240	4	351	Not intact enough to sample.
03:35	145.68127	15.94281	240	4	351	Top half fell off into basket.
03:36	145.68128	15.94281	240	7	353	Backing off to let dust settle.
03:36	145.68129	15.94281	240	7	354	Nothing in basket...no sample.
03:37	145.68132	15.94276	240	7	354	Orange colored chimneys are too fragile. Recent orange to unstable.
03:38	145.68130	15.94272	307	5	354	Looking for another sample.
03:39	145.68129	15.94273	307	1	352	Smaller chimneys with white beehive on top.
03:40	145.68129	15.94273	305	3	353	That one is about 20 cm tall...the beehive should drop off. Smoking.
03:40	145.68129	15.94273	305	3	353	Trying the bag technique again.
03:41	145.68129	15.94273	305	1	352	Probably 30cm tall. 10cm high beehive top..3-4cm wide. Can't be more than 240deg.
03:41	145.68129	15.94273	306	1	352	Bag is just fitting over it...beehive crumbled.
03:41	145.68129	15.94273	305	1	352	Not sure of bag is going to preserve it.
03:42	145.68129	15.94273	306	1	352	Doesn't look like any intact structure in bag.
03:42	145.68129	15.94273	306	1	352	Doesn't appear to have anything in bag.
03:42	145.68129	15.94273	306	1	352	Putting bag away.
03:42	145.68129	15.94273	307	1	352	All these at the base are older.
03:43	145.68129	15.94273	308	1	352	Don't want that one...too old.
03:43	145.68130	15.94273	306	5	354	Orange ones are low-temp sulfates...don't want that.
03:43	145.68130	15.94272	305	6	354	New ones tend to be more robust.
03:44	145.68129	15.94271	318	6	354	Moving around base of vent looking for sample.
03:44	145.68131	15.94273	313	5	353	Moving laterally to right.
03:44	145.68132	15.94278	277	6	354	Base has a lot of white staining.
03:45	145.68130	15.94283	244	7	355	Still moving right.. counterclockwise.
03:46	145.68130	15.94288	246	6	354	Don't know full extent of this field so just go in either direction.. left or right to see what is around.
03:47	145.68124	15.94289	243	6	354	Moving along slope at same depth. 348 meters.
03:47	145.68115	15.94289	250	4	352	Massive lava flow here… blocky and ropey and a lot of pelagic sediment.. older.
03:48	145.68112	15.94287	174	4	352	Need to get elevator on surface by 5pm.
03:48	145.68114	15.94280	175	3	351	Older fallen down chimneys… dead ones… moving upslope.
03:48	145.68115	15.94279	175	3	350	Plenty of dead chimneys.
03:49	145.68117	15.94275	125	3	349	Active ones here at 346.7meters.
03:49	145.68117	15.94274	97	2	349	Good targets here for sampling.
03:49	145.68117	15.94272	47	4	351	Ones with the white tops may be good.
03:51	145.68121	15.94272	337	3	351	2004 positions seem to be 15m SW...this year's fixes are NE.
03:51	145.68121	15.94271	341	3	351	Positioning for a sample.
03:51	145.68121	15.94272	341	3	351	Another chimney field here… about 20 chimneys.. smoking.
03:51	145.68121	15.94272	341	1	350	Barely making smoke.. gray more than black.
03:52	145.68121	15.94272	341	2	350	.5meter tall by 15cm wide… see if we can get it.
03:52	145.68121	15.94272	340	2	350	At 348meters among a big pile of lava and not a lot of sediment.
03:53	145.68121	15.94273	340	2	350	Using manipulator to grab chimney.
03:53	145.68121	15.94273	341	2	350	Got a big piece
03:53	145.68122	15.94272	341	3	351	SAMPLE-2 Chimney. Active chimney.. great potential site for HFS site.
03:54	145.68122	15.94272	341	3	350	SAMPLE-2 Chimney Calling this Gnome Vents...chimney still venting while placing it in basket.
03:54	145.68122	15.94272	341	3	350	SAMPLE-2 Chimney Sample split when put in basket.
03:55	145.68122	15.94272	341	3	351	**SAMPLE-2 Chimney. Active chimney. ~40cm tall and 12cm wide. Good flow at this site. Chimney still venting while placing it in basket (it split). T=340C [Gnome Vents 145.68122E/15.942719N] PI geogroup (de Ronde)**
03:55	145.68122	15.94272	341	3	351	Ambient water is 12.2deg.
03:55	145.68122	15.94272	341	3	351	SAMPLE-2 Chimney PI de Ronde.
03:55	145.68122	15.94272	342	3	351	Good flow where sample taken.

time	raw long	raw lat	hdg	alt	Z	Dive J2-193 E Diamante - Dive Log Comments
03:55	145.68122	15.94272	341	3	351	Good flow at site...dropping weight.
03:55	145.68122	15.94272	341	3	351	Bigger flow than before sample.
03:56	145.68122	15.94272	341	3	351	Chimney is in fwd basket ready to go to the elevator.
03:57	145.68122	15.94272	341	3	351	We are at payload at the elevator. 50-60lbs estimate of weight.
03:57	145.68122	15.94272	341	3	351	280deg 144m to the elevator.
03:58	145.68123	15.94271	339	5	352	Great spot for water sampling.
03:58	145.68125	15.94273	288	18	352	Another big one adjacent to this site… 4 meters at least high.. with 4 turrets on top with 20 1-meter chimneys.
03:58	145.68124	15.94274	284	19	351	A big field here.
03:59	145.68116	15.94278	285	14	348	Driving through water column. 280deg heading to elevator.
04:11	145.67994	15.94291	285	15	347	At the elevator target and going down.
04:11	145.67994	15.94291	286	8	348	There is the elevator.
04:11	145.67994	15.94291	285	5	347	Switched pilots.
04:12	145.67992	15.94292	273	1	349	Nice biology neat elevator...soft coral.
04:13	145.67990	15.94290	338	1	350	Look at the old chimney sticking out of the elevator box.
04:13	145.67988	15.94291	333	1	350	Chimney is still venting.
04:14	145.67989	15.94290	333	1	350	Getting ready to transfer chimney to elevator.
04:15	145.67988	15.94291	333	1	350	Got it.... Placing in elevator box. Looks good.
04:16	145.67988	15.94289	333	1	350	Giving bridge notice that elevator will be ready to surface in 15 minutes.
04:16	145.67987	15.94288	333	1	350	We will wait here for 15 minutes until it releases to surface.
04:17	145.67989	15.94285	329	1	350	Pull pin is 90deg around. Backing away from elevator.
04:18	145.67989	15.94285	334	2	350	Will hover here.
04:18	145.67989	15.94285	333	2	350	Positioning Medea and Jason for elevator release.
04:26	145.67990	15.94285	333	2	349	Waiting for ship to get ready for recovery.
04:32	145.67990	15.94285	333	1	349	Calling bridge for release.
04:33	145.67988	15.94285	333	2	350	Positioning for release.
04:35	145.67988	15.94286	332	1	350	Have loop in manipulator.
04:35	145.67989	15.94286	329	1	350	Grabbing and pulling away.
04:36	145.67991	15.94285	311	2	349	There it goes...let go.
04:38	145.67969	15.94300	334	27	357	Will have to maneuver to follow ship around.
04:49	145.67967	15.94303	290	49	359	On surface.
04:49	145.67968	15.94303	292	48	358	12 minutes to reach surface.
04:59	145.67973	15.94307	141	95	380	Elevator at stern of ship.
05:01	145.67968	15.94314	153	117	401	Monitor shows billowing smoke at vehicle...depth is 284m.
05:02	145.67968	15.94315	153	119	403	116m altitude with billow of smoke.
05:02	145.67967	15.94317	153	130	415	Position is 15deg 56.590 145deg 40.780E
05:02	145.67967	15.94318	154	119	404	On edge of a plume
05:03	145.67966	15.94319	154	116	401	Big plume.
05:06	145.67960	15.94332	155	181	466	After recovery we want to go back to Gnome to water sample.
05:06	145.67959	15.94334	156	138	423	Current going to the NW.
05:29	145.67921	15.94423	108	168	420	Will move ship at .7knts back to dive target once elevator secured.
05:35	145.67898	15.94427	81	169	422	Waiting for ship to turn heading before ready to switch to DP.
05:36	145.67896	15.94426	80	142	411	Approx. 1.5 hours to get back to target.
05:49	145.67888	15.94422	339	168	449	Not making headway with 2kt surface current.
05:50	145.67888	15.94422	339	145	426	Current is setting us north.
06:13	145.67916	15.94374	310	178	447	We've decided to head toward the western (previously unexplored) pinnacle. Should take about an hour.
06:51	145.67917	15.94287	4	119	422	We have arrived on site above the western pinnacle. Jason is at 295m. Preparing to descend.
06:52	145.67918	15.94287	6	103	422	Water already appears smoky. Is there a plume down there?
07:00	145.67918	15.94277	359	38	488	Heading to the bottom
07:02	145.66935	15.94522	163	2	476	Bottom in sight
07:02	145.66936	15.94521	116	1	475	Stingray
07:03	145.66933	15.94511	182	2	473	Coming up slope slightly.
07:03	145.66932	15.94506	179	2	471	Big burrows.
07:04	145.66931	15.94504	181	2	471	Sediment is quite thick probably at least 10cm or so.
07:04	145.66930	15.94499	181	2	470	Might be another fault to stbd.
07:05	145.66929	15.94499	180	2	470	Some outcrop of rock//highly vesicular.
07:05	145.66931	15.94498	182	2	470	Vesicular andesite and shell material in sediment.
07:06	145.66935	15.94496	181	2	469	Small organisms.
07:06	145.66936	15.94497	180	2	469	Auto-altitude drove Jason right into the bottom.
07:06	145.66936	15.94496	180	3	469	Very soupy sediment.
07:07	145.66936	15.94488	182	2	467	More vesicular outcrop.
07:07	145.66939	15.94484	180	2	465	Rock outcrops with very large holes in them.
07:07	145.66939	15.94484	180	2	465	Gassy lava?
07:08	145.66940	15.94479	180	2	463	Interesting lava or something we should get a sample of
07:08	145.66940	15.94478	180	3	463	Big dike or columnar piece.
07:08	145.66939	15.94465	179	5	460	More sediment and less outcrop again.
07:09	145.66939	15.94456	179	4	458	Seastars.
07:09	145.66939	15.94455	183	4	457	More outcrops but not vesicular.
07:12	145.66934	15.94437	180	4	453	Small boulders on the sedimented slope.
07:13	145.66934	15.94423	180	3	449	Sediment cover is pretty thick.

time	raw long	raw lat	hdg	alt	Z	Dive J2-193 E Diamante - Dive Log Comments
07:14	145.66934	15.94417	180	3	448	Continuing to head south.
07:15	145.66934	15.94408	181	3	447	Crossing a number of massive boulders.
07:18	145.66934	15.94376	179	3	446	Looks like rubble slope of lava blocks. Slope is increasing.
07:20	145.66935	15.94366	180	3	447	Just passed some sort of 20cm blue fish that looked a bit like a catftsh (appeared to have long "whiskers").
07:21	145.66935	15.94361	180	2	447	Crossing an area of ripple marks parallel to the contours.
07:25	145.66935	15.94336	180	8	440	Just crossing a massive boulder (car sized).
07:26	145.66931	15.94329	209	3	432	Large lava blocks separated by areas of heavy sediment.
07:27	145.66926	15.94329	163	6	436	Looks like there might be some kind of fault near here.
07:28	145.66924	15.94329	204	2	432	These big piles of lava probably explain the steep contours on the map.
07:28	145.66924	15.94330	223	2	432	Crossing a large lava flow surrounded by blocky lavas.
07:29	145.66924	15.94329	253	3	433	We are now going to head due west along the escarpment of this fault.
07:31	145.66906	15.94341	217	5	429	Crossing an area of jumbled lava block of very different sizes.
07:32	145.66889	15.94341	217	6	424	Lava appears fairly old based on the degree of sediment coverage.
07:34	145.66878	15.94342	235	7	419	Water becoming more turbid.
07:35	145.66871	15.94344	229	5	417	Just saw a crinoid and a small coral.
07:36	145.66870	15.94344	229	7	417	Quite a few small black fish on these blocky lavas.
07:37	145.66862	15.94342	230	5	414	Continuing westward.
07:38	145.66859	15.94341	212	4	413	We've seen several red spiny crabs amongst the lava blocks.
07:47	145.66817	15.94339	208	6	406	The bottom is covered by what appears to be a crust of some sort. Manganese?
07:47	145.66815	15.94336	208	7	403	Just saw some sort of white sea urchin with dark spines.
07:47	145.66814	15.94334	207	7	402	We are now heading SSW.
07:49	145.66816	15.94321	206	4	392	Consensus is that this a very old crust.
07:50	145.66817	15.94316	207	5	388	Crust becoming more rugose.
07:51	145.66816	15.94304	210	5	378	Pretty barren environment in terms of macrofauna.
07:52	145.66818	15.94298	208	3	373	We're still climbing slowly. Now at 370m.
07:53	145.66819	15.94291	205	5	367	Water is getting more turbid again.
07:54	145.66818	15.94291	98	7	366	Is this "smoke" from the chimney
07:55	145.66819	15.94287	200	4	364	Is this smoke from the other chimneys or is there another plume source here?
07:57	145.66823	15.94277	197	2	359	Back amongst large boulders and lava blocks.
07:57	145.66823	15.94273	195	6	357	Moving onto a massive lava flow.
07:58	145.66822	15.94269	196	5	352	Eh is continuing to fall. Was about 110 but now down to about 78.
07:59	145.66820	15.94265	197	5	348	Visibility is getting steadily worse.
08:00	145.66819	15.94259	194	8	342	Climbing a very large lava flow. Several metres thick.
08:01	145.66821	15.94253	206	12	333	Passing a large crinoid and another of the red crabs on this massive lava flow.
08:01	145.66821	15.94252	210	14	333	We're now up to 320m.
08:02	145.66819	15.94251	300	2	317	We have entered an area with very smoky water.
08:04	145.66817	15.94249	284	6	319	We just passed an area of shimmering water atop the lava flow.
08:04	145.66816	15.94248	289	4	318	Seems like there might be a local source for this smoky water.
08:05	145.66816	15.94247	319	5	320	Top of flow also had several large corals.
08:06	145.66816	15.94242	310	1	318	Looking around the top of the flow trying to find the venting source.
08:09	145.66819	15.94241	237	5	319	We may have found some shimmering water coming out of the lava flow.
08:12	145.66818	15.94242	283	3	319	We can see a wafting flow and some shimmering water but we can't identify the source.
08:15	145.66816	15.94243	289	2	319	Still can't find any obvious venting source.
08:17	145.66817	15.94242	307	1	318	Quite a few medium sized white corals and some orange crinoids here.
08:19	145.66814	15.94242	278	169	487	Eh has climbed back up from a low of 68 to almost 110.
08:23	145.66808	15.94245	240	6	321	Amount of particulate material has just increased quite a bit.
08:26	145.66813	15.94236	285	1	308	Still climbing the large flow feature. Now at 307m. Lots of white corals.
08:27	145.66817	15.94235	219	3	310	Flows are quite fractured.
08:28	145.66812	15.94230	182	5	311	Visibility is getting better than it was down at 320m.
08:30	145.66809	15.94228	214	12	309	Flow appears to have numerous joints and gas vesicles.
08:31	145.66809	15.94227	213	14	308	We are nearing the top of a ridge. There is a large boulder here. Not clear where it came from.
08:32	145.66807	15.94224	210	11	296	Numerous basket stars atop the flow.
08:33	145.66804	15.94219	192	6	284	FrameGrab
08:33	145.66805	15.94218	196	5	283	there is a long line of basket stars lined up along a ridge.
08:36	145.66810	15.94206	225	3	274	Density of basket stars here is amazing!
08:40	145.66804	15.94196	249	8	277	The tops of the peaks here are covered with basket stars corals and crinoids. Very dense coverage.
08:44	145.66801	15.94176	184	9	276	Climbing a steep spire. Lots of basket stars and corals.
08:45	145.66800	15.94178	183	9	273	Top of the spire is at 264m.
08:47	145.66800	15.94183	78	7	271	This would appear to be the highest point for this particular summit.
08:49	145.66810	15.94174	259	4	279	We're trying to find a place to pick up a rock.
08:54	145.66804	15.94186	22	1	280	We're seeing some very bright yellow anemones. Will try for a still after we collect the rock.
08:58	145.66804	15.94192	72	39	319	Still setting up to take a rock sample.
09:01	145.66795	15.94189	72	1	280	**SAMPLE-3 Rock sample from the highest point for this particular area (small peak north of main western pinnacle). [145.668038E/15.941853N] PI geogroup**
09:01	145.66794	15.94189	71	1	280	position 15 56.511 145 40.087
09:06	145.66810	15.94184	46	1	280	Just took a series of stills of what appears to be a rather unusual yellow anemone.
09:07	145.66804	15.94184	47	1	280	*We will now head to the south west to another local topographic high. [big doppler reset jump - cut the wandering data]*
09:10	145.66798	15.94179	273	6	278	Beautiful yellow anemones with white coral nearby at top of cone.
09:12	145.66782	15.94170	201	3	278	Going to move off to the SW and go onto a plateau area then will go S from there to top of cone.

time	raw long	raw lat	hdg	alt	Z	Dive J2-193 E Diamante - Dive Log Comments
09:19	145.66749	15.94160	245	3	305	Moving SW to plateau through water column and have quite turbid water.
09:28	145.66734	15.94146	173	4	316	Going to collect a rock sample here from what looks like highly vesiculated rock. Almost pumice like?
09:32	145.66738	15.94142	173	4	316	**SAMPLE-4 Rock. Collected a piece of the tan colored highly vesiculated - almost pumice-like rock. [W peak saddle area 145.66734E/15.94146N] PI geogroup**
09:37	145.66723	15.94134	296	10	318	Moving off again to the SW and see more turbidity in the water column.
09:43	145.66694	15.94130	258	11	319	A little crater up ahead.
09:46	145.66682	15.94122	257	4	305	Massive pyroclastic flow here?
09:54	145.66652	15.94100	240	9	290	We have no audio on the DVcam.
09:56	145.66644	15.94091	239	6	289	We are going to go up the steep slope to the southwest.
10:02	145.66642	15.94074	180	9	314	Going back to the bottom and heading south.
10:04	145.66642	15.94054	180	9	318	Heading into the south part of the steep sided crater.
10:07	145.66647	15.94047	180	6	315	Sediment pockets.
10:08	145.66649	15.94045	180	16	313	Starting up the steep slope and the south side of the crater-like feature.
10:11	145.66648	15.94033	180	4	296	Tiny little rockfish.
10:12	145.66646	15.94031	180	4	295	Massive vesiculated flow. Could be a lava dome.
10:12	145.66647	15.94031	180	4	295	It could be dacite or rhyolite.
10:13	145.66647	15.94028	180	4	294	Lots of fractures in the surface.
10:14	145.66648	15.94024	180	3	291	Manganese iron coating on the surface.
10:16	145.66646	15.94021	180	5	290	Slip fault or thermal contraction in the surface.
10:16	145.66647	15.94018	180	3	287	Crack appears very deep.
10:18	145.66646	15.94008	179	6	283	We have come to a vertical wall.
10:19	145.66645	15.94007	181	17	282	There are some large pits in the wall as we rise up it.
10:19	145.66644	15.94003	180	22	280	Water is getting murky. There is a lot of carbonate sediment on the rock.
10:20	145.66642	15.93996	180	9	267	This looks like more of the dome with a very uniform surface.
10:20	145.66642	15.93995	180	7	266	Surface is covered in small corals.
10:21	145.66641	15.93994	180	3	261	Carbonate bits look like coral debris.
10:22	145.66640	15.93992	180	3	261	They may be hydrozoans.
10:23	145.66646	15.93988	180	3	257	We are following another deep crack.
10:25	145.66646	15.93978	180	3	251	Gorgonian corals but what is the yellow stuff?
10:26	145.66644	15.93972	180	3	248	They are deep water hard corals likely lacking zoanthellae.
10:27	145.66646	15.93967	180	3	245	Layered crust. Stopping to get a closer look.
10:32	145.66647	15.93967	176	2	245	SAMPLE-5 Crust. Not sure if it is crust or lava.
10:33	145.66647	15.93967	175	2	245	There is red algae on this crust at 243 m.
10:35	145.66647	15.93967	176	2	245	SAMPLE-5 Crust We did not get the sample yet. It was too tough to break.
10:37	145.66647	15.93966	179	2	244	Looks like these crusts may have flowed down then degassed and contracted.
10:39	145.66646	15.93966	179	2	244	Still trying to find a good piece to break off.
10:42	145.66652	15.93967	161	2	244	Repositioning to get a better grip.
10:43	145.66651	15.93967	164	2	244	Having trouble getting leverage because the vehicle is not very stable here.
10:44	145.66652	15.93967	166	2	244	This material is more solid than it looks.
10:46	145.66651	15.93967	165	2	244	Going to drop the weight on this piece to break it into a smaller sample.
10:49	145.66651	15.93967	165	2	244	That didn't work either. Trying for another smaller piece.
10:51	145.66651	15.93967	165	2	244	**SAMPLE-5 Crust. Small piece of crust (layered in this area). [N of peak - but near- top of W pinnacle 145.666514E/15.939671N] PI geogroup**
10:52	145.66651	15.93967	165	2	244	Moving the suction hose out of the way.
10:55	145.66651	15.93968	165	2	245	Continuing up the slope to the south.
10:56	145.66651	15.93968	178	2	244	There is diffuse flow coming out of this crust.
10:57	145.66651	15.93968	179	3	244	Shimmering could just be a density difference effect.
10:57	145.66651	15.93964	180	4	243	Continuing south then we will go to the hill to the southeast.
11:00	145.66650	15.93953	180	3	239	Lots of coral debris as we pass up through 235m.
11:02	145.66649	15.93946	180	3	237	We are approaching a large crack in the flow.
11:02	145.66649	15.93943	179	5	236	Looking down on the interior of the flow.
11:03	145.66649	15.93936	179	6	236	This is a huge cracked dome of lava.
11:04	145.66650	15.93930	179	3	231	Investigating white patch ahead. They are polychaetes and are covering a very large area.
11:05	145.66654	15.93928	178	4	231	Stopping to take some photos.
11:06	145.66654	15.93927	181	3	232	There are corals and polychaetes and red algae. Oh my!
11:07	145.66654	15.93927	181	3	232	Worms look like they are imbedded in some sort of mucous.
11:08	145.66654	15.93927	181	3	232	Verena says it is a sponge. There are possibly chitinous tubes within it.
11:10	145.66654	15.93927	181	3	232	Going to try to get a sample.
11:11	145.66654	15.93927	181	3	232	Water is shimmering again but it seems unlikely that it is hydrothermal.
11:14	145.66654	15.93927	179	3	232	**SAMPLE-6 Bio-macro. Sponge with embedded worms. [west cone on the north part of the summit dome 145.666541E/15.939271N] PI Tunnicliffe**
11:16	145.66654	15.93927	180	3	232	High density of the yellow hard corals all around.
11:17	145.66654	15.93927	180	3	232	There are more patches of these sponges in the distance.
11:18	145.66653	15.93927	180	3	232	Here is a lovely Comatulid crinoid that is folded closed.
11:23	145.66650	15.93924	178	3	230	These crinoids are free swimming and do not have stalks.
11:23	145.66651	15.93922	179	3	229	We are continuing on to the south.
11:24	145.66653	15.93916	179	2	227	We are seeing more red algae as we go up. More Gorgonian corals as well.
11:27	145.66657	15.93911	208	2	227	Hydroids. No it's a different type of free swimming crinoid.
11:29	145.66645	15.93915	204	2	227	We seem to have reached the top of this peak.
11:29	145.66637	15.93911	207	3	226	It is the top of the west cone.
11:31	145.66636	15.93902	185	3	225	Lots of schlieren here. Bob is really enjoying saying schlieren.

time	raw long	raw lat	hdg	alt	Z	Dive J2-193 E Diamante - Dive Log Comments
11:31	145.66636	15.93900	182	2	225	Lots more gorgonians and crinoids.
11:32	145.66636	15.93898	182	2	225	We are going to head to the cone that is southeast of us next.
11:34	145.66633	15.93891	183	1	224	There is an abrupt break in the biology. It looks like a dredge track.
11:36	145.66634	15.93887	183	1	223	The top is covered in broken off dead coral stalks.
11:39	145.66636	15.93877	183	1	222	The area of the dredge damage is very extensive.
11:41	145.66637	15.93876	119	1	222	Seeing more plankton in the water.
11:43	145.66657	15.93867	119	1	223	Stopping to take a closer look at these dredge beds.
11:44	145.66660	15.93865	119	39	260	Claw deep at the deepest point. About 10 cm deep of dredge kill.
11:45	145.66664	15.93864	120	1	222	Zooming in on a gorgonian.
11:46	145.66673	15.93864	117	3	223	The yellow corals take years and years to grow.
11:48	145.66683	15.93858	120	3	224	So we're moving again. There was a tuna? in the Medea cam.
11:49	145.66683	15.93858	120	3	224	They looked like tuna in the Medea cam.
11:51	145.66690	15.93855	120	4	225	We're transfixed on the tuna. Dara says he has bacteria on his face.
11:52	145.66695	15.93853	121	4	226	We're moving very slowly. Looks like we're getting out of the area of carnage.
11:52	145.66699	15.93853	121	5	226	We seem to be losing the coral here. Perhaps it is on the other side of the ridge.
11:55	145.66709	15.93838	120	8	229	Moving again. We have to leap into the abyss. We're going to go 200 meters through the water column to the next knoll.... and then we're going to Aquarium.
11:56	145.66716	15.93832	120	9	231	Verena think that dredge kill could have been in the range of 10 years ago.
12:11	145.66790	15.93798	118	103	325	Still in the water column.
12:25	145.66895	15.93745	130	2	350	Coming down to the bottom again. Plan to head up this small knoll.
12:27	145.66899	15.93737	132	2	351	Lots of white stuff on the bottom here. Looks like mat. Could be calcareous??
12:28	145.66900	15.93737	128	2	351	Looks similar to what we just came off. Massive sheet-like lava flows.
12:29	145.66904	15.93731	131	4	349	We're in the saddle between these two peaks at 345 meters.
12:29	145.66904	15.93730	129	4	349	Vesicular lavas again.
12:31	145.66909	15.93724	131	3	346	Cracks in the lava that are in flowed with sediment.
12:32	145.66914	15.93720	132	5	343	Close up of the lava. Could be combo of staining and oxidation.
12:33	145.66917	15.93717	129	4	338	We're doing a bit of nav housekeeping here then will move up this slope.
12:34	145.66919	15.93715	130	5	336	Bob thinks these lavas are hundreds of years old (at least)... But there is not much sediment so ?? The white stuff looks like calcium carbonate says Verena.
12:35	145.66926	15.93711	130	7	332	We're debating how to do this.
12:37	145.66942	15.93700	129	11	314	Verena is commenting on the pocked terrain. Looks like it has seen better days.
12:39	145.66951	15.93696	130	11	306	We're hoping to see a chemosynthetic/photosynthetic overlap zone.
12:42	145.66966	15.93685	132	12	287	The visibility is decreasing here. We can see a plume here.
12:42	145.66968	15.93684	130	14	289	Where is the smoker?
12:44	145.66978	15.93682	132	10	283	This peak looks the same as the previous one. We're creeping along.
12:46	145.66984	15.93677	132	4	277	Visibility is clearing up a bit. Not much biota here.
12:46	145.66989	15.93673	130	4	276	Seawhip ahead.
12:48	145.66996	15.93666	130	3	274	We're seeing a few very small hydrozoa and lots of carbonate sediments in the pockets here.
12:50	145.67006	15.93661	130	5	273	We're nearly at the top of this knoll. The crust is more broken here.
12:54	145.67015	15.93656	129	5	272	We're going to make a water column leap to the next knoll.
12:55	145.67017	15.93655	87	5	272	Making the grand leap. Will leap off this peak to the saddle between.
13:18	145.67142	15.93667	85	31	322	We're descending into a plume here.
13:19	145.67141	15.93674	77	3	320	Eh is dropping a bit. We're at 96 now.
13:20	145.67142	15.93674	84	3	320	We want to go along the bottom.
13:20	145.67141	15.93671	79	4	322	*We're going to reset the doppler.*
13:22	145.67262	15.93668	53	5	323	Heading down to the bottom. We will climb up the SW side of this center pinnacle.
13:23	145.67265	15.93670	51	4	322	This is a very steep slope.
13:24	145.67270	15.93674	52	4	319	Not much excitement here. Talus. Quite a bit of "smoke" in the water.
13:27	145.67279	15.93683	51	5	313	Moving up slope....
13:28	145.67283	15.93685	51	6	310	Bob is zoomed in on a ??? (looks like a slug)
13:28	145.67287	15.93688	53	5	306	More particles in the water. The rocks seem to be covered with this detritus.
13:29	145.67288	15.93689	51	4	304	The Eh has plummeted down to 25.
13:29	145.67289	15.93690	53	5	304	There is a light film on the rocks here.
13:29	145.67289	15.93691	51	4	303	Eh is down to 15.
13:30	145.67289	15.93693	54	6	303	We're going to do a bit of lateralling.
13:30	145.67293	15.93691	52	6	301	That's some mat on the rocks here.
13:31	145.67297	15.93691	91	4	297	The mat is waving on the rocks here.
13:32	145.67303	15.93690	90	2	293	There is mat covering these rocks.
13:39	145.67309	15.93686	202	14	290	We're chasing the plume.
13:39	145.67303	15.93678	201	21	296	Going to turn around here and head back up.
13:39	145.67303	15.93676	203	22	297	Eh is 62 here.
13:41	145.67292	15.93649	204	40	315	We're flying through the water column down to the red cross and going to go back up hill again. Looking for the Eh anomaly.
13:44	145.67295	15.93653	1	48	330	Lots of plumage in the water here.
13:50	145.67286	15.93643	356	6	329	Change of watch.
13:54	145.67283	15.93661	7	4	323	Heading 007...lots of rocks with sediment.
13:55	145.67281	15.93665	6	7	322	Big rock.
13:56	145.67277	15.93668	7	5	321	Getting closer to bottom. Hard to see with the visibility.
13:58	145.67276	15.93667	8	5	321	Big blocky rocks covered in sediment.
13:58	145.67276	15.93667	7	4	321	Driving uphill.
14:00	145.67286	15.93673	7	4	316	Big broken pillows.

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14:00	145.67287	15.93675	7	3	314	Talus blocks.
14:01	145.67291	15.93686	3	4	305	Visibility poor...looks like mat on rocks and eH is dropping dramatically.
14:01	145.67292	15.93689	5	4	304	Depth is 300.
14:01	145.67292	15.93691	5	3	302	Driving upslope through big broken talus.
14:02	145.67292	15.93695	3	4	300	Looks like thin coating of white mat.
14:02	145.67290	15.93698	301	2	299	Turning toward target.
14:03	145.67286	15.93697	300	3	301	Continuing up to summit. Visibility is very poor at 2m altitude.
14:04	145.67282	15.93698	330	4	303	EH stopped dropping and then gradually climbed.
14:05	145.67284	15.93702	40	3	299	Traveling toward summit.
14:05	145.67287	15.93701	51	4	299	175 meters to summit.
14:06	145.67291	15.93702	31	2	297	Lots of fish on Medea camera.
14:06	145.67290	15.93703	31	3	297	Visibility much improved at 294m. Talus blocks.
14:07	145.67287	15.93704	31	4	297	Little bit of bacterial mat.
14:07	145.67286	15.93704	31	4	297	More fish as we climb up...293m.
14:08	145.67286	15.93709	31	4	294	Large talus pieces.
14:09	145.67287	15.93719	36	3	288	Summit of cone we visited in 2004. We are going up a different side of the summit than 2004.
14:09	145.67287	15.93723	33	6	286	Definite mat on the rocks. Pretty thin.
14:09	145.67290	15.93725	30	2	282	Medea cam shows the big rock we bumped into.
14:10	145.67290	15.93727	33	6	281	Off the big blocks into smaller talus blocks...still some big boulders.
14:10	145.67294	15.93730	30	5	280	Top had big spires in 2004. This probably shed off the top of cone during eruptions long ago.
14:11	145.67297	15.93730	30	5	280	Fish.
14:11	145.67300	15.93731	28	7	278	Large boulder in talus.
14:13	145.67306	15.93740	30	4	268	Smaller talus and steeper slope.
14:14	145.67305	15.93744	31	4	267	Stalked biology...sea whips.
14:14	145.67304	15.93744	31	3	267	Little bit of mat but less.
14:14	145.67304	15.93745	33	4	267	Good visibility.
14:15	145.67304	15.93750	27	7	265	Huge wall in front of us... actually a big intact rock.
14:16	145.67309	15.93757	31	5	256	At 255m and climbing (maybe top is 165m.)
14:16	145.67310	15.93758	30	5	256	Smaller talus.
14:16	145.67312	15.93760	31	4	253	Little corals on the talus. and seawhips.
14:16	145.67312	15.93761	20	4	253	Large boulder in talus.
14:17	145.67313	15.93765	28	6	251	Big rock outcrop...corals on underside of boulder.
14:18	145.67314	15.93766	26	2	247	May be a tiny bit of shimmer between rocks...stopped for a look.
14:18	145.67314	15.93766	27	2	247	Going up again.
14:19	145.67314	15.93768	26	3	246	Edible looking fish.
14:20	145.67318	15.93775	27	4	243	Smaller talus.
14:20	145.67320	15.93778	27	4	242	Orange fish...medium-sized.
14:21	145.67321	15.93778	26	4	241	Not a lot of mat here.
14:21	145.67321	15.93779	27	3	240	Tiny bit of fuzz coating of mat on rock faces.
14:21	145.67321	15.93781	26	4	240	Beautiful soft coral or something.
14:22	145.67323	15.93781	26	3	238	Larger pieces of talus.
14:22	145.67326	15.93784	27	4	236	Orange fish again.
14:23	145.67328	15.93785	27	4	235	Multiple orange fish hiding in cracks at 231m.
14:24	145.67332	15.93791	31	7	229	More intact boulders.
14:25	145.67329	15.93796	32	5	227	Some shimmering in these rocks.
14:25	145.67331	15.93799	32	4	225	Strongest shimmer seen on this entire traverse.
14:26	145.67332	15.93801	33	4	225	Lots of sandy sediment.
14:26	145.67334	15.93806	33	7	223	Sedimented slope with shimmering at 217m.
14:27	145.67334	15.93808	30	7	221	Big cliff in front of us.. big wall.
14:27	145.67332	15.93809	21	13	221	Stop ship to look round. Need to come top of wall because Medea is dragging us into the wall.
14:28	145.67331	15.93812	24	26	221	Amazing wall… cliff depth at 197 and still climbing.
14:28	145.67330	15.93817	351	17	202	Top of cliff is at 186m.
14:29	145.67328	15.93818	340	6	188	Green algae and soft corals on top of cliff. We are at 180m. More fish.
14:29	145.67332	15.93823	342	8	190	Want to go back to base of cliff once ship and Medea are in position to look for shimmer.
14:29	145.67334	15.93824	340	4	187	In photic zone at 182 metes.
14:30	145.67333	15.93828	49	9	189	Waiting for vehicles to position...fish swimming around.
14:33	145.67339	15.93826	359	24	187	Ship is stopped… looking for Medea.
14:33	145.67340	15.93823	1	22	184	We are 20m shallower than top of cliff.
14:35	145.67348	15.93823	36	32	190	Not making headway with getting Medea and Jason together.
14:36	145.67356	15.93828	46	22	181	Current is not allowing us to drive.
14:38	145.67357	15.93820	33	34	186	Problem getting back to Medea… current probably was very strong at top of cliff or something is wrong with the vehicle.
14:39	145.67357	15.93819	34	37	189	time for tape change.
14:40	145.67353	15.93813	34	38	189	Shark in back camera.
14:43	145.67336	15.93806	21	36	213	We can see the top of the cliff we think
14:43	145.67334	15.93805	20	41	218	We are back down at 177 m
14:43	145.67332	15.93801	19	44	223	We saw another shark in medea cam
14:43	145.67330	15.93799	19	43	224	We are continuing down
14:44	145.67326	15.93797	21	43	228	We can see the cliff on the sonar in front of us
14:44	145.67323	15.93795	34	40	229	We are now going to try to make the turn back under medea
14:44	145.67322	15.93794	65	37	228	Big fish swimming around

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14:44	145.67314	15.93793	38	39	234	Cliff seems to be oriented right across the slope
14:46	145.67308	15.93789	71	30	242	Still fighting the current.
14:46	145.67306	15.93788	174	25	242	Went deeper with Jason and can see wall on the sonar.
14:47	145.67304	15.93782	169	25	247	We are turning around to drive under Medea. facing south driving ahead. 20m off the bottom.
14:47	145.67312	15.93771	144	26	251	Medea and Jason are together.
14:48	145.67320	15.93774	86	23	250	Current dragged vehicles apart.
14:48	145.67307	15.93762	93	22	249	Doppler reset.
14:49	145.67303	15.93761	231	21	248	Will go back down to base of cliff.
14:49	145.67314	15.93764	70	18	245	Ship has stopped moving.
14:50	145.67312	15.93762	66	15	246	Continuing down.. 20m off bottom.
14:50	145.67314	15.93764	71	11	246	Moving ship 20 meters back to the wall.
14:51	145.67316	15.93767	68	10	243	At 235m within site of bottom...about 30m from base of cliff
14:51	145.67317	15.93763	121	10	243	Moving toward the wall.
14:51	145.67316	15.93761	118	10	243	Looking east.
14:52	145.67316	15.93758	119	8	245	Heading to target 027deg.
14:53	145.67317	15.93764	52	9	244	More fish.
14:53	145.67317	15.93764	51	9	244	Needle or trumpet fish.
14:54	145.67317	15.93775	32	5	240	Big fish. Medea is on the move.
14:55	145.67318	15.93781	33	5	235	Outcrop not the wall.
14:55	145.67318	15.93782	35	5	235	Moving Medea due east.
14:55	145.67318	15.93782	35	4	235	Getting current even down here.
14:56	145.67319	15.93781	29	4	235	Fuzzy bacterial mat on rocks here.
14:56	145.67322	15.93779	35	7	234	Orange fish again in boulders.
14:56	145.67323	15.93780	33	6	233	Not quite at the wall.
14:57	145.67323	15.93785	26	8	232	Going to try to keep Jason leading Medea.
14:58	145.67330	15.93788	31	8	226	Talus… fish.
14:58	145.67329	15.93789	29	8	225	Moving Medea 5m...waiting here until Medea catches up.
14:59	145.67330	15.93789	27	8	225	Here's Medea.
14:59	145.67331	15.93790	32	7	224	FrameGrab
14:59	145.67333	15.93792	31	4	221	At 217m and not at wall yet.
15:00	145.67330	15.93794	359	9	222	Base in front of us now.
15:00	145.67327	15.93794	15	12	225	Wall looks to have edge at base.
15:00	145.67324	15.93798	331	9	224	Heading 016… wall is going EW.. looking for shimmer at base.
15:01	145.67332	15.93799	346	6	219	Amazing wall front.
15:02	145.67333	15.93798	345	4	219	See some shimmer in crack… can't see if from crack or base.
15:02	145.67334	15.93800	344	3	219	Light coating on rocks below.
15:02	145.67333	15.93800	344	4	219	Lither part of rock isn't staining but just where rock has broken.
15:03	145.67335	15.93797	352	5	219	EH is still high here..over 100...105.87
15:04	145.67334	15.93798	353	5	219	Light patches do not look like they are hydrothermal.
15:05	145.67334	15.93798	353	5	219	Not seeing shimmer like before.
15:06	145.67334	15.93798	352	5	219	Going to try to get to the top of the cliff again - .knowing about the current. Want to try to take a look.
15:06	145.67334	15.93798	351	5	219	57 meters from the summit...at 214meters at base.
15:07	145.67334	15.93798	352	5	219	Want Medea to see Jason.
15:07	145.67333	15.93798	355	9	220	Positioning ship. Heading is 352...going up.
15:08	145.67327	15.93801	358	16	221	Want a look at the summit.
15:08	145.67327	15.93802	357	21	221	Red and green algae and shimmer as we move up… at 200m.
15:08	145.67325	15.93801	2	29	223	Mat is space here… hard to see.
15:09	145.67325	15.93806	17	35	220	Getting to top edge...1 86m.
15:09	145.67326	15.93810	7	18	196	At 179m… probably in current.
15:10	145.67329	15.93812	41	12	189	Trying to sneak down to bottom.
15:10	145.67333	15.93810	52	13	190	See corals on top. Finished 20m ship move..moving again to summit.
15:10	145.67334	15.93809	52	15	192	Sonar shows slope 20m ahead of us.
15:10	145.67334	15.93809	55	16	193	We are facing 050.
15:11	145.67339	15.93811	48	5	187	Medea is above us. 8m off bottom.
15:11	145.67346	15.93810	48	7	190	Coming down… large boulders.. making no headway in this current.. we are facing into it.
15:12	145.67349	15.93811	33	4	187	Holding a bit for Medea...can see Jason in Medea camera.
15:12	145.67352	15.93811	25	5	188	Vehicle is fighting to stay here… 3chip is jiggling.
15:13	145.67356	15.93816	36	5	185	Seeing more fish on top here. Lots of crevices and cliff.
15:13	145.67356	15.93818	35	13	185	Summit is going to be very jagged.
15:14	145.67357	15.93818	90	12	186	Top of cliff.
15:14	145.67357	15.93820	94	5	180	At 174m depth and 6m altitude.
15:14	145.67352	15.93825	51	14	187	Lots of color...corals and algae.
15:15	145.67352	15.93831	58	9	178	Jagged rocks at 169 meters.
15:16	145.67352	15.93832	25	12	180	Vehicle is not very responsive in this current.
15:16	145.67354	15.93829	30	14	182	Current is along the edge of the slope.
15:16	145.67354	15.93830	32	13	182	Big fish in Medea cam.
15:17	145.67361	15.93837	36	10	174	Sonar shows us at top.... we are full reverse.
15:18	145.67368	15.93850	28	15	176	Can't do much at summit here due to current.
15:18	145.67377	15.93862	36	35	187	Going to go to Gnome vent mid-water transit.
15:18	145.67378	15.93862	34	41	186	Gnome vent is where the active chimney was taken.
15:20	145.67375	15.93860	343	56	185	060deg at 120meters.. speed at .7knts.

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15:21	145.67375	15.93861	345	63	187	Big midwater fish.
15:21	145.67376	15.93861	357	63	186	At 122m...65m altitude.
15:41	145.67394	15.93870	227	179	287	DVCam tape change.
15:58	145.67417	15.93884	247	179	287	100m to go for the ship.
15:59	145.67418	15.93885	240	192	302	Bottom here is 347. going down with vehicles.
16:03	145.67421	15.93887	247	104	332	Holding at 100m altitude until ship stops.
16:07	145.67424	15.93888	307	115	343	Settled...bottom approach.
16:07	145.67424	15.93888	296	87	346	Lots of big fish.
16:08	145.67425	15.93888	299	75	348	Going down to Gnome.
16:08	145.67425	15.93888	300	69	350	Driving down.
16:09	145.67425	15.93889	303	47	352	Plume in water as we go down.
16:11	145.67426	15.93883	174	32	343	Want to sample the water from the chimney we cut down.
16:14	145.68114	15.94276	2	12	347	*Doppler reset.*
16:15	145.68114	15.94275	4	2	348	On the bottom.
16:16	145.68119	15.94276	1	4	349	6m at 159 deg.
16:16	145.68118	15.94276	155	4	350	Spinning around seeing old chimneys.
16:17	145.68117	15.94271	157	2	349	Lots of tuna-looking fish.
16:17	145.68119	15.94267	150	3	350	Rotate left to 038.
16:17	145.68119	15.94269	70	1	350	Visibility is poor.
16:24	145.68128	15.94274	121	4	350	Moving around Gnome looking for spot where chimney was taken...heading at sample was 341deg.
16:24	145.68130	15.94273	119	4	350	We are looking at 121deg.
16:25	145.68133	15.94266	0	7	353	We have backed up and moving laterally counterclockwise.
16:25	145.68136	15.94267	336	6	355	Heading now at 341deg at base.
16:31	145.68140	15.94265	336	9	357	Retrieving HFS wand from basket.
16:31	145.68140	15.94264	336	9	357	Trying to determine proper vent for sample.
16:31	145.68141	15.94264	336	9	357	Data logger shows heading of 341.3 during sampling.
16:32	145.68141	15.94263	336	10	357	Depth was 341.3
16:34	145.68144	15.94261	336	9	356	Good image of sampled chimney is at 14750 in logger.
16:34	145.68144	15.94261	336	9	356	Going to take some temperatures first then fluid sample.
16:37	145.68139	15.94268	339	6	354	Trying to find a good position to sample.
16:40	145.68136	15.94270	352	3	352	Think this is the shallowest known black smoker fields at 350m.
16:40	145.68136	15.94270	352	4	353	Still trying to position vehicle.
16:41	145.68136	15.94269	351	4	353	A lot more fish at this site compared to the daylight visit here.
16:43	145.68136	15.94269	352	4	352	This might not be the same stump but is a great place to sample anyhow.
16:46	145.68136	15.94270	351	4	352	Big fish swimming around vent.
16:46	145.68136	15.94270	348	5	353	Tape change.
16:49	145.68136	15.94269	348	5	353	Temp is stable at 220deg.
16:49	145.68136	15.94269	348	5	353	We are not at the same spot.
16:50	145.68136	15.94269	348	5	353	While have probe out we will take a few more temps.
16:50	145.68136	15.94269	348	5	353	Excavating to get a better flow and temp. sample.
16:51	145.68137	15.94269	349	5	353	Temp is up to 22.8....224.6...226.3
16:52	145.68137	15.94269	349	5	353	Looks like this one opened up would be a good place to sample.
16:54	145.68137	15.94269	349	5	353	Stowing wand and then retrieving HFS intake.
17:02	145.68134	15.94272	348	4	352	**SAMPLE-7 HFS. Unfiltered piston #5. Tmax=162.8C Tavg=140 T2=72. Vol=350ml. [between Gnome and 5 Towers 145.681336E/15.942718N] PI Butterfield**
17:02	145.68134	15.94272	349	4	352	May not be Gnome nav has offset..could be 5 Towers.
17:04	145.68133	15.94273	349	4	352	SAMPLE-7 HFS Stop.
17:04	145.68133	15.94273	349	4	352	**SAMPLE-8 HFS. Filter Bag #11. Same orifice as #7. Tmax=156C Tavg=128 T2=21. Vol=352ml. [between Gnome and 5 Towers 145.681336E/15.942718N] PI Butterfield**
17:05	145.68133	15.94273	348	4	352	SAMPLE-8 HFS Start.
17:05	145.68133	15.94273	349	4	352	Nav has us 15m east of Gnome.
17:08	145.68133	15.94273	348	4	352	SAMPLE-8 HFS Stopping.
17:09	145.68133	15.94273	348	4	352	Moving 12 meters west to get to Gnome after stowing wand.
17:10	145.68133	15.94273	348	4	352	Looking for weight we dropped after getting chimney.
17:10	145.68133	15.94273	348	4	352	268deg at 12 meters for target.
17:14	145.68128	15.94272	348	3	351	Found the spot of chimney sample.
17:14	145.68128	15.94272	347	3	351	Will take temperature probe first then water.
17:15	145.68128	15.94272	347	3	351	Lower orifice is fresher looking… lower left is the spot.
17:16	145.68128	15.94272	347	3	351	Retrieving wand.
17:16	145.68128	15.94272	347	3	351	*Nav is 6m east of target now...slight offset with doppler.*
17:18	145.68128	15.94272	347	3	351	TEMPERATURE degrees C Excavating with probe a bit...rapid rise.
17:19	145.68128	15.94272	348	3	351	TEMPERATURE 210.7 stable.
17:20	145.68128	15.94272	348	3	351	Moved probe a bit.
17:20	145.68128	15.94272	347	3	351	TEMPERATURE 211.6
17:21	145.68128	15.94272	350	3	351	TEMPERATURE Lower left orifice is at 200.9
17:26	145.68128	15.94273	347	3	351	TEMPERATURE Still positioning...upper orifice looks like more water is coming out of it.
17:28	145.68128	15.94273	348	3	351	TEMPERATURE degrees C Vehicle stable. Probe in. 193.2 max.
17:29	145.68128	15.94273	348	2	351	Stow temp probe and retrieve HFS wand.
17:29	145.68128	15.94273	348	2	350	211deg on right and 199 on the lower left orifice.
17:29	145.68128	15.94272	347	2	351	DVCam tape change.
17:30	145.68128	15.94272	347	3	351	Moving wand into position to right hole.

time	raw long	raw lat	hdg	alt	Z	Dive J2-193 E Diamante - Dive Log Comments
17:39	145.68128	15.94272	354	2	351	SAMPLE-9 HFS. Moving probe a bit to get temp up...can't get temp over 106 with this intake.
17:43	145.68128	15.94272	354	2	351	SAMPLE-9 HFS Repositioned. Back in hole.
17:43	145.68128	15.94272	354	2	351	SAMPLE-9 HFS Start piston #20.
17:47	145.68128	15.94272	351	2	351	**SAMPLE-9 HFS. Unfiltered piston #20.Tmax=108.4C Tavg=105.7 T2=99. Vol= 533ml. Same pos as sample#2 active chimney - bit of doppler shift. [Gnome area 145.681279E/15.942719N] PI Butterfield**
17:48	145.68128	15.94272	351	2	351	SAMPLE-10 HFS starting
17:52	145.68128	15.94272	351	2	351	**SAMPLE-10 HFS HFS. Filtered bag #18. Tmax=108.7C Tavg=102.4 T2=99. Vol= 551ml. Same pos as sample#2 active chimney - doppler shift. [Gnome area 145.681279E/15.942719N] PI Butterfield**
17:54	145.68128	15.94272	351	2	350	**SAMPLE-11 HFS. Gastight on the HFS fired. Tmax=108.7C. Same pos as sample#2 active chimney - doppler shift. [Gnome area 145.681279E/15.942719N] PI Evans**
17:55	145.68128	15.94272	349	2	350	We're still at" Gnome vents" were Cornel got his chimney
18:00	145.68138	15.94266	101	1	356	We're heading to the Five Towers site.
18:04	145.68146	15.94263	171	5	357	Lots of small but active chimneys around.
18:08	145.68139	15.94260	290	9	357	Still searching for Five Towers. Water is increasingly murky.
18:12	145.68134	15.94273	359	7	351	Found what we think is Five Towers - now ascending to the top of the spire.
18:15	145.68134	15.94275	359	6	349	Lots of venting visible as we climb the spire.
18:17	145.68133	15.94275	62	6	348	We're now at the top of Five Towers. Depth is 342.4m.
18:19	145.68133	15.94276	61	7	348	Deciding where to take water samples. We'll start by taking a temperature reading.
18:21	145.68133	15.94276	62	6	348	Jason just accidentally knocked one of the "bee-hive" tops of one of the towers. We'll check temp there.
18:25	145.68133	15.94277	61	6	348	Eh is down to -24 here just above the Five Towers. Temperature reading in the outflow from the chimney is 211C.
18:29	145.68133	15.94277	61	5	347	Temp is now up to 232.4C
18:35	145.68132	15.94277	64	3	349	Rock near the top of the chimneys was very crumbly do moving down to the base of the spire to look for a water sampling site.
18:36	145.68132	15.94277	65	2	349	Taking temp near a smaller vent orifice.
18:38	145.68132	15.94277	65	3	349	Temp reached 237.8C.
18:38	145.68132	15.94277	65	3	349	Water appears to be boiling as it exits the orifice..
18:43	145.68132	15.94278	93	3	349	Repositioning Jason to facilitate water sampling at the high temperature vent.
18:46	145.68132	15.94278	93	3	349	**SAMPLE-12 HFS Unfiltered bag #19 Tmax=241.2C Tavg=240.3 T2=110. Vol=398ml. [upslope of Five Towers 145.681316E/15.942773N] PI Butterfield**
18:49	145.68132	15.94278	94	3	349	**SAMPLE-13 HFS Piston #22. Tmax 239.3C Tavg=214.7 T2=100. Vol=384ml. [upslope of Five Towers 145.681316E/15.942773N] PI Butterfield**
18:49	145.68132	15.94278	94	3	349	Position is same as Sample 12.
18:52	145.68132	15.94278	93	3	348	Sample stopped.
18:54	145.68132	15.94278	93	3	349	**SAMPLE-27 HFS (SAMPLE-27) SAMPLE # OUT OF ORDER. MISSED THIS EARLIER. Time was 1854. Filter bag #17. Tmax=244.6C Tavg=244.3. T2=116. Vol=325ml. [upslope of Five Towers 145.681316E/15.942773N] PI Butterfield**
18:54	145.68132	15.94278	94	3	348	Position is same as previous sample.
18:57	145.68132	15.94278	94	3	349	Sample stopped.
18:58	145.68132	15.94278	93	3	349	Overall maximum temp for these three samples was 244.6C
18:59	145.68130	15.94277	75	3	349	Finished water sampling here. Now looking for barnacles and Alvinaconcha snails.
19:04	145.68134	15.94274	35	1	348	**SAMPLE-14 Chimney. Another small chimney. Max temp from vent is 195.4C [upslope of Five Towers 145.681316E/15.942773N] PI geogroup**
19:04	145.68134	15.94274	35	1	348	Position is same as last two samples.
19:07	145.68134	15.94274	35	1	348	TEMPERATURE From outflow where we collected chimney is 172.7C
19:11	145.68134	15.94274	35	1	348	Max temp from vent is 195.4C
19:12	145.68134	15.94274	35	1	348	Moving off to hunt for snails and barnacles.
19:16	145.68145	15.94278	256	3	354	Crossing a very tall sulphide mound.
19:20	145.68144	15.94279	247	4	355	Have found barnacles and snails. Now setting up to collect them.
19:25	145.68143	15.94278	252	3	354	**SAMPLE-15 Scoop. Hairy snails in area of diffuse venting. [base of Five Towers 145.681409E/15.942771N] PI Tunnicliffe**
19:26	145.68143	15.94278	252	3	354	SAMPLE-15 Scoop We are at the base of the five towers sulfide mound.
19:26	145.68143	15.94278	252	3	354	There is diffuse venting with snails and barnacles together on sulfide and talus.
19:28	145.68142	15.94278	224	3	353	SAMPLE-15 Scoop Repositioning to get more snails.
19:29	145.68142	15.94278	222	3	353	The base of the sulfide mound to the top of the chimneys is about 10 m.
19:30	145.68142	15.94278	222	3	353	Finished scoop sample of snails. Looking to see if a barnacle rock can fit in the scoop also.
19:36	145.68141	15.94278	227	3	352	**SAMPLE-16 Bio/geo. Two rocks (could be a sulfide rather than lava) with barnacles and limpets on it. [base of Five Towers 145.681409E/15.942771N] PI Tunnicliffe / geogroup**
19:37	145.68141	15.94278	227	3	352	Took digital stills of sample.
19:37	145.68141	15.94279	226	4	353	SAMPLE-16 Bio/geo We think there are limpets on the rock as well as barnacles.
19:38	145.68141	15.94279	226	4	353	SAMPLE-16 Bio/geo Rock may be sulfide rather than lava.
19:38	145.68141	15.94279	226	4	353	Looking for another rock with barnacles.
19:42	145.68142	15.94276	243	4	353	We are at the base of the sulfide mound with a heading of 243.
19:47	145.68142	15.94278	246	5	353	SAMPLE-16 Bio/geo Picked up another rock with barnacles with the port arm.
19:49	145.68141	15.94278	246	5	353	Digital camera images of crab feeding frenzy.
19:54	145.68141	15.94277	234	4	353	We're going to take temperatures and water samples from where the limpets (snails?) and barnacles were collected.
19:57	145.68141	15.94277	234	4	353	Temp where limpets were collected is 23

time	raw long	raw lat	hdg	alt	Z	Dive J2-193 E Diamante - Dive Log Comments
19:58	145.68141	15.94277	234	4	353	**SAMPLE-17 HFS. Filtered piston #1. Tmax=23.1C Tavg=21.8 T2=19 Vol=593ml. [base of Five Towers 145.681409E/15.942771N] PI Butterfield**
20:01	145.68141	15.94277	234	4	353	End sample
20:02	145.68141	15.94277	234	4	353	**SAMPLE-18 HFS. Unfiltered bag #8. Tmax=23.8C Tavg=20 T2=18. Vol=590ml [base of Five Towers 145.681409E/15.942771N] PI Butterfield**
20:03	145.68141	15.94277	234	4	353	We're watching a "bar-room brawl" involving 6-8 white crabs fighting over snail scraps.
20:06	145.68141	15.94277	234	4	353	Ending sample
20:07	145.68141	15.94277	234	4	353	**SAMPLE-19 HFS. Sterivex filter #3. Tmax=26.0C Tavg=22.5 T2=18. Vol=3004ml [base of Five Towers 145.681409E/15.942771N] PI Butterfield (subsamps Huber/Bolton**
20:28	145.68140	15.94277	234	4	353	SAMPLE-19 HFS Stop sample
20:31	145.68140	15.94277	234	4	353	Preparing to collect another small chimney.
20:32	145.68140	15.94277	234	4	353	The chimney we're after has small gas bubbles coming out of its top.
20:35	145.68140	15.94277	234	4	353	**SAMPLE-20 Chimney. Small chimney that was spewing bubbles. [base of Five Towers 145.681409E/15.942771N] PI geogroup**
20:47	145.68140	15.94277	231	4	353	TEMPERATURE above the vent we removed is 147.7C
20:50	145.68140	15.94277	232	4	353	This whole area is made up of a large (10+ m across) sulfide mound with large 5 tower chimneys on top and >50 smaller chimneys at base.
20:56	145.68140	15.94277	234	4	353	Leaving Alvin weight at this site of snails.. limpets.. barnacles and small chimneys with flow up to 140 C and occasional gas bubble.. especially coming out of sample #20 (small chimney).
21:01	145.68140	15.94276	246	9	353	The base of 5 towers chimney = 347 m where if rises above the mound.
21:03	145.68139	15.94276	245	9	351	341.5 top of tallest tower at 5 towers chimney so are 5 m tall and mound an additional couple of meters so this at point 11 m off the bottom so approximates the entire height of the complex.
21:07	145.68139	15.94276	246	9	352	We're now trying to estimate the width of this particular structure.
21:15	145.68133	15.94270	40	5	349	The mound seems to be at least 10m in diameter.
21:17	145.68134	15.94272	41	9	349	Departing the Five Towers site and heading to Barnacle Beach.
21:23	145.68166	15.94281	69	2	371	Passing over a field of numerous small (1m) chimneys as we head NE toward Barnacle Beach.
21:25	145.68181	15.94287	68	2	385	Moving out of the chimneys and onto some blocky lavas.
21:27	145.68188	15.94288	72	2	393	We're descending over quite a steep slope.
21:28	145.68193	15.94292	75	168	561	We're now down to 393m. The blocky lavas are separated by what appears to be fairly deep sediment cover.
21:34	145.68220	15.94309	30	1	415	Crossing onto a sedimented slope at 414m.
21:34	145.68223	15.94313	28	1	417	Frequent small patches (10cm) of white area on the darker grey sediments. Bacteria?
21:35	145.68225	15.94317	31	1	418	Small lava boulders and a what appears to be a relatively old lava flow.
21:37	145.68240	15.94322	71	3	428	Boulder field made up of 30-40cm boulders with sediment on top.
21:40	145.68257	15.94327	63	1	440	Boulder field becoming more extensively sedimented.
21:43	145.68279	15.94333	63	3	448	We are about 10m from Barnacle Beach
21:46	145.68279	15.94336	63	1	449	We're near Barnacle Beach thinking of where to water sample.
21:50	145.68285	15.94349	154	5	459	We're gonna take a look here.
21:51	145.68268	15.94347	206	2	460	This is the first time the species has ever been seen by man.
21:51	145.68269	15.94346	200	1	460	Look at all the barnacles here. We want to find a possible place to sample fluids.
21:51	145.68269	15.94346	199	1	460	FrameGrab
21:53	145.68268	15.94346	199	1	459	***ALL THE POSITIONS ON THE MAP ('04) ARE OFFSET FROM THIS YEAR BY ~10 METERS TO THE NORTHWEST. 2004 used USBL nav - this year using Doppler nav here.***
21:54	145.68269	15.94345	201	1	459	2 meter by 1 meter spot here.
21:56	145.68268	15.94345	201	1	459	Neoverruca barnacles here. A new species. Quoting Verena.
21:58	145.68268	15.94345	200	1	459	These guys just leave their cirri hanging out pulsing. They have bacteria on their cirri and they leave them hanging out - then they bring them in and "lick their feet".
21:59	145.68268	15.94345	200	1	459	Preparing to sample here at Barnacle Beach.
21:59	145.68268	15.94345	200	1	459	There are also anemones in this area.
22:02	145.68266	15.94344	200	1	459	Tambient is 7.9.
22:04	145.68277	15.94344	199	1	459	**SAMPLE-21 HFS. Unfiltered bag #9. Tmax=13.7C Tavg=12.3 T2=11.3. Vol=600ml. Temp anomaly is 3 - 4 degrees above background in area of barnacles and anemones. [Barnacle Beach area 145.682779E/15.943448N] PI Butterfield**
22:08	145.68278	15.94345	199	1	459	**SAMPLE-22 HFS. Sterivex filter #10. Tmax=13.4C Tavg=12.5 T2=12. Vol=3002ml. [Barnacle Beach area 145.682779E/15.943448N] PI Butterfield (subsamps Huber/Bolton)**
22:13	145.68277	15.94343	199	1	459	SAMPLE-22 HFS This is one of the large volume filters.
22:32	145.68278	15.94347	201	1	459	**SAMPLE-23 HFS. Unfiltered piston #6. Tmax=13.6C Tavg=13.5 T2=12. Vol=600ml. Looks like we're seeing more milky water here. [Barnacle Beach area 145.682779E/15.943448N] PI Butterfield**
22:34	145.68278	15.94346	201	1	459	Looks like we're seeing more milky water here. Temp is the same.
22:38	145.68277	15.94344	200	1	459	**SAMPLE-24 HFS. Filtered bag #14. Tmax=13.7C Tavg=13.3 T2=12. Vol=598ml. [Barnacle Beach area 145.682779E/15.943448N] PI Butterfield**
22:43	145.68275	15.94338	200	1	459	We're finished here. May take some digitals before we go.
22:44	145.68275	15.94337	199	1	459	Stowing the sampler and will move on from here.
22:46	145.68275	15.94337	200	1	459	**SAMPLE-25 Bio/geo. Small rock (about fist sized) covered with barnacles. [Barnacle Beach area 145.682779E/15.943448N] PI geogroup / Tunnicliffe**
22:49	145.68276	15.94338	199	1	459	Grabbing a small rock covered with barnacles. Going in the forward port corner of the biobox.
22:50	145.68277	15.94337	200	2	459	Picked up a barnacle-encrusted rock. It's about fist size.
22:51	145.68277	15.94337	43	14	457	We're coming up and will transit through the water column 754 meters away (at the NE base of the central mound) Heading to Limpets site.

time	raw long	raw lat	hdg	alt	Z	Dive J2-193 E Diamante - Dive Log Comments
23:26	145.67749	15.94037	57	77	357	**SAMPLE-26 Niskin (red) fired in the plume. Eh is plummeting here (0.09). Fired at 2325. [145.677483E/15.940383N] PI Resing**
23:28	145.67745	15.94035	57	65	345	SAMPLE-26 Niskin. SAMPLES 26 AND 27: SAMPLE 26 WAS THE NISKIN IN THE PLUME. SAMPLE 27 WAS A SAMPLE TAKEN AT FIVE TOWERS MUCH EARLIER AND NOT LOGGED.
23:44	145.67731	15.94025	139	49	314	We're settling down. There's a large plume here.
23:49	145.67726	15.94045	358	27	308	Eh is -50. We see major plumage.
23:53	145.67676	15.93976	268	2	318	We're on the bottom at 317 meters.
23:54	145.67674	15.93978	269	1	319	We've got bacterial mat on the ground. There is venting all around. Eh is steady at -37ish.
23:55	145.67674	15.93978	269	1	319	There are little anemones all over the place here. We have red snails here and anemones. These are what Kim Juniper wants.
23:55	145.67674	15.93977	270	1	319	These are a new anemone. We saw them here at Barnacle Beach too. We want to suction here.
23:56	145.67673	15.93975	271	1	319	Oh what a lovely place Verena says".
						Nav gap till 0000.
23:57	145.67673	15.93975	271	1	318	We have snails and anemones and crabs. The red snails are about 1.5 cm across.
00:00	145.67673	15.93975	271	1	318	**SAMPLE-28 Suction. Red snails; pointy white snail; hermit crabs; sponges; anemone and lots of rock. At Limpets but there are no limpets. There are snails anemones and mat here. Tamb=12.4C. Eh=-40 [Limpets'06 145.676734E/15.939748N] PI Tunnicliffe**
00:02	145.67673	15.93975	272	1	318	Limpets'06 - We're sitting 10 meters from the 2004 position.
00:04	145.67673	15.93975	272	1	318	The little crab has a red snail shell that its running with.
00:05	145.67673	15.93975	272	1	318	We're going to suction the rock to get the snails.
00:10	145.67673	15.93975	272	2	318	SAMPLE-28 Suction We're getting the crab and snails We're getting a sample here. A few red snails and working on this pointy white snail here. He got it. Adding the anemone and lots of rock.
00:11	145.67674	15.93975	272	1	318	Something strange under the rock ledge we didn't get.
00:12	145.67674	15.93975	272	1	318	Got another pointy snail. She wants a sponge.
00:18	145.67674	15.93975	272	1	318	Verena wants a sponge and a crab. We do have a couple hermit crabs already. Got the sponge too. He's got a rock with sponge in one hand and trying to suck it off the rock.
00:19	145.67674	15.93975	272	1	318	SAMPLE-28 Suction [Limpets'06] Trying for a couple more anemones here.
00:24	145.67672	15.93974	271	1	318	Eh is up to +71. Verena is happy with her sample.
00:25	145.67672	15.93974	271	1	318	We're contemplating moving out of here.
00:27	145.67672	15.93974	271	1	318	Eh dropped to -40 and its dropping.
00:28	145.67671	15.93974	266	1	318	We're heading up to the pinnacle.
00:30	145.67665	15.93975	253	3	316	We're heading up the slope. We want t good video transect.
00:30	145.67662	15.93972	253	2	315	It's really smoky. Eh is -70 and dropping.
00:31	145.67660	15.93970	253	2	313	Little pockets of white mat. Red snails.
00:31	145.67656	15.93970	254	2	312	The water is really quite cloudy.
00:32	145.67656	15.93970	253	2	312	The density of the red snails is abundant. Over 100 per square meter.
00:33	145.67651	15.93968	254	3	310	A light bacterial mat coverage. The water is very cloudy.
00:34	145.67649	15.93968	254	3	309	Large area of mat here.
00:34	145.67648	15.93968	254	2	308	Can't get anything from the digital images either. We have a white out here.
00:35	145.67643	15.93966	253	3	307	What are all the little white dots?
00:35	145.67640	15.93965	253	3	306	More mat here.
00:36	145.67639	15.93965	252	4	305	The white dots are snails. All the beige spots are snails.
00:36	145.67637	15.93965	253	5	304	We're getting into sponges here.
00:37	145.67632	15.93964	254	2	301	There is a high density of sponges here. The visibility is really bad. Seems much worse than last time.
00:37	145.67630	15.93964	254	2	301	We're in sponge land now. Don't see the snails but doesn't mean they're not here. The visibility is bad.
00:38	145.67629	15.93964	254	2	301	All the white stuff is a couple species of sponges and some bacterial mat.
00:39	145.67626	15.93963	253	2	300	We have transitioned from the snails to the sponges. Still bacterial coating here.
00:39	145.67624	15.93961	253	3	299	Moving up this slope.
00:40	145.67623	15.93961	253	3	298	Can't see much in the digital. That's too bad.
00:40	145.67622	15.93960	253	3	298	We're pointing the camera straight ahead.
00:40	145.67619	15.93960	254	2	296	Verena's working with the video now.
00:41	145.67615	15.93959	254	2	295	Still the same here.
00:42	145.67610	15.93956	253	3	292	Looks like we have some harder rocks here. Still in the sponge range here.
00:42	145.67609	15.93956	253	3	292	More rocky blocks and sediment cover.
00:43	145.67604	15.93955	253	3	289	We are seeing bivalve shells all over the place. Just the shells here.
00:44	145.67602	15.93954	253	2	289	This is much murkier than two years ago.
00:45	145.67599	15.93953	254	3	287	It's a soupy mess.
00:47	145.67589	15.93950	253	4	282	Large talus blocks and sponges.
00:48	145.67583	15.93948	254	3	279	Dara is adding the Aquarium site to the nav.
00:51	145.67578	15.93946	242	4	276	We're changing course to 243 so that we can make it to Aquarium site.
00:53	145.67568	15.93941	241	4	271	Big angular blocks and sponges.
00:54	145.67561	15.93940	242	5	267	Looks like we might be seeing the return of the red snails.
00:56	145.67552	15.93933	244	4	259	Visibility is still bad here.
00:56	145.67551	15.93932	243	5	259	Our first shallow water fish here.
00:57	145.67551	15.93929	243	4	257	Less outcrop and more talus now. The size of the sponges has decreased.
00:57	145.67551	15.93929	243	4	257	Looks like the visibility is getting better. Still have bacterial mat all over everything.
00:59	145.67542	15.93926	243	5	251	No snails left. Smaller sponges.
01:01	145.67527	15.93921	243	6	240	Lost the suspension feeders now. Just have a bit of mat on the rocks.
01:02	145.67527	15.93921	244	9	240	We're on a blocky outcrop on a vertical cliff.
01:04	145.67522	15.93918	243	12	236	The Eh is-131. There are tiny dots on the rock.
01:07	145.67516	15.93908	245	7	228	The stuff in the water is probably tiny sulfur particles.

time	raw long	raw lat	hdg	alt	Z	Dive J2-193 E Diamante - Dive Log Comments
01:08	145.67513	15.93906	245	6	225	The mat is increasing on these rocks. We don't see the animals.
01:08	145.67512	15.93905	244	6	224	Lots of mat here on these talus blocks. Don't see any algae yet.
01:09	145.67506	15.93901	243	13	217	Eh is a -115 here. It was as low as -140 earlier.
01:10	145.67505	15.93900	244	11	215	We're seeing tropical fish here.
01:10	145.67505	15.93900	241	13	216	Looks like some red algae here on the rocks.
01:10	145.67504	15.93900	248	11	215	Can't tell that from this distance.
01:11	145.67501	15.93899	242	5	208	Just bumped the Eh up 60 points to negative 60.
01:11	145.67499	15.93898	241	2	205	We're seeing red algae here. **We're just entering the photosynthetic zone.**
01:12	145.67494	15.93898	241	2	204	We're seeing some ambient light now in the medea camera. Can see the whole scene now.
01:12	145.67493	15.93898	240	2	203	Turning off medeas down light so we're seeing all ambient light.
01:13	145.67488	15.93896	242	8	209	There's more diffuse flow coming out through this than the last time we were here.
01:13	145.67487	15.93896	241	9	209	Don't see many animals. Where are the grazers?
01:14	145.67482	15.93896	241	8	207	The bacterial mat seems more extensive than we remember.
01:14	145.67481	15.93896	239	9	206	The larvae of deep sea animals aren't settling here.
01:16	145.67476	15.93894	240	5	201	We have passed the 200 meter mark and are continuing up.
01:16	145.67474	15.93893	240	5	201	We see the small corals and yellow tropical fish. We're seeing red and green algae and coral.
01:16	145.67474	15.93893	240	6	201	The coral is a hard hydrozoan (not a true coral).
01:18	145.67471	15.93890	240	4	198	The amount of mat seems to have suddenly decreased. Eh barrier crossed. It went to +50 from a negative number. The bacterial mat dropped way down and the Eh went way up. The shimmering water is back.
01:18	145.67470	15.93890	241	3	197	We've got red algae coverage still with bacterial mat and hydrozoans with bac bat on them as well.
01:19	145.67468	15.93889	239	3	196	Look at all the small tropical fish here.
01:19	145.67466	15.93888	241	3	196	Lots of fish in this area. A little tang fish here. Still have bac mat and red and green algae.
01:19	145.67465	15.93888	240	3	196	The same fish is here as last year.
01:20	145.67464	15.93887	240	3	196	The next generation of little tropical fish are here.
01:21	145.67454	15.93883	241	4	193	Looks like the bacterial mat is really going away.
01:22	145.67454	15.93883	241	4	193	Lots of little teeny fish here. They could be ras.
01:23	145.67447	15.93882	286	7	191	We're continuing up the slope heading for Aquarium. The water is still murky but much improved.
01:24	145.67444	15.93883	271	8	189	There are the soft corals that we saw before.
01:25	145.67438	15.93882	285	8	186	We're seeing tons of these alcyoneacean corals here. They are almost translucent.
01:26	145.67432	15.93884	255	6	184	We want to get in closer to get some good images here.
01:27	145.67431	15.93882	254	6	185	There's the basket star here.
01:27	145.67431	15.93880	253	7	185	We're trying to get some decent images here.
01:28	145.67428	15.93883	265	10	184	We're going to move along this ridge
01:29	145.67427	15.93884	262	10	184	We're seeing a number of butterfly fish.
01:29	145.67426	15.93883	259	12	184	There's a high density of soft corals here.
01:30	145.67426	15.93884	264	16	183	There's another basket star here. Gorgonian coral off to the side in the pilot cam.
01:30	145.67425	15.93883	259	17	183	We're at the top of this little peak.
01:30	145.67421	15.93880	260	13	178	We just can't get the color with this camera.
01:31	145.67419	15.93879	299	15	180	We think we're at the Aquarium site. We see lots of small fish. Lots of basket stars and small fish. Not getting the color here because the camera is too far back.
01:32	145.67418	15.93880	320	15	181	We want to get some nice imagery here.
01:32	145.67416	15.93880	324	14	182	We're seeing some really beautiful color now.
01:33	145.67416	15.93881	322	16	184	This looks like the spot. This is absolutely beautiful.
01:34	145.67416	15.93881	323	15	183	We're looking at a basket star that is all folded in. We're looking at the soft corals here.
01:35	145.67416	15.93881	322	16	184	Verena is zooming in on a nice primnoid (sp?) coral.
01:35	145.67416	15.93881	322	16	184	We're seeing lots of beautiful corals here.
01:35	145.67416	15.93881	321	16	184	We have hard corals and sponges.
01:36	145.67416	15.93881	323	16	184	We're looking around a bit.
01:37	145.67416	15.93881	321	16	184	The biota is amazing here.
01:38	145.67416	15.93881	322	16	184	Trying to turn the overlay off. The tang is beautiful.
01:39	145.67416	15.93881	321	15	183	The overlay is off.
01:40	145.67416	15.93881	322	15	183	We see a piece of black coral in the background.
01:41	145.67419	15.93884	264	7	175	We're trying to get some different images with the digital now.
01:44	145.67419	15.93887	185	15	183	Watch change and preparing for leaving bottom.
01:46	145.67419	15.93887	185	15	183	Trying to get some digital stills before lift off.
01:46	145.67419	15.93887	185	15	183	Heading of ship good for recovery.
01:48	145.67418	15.93887	184	15	183	Starting to move Jason for stills.
01:49	145.67417	15.93888	183	16	183	Lots of fish.
01:49	145.67416	15.93888	183	15	183	Want to get closer for photos.
01:51	145.67416	15.93888	186	17	183	Current is difficult here… trying to image top of rock.
01:54	145.67416	15.93888	185	17	183	Great stills.
01:55	145.67414	15.93888	186	16	183	Moving around right for last few photos.
01:56	145.67413	15.93888	185	17	183	Dumping weights.
01:57	145.67413	15.93888	184	17	183	**Off bottom.**
01:59	145.67413	15.93888	184	17	183	Last weight away.
02:00	145.67413	15.93888	184	17	183	Stowing arm. Lots of current.
02:00	145.67413	15.93888	185	17	183	J2-193 ending.... fish swarming about. Starting ascent at 0201.
02:21	145.67418	15.93888	45	162	164	J2-193 ENDING...Jason on surface. **Jason on deck at 02:30**

5.4.11 J2-194 Ruby Dive Log

time	raw long	raw lat	hdg	alt	Z	Dive J2-194 Ruby - Dive Log Comments
J2-194 Ruby Dive Summary: Started the dive E/SE of the summit at 270 meters - heading W ascending to the summit. At the summit collected a rock sample. Next ascended the slope from the NW to the summit. Saw an outcrop covered with crinoids - also lots of red sea stars. As approached the summit ran into extensive area of diffuse venting at ~215 meters. Lots of red sediments and crabs. Named it Rua Vent and collected 1 rock, 1 major and 1 scoop sample. Very aggressive little red crabs here fighting over bacterial mat. Also little holes in the sediment dubbed "crop circles". Continued uphill to the east where collected a heavily oxidized piece of crust and took a major sample in an area of very little flow. Lots of big schooling fish around Medea (feeding frenzy). Collected one rock from the summit. Next did another transect from SW of the summit ascending to the summit. Came upon a large extent of white mat on the rocks. Grabbed one bio-geo sample and suctioned a crab. 12 samples total.						
J2-194 Bottom time: 4/30/2006 0918 - 1725 UTC (8.12 hrs). **Z column represents seafloor depth in meters.**						
08:43	145.65002	15.90000	91	1	3	Preparing for dive J2-194 at Ruby Volcano!
08:46	145.65000	15.90000	0	0	0	Powering up Jason.
08:50	145.65000	15.90002	1	0	1	Dive J2-194 configuration consists of 4 majors 3 gas tights 3 canvas scoops 2 mesh scoops and a single chamber suction sampler.
08:57	145.64994	15.89998	256	0	6	**JASON is in the water**
09:18	145.67426	15.92039	31	2	273	**On bottom at 270m.**
09:20	145.67425	15.92039	281	5	274	Several large pink/orange sea stars on a black gravel/sand bottom.
09:22	145.67420	15.92041	281	7	272	Seeing some small boulders.
09:26	145.67399	15.92051	289	5	258	Density of sea stars increasing. Also some ophiuroids.
09:27	145.67390	15.92052	291	6	251	A few large long stalked crinoids.
09:28	145.67375	15.92056	287	4	241	Bottom continues to be largely rubble.
09:30	145.67367	15.92057	233	6	239	Bottom has less sand and more cobbles now.
09:31	145.67359	15.92057	234	4	236	Bottom is quite well winnowed.
09:32	145.67354	15.92057	235	3	233	Approaching a ridge.
09:33	145.67351	15.92058	235	3	232	Still heading upslope to the SW toward the summit.
09:33	145.67348	15.92058	180	2	232	Seeing an increasing number of small pelagic fish.
09:35	145.67346	15.92058	273	1	232	Crossing an area which looks as if it may have been hydrothermally active in the past.
09:36	145.67343	15.92059	275	1	234	Getting into some fresh looking blocky lavas.
09:38	145.67331	15.92063	283	4	232	We are now on a fairly recent lava flow that cascaded downslope before breaking up.
09:43	145.67306	15.92057	301	7	219	For the most part the lava flow is unsedimented.
09:50	145.67302	15.92060	296	5	214	We just paused for a watch change. Resuming our ascent toward the summit.
09:56	145.67299	15.92061	278	6	213	Still mostly blocky lavas and what appear to be some small pillows.
09:59	145.67281	15.92062	283	6	200	Quite a few largish orange fish (they look similar to Sebastes rockfish).
10:01	145.67266	15.92066	283	8	188	Some fairly large pillows here. Perhaps 1m across.
10:04	145.67260	15.92070	319	5	181	We're now just about at the summit at 176m. Some old fishing lines visible.
10:11	145.67250	15.92094	346	1	175	We are now at the summit of Ruby volcano. Lots of large lava blocks and pillows.
10:12	145.67251	15.92094	342	3	175	Just saw another bunch of fishing line. Think its time to move out of here before getting tangled.
10:14	145.67251	15.92101	285	5	178	Traversing along a ridge on the summit. Moving westward.
10:15	145.67239	15.92103	341	9	183	The current is quite strong up here. Jason is having trouble fighting it.
10:17	145.67240	15.92106	70	6	185	We're now on the west side of the ridge on the summit.
10:20	145.67237	15.92115	70	9	186	We're at the summit and traversing along the summit.
10:22	145.67240	15.92116	129	7	183	A bit of fish and some fishing line.
10:23	145.67243	15.92117	160	5	180	No real evidence of venting.
10:26	145.67236	15.92126	88	7	189	Some rather big fish here and lots of rock....
10:27	145.67237	15.92127	86	4	189	This place has lots of larger=sized fish.
10:28	145.67237	15.92127	88	4	188	Looking at an odd-looking crab here.
10:29	145.67237	15.92127	88	4	189	We're not autosnapping at this depth.
10:31	145.67237	15.92127	88	4	188	**SAMPLE-1 Rock. Looks like basalt. [Just north of summit - on summit ridge 145.572333E/15.60460N] PI geogroup**
10:33	145.67237	15.92127	88	4	188	Going to continue north.
10:36	145.67233	15.92131	89	6	191	We see a sea snake or an eel here.
10:39	145.67230	15.92132	86	4	194	There are 2 moray eels here.
10:40	145.67229	15.92134	85	4	194	Seeing some iron oxide sediments here but no sign of any hydrothermal activity.
10:40	145.67228	15.92135	85	4	194	We plan to travel through the water column.
10:41	145.67228	15.92137	86	4	194	190 to 194 meters on the east/northeast side is Joe's prediction where we will find the plume.
10:42	145.67223	15.92142	331	7	197	We are looking for the source of the smoke.
10:43	145.67224	15.92142	268	2	192	We're moving 344 meters bearing 268.
10:43	145.67223	15.92145	272	3	192	We put a target here called Smoke Scene.
10:46	145.67201	15.92145	268	17	207	The Eh is starting to drop. It was 140. The EH is now 108.
10:49	145.67179	15.92143	266	23	213	We're transiting through the water column 300 meters to the west and then will climb up the west side of the volcano.
11:11	145.67098	15.92144	3	116	306	Rick just changed the tapes.
11:12	145.67101	15.92142	88	81	312	Went through another plume a minute ago.
11:14	145.67099	15.92145	91	35	315	Joe says the plume was about 189 meters.
11:15	145.67011	15.92144	91	5	311	We're on the bottom. Looking on the slope with a lot of fine grained material mixed in with some lava chunks.

time	raw long	raw lat	hdg	alt	Z	Dive J2-194 Ruby - Dive Log Comments
11:16	145.67013	15.92144	92	4	309	It's a bit wispy here too.
11:17	145.67016	15.92144	92	3	308	White material here. Sediment and volcaniclastic sands. It's pretty clear here.
11:19	145.67015	15.92144	91	3	307	Could be coral fragments here.
11:20	145.67017	15.92144	91	4	305	Starting up slope now. Seeing coral debris mixed in with this volcaniclastic sand.
11:22	145.67032	15.92141	91	4	297	Bob is zooming way in and then way out. Seems to be working alright..
11:22	145.67036	15.92141	92	3	294	Moving upslope. Looks like the rock is highly altered and covered with biology.
11:23	145.67041	15.92140	93	3	291	There's a chute of finer material coming down slope.
11:24	145.67042	15.92139	92	5	291	We're seeing crinoids and an unknown species.
11:24	145.67042	15.92139	91	5	291	It has some VERY long tentacles.
11:25	145.67049	15.92140	92	5	287	Very unusual animal that looked almost like a plane with long tentacles.
11:25	145.67050	15.92140	92	5	286	Some beautiful crinoids here.
11:27	145.67059	15.92138	93	7	279	It's getting really steep here. The lava is really ropey here. It was very blocky on the east side.
11:27	145.67061	15.92138	91	7	277	The lava looks like toothpaste.
11:29	145.67067	15.92139	92	12	273	We're looking at a bunch of these crinoids on this ropey outcrop.
11:30	145.67073	15.92138	92	3	262	Verena has never seen so many stalked crinoids in one place.
11:31	145.67075	15.92136	92	4	261	10 crinoids in one group. Bob is calling this crinoid ridge.
11:33	145.67081	15.92136	92	4	259	There are beautiful red sea stars up here.
11:39	145.67105	15.92140	90	5	243	We seem to have lost our crinoids. Seeing some fish. Seeing lots of bottoms that have been broken off. The seastars always seem to be near by.
11:40	145.67111	15.92138	93	4	238	Big cracks and narrow ridges all up the side of this seamount. Lots of starfish here.
11:40	145.67112	15.92138	92	4	237	Do the starfish eat the crinoids?
11:42	145.67116	15.92137	91	4	235	More massive flows now.
11:45	145.67136	15.92131	91	7	229	We're in the fog here. Coming up on some plumage.
11:49	145.67133	15.92135	84	7	229	Verena decided that it is probably a sponge.
11:50	145.67137	15.92130	94	4	229	We're going to stop to take a look at this stuff.
11:51	145.67139	15.92129	72	2	229	Sponge Bob. Verena's zooming out and taking a look at this white stuff.
11:53	145.67140	15.92129	76	4	229	The white stuff we're seeing is a sponge.
11:53	145.67144	15.92128	132	5	226	We moved from crinoids to sponges.
11:54	145.67144	15.92129	324	4	225	We just came to an extensive are of sponges on this old altered slope.
11:54	145.67146	15.92128	185	3	224	We can see the plume in the Medea cam.
11:55	145.67150	15.92129	91	5	224	We're seeing a bit of alteration on some of these big boulders.
11:56	145.67152	15.92128	83	5	224	We're looking for hydrothermal signs here.
11:59	145.67151	15.92128	83	6	223	Looking at some altered sediments. Quite a bit of orange sediments on this old outcrop.
12:00	145.67153	15.92128	82	6	223	FrameGrab
12:01	145.67157	15.92128	82	6	219	There's got to be something more because something is making all of that slope.
12:02	145.67164	15.92128	80	4	215	Ridge with a lot of hydrothermal sediment on it. We're seeing more plumage.
12:02	145.67168	15.92129	84	1	214	We have found a bit of shimmering water here.
12:02	145.67168	15.92130	84	1	214	Looks like quite a large area of shimmering water here.
12:03	145.67168	15.92130	84	1	214	We're seeing some crabs here and the white stuff.
12:03	145.67168	15.92130	83	1	214	Coming up the hill we see the iron first then we see this venting. The iron is a sign that there is some kind of venting here.
12:03	145.67168	15.92130	83	1	214	We're stopped here.
12:04	145.67168	15.92130	82	1	214	This area is making some smoke.
12:06	145.67168	15.92130	83	1	214	The EH is down to 7 now. Temp ambient is 19.1
12:08	145.67168	15.92130	83	1	214	The Eh is down to 0 now. The white smoke is coming out of the area where the temp is being probed.
12:09	145.67167	15.92130	82	1	214	TEMPERATURE degrees C ambient is 19. Temp in the seds reached up to 38.
12:11	145.67167	15.92131	76	1	214	A little different spot here. Temp here is 41+.
12:16	145.67168	15.92132	85	1	215	Named this area Rua Vent [15 36.2801 145 34.299] We see a flat fish here too. Lots of these little red (iron coated?)
12:16	145.67168	15.92132	85	1	215	The sediments are all totally reduced.
12:18	145.67168	15.92132	82	1	215	**SAMPLE-2 Rock with red oxidized sediment coating on top side. This rock is larger than the first sample and black on the bottom - the part not exposed to the plume. [Rua 145.571647E/15.604656N] PI geogroup**
12:20	145.67168	15.92132	76	1	215	There's quite a bit of diffuse venting here but we're having a hard time finding any flow we can sample.
12:21	145.67168	15.92131	83	1	215	The crabs are fighting here. They're tearing up bacterial mat and fighting over it.
12:22	145.67168	15.92131	82	1	215	The fighting crabs are churning up the microbial area.
12:24	145.67168	15.92132	81	1	215	Tambient is about 18. Tmax was about 27 in the seds.
12:26	145.67168	15.92132	81	1	214	SAMPLE-3 Major. Blue major here in the seds stirred up by the temp probe.
12:27	145.67168	15.92132	82	1	214	**SAMPLE-3 Major (blue) in the seds stirred up by the temp probe. Tamb=~18C. Tmax=~27 in the seds. [Rua 145.571647E/15.604656N] PI Butterfield**
12:31	145.67168	15.92132	82	1	215	Took about half a sample.
12:34	145.67167	15.92131	82	1	215	This is a strange place. Little orange crabs. White stuff. Something the crabs are eating.
12:35	145.67166	15.92131	82	1	214	**SAMPLE-4 Scoop. Open mesh scoop of the crop circles (little white and brown holes in the sediment). A couple crabs too if possible? [Rua 145.571647E/15.604656N] PI Tunnicliffe**
12:39	145.67165	15.92131	80	1	215	SAMPLE-4 Scoop Verena has never seen crabs so aggressive.
12:41	145.67165	15.92131	79	1	214	SAMPLE-4 Scoop Not sure what we got. Probably got the white circles. Not sure about the crabs.

time	raw long	raw lat	hdg	alt	Z	Dive J2-194 Ruby - Dive Log Comments
12:42	145.67164	15.92131	79	1	214	Not sure what all the stuff is in the seds that's creating this white cloud when they are disturbed.
12:43	145.67165	15.92131	79	1	214	Putting the bag in the biobox.
12:44	145.67164	15.92131	79	1	214	There is some kind of food in the sediments that the crabs are fighting over.
12:47	145.67164	15.92131	78	1	214	The crabs are just gathering up these big globs of white stuff and rolling it around. We haven't seen them actually eat one.
12:49	145.67164	15.92131	78	1	214	We probably ought to move on and find something else.
12:50	145.67164	15.92131	77	1	214	This is quite the place. Very badly behaved crabs. Seems like constant warfare here.
12:50	145.67164	15.92131	77	1	214	This area is quite extensive.
12:51	145.67164	15.92131	77	1	214	Verena is not sure that what she saw earlier and called a sponge was not necessarily a sponge at all??
12:55	145.67163	15.92130	79	1	214	We're moving on. We'll lateral around here as much as we can at this contour.
12:56	145.67163	15.92131	80	1	215	We're still a little below the maximum of the plume.
12:57	145.67163	15.92134	100	3	215	Eh is 16. The rocks all around here are red. Lots of iron crust here. Looks more like a solid crust to port.
12:58	145.67164	15.92130	105	2	214	We want to go around to the right a bit. There is more over there.
12:58	145.67165	15.92129	101	2	214	This open area where the crust isn't is quite as big.
12:59	145.67167	15.92127	105	1	214	Massive crabs here and the little white "crop circles" here. The bits of rock here appear quite altered.
13:02	145.67173	15.92126	115	3	214	Patches of the stuff we just saw all over the place. Quite the iron covering.
13:04	145.67167	15.92130	106	4	215	We're moving up the hill again.
13:05	145.67170	15.92130	84	2	214	Tons of zooplankton or very small fish in the water.
13:05	145.67171	15.92130	84	1	213	A thick cruse here. At least 10 cm thick.
13:06	145.67171	15.92129	48	1	213	Still seeing heavily oxidized area. Big thick crust heavily oxidized on top.
13:07	145.67171	15.92130	42	1	213	Looks like rock underneath this heavily altered crust.
13:08	145.67172	15.92131	48	4	213	Jim is bouncing around on the tether.
13:09	145.67180	15.92138	84	5	214	We need to move ahead because the ship is ahead of us.
13:10	145.67178	15.92139	84	3	215	The vehicle doesn't have enough weight in the back so Sharps is pointing down more. Making Jason seem closer to Medea than it is.
13:12	145.67178	15.92141	84	1	215	**SAMPLE-5 Crust. Thin piece of crust (red on top). Once Jason grabbed it the crust just crumbled. [heavily oxidized area E of Rua 145.571762E/15.604708N] PI geogroup**
13:13	145.67179	15.92137	84	1	215	SAMPLE-5 Crust Thin piece of crust (red on top)
13:14	145.67179	15.92138	84	1	215	Putting it in the forward port quarter box (1)
13:17	145.67180	15.92137	84	1	215	TEMPERATURE It's going up - Tambient was about 18C.
13:19	145.67180	15.92137	84	1	215	The fish have just fallen down. What's happening? Medea is like a feeding frenzy area.
13:20	145.67180	15.92137	84	1	215	Something in the sediment looks like it is poofing out. Something is puffing out of the sediments.
13:21	145.67180	15.92137	84	1	215	TEMPERATURE 47 C. It's in the seds a bit.
13:22	145.67179	15.92137	85	1	215	Going to take a major sample here at least (maybe a gastight too).
13:23	145.67180	15.92137	85	1	215	See a bit of shimmering water here where we gathered the orange crust. Going to take a major now.
13:26	145.67179	15.92137	85	1	215	**SAMPLE-6 Major (red) here at the same spot as the previous crust sample. There's a little flow here. Not much but some. [heavily oxidized area E of Rua 145.571762E/15.604708N] PI Butterfield**
13:27	145.67180	15.92137	85	1	215	Very high abundance of small fish and plankton. Can see about 20 large fish in Medea's camera.
13:29	145.67180	15.92137	85	1	215	Eh at -2.0.
13:30	145.67180	15.92137	85	1	215	Temp at about 35 deg
13:37	145.67180	15.92138	86	1	215	**SAMPLE-7 Gastight (red-handle) in same spot as Major. [heavily oxidized area E of Rua 145.571762E/15.604708N] PI Evans**
13:38	145.67179	15.92138	86	1	215	Site is near Rua - about 10m northeast.
13:39	145.67179	15.92138	86	1	215	A vast expanse of redness - crust everywhere.
13:51	145.67180	15.92138	86	1	215	Falling dead fish - we are wondering if it is related to Medea. Or there is a feeding frenzy above us.
13:51	145.67180	15.92138	86	1	215	Ready to leave this spot.
13:52	145.67180	15.92138	84	1	215	Ready to go upslope which is to the east.
13:52	145.67182	15.92138	84	2	215	Lots of pretty fish.
13:52	145.67183	15.92138	83	2	215	Depth is 213 and heading East.
13:53	145.67185	15.92137	82	2	214	Big fish in Medea camera.
13:53	145.67185	15.92137	83	2	214	Looks like solid crust.
13:54	145.67185	15.92137	84	2	214	Want a sample here… didn't get very far in our transit to the summit.
13:54	145.67185	15.92137	83	2	214	Saw a lot of water coming out of the shimmering crack.
13:54	145.67185	15.92137	84	2	214	First get a temperature.
13:56	145.67185	15.92138	97	1	214	Plume had a lot of iron in it which corresponds to all the red we are seeing.
13:57	145.67185	15.92138	96	1	214	TEMPERATURE ambient is 20.3deg.... in crack it is 46.6.
13:58	145.67185	15.92138	96	1	214	Good place to take a water sample.
13:59	145.67185	15.92138	96	1	214	TEMPERATURE Moved up a few inches...33.5
13:59	145.67185	15.92138	94	1	214	Always seems like there is white powder underneath this red crust.
14:03	145.67185	15.92138	95	1	214	**SAMPLE-8 Major (yellow) in same hole as temperature reading. [145.571819E/15.604709N] PI Butterfield**
14:03	145.67185	15.92138	95	1	214	6 meters east of samples 5-7.
14:05	145.67185	15.92138	95	1	214	SAMPLE-8 Major Triggered.
14:08	145.67185	15.92138	95	1	214	Lots of large schooling fish in Medea camera.

time	raw long	raw lat	hdg	alt	Z	Dive J2-194 Ruby - Dive Log Comments
14:08	145.67185	15.92138	95	1	214	Want to do a gas tight in the exact same spot.
14:09	145.67185	15.92138	94	1	214	Putting major in center of the basket on top of a weight.
14:13	145.67184	15.92138	94	1	214	Rearranging basket to get the gas tight.
14:17	145.67184	15.92139	95	1	214	**SAMPLE-9 Gastight (black on handle-blue/white everywhere else). Same hole as yellow Major. Tip just off the rock. [145.571819E/15.604709N] PI Evans**
14:18	145.67184	15.92138	96	1	214	Stowing basket.
14:18	145.67184	15.92138	96	1	214	Fish are getting closer to Medea.
14:18	145.67184	15.92138	96	1	214	Resuming trek upslope.
14:19	145.67193	15.92139	98	2	212	More crust here. Looks like cemented sediment.
14:19	145.67194	15.92140	98	3	212	Very orange with layering.
14:20	145.67196	15.92141	97	2	211	Do not see any fluid shimmer here.
14:20	145.67196	15.92142	97	2	211	Waiting for Medea to get going.
14:21	145.67197	15.92141	97	3	211	Crabs are well camouflaged...same color as sediment.
14:22	145.67200	15.92139	96	3	210	Seeing smoke in the water.
14:22	145.67203	15.92133	93	2	209	Lateralling right toward smoke.
14:23	145.67206	15.92131	100	3	208	What is the white stuff.
14:23	145.67207	15.92132	99	2	207	Crust has come off here?
14:23	145.67208	15.92133	100	2	207	Looks microbial.
14:23	145.67213	15.92140	119	2	205	Still seeing smoke as we lateral left.
14:23	145.67213	15.92141	109	2	204	Lots of fish in Medea.
14:24	145.67213	15.92142	125	3	204	Little outcrop.
14:24	145.67213	15.92144	77	5	205	Close to hitting current.
14:24	145.67213	15.92146	91	5	204	Fish parts are landing in basket.
14:24	145.67216	15.92154	92	4	199	Large outcrop as we move left and up.
14:25	145.67219	15.92154	96	5	199	More rocky above 200m.
14:25	145.67224	15.92153	127	4	196	More rock outcrops.
14:26	145.67226	15.92144	135	3	191	Just about completed the move to summit.
14:26	145.67227	15.92140	106	5	193	If ship/Medea stopped - get a sample of rock.
14:27	145.67229	15.92141	100	3	191	Saw a little bubble come up.
14:27	145.67229	15.92141	101	3	191	Preparing to sample a rock.
14:29	145.67229	15.92141	101	3	191	**SAMPLE-10 Rock. Orange 8-10 inches long. [northern summit area 145.572258E/15.604743N] PI geogroup**
14:29	145.67229	15.92141	101	3	191	Next go to top another 30-50m to east.
14:30	145.67230	15.92142	96	3	190	Going to top… 30m 090deg.
14:31	145.67234	15.92139	99	2	188	Larger boulder outcrop. Urchin.
14:31	145.67234	15.92138	97	2	188	Angel fish.
14:32	145.67236	15.92138	150	3	189	Surprised not more growing on the rocks.
14:33	145.67241	15.92138	153	6	191	Big fish close-up.
14:34	145.67255	15.92137	121	6	196	We are being pushed to the north by the current.
14:35	145.67257	15.92134	126	4	196	Bottom is dropping away .
14:36	145.67263	15.92143	105	9	203	Going to do another traverse to the SW.
14:36	145.67263	15.92144	109	10	204	Heading downslope.
14:36	145.67262	15.92143	127	6	203	Moving ship 270m southwest then come back upslope.
14:36	145.67261	15.92141	108	2	201	Will drive in water column.
14:36	145.67261	15.92140	157	2	202	Looks like we re in a plume here.
14:36	145.67261	15.92140	161	3	203	Smokey.
14:37	145.67260	15.92139	234	4	203	Moving ship to SW.
14:37	145.67253	15.92144	265	3	201	Lots of big fish at 197m.
14:38	145.67247	15.92146	229	6	202	Big boulders...nice orange fish.
14:39	145.67237	15.92142	234	4	193	Driving 230....making good 258.
14:39	145.67235	15.92140	212	5	192	Here's a ridge. at 187m.
14:39	145.67234	15.92138	223	4	191	Jason struggling in the current at the ridge.
14:40	145.67233	15.92135	222	3	189	Downhill from here.
14:43	145.67222	15.92117	222	5	196	Going to try to come down a bit as we are over the crest. Driving downhill.
14:43	145.67218	15.92116	224	6	198	White areas on outcrop. Fuzzy mat on rocks.
14:44	145.67212	15.92108	222	2	199	Stop for a bit to look at white patch.
14:45	145.67213	15.92108	98	9	206	Trying to take a quick look at the white stuff.
14:45	145.67215	15.92105	49	8	205	White on rocks.
14:46	145.67215	15.92108	49	9	205	White looks like mat...furry.
14:46	145.67215	15.92108	47	8	203	Looks like a dike outcrop with the columnar joints.
14:47	145.67216	15.92108	50	7	202	The white waves like hair in the breeze.
14:49	145.67215	15.92105	87	10	205	Having to move because of Medea. Nothing to sample.
14:49	145.67213	15.92103	204	6	202	Target here...MAT...15deg 36.263 145deg 34.320..depth 195.7.
14:50	145.67214	15.92103	207	7	202	That is target #6.
14:50	145.67215	15.92104	205	4	200	Moving again to target downslope.
14:52	145.67215	15.92104	220	4	199	Medea is catching up to us.
14:53	145.67208	15.92112	247	5	204	Looks like more white below us in the Brow cam.
14:54	145.67192	15.92115	345	10	213	Extensive area of white.

time	raw long	raw lat	hdg	alt	Z	Dive J2-194 Ruby - Dive Log Comments
14:55	145.67197	15.92116	248	6	210	Going downslope about 100m in depth.
14:55	145.67193	15.92112	216	8	212	Fish escorts.
14:57	145.67203	15.92114	332	15	209	Fighting current...coming up and will let Jason be dragged back to target.
15:00	145.67210	15.92103	34	30	206	Look at all the little fish.
15:03	145.67199	15.92090	38	38	213	Changing video tapes.
15:25	145.67154	15.92055	51	93	269	squid
15:29	145.67149	15.92055	51	103	278	Ship is at the target.
15:30	145.67148	15.92055	56	78	279	Moving down 50m in depth to get out of current some more.
15:33	145.67112	15.92035	237	37	294	There's Medea. Preparing to go to the bottom with Jason.
15:34	145.67087	15.91956	70	7	299	*Doppler reset....moved us about 100m SSW.*
15:34	145.67087	15.91956	71	5	299	There's the bottom.
15:35	145.67086	15.91954	67	4	300	Offset in doppler because we came off the bottom
15:35	145.67087	15.91954	71	4	300	Gravelly-cobbly bottom. No orange crust we saw on last transit.
15:35	145.67086	15.91954	71	4	300	Sand and gravel and fish.
15:35	145.67088	15.91949	68	5	301	SW of summit. Down at 395.7m and heading upslope.
15:36	145.67088	15.91948	70	6	301	We will do the transit in 3-4 steps so we can stop and sample if necessary.
15:36	145.67093	15.91949	66	4	299	Heading 72deg.
15:37	145.67096	15.91953	60	3	297	Fish we are seeing in the cameras are being caught on deck… calling them Skip Jacks.
15:38	145.67097	15.91955	60	3	295	Tucking biobox in.
15:38	145.67098	15.91954	60	3	295	Fish are following Jason… seen on back camera.
15:39	145.67098	15.91954	60	3	295	Ship is starting the move.
15:41	145.67108	15.91959	61	3	289	Seastars and skip jacks.
15:41	145.67111	15.91961	63	4	287	Jason on the move across gravel and sand.
15:42	145.67127	15.91970	60	3	278	Fairly featureless bottom… sand and gravel.
15:42	145.67127	15.91970	60	3	278	Lots of little fish under Medea.
15:43	145.67126	15.91971	60	3	278	Fish eats fish.
15:44	145.67126	15.91972	59	2	278	V-shaped biology.. looks like bunny ears.
15:45	145.67126	15.91972	60	2	277	Crab in rock under white animal (nudibranch?). Brittle star.
15:48	145.67136	15.91974	60	7	273	End of that move… continue along another 30m or so.
15:50	145.67140	15.91980	59	4	269	Sand and gravel containing more rocks now.
15:51	145.67149	15.91987	60	7	262	Seastar.
15:52	145.67152	15.91991	60	5	259	Outcrops with biology.
15:53	145.67154	15.91992	60	5	258	Umbrella-like animals.
15:53	145.67157	15.91994	60	7	255	At 250m getting rocky outcrops coming out of gravel.
15:54	145.67160	15.91995	60	8	253	Seastars.
15:54	145.67161	15.91996	59	8	251	Big outcrop we are going over.
15:55	145.67167	15.92001	59	4	242	Big ridge up-down slope with steep sides.
15:55	145.67169	15.92004	60	5	240	School of fish.
15:55	145.67170	15.92005	60	5	240	Skip jack after medium orange fish.
15:57	145.67174	15.92009	60	3	237	Some red - iron staining.
15:58	145.67178	15.92012	60	6	235	Going over outcrop… done with this move.
15:58	145.67178	15.92012	61	6	235	May be a bit of shimmer.
15:58	145.67179	15.92012	60	8	235	Tiny bit of shimmer but not an obvious place to take a sample.
15:59	145.67184	15.92013	60	2	223	Lot more shimmering in rock.
16:00	145.67184	15.92012	58	6	227	At 221m coming to top of ridge quickly.
16:00	145.67186	15.92014	59	4	223	Seems to have water coming out everywhere not a specific place.
16:00	145.67186	15.92013	59	5	223	Came over rock outcrop for last few minutes...no sample area.
16:01	145.67193	15.92012	60	5	225	Less visibility after coming over the ridge.
16:01	145.67195	15.92012	60	6	225	Coming to another outcrop.
16:02	145.67196	15.92014	60	6	222	Not seeing shimmer but more bright orange in between the rocks.
16:03	145.67199	15.92017	60	6	219	May be a little shimmer here.
16:05	145.67209	15.92024	60	4	211	Continue this move. A little bit of mat on the rocks.
16:05	145.67210	15.92024	61	5	210	More iron staining in between the rocks.
16:08	145.67215	15.92034	60	7	210	Current making hard to stay on bottom.
16:09	145.67219	15.92035	61	5	207	Fuzzy rocks. Maybe not hydrothermally related.
16:10	145.67222	15.92038	61	6	206	Can see current moving along the white fuzz on rocks.
16:10	145.67223	15.92038	61	5	205	Butterfly fish in hole.
16:11	145.67226	15.92036	61	8	203	Going up steep cliff face...here's the top at 195m.
16:11	145.67234	15.92038	61	3	194	Thin mat on the rocks and orange staining between rocks.
16:12	145.67239	15.92043	59	7	194	Will go to Target Mat after this transect.
16:14	145.67238	15.92041	360	7	193	Changing direction 74m at 341deg after everything settles.
16:15	145.67234	15.92037	341	4	196	Starting ship moving to transit to the Mat Target.
16:16	145.67237	15.92039	356	5	194	Will be contouring around the west side of the summit to the site.
16:17	145.67231	15.92046	341	9	198	Rib of rocks in brow cam.
16:17	145.67224	15.92050	341	13	205	Another outcrop above slope.
16:19	145.67226	15.92063	343	1	195	Running along series of rock outcrops.
16:19	145.67226	15.92066	342	2	197	Fuzzy rocks.

time	raw long	raw lat	hdg	alt	Z	Dive J2-194 Ruby - Dive Log Comments
16:19	145.67226	15.92067	343	3	197	Maybe shimmer.
16:20	145.67226	15.92067	343	3	197	No obvious source.
16:20	145.67221	15.92077	343	3	200	Very fuzzy rocks.
16:22	145.67221	15.92077	343	3	200	White fuzz over large extent of area… must be very diffuse everywhere.
16:24	145.67223	15.92090	343	3	196	Seeing iron again in between rocks.
16:24	145.67219	15.92097	343	5	200	White now in patches.. bright white.... getting near Target Mat.
16:25	145.67215	15.92105	345	7	200	Want to stop and take a look here.
16:26	145.67215	15.92104	18	7	201	Turn heading to right.. area of white.
16:26	145.67215	15.92105	45	9	203	Take a look at hole and crack in wall.. no shimmer.
16:27	145.67214	15.92106	44	8	204	Backing up and lowering to look at hole.
16:27	145.67214	15.92106	44	7	204	Slight shimmer in hole.
16:27	145.67213	15.92106	44	7	204	Not many obvious animals.
16:31	145.67213	15.92105	44	9	205	Looking for good water source.
16:32	145.67214	15.92105	45	7	204	Don't see much water.
16:33	145.67214	15.92104	24	6	202	Want to look around this area...lateralling left.
16:35	145.67211	15.92108	69	8	206	Seeing small white dots in the rocks.
16:36	145.67215	15.92105	354	3	201	Exploring around this outcrop with white staining.
16:38	145.67218	15.92103	107	4	198	Could be limpets...stopping for a look.
16:39	145.67215	15.92105	114	5	201	Want to try to grab a rock with the limpets on it.
16:41	145.67216	15.92105	110	4	200	Limpets are probably hydrothermal.
16:41	145.67216	15.92105	115	4	200	Want to try to sample a rock with limpets.
16:44	145.67217	15.92105	113	3	199	Holding for a rock sample.
16:45	145.67217	15.92105	113	3	199	The whiter the sample the better (more limpets).
16:47	145.67217	15.92105	113	3	199	**SAMPLE-11 Bio/geo. 2 tennis ball-sized rocks with limpets. [Mat 145.572133E/15.604385N] PI Tunnicliffe / geogroup**
16:49	145.67217	15.92105	113	3	200	Trying to get one more piece in same spot.
16:52	145.67217	15.92105	108	3	200	SAMPLE-11 Bio/geo Another piece about same size. Aft-port quad of milk crate.
16:52	145.67217	15.92105	108	3	200	Going to try suction sampler to get a crab.
16:54	145.67216	15.92105	107	4	201	Retrieving suction sampler.
17:00	145.67217	15.92105	110	3	200	Got intake and retracting drawer.
17:03	145.67217	15.92104	110	3	200	SAMPLE-12 Bio-macro. Maybe cracked the intake tube. Trying to suction a crab. Crab disappeared.
17:03	145.67217	15.92104	110	3	200	**SAMPLE-12 Suction. Bio-macro. Found another crab...got it! [Mat 145.572133E/15.604385N] PI Tunnicliffe / geogroup**
17:04	145.67217	15.92104	110	3	200	SAMPLE-12 Bio-macro Found another crab...got it!
17:05	145.67217	15.92104	110	3	200	Suction worked! Same place as limpet-rock.
17:05	145.67217	15.92104	110	3	200	DVCam tape change.
17:08	145.67217	15.92104	108	3	200	Suction worked well.
17:09	145.67217	15.92104	107	3	200	Stowing suction wand.
17:11	145.67217	15.92104	112	3	200	Want to take a temperature here.
17:15	145.67217	15.92104	112	3	200	TEMPERATURE degrees C Placing wand ambient is 23.2.... Eel… 28deg.
17:15	145.67217	15.92104	112	3	200	Moray eel in 3-chip. Great images.
17:16	145.67217	15.92104	111	3	200	TEMPERATURE degrees C High was 28.1.
17:17	145.67217	15.92104	110	3	200	Going to reposition wand.
17:18	145.67217	15.92104	110	3	200	Temp in second spot a few inches away...27.1
17:19	145.67217	15.92104	110	3	200	Great eel images.
17:22	145.67217	15.92104	110	3	200	Stow the wand.
17:24	145.67217	15.92104	110	3	200	Ending dive observing the eel.
17:24	145.67217	15.92104	109	3	200	Shutting off hydraulics.
17:25	145.67217	15.92103	112	5	200	Jason off bottom.
17:26	145.67217	15.92102	113	5	199	Ending Dive J2-194.
17:26	145.67217	15.92103	113	4	199	Bringing up hydraulics to drop one weight.
17:27	145.67217	15.92103	114	5	199	Dropping weight - stowing arm.
17:28	145.67217	15.92103	113	4	198	Basket in - Jason on the way up.
17:56	145.67197	15.92068	285	147	150	JASON is at the surface
18:05	145.67200	15.92063	242	170	172	**JASON on deck - end of dive J2-194 at Ruby.**

5.4.12 J2-195 Daikoku Dive Log

time	raw long	raw lat	hdg	alt	Z	Dive J2-195 Daikoku - Dive Log Comments
J2-195 Daikoku Dive Summary: Started dive NW of the summit and climbed up slope where proceeded to do flatfish transects looking at the size, number and location of the fish. After first transect observed flatfish and snails - snapping digital stills. Samples: 1 niskin, 2 suctions flatfish and seds, 1 scoop. Prepared to survey again - sampled piece of sulfur crust and found Bubble Bath Vent site - a pit with bizarre gas bubbles (possibly CO2). Samples at Bubble Bath: 1 major, 1 gastight. After left Bubble Bath discovered Sulfur Cauldron - a pit of undulating, smoking, molten sulfur!! Sampled molten sulfur with marker chain, and later picked up a piece of sulfur crust. Next discovered Smoking Vent (little white smoking chimneys). Samples at Smoking: 1 major, 1 gastight, 1 tiny white chimney. Went back to scope out the cauldron extent. Next was a SM2000 survey over the 2 pits at the summit and over the newly discovered vents to the NW of the summit. Next suctioned flatfish and snails at Fish Spa, then on to the big NE Pit for a Niskin and rock sample. Finished dive running another SM2000 line over both of the large pits at the summit. 16 samples total.						
J2-195 Bottom time: 5/2/2006 0555 - 5/3 0524 UTC (23.48 hrs). **Z column represents seafloor depth in meters.**						
05:28	144.18331	21.31667	265	1	4	**Start of dive J2-195. Jason in the water.**
05:29	144.18331	21.31668	264	1	4	Diving at Daikoku Volcano.
05:29	144.18332	21.31668	268	1	4	Preparing to launch Medea.
05:30	144.18334	21.31670	262	1	4	Medea in the water.
05:33	144.18344	21.31675	238	172	210	Heading down
05:34	144.18346	21.31677	241	172	227	120
05:39	144.18352	21.31684	171	173	387	J2-195 Dive Configuration: 5 chamber suction sampler. SM2000. Scoops, bags, mesh, majors, niskins?
05:45	144.18352	21.31687	183	58	448	Smoke in the water column
05:55	144.19123	21.32570	102	7	446	On bottom at 440m. See sediment covered slopes with some rock outcrop.
05:55	144.19126	21.32574	106	8	445	Lavas look like it has some sort of layering almost flow banding.
06:00	144.19141	21.32581	106	4	453	See scree slope of boulders.
06:08	144.19157	21.32567	130	4	441	Going to move up slope to get to first way point and from there go in a straight line transect for 75 m to survey the location and number and size of flat fish found here at Daikoku.
06:11	144.19161	21.32564	131	3	439	Moving up slope covered with white deposit on top. See first tube worms and some others soon after. Also chiton.
06:11	144.19163	21.32563	130	3	438	Star fish.
06:12	144.19164	21.32562	130	4	438	Moving approximately SE upslope. Depth here is 434 m.
06:13	144.19166	21.32560	130	5	436	High density of urchins and chitons and tubeworms.
06:17	144.19180	21.32548	135	4	429	Continue to move upslope and see lots of sediment with flat fish and possibly some sulfur deposit on top?
06:19	144.19186	21.32546	144	4	428	See some red starfish and lots of flat fish.
06:20	144.19188	21.32543	147	3	426	Nice urchin here.
06:21	144.19190	21.32541	150	4	425	See large outcrops of rock which is massive and blocky.
06:22	144.19191	21.32538	157	3	422	See tube worms on top of rocky outcrop. Lots of whitish possibly sulfur on sediment surface. Tube worms are alive.
06:27	144.19195	21.32527	148	7	416	Rock outcrop looks layered in part. Felsic rock?
06:27	144.19198	21.32526	148	6	414	Vertical wall of lava in front of us.
06:28	144.19199	21.32525	148	5	413	Some bacterial mats seen on surface of rock.
06:31	144.19202	21.32525	158	3	411	Survey came to a stop as have a vertical wall in front of us at the first weigh point so will move away and try and find a less steep slope.
06:33	144.19207	21.32527	141	5	410	Vertical walls of lava. Looks massive. Seem to be located on a ridge.
06:34	144.19209	21.32526	147	6	411	Moving eastwards to move off this ridge and find a less steep slope.
06:34	144.19212	21.32525	150	10	412	Looks like flows and see some flow banding.
06:37	144.19225	21.32515	137	5	403	Depth here is 400 m but slope still covered by rocky outcrop so will proceed up slope trying to find sediments.
06:37	144.19227	21.32515	137	4	403	See tubes worms all around here where slope is very steep.
06:40	144.19232	21.32510	140	5	402	See loads of tubeworms straight ahead on the steep slope.
06:44	144.19217	21.32517	279	5	402	Repositioning the sub to start a new survey line to try and get away from the steep rocky slope.
06:46	144.19184	21.32514	283	11	409	See a big plume here with sub at 398 m depth. Very thick.
06:50	144.19182	21.32506	165	3	408	Sitting still to let sub and tether sort itself out. Eh reading of -115!
06:51	144.19177	21.32507	139	3	408	Eh -140 at bottom here at 405 m
06:52	144.19179	21.32506	140	2	408	Slope here has more sediment and lots of flat fish here.
06:52	144.19179	21.32506	140	2	408	Setting up sub and cameras before heading out on survey upslope.
06:55	144.19182	21.32510	140	3	408	**Beginning a flatfish transect.**
06:56	144.19182	21.32510	140	3	408	Good nav: 21deg 19.506N 144deg 11.500E start pos for transect.
06:56	144.19182	21.32510	140	3	408	Will try to take stills approx. every 10 seconds.
06:57	144.19182	21.32510	140	3	408	Heading is 139.6 deg. Depth is 405m and alt. 2.8m.
06:59	144.19182	21.32510	142	3	408	Starting transect at .1knts as close to bottom as possible.
06:59	144.19182	21.32510	142	3	408	Start.
07:00	144.19182	21.32510	142	3	408	Waiting for Medea to move...not starting.
07:00	144.19182	21.32510	142	3	408	Ready to move forward.
07:00	144.19182	21.32509	142	3	408	First photo now.
07:00	144.19182	21.32509	142	3	408	First photo at 0700:46.
07:01	144.19182	21.32509	142	4	408	Visibility is poor.
07:02	144.19183	21.32508	142	4	407	Fog just came up about 10 minutes ago...no visibility.
07:03	144.19183	21.32508	142	2	407	Looked like cloud just moved by - better visibility.
07:04	144.19183	21.32508	142	2	407	Traveling 1knt.
07:04	144.19184	21.32508	145	3	407	Burst of white particulates in water.
07:05	144.19189	21.32511	147	3	407	Moving along but still poor visibility.

time	raw long	raw lat	hdg	alt	Z	Dive J2-195 Daikoku - Dive Log Comments
07:06	144.19190	21.32510	151	3	407	Clearer visibility.
07:10	144.19199	21.32500	138	4	400	Want to get closer to bottom.
07:11	144.19201	21.32497	140	2	399	Still camera seems to be focusing on particulates in water and not the fish on the bottom.
07:13	144.19208	21.32493	139	4	395	Medea shows plume coming this way.
07:14	144.19208	21.32492	138	4	395	There is something active around here.
07:17	144.19213	21.32487	138	5	392	Current was coming from the 250W… from Jason's left.
07:18	144.19216	21.32485	138	4	390	Clearer again.
07:18	144.19217	21.32484	138	3	390	One that is 10cm with a lot of smaller fish around.
07:23	144.19230	21.32470	138	4	381	More smoke.
07:29	144.19240	21.32459	138	1	380	End of transect No. 1. 21 19.476 and 144 11.544.
07:38	144.19205	21.32468	120	3	382	Settling the sub down to see if can lose the hydrothermal plume. Very thick here. Transect considered qualified success as plume interfering and hinders good photographs.
07:43	144.19218	21.32473	119	1	382	Going to do some observations here for about 15 minutes.
07:43	144.19218	21.32473	119	1	382	Beginning flatfish and snail observations.
07:45	144.19218	21.32473	119	1	382	Position of flatfish and snail observations. 21 19.484 144 11.531.
07:48	144.19218	21.32473	118	1	382	Taking a series of still photographs about every 30 seconds of the observation location. Ambient water temperature is 13.8 C.
07:51	144.19218	21.32473	118	1	382	Flicked a snail on its back (flat fish did).
07:57	144.19219	21.32474	116	1	382	Close-up of tongue fish (flat fish). Tried to see breathing but unable to detect.
08:01	144.19218	21.32474	116	1	382	Flat fish seem to working the sediment around the snails.
08:05	144.19219	21.32473	119	2	382	Will take some temperature measurements in same general area as have now finished observations.
08:06	144.19221	21.32473	119	3	382	Now decided to move slightly and reposition sub for T measurements.
08:10	144.19221	21.32473	118	2	381	Temperature immediately above the sediment surface where fish are sitting is 13.8 sane as ambient.
08:11	144.19221	21.32473	118	2	381	5 cm into the sediment T = 13.9 C.
08:11	144.19221	21.32473	118	2	381	Probe about 10 cm into sediments is 14.0 C.
08:15	144.19221	21.32473	118	2	381	**SAMPLE-1 Niskin (red) tripped immediately above the flat fish where temperature probe was placed. Tamb=13.8C. Temp 10cm into seds is 14.0. [144.1922167E/21.324733] PI Resing**
08:21	144.19221	21.32473	119	2	381	**SAMPLE-2 Suction. Sampling flat fish into yellow jar. (same spot as sample 1 and temp reading Tamb=13.8) [144.1922167E/21.324733] PI Dower**
08:28	144.19221	21.32473	118	2	381	Continuing to sample flat fish. Move the sub slightly to get access to more fish.
08:29	144.19222	21.32472	119	2	381	Position of first sampling of flat fish here same as where Niskin triggered and temperature taken.
08:31	144.19222	21.32472	119	2	381	Position of 2nd site very close to first. Within a meter or so.
08:33	144.19222	21.32471	118	2	381	Still camera here put on 30 second interval to capture nice group of flat fish.
08:44	144.19222	21.32470	117	2	380	**SAMPLE-3 Suction. Sediment sample into white jar. [144.1922167E/21.324733] PI Dower**
08:51	144.19230	21.32468	118	33	411	Moving a few meters to collect
08:52	144.19230	21.32467	118	22	400	Going sample in a dark patch
08:57	144.19224	21.32469	119	1	380	Suction of white stuff. Broke through crust.
09:00	144.19224	21.32469	119	1	380	Finish Sample 3.
09:19	144.19221	21.32469	120	1	380	**SAMPLE-4 Scoop. Dark patches of sediment - with lots of fish in area. Into fine mesh bag. Starboard bio box. [144.1922167E/21.324733] PI Dower**
09:27	144.19197	21.32478	297	2	387	Going to do another survey while opportunity exists with water column quiet clear now.
09:34	144.19160	21.32485	266	193	594	See a major plume at 395 m and have found vent.
09:35	144.19152	21.32486	70	1	395	See very smoky vent and will mark on the map. 21 19.494/144 11.498.
09:39	144.19158	21.32495	144	9	406	Smoke is distinctly white. Looks like crater. Have come down cliff face about 10 m and see a number of vents all smoking white plumes.
09:41	144.19158	21.32495	145	16	406	There is a little smoker on the other side of the bowl. We were at 389 meters where put marker on the edge of the pit. Went past it and spun around. We dropped down.
09:44	144.19158	21.32495	111	10	406	Seems to be a rather small area here but very murky.
09:44	144.19158	21.32495	111	11	406	We're nowhere near the bottomless pit.
09:45	144.19158	21.32495	111	11	406	Probably 50 meters at most W/SW of Fish Spa/Fish Crack.
09:48	144.19158	21.32495	110	11	406	We're at the end of the fish transect line.
09:49	144.19158	21.32495	111	11	406	The little smokers would be just ahead of us at the wall ahead. [21 19.497' 144 11.494 position from the virtual van]
09:50	144.19157	21.32495	111	7	402	The plan is to move down slope a bit and then come up.
09:53	144.19146	21.32506	31	16	412	We're moving out of the smoke a bit about 20 meters (laterally) or so NW of the original target. Trying to get away from the smoke.
09:54	144.19150	21.32513	30	14	409	We've moved far enough to the northwest that the smoke is clearing a little.
09:55	144.19149	21.32514	29	3	410	Now what bearing to the target? We see the bottom now.
09:56	144.19149	21.32514	103	4	410	The bottom is full of crabs. Lots of bacterial mat? Z=406m facing northeast.
09:58	144.19147	21.32516	128	5	411	Not sure what we're seeing here. There are bubbles coming out of the seafloor. Lots of crabs. [21 19.508 144 11.490]
09:58	144.19147	21.32516	128	5	411	We're looking southeast up the slope.
09:59	144.19147	21.32515	129	3	411	The crabs are hiding under a big crust here. There are flat fish here too. Is that a sulfur crust?
10:01	144.19148	21.32515	130	1	411	The crabs and flatfish are here. Could this be a sheet of sulfur?
10:01	144.19148	21.32515	130	1	411	At the base of the smoking cliff we're going to take a sample of this crust that may be sulfur.
10:03	144.19148	21.32516	130	1	411	**SAMPLE-5 Crust. Grabbed a piece of sulfur crust. This area looks very much like the sulfur lake at Nikko. Lots of crabs and flat fish. Tamb=13.8C [144.191493E/21.325133N] PI geogroup**
10:05	144.19147	21.32516	129	2	411	SAMPLE-5 Crust Close-up of this crust looks like sulfur. We are going to put it behind the suction sampler.
10:08	144.19147	21.32516	129	2	411	It's bubbling here too. Lots of bubbles coming out.

time	raw long	raw lat	hdg	alt	Z	Dive J2-195 Daikoku - Dive Log Comments
10:11	144.19147	21.32516	129	2	411	Tambient=13.8. Z=409. [Sulphur crust is our target]
10:12	144.19147	21.32516	129	2	411	[Sulphur Crust 21 19.5092 144 11.4890] Tambient=13.8
10:16	144.19148	21.32516	129	2	411	Going to check temp in the bubbles area. Dave says it looks like gas escaping.
10:17	144.19148	21.32516	128	2	411	Just NW of the breach in the crater.
10:18	144.19148	21.32516	128	1	411	TEMPERATURE degrees C Only 14.5 C. Lots of bubbles coming up but not much heat.
10:20	144.19149	21.32514	159	1	410	The sulfur crust on the rim here looks very much like Nikko. We're going to look over the edge of this pit straight ahead. It looks pretty steep. More bubbles here.
10:20	144.19149	21.32513	162	1	410	Smoke here too. Could be part of the source of the flow?
10:21	144.19145	21.32510	111	3	411	It looks structural. Action at Daikoku.
10:23	144.19150	21.32508	92	3	410	We're going to call this Bubble Bath. [Bubble Bath 144.19147E/21.32508N] Z=410.
10:23	144.19150	21.32509	93	1	409	Looks like some more flow from this pit. Very gassy.
10:24	144.19150	21.32509	101	1	410	The bubbles here look bizarre with lots of CO2 gas.
10:25	144.19151	21.32509	102	1	410	Zooming in on the bubble source. Lots of yellow on these rocks.
10:26	144.19150	21.32510	102	1	410	Tambient=15.6 here.
10:28	144.19149	21.32510	100	1	410	TEMPERATURE degrees C Tambient=14.0. Sticking it in Bubble Bath here. It's not far in. T=38 and we had to back out.
10:30	144.19149	21.32511	100	1	409	We've stirred up lots of flock.
10:31	144.19150	21.32512	99	1	410	Trying to decide where to sample here.
10:31	144.19149	21.32513	99	1	410	Flatfish are really moving.
10:34	144.19149	21.32512	99	1	410	Tamb=14.6. Putting probe on the lip of this crack in the crust. Got up to 52C.
10:37	144.19147	21.32511	100	1	410	**SAMPLE-6 Major (blue). In the crack where we just took the temp here at Bubble Bath. Tmax=52C. [Bubble Bath 144.19147E/21.32508N] PI Butterfield**
10:40	144.19147	21.32513	100	1	410	We're seeing a big plume of smoke approaching from the south.
10:41	144.19146	21.32513	100	1	410	Wondering where we will store this. Probably going to have to set it on the piece of sulfur we just collected.
10:42	144.19147	21.32513	100	1	410	Medea's camera has totally lost it.
10:43	144.19147	21.32513	100	1	411	DEPLOY Marker Plan to deploy the marker here at the edge of Bubble Bath.
10:47	144.19148	21.32511	100	1	411	**Gastight (red-tape) here at same spot where we took the major. Tmax=52C. [Bubble Bath 144.19147E/21.32508N] PI Evans**
10:49	144.19148	21.32514	100	1	411	This white crab is the same as NW Rota. "austinograea yunohana"
10:54	144.19150	21.32509	107	1	409	DEPLOY Marker Placing this marker in the area we're calling Bubble Bath.
10:55	144.19150	21.32509	107	1	409	DEPLOY Marker. Couldn't get the marker out of the basket so we didn't deploy it. DID NOT DEPLOY THE MARKER.
10:56	144.19148	21.32506	154	3	410	We want to head up the slope to the spot where they saw the white smokers. Can see some in the Medea cam.
10:57	144.19143	21.32500	126	2	413	There's a bunch of smoke coming out of this large hole. We are only about 1 meter up and turned around.
10:58	144.19143	21.32500	125	3	413	It's a big hole. Looks like a flange. Different layers of sulfur here.
10:59	144.19143	21.32500	125	2	413	There's some yellow smoke coming out of the pit.
10:59	144.19144	21.32501	125	2	413	We could have a sulfur eruption pit here.
11:00	144.19144	21.32501	125	2	413	It looks like bubbling boiling sulfur.
11:01	144.19144	21.32501	125	2	413	**That's liquid boiling sulfur there**. That's a mess of boiling bubbling sulfur here. There's a flat fish down there. The Eh is -167.
11:01	144.19144	21.32501	125	2	413	Look at the boiling sulfur. Gas coming up through the sulfur.
11:02	144.19144	21.32501	125	2	413	The whole thing is undulating. It's black looking. Looks like a tar pit.
11:03	144.19144	21.32501	125	2	413	Turning off the overlay. The whole surface of this is undulating.
11:04	144.19144	21.32501	125	2	413	We're hovering above this thin crust.
11:04	144.19144	21.32501	125	2	413	This looks very much like Nikko only smaller. There is some gas and waves going over the surface.
11:06	144.19144	21.32501	125	2	413	[Devils Cauldron (later re-named Sulfur Cauldron) [21 19.4994 144 11.4887]
11:08	144.19144	21.32501	125	2	413	This is just incredible. We're looking toward the southeast - upslope. Z=411.
11:08	144.19144	21.32501	125	1	413	We want some good pictures with the digital camera. There is another event happening.
11:11	144.19145	21.32501	125	1	413	Lots of bubbling and boiling going on here too. We can see it all moving around just undulating with molten sulfur.
11:12	144.19145	21.32501	125	1	413	Still taking digitals. That looks just like a tar pit.
11:14	144.19145	21.32501	125	1	413	There are flat fish floating down in there. We're debating whether or not he's alive or dead.
11:16	144.19145	21.32501	125	1	413	Yogi found this spot.
11:17	144.19145	21.32501	125	1	413	Eh=-160. The bubbling cauldron is heaving and looks almost like waves breaking.
11:22	144.19145	21.32501	125	1	413	Look at how large it actually is. It extends for quite some are.
11:22	144.19145	21.32501	125	1	413	We are going to move to the southwest.
11:23	144.19145	21.32499	125	2	413	Working on some more digitals here.
11:28	144.19142	21.32495	125	3	414	We are stopped here for a minute. We are going to move along this down hill and behind us.
11:29	144.19142	21.32496	125	3	414	We are going to see where this comes out.
11:37	144.19142	21.32496	125	3	414	Going to try to sample the sulfur by sticking the marker chain in the molten sulfur.
11:42	144.19142	21.32496	125	3	414	Manipulating various things in the basket so that w can get at the marker chain so that we can get a sample of this molten sulfur.
11:48	144.19147	21.32499	116	2	413	We have the marker untangled and are moving back where we were before.
11:50	144.19148	21.32499	110	2	414	We're back at the edge of the pit here and the molten sulfur is undulating.
11:51	144.19149	21.32499	110	2	414	There is a sulfur-encrusted overhang here.
11:52	144.19149	21.32499	110	2	414	The marker has been dunked into the bubbling Devils Cauldron.
11:53	144.19149	21.32499	110	2	414	The visibility is decreasing. Lots of smoke . It's still bubbling up here.
11:54	144.19149	21.32499	110	1	414	Pulling the weights out of the cauldron.

time	raw long	raw lat	hdg	alt	Z	Dive J2-195 Daikoku - Dive Log Comments
11:55	144.19146	21.32499	109	1	413	Dunking the marker.. Zooming in on the black molten sulfur. It's really black.
11:56	144.19146	21.32499	112	1	413	Ko-ichi says it may change to yellow when it gets back on the deck.
12:00	144.19145	21.32500	135	1	413	**SAMPLE-8 Molten sulfur. Collected by dunking the marker chain into Sulfur (Devil's) Cauldron. This sample is not crust - at least not yet. The sulfur looks black. [Sulfur Cauldron 144.19148E/21.32499N] PI geogroup**
12:00	144.19145	21.32499	138	1	413	The lake level is probably 1 meter below the sulfur crust.
12:03	144.19145	21.32499	138	1	413	Jimmy is removing the net-mesh from the biobox. He will wind the marker up and put it on top of the mesh bag in the biobox.
12:04	144.19145	21.32499	138	1	413	Rolled up the marker polypro line and it's all nice and neat. Will go in the biobox.
12:06	144.19145	21.32499	138	1	413	Putting the overlay back on the DVCam.
12:12	144.19145	21.32499	138	1	413	Discussing what we're going to do now.
12:14	144.19145	21.32499	138	1	413	Now thinking of trying to put it in the basket with the gastights. The darn marker kept wanting to float up. Go figure.
12:18	144.19145	21.32499	138	1	413	Trying to put the marker in the basket. It is wrapped around a gas tight.
12:19	144.19145	21.32499	138	1	413	Got it in the basket.
12:21	144.19145	21.32499	138	1	413	We plan to go directly down slope from here a few meters and see what's happening down there. Could be sulfur spatter at the edge of this cauldron.
12:21	144.19145	21.32499	138	1	413	The place is crawling with fish here. That's a BIG flat fish.
12:22	144.19145	21.32499	138	1	413	This place is crawling with flat fish and crabs.
12:24	144.19145	21.32499	138	1	413	We're seeing tons of flat fish here at the edge of the cauldron. They're a tongue-fish symphurus n.sp. This is a new species of fish.
12:25	144.19145	21.32499	138	1	413	Zooming in near the edge. They're there too. See yellow smoke rising here. Going to take a temp here and a water sample too.
12:28	144.19147	21.32499	103	1	413	The overlay is off.
12:28	144.19147	21.32499	103	1	414	Zooming in on the surface of Devils cauldron.
12:30	144.19147	21.32499	103	1	414	TEMPERATURE Tambient=13.7. Taking temp in this little hole where yellow smoke is wafting out right next to the molten pit.
12:33	144.19147	21.32499	88	1	414	TEMPERATURE degrees C Up to 22 degrees in the white smoke.
12:33	144.19146	21.32499	87	1	414	Lots more smoke and floc in the water around us suddenly.
12:34	144.19146	21.32499	87	1	414	We are in a whiteout.
12:34	144.19145	21.32499	88	2	414	Eh is -190.
12:35	144.19142	21.32501	91	2	413	This is a huge cloud that could be acidic so we are backing away.
12:38	144.19141	21.32501	28	2	414	Heading downslope again.
12:39	144.19139	21.32501	302	2	414	This whole area may be covered in sulfur crusts from older flow events.
12:40	144.19125	21.32499	307	4	418	Heading northwest down the slope and the Eh is falling.
12:41	144.19119	21.32500	67	8	422	We are going down through a plume again. We will move 20 m down below the plume and head back upslope to find the source.
12:44	144.19136	21.32512	313	4	416	We have moved out of the plume as we continued northwest.
12:49	144.19106	21.32534	313	23	435	Siphonophore.
12:54	144.19109	21.32522	126	12	437	Going back to the bottom and then we will traverse back up towards Devil's Cauldron.
12:55	144.19109	21.32524	125	5	437	We are on the bottom. Heading upslope to the southeast. There are no flatfish but we did see a starfish.
12:57	144.19124	21.32519	126	5	429	This is an outcrop sediment slope with some pieces of sulfur. No flatfish.
12:58	144.19131	21.32514	127	10	424	Large outcrop with a dusting of fine sediment on it.
12:59	144.19136	21.32512	126	2	417	Slope is sandy again and whitish in color. Now there are flatfish again.
12:59	144.19139	21.32512	126	2	416	There are bits of sulfur now as well. It may be leaking out all over the slope.
13:00	144.19145	21.32509	126	3	413	Sulfur looks like spatter similar to up above the cauldron.
13:01	144.19149	21.32505	126	3	411	There is another pit here. We may be back at Bubble Bath.
13:02	144.19154	21.32502	126	2	410	Yes this is Bubble Bath. Now we will continue upslope to where we saw smoking vents earlier in the dive.
13:05	144.19155	21.32496	136	2	410	There are crabs all over this white-stained slope.
13:05	144.19155	21.32496	136	2	410	Waiting for medea.
13:07	144.19159	21.32492	136	6	408	This cliff looks like it has had molten sulfur dripping over the edge.
13:08	144.19164	21.32486	147	4	405	There is a tiny white smoker ahead.
13:09	144.19164	21.32484	149	2	404	This could be the smoking vent target.
13:10	144.19164	21.32484	149	2	404	We are settling down to do some sampling.
13:11	144.19164	21.32484	148	3	404	Temperature is climbing as we sit here. We may have punched a hole when we sat down.
13:12	144.19165	21.32484	194	1	403	Crabs are very dense. What are they feeding on?
13:17	144.19165	21.32484	192	1	403	TEMPERATURE ambient temp is 14.3. Temperature in the small white chimney reached 173 degrees.
13:20	144.19165	21.32483	192	1	403	Changed the angle of the probe and got to 211.6C.
13:22	144.19165	21.32483	192	1	403	We are going to take some water samples and then sample the chimney. Named the site Smoking Vent.
13:24	144.19165	21.32483	192	1	403	**SAMPLE-9** Major. White major taken in the tiny sulfur chimney at . Tmax was 211.
13:28	144.19165	21.32483	191	1	403	SAMPLE-9 Major Sample not taken yet. Waiting for stable flow from the vent.
13:28	144.19165	21.32483	191	1	403	Major intake had some sediment in it. Shaking it loose.
13:29	144.19165	21.32483	191	1	403	Outflow seems to have moved. Trying to find a good position to take a sample.
13:31	144.19164	21.32484	191	1	403	**SAMPLE-9 Major (white) taken in the little venting crack immediately at the base of the tiny sulfur chimney. Tmax=211C. [Smoking Vent 144.19163E/21.32483N] PI Butterfield**
13:36	144.19163	21.32484	192	1	403	We will try to take a gas tight too but the visibility is getting pretty poor.

time	raw long	raw lat	hdg	alt	Z	Dive J2-195 Daikoku - Dive Log Comments
13:36	144.19163	21.32484	193	1	403	**SAMPLE-10 Gastight (white tape). Tmax=211C. Sampled directly in the tiny chimney. [Smoking Vent 144.19163E/21.32483N] PI Evans**
13:47	144.19163	21.32485	192	1	403	Deciding what to sample next.
13:52	144.19163	21.32486	192	1	403	Want to sample some of the clear water.
13:54	144.19163	21.32486	192	1	403	First temperature reading then major and gas tight.
13:55	144.19163	21.32486	176	1	404	Fish swimming in water.
13:56	144.19163	21.32486	158	1	404	Same species of fish at the Kermadecs where there was a lot of sulfur.
14:00	144.19163	21.32486	157	1	404	At target 10 'Smoking Vent'
14:00	144.19163	21.32486	157	1	404	Retrieving temperature wand.
14:04	144.19163	21.32486	158	1	404	In shimmering clear water...24.5C
14:04	144.19163	21.32486	158	1	404	Repositioning wand.
14:05	144.19163	21.32486	158	1	404	TEMPERATURE Moved along crack. over 40 then lost it.
14:05	144.19163	21.32486	157	1	404	Getting smoky.
14:06	144.19163	21.32486	157	1	404	Going to save the major for later.
14:06	144.19163	21.32486	158	1	404	Now will try to retrieve the nearby chimney.
14:06	144.19163	21.32486	158	1	404	Try a scoop-mesh bag to capture chimney.
14:07	144.19163	21.32486	158	1	404	Water in chimney is over 200C.
14:08	144.19163	21.32486	158	1	404	Plume seen in Medea coming over the area.
14:09	144.19163	21.32486	158	1	404	Temperature went up .5deg as plume moved over site.
14:12	144.19162	21.32487	158	1	404	Chimney is to the right of the basket....visibility is diminished.
14:13	144.19162	21.32486	158	1	404	Opening biobox to put sample in.
14:14	144.19162	21.32486	158	1	404	Not sure if chimney will be solid enough to sample.
14:21	144.19162	21.32487	160	2	404	Retrieving mesh scoop.
14:24	144.19162	21.32487	160	1	404	Got the bag.
14:26	144.19162	21.32487	160	1	404	**SAMPLE-11 Scooping up the tiny chimney. Tmax=211C. [Smoking Vent 144.19163E/21.32483N] PI geogroup**
14:27	144.19162	21.32487	160	1	404	Scooping up remaining chimney-shake into scoop.
14:32	144.19161	21.32487	159	3	404	Closed lid and stowing.
14:33	144.19161	21.32487	160	3	404	Going back to fish counting.
14:36	144.19161	21.32487	160	3	404	Snowing.
14:37	144.19161	21.32487	160	3	404	Medea cam lost site of Jason and then snow happened.
14:38	144.19161	21.32487	159	3	404	Will start fish survey from here moving upslope at 129deg for 97meters.
14:39	144.19160	21.32487	160	3	404	Move out of storm to get to flats where we will setup camera.
14:41	144.19162	21.32477	130	6	403	Trying to get off sediment slope and get over to outcrop.
14:49	144.19190	21.32459	130	2	384	Going to start the fish transect.
14:50	144.19190	21.32460	131	2	384	Moved about 30 m up slope from chimney sample.
14:54	144.19190	21.32459	129	2	384	Starting fish transect.
14:54	144.19190	21.32459	130	3	384	This is transect 2.
14:57	144.19197	21.32454	130	3	381	Leaving outcrop and onto steep sediment slope.
14:59	144.19200	21.32452	129	3	380	Still have a pretty steep slope contrary to contours.
15:00	144.19203	21.32450	130	3	378	Head set not working. Comms are spotty.
15:01	144.19204	21.32448	129	3	377	White sulfur everywhere. Lower fish abundance than transect 30 m away .
15:03	144.19207	21.32446	129	2	375	Visibility making transect 2 less than ideal.
15:03	144.19208	21.32445	130	2	375	Lots more outcrop than transect 1.
15:04	144.19208	21.32444	130	2	374	Actual terrain different the expected .
15:06	144.19211	21.32443	129	1	374	Jason just got yanked by the current.
15:07	144.19212	21.32442	125	1	374	Ending Fish Transect 2.
15:08	144.19214	21.32442	122	1	374	Going down on the bottom to take a look.
15:12	144.19204	21.32435	122	199	572	Suction sample of dark fish laden patch of sediment.
15:13	144.19207	21.32438	130	1	374	repositioning Jason slightly
15:15	144.19207	21.32437	131	147	521	*doppler reset*
15:19	144.19209	21.32437	130	20	393	Jason viewable in Medea cam as cloud dissipates and snowfall decreases
15:22	144.19208	21.32438	130	101		gentle suck on the surface and it will clog
15:25	144.19209	21.32437	125	47		SAMPLE-12 Suction Begin slurp of sediment around fish
15:28	144.19211	21.32436	125	101		Did not get any sample because bad position
15:31	144.19210	21.32433	356	100		Repositioning for suction sample and try again
15:31	144.19210	21.32432	356	101		Starting suction sample again
15:33	144.19208	21.32430	356	200	382	**SAMPLE-12 Suction sample (blue cylinder) of sediment patch around tongue fish. [144.19205E/ 21.3244N] PI Tunnicliffe/Dower**
15:35	144.19208	21.32427	356	153		Suction clogging up Will is joggling it
15:36	144.19210	21.32423	356	194		Suction has slowed
15:37	144.19211	21.32421	356	192		Need one more suck
15:41	144.19208	21.32413	356	100		Clogged suction...index and flush.
15:43	144.19207	21.32408	356	89		Fish have a lot of energy. They are moving around a lot.
15:44	144.19208	21.32410	356	89		Other fish swimming around the arm.
15:46	144.19210	21.32410	356	196		Over 30 fish were in the 3chip frame at once.
15:46	144.19211	21.32432	356	190		*Doppler reset.*
15:47	144.19211	21.32432	356	193		Lots of flatfish activity.
15:47	144.19211	21.32432	356	193		Stowing arm.
15:50	144.19206	21.32429	356	198		Bottom is covered in these fish.
15:50	144.19206	21.32429	356	39		Snails in with the fish.

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15:51	144.19205	21.32428	356	101		Done with fish transect and observations.
15:52	144.19206	21.32426	356	99		Going to explore the pit.
15:54	144.19205	21.32429	359	195		Going to transect along bottom to bottomless pit.
15:55	144.19211	21.32429	87	1	377	Depth 375 and visibility is poor.
15:55	144.19216	21.32429	84	1	379	075deg at 73 meters to target.
15:57	144.19220	21.32441	78	1	380	We are downslope of rim.
15:57	144.19220	21.32441	78	1	380	Snowing again.
15:58	144.19223	21.32442	78	1	381	On edge of plume.
15:58	144.19227	21.32444	80	1	382	Coming out of plume and can see bottom again.
15:58	144.19230	21.32446	79	1	382	Lots of flatfish here.
16:01	144.19241	21.32442	150	3	390	Still moving downslope.
16:01	144.19244	21.32441	133	100	491	Light colored sediment.. could me mouth of pit.
16:02	144.19253	21.32447	133	3	392	*Doppler reset.*
16:02	144.19252	21.32447	133	3	392	Good nav: 21deg 19.468N 144deg 11.551E
16:02	144.19252	21.32447	135	2	392	Edge of pit.
16:03	144.19251	21.32448	177	1	393	We are at northern edge looking south.
16:03	144.19251	21.32448	177	1	393	Moving ship to south.
16:04	144.19253	21.32447	177	1	393	Poor visibility.
16:05	144.19252	21.32449	175	1	392	EH is -110.
16:05	144.19252	21.32449	177	1	392	Waiting for ship.
16:07	144.19252	21.32449	176	197	588	Hole is 50m wide...we are waiting for ship to move to proceed.
16:10	144.19252	21.32448	177	2	393	Want to get down over the rim and confirm with the sonar where we are.
16:11	144.19252	21.32438	170	1	392	*Doppler reset.*
16:11	144.19252	21.32434	177	3	393	Better edge of rim position...rim depth is 375 and now is 390m.
16:11	144.19253	21.32432	177	5	396	Pos: 21deg 19.460N 144deg 11.552E
16:11	144.19253	21.32431	177	6	397	Moving below rim… can't see a thing… watching sonar.
16:12	144.19253	21.32430	177	7	398	Rim is football shape in the sonar.
16:12	144.19253	21.32429	177	6	398	No visibility whatsoever.
16:12	144.19253	21.32429	177	5	398	Lots of white snow.
16:13	144.19254	21.32430	246	12	407	Turning around to face the wall.
16:14	144.19253	21.32430	292	19	413	Depth is 394m and altitude is not working.
16:14	144.19245	21.32426	347	7	399	Facing wall with 347 heading.
16:15	144.19250	21.32427	344	16	407	Recording sonar on digital file.
16:16	144.19258	21.32429	347	21	416	60m across the long dimension and 40m in other direction.
16:16	144.19259	21.32428	345	16	415	Depth is 396m...alt is 11.4 m. (may be wall)
16:16	144.19260	21.32427	346	14	415	Slowly sinking down pit...at 401.1 m.
16:17	144.19260	21.32425	345	12	416	Driving down the wall.
16:17	144.19260	21.32425	346	13	416	Staying at this depth want to fly to center and get depth reading.
16:17	144.19260	21.32423	346	20	423	Can see Jason with Medea in pit.
16:19	144.19261	21.32417	345	31	435	Moved out to middle of pit… altimeter is reading 23.8m and depth is 403m.
16:19	144.19261	21.32416	346	34	438	Actually pilot altimeter is 34.4m and depth is 403m.
16:19	144.19262	21.32415	346	38	442	Small fish around vehicle.
16:20	144.19262	21.32413	346	39	442	Looking at sonar of pit at 403.6m depth and 38.1m altitude.
16:23	144.19266	21.32407	345	42	445	Altimeter is 40m at 403m depth while we are in center of hole.
16:24	144.19264	21.32418	345	42	445	Target at Center of Pit #11
16:25	144.19262	21.32419	342	42	445	Position 21deg 19.450'n 144deg 11.558E.
16:25	144.19258	21.32424	340	45	443	Coming up out of the pit.
16:25	144.19257	21.32428	338	47	441	Visibility is poor again at 395m… lots of snow.
16:25	144.19257	21.32428	338	44	436	Still seeing pit at 395 in sonar.
16:26	144.19256	21.32428	338	53	430	Out at 375m of the hole.
16:27	144.19256	21.32428	338	51	428	Stopped recording digital sonar image.
16:29	144.19256	21.32427	337	52	428	Start of line is 178m away.
16:32	144.19255	21.32424	335	49	425	Driving through the water to the target.
16:50	144.19278	21.32369	337	12	347	Seems to be a lot of current here.. shipping having difficulty getting to line.
16:53	144.19299	21.32357	337	28	332	On edge of a plume… see clouds.
16:59	144.19296	21.32358	338	33	338	Plume again.
16:59	144.19295	21.32359	338	35	341	Ship is now moving.
17:04	144.19297	21.32375	352	48	353	2-2.5 knts surface current here.
17:05	144.19298	21.32376	352	58	363	Big plume again.
17:12	144.19300	21.32371	344	59	364	Driving on top of a plume.
17:20	144.19303	21.32379	13	66	373	Still driving in the smoke.
17:21	144.19302	21.32381	12	70	377	Low visibility. Medea cam shows big plume.
17:23	144.19302	21.32383	13	128	436	Billows of smoke.
17:35	144.19302	21.32386	354	49	356	Jelly fish.
17:39	144.19298	21.32386	355	23	330	Should be there in 8 minute.
17:41	144.19296	21.32387	345	82	389	Getting setup for the SM2000 lines.
17:43	144.19295	21.32386	354	72	399	Starting to head to the bottom...getting ready for SM2000.
17:43	144.19295	21.32386	354	69	400	Driving through snow. *(cut 1743:04-1801:06 from nav)*
18:08	144.19251	21.32589	130	14	401	SM2000 line start of line 1. NW end of line driving SE.
18:37	144.19454	21.32415	132	14	358	SM2000 line end of line 1.
18:41	144.19454	21.32407	227	14	361	Still see sulfur snow in the water and Jason is in a cloud in the Medea camera.

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18:48	144.19425	21.32392	317	14	357	*SM2000 line start. Did a doppler reset.*
18:48	144.19425	21.32392	317	14	357	SM2000 line start line 2. At SE end driving NW.
18:48	144.19425	21.32392	312	14	357	Water seems to be a bit clearer. Can see Jason in Medea camera.
18:50	144.19419	21.32398	312	14	355	Driving using doppler to drive Jason with auto altitude and heading and speed.
19:04	144.19312	21.32483	310	14	365	Going over a big hole in the SM2K.
19:04	144.19308	21.32487	310	14	356	Lots of plume and snow in the water. Jason in cloud in Medea camera.
19:15	144.19212	21.32560	310	14	413	We are going to extend the NW end of the lines by 50 m so we can cover Devil's Caldron.
19:15	144.19207	21.32564	311	14	418	Almost no snow in the water now and clear view of Jason in the Medea camera.
19:16	144.19204	21.32567	310	14	420	We are on the NW slope below 400 m.
19:19	144.19175	21.32589	212	14	444	SM2000 end of line 2.
19:29	144.19161	21.32566	130	14	436	*Doppler reset.*
19:29	144.19160	21.32565	130	14	436	SM2000 Start of line 3. At NW end driving SE.
19:41	144.19215	21.32518	130	14	400	Jason coming up steep slope. Can see rock outcrops ahead of us even though our altitude is 25m!
19:41	144.19216	21.32516	130	14	396	Water is still clear. Just a little snow in the water.
19:45	144.19243	21.32496	130	14	377	Visibility is getting bad. Lots of snow in the water.
19:50	144.19289	21.32460	130	14	361	White out.
19:57	144.19348	21.32412	130	14	360	Went over huge crater in SM2000 data about 5 minutes ago.
19:57	144.19350	21.32410	130	14	360	Crater was about 160 m deep in SM2000 profiles.
19:57	144.19353	21.32408	130	14	360	It's location roughly corresponds to a low in the multibeam data.
19:58	144.19356	21.32405	130	14	360	However we drove down inside another crater earlier in the dive so it looks like there are two craters.
19:58	144.19358	21.32402	130	14	359	Jason used auto depth to drive over the crater instead of auto altitude.
19:59	144.19361	21.32399	130	14	359	Still in a cloud with snow in the water and poor visibility.
20:04	144.19404	21.32365	131	14	352	SM2000 End of line 3.
20:05	144.19407	21.32363	220	14	355	Water is still cloudy.
20:13	144.19375	21.32343	311	14	344	Didn't need Doppler reset this time.
20:14	144.19375	21.32343	311	14	344	SM2000 Start of line 4. At SE end driving NW.
20:19	144.19352	21.32361	311	14	351	Cloudy milky water. Just lost Jason in Medea camera.
20:31	144.19272	21.32426	315	14	352	Went over 80-100 m pit about 5 minutes ago.
20:31	144.19269	21.32429	310	14	354	Could also see second pit off the NE.
20:32	144.19264	21.32431	309	14	361	*Lost doppler lock when bottom dropped off.*
20:32	144.19263	21.32432	311	14	364	Slowing ship.
20:33	144.19257	21.32438	308	14	372	Stopping ship so we can reset doppler.
20:34	144.19265	21.32434	312	14	373	Jason moving to get under Medea.
20:37	144.19243	21.32452	310	14	374	*Reset doppler.*
20:38	144.19243	21.32452	310	14	374	Going to back ship up about 70 m so we can re-do that section.
20:38	144.19243	21.32452	310	14	374	We are right over the pit.
20:42	144.19264	21.32434	310	14	374	*Lost doppler lock again in auto-depth.*
20:42	144.19263	21.32436	310	14	374	We are going to try backing up more then going slow with auto altitude.
20:55	144.19310	21.32413	308	14	360	*Doppler reset on SE side of pit.*
20:58	144.19310	21.32413	311	14	360	We are about 10 m NE of the line and we are going to drive parallel to the line.
20:59	144.19307	21.32415	313	14	360	This way we will drive over the NE rim of the pit rather than directly over the center of it.
20:59	144.19305	21.32417	312	14	361	Hopefully we will keep doppler lock that way.
20:59	144.19304	21.32418	312	14	361	Here we go. Driving NW.
20:59	144.19301	21.32420	311	14	362	*When we backed up over the pit before we lost doppler again using auto depth.*
21:04	144.19278	21.32439	311	14	357	*Lost doppler again.*
21:05	144.19278	21.32440	311	14	348	See double pit in SM2000.
21:06	144.19278	21.32440	309	14	348	There is only 20 m between the pits.
21:07	144.19278	21.32440	311	45	379	The south pit seems to be about 80 m deep.
21:14	144.19276	21.32440	281	51	407	No longer over the pit. Stopping ship. We are 50 m up going down to reaquirre doppler.
21:20	144.19239	21.32455	308	51	412	*Doppler reset just NW of south pit.*
21:21	144.19239	21.32455	308	51	411	Resuming the line.
21:21	144.19239	21.32455	310	51	412	Water is very cloudy.
21:34	144.19174	21.32505	311	51	432	Water getting clearer.
21:35	144.19167	21.32511	312	51	435	Still snow in the water but not as thick. Can see Jason in Medea camera.
21:35	144.19162	21.32515	311	51	437	Devil's caldron is SW of Jason now.
21:36	144.19157	21.32518	311	51	438	Saw possible plume in SM2000 data a minute ago. No major feature on seafloor.
21:40	144.19129	21.32541	308	51	455	SM2000 End of line 4.
22:06	144.19186	21.32449	128	51	416	Started line 5 at 21:52:00. Heading 131.
22:13	144.19245	21.32404	131	51	396	*We lost the bottom and the doppler.*
22:14	144.19252	21.32398	130	51	392	*Doppler is in and out.*
22:16	144.19255	21.32396	130	51	381	*Stopping the ship to reset the doppler.*
22:21	144.19249	21.32409	129	51	396	*We can't reset the doppler here because we are still over the pit. Moving the ship.*
22:24	144.19277	21.32383	130	51	396	*Doppler is reset.*
22:26	144.19274	21.32380	130	51	394	We are back on the line and continuing along line 5.
22:30	144.19300	21.32359	132	51	388	Slowing to 0.2 over the steep contours.
22:38	144.19350	21.32317	129	51	378	SM2000 End of line 5.
22:42	144.19352	21.32323	220	51	380	*Doppler reset at end of line.*
22:49	144.19320	21.32286	310	51	370	*Doppler reset again before start of line 6.*
22:52	144.19325	21.32293	310	51	360	*SM2000 Start line 6. Reset doppler again.*
22:53	144.19325	21.32292	310	51	360	Starting line 6. Heading 311.
23:22	144.19076	21.32494	247	51	456	SM2000 lEnd of line 6.

time	raw long	raw lat	hdg	alt	Z	Dive J2-195 Daikoku - Dive Log Comments
23:41	144.19057	21.32467	131	51	447	*Reset the doppler.*
23:43	144.19054	21.32466	130	51	446	SM2000 Start of line 7. Heading 131.
23:55	144.19148	21.32393	130	51	388	*Lost doppler. We will have to reset.*
23:57	144.19161	21.32381	129	51	386	We are going to slow down then get past the large feature ahead before resetting.
00:04	144.19200	21.32355	131	51	376	Still waiting to get a stable position to reset the doppler.
00:10	144.19198	21.32353	133	51	375	Doppler looks ok so we will not reset. Continuing on line 7.
00:23	144.19302	21.32265	131	51	357	SM2000 End of line 7.
00:36	144.19233	21.32277	42	51	365	*Doppler looks good. No reset necessary.*
00:37	144.19238	21.32281	43	51	363	SM2000 Start of line 8. Heading 043.
00:39	144.19239	21.32283	41	51	361	Correction. Heading for line 8 is 039.
00:50	144.19297	21.32349	37	51	362	*Lost doppler*. We will proceed on a bit to a flat spot and reset.
00:53	144.19295	21.32358	37	51	380	Doppler looks ok. We will not reset.
01:03	144.19360	21.32423	39	51	398	Big plume.
01:07	144.19396	21.32464	42	51	389	SM2000 End of line 8.
01:11	144.19387	21.32496	341	51	396	We will record data along a line parallel and about 40 m northeast of line 1.
01:24	144.19314	21.32582	271	51	408	*No need to reset the doppler.*
01:25	144.19313	21.32579	222	51	414	SM2000 Start of line 9. Heading 219.
01:48	144.19148	21.32387	220	51	377	End of line
01:48	144.19151	21.32392	219	51	374	SM2000 survey is over
01:49	144.19152	21.32390	218	51	375	Flying back to the molten sulfur lake in the water column
01:49	144.19152	21.32391	238	51	376	Heading 353
01:54	144.19149	21.32422	352	51	391	Going to bottom target.
02:04	144.19134	21.32448	353	51	392	The ship is at the target...Jason going down to bottom.
02:07	144.19130	21.32505	353	15	416	*Doppler reset.*
02:08	144.19132	21.32498	353	15	417	DVCam is back on… near bottom. .can see it in Medea cam.
02:10	144.19128	21.32500	358	9	417	Some white particles in water but not too bad visibility.
02:10	144.19128	21.32498	358	8	419	We should be due west of Devil's cauldron.
02:10	144.19127	21.32496	0	10	421	Big outcrop.
02:11	144.19131	21.32495	62	10	419	Target is 070deg.
02:11	144.19134	21.32494	104	10	417	Target depth is 412… we hovered at 410m.
02:11	144.19135	21.32493	84	13	417	Waiting for Medea.
02:12	144.19136	21.32499	91	15	416	Target is now 092.
02:13	144.19147	21.32501	92	10	412	Outcrop and steep hill is behind lake.
02:13	144.19146	21.32501	90	11	412	Should be over it now.
02:14	144.19146	21.32499	118	7	409	We are up too high at 401m.
02:15	144.19144	21.32500	120	7	412	Coming down for a closer look.
02:15	144.19142	21.32501	117	8	413	Smoke plume in front of us at 117deg.
02:17	144.19143	21.32497	113	5	413	Looking for sulfur lake.
02:17	144.19142	21.32498	112	4	413	Van is packed… fire drill in 15min… sulfur lake soon.
02:20	144.19143	21.32489	90	5	413	In a plume. Can see lake in Medea cam.
02:21	144.19142	21.32490	109	5	413	Here we are at Devil's Cauldron.
02:21	144.19148	21.32494	109	6	413	*Doppler reset.*
02:22	144.19148	21.32494	109	6	413	Good nav at south edge of lake: 21deg 19.496N 144deg 11.489E
02:22	144.19148	21.32494	109	3	412	Slowly approaching lake. Trying to decide what to do first.
02:23	144.19149	21.32494	108	3	413	Observing sulfur lake.
02:26	144.19150	21.32493	109	2	413	White wall face at back of lake could be acid alteration of the rock or from the sulfur.
02:27	144.19150	21.32493	109	2	413	Observing lake.
02:28	144.19150	21.32493	109	2	413	Big waves.
02:29	144.19150	21.32493	109	2	413	Fire drill.
02:29	144.19150	21.32493	109	2	413	Oozing sulfur.
02:32	144.19150	21.32493	108	2	413	On far right end you can see more molten sulfur under the crust.
02:36	144.19150	21.32493	109	2	413	Bob wants to look at spatter on rim to the right.
02:40	144.19150	21.32492	128	1	413	Thinking of trying land a bit back off the lake after taking a temp reading of the surface.
02:40	144.19150	21.32492	128	1	413	Retrieving wand from basket.
02:45	144.19150	21.32492	128	1	413	TEMPERATURE taking temp of crust. Ambient at 12.7C.
02:45	144.19150	21.32492	128	1	413	Can't really see the tip of the probe while hovering with basket out.
02:46	144.19150	21.32492	127	1	413	Trying another poke at surface.
02:46	144.19150	21.32492	128	1	413	Broke through something and still at 12.7deg.
02:46	144.19150	21.32492	128	1	413	TEMPERATURE Might be on thermocline...went up to 12.8deg
02:47	144.19150	21.32492	128	1	413	Going to try to land here.
02:49	144.19153	21.32491	115	99	512	We are going to try to put probe in the molten sulfur.
02:49	144.19154	21.32492	109	110	523	Temperature off the edge was same as ambient.
02:49	144.19154	21.32492	110	19	432	Fish is sitting on the lake right in the middle.
02:50	144.19154	21.32492	111	100	513	We are on the edge sitting!
02:50	144.19154	21.32492	111	100	513	Putting probe in lake.
02:54	144.19157	21.32483	110	1	414	TEMPERATURE degrees C Temp is going up.... 54… 63… 135… deeper… 151… 162… 168… 180C Tmax.
02:54	144.19155	21.32484	113	1	413	Moving back away from lake into a hover.
02:55	144.19155	21.32484	112	1	413	Probe looks great.. tip has a bit of coating.
02:57	144.19155	21.32484	112	1	413	Could not find outlet for sulfur on last survey around the pit.
02:57	144.19155	21.32484	112	2	413	Trying to decide where to sample.

time	raw long	raw lat	hdg	alt	Z	Dive J2-195 Daikoku - Dive Log Comments
02:58	144.19155	21.32484	112	1	413	Going to try to get a sample of the rock on the edge of the lake.
02:59	144.19156	21.32482	110	104	518	Potential sample is white.
03:00	144.19154	21.32482	106	162	575	Fish swimming all over the surface of the lake on the crust.
03:03	144.19154	21.32479	106	97	510	Thinking of using a bag to sample as it crumbled with the manipulator.
03:04	144.19153	21.32479	106	145	558	Changing DVCam tape.
03:04	144.19152	21.32480	106	162	575	Last scoop bag is mesh with a hole at top.
03:05	144.19152	21.32480	106	99	512	No bag… too torn up.
03:08	144.19153	21.32485	106	157	570	Changing dvds.
03:09	144.19151	21.32486	106	157	570	Decided to go fish survey next and then visit the bottomless pit.
03:09	144.19151	21.32485	106	157	570	We will return to this lake on the second dive to get sample of the plume.
03:11	144.19152	21.32486	106	195	608	Considering taking a piece of sulfur from edge before leaving.
03:12	144.19153	21.32486	106	195	608	Knocked piece off into lake and watching it float on top.
03:15	144.19157	21.32491	111	185	598	Still trying to get piece of crust...waiting for smoke to clear. Altimeter has been having bad readings.
03:15	144.19157	21.32491	111	185	598	Got a piece.
03:16	144.19156	21.32490	111	196	609	**SAMPLE-13 Rock (sulfur crust). Piece from edge of sulfur lake - fist-sized. [Sulfur Cauldron area 144.19148E/21.32499N] PI geogroup**
03:16	144.19156	21.32490	111	192	605	At lake...nav is questionable at the moment.
03:17	144.19155	21.32489	111	193	606	Looks like spreading ridge on the surface of the lake.
03:17	144.19155	21.32488	111	157	570	New material coming up in between crust.
03:17	144.19155	21.32488	111	165	578	Good sample. Will move on to fish survey site.
03:18	144.19154	21.32487	112	1	414	Moving away from lake to go to Fish site.
03:19	144.19153	21.32487	112	1	414	Altimeter looks like it is reading well again.
03:19	144.19153	21.32487	112	1	413	Using target 5 to start fish survey.
03:21	144.19164	21.32487	109	25	411	Driving off bottom to fish site.
03:22	144.19165	21.32486	109	28	410	Ship is moving.
03:29	144.19213	21.32469	109	9	389	Jason is close to target but the ship still needs to catch up.
03:32	144.19217	21.32471	109	8	387	*Doppler reset.*
03:32	144.19217	21.32471	111	8	387	Pos: 21deg 19.483N 144deg 11.530E
03:33	144.19223	21.32469	108	7	384	Visibility is not good.
03:34	144.19233	21.32470	105	5	383	Looking for a spot with good visibility for fish observing.
03:34	144.19239	21.32471	106	4	383	Setting down here gently over a dark spot.
03:36	144.19242	21.32470	103	1	382	Not seeing as many fish here but looks like they are buried a bit.
03:37	144.19242	21.32470	103	1	382	Fish are looking less active.
03:38	144.19242	21.32470	104	1	382	Going to reposition to find a better spot.
03:43	144.19227	21.32474	105	4	385	Driving around due East looking for fish spot.
03:45	144.19219	21.32471	153	3	386	Visibility is poor.
03:45	144.19219	21.32472	159	2	386	Big current moving across here.
03:50	144.19222	21.32465	142	2	383	Found a good spot. Want to sit and take video then sediment temperature.
03:50	144.19222	21.32465	142	2	383	At end pick up fish with suction.
03:50	144.19222	21.32465	142	2	383	Zooming in on pilot cam.
03:51	144.19222	21.32465	142	2	383	Observing snails and fish.
03:51	144.19222	21.32465	142	2	383	Good nav: 21deg 19.479'N 144deg 11.534E.
04:00	144.19223	21.32465	142	2	383	Are the fish burying themselves for feeding or is it camo?
04:06	144.19223	21.32465	142	2	383	Retrieving wand for temperature of sediment.
04:07	144.19223	21.32465	142	2	383	TEMPERATURE degrees C Ambient 13.2.... in about 5cm it is 13.3.
04:07	144.19223	21.32465	142	2	383	TEMPERATURE Climbed to 13.4...13.5.
04:07	144.19223	21.32465	141	2	383	Took sediment temp at the fish observation site.
04:08	144.19223	21.32465	142	2	383	Jar red fish suction sample.
04:10	144.19223	21.32465	143	2	383	SAMPLE-14 Suction. Indexing to red. retrieving other manipulator.
04:10	144.19222	21.32464	137	2	383	Are fish making pits or maintaining the geology here.
04:10	144.19222	21.32464	142	1	382	Repositioning Jason to get better suction placement.
04:12	144.19222	21.32464	144	1	383	Got one.
04:12	144.19222	21.32464	144	1	383	Getting another suction. Looks like another one.
04:13	144.19222	21.32464	144	1	383	**SAMPLE-14 Suction (red). A number of fish and possibly snails. [144.192233E/21.32465N] PI Dower / Tunnicliffe**
04:13	144.19222	21.32464	144	1	383	Have not seen fish go into jar but did see go in suction.
04:16	144.19222	21.32465	145	1	383	Suction Lots of snails...no fish. Chasing a big one.
04:18	144.19222	21.32464	145	1	383	Escaped...Good one.
04:18	144.19222	21.32464	145	1	383	Suction Got it.
04:19	144.19222	21.32464	145	1	383	Another one...best to get them from the head.
04:20	144.19223	21.32464	145	1	383	One last suction...got it.
04:22	144.19222	21.32464	148	1	383	Saw a fish at top of jar - turned back on suction to get it inside the jar.
04:23	144.19222	21.32464	147	1	383	Going to the big pit.
04:23	144.19222	21.32464	147	1	382	Securing hydraulics.
04:25	144.19223	21.32465	142	3	383	144deg at 69m to target.
04:26	144.19221	21.32463	110	3	383	Preparing to leave Fish Spa area for transit to large pit.
04:28	144.19242	21.32456	113	2	380	Passing over light-colored area with visible fish.
04:29	144.19250	21.32452	114	4	383	Heading into low-visibility area.
04:32	144.19259	21.32447	115	2	387	Driving along slope in the saddle between pits.
04:32	144.19265	21.32445	113	3	387	Seeing fish and rock outcrops.
04:32	144.19266	21.32443	116	4	387	Lava outcrops here.

time	raw long	raw lat	hdg	alt	Z	Dive J2-195 Daikoku - Dive Log Comments
04:33	144.19275	21.32439	120	3	382	Touch down slightly.
04:34	144.19278	21.32438	117	3	380	Ridge or edge of pit.
04:34	144.19280	21.32439	68	6	380	Plume coming out of this pit.
04:37	144.19287	21.32445	120	2	378	Nav ok: 21deg 19.467N 144deg 11.572E
04:37	144.19287	21.32445	116	3	379	We are over the pit.
04:37	144.19287	21.32443	108	4	380	Big plume here.
04:38	144.19287	21.32438	96	8	381	Want to get a Niskin of this plume.
04:38	144.19286	21.32435	74	5	379	Multiple plumes here.
04:40	144.19293	21.32438	63	20	395	Moving into the plume.
04:41	144.19301	21.32443	63	32	411	In plume...ambient water is 14.7deg.
04:41	144.19303	21.32444	59	36	414	Altimeter reading 49m.
04:42	144.19297	21.32441	61	29	404	**SAMPLE-15 Niskin. Triggered at 377m from plume over the big NE Pit. T=14.8C. [NE Pit area 144.192867E/21.32445N] PI Resing**
04:43	144.19294	21.32440	349	28	404	Want to look around rim and check out the rocks. maybe sample.
04:43	144.19291	21.32439	284	19	395	SAMPLE-15 Niskin Temperature was 14.8 of the sample.
04:44	144.19283	21.32436	268	2	380	Sitting on rim of pit...ambient water 14.6.
04:46	144.19283	21.32436	267	3	380	Bacterial mat on the rocks...not too much biology evident.
04:47	144.19283	21.32436	267	3	380	White coating and black underneath while trying to sample.
04:48	144.19283	21.32436	266	3	381	**SAMPLE-16 Rock from west edge of pit (non-plume pit). Round grapefruit size. A second piece on top of round rock - slabby piece broke up when placed in basket. [NE Pit area 144.192867E/21.32445N] PI geogroup**
04:49	144.19283	21.32436	266	3	380	Sample from the west side rim of the pit.
04:50	144.19284	21.32436	275	4	380	We are looking west 270.
04:50	144.19285	21.32438	277	12	386	There are 2 pits adjacent to each other.
04:51	144.19289	21.32440	277	33	407	Rock taken from the non-plume pit.
04:53	144.19293	21.32436	278	7	381	Waiting to image the inside of the pit with the plume.
04:58	144.19295	21.32438	281	14	383	Going to do a short run over the plume pit with the SM2000.
04:59	144.19291	21.32440	346	16	385	40m at 054deg to target of sm2000 start.
05:00	144.19291	21.32444	56	13	382	Try to do line at .3knts.
05:01	144.19295	21.32450	56	12	381	Calibrating and starting SM2000.
05:03	144.19315	21.32451	54	12	381	Driving over the plume again.
05:03	144.19318	21.32451	56	12	381	10m away from target.
05:04	144.19327	21.32451	208	10	379	Going to go over both pits with sm2000.
05:05	144.19329	21.32461	235	21	390	Didn't get any bottom alt. when over pit.
05:06	144.19328	21.32461	242	21	391	Jason is at the target.
05:06	144.19323	21.32472	245	16	385	*Doppler reset.*
05:07	144.19330	21.32462	241	13	381	Good pos: 21deg 19.480N 144deg 11.598E
05:07	144.19332	21.32463	248	15	381	Setting up the line. Bring altitude up to 20-25m.
05:08	144.19336	21.32458	243	23	374	Going to auto-depth starting at 25m off the bottom at the start.
05:09	144.19335	21.32457	246	23	377	SM2000 line start Driving will be at 250deg. Ready to go. At .2knts.
05:09	144.19328	21.32453	250	22	377	SM2000 line start Line 10 of sm2000.
05:10	144.19316	21.32449	250	19	373	Seeing edge of pit on sm2000 sonar.
05:10	144.19313	21.32448	249	16	370	Pos. 21deg 19.470N 144deg 11.587'E seeing edge of pit in sonar.
05:12	144.19313	21.32443	247	19	373	Making a small lateral move to stbd about 10m.
05:12	144.19310	21.32447	246	21	374	Driving over plume.
05:13	144.19299	21.32445	252	21	376	Turning off Jason altimeter - interfering with signal.
05:13	144.19293	21.32444	250	21	376	Measuring 110m depth with sonar at this point.
05:14	144.19288	21.32441	250	21	375	Pit is only 20m across using sm2000.
05:14	144.19285	21.32440	250	21	375	At 120m depth now.
05:14	144.19284	21.32440	249	21	376	120m depth of pit using sonar.
05:15	144.19280	21.32441	250	21	376	Still driving in plume.
05:15	144.19280	21.32442	250	21	375	Coming out of first pit now.
05:16	144.19268	21.32439	251	21	376	On the saddle out of the pit.
05:16	144.19265	21.32436	248	21	375	Starting to see second pit really quickly after first pit.
05:17	144.19262	21.32431	250	21	375	Looks like 86m deep with sonar.
05:17	144.19259	21.32430	250	21	376	About 40m across with sonar.
05:18	144.19257	21.32429	249	21	375	Jason is flying at 354m.
05:19	144.19252	21.32426	251	21	376	Now at 50m across.
05:19	144.19246	21.32425	251	21	376	This is the second pit.
05:20	144.19244	21.32424	249	21	376	Climbing out of pit.
05:20	144.19232	21.32420	248	21	376	Out of the pit. Not much smoke here.
05:21	144.19224	21.32416	246	21	375	*Waiting for doppler reset.*
05:21	144.19224	21.32417	248	21	376	SM2000 line end Ending line after second pit.
05:22	144.19225	21.32435	303	21	376	Getting recovery heading...will come to surface after this.
05:23	144.19229	21.32433	183	21	376	*Doppler reset.*
05:24	144.19210	21.32407	192	21	374	Final pos 21deg 19.449N 144deg 11.527E and Jason is off bottom.
05:24	144.19210	21.32401	192	21	370	Jason is off bottom.
06:04	144.19231	21.32446	157	1	2	JASON on deck

5.4.13 J2-196 NW Eifuku Dive Log

time	raw long	raw lat	hdg	alt	Z (m)	Dive J2-196 NW Eifuku - Dive Log Comments
J2-196 NW Eifuku Dive Summary: Navigation was an issue throughout the dive. Large offset from 2004 positions so much time spent trying to find vent sites discovered then. Want to sample mussels and water at same spots for CO2 dissolution analysis. Started the dive in the area of the Bacterial Balls 2004 target. Not active if at the site. Drove around and decided to head to Cliff House. Couldn't find it so went to Champagne where there was only 1 small white chimney remaining. CO2 bubbles were observed. Samples at Champagne area: 5 HFS, 1 gastight, 1 scoop of mussels. 1 niskin fired just upslope. Moved ~10m NW of Champagne to a medium mussel density site: 1 scoop of mussels and 1 HFS. Next collected small friable chimney at Sulfur Slope. Next found higher density mussel site (~85% coverage) named it Rippling Mussels. Sampled mussels and water there (2 HFS, 1 scoop). Next picked up one dead mussel casing. Found an area dubbed Where? with a high concentration of mussels. Sampled mussels and water. Moved on to Cliffhouse'06 where sampled: 4 HFS, 2 gastights, 1 major, 1 niskin. [25 samples total]						
J2-196 Bottom time: 5/3/2006 1503 - 5/4 0423 UTC (13.33 hrs). **Z column represents seafloor depth in meters.**						
13:50	144.03331	21.46665	237	1	2	Preparing for dive J2-196 at Northwest Eifuku Volcano. Target site is Champagne Vent field.
13:54	144.03335	21.46665	156	1	2	Jason-2 in the water.
13:56	144.03336	21.46665	165	1	4	J2-196 Dive Configuration: 5 chamber suction sampler. The Beast. Scoops, bags, mesh, majors, niskins?
13:57	144.03337	21.46666	166	1	4	Medea in the water too.
14:14	144.03339	21.46678	192	190	625	J2-196 Beginning dive at Eifuku.
14:51	144.03337	21.46685	115	108	1691	Altimeter seeing bottom...we are 110 above bottom.
14:57	144.03323	21.46680	208	17	1702	Driving the bottom to target...we are 20m off bottom.
14:59	144.03327	21.46696	231	27	1711	Vehicle is getting pulled here.
15:01	144.04055	21.48933	280	29	1718	*Doppler reset.*
15:03	144.04054	21.48938	179	10	1726	There's the bottom.
15:03	144.04055	21.48938	178	11	1726	Starting videos.
15:04	144.04052	21.48932	180	11	1722	Target is Bacterial Balls.
15:04	144.04053	21.48930	179	17	1722	Should be driving upslope to target. Jason heading 179deg.
15:06	144.04055	21.48926	179	6	1717	60m wall in front of us.
15:06	144.04053	21.48927	178	8	1718	Not really a wall - artifact of 2 different mapping systems.
15:07	144.04051	21.48927	179	7	1717	Sedimented slopes with outcrops and not much bacterial mat evident.
15:07	144.04051	21.48925	179	7	1716	Waiting for Medea to get moving.
15:07	144.04051	21.48925	179	7	1716	Bacterial Balls is due north at about 50m.
15:08	144.04052	21.48919	179	7	1711	Some patches of white staining.
15:10	144.04055	21.48909	177	10	1705	White patches are not white when close. It's iron staining.
15:11	144.04055	21.48909	179	9	1705	Putting overlay back on DVCam.
15:14	144.04056	21.48905	179	9	1701	Fish.
15:14	144.04055	21.48903	179	9	1699	Colored areas look like they may have been hydrothermal venting but not any more.
15:14	144.04055	21.48903	179	9	1699	Shrimp
15:16	144.04055	21.48895	178	8	1693	More and more brown staining. Not active.
15:17	144.04058	21.48889	179	8	1688	Target depth may be off on the list for Bacterial Balls.
15:18	144.04056	21.48888	179	6	1686	Nearby target depth is 1675m. Looks like same contour interval.
15:19	144.04056	21.48885	179	6	1684	If nothing is here we will continue to Yellow Top.
15:19	144.04056	21.48884	179	6	1683	Rocks outcrops and not much mat and no visible activity.
15:20	144.04055	21.48882	179	8	1682	Brown stuff could be residue of old bacterial mat.
15:21	144.04050	21.48882	200	10	1683	208deg 34 meters to next target. Target at same depth.
15:22	144.04045	21.48878	207	4	1680	Going over ridge outcrop.
15:23	144.04038	21.48876	207	1	1681	Visibility went down as we went over cliff. Going back down.
15:24	144.04034	21.48875	206	4	1682	Depth difference for Bacterial Balls could be difference between where we saw them falling down cliff and top of cliff.
15:25	144.04034	21.48877	206	2	1683	Cliff to left. On the bottom again. Head due south to target.
15:27	144.04037	21.48854	179	3	1690	Brown material between rocks.
15:27	144.04037	21.48854	179	3	1690	No evidence of venting here.
15:27	144.04037	21.48854	180	3	1690	Now want to drive east.
15:28	144.04037	21.48857	180	5	1691	Patches of black sediment.
15:28	144.04037	21.48858	175	5	1691	Moving east to go upslope.
15:29	144.04037	21.48860	143	5	1691	Some white staining but no flow.
15:30	144.04035	21.48863	91	5	1691	Looks like orange pieces of crust...potato chip shaped.
15:31	144.04038	21.48860	125	4	1690	Moving upslope.
15:31	144.04040	21.48858	125	4	1690	Fish under rock - looks eel-like.
15:32	144.04043	21.48856	125	4	1689	Looks all dried up here - no mat or diffuse venting.
15:32	144.04046	21.48856	125	3	1687	Brown balls of mat.
15:33	144.04048	21.48855	125	3	1686	More crust material
15:34	144.04048	21.48857	125	3	1686	Still have 10m depth more to go upslope.
15:35	144.04048	21.48857	125	3	1686	Great shrimp in 3chip camera.
15:36	144.04045	21.48858	125	4	1687	Waiting for Medea to go upslope.
15:38	144.04045	21.48859	120	4	1686	Here's Medea and away we go upslope.
15:38	144.04048	21.48859	118	4	1685	Seeing some white.
15:39	144.04052	21.48859	118	3	1682	Still looks like remnants of venting here.

time	raw long	raw lat	hdg	alt	Z (m)	Dive J2-196 NW Eifuku - Dive Log Comments
15:40	144.04055	21.48859	110	5	1681	Some bio in the white patch.
15:42	144.04058	21.48860	104	5	1679	Looks like snails or something on a white band in rocks.
15:42	144.04058	21.48860	104	5	1679	Worms in white - lots.
15:43	144.04058	21.48860	104	5	1679	Nothing moving… maybe not alive bio.
15:43	144.04058	21.48860	142	4	1678	Want to go 20m south now.
15:45	144.04058	21.48850	178	5	1677	Less sediment/residue and more rock.
15:46	144.04057	21.48843	178	5	1674	Brown residue very evident between rocks again.
15:48	144.04069	21.48825	178	5	1672	*Doppler reset (~20m to east).*
15:49	144.04068	21.48818	173	6	1672	Heading to Yellow Cone… 35m at 090deg.
15:50	144.04073	21.48818	89	9	1671	More sediment on slope as we go up.
15:50	144.04074	21.48818	89	10	1670	See a squat lobster and crust between lava outcrops.
15:51	144.04080	21.48817	89	6	1661	White areas do not look active.
15:51	144.04081	21.48817	89	6	1659	Larger outcrop.
15:53	144.04082	21.48817	89	6	1659	A bit of venting with some mats. Stopping to look and suction.
15:54	144.04082	21.48817	90	6	1659	Slight shimmer.
15:54	144.04093	21.48822	93	6	1659	*Doppler reset (13m to NE).*
15:55	144.04093	21.48822	93	7	1659	Red jellyfish.
15:56	144.04093	21.48822	93	6	1659	Retrieving temperature wand to get water temperature first.
15:57	144.04093	21.48822	93	6	1659	Need to bring Medea back to west.
15:57	144.04093	21.48822	93	6	1659	Finding water area.
16:02	144.04097	21.48821	120	6	1659	Interesting formations of bacteria.
16:02	144.04097	21.48821	120	6	1659	Ambient water is 1.8C.
16:06	144.04097	21.48821	120	4	1658	TEMPERATURE degrees C In bacteria and water..4.7C.... max is 6.3C.
16:06	144.04097	21.48821	120	6	1659	Want to suction where temperature probe is.
16:09	144.04095	21.48822	117	7	1660	Stowing wand and retrieving suction sampler.
16:12	144.04095	21.48822	117	8	1660	Indexing to yellow suction jar.
16:18	144.04096	21.48820	120	6	1659	Suction of iron bacterial mat into Yellow jar. PI: Davis.
16:18	144.04078	21.48829	121	6	1659	*Doppler reset (20m to NW).*
16:18	144.04078	21.48829	120	6	1659	SAMPLE-1 Suction Even better position: 21deg 29.297'N 144deg 2.447'E
16:20	144.04078	21.48829	120	5	1659	Sampler not suctioning...have 1500 psi .
16:21	144.04078	21.48829	120	5	1659	Checking indexing.
16:21	144.04078	21.48829	120	6	1659	Jar looks good. Reversing flow.
16:22	144.04078	21.48829	120	5	1659	Going to index to green for testing.
16:26	144.04077	21.48829	118	7	1660	Indexing to green.
16:29	144.04077	21.48829	118	7	1660	Testing sampler to determine problem.
16:30	144.04077	21.48829	118	7	1660	Looks like bad index… will try again.
16:31	144.04077	21.48829	118	7	1660	Moved carousel a bit to better fit green flush jar.
16:33	144.04077	21.48829	118	7	1660	Going to try to reset the valve on the pump.
16:36	144.04077	21.48829	118	7	1660	Nothing is getting it to work. NO SAMPLE.
16:36	144.04077	21.48829	118	7	1660	SAMPLE-1 Suction. NO SAMPLE. NO PRESSURE.
16:36	144.04077	21.48829	118	7	1660	Placing target here to come back later.
16:37	144.04077	21.48829	118	7	1660	Target 10 Red Hill. 21 deg 29.298'N 144deg 2.446'E.
16:37	144.04077	21.48829	118	7	1660	Next target is Mussel Mound.
16:38	144.04077	21.48829	118	7	1660	112deg at 100m to next target.
16:39	144.04080	21.48828	119	7	1658	Should be going along ridge between targets.
16:39	144.04081	21.48827	119	6	1655	Pillow lava here coming down slope.
16:39	144.04083	21.48826	120	7	1653	Long stretching tubes.
16:40	144.04086	21.48820	117	4	1648	Some white deposits or staining between pillows.
16:40	144.04088	21.48819	118	5	1647	White thin mat.
16:41	144.04088	21.48819	117	6	1647	Evidence of past hydrothermal flow. More squat lobsters. Live white mat.
16:43	144.04092	21.48815	113	4	1642	Mussel shell.
16:45	144.04096	21.48811	128	5	1640	Long pieces of mat waving in current.
16:47	144.04111	21.48803	136	16	1635	Came off the bottom - heading back down.
16:48	144.04113	21.48809	360	18	1633	Looking at ridge or outcrop in Medea.
16:48	144.04113	21.48811	359	16	1634	Still way off bottom.
16:48	144.04117	21.48812	53	8	1625	Need to drive 112 to target.
16:48	144.04116	21.48811	299	9	1625	Taking a wrap out of tether.
16:50	144.04116	21.48808	109	12	1629	Large outcrop.
16:51	144.04128	21.48795	116	9	1621	Heading 114 to target of Mussel Mound.
16:51	144.04134	21.48792	112	12	1616	Going upslope.
16:52	144.04140	21.48793	93	8	1613	Change course to 085 to target.
16:53	144.04142	21.48793	75	1	1612	Target depth is 1594m.
16:53	144.04153	21.48796	89	7	1622	Going downslope here...looks like target is upslope.
16:54	144.04159	21.48794	97	6	1619	Squat lobsters and mussels here.
16:55	144.04167	21.48797	91	7	1612	Lots of squat lobsters and lots of mussels here.

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16:56	144.04170	21.48797	97	8	1610	Mussel mound has higher density than what we are seeing here. We are at 1602 and target is 1594m depth.
16:56	144.04172	21.48799	81	11	1609	More and more mussels as we climb up slope.
16:57	144.04174	21.48801	82	8	1601	*Doppler is off right now...bad positions.*
16:57	144.04174	21.48801	82	9	1600	We are on the ridge at the proper depth but not as many mussels.
16:58	144.04174	21.48799	116	10	1600	Much less dense than 2 years ago.
16:59	144.04174	21.48801	127	13	1600	Pilot break.
17:00	144.04182	21.48799	149	9	1595	Only seeing live shells… no dead ones.
17:02	144.04187	21.48794	151	4	1591	Some shrimp.
17:03	144.04187	21.48794	141	4	1591	Some snails on white patch of white.
17:04	144.04187	21.48794	141	5	1591	Either everything has changed or nav is way off.
17:04	144.04187	21.48794	141	5	1591	Changing tapes.
17:06	144.04192	21.48783	182	4	1589	*Doppler reset (12m to SE).*
17:06	144.04192	21.48782	182	5	1588	Position now is 21deg 29.270'N 144deg 2.515'E.
17:07	144.04192	21.48779	182	3	1585	Want to head to Cliff House to depth 1573m up the ridge.
17:08	144.04191	21.48774	134	7	1588	Cliff House is a ridge that meets massive cliff.
17:10	144.04194	21.48770	68	6	1584	Driving upslope.
17:12	144.04199	21.48775	88	11	1583	Looking around for Cliff House.
17:13	144.04204	21.48771	171	5	1575	On a ridge. Want to drive south a bit along this ridge.
17:13	144.04205	21.48771	127	7	1577	Want to face upslope and lateral to right.
17:14	144.04199	21.48764	127	6	1579	Do another 10m jump south.
17:15	144.04198	21.48765	127	7	1579	Some mussels and squat lobsters.
17:17	144.04196	21.48755	127	6	1577	Going another 10m south.
17:18	144.04196	21.48755	127	6	1577	Some mussels.
17:21	144.04187	21.48752	126	18	1583	Moving west.
17:26	144.04192	21.48740	98	22	1571	Ship move is finished.
17:26	144.04191	21.48741	89	22	1571	Waiting for everything else to settle.
17:26	144.04189	21.48742	77	18	1567	Want to be at 1573meters of depth.
17:26	144.04188	21.48743	75	16	1564	Medea is still close to cliff.
17:27	144.04188	21.48743	60	21	1571	Maybe we should go south to get Medea away from cliff.
17:27	144.04185	21.48746	50	13	1563	Squat lobsters and mussels.
17:30	144.04169	21.48740	92	20	1587	Coming into a plume of smoke.
17:30	144.04170	21.48738	86	22	1588	We are heading 90deg.
17:31	144.04172	21.48738	54	14	1581	We could be upslope of Champagne.
17:31	144.04173	21.48737	49	9	1576	Big ridges.
17:31	144.04173	21.48736	52	7	1574	Shimmering water on cliff edge.
17:31	144.04173	21.48737	53	7	1576	Going down to 1573...we are at 1568 and still in plume.
17:33	144.04169	21.48736	39	7	1581	Some mussels.
17:33	144.04169	21.48736	22	4	1577	Lateral right and face the slope.
17:33	144.04169	21.48735	37	4	1577	Out of smoke.
17:34	144.04170	21.48734	50	4	1577	More mussels here.
17:34	144.04170	21.48734	50	5	1578	Depth is 1573.
17:34	144.04171	21.48732	49	7	1579	Mussels and lobsters.
17:35	144.04173	21.48729	50	7	1580	More of a talus slope here. Some plume/smoke above us.
17:36	144.04170	21.48735	8	20	1593	Can't find any identifiable targets so thinking of heading to Champagne. In a big smoke plume again at 1572m.
17:36	144.04168	21.48734	351	1	1574	Go 67meters due west. Lost.
17:37	144.04167	21.48732	268	13	1587	Driving through plume and smoke.
17:37	144.04166	21.48731	268	14	1587	Driving midwinter to make approach to Champagne.
17:50	144.04147	21.48737	309	56	1630	Still on approach to Champagne.
17:54	144.04145	21.48741	35	5	1638	Back on bottom at 1632m. Lots of mussels and white squat lobsters.
17:55	144.04114	21.48735	40	5	1638	Going to work our way upslope to Champagne which should be about 30m above us.
17:55	144.04115	21.48736	41	4	1637	Visibility is good so far. No sign of any milky/smoky water.
17:58	144.04122	21.48736	91	6	1632	Water becoming cloudy. Evidence of white diffuse venting.
17:59	144.04122	21.48738	94	6	1631	Just noted this as Nav Target 12.
18:00	144.04124	21.48744	103	5	1631	We're passing over a boulder field with lots of healthy mussels.
18:01	144.04126	21.48749	92	6	1631	Some large blocks of sulphur with shrimp on them.
18:02	144.04128	21.48748	96	8	1630	Small area of shimmering water coming out of the sulphur slope.
18:03	144.04129	21.48748	90	8	1629	Placing Nav Target 12 here. Previous Nav Target should have been #11.
18:05	144.04135	21.48744	70	5	1624	Just approaching what looks like a small (few metres) sulphur mound.
18:05	144.04136	21.48744	70	4	1624	Shrimp becoming very abundant here.
18:06	144.04137	21.48744	68	4	1624	Another small shimmering water flow.
18:10	144.04131	21.48750	76	6	1626	Still moving uplsope. Now at 1619m.
18:11	144.04135	21.48752	85	9	1623	Water seems to be becoming somewhat cloudier.
18:18	144.04128	21.48760	80	15	1625	No luck finding Champagne yet. We're going to try looking to the southeast.

time	raw long	raw lat	hdg	alt	Z (m)	Dive J2-196 NW Eifuku - Dive Log Comments
18:20	144.04140	21.48754	50	9	1619	Entering another area with increasing mussel coverage.
18:26	144.04151	21.48752	103	8	1611	Mussel coverage still pretty good but water is not very cloudy. Still no sign of Champagne.
18:34	144.04147	21.48740	36	17	1620	Eh has just dropped precipitously to -100.
18:36	144.04148	21.48741	61	7	1618	Still searching for Champagne. We are now at 1610m heading NE.
18:38	144.04152	21.48738	51	9	1620	Entering an area with very dense mussel coverage on a steep sloping outcrop.
18:41	144.04169	21.48732	78	4	1611	Placing Nav Target 13 on an area with some evidence of bubbling.
18:42	144.04169	21.48732	78	4	1611	Looks like liquid CO2.
18:46	144.04169	21.48733	77	4	1610	Fair amount of liquid CO2 bubbling action here.
18:56	144.04159	21.48735	64	7	1616	We think we have found the **Champagne** site. If it is it has only a single small white chimney.
18:59	144.04164	21.48737	83	3	1613	We're going to set up to try some sampling here. Looks like a good site for bacterial mat.
19:14	144.04167	21.48730	84	3	1613	Suction sampler not working. So no bacteria sampling.
19:19	144.04167	21.48731	83	3	1613	Getting set up for some water sampling.
19:35	144.04164	21.48732	83	2	1612	**SAMPLE-1 HFS. Unfiltered piston #5. Tmax=31.3C Tavg=30.1 T2=20.7. Vol=400ml. [Below Champagne vents on sulfur flow 144.041682E/21.487359N] PI Butterfield**
20:05	144.04164	21.48732	83	2	1612	**SAMPLE-2 HFS. Sterivex filter #10. Tmax=52.7C Tavg=42.9 T2=27. Vol=4000ml. [Below Champagne vents on sulfur flow 144.041682E/21.487359N] PI Butterfield (subsamps Huber/Bolton)**
20:11	144.04164	21.48732	83	2	1612	SAMPLE-2 HFS Stopped
20:12	144.04164	21.48732	83	2	1612	Sterivex Sample Stopped.
20:12	144.04164	21.48732	83	2	1612	**SAMPLE-3 HFS. Unfiltered bag #9. Tmax=44.2C Tavg=41.2 T2=28. Vol=251ml. [Below Champagne vents on sulfur flow 144.041682E/21.487359N] PI Butterfield**
20:14	144.04164	21.48732	83	2	1612	SAMPLE-3 HFS stopped
20:15	144.04164	21.48732	83	2	1612	**SAMPLE-4 HFS. Fish filter #7. Tmax=43.6c Tavg=41.9 T2=29. Vol=201ml. Sample number added post-dive. [Below Champagne vents on sulfur flow 144.041682E/21.487359N] PI Butterfield (subsamps Huber/Bolton)**
20:17	144.04164	21.48732	83	2	1612	Stopped sample
20:25	144.04165	21.48732	83	3	1612	**SAMPLE-5 Gastight (black). Tmax~43C? [Below Champagne vents on sulfur flow 144.041682E/21.487359N] PI Evans**
20:27	144.04164	21.48732	83	2	1612	Position for Samples 1-5 - 11m S/SE of Champagne'06 target (~30m S/SW of 2004 position).
20:34	144.04158	21.48738	73	3	1610	Going upslope to the NE. Steep slope with a mix of small boulders and light coloured sandy sediment.
20:37	144.04151	21.48734	64	12	1617	Preparing to fire a Niskin bottle.
20:45	144.04163	21.48740	57	4	1605	**SAMPLE-6 Niskin (green) fired. [Just upslope of Champagne site 144.041618E/21.487424] PI Resing**
20:51	144.04159	21.48731	39	10	1611	We just found a marker from the Nov 2005 Hyperdolphin cruise. Marker reads HD492.
20:53	144.04161	21.48735	39	10	1612	Moving slightly to the NE to find a place to sample mussels and the overlying water.
20:56	144.04157	21.48746	37	3	1610	Setting down to sample mussels. This is a "medium density" site.
21:01	144.04156	21.48745	38	4	1610	Using the stubby scoop net with the white tape around the mouth to scoop mussels.
21:08	144.04156	21.48745	38	4	1610	We scooped up about 5-6 mussels.
21:09	144.04156	21.48745	38	4	1610	**SAMPLE-7 Scoop (net) 5-6 mussels at 'medium mussel density' site. [About 10m NW of Champagne 144.041565E/21.487453N] PI Tunnicliffe**
21:10	144.04156	21.48745	38	4	1610	Position 21 29.247 144 02.494
21:10	144.04156	21.48745	38	4	1610	Sample was collected about 10m NW of Champagne.
21:13	144.04156	21.48746	37	3	1610	**SAMPLE-8 HFS. Filtered bag #11 just above mussels (sample7). All temps ambient (no anomaly) at 2.4C. Vol=551ml. [~10m NW of Champagne 144.041565E/21.487453N] PI Butterfield**
21:18	144.04156	21.48746	36	3	1610	Sample stopped. All temps were ambient (i.e. no anomaly) at 2.4C.
21:19	144.04154	21.48744	307	4	1610	Moving to the north toward the Sulphur Slope 06 site.
21:20	144.04149	21.48741	276	6	1614	If this is the same site where we saw all the mussels in 2004 then the density has been greatly reduced.
21:21	144.04142	21.48732	330	5	1622	Approaching the small sulphur mound that we saw earlier on the dive.
21:23	144.04140	21.48733	32	3	1624	Trying to locate the small venting site that we saw earlier on this sulphur mound.
21:28	144.04142	21.48732	8	3	1623	Preparing to collect water samples near small venting orifice on the sulphur mound.
21:39	144.04142	21.48731	8	2	1622	We've decided to abort water sampling and will try to collect a small white chimney instead.
21:50	144.04143	21.48733	7	2	1623	SulfurSlope'06 Taking the temp. Tamb=2.0. Lots of shrimp here - "Loihi".
21:55	144.04143	21.48733	7	2	1623	TEMPERATURE degrees C Tamb=2.0. Taking temp of this diffuse flow here. Lots of "loihi" shrimp here. This is next to the little chimney that Cornel wants to sample. We're down slope from Champagne. Tmax=22.4.
21:55	144.04143	21.48733	7	2	1623	The chimney is mainly sulfur - probably has some silica too.
21:58	144.04135	21.48732	7	2	1623	**SAMPLE-9 Chimney. Mainly sulfur (probably some silica too) covered with shrimp. Diffuse venting area. Mound is ~2m across and 4m tall. Tmax=22.4C. [SulfurSlope'06 144.041415E/21.487324N] PI geogroup**
22:02	144.04134	21.48732	7	2	1623	SAMPLE-9 Attempting to use a mesh bag. Doesn't want to go in the bag. Got a small bit in the bag. Mound is bigger than we thought. At least 2 m across and 4 m tall.
22:04	144.04132	21.48733	50	2	1624	Sulfur chimney is sitting on the top of the mesh bag. Need to get it in the bag.
22:06	144.04133	21.48733	50	2	1624	The chimney is in the bag. Z=1621.
22:10	144.04132	21.48733	49	2	1624	SAMPLE-9 Chimney Have a shrimp in the bag too. Stowing it in rear stbd milk crate.
22:10	144.04132	21.48733	49	3	1624	We're going to head to Mussel Mound. Should have a depth of 1594. Doing a bit of housekeeping first.
22:13	144.04131	21.48733	49	4	1624	***There is a 45 meter offset from the 2004 nav. (bearing 116) 2006 nav is east and south of 2004 nav. (doppler offset 10m W)***

time	raw long	raw lat	hdg	alt	Z (m)	Dive J2-196 NW Eifuku - Dive Log Comments
22:19	144.04101	21.48737	110	25	1643	We're heading through the water column to Mussel Mound (its predicted offset location).
22:23	144.04110	21.48721	112	2	1637	Mussels all over the place. Landed back in at 1633m. We're further down slope than where we previously saw them in 2004?? Verena would like to sample here. We've stirred up a bunch of shrimp here.
22:24	144.04117	21.48726	113	2	1637	These are all the alvinocarid shrimp. Also galatheids (squat lobsters).
22:26	144.04114	21.48730	112	3	1638	[Rippling Mussels'06] Sampling mussels here first and then will take a water sample. The shrimp here are separated. These are the "alvinocarids". They are on the mussels. The "loihi" hang out on the mat.
22:29	144.04114	21.48729	112	3	1638	These mussels have byssal threads that attach them to the substrate. These are going to go in a bag.
22:31	144.04115	21.48729	112	3	1638	**SAMPLE-10 Bio-macro. Scooping mussels (mesh bag). Great sample. [Rippling Mussels'06 144.041164E/21.487351N] PI Tunnicliffe**
22:35	144.04115	21.48729	113	3	1638	**SAMPLE-11** HFS. Filtered bag #14 in this area with > 100 mussels here. Starting now.
22:37	144.04116	21.48735	113	3	1638	There are limpets here as well on the mussels. Lots of squat lobsters and shrimp (alvinocarids).
22:38	144.04116	21.48735	112	3	1638	We do see smaller mussels here too. The little mussels are juveniles. The baby mussels are tiny. Verena doesn't see any.
22:39	144.04116	21.48735	112	3	1638	SAMPLE-11 HFS Not seeing anything coming out of the exhaust for the sample pump. Don't see a problem with the beast. Going to try again.
22:40	144.04116	21.48735	112	3	1638	**SAMPLE-11 HFS. Filtered bag #14 in this area on rock with ~85% mussel coverage. Tmax=2.9C Tavg=2.8. Vol=646ml. [Rippling Mussels'06 144.041164E/21.487351N] PI Butterfield**
22:41	144.04116	21.48735	112	3	1638	SAMPLE-11 HFS Stopped
22:43	144.04116	21.48735	113	3	1638	**SAMPLE-12 HFS. Unfiltered bag #19 here in the mussels. Tmax=2.7 Tavg=2.6. Vol=604ml. [Rippling Mussels'06 144.041164E/21.487351N] PI Butterfield**
22:44	144.04116	21.48735	112	3	1638	The squat lobsters here are a new species.
22:45	144.04116	21.48735	112	3	1638	New position 21 29.24 144 2.470 RIPPLING MUSSELS'06 CORRECTED POSITION
22:46	144.04116	21.48735	112	3	1638	The squat lobsters are holding hands. We're watching.
22:48	144.04116	21.48735	112	3	1638	Stowing the sampler. We're heading up hill to the old Mussel sampling spot.
22:49	144.04114	21.48736	111	5	1640	Waiting for the ship to reposition
22:54	144.04116	21.48738	67	6	1639	We are on our way to Mussel Mound 06.
22:55	144.04118	21.48739	67	7	1638	As soon as we left the last sampling site we lost the mussels.
22:56	144.04125	21.48741	64	11	1633	Seeing sulfur patches. Are we nearing sulfur slope?
22:56	144.04127	21.48742	66	10	1632	There are some mussels on the bottom.
22:57	144.04133	21.48743	67	9	1626	Small rocks between sulfur chutes have mussels on them.
23:00	144.04139	21.48744	66	7	1622	Near the sulfur slope target and there is a lot of sulfur and a few empty mussel shells.
23:01	144.04142	21.48745	66	4	1620	Stopping to pick up some of the empty mussel shells.
23:01	144.04142	21.48745	71	3	1620	Looks like the calcium carbonate in the shells is partially dissolved.
23:05	144.04142	21.48745	73	3	1620	**SAMPLE-13 Bio-macro. One dead mussel casing with no calcium carbonate. Periostricum is all that is left of these dead mussels. [144.041335E/21.487431N] PI Tunnicliffe**
23:07	144.04142	21.48745	74	3	1620	Going to try to sample the dead mussels with the claw.
23:11	144.04142	21.48745	74	3	1620	Dead mussel casings with no Calcium carbonate. In the biobox.
23:14	144.04142	21.48745	74	3	1620	SAMPLE-13 Bio-macro We only got one dead mussel. We got good video of the dead ones.
23:19	144.04142	21.48745	72	3	1620	We saw at least 5 empty mussel shells with only the periostricum left.
23:23	144.04142	21.48745	72	3	1620	We are headed towards the Mussel Mound site and it should take us over all the other mussel sights.
23:27	144.04142	21.48745	72	3	1620	We're sitting here looking at the shrimp. Waiting for the pilot to return. We don't see the aggressive behavior here (cannibalism). There's more to eat here.
23:28	144.04141	21.48745	69	3	1620	Heading upslope. Make it so. ay ay captain.
23:29	144.04144	21.48747	63	5	1618	There's a bit of yellow tinge to the bacterial mat here. Obviously some sulfur here. Going upslope over this large sheet of sulfur deposit is bounded by talus piles and lots and lots of mussels.
23:29	144.04144	21.48747	62	6	1618	We're moving up over mussels.
23:30	144.04147	21.48749	62	8	1615	The mussels don't seem as thick as in 2004 - or we haven't found the spot yet.
23:31	144.04149	21.48753	62	6	1609	Quite an outcrop off to the northwest. Large amount of sulfur. White deposits along the cracks.
23:32	144.04153	21.48755	61	9	1608	In some places the white deposits are a sulfur crust. Where the white is mat there tends to be hairy filaments.
23:33	144.04156	21.48758	62	5	1602	We do have localized concentrations of mussels. The white we see here is bacteria.
23:35	144.04161	21.48761	64	3	1596	Mussel density is picking up here. Lots of mussels here.
23:35	144.04162	21.48761	63	2	1595	This is more mussels than we have seen elsewhere on this dive.
23:36	144.04170	21.48765	62	4	1596	Nav here is 21 29.258 144 2.501. LARGEST CONCENTRATION OF MUSSELS SO FAR. Z=1594.
23:37	144.04171	21.48765	62	3	1596	All of a sudden the mussels went away. There is not flow here? Just before we came into the mussels Yogi saw a big plume. We now are out of the flow and out of the mussels.
23:37	144.04171	21.48765	109	5	1597	They cluster on the rocks instead of the sediments. They are trying to access water blowing by not in the sediment.
23:38	144.04173	21.48763	110	5	1596	Seeing more bacterial staining here.
23:38	144.04174	21.48762	109	6	1595	We still have chunky outcrop and chunks of sulfur and shoots of sediment (black).....
23:39	144.04178	21.48761	111	5	1592	Beware all you mussels we're coming to get you.
23:40	144.04187	21.48760	94	5	1587	That rock looks like cemented breccia. Rubble slope of talus deposits. We're near the shifted More Mussels target.
23:41	144.04190	21.48759	113	7	1585	Dave's wondering where these big blocks are coming from? We're going to keep to the game plan. Heading up slope as originally planned.
23:41	144.04192	21.48759	85	9	1585	Mussels are sparse right here.

time	raw long	raw lat	hdg	alt	Z (m)	Dive J2-196 NW Eifuku - Dive Log Comments
23:42	144.04193	21.48760	51	8	1583	We're lost almost all the mussels. The water is milky. The depth seems wrong.
23:43	144.04199	21.48769	48	5	1578	We're quite confused about where we are and what's up ahead.
23:43	144.04200	21.48771	43	5	1579	No mussels here. Cliff wall with sulfur deposits but no sulfur blocks.
23:45	144.04205	21.48777	46	7	1581	The ridge that we saw earlier may have been what we were looking for.
23:46	144.04206	21.48783	59	6	1579	We have no mussels here at 1573 meters.
23:47	144.04202	21.48783	69	9	1583	We're going to head back down to where we saw the densest mussels. We're going to do the sampling and go from there.
23:50	144.04195	21.48776	236	3	1587	**Where?** is the name of the largest concentration of mussels area. 21 29.258 144 2.501. LARGEST CONCENTRATION OF MUSSELS SO FAR. Z=1594.
23:53	144.04174	21.48770	237	8	1599	Here comes the bottom.
23:55	144.04171	21.48763	203	2	1597	We're close to Where? mussel area. Lots of Mussels here. We're there **(Where? target)**.
23:57	144.04171	21.48763	202	2	1597	We did see some dead shells in one area. Focused in on them and all the calcium carbonate was gone. Only the organic cover is left. They dissolve immediately. There are so many live shells and don't see many (just a few) dead ones. We're seeing scale worms here.
23:57	144.04171	21.48763	203	2	1597	Verena is convinced we're not seeing the shells of the dead mussels because of the enhanced levels of CO2 here.
23:58	144.04171	21.48763	203	2	1597	They protect themselves from dissolving with the organic coating while they are alive. This isn't calcite. It's aragonite. When they come up she will slit them open. Take the meat out and keep the shell.
00:00	144.04171	21.48763	201	1	1597	**SAMPLE-14 Bio-macro. Scooping up (black bag) healthy looking mussels (~8 of them). Area with the largest concentration of mussels so far. [Where? 144.041692E/21.487647N] PI Tunnicliffe**
00:02	144.04171	21.48763	202	1	1597	Putting the black mesh bag with red handle in the biobox. Looks like 8 or so mussels in the bag.
00:04	144.04171	21.48763	202	1	1597	Verena is scanning for dead mussels. Can't see anything and we've been over a large area. Just one tiny piece of organic covering here. There is a dissolved out piece of organic covering in front of us. No shell there.
00:06	144.04172	21.48763	206	2	1597	These mussels are a bit fuzzy with bacterial mat. All the little scar marks on them are where other mussels have attached to them with the byssal threads. They're shuffling around all the time.
00:07	144.04172	21.48762	202	1	1597	See some "alvinocarids" on the mussels.
00:09	144.04172	21.48762	202	1	1597	**SAMPLE-15 HFS. Filtered bag #18. Tiny temp anomaly. Tamb=1.8C on Jason probe. Tmax=2.5 Tavg=2.4. Vol=601ml. In the area of the mussels. Sample failed. [Where? 144.041692E/21.487647N] PI Tunnicliffe**
00:14	144.04169	21.48764	199	1	1597	Going to attempt another suction here. Put it on the green bottle and attempt it again. Please please work....
00:18	144.04169	21.48765	199	1	1597	Suction sampler is not working. Looks like a hydraulic problem to Jimmy.
00:19	144.04169	21.48765	199	1	1597	We want to get to Champagne. We're going to go over in the plume and shoot a gastight.
00:23	144.04169	21.48763	192	2	1596	We're going to do a gastight in the plume above Champagne.
00:24	144.04171	21.48761	190	6	1595	Looks like the flush pump was not working.
00:24	144.04170	21.48761	190	6	1595	We're within 5 meters of the sample.
00:29	144.04170	21.48760	191	5	1595	**SAMPLE-16 HFS. Filtered bag #17. Sample for the mussel info. Sample 15 didn't work - the flush pump was not on. T=2.5C Tamb=2.4. Vol=605ml. [Where? 144.041692E/21.487647N] PI Butterfield**
00:32	144.04170	21.48760	190	5	1595	We're lifting off and heading to the Champagne site for the gastight in the plume.
00:32	144.04170	21.48761	191	5	1595	Heading 193.
00:33	144.04165	21.48757	192	3	1593	Eh here above the mound is ~43.
00:34	144.04164	21.48750	193	10	1600	We're going to take the gastight where we took the Niskin. A couple meters above where the bubbles are coming out.
00:37	144.04158	21.48730	182	16	1612	We're traveling in the water column to the Champagne site.
00:40	144.04167	21.48738	34	8	1609	We see Champagne here and below.
00:40	144.04169	21.48738	37	4	1606	Depth of 1601
00:45	144.04164	21.48732	36	13	1614	**SAMPLE-17 HFS Gastight. Firing gastight (red) in water column within sight of Champagne plume (for background). Tamb=1.8C. Z=1601. Alt=7.1. [144.041598E/21.487305N] PI Evans**
00:47	144.04169	21.48736	34	8	1609	Gastight fired.
00:48	144.04163	21.48731	18	15	1616	Want to go to Cliffhouse now.
00:59	144.04185	21.48715	47	13	1613	We're on our way to Cliffhouse. Should be there soon.
01:03	144.04188	21.48720	44	4	1599	Big white active venting area. Venting is coming out at the base of the cliff. The depth should be 1573. We're still looking for Cliffhouse.
01:05	144.04198	21.48727	46	12	1585	Champagne was 1601 this year. It was 1607 in 2004.
01:06	144.04204	21.48733	46	9	1574	We're seeing LOTS of smoke.
01:07	144.04207	21.48745	65	14	1566	White staining in the cracks. We are too shallow now.
01:07	144.04209	21.48750	52	7	1553	*The ship went over the top of the hill so we're trying to avoid being dragged.*
01:07	144.04208	21.48743	52	6	1550	We're backing the ship up and then we'll have to lower back down.
01:19	144.04180	21.48734	60	24	1567	Jimmy is not moving at all.
01:19	144.04180	21.48734	60	25	1566	What's happening?
01:19	144.04182	21.48734	60	31	1566	We're having some difficulties here.
01:19	144.04183	21.48734	60	32	1566	The vehicle doesn't seem to be moving??
01:20	144.04184	21.48734	60	36	1566	Trying to figure out what's happening here.
01:23	144.04184	21.48733	59	30	1547	We're experiencing technical difficulties with Jason.
01:28	144.04198	21.48739	59	22	1558	The bottom is in sight. again.

time	raw long	raw lat	hdg	alt	Z (m)	Dive J2-196 NW Eifuku - Dive Log Comments
01:32	144.04226	21.48753	60	22	1559	*Lost the location because the ship moved very quick and they lost doppler. Dara is trying to seed the nav.*
01:37	144.04234	21.48753	59	12	1561	The summit here is 1536 - which agrees with the ROPOS depth in 2004.
01:38	144.04235	21.48753	59	12	1560	They're working on figuring things out here. We're looking directly at the wall heading northeast.
01:41	144.04225	21.48742	53	26	1573	Still trying to figure this out. There's a bit of smoke in the water.
01:41	144.04220	21.48738	59	31	1579	The Eh has been dropping for awhile. It's at 25 now.
01:46	144.04178	21.48730	85	23	1586	*We have been floundering here for about a half hour.*
01:46	144.04184	21.48729	90	15	1579	We're heading toward Cliff House and going to fly by the geology instead of the nav.
01:49	144.04137	21.48743	32	27	1590	Change of watch.
01:50	144.04137	21.48743	40	22	1585	Trying to get to vent below the white steam we are seeing on the left.
01:50	144.04137	21.48744	71	22	1586	Previous depth was 1573-75..some discrepancies in the depths.
01:51	144.04139	21.48743	65	12	1586	Smoke could be from Champagne which is 40m downslope.
01:51	144.04139	21.48743	70	13	1588	Do not go deeper...do a lateral side to side.
01:51	144.04139	21.48742	77	13	1587	We are looking for Cliff House.
01:52	144.04199	21.48724	46	12	1586	Moving to the right as we face wall.
01:53	144.04203	21.48726	47	12	1583	Need to position Medea to go further.
01:53	144.04204	21.48727	47	13	1583	Moving ship 15m SE.
01:54	144.04204	21.48728	25	12	1583	Can see some flow just left of the flat work.
01:57	144.04207	21.48729	9	8	1579	Good source of water ahead.
01:57	144.04212	21.48722	9	8	1579	*Doppler reset.*
01:57	144.04211	21.48722	9	8	1579	Pos: 21deg 29.233N 144deg 2.527E
01:58	144.04211	21.48722	8	9	1580	Globules of liquid CO2 coming up from somewhere.
01:59	144.04209	21.48721	8	11	1582	Getting in position for fluid sampling.
01:59	144.04209	21.48720	8	11	1583	This is Cliff House.
02:05	144.04212	21.48725	16	5	1577	Shrimp coming up from surfaces.
02:07	144.04212	21.48725	10	5	1578	Going to let things settle before sampling.
02:08	144.04212	21.48725	10	5	1578	SAMPLE-18 HFS. At Cliff House. intake ready and good water source visible.
02:08	144.04212	21.48725	10	5	1578	SAMPLE-18 HFS pos: 21deg 29.235N 144deg 2.527'E
02:11	144.04212	21.48725	10	5	1578	Ambient water is 2.3deg. ..maxing out at 25deg at this hole.
02:12	144.04212	21.48725	10	5	1578	Repositioning to hole just below this one...on same rock.
02:13	144.04212	21.48725	10	5	1578	Tmax here was 17deg....looking for another hole.
02:14	144.04212	21.48725	9	6	1578	Lots of shrimp nearby this area.
02:19	144.04213	21.48725	10	6	1578	**SAMPLE-18 HFS. Unfiltered piston #20. Tmax=40C Tavg=30.6 T2=30. Vol=401ml. [Cliff House'06 144.042123E/21.487248N] PI Butterfield**
02:21	144.04213	21.48725	10	6	1578	Shrimp near the intake. Exhaust looks good.
02:22	144.04213	21.48725	10	6	1578	SAMPLE-18 HFS Temp. dropped into 20s during sampling...put back in.
02:22	144.04213	21.48725	10	6	1578	SAMPLE-18 HFS Stopped.
02:23	144.04213	21.48725	10	6	1578	**SAMPLE-19 HFS. Sterivex #21. Same location as previous sample. Tmax=54.1C Tavg=45.1. Vol=5 liters. [Cliff House'06 144.042123E/21.487248N] PI Butterfield (subsamps Huber/Bolton)**
02:26	144.04213	21.48725	10	6	1578	**SAMPLE-20 HFS. Gastight same hole and time as sample 19. Tmax=54.1C. [Cliff House'06 144.042123E/21.487248N] PI Evans**
02:56	144.04213	21.48725	10	5	1578	SAMPLE-19 HFS This sample is going to take a long time. It's a microbiology sample here at Cliffhouse. Julie needs about 5 liters of fluid. Temp in the hole got up to 54 at one point.
02:57	144.04213	21.48725	10	5	1578	WE LOST 5 MINUTES OF TAPING ON THE BROW CAM AND THE PILOTS CAM WORKING AND ARCHIVE DVDS. THE SCIENCE CAM WAS RECORDING.
03:02	144.04213	21.48725	10	5	1578	SAMPLE-19 HFS stop
03:02	144.04213	21.48725	10	5	1578	Repositioning Medea.
03:06	144.04213	21.48725	10	6	1578	**SAMPLE-21 HFS. Unfiltered piston #22. Same spot. Tmax=46.7 Tavg=41.7 T2=28. Vol=461 ml. [Cliff House'06 144.042123E/21.487248N] PI Butterfield**
03:07	144.04213	21.48725	10	6	1578	**SAMPLE-22 HFS. Sterivex filter #23. This is a large volume sample. Tmax=43.6C Tavg=33.7. Vol=3021ml. [Cliff House'06 144.042123E/21.487248N] PI Butterfield (subsamps Huber/Bolton)**
03:31	144.04214	21.48725	10	5	1578	SAMPLE-22 HFS Stopped.
03:35	144.04213	21.48724	16	6	1578	Retrieving the temperature wand now.
03:36	144.04213	21.48724	16	7	1579	Snowing.. bad visibility when pulled out intake - bacteria snow.
03:42	144.04213	21.48724	16	7	1579	Trying to retrieve HFS intake that got knocked out of basket.
03:46	144.04213	21.48724	16	7	1579	Intake stowed and now ready to get temperature wand.
03:48	144.04213	21.48724	16	7	1578	Ready to take temperature reading around this area.
03:50	144.04212	21.48724	11	5	1577	Trying to get wand in the same hole as the fluid samples.
03:53	144.04206	21.48717	11	5	1577	TEMPERATURE degrees C Ambient 2.1.... 55.0
03:53	144.04206	21.48717	11	5	1577	TEMPERATURE degrees C Pushing it further in and around.
03:54	144.04205	21.48715	11	5	1577	TEMPERATURE degrees C Max this time is 51deg.
03:54	144.04204	21.48714	18	4	1577	Going to do a major next and maybe a gastight.
03:55	144.04203	21.48712	18	2	1574	Stowing wand.
04:05	144.04199	21.48708	10	6	1578	**SAMPLE-23 Major (red.) Same hole as all the other samples here. Tmax=~43C. [Cliff House'06 144.042123E/21.487248N] PI Butterfield**
04:08	144.04198	21.48707	18	5	1577	Going to fire a gastight as well.

time	raw long	raw lat	hdg	alt	Z (m)	Dive J2-196 NW Eifuku - Dive Log Comments
04:18	144.04190	21.48700	22	6	1577	**SAMPLE-24 Gastight (white). Same spot as previous samples. Tmax=~43C. [Cliff House'06 144.042123E/21.487248N] Pl Evans**
04:19	144.04190	21.48699	36	7	1579	Looking for a bit of plume to fire the last Niskin.
04:20	144.04190	21.48699	36	8	1579	Can't see any plume.
04:21	144.04190	21.48699	36	7	1578	**SAMPLE-25 Niskin (red). Pulled off of wall at depth 1571m. [Cliff House'06 area 144.042123E/21.487248N] Pl Resing**
04:22	144.04190	21.48699	36	7	1578	Getting ready for recovery.
04:22	144.04190	21.48699	36	7	1578	Stow basket and arm then take some wraps out before recovery.
04:23	144.04189	21.48699	37	20	1580	Moving away from the wall.
04:23	144.04190	21.48701	37	27	1578	**Off bottom.**
04:24	144.04191	21.48705	44	25	1568	J2-196 ENDING....Jason preparing for ascent.
04:29	144.04135	21.48717	248	93	1621	Placing arm over some of the bottles to keep them in the basket during ascent.
04:31	144.04134	21.48717	258	103	1622	Moving at .2knts...ascending....1520m.
05:29						Jason on surface....
05:31						Medea on deck.
05:36						Jason out of water.
05:38						Jason on deck.

5.4.14 J2-197 Daikoku Dive Log

time	raw long	raw lat	hdg	alt	Z (m)	Dive J2-197 Daikoku - Dive Log Comments
J2-197 Daikoku Dive Summary: Started the dive at Sulfur Cauldron - observing. Next moved to Bubble Bath for sampling: 1 gastight, 1 major, 1 sediment suction. Next another fish transect - sampled flat fish and sediment. After that moved to the big NE Pit at the summit. Went down into the pit and collected samples: 6 HFS, 1 niskin, 1suction of bacterial mat, 1 rock with barnacles. Couldn't get pit depth - but could be greater than 50 meters deep. Next discovered a new vent with lots of gas bubbles and called it Alka Seltzer. Samples at Alka Seltzer: 4 HFS, 1 gastight, 1 small black chimney (pieces). At the end of the dive returned to Sulfur Cauldron and filled a can with molten sulfur. 22 samples total						
J2-197 Bottom time: 5/4/2006 1444 - 2343 UTC (8.98 hrs). **Z column represents seafloor depths in meters.**						
14:09	144.19157	21.33850	316	0	1	Preparing to launch Jason for Dive J2-197
14:09	144.19157	21.33850	317	0	1	J2-197 Dive Configuration: 5 chamber suction sampler. The Beast. Scoops, bags, mesh, niskins.?
14:09	144.19157	21.33850	314	0	1	Jason is off the deck.
14:09	144.19157	21.33850	190	0	1	Jason is in the water. J2-197
14:14	144.19157	21.33850	238	0	15	Medea in water.
14:31	144.18332	21.31666	232	77	403	Jason is 77m off bottom and depth is 325.
14:34	144.18333	21.31668	232	77	403	17m to target.
14:34	144.18334	21.31669	232	78	404	Turning lights on.
14:35	144.18334	21.31670	233	78	404	Water is sparkling...glitter.
14:39	144.18336	21.31672	226	56	419	Smoke as we descend.
14:39	144.18336	21.31672	226	49	420	Visibility is poor.
14:40	144.18336	21.31672	209	40	411	Bottom approach.
14:41	144.18341	21.31679	22	31	426	Lots of white particles in water.
14:42	144.18344	21.31684	38	23	428	Looks like a snow storm.
14:43	144.18358	21.31704	15	25	433	There's Medea.
14:43	144.19119	21.32525	12	23	430	*Doppler reset.*
14:43	144.19120	21.32525	14	23	433	Pos: 21deg 19.515N 144deg 11.472E
14:44	144.19121	21.32526	13	3	434	There's the bottom.
14:44	144.19121	21.32526	13	2	434	Lots of sediment with a few rock outcrops.
14:44	144.19122	21.32527	13	2	434	Lots of white particles in the water.
14:45	144.19123	21.32528	13	2	433	See plume coming over the view. Plume on surface.
14:46	144.19124	21.32529	13	1	433	Heading to Cauldron 42m at 143deg.
14:50	144.19126	21.32514	144	6	430	Heading upslope.
14:51	144.19132	21.32503	145	7	420	Big rock outcrop...Medea shows one big lump.
14:51	144.19137	21.32496	144	2	417	Lots of material in water...are obscuring view.
14:51	144.19137	21.32495	144	1	417	Seeing flatfish on bottom.
14:52	144.19137	21.32495	144	1	417	Barnacles on red edge of outcrop.
14:52	144.19137	21.32495	144	1	417	Stopping to drop a weight.
14:53	144.19137	21.32495	144	1	417	Target #10 Barnacles. 21deg 19.497N 144deg 11.482E.
14:53	144.19137	21.32495	143	1	417	Can't see flow but can see flatfish and snails. Barnacles on edge of outcrop.
14:54	144.19137	21.32495	144	1	417	Lake is 7 meters away.
14:54	144.19137	21.32495	130	2	418	11 meters at 067deg actually.
14:54	144.19137	21.32495	130	2	418	Looking with Medea camera.
14:55	144.19147	21.32493	68	4	414	Saw a lot of this snow when doing the SM2000 survey from the NE plume.
14:56	144.19145	21.32499	36	5	415	4m at 058 to lake.
14:57	144.19151	21.32500	88	5	412	Depth 411 at lake.
14:58	144.19151	21.32500	134	4	412	Looking for the lake.
14:58	144.19150	21.32500	187	4	411	Lateraling to the right
14:59	144.19151	21.32500	248	1	410	Moving arm out of the way. Jason touched down and made a sediment plume.
15:00	144.19150	21.32500	249	3	410	Seeing some bubbles come up through the basket.
15:00	144.19149	21.32499	249	2	410	Very poor visibility.
15:01	144.19147	21.32496	211	1	412	Driving forward just a bit to get out of the cloud.
15:03	144.19148	21.32493	347	3	413	White crust of sulfur.
15:05	144.19150	21.32503	64	2	412	Visibility has improved.
15:05	144.19151	21.32503	70	2	412	We are at the correct depth.
15:08	144.19148	21.32512	33	3	414	Looking for the lake (Sulfur Cauldron) by driving north a bit from target.
15:08	144.19149	21.32513	64	3	414	Going obliquely along slope.
15:08	144.19155	21.32511	125	2	413	Lots of flatfish on this smooth slope of a sulfur crust.
15:09	144.19156	21.32511	166	2	412	Making a loop. Turning back south and going upslope a bit.
15:10	144.19154	21.32500	160	2	410	Think it is visible on Medea. See a plume.
15:10	144.19155	21.32500	159	2	410	Touched down and made our own plume.
15:11	144.19155	21.32499	159	2	410	Going to wait for it to clear.
15:11	144.19156	21.32498	159	2	410	View is clearing. Seeing lots of crabs.
15:11	144.19157	21.32498	159	1	409	Bubbles coming up.
15:12	144.19158	21.32497	158	1	409	Visibility is clearing a bit.
15:14	144.19158	21.32495	168	2	409	Moving slightly ahead to get out of plume/dust.

time	raw long	raw lat	hdg	alt	Z (m)	Dive J2-197 Daikoku - Dive Log Comments
15:15	144.19154	21.32492	187	2	410	There it is. Looking at 187 at edge of lake.
15:15	144.19149	21.32489	138	4	413	*Devil's Cauldron..just a big south of the target..a doppler offset.*
15:16	144.19146	21.32486	111	5	414	Current position is 10m south of original target.
15:16	144.19146	21.32485	108	6	414	Going to take some wraps out of the tether.
15:18	144.19146	21.32485	114	3	414	Recording Pilot's Pan
15:19	144.19148	21.32484	99	1	414	A lot more smoke coming out of the leading edge.
15:20	144.19148	21.32483	79	1	414	Going to within .5m of edge.
15:21	144.19151	21.32482	78	74	488	See lots of fish and a crab on the edge of the lake.
15:21	144.19148	21.32498	78	95	509	*Doppler reset.*
15:21	144.19148	21.32496	78	100	513	Pos: 21deg 19.498N 144deg 11.499E.
15:21	144.19149	21.32493	78	101	514	Great waves on Pilot cam.
15:22	144.19153	21.32487	78	198	611	We landed just a little right to where we were before.
15:23	144.19155	21.32487	78	172	585	Can see where we took the chimney sample in the left part of the view.
15:23	144.19157	21.32487	78	169	582	Lake seems a bit more active.
15:23	144.19161	21.32486	78	169	582	Crab took a fish...not a flatfish some other kind.
15:24	144.19162	21.32486	78	176	589	Bottom is carpeted in snails with flatfish on top.
15:24	144.19163	21.32485	78	158	571	Crust and sediment and then a coating of snails.
15:25	144.19163	21.32481	78	173	587	Looks like smoke is coming out of the near edge this time and wafting across the lake.
15:27	144.19158	21.32477	78	97	511	Going to try to lateral to the left to get better visibility.
15:27	144.19159	21.32478	98	1	414	Sulfur looks like it is circulating - moving more than last time.
15:28	144.19148	21.32498	116	185	598	*Doppler reset. (25 meters)*
15:29	144.19149	21.32499	124	198	612	Moving a little more to the left out of the small plume in front of us.
15:30	144.19150	21.32499	124	182	596	Seems to be boiling in the center and back.
15:31	144.19150	21.32500	124	192	606	No visibility at all.
15:33	144.19151	21.32500	124	128	541	White out.
15:36	144.19151	21.32499	124	46	459	Clearing a bit.
15:40	144.19152	21.32499	124	90	503	Waiting for things to clear.
15:40	144.19152	21.32499	123	1	414	Going to try to take a temperature reading on the edge visible.
15:40	144.19152	21.32500	122	1	413	Backing off to get drawer out and retrieve wand.
15:42	144.19152	21.32499	123	1	414	Got the wand.
15:42	144.19153	21.32500	122	1	413	Looking for the best visibility on the edge of the lake.
15:46	144.19156	21.32506	126	174	587	In the pit with the wand.
15:46	144.19157	21.32509	126	174	587	TEMPERATURE degrees C No idea where the wand is due to visibility.
15:50	144.19174	21.32540	126	116	529	Tmax=185.7 visibility improved a lot while sampling.
15:50	144.19176	21.32544	126	183	596	Tmax=187 when wiggled.
15:51	144.19179	21.32549	126	184	597	Going down again for another reading.
15:51	144.19180	21.32551	126	113	526	In the same spot as before.
15:52	144.19182	21.32554	126	132	545	Wand has a bit of crust on it.
15:52	144.19183	21.32556	126	164	577	Wand was in quite a bit.
15:53	144.19185	21.32559	126	26	439	Can see tip go in on the brow camera.
15:54	144.19186	21.32561	126	139	552	Could see probe push down on the crust.
15:55	144.19185	21.32561	126	124	537	TEMPERATURE degrees C Another probe...
15:57	144.19184	21.32566	152	1	413	Temperature was less. Need to back up.
15:57	144.19184	21.32566	144	1	413	Residue is far up on the wand.
15:57	144.19184	21.32566	144	1	413	Stowing the wand...visibility is poor again.
15:58	144.19184	21.32566	143	1	413	Want to circle the site to see entire rim.
15:58	144.19184	21.32566	143	1	413	Ambient water is 12.8 deg.
15:59	144.19147	21.32498	144	1	413	*Doppler reset. (70 meter offset)*
16:00	144.19147	21.32497	143	1	413	Want to see if it is a closed depression or if there is an outlet.
16:00	144.19145	21.32494	129	2	414	Moving along the right edge. We are looking SE and upslope.
16:00	144.19145	21.32493	122	2	414	This is the NW shoreline and we are lateralling to our right.
16:01	144.19144	21.32491	52	2	414	Coming up a bit because the bottom comes up here.
16:01	144.19145	21.32488	74	3	413	At the SW edge looking NE and still lateralling to the right.
16:01	144.19145	21.32488	74	3	413	We are at the wall.
16:01	144.19145	21.32488	70	3	413	There is no outlet at this end with the big wall. Looking NE.
16:02	144.19144	21.32488	34	2	413	Don't see how there can be an outlet with the high end here and where we had landed.
16:02	144.19143	21.32489	40	3	413	Lateralling back around left now.
16:02	144.19143	21.32494	87	4	414	Another wall at this end.
16:02	144.19144	21.32497	83	4	413	We have not seen where the back white wall is.
16:02	144.19145	21.32498	101	3	413	Outlet would have to be underground.
16:02	144.19146	21.32499	115	1	413	Back to where we took the temperature.
16:03	144.19150	21.32500	129	167	580	Depression is only a few meters bigger than the lake.
16:04	144.19151	21.32502	129	180	593	It is 5m by 5m on the sonar.
16:05	144.19151	21.32502	129	168	581	Actually 10m from rim to rim.
16:05	144.19151	21.32502	129	155	568	10m measurement from the sonar. Sonar was pointing down at a 10deg angle.

time	raw long	raw lat	hdg	alt	Z (m)	Dive J2-197 Daikoku - Dive Log Comments
16:06	144.19151	21.32502	129	186	599	Would like to back out of this and take a look. Then head over to Bubble Bath.
16:06	144.19151	21.32503	129	113	526	Bubble Bath is just a few meters downslope.
16:08	144.19149	21.32506	146	2	411	As we back out there are a lot of sulfur crusts on the rim. Blocky crusts.
16:08	144.19149	21.32506	185	3	411	Seemed like we came out a bit of depression but we are still facing upslope.
16:08	144.19149	21.32507	247	4	411	We are going to turn around and should be in Bubble Bath.
16:09	144.19150	21.32507	311	5	412	Seeing little holes in crust that may have been where venting came out before.
16:10	144.19150	21.32509	311	2	411	Still lots of flock in the water.
16:11	144.19149	21.32508	258	1	411	Just a crust.
16:11	144.19149	21.32508	258	2	411	Looking for site… we are at the correct depth.
16:12	144.19148	21.32508	180	2	411	Looking around… good visibility now at the lake.
16:14	144.19148	21.32508	305	3	412	Seeing a lot of fish.
16:15	144.19148	21.32508	4	3	413	Found it. there are the bubbles and a lot of crabs.
16:15	144.19148	21.32508	6	3	413	Facing away from the Cauldron when facing the ledge with the bubbles.
16:16	144.19148	21.32509	16	3	413	Moving Medea to a better position as we will be sampling here for awhile.
16:18	144.19148	21.32509	25	3	413	Retrieving HFS wand from basket.
16:21	144.19148	21.32509	25	3	412	Basket retracted and moving closer for sampling.
16:23	144.19147	21.32510	23	1	412	The hole by the crab looks vigorous.
16:30	144.19149	21.32509	11	1	412	Brushed the tip of HFS off with the new probe cleaner.
16:31	144.19149	21.32509	11	1	412	Trying to go back in the hole.
16:32	144.19148	21.32509	12	1	412	SAMPLE-1 HFS Starting
16:33	144.19148	21.32509	12	1	412	Looks like all gas and no fluid.
16:34	144.19148	21.32509	12	1	412	SAMPLE-1 HFS Do not see any freshwater exhaust.
16:35	144.19149	21.32508	11	1	412	**SAMPLE-1 HFS Unfiltered piston #5. Tmax=18.3C Tavg=17.5 T2=15.9. Vol=401ml. [Bubble Bath area 144.191483E/21.325083N] PI Butterfield**
16:36	144.19148	21.32508	11	1	412	SAMPLE-1 HFS Stopping.
16:36	144.19148	21.32508	11	1	412	Want to do a gastight with the funnel next.
16:40	144.19148	21.32508	11	1	412	Retrieving funnel gastight.
16:47	144.19149	21.32509	12	1	412	**SAMPLE-2 Gastight. Funnel gastight over bubbles - very near sample 1 position. [Bubble Bath area 144.191483E/21.325083N] PI Evans**
16:49	144.19148	21.32509	11	1	412	Next we would like to do the Major.
16:51	144.19149	21.32508	12	1	412	Got the Major.
16:53	144.19148	21.32509	12	1	412	**SAMPLE-3 Major (white). [Bubble Bath area 144.191483E/21.325083N] PI Butterfield**
16:54	144.19148	21.32509	13	1	412	SAMPLE-3 Major Now fired...(premature)...fired..spring moved.
16:55	144.19148	21.32508	13	1	412	SAMPLE-3 Major Done.
16:56	144.19147	21.32508	14	1	412	We are going to try suctioning here
17:00	144.19147	21.32508	13	1	412	Preparing suction sampler.
17:02	144.19147	21.32508	11	1	412	Indexed sampler to white.
17:10	144.19146	21.32508	358	2	412	Repositioning vehicle slightly for suction sample.
17:17	144.19146	21.32508	2	1	412	Going to try to move a rock so Jason can sit down in a better position for sampling.
17:20	144.19146	21.32508	351	1	412	Rock has been moved.
17:25	144.19145	21.32507	19	1	411	SAMPLE-4 Suction. In position. See material going up hose. Trying to get sediment below rock.
17:26	144.19145	21.32507	19	1	411	**SAMPLE-4 Suction sediment below rock. Good sample. [Bubble Bath area 144.191483E/21.325083N] PI Davis**
17:27	144.19145	21.32507	19	1	411	Suction is secured. Good sample.
17:27	144.19143	21.32507	19	1	411	Need to index to green for flushing.
17:29	144.19143	21.32503	17	1	411	Flushing.
17:31	144.19147	21.32508	15	1	411	*Doppler reset.*
17:32	144.19147	21.32508	15	1	411	Flushing out the sampler again...could see residue in it.
17:33	144.19147	21.32508	15	1	411	Suction secured.
17:34	144.19148	21.32508	15	1	411	Next is a fish transect.
17:39	144.19149	21.32507	44	2	412	Going to turn around and drive upslope to take a look at the Cauldron.
17:39	144.19148	21.32507	32	3	412	Good view of bubbles as we take off.
17:40	144.19146	21.32497	151	2	413	Can see a good view in Medea cam.
17:41	144.19146	21.32497	156	3	413	Good visibility now at the Cauldron.
17:41	144.19147	21.32497	153	3	413	Waves going across it from the far side.
17:41	144.19151	21.32500	153	1	412	From Medea cam it looks like the lake is 5m across compared to the size of Jason.
17:42	144.19152	21.32504	157	196	608	Good view of the cauldron.
17:42	144.19149	21.32507	157	197	609	Amazing view of the bubbling cauldron.
17:42	144.19149	21.32507	157	197	609	Looks like oil gushing out of the ground.
17:43	144.19148	21.32508	157	194	606	Hard surface in the back and bubbling up against the back wall.
17:43	144.19147	21.32500	157	187	599	*Doppler reset.*
17:43	144.19144	21.32500	157	192	603	Position: 21deg 19.500'N 144deg 11.487E
17:44	144.19143	21.32500	157	192	603	Great views of cauldron.
17:48	144.19146	21.32501	152	140	553	Hovering over Devil's cauldron to get better photographs.

time	raw long	raw lat	hdg	alt	Z (m)	Dive J2-197 Daikoku - Dive Log Comments
17:53	144.19143	21.32503	152	195	608	Far shore is where all the gas is coming out of the molten pond and it is the gas that appears to be driving the boiling of the sulfur surface.
17:55	144.19144	21.32492	152	130	543	Took series of digital stills of the lake surface.
17:56	144.19143	21.32490	141	2	414	Good visibility for the video at present and can see the back wall of the pond nicely.
17:59	144.19137	21.32490	117	4	414	Going to set up the still and video camera to do John's fish survey again.
18:06	144.19160	21.32504	65	4	408	See lots of crabs and fish and commonly see CO2 bubbles separate from the smoke - suggesting they separate earlier (deeper down) in the system.
18:09	144.19170	21.32518	150	4	412	Saw an eel-like fish on the video.
18:11	144.19170	21.32518	151	4	412	Getting set up for the fish survey.
18:17	144.19174	21.32507	180	3	412	Position at start of fish survey 21 19.504/144 11.504.
18:18	144.19174	21.32507	180	3	412	Trying to establish best picture setup.
18:24	144.19174	21.32508	178	2	413	Starting survey towards 115 @ 0.1 knts.
18:26	144.19174	21.32508	138	2	413	Heading now going to be 130
18:32	144.19191	21.32499	143	4	408	Position of survey. 21 19.500/144 11.515.
18:33	144.19191	21.32500	143	4	408	Starting transect and this first photo.
18:37	144.19178	21.32494	148	3	407	Starting up slope at 0.1 knts.
18:46	144.19192	21.32480	146	3	399	Squid and ink jet?
18:46	144.19192	21.32478	146	3	398	Visibility getting more difficult.
18:49	144.19196	21.32470	146	2	394	Fish eating something here.
18:59	144.19211	21.32452	139	2	383	Terminate survey here as enter some crusts. 21 19.471/144 11.526.
19:01	144.19211	21.32451	148	2	383	See old sulfur crust here.
19:02	144.19211	21.32452	148	2	383	Going to move back to where high density of fish to get fish sample.
19:09	144.19201	21.32469	148	2	392	Back to a site with high density of fish to sample fish.
19:10	144.19201	21.32469	147	2	392	Dead fish just landed on the bottom and flat fish attacking it.
19:12	144.19201	21.32469	147	2	392	Position for fish sample is 21 19.483/144 11.517.
19:14	144.19200	21.32469	147	2	392	**SAMPLE-5 Suction flat fish into green jar. [144.19195E/21.324717N] PI Dower**
19:17	144.19200	21.32469	148	2	392	Seeing a lot of dead fish at this site and have seen several drop out of water column while here.
19:28	144.19201	21.32468	162	2	392	Finished fish sampling.
19:33	144.19201	21.32468	159	2	392	**SAMPLE-6 Suction sediment beneath where fish were collected into blue fine mesh jar. [144.19195E/21.324717N] PI Dower**
19:42	144.19199	21.32476	160	4	393	Finished fish and sediment sampling. Must have observed at least six myctophids fall dead on to the bottom during the past 15 minutes.
19:44	144.19207	21.32473	137	3	390	Heading NE toward the NE Pit on the summit to sample fluids.
19:50	144.19210	21.32465	127	3	387	We've passed another two dead myctophids in the past five minutes.
19:51	144.19210	21.32465	127	3	387	The flatfish are clearly feeding on the dead fish.
19:56	144.19218	21.32460	125	3	383	Got a nice sequence of flatfish feeding on the dead myctophid while the ship settled out.
19:57	144.19232	21.32456	115	4	379	Another dead myctophid floating by the camera.
19:57	144.19239	21.32456	114	5	380	Visibility is deteriorating.
19:58	144.19270	21.32454	117	4	379	Still heading NE toward the pit at the summit.
19:58	144.19278	21.32452	115	4	377	We appear to be on the saddle between the two pits.
20:01	144.19279	21.32452	115	4	376	Bottom here is covered by a layer of tiny sulphur balls.
20:03	144.19283	21.32450	116	2	375	We're now at the edge of the NE pit.
20:04	144.19287	21.32448	116	2	375	We're going to drop down over the edge to see what the bottom profile looks like on sonar.
20:05	144.19299	21.32443	117	48	426	We've encountered a large white plume over pit.
20:05	144.19301	21.32441	117	56	433	Altimeter just jumped up to 55m suggesting the pit is at least that deep.
20:07	144.19303	21.32443	116	56	433	We're now recording the sonar record.
20:07	144.19302	21.32443	117	56	433	Sonar shows the pit to be quite deep.
20:10	144.19299	21.32447	116	48	438	We're now at a depth of 385 in the pit and the altimeter is still reading 50m.
20:10	144.19299	21.32448	116	36	425	Main axis of pit runs NW to SE.
20:12	144.19299	21.32452	116	6	386	Turning sonar logging off.
20:14	144.19294	21.32452	317	56	436	Approaching the north wall of the pit. We're still down inside the pit at 379m.
20:16	144.19293	21.32452	317	57	437	**SAMPLE-7 HFS Unfiltered bag #8. T=15.4C. Vol=564ml. [in NE Pit 144.19293E/21.324536N] PI Butterfield**
20:20	144.19293	21.32454	317	60	440	Stopping sample.
20:22	144.19293	21.32454	317	60	439	**SAMPLE-8 HFS. Filtered bag #11 Tmax=15.6C Tavg=15.4. Vol=623ml. [in NE Pit 144.19293E/21.324536N] PI Butterfield**
20:25	144.19292	21.32456	317	141	521	Stopping sample.
20:26	144.19292	21.32456	317	151	530	**SAMPLE-9 HFS Sterivex filter #10. Tmax=15.6C Tavg=15.3 Vol=3029ml. [in NE Pit 144.19293E/21.324536N] PI Butterfield (subsamps Huber/Bolton)**
20:30	144.19292	21.32455	316	61	440	**SAMPLE-10 Niskin (green). [in NE Pit 144.19293E/21.324536N] PI Resing**
20:34	144.19287	21.32462	314	151	531	Position for previous four samples 21 19.476 144 11.583. That given position turned out to be incorrect. Changed post-cruise to: 144.192930 21.324717 (bad nav in large NE Pit)
20:36	144.19286	21.32461	316	129	508	Altimeter is reading 145m but apparently is not reliable over 100m.
20:43	144.19289	21.32463	317	64	444	Still running the Sterivex sample.
20:46	144.19293	21.32464	317	150	529	Stopping sample Number 9 (Sterivex)

time	raw long	raw lat	hdg	alt	Z (m)	Dive J2-197 Daikoku - Dive Log Comments
20:47	144.19293	21.32464	317	152	531	**SAMPLE-11 HFS FISH filter #12. Tmax=15.3C Tavg=15.2. Vol=167ml. [in NE Pit 144.19293E/21.324536N] PI Butterfield (subsamps Huber/Bolton)**
20:48	144.19295	21.32465	317	62	442	Sample stopped.
20:49	144.19295	21.32465	317	62	441	Position is the same as for the previous four.
20:49	144.19295	21.32466	317	62	442	**SAMPLE-12 HFS Filtered piston #1. Tmax=15.3 Tavg=15.2 Volume=657ml. [in NE Pit 144.19293E/21.324536N] PI Butterfield**
20:55	144.19299	21.32468	316	70	449	Stopping sample.
20:56	144.19300	21.32468	317	130	509	**SAMPLE-13 HFS. Filtered bag #14 Tmax=15.9C Tavg=15.6. Volume=363ml. [in NE Pit 144.19293E/21.324536N] PI Butterfield**
20:58	144.19301	21.32467	316	127	507	We're on the north face of the pit and see that it has a cover of barnacles.
20:59	144.19301	21.32467	317	148	527	Stopping sample.
21:00	144.19301	21.32470	319	153	532	Position for these two is same as previous five.
21:03	144.19306	21.32472	350	70	449	We're going to try to grab a barnacle covered rock from the wall of the pit.
21:03	144.19305	21.32471	348	62	441	In addition to the barnacles we can also see some limpets.
21:06	144.19305	21.32472	351	62	441	**SAMPLE-14 Bio/geo Barnacle covered rock from north face of pit wall. [in NE Pit 144.19293E/21.324536N] PI Tunnicliffe / geogroup**
21:08	144.19306	21.32473	353	66	445	We're also going to try for a suction sample of bacterial mat from the wall.
21:14	144.19309	21.32473	347	62	440	**SAMPLE-23 Suction of bacterial mat from pit wall into yellow suction jar. Sample number changed to 23 due to mix up. [in NE Pit 144.19293E/21.324536N] PI Davis**
21:19	144.19306	21.32472	295	137	506	We're now leaving the pit and heading back toward the Sulphur cauldron.
21:21	144.19300	21.32474	295	7	369	We are heading ENE.
21:22	144.19299	21.32467	280	7	369	Some large rocks at the rim of the pit. Perhaps 1m wide. Possible ejecta?
21:24	144.19293	21.32465	279	13	375	Looks like the two pits are quite close to each other.
21:24	144.19290	21.32467	281	10	372	As we exited one pit we almost immediately started going down into the other.
21:27	144.19276	21.32473	281	3	377	Headed down slope from the pit heading 281
21:28	144.19266	21.32475	281	3	378	Looking for target 10 barnacles site.
21:29	144.19262	21.32476	288	2	378	Taking a wrap out of the tether. Lots of fish on the bottom.
21:31	144.19245	21.32480	287	1	382	*Doppler reset done but position not very reliable.*
21:33	144.19224	21.32487	288	2	387	Target is about 100 m away still. Visibility poor.
21:34	144.19211	21.32491	288	3	391	Still moving but cannot see bottom.
21:45	144.19151	21.32494	268	3	414	10 meters away from the cauldron. We're going to pick up a rock with barnacles.
21:48	144.19148	21.32494	268	1	414	Target here is Barnacles. We're W/SW of the Cauldron.
21:53	144.19126	21.32494	193	1	414	**SAMPLE-15 Bio/geo. Small rock covered with barnacles. Can't even see the large rock nearby - just a mass of barnacles with their cilia out. [Barnacles 144.19133E/21.32493N] PI Tunnicliffe / geogroup**
21:56	144.19133	21.32494	168	1	414	[Barnacles 21 19.496 144 11.480]
22:00	144.19133	21.32494	168	1	414	The report is that mid-water fish were raining down on the bottom and flat fish were munching on them..... That's the story.
22:03	144.19137	21.32491	164	1	414	We're W/SW of Cauldron. Bubble Bath is north. We've moved a bit to the NE.
22:06	144.19140	21.32483	166	1	414	There is shimmering water everywhere.
22:07	144.19139	21.32481	166	1	414	We see a little black sulfur chimney here.
22:08	144.19138	21.32478	165	1	414	Preparing to fluid sample here.
22:09	144.19139	21.32478	165	1	414	There are little rounded rocks here. Is it vesiculated sulfur?
22:10	144.19147	21.32484	165	1	414	**SAMPLE-16 HFS. Unfiltered piston #6. Tmax=63.4C Tavg=56.1. Vol=557ml. [Alka Seltzer 144.191391E/21.324962N] PI Butterfield**
22:11	144.19148	21.32482	165	1	414	The little pebbles in the area are round here. They're rocks here - not snails.
22:12	144.19147	21.32481	165	1	414	**SAMPLE-17 Gastight in same spot as sample 16. Tmax=55C. [Alka Seltzer 144.191391E/21.324962N] PI Evans**
22:14	144.19149	21.32479	165	1	414	SAMPLE-16 HFS Stop.
22:15	144.19150	21.32476	165	1	414	**SAMPLE-18 HFS. Unfiltered piston #20. Tmax=53.3C Tavg=40.5. Vol=504ml. [Alka Seltzer 144.191391E/21.324962N] PI Butterfield**
22:18	144.19144	21.32486	165	170	582	We're calling this place Alka Seltzer. Samples 16-18 so far. Lots of bubbles. [Alka Seltzer 21 19.4977 144 11.48346]
22:18	144.19143	21.32489	165	178	591	SAMPLE-18 HFS Finished.
22:23	144.19139	21.32496	165	157	570	SAMPLE-19 HFS. Temp is dropping again. It was up to 55. Down to 16 now.
22:31	144.19134	21.32491	169	1	414	SAMPLE-19 HFS This sample is supposed to be a large volume. It may clog up. Could be a lot of sulfur on it.
22:32	144.19136	21.32493	169	1	414	**SAMPLE-19 HFS. Sterivex filter #21. Tmax=64.5C Tavg=45.5. Vol=1317ml. [Alka Seltzer 144.191391E/21.324962N] PI Butterfield (subsamps Huber/Bolton)**
22:33	144.19144	21.32493	169	1	414	**SAMPLE-20 HFS. Filtered piston #24. Tmax=19C Tavg=16.4. Vol=302ml. [Alka Seltzer 144.191391E/21.324962N] PI Butterfield**
22:36	144.19151	21.32489	165	1	414	Stowing the wand. Preparing to scoop this little dark chimney that may be made of the same stuff as the pit.
22:37	144.19151	21.32489	165	1	414	There is a bit of a darker tinge to some of the sediment here - almost like an old flow area.
22:38	144.19150	21.32488	165	1	414	Opening the biobox preparing it for the small chimney sample.

time	raw long	raw lat	hdg	alt	Z (m)	Dive J2-197 Daikoku - Dive Log Comments
22:41	144.19151	21.32489	165	1	414	**SAMPLE-21 Chimney. Scooping up part of the little black (sulfur) chimney. Little black piece fell in. Mostly ash here bound by sulfur. Getting ash; sediment; sulfur globules etc. [Alka Seltzer 144.191391E/21.324962N] PI geogroup**
22:43	144.19151	21.32489	164	1	414	Scooping sediments with this small black chimney. A piece of the chimney fall on the ground. Jimmy is going in for another scoop.
22:52	144.19143	21.32480	164	1	414	We may have to get rid of something here. We're quite heavy.
22:57	144.19140	21.32485	164	4	413	We're going to head to the Cauldron.
22:58	144.19141	21.32485	165	4	413	How much will a coffee can of sulfur weigh? About 8 pounds.
23:03	144.19144	21.32489	102	3	413	The cauldron is right ahead of us in the pilot cam.
23:07	144.19144	21.32489	102	3	413	The cauldron is right ahead. We're going to take the sulfur can.
23:09	144.19145	21.32488	102	2	413	We are recording the pilot cam on DVCam tape while we are here at the Cauldron.
23:11	144.19145	21.32488	102	2	413	There was no sound on the audio channel for awhile.
23:11	144.19145	21.32488	102	2	413	Preparing to sample the molten sulfur into a coffee can.
23:12	144.19145	21.32488	102	2	413	The coffee can is on a pole that's a bit over 6 feet long (~2 meters).
23:16	144.19147	21.32487	96	1	413	SAMPLE-22 Molten Sulfur Going to scoop up this molten sulfur into this coffee can here at the cauldron pit. Want to get some of this molten sulfur in the can.
23:17	144.19147	21.32487	93	1	413	The surface of the sulfur pond is undulating. Very fascinating to observe.
23:18	144.19147	21.32486	85	2	414	The can has been dipped into the pool (we think). Lots of bubbles in the background.
23:19	144.19148	21.32486	85	1	414	Can't see what's going on in the science cam. He's hovering above the cauldron.
23:20	144.19147	21.32487	85	3	414	**SAMPLE-22 Molten Sulfur. Scoop molten sulfur into coffee can. First attempt on the edge proved the crust is hard. Broke crust and filled the can with sulfur. Temp here last night was 187C. [Sulfur Cauldron 144.19148E/21.32499N] PI geogroup / Takano**
23:23	144.19147	21.32488	132	2	413	The can is coated on the outside and full to the brim.
23:26	144.19145	21.32488	132	3	413	This is the last sample. Jimmy has to hold onto this until the surface.
23:27	144.19145	21.32488	132	3	413	Stowing the pole.
23:27	144.19145	21.32488	132	3	413	Stopped recording pilot cam on DVD.
23:30	144.19145	21.32488	132	3	413	Seems like the crust is pretty thick. Jimmy had to poke it pretty good to get the can into the sulfur. The temp probe read 187 C here last night.
23:34	144.19145	21.32488	132	3	413	Still stowing the DVCam.
23:39	144.19145	21.32488	132	3	413	Jimmy has the pole and can gripped with both hands. Quite a feat. He's not losing that sample.
23:43	144.19143	21.32486	132	14	413	We're coming up off the bottom with hydraulics on idle. Stopping the video.
00:20	144.19156	21.32510	238	149	151	Jason is at the surface.
00:21	144.19156	21.32511	219	107	109	Bringing Medea on board.
00:22	144.19156	21.32511	219	121	123	Medea on deck.
00:25	144.19156	21.32516	209	1	4	Having some problems with the recovery. Just lost the recovery line. It was pulled out of their hands.
00:26	144.19157	21.32518	202	140	143	The recovery line is streaming past the vehicle.
00:35	144.19154	21.32534	305	188	189	**Jason is on deck. End of dive.**

5.4.15 J2-198 Nikko Dive Log

time	raw long	raw lat	hdg	alt	Z (m)	Dive J2-198 Nikko - Dive Log Comments
J2-198 Nikko Dive Summary: Started dive at the north-central portion of the crater - visibility was poor. Found Marv Lilley's data logger at North Vent. Went searching for the sulfur lake next (to the NW). Encountered dense tubeworm patches, white smokers, crabs, sulfur, and a very thick plume that hindered visibility. NW crater floor samples: 1 major, 1 gastight, 1 sulfur rock. Proceeded to the SE across the crater floor. 1 geology sample at the crater center, then continued to the SE. Dense biota and low-level venting in many areas. 1 niskin on the way. Thick plume in the SE section of the crater. Smoke is pouring out of the crater wall - There is a "pit" (depression) at the SE crater location. Looked around it a bit. Suction sampled bacterial mat and shrimp at Tubeworm Hangover (SE Vent). Next climbed up the SE crater wall to the top - sampled a rock. Dense biota there also and diffuse flow. Proceeded on, climbing up the E/SE crater wall. Sampled a rock near the top. Lots of dense biota and diffuse venting at the top too. SM2000 survey followed - then retrieved Marv's data logger after waiting for the plume to clear. Visibility was poor but were able to recover the instrument. 9 samples total.						
J2-198 Bottom time: 5/7/2006 0629 - 5/8 0522 UTC (22.88 hrs). **Z column represents seafloor depth in meters.**						
05:44	142.31664	23.06666	287	1	4	**Jason is in the water**
05:46	142.31663	23.06666	306	1	4	Medea is in the water
05:47	142.31664	23.06665	313	1	4	Jason diving
05:49	142.31665	23.06663	315	1	31	Dive J2-198 Nikko volcano
06:17	142.31688	23.06624	316	93	445	J2-198 Dive Configuration: 5 chamber suction sampler. Scoops, bags, mesh, niskins.
06:21	142.31692	23.06621	315	70	457	Beginning to see lots of smoky water at 380m.
06:24	142.31694	23.06618	315	53	460	Passing 410m. Visibility is beginning to deteriorate.
06:29	142.31694	23.06616	316	6	464	Bottom coming into view at about 460m.
06:31	142.32568	23.08073	205	3	461	We appear to be near the edge of the sulphur lake.
06:32	142.32565	23.08074	323	4	462	Plan is to head to the North Vent site and look for Marv Lilley's logger.
06:33	142.32563	23.08072	327	4	463	Currently heading NW.
06:34	142.32563	23.08070	331	8	466	We are about 45m from the homing beacon.
06:34	142.32562	23.08071	333	4	463	Visibility is pretty poor.
06:36	142.32558	23.08075	334	2	460	We are transiting across the sulphur lake.
06:37	142.32557	23.08077	347	2	460	Lots of small white crabs and flatfish visible.
06:39	142.32553	23.08086	351	2	460	Crabs and flatfish are concentrated in the channels.
06:40	142.32551	23.08092	347	2	460	We are now 22m from the homing beacon.
06:42	142.32551	23.08100	341	3	460	We've just passed our first large "bush" of tubeworms.
06:44	142.32550	23.08108	47	4	459	Ko-ichi says that it's murkier than when we were here with the Hyperdolphin last November.
06:45	142.32556	23.08107	54	4	460	We've found the data-logger.
06:45	142.32556	23.08108	57	4	460	First observed logger at 06:45UTC.
06:46	142.32556	23.08109	67	4	462	The logger looks quite clean. Does not appear to have any obvious sulphur coating.
06:50	142.32551	23.08115	81	1	461	It appears that the cable leading from the instrument to the sensor probe may have been buried by sulphur.
06:50	142.32551	23.08114	69	4	462	Now that we've confirmed its location we will collect the logger at the end of the dive.
06:51	142.32551	23.08115	58	4	462	We are going to head SW to the Sulphur Vent site.
06:53	142.32548	23.08114	250	5	461	Tubeworms.
06:53	142.32548	23.08114	251	5	461	Heading over to the sulfur mounds...abou t30m
06:53	142.32546	23.08113	250	5	460	Murky.
06:53	142.32545	23.08113	251	5	460	This side may be blown away.
06:54	142.32544	23.08112	249	3	457	Last time this place was very clear for visibility.
06:54	142.32537	23.08110	252	4	457	Lots of sea vog.
06:55	142.32533	23.08107	253	4	457	Last time this place had a lot of brightly colored sulfur flows.
06:56	142.32528	23.08103	252	4	458	Lots of tubeworms visible as we transit.
06:56	142.32527	23.08103	256	4	458	Heading last time was 330 when at the upcoming target.
06:58	142.32525	23.08103	257	4	457	These tubeworms are also found on the Oregon Margin and the Gulf of Mexico.
06:58	142.32525	23.08103	257	4	457	Last dive here had a depth 456m.
06:59	142.32520	23.08103	256	3	455	Visibility is still murky.
06:59	142.32519	23.08103	247	3	455	Nav says we should be here…looking for white smoker.
07:00	142.32519	23.08102	220	3	455	Smoker is up on ledge with bright sulfur flows.
07:00	142.32520	23.08103	196	2	455	Coming into a plume
07:00	142.32520	23.08104	197	2	454	Moving downslope a bit…we are at 452m. Target at 456.
07:00	142.32521	23.08104	196	1	454	Target at 456m.
07:01	142.32518	23.08111	197	2	455	Can't see anything.
07:01	142.32517	23.08109	198	2	456	Bottom barely visible at 453m.
07:02	142.32521	23.08097	199	1	456	*Doppler reset.*
07:03	142.32521	23.08098	236	2	456	Lots of floc in water and a lot more plume.
07:03	142.32522	23.08097	239	3	457	At 455m and see some worm patches in plume.
07:04	142.32524	23.08097	237	2	458	Need to go downslope more than turn around and look up.
07:04	142.32522	23.08095	239	1	458	Focused plume visible.
07:05	142.32529	23.08116	238	1	459	At 457.8 m looking at a hill with a plume.
07:06	142.32524	23.08096	302	7	462	*Doppler reset.*
07:07	142.32526	23.08093	298	3	462	Lots of bubbles.
07:08	142.32522	23.08092	334	5	464	Smoke coming up from spot in Pilot cam.
07:08	142.32522	23.08092	333	5	464	We are at 333deg with 459m depth.
07:09	142.32523	23.08093	334	4	464	This does not look like it did before.
07:10	142.32522	23.08093	336	4	464	Going to lateral left to see if we are in a different location.

time	raw long	raw lat	hdg	alt	Z (m)	Dive J2-198 Nikko - Dive Log Comments
07:10	142.32520	23.08093	342	4	463	Lateral left at 459.5m. Head is 341deg.
07:11	142.32514	23.08097	29	2	458	Still do not see familiar site.
07:12	142.32514	23.08098	31	2	458	Lots of crabs.
07:12	142.32514	23.08099	27	2	458	See a plume.
07:13	142.32519	23.08100	311	5	460	Flow out of small boulders of sulfur.
07:13	142.32520	23.08101	310	4	460	This is 455m at 313deg heading.
07:14	142.32520	23.08099	318	6	461	Backing off to look down the hill.
07:20	142.32522	23.08094	285	3	463	Crossing a boulder strewn portion of the crater floor. Heading westward.
07:21	142.32523	23.08095	336	3	463	Lots of white crabs and some scattered tube worms.
07:22	142.32527	23.08092	32	4	464	Still searching for the vent with the active sulphur flows.
07:23	142.32530	23.08089	54	6	465	Crossing another channel with lots of flatfish and crabs.
07:24	142.32534	23.08087	23	6	464	This side of the sulphur lake is cracked and has fallen away.
07:28	142.32528	23.08098	302	3	460	Heading NW still searching for the sulphur vent.
07:30	142.32530	23.08092	20	5	464	Visibility has just improved markedly.
07:33	142.32547	23.08105	3	4	460	There is a lot of particulate material in the water here.
07:35	142.32539	23.08106	328	4	460	Passing over some more tube worm clusters.
07:37	142.32524	23.08098	317	6	462	Visibility is getting murkier again.
07:40	142.32515	23.08097	305	5	460	Still searching NW along a steep slope. Some active venting visible further upslope.
07:42	142.32514	23.08096	299	5	460	We're waiting for the ship to center up before moving upslope to this venting area.
07:43	142.32512	23.08098	297	4	459	We're at what may be the sulphur venting site but it looks different than last November.
07:47	142.32510	23.08093	272	4	460	We're not sure that we're at the right place.
07:48	142.32512	23.08087	252	7	464	We're moving again. This time we're headed SW.
07:53	142.32505	23.08092	315	5	459	Still no luck. We've now traversed this slope a few times.
08:02	142.32510	23.08099	321	2	457	We're at a site with active venting and some bubbling. No obvious sulphur flows however.
08:05	142.32511	23.08099	312	3	458	We're going to take a temperature reading to check things out.
08:07	142.32509	23.08099	317	2	457	Visibility just dropped off quite a bit.
08:11	142.32510	23.08099	322	2	457	TEMPERATURE here reached 51C.
08:16	142.32510	23.08100	322	2	457	TEMPERATURE We moved the probe slightly and got a reading of 215.9C
08:20	142.32510	23.08100	322	2	457	We have another reading of 202C. We'll do some water sampling here.
08:21	142.32510	23.08100	322	2	457	Looks like we might have collected some molten sulphur on the end of the temp probe.
08:28	142.32510	23.08100	321	2	457	**SAMPLE-1 Major (red) sampler. Tmax=216C. Site with active venting and some bubbling. No obvious sulphur flows. [NW crater floor 142.325091E/23.081008N] PI Butterfield**
708:33	142.32509	23.08100	323	2	457	Preparing to fire white handled gastight.
08:36	142.32508	23.08102	323	2	457	**SAMPLE-2 Gastight fired. Tmax=216C. Site with active venting and some bubbling. No obvious sulphur flows. [NW crater floor 142.325091E/23.081008N] PI Evans**
08:38	142.32508	23.08102	323	3	457	Position for Samples 1 and 2 is 23 4.858 142 19.505
08:38	142.32508	23.08102	323	3	457	**SAMPLE-3 Rock. Yellow sulphurous rock with the triangular scoop (into biobox). Lots of vigorous white smoking action but no active sulphur flow visible. [NW crater floor 142.325091E/23.081008N] PI geogroup**
08:52	142.32508	23.08103	332	2	457	Lots of vigorous white smoking action but no active sulphur flow visible.
08:56	142.32507	23.08102	332	2	457	The white smoker seems to have suddenly gotten more active.
08:59	142.32509	23.08094	329	4	459	We're leaving this site for now and will head toward the SE side of the crater.
09:02	142.32515	23.08086	330	4	466	We're moving downslope. There are lots of crabs and tubeworms.
09:03	142.32519	23.08082	330	4	468	Slope is covered with some very dark material that almost looks like ash.
09:06	142.32532	23.08070	330	4	472	We're in an area with large sulphur blocks.
09:07	142.32535	23.08066	328	4	472	We just added a nav marker called "Potential Beast Sniffing". Go figure.
09:08	142.32535	23.08066	130	4	471	We're near the base of this wall at 469m. Lots of sulphur boulders.
09:11	142.32551	23.08047	152	2	477	Crossing the crater floor at 474m. Lots of tubeworms and crabs.
09:13	142.32554	23.08045	142	1	477	A second species of crab (small red one) visible here. Tubeworms are not very long. Juveniles?
09:15	142.32569	23.08033	137	2	475	We're now moving rapidly to the SE.
09:20	142.32568	23.08023	174	2	470	Coming up on what looks to be a yellow sulphur chimney or spire. Looks to be about 50cm high.
09:23	142.32568	23.08022	186	1	470	We're going to try to snap off a piece of this odd looking sulphur structure.
09:28	142.32568	23.08020	187	2	470	Collected piece of odd looking sulphur structure.
09:29	142.32568	23.08020	187	2	470	**SAMPLE-4 Rock. Piece of odd looking sulphur structure (yellow sulfur chimney or spire). [crater center 142.325683E/23.080198N] PI geogroup**
09:30	142.32573	23.08010	187	3	470	Resuming our transit to the south portion of the crater
09:32	142.32574	23.08006	188	3	468	Approaching a sulfur flow that is almost completely overgrown with tubeworms.
09:33	142.32576	23.08006	189	1	465	Density of white crabs is very high here on the slope at 464m.
09:36	142.32576	23.08001	192	1	465	We just excavated with the manipulator arm. There appear to be tubeworms buried under the sediment. Perhaps this area was covered by a debris slide?
09:40	142.32575	23.07994	176	4	465	We're looking at chunks of sulfur tubeworms crabs etc..
09:41	142.32577	23.07991	146	4	463	We're going to traverse from the SE. Traverse from the molten sulfur area (where it was anyway) to SE vent. Along the bottom.
09:42	142.32581	23.07986	146	5	458	We see big slabs that have collapsed down from the slope.
09:42	142.32580	23.07986	145	8	460	We're going to stop for a minute and look around.
09:44	142.32585	23.07980	135	6	453	Tubeworms everywhere. We're looking at overhangs of sulfur flows and lots of worms
09:44	142.32587	23.07979	135	6	452	Could be a sulfur lake that drained out.
09:44	142.32587	23.07978	135	5	451	We're on the surface again.

time	raw long	raw lat	hdg	alt	Z (m)	Dive J2-198 Nikko - Dive Log Comments
09:45	142.32590	23.07975	136	2	448	Lots of crabs and flat fish here. Relatively barren except for the big tubeworm bush on left. Lots of crabs and flatfish.
09:47	142.32594	23.07965	148	2	447	Z=446m. There's low-level venting all around here.
09:48	142.32597	23.07964	141	1	447	Zooming on a white patch with tons of crabs and worms.
09:49	142.32600	23.07959	137	2	445	Just looking around here. We're climbing up another level of sulfur here.
09:49	142.32601	23.07958	138	2	445	The smoke is really dense up here.
09:50	142.32599	23.07958	231	1	445	We will look around here a bit to try to find the source of the dense smoke here.
09:52	142.32597	23.07962	184	3	446	The Eh is at -168.
09:53	142.32597	23.07950	222	1	445	Trying to find the source of the plume.
09:55	142.32594	23.07946	107	2	446	Eh is -170.
09:56	142.32596	23.07945	108	1	445	What the heck is this? Looks like ash.
09:57	142.32617	23.07950	108	1	445	Flat fish are swimming in front of the sub.
09:58	142.32602	23.07948	7	2	445	This is really something. Big tubeworms everywhere.
09:59	142.32602	23.07950	338	2	445	Huge density of biology. Tubeworms everywhere.
09:59	142.32603	23.07953	110	2	445	We're heading for the SE Vent target.
10:03	142.32614	23.07942	125	1	444	**SAMPLE-5 Niskin (green). Could possibly have fired the red one too. Area of dense biology. [142.32615E/23.079417N] PI Resing**
10:06	142.32627	23.07933	127	1	445	We're heading toward the SE vent.
10:07	142.32632	23.07932	231	2	448	Venting right up ahead. Depth of SE vent was 441. This place is a few meters deeper.
10:07	142.32631	23.07932	231	2	447	See smoke coming out of this hillside.
10:10	142.32631	23.07932	233	2	447	We're going to take a temp reading here in the smoke hole.
10:11	142.32631	23.07932	232	2	447	Looking at the smoke pouring out of the hillside.
10:16	142.32631	23.07932	233	2	447	TEMPERATURE is jumping up pretty quickly. Now at 170C and climbing. The smoke is a bit gray. Pushing it deeper into the hole. It's at 206 here. Still climbing. He pushed it in deeper. Pushing it farther in. The probe read 247.6.
10:16	142.32631	23.07932	233	2	447	The end of the probe looks clean.
10:18	142.32631	23.07932	233	2	447	Naming this vent **Varnum Vent**. [23 4.7585 142 19.578]
10:19	142.32631	23.07932	231	1	447	Just looking around here. There is a black spot here that looks like molten sulfur.
10:20	142.32630	23.07931	231	1	447	Looks like a crust of sulfur here with patches of black here and there.
10:21	142.32633	23.07934	231	2	448	We're moving down into the pit here.
10:22	142.32634	23.07938	229	2	448	Verena thinks this is a different shrimp here. Seems more prone to swimming.
10:22	142.32634	23.07940	231	2	448	147 meters and we're nearing the bottom of the pit.
10:23	142.32634	23.07940	243	2	448	Flat fish everywhere on the bottom. Plus lots of crabs.
10:23	142.32635	23.07940	165	3	449	We're looking around the depression here.
10:24	142.32636	23.07937	169	2	448	We see a plume here too. Could just be a white rock or some diffuse flow.
10:24	142.32637	23.07935	79	2	448	Just a white rock here.
10:25	142.32641	23.07938	42	2	449	Something is around here.
10:25	142.32641	23.07938	1	2	450	Lots of smoke.
10:26	142.32641	23.07942	257	4	450	Starting to climb out of this SE pit. At the bottom at 448 meters.
10:27	142.32639	23.07941	258	4	451	Can see the whole pit in the sonar.
10:28	142.32634	23.07939	223	1	448	We're going to head up the slope to SE Vent target.
10:28	142.32628	23.07936	244	3	448	The bottom is covered up with crabs. Tons of flatfish.
10:30	142.32628	23.07936	163	2	445	Everywhere in this crater there are crabs.
10:32	142.32641	23.07926	135	3	448	We're driving around the place. Then will take a few water samples. Pick up the instrument then will do SM2000 for 8 hours.
10:33	142.32644	23.07925	134	3	448	Discussing the plan.
10:34	142.32650	23.07924	165	2	449	We see some staining here. Bacterial mat? Could be sulfur?
10:35	142.32651	23.07923	188	4	450	Zooming in here and looking at the white staining.
10:36	142.32652	23.07919	188	2	448	Huge blocky talus as we climb up the crater edge.
10:37	142.32651	23.07917	223	2	447	The depth of the vent should be 441.
10:37	142.32650	23.07915	207	1	446	Flat fish swimming around. Very murky here.
10:39	142.32647	23.07911	206	4	447	Looks like bacterial mat on the rocks here.
10:40	142.32647	23.07910	206	4	447	Beautiful tubeworms. Zooming in to see if there is bacterial mat here.
10:42	142.32647	23.07909	208	2	447	Going to put the temp probe in the white mat (is it mat?)
10:46	142.32647	23.07909	206	3	447	Taking the temp here where there is invisible venting.
10:47	142.32647	23.07909	206	3	447	TEMPERATURE degrees C Temp is climbing. Tambient is 11.9. Probe isn't very far in but it's climbing. it's up to 33 now.
10:47	142.32647	23.07909	206	3	447	Depth is 444 here. Right at the SE vent target - re-naming it Tubeworm Hangover.
10:48	142.32647	23.07909	206	3	447	Rick wants a suction here.
10:49	142.32648	23.07908	206	3	447	Going to suction mat here in this diffuse venting area. See white mat.
10:50	142.32647	23.07908	206	3	447	**SAMPLE-6 Suction of white mat. Area of dense biology; mat; and diffuse flow. [Tubeworm Hangover 142.32648E/23.07908N] PI Davis**
10:56	142.32647	23.07909	198	2	446	Trying to suction this white mat. Can't seem to get to it.
10:58	142.32647	23.07909	210	2	446	Zooming in on the suction area.
11:01	142.32647	23.07909	210	2	446	Suctioning this white material off of a rock.
11:02	142.32647	23.07909	210	2	447	SAMPLE-6 Suction White mat is going up the suction tube.
11:02	142.32647	23.07909	210	3	447	The tubeworms need a sustained venting environment. Verena thinks they have that here from the looks of it.

time	raw long	raw lat	hdg	alt	Z (m)	Dive J2-198 Nikko - Dive Log Comments
11:03	142.32647	23.07909	210	3	447	Lots of big chunks of white mat coming out of somewhere. Big mat chunks.
11:07	142.32647	23.07908	209	2	446	We see a bit of shimmer here coming up through the tubeworms and mat.
11:09	142.32647	23.07908	210	2	446	Finished up sample 6.
11:10	142.32647	23.07908	209	2	446	Want to suction shrimp here in the same position as the last sample. 3 different species here.
11:11	142.32647	23.07908	209	2	446	Naming this vent area Tubeworm Hangover.
11:14	142.32647	23.07908	211	2	446	Suctioned up one shrimp here and trying for more. [Tubeworm Hangover] Same position as sample 6. Jimmy is getting several of these little shrimp.
11:15	142.32647	23.07908	211	2	446	This is the black suction. Jimmy is a great shrimp sucker.
11:17	142.32647	23.07908	209	2	446	**SAMPLE-7 Suctioned up quite a few shrimp here (loihi). [Tubeworm Hangover 142.32648E/23.07908N] PI Tunnicliffe**
11:19	142.32647	23.07908	209	2	446	Continuing to suction shrimp.
11:23	142.32647	23.07908	209	2	446	Got a tube too. Still chasing the worms. We're calling it a day.
11:28	142.32647	23.07908	209	2	446	We're watching a flat fish swimming around here.
11:32	142.32647	23.07908	208	2	446	Concerned that the little shrimpies may have gotten out. We can't tell how many got away. Hopefully not many.
11:34	142.32647	23.07908	209	3	447	Trying to "index" the sampler. Got it. Don't want the shrimp getting away.
11:38	142.32647	23.07908	208	2	447	We're planning to go up and then move along the slope.
11:39	142.32647	23.07908	201	3	447	Verena is zooming in on tubeworms here.
11:41	142.32654	23.07908	128	4	447	Very impressive place.
11:42	142.32662	23.07912	118	8	446	This is an amazing place. Must be a slow ooze everywhere to support the biomass we see.
11:43	142.32665	23.07913	110	17	446	-174 Eh. The Eh has been -160 or below the whole time we've been on shift - 2 hours now.
11:44	142.32666	23.07922	92	13	442	Wow - another amazing overhang and lots of wafting smoke coming up here as well.
11:45	142.32669	23.07927	91	10	439	Irregular surface indicates it may be sulfur flows.
11:45	142.32669	23.07935	93	9	439	We're looking at an almost vertical wall here. It's covered with life.
11:46	142.32668	23.07938	91	13	443	We have a bit of a break.
11:46	142.32668	23.07939	91	13	442	Red crabs and white crabs here.
11:46	142.32668	23.07939	91	11	440	There are mussels here too.
11:46	142.32667	23.07942	94	10	439	The wall is just hanging out here in space.
11:47	142.32667	23.07941	60	13	443	The white stuff is barnacles.
11:47	142.32666	23.07941	58	14	443	Mussels just lying there.
11:48	142.32665	23.07943	58	11	441	The mussels here are a different species. This outcrop is just covered with bacterial mat and barnacles. Another mussel.
11:48	142.32662	23.07949	58	9	438	It looks like the intertidal. We have barnacles mussels brabs and zonation. Verena says its like the intertidal here.
11:49	142.32662	23.07952	55	6	436	We're seeing a red crab. Verena doesn't know who it is.
11:50	142.32663	23.07953	57	6	435	We're doing a bit of tether management.
11:50	142.32663	23.07953	57	5	435	Mussel target is straight ahead.
11:52	142.32661	23.07954	58	1	430	Plan to poke around here and see what the mussels are. She wants the same species as at Eifuku so that she can do the comparison.
11:53	142.32661	23.07957	58	6	441	The Eh is -142 here. Tether management.
11:55	142.32659	23.07961	60	9	444	It seems to be "magmatic " venting rather than hydrothermal venting.
11:56	142.32659	23.07954	64	7	438	There's a big spire sticking up that Jimmy is trying to avoid.
11:57	142.32657	23.07954	150	11	441	We're looking around here at a huge free-standing spire. It looks like Stonehenge here.
12:00	142.32670	23.07958	76	8	439	Moving away from the big spire here.
12:00	142.32670	23.07959	76	8	440	Back near the wall again.
12:01	142.32669	23.07958	76	6	440	Were looking for mussels.
12:01	142.32668	23.07959	76	6	440	We see some mussels.
12:03	142.32669	23.07961	76	12	438	Amazing geology here. Steep almost vertical cliffs covered with biota.
12:04	142.32668	23.07962	76	22	442	Looks like we're almost at the top.
12:05	142.32668	23.07964	76	19	437	We're going to go to the top of the crater wall.
12:06	142.32673	23.07966	76	12	428	We're at the top now.
12:07	142.32673	23.07966	76	12	428	There are more tubeworms up here.
12:08	142.32673	23.07966	77	12	428	**SAMPLE-8 Rock. Small rounded rock from near the top of the east/southeast crater rim. [142.326725E/23.079661N] PI geogroup**
12:12	142.32673	23.07966	78	12	428	Anemones all over the place here.
12:12	142.32673	23.07967	77	4	419	We're going to creep forward a bit and have a look around.
12:14	142.32675	23.07966	77	2	416	The rocks look like rubble here.
12:14	142.32676	23.07966	77	2	416	No flat fish up here that we see. Lots of crabs.
12:15	142.32676	23.07967	76	1	416	We see flat fish on the smooth area here. They're fighting. That's a first.
12:15	142.32677	23.07967	76	1	416	Top of the world here.
12:16	142.32678	23.07967	74	2	416	The flat fish is resting up against a crab.
12:16	142.32678	23.07967	76	2	416	We're continuing up to the top of the crater wall.
12:17	142.32678	23.07967	83	2	416	We're moving to the top. There's a lot of venting in this place!
12:20	142.32682	23.07968	90	3	417	There's a crab pile. They are all piled up together with all the tube worms. There are barnacles in there too.
12:20	142.32683	23.07968	91	5	416	We're still climbing.
12:21	142.32686	23.07968	91	8	415	There is a cloud that envelops this place. Must be lots of hot water seeping out of this place.
12:22	142.32689	23.07971	90	7	413	There are crabs everywhere here..... and everything else.

time	raw long	raw lat	hdg	alt	Z (m)	Dive J2-198 Nikko - Dive Log Comments
12:22	142.32687	23.07969	120	7	414	Z=407. We're at the top. We're going to fly down through the water column to get to North vent to pick up Marv Lily's experiment.
12:23	142.32687	23.07968	124	8	414	There is warm water coming out of there. There is shimmering going on here.
12:25	142.32687	23.07968	131	5	413	Definitely saw shimmering there. Also see mussels.
12:25	142.32687	23.07968	131	6	414	The shimmer here is clear - not smoky.
12:27	142.32684	23.07974	131	3	413	Naming this Top Vent. Clear shimmering water. Fighting crabs. Barnacles. [Top Vent 23 4.785 142 19.614]
12:28	142.32684	23.07974	131	3	413	The barnacles are all pumping water here. They closed up really quick when the crabs ran over them.
12:31	142.32684	23.07974	131	3	413	Tambient was ~12. Tmax ~23.
12:33	142.32683	23.07974	131	3	413	Jimmy thinks that we should get the instrument after the survey.
12:39	142.32679	23.07981	131	5	416	Jimmy has spoken. Dara agrees.
12:41	142.32677	23.07979	181	4	415	We plan to go to the southeast edge of the survey lines and will start out from there.
12:41	142.32677	23.07979	181	4	415	Dara says we'll be lucky to do it with the seas and steep slopes.
12:43	142.32676	23.07976	180	7	417	Decided to stop the DVCam tape now. Taped 18 minutes here. We were at the top of the crater wall on the E/SE rim. Just amazing biology and diffuse flow.
13:00	142.32681	23.07855	185	6	404	Shimmering water here at 298 meters. Warm Water target. Heading to the start of SM200 survey. Turned the DVCam tape on at 1154.
13:14	142.32650	23.07855	282	6	374	DVCam turned off now.
13:15	142.32641	23.07856	282	6	372	SM2000 line start Started line at 1310. Flying 25 meters above the bottom.
13:55	142.32306	23.07922	11	6	395	SM2000 line end Line 1.. .8 to go.
13:56	142.32306	23.07922	14	6	394	Ship is moving up to start of line 2. Smokey plumes in Medea camera.
13:59	142.32314	23.07938	22	6	395	Ship having trouble going sideways.
14:00	142.32315	23.07941	22	6	395	Coming into a plume as we head to next line.
14:02	142.32320	23.07954	21	6	394	Lots of plume moving from right to left.
14:06	142.32321	23.07956	102	6	396	*Doppler reset*
14:06	142.32321	23.07956	101	6	396	SM2000 line start of SM2000 line 2.
14:07	142.32326	23.07955	102	6	394	At NW end driving SE. 386 m at a heading of 102.
14:19	142.32412	23.07937	103	6	355	*Lost doppler going down steep slope.*
14:20	142.32412	23.07940	102	6	387	*Doppler back (but not reset yet).*
14:43	142.32605	23.07896	100	6	412	*Since the doppler drop out our position went from north of the line to about 5 m south of the line and stayed there.*
14:43	142.32607	23.07895	100	6	412	*The doppler drop out was only for about a minute.*
14:44	142.32612	23.07894	100	6	413	We discussed what to do and decided to just keep going as is. Jason is right under Medea more or less.
14:49	142.32656	23.07890	98	6	403	*Lost doppler again over steep slope.*
14:53	142.32695	23.07884	98	6	401	*During the last doppler drop Jason's position moved north a few meters. Jason is ending just north of the track line on the nav screen.*
14:54	142.32694	23.07884	100	6	401	SM2000 line end of line 2.
14:54	142.32697	23.07879	97	6	401	Jason getting under Medea.
14:55	142.32708	23.07873	100	6	400	*Doppler reset.*
14:56	142.32708	23.07873	99	6	400	Moved Jason 6 m NE.
14:58	142.32712	23.07882	21	6	403	*That 6 m offset probably occurred during the first doppler drop out.*
15:07	142.32725	23.07911	287	6	419	SM2000 line start of line 3 at SE end driving NW.
15:08	142.32724	23.07912	282	6	420	Going to try the first part slower (0.1 knot instead of 0.3 knots).
15:18	142.32662	23.07924	282	6	403	We have been going 0.2 knots. Now slowing to 0.1 to go down steep wall.
15:24	142.32644	23.07927	282	6	426	We seem to be down the wall and doppler held. Increasing speed.
15:50	142.32456	23.07963	282	6	421	Slowing to 0.2 knots to go up far wall.
15:53	142.32439	23.07967	281	6	414	Slowed to 0.1 knots.
16:06	142.32372	23.07980	282	6	371	Topping out. Increasing speed.
16:06	142.32371	23.07980	283	6	362	*Just lost doppler. Too high.*
16:07	142.32365	23.07982	281	6	362	Got it back.
16:11	142.32330	23.07988	282	6	372	SM2000 line end of line 3. NW end of line.
16:27	142.32338	23.08023	103	6	394	*Did a doppler reset near the start of line 4.*
16:34	142.32339	23.08028	104	6	394	SM2000 line start Having some problems getting the ship in position at the start of the line.
16:42	142.32337	23.08021	103	6	395	SM2000 line start of line 4. At NW end driving SE.
16:47	142.32362	23.08018	102	6	383	Going to stop line and start over.
16:49	142.32369	23.08016	102	6	380	No the ship is going to boost some power to the DP and we're going to try to keep going.
17:01	142.32421	23.08005	103	6	379	*Just went over cliff and lost doppler.*
17:03	142.32418	23.08011	103	6	410	We were going 0.1 knot down the wall. Now increasing to 0.2.
17:06	142.32433	23.08005	112	6	421	Speed up to 0.3 knots.
17:34	142.32634	23.07964	103	6	430	Slowing to go upslope.
17:39	142.32665	23.07955	103	6	399	Speeding back up.
17:48	142.32717	23.07944	105	6	412	End of line #4.
18:06	142.32727	23.07981	281	6	411	Start of line #5.
18:21	142.32650	23.07996	281	6	431	We are off the wall now so speeding up the ship.
18:47	142.32437	23.08048	315	6	401	*Having to drive off the line. Loosing doppler.*
18:49	142.32447	23.08072	43	18	402	Altimeter on.
18:50	142.32452	23.08082	49	18	394	Ship has drifted off line to the north. Trying to wrestle it back south. Jason following Medea.

time	raw long	raw lat	hdg	alt	Z (m)	Dive J2-198 Nikko - Dive Log Comments
18:54	142.32447	23.08069	208	29	405	*Lost doppler for good over steep wall.*
19:13	142.32455	23.08080	118	44	404	We're still trying to get the ship back on the line.
19:14	142.32455	23.08079	120	41	401	We're going to resume the line a little bit to the west of where we lost it because we are right over a cliff.
19:28	142.32459	23.08029	292	48	446	We've been about 50 m above the bottom for a while now using the Jason altimeter. Now going back down to use the doppler.
19:30	142.32465	23.08037	291	20	451	*Doppler reset.*
19:31	142.32465	23.08036	291	20	451	We are a little east of where we lost it (not west).
19:31	142.32466	23.08036	285	20	451	Resuming line (I hope!).
19:57	142.32359	23.08059	283	20	400	SM2000 line end of line 5.
20:09	142.32367	23.08088	102	20	416	*Doppler reset at start of line 6.*
20:10	142.32369	23.08089	101	20	418	SM2000 line start of line 6. At NW end driving SE.
20:30	142.32451	23.08073	99	20	388	*Lost doppler.*
20:38	142.32475	23.08067	102	20	446	*Only lost doppler for a minute or so this time*
21:21	142.32743	23.08022	101	20	440	SM2000 line end of line 6.
21:34	142.32753	23.08047	12	20	458	*Doppler reset near beginning of line 7 (~10 m).*
21:34	142.32753	23.08048	283	20	462	SM2000 line start line 7. SE end driving NW.
21:37	142.32750	23.08049	282	20	461	Start of Line 7
22:17	142.32484	23.08101	281	20	418	*Lost doppler.*
22:18	142.32480	23.08106	282	20	413	*Doppler is back.*
22:36	142.32382	23.08120	281	20	417	SM2000 line end of line 7.
22:56	142.32411	23.08139	6	20	420	Ship is having trouble with DP.
22:57	142.32406	23.08151	13	20	420	*Doppler reset.*
23:05	142.32406	23.08145	174	20	417	SM2000 line start Ship increased the gains to DP.
23:05	142.32406	23.08145	174	20	417	*Doppler reset again.*
23:06	142.32406	23.08145	98	20	419	SM2000 line start of line 8. From NW to SE.
23:50	142.32763	23.08079	103	20	473	SM2000 line end of line 8.
23:50	142.32765	23.08079	103	20	474	SM2000 line end of line 8.
00:00	142.32776	23.08115	283	20	490	*Doppler reset.*
00:01	142.32776	23.08114	282	20	490	SM2000 line start of line 9. SE to NW.
00:38	142.32407	23.08187	280	20	435	SM2000 line end of line 9.
00:39	142.32408	23.08187	282	20	435	Now we are going to do two cross lines - one on the west side and one on the east side.
00:41	142.32409	23.08177	191	20	433	SM2000 line start Starting line 10. This is a cross line on the west end.
00:43	142.32409	23.08173	190	20	433	*We're not doing a doppler reset because it looked like we didn't one.*
00:50	142.32421	23.08135	190	20	407	This cross line is going north to south mainly going over the western rim of the crater.
01:23	142.32375	23.07908	141	20	376	SM2000 line end of line 10.
01:24	142.32379	23.07908	126	20	378	Now moving ship to south end of last cross line. Not following the bottom during the move.
01:25	142.32403	23.07908	102	20	378	Doppler seemed good all the way down line 10 so we are not doing a reset at the end.
01:52	142.32668	23.07852	120	20	378	*Doppler reset.*
01:55	142.32666	23.07855	70	20	378	Starting ship moving 013deg.
01:58	142.32650	23.07856	27	20	386	Waiting for ship to change heading before starting to move.
02:06	142.32667	23.07850	12	20	391	SM2000 line start Starting line.
02:07	142.32667	23.07850	13	20	391	Ship moving.
02:14	142.32685	23.07918	13	20	408	This is line #11...cross line.
02:38	142.32735	23.08107	14	20	469	Nearing the end of the line and the survey.
02:40	142.32739	23.08123	8	20	475	End of line 11.
02:43	142.32719	23.08118	284	10	477	SM2000 line end Going to North Vent and the homer.
02:43	142.32712	23.08120	285	10	474	Depth of Homer is 460.
02:44	142.32716	23.08120	283	15	474	Starting the move.
02:45	142.32708	23.08118	286	13	471	Resetting the Homer.
02:45	142.32711	23.08114	289	9	467	Talking to the Homer but not hearing back yet.
02:48	142.32692	23.08121	290	10	465	Extending base to take an inventory.
02:49	142.32679	23.08124	293	10	459	Can see a bit of the bottom...yeah.
02:50	142.32671	23.08116	290	11	455	Starting DVCam.
02:50	142.32668	23.08112	271	13	453	We are 11m off bottom heading for Homer.
02:51	142.32662	23.08109	266	11	451	Just heard from the Homer.
02:52	142.32654	23.08113	272	9	446	Homer is 104 meters away.
02:53	142.32647	23.08114	275	8	442	Coming over a little ridge...hard to see as we are 8m off bottom. Cloudy water.
02:54	142.32634	23.08112	274	7	442	Barely seeing the bottom...some boulders.
02:57	142.32611	23.08110	276	13	448	Instrument at Homer put down last November.
02:57	142.32610	23.08108	273	15	449	63m to go.
02:58	142.32599	23.08107	274	23	457	Going through some smoke.
03:01	142.32581	23.08107	272	24	459	Some smoke still wafting my...no visual to Medea.
03:03	142.32564	23.08107	285	10	460	See a big plume in Pilot cam.
03:03	142.32564	23.08107	297	11	460	We are 15m away.
03:03	142.32558	23.08110	304	9	460	Very focused plume below us.
03:04	142.32550	23.08115	307	8	458	Driving through the plume. 14m away and we are 9m off the bottom.
03:05	142.32544	23.08120	330	6	455	Big boulder in front of us.

time	raw long	raw lat	hdg	alt	Z (m)	Dive J2-198 Nikko - Dive Log Comments
03:05	142.32545	23.08119	323	7	456	Backing up into plume again.
03:07	142.32547	23.08111	309	5	459	Tubeworms. and plume.
03:08	142.32550	23.08121	327	6	459	*Doppler reset.*
03:08	142.32550	23.08121	325	6	459	Homer is 16m away - we are 5m off bottom.
03:09	142.32550	23.08119	145	6	459	Looking to port - target at 135deg.
03:09	142.32551	23.08119	134	6	459	Visibility is cloudy.
03:10	142.32554	23.08116	127	3	457	Now at 090
03:10	142.32567	23.08113	88	2	460	See crusts of sulfur; fish; crabs.
03:11	142.32570	23.08119	21	2	460	10m away; 025deg; 458m depth.
03:11	142.32569	23.08121	8	2	460	Lots of crabs.
03:12	142.32568	23.08125	7	2	460	Looking at slope and old vent and tubeworm clumps.
03:13	142.32568	23.08124	347	2	460	8m away at 005deg.
03:13	142.32568	23.08124	323	2	460	Actually target is to the left.
03:13	142.32568	23.08125	334	2	460	Lots of plumes from surface.
03:14	142.32568	23.08124	332	2	460	North Vent heading was 102 at this depth.
03:15	142.32568	23.08123	269	2	460	Big plumes - hard to find an instrument.
03:15	142.32568	23.08120	286	2	460	Driving left around the plumes to get some visibility.
03:15	142.32565	23.08118	316	1	460	Homer is in the smoke probably.
03:16	142.32565	23.08118	314	1	460	6m ahead - see it.
03:17	142.32565	23.08118	314	1	460	Looking for a good place to get a fish sample.
03:17	142.32566	23.08120	309	1	460	Lateraling to the right to look for fish.
03:18	142.32567	23.08121	298	1	460	See a lot of plumes.
03:19	142.32568	23.08124	295	1	460	Lots of fish adjacent the vents (to the east of the vents).
03:19	142.32568	23.08125	295	1	460	Going to slurp sample the fish.
03:20	142.32567	23.08126	309	100		Indexing the sampler to red jar.
03:23	142.32567	23.08125	309	49		Fish appear to be bigger here.
03:25	142.32568	23.08126	309	185		**SAMPLE-9 Suction. Sampling flat fish (tongue fish). Got at least 5. Also got a crab; a mussel shell and sediment. [N crater floor 142.3257E/23.08115N] PI Dower**
03:26	142.32570	23.08125	309	173		Got 2-3 so far...more..big one got away.
03:27	142.32564	23.08121	308			Doppler reset.
03:29	142.32564	23.08121	308	99		Waiting for dust to clear.
03:33	142.32566	23.08120	333	1		Suction More plume. Backing up a bit to get out of the smoke.
03:34	142.32567	23.08116	7	48		Crab ball. Looks like a rugby match in 3-chip.
03:35	142.32568	23.08116	3	30		Fish scattering as we approach.
03:35	142.32569	23.08116	3	34		One red crab among all the white ones.
03:36	142.32569	23.08116	3	30		See one dead mussel shell.
03:44	142.32571	23.08135	3	76		Suction Picking up a mussel shell too.. more.
03:46	142.32568	23.08136	3	85		Suction Going to crawl forward to get some more..
03:46	142.32568	23.08137	3	61		Can see barnacles and anemones on outcrop with short tubeworms.
03:47	142.32565	23.08139	7	1	460	Slight repositioning forward..not even a meter.
03:48	142.32563	23.08143	43	1	460	Suctioning again.
03:49	142.32560	23.08140	43	1	460	SAMPLE-9 Suction Got some big ones..got a crab too (they don't eat these fish).
03:50	142.32558	23.08140	43	1	460	More fish and sediment. Letting the sediment out of intake.
03:52	142.32561	23.08143	43	1	460	Flow on again - sampling complete.
03:52	142.32565	23.08141	43	1	460	Stowing intake.
03:54	142.32569	23.08143	42	1	460	Indexing to the green jar
03:58	142.32568	23.08142	42	1	460	Having some trouble with the arm wrist rotate.
03:58	142.32568	23.08143	42	1	460	Now are on the flush jar.
03:59	142.32569	23.08145	42	1	460	Conclusion is the arm is okay.
03:59	142.32564	23.08122	43	1	460	Now we are going to go back to the instrument at North Vent.
04:01	142.32559	23.08127	17	5	461	Large colonies of tubeworms.
04:02	142.32557	23.08128	339	9	461	In the plume of the vents.
04:03	142.32558	23.08121	345	4	460	Can see some distinct plumes.
04:04	142.32558	23.08120	327	2	460	Can see vents and bottom again.
04:04	142.32557	23.08120	322	2	460	There it is.
04:05	142.32555	23.08119	343	2	460	Going closer to take stills of instrument.
04:06	142.32553	23.08121	63	1	461	Good pictures of probe and instrument.
04:07	142.32553	23.08121	63	1	461	Wand is in smoke - can't see it yet.
04:08	142.32553	23.08121	62	1	461	Still trying to look for the wand.
04:09	142.32553	23.08121	62	1	461	Seeing bubbles.
04:10	142.32553	23.08121	62	1	461	Looks like cables are fried.
04:11	142.32553	23.08121	62	1	461	Want to recover the wand and not the cables - afraid if grab cables will lose wand.
04:11	142.32553	23.08121	62	1	461	Going to pick up Homer first.
04:14	142.32552	23.08121	61	1	461	RECOVER Instrument. Got the Homer...back down..going to get rid of a weight first.
04:15	142.32551	23.08121	60	1	461	Weight down just beside the instrument.
04:16	142.32551	23.08121	60	1	461	Back for the Homer.
04:17	142.32550	23.08120	60	1	461	Got the Homer again. This time it goes in the basket.
04:17	142.32550	23.08120	60	1	461	Drawer in.

time	raw long	raw lat	hdg	alt	Z (m)	Dive J2-198 Nikko - Dive Log Comments
04:18	142.32550	23.08120	60	1	461	Plume coming over us again - will wait for a change in direction.
04:20	142.32548	23.08120	59	1	461	Smoke starting to clear. Just a bit.
04:22	142.32548	23.08119	63	3	462	Going to lateral around vent to see if any better visibility from another direction.
04:23	142.32553	23.08119	335	1	460	Rocks in the way a bit to the east.
04:25	142.32551	23.08117	10	1	461	More bubbles when the instrument was deployed.
04:27	142.32551	23.08116	8	1	461	Visibility is not improving.
04:28	142.32554	23.08114	352	3	460	Going to water sample first to make room in basket.
04:29	142.32558	23.08116	307	2	460	First a temperature reading.
04:34	142.32560	23.08115	244	3	460	TEMPERATURE degrees C. Ambient was 11.9… no good readings… can't see the vents.. too much smoke.
04:40	142.32547	23.08108	336	2	460	Crashed into tubeworm cluster… no visibility.
04:41	142.32558	23.08118	336	5	460	*Doppler reset.*
04:43	142.32562	23.08130	337	1	460	Back to take a temp nearby the instrument.. looking for a vent we can see.
04:47	142.32568	23.08133	222	184	644	The best side for a view is upslope with rocks blocking good place to settle and sample.
04:53	142.32567	23.08131	230	2	460	Stowing wand… can't get a temperature due to poor visibility and terrain.
04:53	142.32568	23.08130	236	2	460	Going back to instrument.
04:59	142.32560	23.08117	305	2	460	*Doppler reset.*
05:00	142.32560	23.08121	6	1	460	Found the weight again.
05:00	142.32558	23.08122	30	2	460	That is weight.
05:00	142.32560	23.08124	77	1	461	Can't see a thing again - smoke.
05:02	142.32560	23.08120	69	2	460	Waiting for it to clear - not moving again.
05:02	142.32558	23.08113	54	2	460	We are moving again - backing out of plume.
05:10	142.32555	23.08125	60	180	641	Can barely see the instrument in the Pilot cam.
05:10	142.32554	23.08125	61	1	461	Poking the black cable.
05:11	142.32553	23.08124	60	1	461	Cable came out of sulfur but it is pulling on something not visible in the plume - probably the intake.
05:12	142.32552	23.08123	61	1	461	Going to pull on the cable.. only option to try to get the sensor back.
05:12	142.32551	23.08123	60	1	461	Pulling blindly.
05:12	142.32551	23.08123	61	1	461	RECOVER Instrument Got it.
05:13	142.32550	23.08122	60	1	461	Cable did not break… got the sensors… setting on the bottom.
05:13	142.32550	23.08122	60	1	461	Can't see any direct orifice to sample from… too much smoke… would like a gastight if it clears.
05:13	142.32549	23.08121	59	1	461	Intend to come back to this spot on next dive with the Beast.
05:13	142.32548	23.08121	59	1	461	Getting rid of a weight.
05:14	142.32548	23.08121	59	1	461	Seeing bubbles come up through the basket.
05:14	142.32546	23.08120	59	1	461	Weight away.. placed just south of the instrument (other one is to the East).
05:15	142.32547	23.08120	59	1	461	Knocked out the temp wand and need to restow it.
05:16	142.32545	23.08119	61	1	461	Trying to recover the instrument - on edge of plume again.
05:16	142.32545	23.08119	60	1	461	Clearing - going for it.
05:17	142.32543	23.08117	60	1	461	RECOVER Instrument Grabbed it by the handle. Going to the basket.
05:18	142.32542	23.08117	60	153	613	RECOVER Instrument Now getting the sensor and cables in to the basket.
05:19	142.32541	23.08117	60	1	461	RECOVER Instrument Sensor in basket.
05:19	142.32541	23.08116	60	97	557	Calling bridge for recovery heading.
05:20	142.32536	23.08113	48	3	460	Arm is over the basket.
05:22	142.32536	23.08112	62	5	461	Going to place other manipulator over basket to hold in contents.
05:22	142.32536	23.08112	62	5	461	**Jason off bottom.**
05:22	142.32536	23.08113	62	6	461	Coming up.
05:22	142.32535	23.08113	117	6	459	J2-198 is ENDING.
05:23	142.32535	23.08114	28	5	460	Taking some wraps out of the cable.
05:23	142.32525	23.08121	312	2	454	Jason off bottom (again) - coming up.
05:40	142.32514	23.08134	322	174	287	Stopping DVDs.
05:50	142.32514	23.08134	300	174	175	JASON is at the surface
05:58	142.32514	23.08134	12	174	175	**JASON on deck**

5.4.16 J2-199 Nikko Dive Log

time	raw long	raw lat	hdg	alt	Z (m)	Dive J2-199 Nikko - Dive Log Comments
J2-199 Nikko Dive Summary: Started the dive on the east rim and proceeded downslope to the north central crater floor. Grabbed 2 geo samples of sulfur chimney structure then continued to the south of N Vent for 4 HFS samples. Too much smoke at N Vent area to sample so proceeded toward the SE crater area. Observed sulfur patches and sediment depressions between them. Flatfish on the sediments mainly. Dense biota - healthy tubeworms. Sampled mussels originally attached to tubeworms. In a small area of shimmering water near SE Vent site collected 4 HFS and 1 rock sample. Next traveled up the SE crater rim to Top Vent. 4 HFS samples in area dense with crabs and diffuse flow. After Top Vent flew off the crater rim down to Varnum Vent where collected 1 HFS sample. Ventured up to the southern crater rim. Dense biomass - named the area Yellow Lips. 2 HFS and 1 rock sample. Continued S/SW to a small pit crater S of the main crater rim. Found small pools of bubbling sulfur (this sulfur clearer than at Daikoku - black in the middle and yellow/clear at the edges). Named the area Naraku. Samples:1 major, 1 gastight, 1 niskin. The winch locked up and Medea crashed so flailed for several hours. Collected 3 HFS background samples. After fixing winch proceeded back to bottom at Naraku and picked up a sulfur rock. Broke through the sulfur crust and coated Jason's under-carriage with ~70 pounds of molten sulfur. End of dive. 27 samples total.						
J2-199 Bottom time: 5/8/2006 1423 - 5/9 0830 UTC (18.12 hrs). Z column represents seafloor depth.						
14:00	142.31666	23.06662	308	0	3	Jason diving
14:05	142.31671	23.06656	346	93	175	J2-198 Dive Configuration: Basket: 2 majors..2 gastights...Beast...multi-chamber suction...scoops
14:06	142.31671	23.06654	350	149	265	Jason at 115m.
14:07	142.31672	23.06653	359	190	316	Diving depth is 460m.
14:18	142.31673	23.06645	304	51	436	Seeing plumes.
14:18	142.31673	23.06645	302	51	436	Wispy smoke
14:19	142.31675	23.06644	287	48	436	Going through smoke.
14:22	142.31707	23.06624	119	30	452	Going to bottom. At 30m.
14:22	142.32679	23.08101	121	25	453	*Doppler reset.*
14:22	142.32678	23.08099	120	17	454	20m to go.
14:23	142.32676	23.08097	120	5	453	Pos: 23deg 4.859'N 142deg 19.606E
14:23	142.32677	23.08096	119	1	454	Sandy bottom...flat...Jason on bottom
14:24	142.32680	23.08097	193	5	456	242deg 101m to target.....checking buoyancy.
14:25	142.32681	23.08097	193	5	456	Large structure on sonar.
14:26	142.32681	23.08097	194	5	456	Dropping a weight here.
14:27	142.32680	23.08097	192	5	456	Going to investigate the large sonar object - 15m at 190deg.
14:28	142.32679	23.08097	191	5	456	Looking upslope.
14:28	142.32677	23.08097	192	4	455	Murky visibility.
14:29	142.32678	23.08094	191	3	455	Crabs and flatfish.
14:30	142.32677	23.08090	192	3	455	Lower density than everything we have seen so far here.
14:30	142.32676	23.08087	190	4	454	One big boulder with mat on it. Red crabs.
14:31	142.32680	23.08084	235	5	454	On to Middle Crate - 249deg at 106m.
14:33	142.32664	23.08086	246	2	450	Going downslope. Lots of red material coating surface.
14:34	142.32662	23.08086	246	2	449	Little worms on the rocks.
14:34	142.32661	23.08085	246	2	448	Beer bottle!!
14:35	142.32658	23.08084	246	3	448	Short worms.
14:36	142.32651	23.08085	248	2	446	Going over outcrop. Large vertical structure on left.
14:36	142.32644	23.08087	247	2	451	Going over breach into the crater proper.
14:37	142.32641	23.08086	247	2	453	Going downslope.
14:38	142.32635	23.08085	206	2	458	Going to do a 180 while Medea is catching up...looking at bottom and slope.
14:40	142.32621	23.08084	289	4	468	Sulfur coating some of the outcrop.
14:40	142.32620	23.08086	289	3	467	Looks like a gooey layer cake.
14:41	142.32619	23.08083	279	5	468	Looks fresh looking.
14:41	142.32619	23.08081	278	3	469	Stopping ship to take a scoop sample of the sulfur sediment.
14:42	142.32619	23.08084	316	3	469	Crabs around sulfur coating.
14:44	142.32619	23.08084	317	3	469	Koichi says it is an old sulfur chimney that isn't covered by tubeworms like most we've seen.
14:45	142.32619	23.08084	316	3	469	Sulfur has layered look.
14:45	142.32619	23.08084	316	3	469	Using canvas scoop bag.
14:46	142.32618	23.08085	332	2	469	**SAMPLE-1 Scoop. Dark and light (layered) sulfur sediments. [142.326167E/23.08085N] PI geogroup**
14:49	142.32616	23.08086	332	1	469	Got piece and black sediment.
14:50	142.32616	23.08086	332	1	469	Going to try to get another piece.
14:53	142.32616	23.08086	332	1	469	SAMPLE-1 Scoop Small piece is not a chimney but larger pointy ones were.
14:53	142.32616	23.08086	332	1	469	Going to stow the scoop and use the manipulator to sample instead.
14:55	142.32616	23.08086	331	1	469	**SAMPLE-2 Rock. Yellow sulfur piece - irregular shaped (broke up). [142.326167E/23.08085N] PI geogroup / Nakamura**
14:56	142.32616	23.08086	330	1	469	SAMPLE-2 Rock Getting a little more. Bigger jagged piece on top of canvas bag.
14:56	142.32616	23.08086	330	1	469	SAMPLE-2 Rock PI: Koichi Same place as scoop.
14:57	142.32616	23.08087	331	1	469	Taking digital stills of the structure.
14:58	142.32616	23.08086	330	2	469	Backing away and coming up to photograph structure.
14:59	142.32617	23.08085	330	5	469	Pieces look like bone. Another one just behind this.
14:59	142.32617	23.08086	329	7	469	Looks like candle with wax that dripped down.
14:59	142.32618	23.08086	330	6	469	Series of these in the area.
15:00	142.32618	23.08088	305	6	467	Lateralling around to the right.
15:01	142.32618	23.08090	294	4	467	Looking over several of the sulfur-wax-dripping structures.

time	raw long	raw lat	hdg	alt	Z (m)	Dive J2-199 Nikko - Dive Log Comments
15:01	142.32618	23.08090	294	1	467	All are multi-layered with a flat top and dripping appendages.
15:02	142.32618	23.08090	294	2	467	Not all the same height. Ones in back are taller.
15:02	142.32618	23.08089	294	2	467	Waiting for Medea before leaving.
15:03	142.32613	23.08072	180	5	472	Formed like fountains overflowing.
15:03	142.32613	23.08071	208	3	473	232deg and 40m to target.
15:05	142.32611	23.08068	233	3	474	Going back to bottom as Medea arrives.
15:06	142.32610	23.08064	233	2	475	Dead tubeworms.
15:07	142.32602	23.08061	233	2	475	About 25m from middle crater target at 474m. Crabs and scraggly tubeworm clumps.
15:07	142.32601	23.08061	233	1	475	Mostly sedimented bottom with few outcrops.
15:07	142.32598	23.08060	233	2	475	No focused venting seen...may be diffuse with all the tubeworms.
15:08	142.32596	23.08060	233	1	476	Water is getting cloudier as we get into crater.
15:08	142.32595	23.08059	232	1	476	Flat fish and crabs.
15:08	142.32593	23.08060	233	1	476	Lots of dead tube worms.
15:09	142.32589	23.08059	233	1	476	Lots of crabs. Large crab densities.
15:09	142.32586	23.08059	232	1	476	Seeing more pillars of sulfur surrounded by dead tubeworms.
15:09	142.32584	23.08059	232	1	476	Sulfur crusts in sheets - broken up a bit.
15:10	142.32583	23.08059	201	1	476	Sulfur flow has different shape - just like basalt flow. Lobate sulfur flows.
15:10	142.32582	23.08061	205	1	476	Next target is sulfur crater to the north.
15:11	142.32581	23.08062	287	2	476	328deg for 29m to next target.
15:12	142.32578	23.08063	326	3	476	Whole bottom is covered in sulfur that is fragmental or continuous sheets.
15:12	142.32577	23.08063	326	3	476	Visibility is worse.
15:12	142.32576	23.08063	327	3	476	Structures that look like sulfur pillar that has fallen over.
15:13	142.32572	23.08067	327	3	475	Sulfur chimneys and solid sulfur below...bad visibility.
15:13	142.32571	23.08067	327	4	475	Covered in crabs.
15:14	142.32571	23.08070	326	3	473	Could be toppled over from above.
15:14	142.32571	23.08071	327	4	473	We are climbing upslope. Rough and uneven surface.
15:15	142.32570	23.08073	327	7	471	Looks like formed in molten state and then breaking apart. Boulders of sulfur.
15:15	142.32566	23.08076	327	11	468	Must degrade as it forms. Medea seeing edge of channel or rim.
15:15	142.32564	23.08079	327	11	465	Looking down at flat surface.
15:16	142.32561	23.08082	326	6	462	Looks like a lip here...top of a rim.
15:16	142.32557	23.08085	327	3	460	On flat surface now at 457m.
15:17	142.32556	23.08087	26	3	460	Flat sulfur flows - turning to right.
15:17	142.32560	23.08086	71	2	460	Looking for channels with crabs and animals.
15:18	142.32561	23.08087	50	4	460	Now going to left to look for channels.
15:19	142.32560	23.08091	355	2	460	Seeing some channels but not that many animals.
15:20	142.32557	23.08091	332	1	460	Settling down to observe channels.
15:21	142.32557	23.08091	332	1	460	Some tubeworms.
15:22	142.32554	23.08090	330	1	460	Going to get a temperature at the tubeworms.
15:22	142.32554	23.08090	329	1	460	Ambient is 11.9deg.
15:26	142.32554	23.08091	328	1	460	Ambient now is 11.7
15:27	142.32554	23.08094	328	1	460	TEMPERATURE degrees C In tubeworm clump.. went down 11.6.. looks like dead ones.
15:28	142.32555	23.08097	328	1	460	TEMPERATURE degrees C Still not seeing any temperature rise....11.6.
15:29	142.32556	23.08101	328	1	460	Position here is 23deg 4.860N 142deg 19.534E
15:30	142.32556	23.08104	328	1	460	Would like to survey around here a bit.
15:31	142.32555	23.08108	329	1	460	Probe away and going to drive forward a bit looking at the channel.
15:33	142.32554	23.08115	358	1	460	Lots of crabs in channels. Going to look at dark patch.
15:33	142.32555	23.08115	1	1	460	Dark is a bunch of tube worms. Worms look dead.
15:34	142.32555	23.08115	358	1	460	Going to center up for doppler reset before moving.
15:35	142.32557	23.08091	359	2	460	*Doppler reset.*
15:35	142.32556	23.08091	353	2	460	347deg and 29m to target.
15:36	142.32556	23.08093	347	2	460	Sulfur have very thin edges.
15:38	142.32549	23.08101	353	3	460	There is shimmer.
15:38	142.32549	23.08101	353	3	460	Going to stop to sample shimmer.
15:39	142.32549	23.08101	353	3	460	Shimmer… animals.. flatfish.
15:39	142.32549	23.08101	353	3	460	Want a temperature.
15:40	142.32549	23.08101	353	3	460	Can see the North Vent in Medea cam.
15:44	142.32549	23.08101	353	3	460	Ambient is 12.0 here.
15:52	142.32553	23.08095	356	1	460	TEMPERATURE degrees C Taking temperature in flows under cracks and between rocks....88.5deg max here.
15:52	142.32554	23.08095	356	1	460	Going to fluid sample here.
15:58	142.32550	23.08097	356	1	460	**SAMPLE-3 HFS unfiltered bag #9. Tmax=66.3C Tavg=63.6 T2=42. Vol=576ml. Area of shimmering water and biota. [20m S of North Vent 142.325483E/23.081017N] PI Butterfield**
15:58	142.32549	23.08096	356	1	460	23m south of North Vent. Pos. 23deg 4.858N 142deg 19.529E
16:02	142.32552	23.08094	356	1	460	**SAMPLE-4 HFS Sterivex Filter #10 Tmax=96.1C Tavg=80.2 T2=51. Vol=4liters. Area of shimmering water and biota. [20m S of North Vent 142.325483E/23.081017N] PI Butterfield (subsamps Huber/Bolton)**
16:02	142.32552	23.08094	356	1	460	SAMPLE-4 HFS Same place as Sample 3.
16:03	142.32552	23.08094	356	1	460	*Doppler reset.*

time	raw long	raw lat	hdg	alt	Z (m)	Dive J2-199 Nikko - Dive Log Comments
16:03	142.32549	23.08102	356	1	460	New position for #3 after reset: 23deg 4.861N 142deg 19.529E
16:07	142.32547	23.08101	356	1	460	SAMPLE-4 HFS Looks like plume and flow changed direction.
16:07	142.32550	23.08101	356	1	460	SAMPLE-4 HFS Paused sample.
16:07	142.32553	23.08101	356	1	460	Looks like current completely changed directions.
16:08	142.32557	23.08102	356	1	460	Sample temperature dropped 10deg when current changed.
16:08	142.32563	23.08101	356	1	460	Got probe back in a good hole again after pause.
16:10	142.32577	23.08096	356	1	460	Starting again.
16:12	142.32599	23.08085	355	1	460	Stopped again...current changed.
16:14	142.32602	23.08082	355	1	460	Nearby is a deal mussel shell and tubeworms with bright red tips.
16:15	142.32594	23.08087	355	1	460	SAMPLE-4 HFS Starting again.
16:27	142.32608	23.08132	355	1	460	Crab is eating another crab...a cannibal.
16:29	142.32608	23.08132	355	1	460	Crab fight over the dead crab.
16:34	142.32586	23.08115	355	1	460	Crab balls are not mating behavior...they are eating/fighting over food.
16:39	142.32576	23.08103	355	1	460	SAMPLE-4 HFS Stopped.
16:40	142.32574	23.08102	355	1	460	**SAMPLE-5 HFS Fish Filter #12. Tmax=74.8C Tavg=72.1 T2=48.8. Vol=200ml. Area of shimmering water and biota. [20m S of North Vent 142.325483E/23.081017N] PI Butterfield**
16:41	142.32570	23.08099	355	1	460	SAMPLE-5 HFS At the same hole as #3
16:42	142.32565	23.08097	355	1	460	**SAMPLE-6 HFS unfiltered piston #20. Tmax=81.2C Tavg=74.6 T2=49.7. Vol=551ml. Area of shimmering water and biota. [20m S of North Vent 142.325483E/23.081017N] PI Butterfield**
16:47	142.32552	23.08084	355	1	460	Done fluid sampling here.
16:48	142.32547	23.08079	355	1	460	Going up to North Vent to try and sample where the instrument was recovered.
16:49	142.32545	23.08075	355	1	460	Stowing wand.
16:50	142.32547	23.08101	355	1	460	*SAMPLE-6 HFS Doppler reset position for all samples here: 23deg 4.861N 142 19.529E*
16:51	142.32543	23.08099	355	1	460	Starting to move to North Vent...due north.
16:53	142.32552	23.08103	353	2	460	Live bunches of tubeworms.
16:53	142.32553	23.08106	354	4	460	Going over large boulder with bunch of tubeworms on top.
16:54	142.32552	23.08110	353	7	460	Can see North Vent plumes in Medea cam.
16:54	142.32552	23.08112	353	4	457	Visibility is degrading.
16:55	142.32556	23.08117	353	2	460	Big plumes....smoke is going straight up.
16:56	142.32556	23.08117	354	1	461	At a vent. Looking 353deg at 459.8m.
16:57	142.32556	23.08117	354	2	461	Got a pretty good view. Want temp; major; gastight.
16:57	142.32556	23.08117	356	1	461	Good pos: 23deg 4.870'N 142deg 19.534E
16:58	142.32556	23.08117	356	2	461	Retrieving temp wand - current changed and no visibility now.
17:03	142.32555	23.08117	356	1	461	Waiting for smoke to clear.
17:07	142.32547	23.08116	2	1	461	Looks like smoke is clearing a little bit.
17:10	142.32546	23.08116	11	1	461	Visibility is still bad.
17:11	142.32546	23.08116	4	2	461	Moving a little bit for visibility.
17:11	142.32547	23.08115	0	2	461	Getting glimpses of vent.
17:12	142.32547	23.08107	306	1	461	Backed away.
17:14	142.32546	23.08107	306	1	461	Going to try another approach.
17:19	142.32545	23.08111	337	1	460	Saw the weights from the last dive.
17:19	142.32545	23.08112	340	1	460	Good visibility at this moment.
17:19	142.32543	23.08112	333	1	460	Here comes the plume.
17:20	142.32541	23.08101	327	2	460	Backed away.
17:21	142.32539	23.08105	355	2	460	Coming in to vents again.
17:21	142.32539	23.08106	354	1	460	Plumes are moving east to west.
17:22	142.32539	23.08108	353	2	460	One more try… go as far right as possible.
17:24	142.32545	23.08111	351	193	653	Lateralling around right.
17:24	142.32544	23.08111	334	1	460	Can't sit here with the rocks in the way.
17:24	142.32546	23.08113	270	2	460	Twirling right - plume coming back toward Jason.
17:29	142.32546	23.08113	267	1	460	Can't get temp. sample… too much smoke following vehicle.
17:29	142.32546	23.08113	267	1	460	Going to SE Vent next. Stowing wand.
17:31	142.32546	23.08113	262	1	460	Target is 242m at 1.4deg.
17:31	142.32546	23.08113	262	1	460	Want to go on the bottom.
17:31	142.32546	23.08113	262	1	460	Actually 154 deg.
17:32	142.32546	23.08113	262	1	460	Should take about 40 minutes to make transit.
17:35	142.32546	23.08108	155	4	460	Out of the fog zone.
17:35	142.32546	23.08108	154	4	460	We are on the sulfur delta with flat flows.
17:35	142.32546	23.08108	154	4	460	Crabs and flatfish.
17:36	142.32543	23.08104	155	4	460	Fish are on sediment depressions not on sulfur patches.
17:37	142.32535	23.08093	155	3	460	Dead mussel shells and crabs. Sulfur sheet with cracks.
17:37	142.32536	23.08093	155	3	460	Channels with tubeworms...narrow.
17:38	142.32542	23.08081	157	3	460	Sulfur sheets look paper thin on the surface.
17:39	142.32542	23.08082	155	3	460	Don't see any shimmer focus. Slight shimmer in water.
17:40	142.32544	23.08078	155	3	460	Edge of sulfur delta. Drop-off.
17:40	142.32546	23.08076	154	3	460	Going down to deeper part of crater.
17:43	142.32551	23.08064	155	3	470	Getting in some current.

time	raw long	raw lat	hdg	alt	Z (m)	Dive J2-199 Nikko - Dive Log Comments
17:43	142.32552	23.08065	154	3	470	190m to go to next target.
17:44	142.32552	23.08064	154	3	470	Next target is SE Vent.
17:49	142.32565	23.08039	148	3	476	Lots of tube worm bushes and some crabs.
17:53	142.32576	23.08021	149	2	475	See flat bottom with many tube worms some flat fish and crab.
17:53	142.32578	23.08018	149	3	474	See large almost 2 m high clumps of tubeworms.
17:54	142.32580	23.08015	149	4	474	Passed low point of crater going up the south slope of the crater now.
17:55	142.32584	23.08010	149	3	471	Incredible mass of crabs.
17:56	142.32587	23.08004	149	4	470	Called 'crab pot' on the map.
17:58	142.32592	23.07997	150	5	466	Tall upstanding clumps of sulfur.
17:59	142.32596	23.07989	149	5	461	Continue to see enormous amounts of tubeworms.
18:01	142.32597	23.07986	149	5	459	Some red crabs among the dominant white crabs.
18:03	142.32598	23.07981	151	7	453	See layering of sulfur in x-section outcrop which probably equals paleo S lake.
18:04	142.32600	23.07977	155	7	450	Deepest part 475 m so now have come up about 30 m.
18:07	142.32604	23.07969	154	2	447	See probable volcaniclastic material plus sulfur that makes up the crater floor.
18:08	142.32606	23.07965	155	2	447	See plume coming into view here from the right hand side (SW) of the sub.
18:12	142.32612	23.07956	152	2	446	See some mussel shells in amongst the tube worms.
18:15	142.32610	23.07958	146	2	446	Looks like we will grab some mussels off the tubeworm bushes here.
18:25	142.32618	23.07968	153	1	446	Setting up for mussel sampling from the clumps of tubeworms.
18:31	142.32629	23.07959	179	1	446	Try and grab a clump of tubeworms with mussels attached.
18:44	142.32620	23.07911	187	2	446	**SAMPLE-7 Scoop. 8-10 mussels that were originally attached to tubeworms. T=11.4C. [142.326263E/23.079588N] PI Tunnicliffe**
18:55	142.32619	23.07913	151	2	447	Put T probe into the tubeworm clumps. Ambient 11.2 in water column. 11.4 inside the clumps.
18:56	142.32619	23.07913	151	2	447	Tried several places and in all cases T max 11.4.
18:57	142.32626	23.07959	151	2	447	*Doppler Reset. Heading off to SE Vent again. (cut nav from 1831-1857 because we were in one place and the nav was wandering)*
19:00	142.32631	23.07948	153	1	444	Large tube worm bushes separated by flat areas with lots of crabs.
19:01	142.32634	23.07946	155	1	443	Crossing a small ridge.
19:01	142.32639	23.07942	149	2	445	Water becoming murkier. Must be a plume near here somewhere.
19:03	142.32644	23.07937	243	4	450	We seem to be in a small basin (perhaps 20m in diameter).
19:04	142.32645	23.07935	198	3	450	We're going to drop down to the bottom and have a look.
19:06	142.32647	23.07925	185	1	450	Crossing an area of boulders and sedimented bottom. Lots of flatfish.
19:08	142.32649	23.07921	185	2	450	Some of the large rocks have a sulfur coating. Looks like rocks might have fallen from the wall.
19:08	142.32646	23.07916	190	1	447	Climbing a small slope made up of talus blocks.
19:09	142.32647	23.07915	129	1	447	We should be near the SE Vent site.
19:09	142.32648	23.07912	127	2	448	Approaching an area with increased smoke.
19:13	142.32642	23.07911	222	5	448	Just saw a small myctophid falling toward the bottom.
19:16	142.32642	23.07909	225	3	447	Looks like we have a small area of shimmering water.
19:17	142.32642	23.07909	225	3	447	Preparing to sample some water here.
19:23	142.32640	23.07908	224	3	447	Poking about for a place to take the water samples.
19:33	142.32643	23.07915	230	2	447	Still looking for a water sampling spot.
19:35	142.32646	23.07911	206	2	447	We're now searching around a large overhang.
19:48	142.32646	23.07911	205	2	447	**SAMPLE-8 HFS. Unfiltered bag #8. Tmax=25.6C Tavg=24.9 T2=20. Vol=511ml. In small area of shimmering water. [Near SE Vent site 142.326433E/23.07913N] PI Butterfield**
19:51	142.32644	23.07912	205	3	447	Ending sample.
19:52	142.32644	23.07912	205	2	447	**SAMPLE-9 HFS Sterivex filter. Tmax=26.1C Tavg=24.1 T2=20. Vol=3522ml. In small area of shimmering water. [Near SE Vent site 142.326433E/23.07913N] PI Butterfield (subsamps Huber/Bolton)**
20:18	142.32646	23.07911	205	3	447	Stopping Sterivex sample.
20:19	142.32646	23.07911	205	3	447	**SAMPLE-10 HFS Filtered bag #14. Tmax=24.5C Tavg=23.6 T2=20. Vol=554ml. In small area of shimmering water. [Near SE Vent site 142.326433E/23.07913N] PI Butterfield**
20:22	142.32648	23.07910	205	2	447	Stopped sample.
20:24	142.32648	23.07910	205	2	447	**SAMPLE-11 HFS FISH filter #11. Tmax=23.9C Tavg=22.9. Vol=201ml. In small area of shimmering water. [Near SE Vent site 142.326433E/23.07913N] PI Butterfield (subsamps Huber/Bolton)**
20:25	142.32648	23.07910	205	2	447	Stopped sample
20:32	142.32650	23.07909	209	2	446	**SAMPLE-12 Rock. Small rock with sulphur inclusions placed in front center basket. In small area of shimmering water. [Near SE Vent site 142.326433E/23.07913N] PI geogroup**
20:33	142.32651	23.07909	207	3	447	Position for Samples 8-12 is 23 4.7478 142 19.586
20:36	142.32650	23.07909	221	3	447	Departing this site and heading upslope to the NE.
20:40	142.32655	23.07916	88	4	448	We're moving to the NE. Water is quite smoky.
20:43	142.32663	23.07916	89	11	447	We've reached the foot of the crater wall.
20:44	142.32667	23.07917	88	18	447	We're now traversing up the wall in the SE corner of the crater.
20:45	142.32674	23.07917	89	5	428	Back into some dense clusters of tubeworms again.
20:49	142.32676	23.07917	90	6	426	There are barnacles and mussels in amongst the tubeworms here.
20:51	142.32684	23.07924	88	2	418	Bottom covered in volcaniclastic sands. Lots of crabs and flatfish too.
20:51	142.32684	23.07924	89	2	417	Large boulders in front of us have a lots of barnacles. Must be some flow near here somewhere.
20:57	142.32690	23.07946	32	8	419	Moving NE and still climbing.
21:09	142.32697	23.07963	4	2	411	We're on the top of the crater near the Top Vent site.

time	raw long	raw lat	hdg	alt	Z (m)	Dive J2-199 Nikko - Dive Log Comments
21:11	142.32696	23.07964	0	2	411	Bottom is covered by small boulders with lots of crabs and barnacles.
21:11	142.32696	23.07964	1	2	411	Bottom current is very strong here near the top of the rim.
21:12	142.32696	23.07964	0	2	411	Both the red and the white crabs are abundant here.
21:17	142.32688	23.07978	160	3	413	Crossing an area with both outcrops and boulders.
21:20	142.32693	23.07982	184	1	413	Bottom below the outcrop is orange in color.
21:22	142.32688	23.07989	203	3	412	Still looking for the Top Vent location that we saw yesterday.
21:23	142.32677	23.07984	195	9	418	Mow heading SW. Water is becoming smokier.
21:29	142.32685	23.07975	158	1	412	We think we've found the Top Vent site.
21:32	142.32684	23.07978	138	4	414	Can't find a suitable position for fluid sampling. We'll try heading north a little.
21:34	142.32687	23.07984	83	2	413	We see more shimmering water (and lots of crabs) but the bottom current is quite strong.
21:36	142.32686	23.07978	83	2	413	The spot where we're trying to sample water is literally crawling with crabs. Can't even see the bottom.
21:39	142.32686	23.07975	84	2	413	Although there are lots of crabs we don't see any tubeworms up here.
21:45	142.32687	23.07977	83	2	413	**SAMPLE-13 HFS Filtered bag #16. Tmax=33 Tavg=31.6 T2=25. Vol=601ml. Eh -92. [Top Vent aprox. 142.32687E/23.07977N] PI Butterfield**
21:48	142.32687	23.07977	84	2	413	SAMPLE-13 HFS Eh -92.
21:48	142.32687	23.07977	84	2	413	SAMPLE-13 HFS stop
21:50	142.32687	23.07977	84	2	413	**SAMPLE-14 HFS Sterivex filter #21. Tmax=35.4C Tavg=32.5 Vol=3069ml. [Top Vent aprox. 142.32687E/23.07977N] PI Butterfield (subsamps Huber/Bolton).**
21:53	142.32687	23.07978	84	2	413	This is the area of diffuse flow - clear water. Crabs upon crabs upon crabs stuck in this crevice and everywhere you look.
21:54	142.32687	23.07979	83	2	413	SAMPLE-14 HFS Starting now.
21:56	142.32687	23.07978	83	2	413	There's a starfish here too. These crabs probably don't eat meat. They could be rock lickers.
21:59	142.32687	23.07978	83	2	413	These crabs are the same ones we saw at Daikoku. Different than the species at Ruby (Ruby crab) and different than the ones at Diamante (Diamond).
22:01	142.32686	23.07978	84	2	413	This is the austinograeayunohana (Nikko crab).
22:03	142.32687	23.07979	83	2	413	Stop recording DVCam when we're sitting here water sampling.
22:04	142.32687	23.07980	83	2	413	Verena nixed that one. We will be recording the DVCam here. It's back on.
22:05	142.32687	23.07980	83	2	413	This guy is licking the rocks.
22:07	142.32687	23.07982	83	2	413	We don't know if they can see or not.
22:07	142.32687	23.07982	83	2	413	They collected mussels inside a tubeworm bush earlier.
22:09	142.32687	23.07983	84	2	413	Verena's theory is that they don't eat meat - but not sure on that.
22:10	142.32687	23.07983	84	2	413	Maybe the red crabs aren't different. Perhaps they are the same species in different phases of molting...
22:13	142.32687	23.07982	84	2	413	The crabs are all piled up on top of each other.
22:14	142.32687	23.07980	84	2	413	The bigger ones seem to be the females.
22:15	142.32687	23.07980	84	2	413	Zooming in on a new group. They're grooming each other.
22:16	142.32687	23.07980	84	2	413	SAMPLE-14 HFS Stopping.
22:17	142.32687	23.07980	84	2	413	**SAMPLE-15 HFS Unfiltered bag #19. Tmax=29.3C Tavg=26.3 T2=13. Vol=563ml. [Top Vent aprox. 142.32687E/23.07977N] PI Butterfield**
22:19	142.32687	23.07980	84	2	413	We will be heading down to SE Vent after this - for high temp sampling.
22:20	142.32687	23.07980	84	2	413	SAMPLE-15 HFS The temp is jumping around.. Stop
22:21	142.32687	23.07980	84	2	413	We're finished here. Very light covering of bac mat - much too fine to suction.
22:23	142.32687	23.07980	84	2	413	People are giving Jimmy a bit of grief. And he likes it.
22:24	142.32687	23.07980	82	2	413	Lifting off and heading down hill.
22:26	142.32687	23.07980	82	2	413	[We're re-naming Top Vent] So this is the name for this area up on the E/SE crater rim.
22:27	142.32687	23.07980	82	2	413	We were at Top Vent here.
22:28	142.32685	23.07979	180	2	412	We're heading 223 down the slope. We're flying off the cliff into the crater. Z=410 here (that's Jason depth).
22:37	142.32641	23.07939	155	27	446	We're going down.
22:38	142.32640	23.07938	153	5	447	In the plume.
22:39	142.32641	23.07937	153	3	448	We're on the bottom here.
22:40	142.32641	23.07931	153	2	448	*We want to go straight to SE Vent. Doppler reset.*
22:40	142.32639	23.07928	152	4	449	Little flat fish on a rock.
22:43	142.32643	23.07924	140	3	448	We're moving up hill at a snails pace.
22:45	142.32648	23.07920	130	4	449	Smoke is coming from back behind this boulder cut.
22:46	142.32648	23.07919	120	1	447	Hard to see the smoke source. We're getting close to SE Vent.
22:47	142.32648	23.07921	150	4	449	It looks impossible to get in there.
22:51	142.32649	23.07915	156	6	448	We don't like it here. Can't see much. A white cloud but can't see the vent.
22:53	142.32649	23.07915	179	5	447	We plan to head west for awhile. Then north.
22:56	142.32640	23.07912	212	4	447	We're at Tubeworm Hangover. Moving on.
22:57	142.32636	23.07915	213	3	445	Looks like lots of sulfur?? on the rocks here. Could be mat.
22:59	142.32630	23.07918	213	2	444	Flat fish are skimming over the rocks here.
23:01	142.32630	23.07920	235	3	445	We see some venting. There's some stuff coming out from under a rock here.
23:01	142.32629	23.07920	236	3	445	We'd like to stop and have a look here.
23:02	142.32628	23.07920	232	2	444	We've found a lot of hot water here.
23:02	142.32628	23.07920	232	2	444	There are bubble bursts coming out from under this rock.

time	raw long	raw lat	hdg	alt	Z (m)	Dive J2-199 Nikko - Dive Log Comments
23:04	142.32628	23.07920	232	3	445	There is a sulfur slab overhang here with white smoke coming out from under it. Periodically bubbles burst out. Going to take a temp here.
23:07	142.32630	23.07922	231	3	444	TEMPERATURE degrees C Tamb=11.6. Tmax=177 down deep. More shallow is was ~110
23:08	142.32630	23.07922	231	3	444	Jim prodded an area and gas exploded out of it.
23:10	142.32631	23.07922	232	2	444	TEMPERATURE degrees C Out of this new hole Jim created we're getting temps up to 216°C.
23:10	142.32631	23.07922	233	2	444	We're going to do a fluid sample here.
23:12	142.32631	23.07922	231	3	444	We're going to sample in this second hole where the bubbles came pouring out.
23:15	142.32632	23.07923	231	2	444	Not much flow in this hole. Going to try the other hole. Looks like a bit of sulfur on the intake.
23:18	142.32633	23.07924	231	3	444	We're trying to find a place where there are hot fluids coming out for the HFS.
23:20	142.32635	23.07925	230	3	444	The flow here is very weak and hard to get.
23:22	142.32629	23.07920	230	3	444	Stopped the DV Cam for now. Too murky anyway and trying to save the tapes.
23:26	142.32629	23.07920	233	3	444	We're heading to Varnum Vent.
23:29	142.32631	23.07935	172	2	446	*We're at the Varnum Vent target. J2-199 position is 12 meters SW of the J2-198 position.*
23:30	142.32631	23.07933	230	3	447	Really lovely here.
23:34	142.32630	23.07930	227	3	447	Looking around here for a place to sample. Did not get the sample at the last site.
23:34	142.32630	23.07930	227	3	447	Very murky here.
23:36	142.32635	23.07930	175	3	448	We see some smoke.
23:38	142.32631	23.07945	187	2	443	Searching around here for the vent. It's really smoky.
23:39	142.32631	23.07945	226	3	443	Trying to find the Varnum vent area.
23:41	142.32631	23.07936	234	3	447	It seems a lot smokier here today.
23:44	142.32633	23.07927	242	2	448	We're here. We're back at Varnum Vent.
23:48	142.32631	23.07932	242	1	447	We will try to find a stable place to sample here.
23:52	142.32631	23.07932	241	1	447	Using the fluid sampler to poke around for a stable temperature.
23:54	142.32631	23.07932	241	1	447	**SAMPLE-16** HFS. HFS filtered piston 1.
23:55	142.32631	23.07932	241	1	447	SAMPLE-16 HFS Sample didn't start. Starting now. Holding at 66 degrees.
23:57	142.32631	23.07932	241	1	447	Note for Verena - fish gill
23:59	142.32630	23.07932	241	1	447	**SAMPLE-16 HFS Filtered piston #1. Looks like a bit of sulfur on the intake. Tmax=78.2C Tavg= 61.6 T2=23. Vol=499ml. [Varnum Vent 142.3263E/23.07931N] PI Butterfield**
23:59	142.32630	23.07932	241	1	447	Sample taken at Varnum Vent.
00:02	142.32630	23.07932	241	1	447	That is all the sampling for this location. Stowing the HFS intake.
00:06	142.32628	23.07931	221	2	447	Heading on to the south crater.
00:08	142.32624	23.07927	222	4	445	Passing over more venting. None of it is very high flow.
00:08	142.32622	23.07925	221	3	444	Water is very murky with no obvious source.
00:11	142.32616	23.07917	222	3	439	Looks like some sulfur sheets here.
00:12	142.32611	23.07913	221	2	435	Visibility is decreasing rapidly.
00:13	142.32607	23.07912	206	2	435	Denser looking cloud in the fog. Can't tell if it is venting or not.
00:14	142.32604	23.07909	210	2	433	Going up the steep slope heading southwest and we are lost in the smoke.
00:15	142.32602	23.07907	188	3	433	There are a lot of shrimp and crabs here. Is it venting?
00:16	142.32600	23.07907	209	3	432	Billowing clouds of smoke. We can't see a thing.
00:18	142.32591	23.07897	210	11	419	Verena thinks there is just enough sulfide wafting around here to support constant microbial growth on the rocks which supports the macrofauna.
00:19	142.32582	23.07888	210	6	405	We are coming up off the bottom to transit. Visibility is too poor to stay near the bottom.
00:22	142.32577	23.07883	211	3	400	We are at the top of the south summit of the crater. Tubeworms; crabs and lots of smoke.
00:22	142.32577	23.07882	210	3	400	Tubeworm bushes look fairly healthy.
00:25	142.32566	23.07877	222	8	391	We are exploring the summit a bit. Visibility is still very poor.
00:26	142.32563	23.07875	224	9	388	There are some massive tubeworm bushes up here.
00:28	142.32561	23.07874	222	8	386	Smoke cleared and the whole top is covered with healthy looking tubeworms.
00:29	142.32555	23.07870	258	3	378	Massive amounts of biomass here. Lots of crabs in the tubeworms and some bacterial mat as well.
00:30	142.32554	23.07872	261	4	377	There is a thick white patch in the middle. Can't tell if it is sulfur or mat.
00:30	142.32554	23.07870	261	6	378	There is some shimmering in the middle of the white patch.
00:31	142.32551	23.07869	295	9	380	Stopping to take a closer look.
00:34	142.32546	23.07870	296	1	379	Water is coming out from under a flange. Looks like there is a formation contact directly under the flange.
00:34	142.32546	23.07870	306	1	379	Looks like there is a gas bubble trapped under the flange.
00:35	142.32546	23.07870	299	1	379	There are a lot of flanges on this rock. They look like they are made of sulfur.
00:36	142.32546	23.07870	305	1	379	There is some pretty good flow coming from under some of these flanges.
00:36	142.32546	23.07871	305	183	561	Going to try the fluid sampler here.
00:39	142.32547	23.07870	306	48	427	Position 23 4.722 142 19.528. Outcrop with a more impermeable layer above.
00:41	142.32547	23.07870	306	55	434	Broke a flange. It is very sulfurous.
00:45	142.32546	23.07870	306	100	478	SAMPLE-17 HFS. HFS Filtered bag 11 started and stopped. T2 is not measuring any temperature anomaly.
00:47	142.32545	23.07871	306	69	448	Pumps may not be working right. Reversing pump and it looks alright.
00:48	142.32545	23.07871	307	64	443	We can see flow coming out the back now. Temperature is going back up.
00:50	142.32545	23.07871	306	75	454	Still having HFS pump problems. Trying to diagnose.
00:56	142.32546	23.07870	302	66	445	We removed the HFS intake to test and now it is back in the vent. Checking the HFS exhaust.
00:57	142.32546	23.07870	302	51	429	**SAMPLE-17 HFS Filtered bag #11. Tmax= 67.9C Tavg=62.8 T2=14-16.9. Vol=601ml. [Yellow Lips 142.32547E/23.0787N] PI Butterfield**
00:59	142.32546	23.07871	302	122	501	Sampling is bringing the T2 up slightly so perhaps the flush pump is not working.

time	raw long	raw lat	hdg	alt	Z (m)	Dive J2-199 Nikko - Dive Log Comments
01:02	142.32544	23.07872	302	111	489	**SAMPLE-18 HFS Unfiltered piston #6. Tmax=76.3C Tavg=65.2 T2=16. Vol=600ml. [Yellow Lips 142.32547E/23.0787N] PI Butterfield**
01:02	142.32544	23.07872	302	74	453	We are calling this site Yellow Lips.
01:03	142.32544	23.07872	302	46	424	Worms here look very healthy. Plumes on them are very small compared to Riftia or Ridgea.
01:07	142.32543	23.07872	303	157	535	Done fluid sampling here.
01:09	142.32543	23.07873	297	1	379	Taking time to do a little basket cleanup.
01:10	142.32544	23.07873	298	1	379	There are sulfur sheets in the distance. Lots of hot water leaking out all over.
01:13	142.32544	23.07873	293	1	380	Going down to take a look at some of the rocks here.
01:15	142.32543	23.07873	293	1	380	Rocks appear to be sulfur as well.
01:16	142.32543	23.07872	293	1	380	**SAMPLE-19 Rock. Round rock about 3 inches wide. Exposed sulfur on the bottom - whole thing may be sulfur. From Yellow Lips directly below fluid sampling orifice. [Yellow Lips 142.32547E/23.0787N] PI geogroup**
01:18	142.32544	23.07872	298	1	379	SAMPLE-19 In left side of starboard basket.
01:20	142.32550	23.07870	219	3	379	We are leaving here and going SW along the flank to the south crater target.
01:23	142.32547	23.07868	246	5	379	We can see the thick plume again to the north.
01:24	142.32528	23.07855	213	12	391	We will transit above the bottom but close enough to not lose doppler.
01:29	142.32515	23.07845	213	6	402	We are skirting along the plume to the northwest of us.
01:30	142.32513	23.07839	214	6	403	Large rock pillar covered in tubeworms. Plume is just off to our right
01:32	142.32501	23.07824	213	13	415	Plume appears to be below us. It could be rolling down into the valley.
01:33	142.32499	23.07812	190	8	424	Turning and heading south. Plume is still visible in Medea's camera. Can't tell if it is wafting or if there is venting on the flanks.
01:34	142.32498	23.07806	189	3	427	Visibility of becoming poor.
01:34	142.32498	23.07804	204	1	426	There are patches of sulfur and tubeworms on the flanks of the crater.
01:35	142.32499	23.07804	307	2	427	Looks a lot like the inside of the crater. Lots of smoke.
01:36	142.32499	23.07804	143	2	427	Quite a lot of biota here. Thick plume as we look south away from the crater.
01:38	142.32499	23.07804	115	2	427	We don't want to change watch in this dense cloud so we will move a ways east to get out of the fog.
01:39	142.32500	23.07802	119	2	427	HFS pump seems to be behaving well now as we drive around. Not sure what the problem was.
01:39	142.32501	23.07801	119	2	427	Visibility is getting worse.
01:41	142.32508	23.07798	147	2	426	We have reached the edge of the plume. We went about 10m to the southeast.
01:41	142.32512	23.07798	239	1	426	Large tubeworm bush with lots of bubbles coming from below the bush.
01:41	142.32513	23.07798	222	1	425	Looks like a pool of bubbling sulfur!
01:43	142.32512	23.07797	283	5	427	We lost it in the smoke again.
01:47	142.32510	23.07797	58	2	425	Change in watch.
01:47	142.32510	23.07797	58	2	425	Waiting for it to clear.
01:48	142.32508	23.07797	57	2	426	Sitting at pos: 23deg 4.678N 142deg 19.505'E
01:49	142.32507	23.07796	58	1	425	Starting to clear… tubeworm cluster.
01:50	142.32507	23.07796	57	1	425	Plume is hugging bottom like fog.
01:52	142.32507	23.07797	56	1	425	Bubbles were coming out of the basketball sized pool of liquid seen before white-out.
01:54	142.32506	23.07800	57	1	425	Clearing on right side of worm cluster but plume wafting from left.
01:55	142.32492	23.07802	58	1	425	White-out again.
01:57	142.32488	23.07802	48	1	425	Flatfish swimming in plume.
01:58	142.32494	23.07795	58	2	425	Large clumps of tubeworms… smoke… moving around to right a bit.
01:59	142.32497	23.07795	57	2	427	In and out of plumes.
01:59	142.32497	23.07795	57	1	427	A few bubbles but then gone.
02:01	142.32499	23.07796	57	1	427	Some bubbles coming from somewhere below - there it is!
02:01	142.32499	23.07796	57	1	427	Bubbles coming from liquid sulfur!
02:02	142.32512	23.07793	54	178	603	Very small pool of liquid with bubbles coming up.
02:02	142.32512	23.07793	54	178	603	Another one.
02:02	142.32509	23.07793	54	178	603	Very liquid pools...black in middle and yellow around edges.
02:02	142.32507	23.07793	54	184	610	Flatfish skirting around pool.
02:03	142.32512	23.07796	54	171	597	*Doppler reset.*
02:04	142.32513	23.07794	54	190	616	Naraku target...pos: 23deg 4.676N 142deg 19.508'E.
02:04	142.32513	23.07793	54	186	612	Going to get temperature first.
02:05	142.32515	23.07791	54	156	581	Wand in hand...basket in.
02:06	142.32515	23.07790	49	1	426	There are a few of these small liquid sulfur pools.. basketball sized.
02:13	142.32515	23.07790	58	1	427	TEMPERATURE degrees C Ambient 11.9...probe in...197.8
02:13	142.32515	23.07790	58	1	427	Can watch the splatters change from black to yellow as it cools around the rim.
02:14	142.32515	23.07790	57	1	427	Wand out. We are on the south flank of the crater.
02:15	142.32515	23.07790	57	1	427	Very clear visibility now...bubbling hole is very colorful.
02:15	142.32515	23.07790	57	1	427	Three of these in a row...a line of these.
02:16	142.32515	23.07790	57	1	427	Can see ground nearby the pool heaving.
02:17	142.32515	23.07790	56	1	427	We are on edge of a sulfur pond that has crusted over.
02:17	142.32515	23.07790	56	1	427	The line of these is on a N-S trend.
02:18	142.32515	23.07790	56	1	427	Plumes coming over site again.
02:18	142.32515	23.07790	56	1	427	Heading is 056 and depth is 425.9.
02:19	142.32515	23.07790	55	1	427	Going to take a major then gastight.

time	raw long	raw lat	hdg	alt	Z (m)	Dive J2-199 Nikko - Dive Log Comments
02:23	142.32514	23.07790	55	1	427	**SAMPLE-20 Major (white). At sulfur pool in smoke. Snout dipped in sulfur. [Naraku 142.325144E,23.077894N] PI Butterfield**
02:24	142.32514	23.07790	55	1	427	SAMPLE-20 Major Sampling with snout after major filled. Quick dip in pool.
02:25	142.32514	23.07790	55	1	427	Bubbles look white when they come out.
02:25	142.32514	23.07790	55	1	427	Looks like small sulfur on tip of Major.
02:25	142.32514	23.07790	55	1	427	Stowing major.
02:29	142.32514	23.07790	55	1	427	**SAMPLE-21 Gastight (red). Same pool as previous major sample. [Naraku 142.325144E,23.077894N] PI Evans**
02:31	142.32514	23.07790	55	1	427	Visibility obscured again.
02:31	142.32514	23.07790	55	1	427	Want to explore around here once visibility gets better.
02:42	142.32515	23.07790	55	1	427	Rearranging basket for better viewing.
02:49	142.32514	23.07790	55	1	427	**SAMPLE-22 Niskin (red) taken in all this white smoke. [Naraku 142.325144E,23.077894N] PI Takano / Resing**
02:50	142.32513	23.07790	122	8	425	Ship drifting...moving ship and vehicle.
02:50	142.32513	23.07791	97	10	426	Bubbles in area.
02:50	142.32513	23.07794	44	10	426	***Lifting off due to movement of ship and Medea. (cut nav from 0250-0645. off the bottom. Medea crashed and winch locked up)***
02:50	142.32513	23.07794	54	10	426	Thick smoke.
02:51	142.32515	23.07800	21	11	425	Problem with winch...getting engineers.
02:51	142.32517	23.07806	21	9	423	Off bottom and trying to get under Medea...head 018.
02:52	142.32518	23.07809	26	9	422	Medea altitude is 5m...need to haul wire...speeding up ship.
02:52	142.32518	23.07809	26	13	421	Can not pull wire...need to get ship moving south fast...Medea only a few meters off bottom.
02:53	142.32518	23.07809	30	15	422	Medea very near bottom.
02:54	142.32528	23.07817	54	15	413	Medea is on bottom...bouncing off bottom. Need to move ship faster.
02:54	142.32532	23.07819	55	13	412	Medea is crashing on bottom...ship is speeding up to the south.
02:54	142.32538	23.07823	56	9	407	Need to haul wire fast...Medea on bottom.
02:54	142.32544	23.07827	67	13	408	Medea is moving off bottom.
02:55	142.32547	23.07830	75	13	407	Medea is 10m off bottom.
02:55	142.32547	23.07834	78	16	406	Winch is not working properly...still hauling wire and moving ship to south.
02:55	142.32547	23.07837	56	22	406	Stopping ship while hauling wire now.
02:56	142.32561	23.07849	56	24	395	Medea is 37m off bottom..all equipment seems ok.
02:57	142.32578	23.07853	114	21	385	Bringing heading around to south - ship is drifting over a bit of a high.
02:57	142.32587	23.07855	113	23	383	Need to recover to check over Medea.
02:58	142.32583	23.07868	111	36	387	Will start to head south for deeper water - winch is not working properly.
02:58	142.32581	23.07871	109	36	386	Ship head south at 1knt.
02:58	142.32575	23.07874	85	27	377	Ship will keep this heading and go 1knt.
03:02	142.32568	23.07872	16	49	397	Everything is steady while trying to fix winch. Depth of Jason is 348m. Medea has 15m of tether out.
03:02	142.32567	23.07871	13	36	383	Going to stop and restart winch.
03:11	142.32569	23.07849	346	63	407	**HFS Background Filtered Bag #18 Tmax=15.0C Tavg=14.9. Vol=700ml. Z=343.7. Not in any visible plume. Winch problems. [No Nav: ~10m S of Naraku ~142.325151E/23.077802N] PI Butterfield**
03:12	142.32569	23.07845	343	68	412	South of cone no good nav (winch problems) depth is 343.7 PI Butterfield
03:16	142.32572	23.07836	349	96	439	SAMPLE-23 HFS Stop.
03:17	142.32572	23.07833	356	97	441	**SAMPLE-24 HFS Background sterivex #23. Tmax=14.0 Tavg=14.7 T2=14.8 vol=4001. Depth is 343.7. Not in any visible plume. Winch problems. [No Nav: ~10m S of Naraku ~142.325151E/23.077802N] PI Butterfield (subsamps Huber/Bolton)**
03:18	142.32572	23.07832	357	98	442	SAMPLE-24 HFS Background while doing winch work. No good nav.
03:18	142.32572	23.07831	356	98	442	Lots of small fish around vehicle.
03:45	142.32557	23.07788	9	109	453	**SAMPLE-25 HFS unfiltered piston #5. Background. Tmax=14.8C Tavg=14.7 T2=14.7. Vol=601ml. Depth is 343.7. Not in any visible plume. Winch problems. [No Nav: ~10m S of Naraku ~142.325151E/23.077802N] PI Butterfield**
03:49	142.32554	23.07784	10	104	447	Stopped.
04:11	142.32540	23.07751	18	104	448	Still working on the winch
04:38	142.32530	23.07707	355	104	448	Discussing the issues with the winch
04:42	142.32530	23.07700	355	107	451	The chief is going to try a few more things with Jason still down
06:04	142.32502	23.07580	0	116	460	Sounds like we have fixed the winch and will go back down
06:14	142.32498	23.07570	358	106	450	We're on our way back down to the last sampling site.
06:27	142.32490	23.07556	52	78	422	Scratch that. We have to move the ship first and then we will begin descending again.
06:43	142.32516	23.07799	174	9	417	We're on the way down. Passing through 400m.
06:45	142.32510	23.07797	211	1	424	Back on bottom again at Naraku site. Depth 422m.
06:48	142.32517	23.07785	243	1	427	Lots of yellowish smoke.
06:51	142.32512	23.07796	282	1	428	We're back at the sulfur pots again. Visibility not too good.
06:52	142.32511	23.07796	282	1	428	Lots of crabs and flatfish visible around the molten sulfur.
06:53	142.32510	23.07795	284	1	428	We're waiting to see if the visibility improves.
06:56	142.32509	23.07796	284	1	428	Lots of bubbles here.
07:03	142.32494	23.07799	284	1	428	Want to drive up NW plateau.
07:04	142.32515	23.07795	284	1	428	*Doppler reset.*

time	raw long	raw lat	hdg	alt	Z (m)	Dive J2-199 Nikko - Dive Log Comments
07:05	142.32515	23.07794	284	1	428	No weights left. If take crust it will be the last piece available for payload.
07:08	142.32507	23.07802	284	1	428	Framing up the still camera on the sulfur pool to get lasers on it.
07:09	142.32506	23.07804	283			Good still photos here.
07:10	142.32506	23.07799	282	1	428	Good visibility and photo ops.
07:12	142.32521	23.07755	283	1	428	Going to try to sample some crust.
07:14	142.32522	23.07757	291	1	428	**Jason cracked through the sulfur surface.**
07:14	142.32521	23.07757	287	1	428	No visibility
07:15	142.32521	23.07758	294	3	428	Looks like flowing sulfur.
07:20	142.32514	23.07793	283	1	428	We're looking around for the hole that Jason made when it cracked the crust.
07:21	142.32511	23.07794	351	1	428	It's beginning to look like this is merely a thin crust over a larger pool of sulfur.
07:23	142.32508	23.07796	48	1	428	Visibility is still very poor.
07:29	142.32512	23.07798	96	1	428	We're trying to figure out how to set up to sample this area.
07:36	142.32520	23.07807	322	1	428	The sulfur puddle appears to be more active. Visibility has improved too so we're getting some good video and stills.
07:40	142.32521	23.07811	322	1	428	Visibility has deteriorated again.
07:41	142.32522	23.07813	322	179		We're discussing whether it might be possible to pick up a piece of the new sulfur crust.
07:48	142.32522	23.07816	323	1	428	While trying to pick up the rock it sunk through the crust and fresh sulfur flowed up around it.
07:49	142.32524	23.07816	325	40		A white crab got dipped in the fresh sulfur but managed to walk across it and continue on its way!
07:50	142.32522	23.07816	325	102		We got a rock but may have clogged or melted the end of the suction sampler in doing so.
07:51	142.32521	23.07816	325	47	428	**SAMPLE-26 Rock. Grabbed a piece of new sulfur. [Naraku area 142.325095E/23.07794N] PI geogroup**
07:51	142.32521	23.07816	325	47	428	**SAMPLE-27 Molten sulfur. ROV dipped in sulfur while attempting to retrieve piece of crust. ~70 pounds of sulfur was coating the carriage of Jason when it was recovered. [Naraku area 142.325095E/23.07794N] PI everyone**
07:51	142.32519	23.07817	325	42		Position is 23 4.677 142 19.507
07:53	142.32515	23.07815	325	53		Trying to clear the end of the suction sampler.
07:54	142.32514	23.07815	325	86		Suction sampler cleared for use again.
07:55	142.32513	23.07817	325	14	441	We are preparing to leave this site and head NW.
08:02	142.32510	23.07809	323	2	423	Now heading NW. Currently trying to adjust Jason's buoyancy.
08:04	142.32507	23.07812	324	2	422	We seem to have picked up some extra sulfur on the skids at the last site.
08:04	142.32507	23.07812	322	2	422	We are now too heavy and have to find a way to reduce weight.
08:06	142.32501	23.07821	323	4	422	Transiting through an area of dense tubeworm cover.
08:11	142.32487	23.07829	322	5	429	Visibility has been reduced to zero and we're still too heavy. We're going to move upslope and get out of here.
08:15	142.32483	23.07839	323	1	429	We're on a very steep slope of loose volcaniclastic. Lots of crabs about.
08:16	142.32484	23.07841	323	2	429	It looks like we may be as much as 60 lbs too heavy.
08:17	142.32484	23.07841	322	2	429	Need to sort this out before proceeding any further.
08:19	142.32486	23.07840	322	2	428	There is a rocky outcrop above us to starboard. Lots of crabs.
08:28	142.32490	23.07834	298	40	424	We've tried to dislodge the rocks we think have accumulated on the bottom but with no luck.
08:29	142.32487	23.07834	252	38	425	It has been decided that we need to break off the dive and recover the vehicle.
08:29	142.32479	23.07831	253	39	427	Preparing to ascend.
08:32	142.32457	23.07823	258	39	407	We are now coming up slowly. Currently at 370m.
08:58	142.32484	23.07799	295	197	198	JASON is at the surface.
09:02	142.32490	23.07794	288	116	118	MEDEA on deck.
09:06	142.32489	23.07788	278	193	194	Power secured.
09:08	142.32489	23.07788	278	193	194	**JASON on deck.**

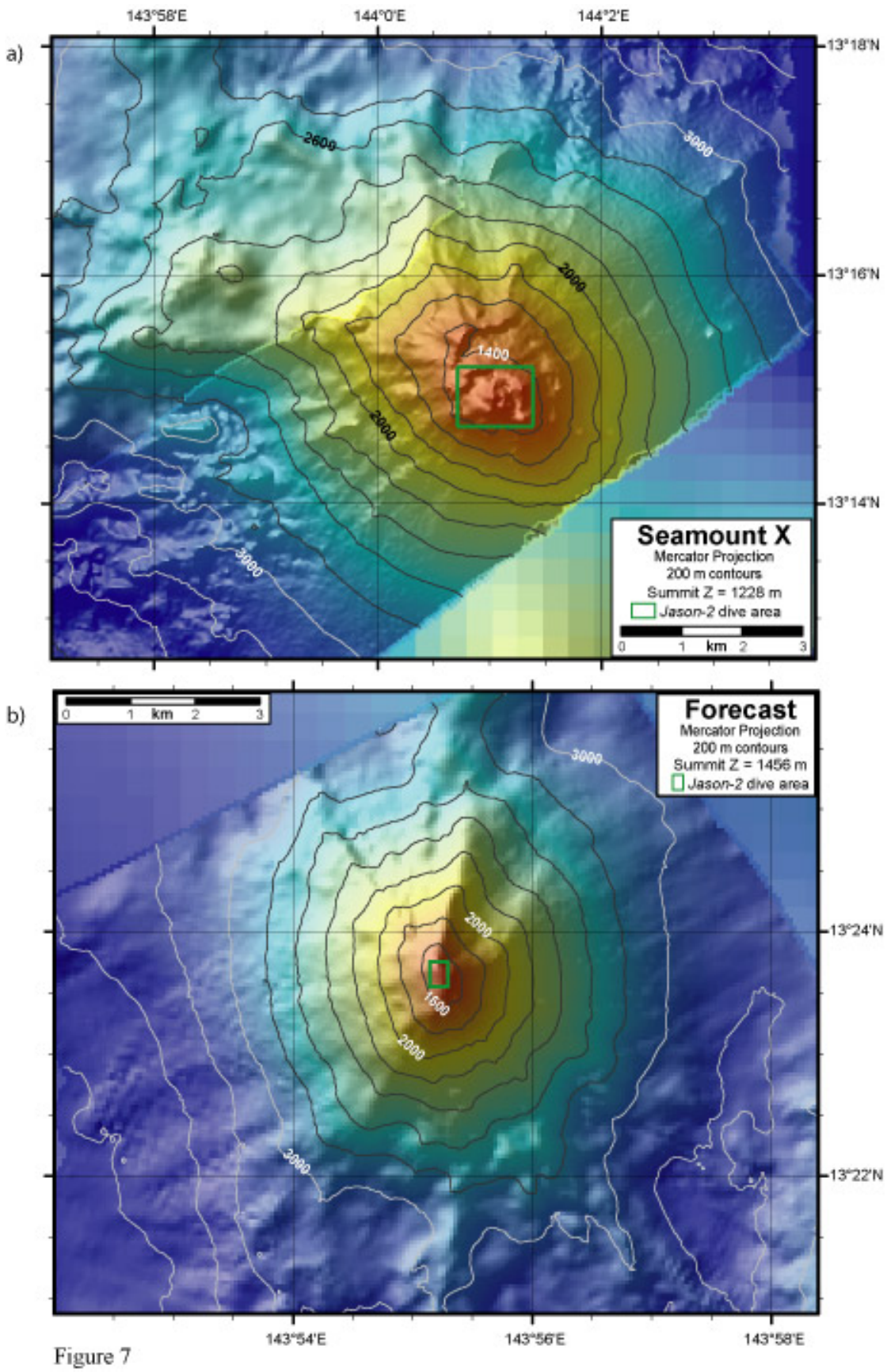
a)
143°58'E
144°0'E
144°2'E
13°18'N
13°16'N
13°14'N
2600
3000
2000
1400
2000
3000
Seamount X
Mercator Projection
200 m contours
Summit Z = 1228 m
Jason-2 dive area
0 1 km 2 3
b)
0 1 km 2 3
Forecast
Mercator Projection
200 m contours
Summit Z = 1456 m
Jason-2 dive area
3000
2000
1600
2000
3000
13°24'N
13°22'N
143°54'E
143°56'E
143°58'E

Figure 7

Figure 7 back

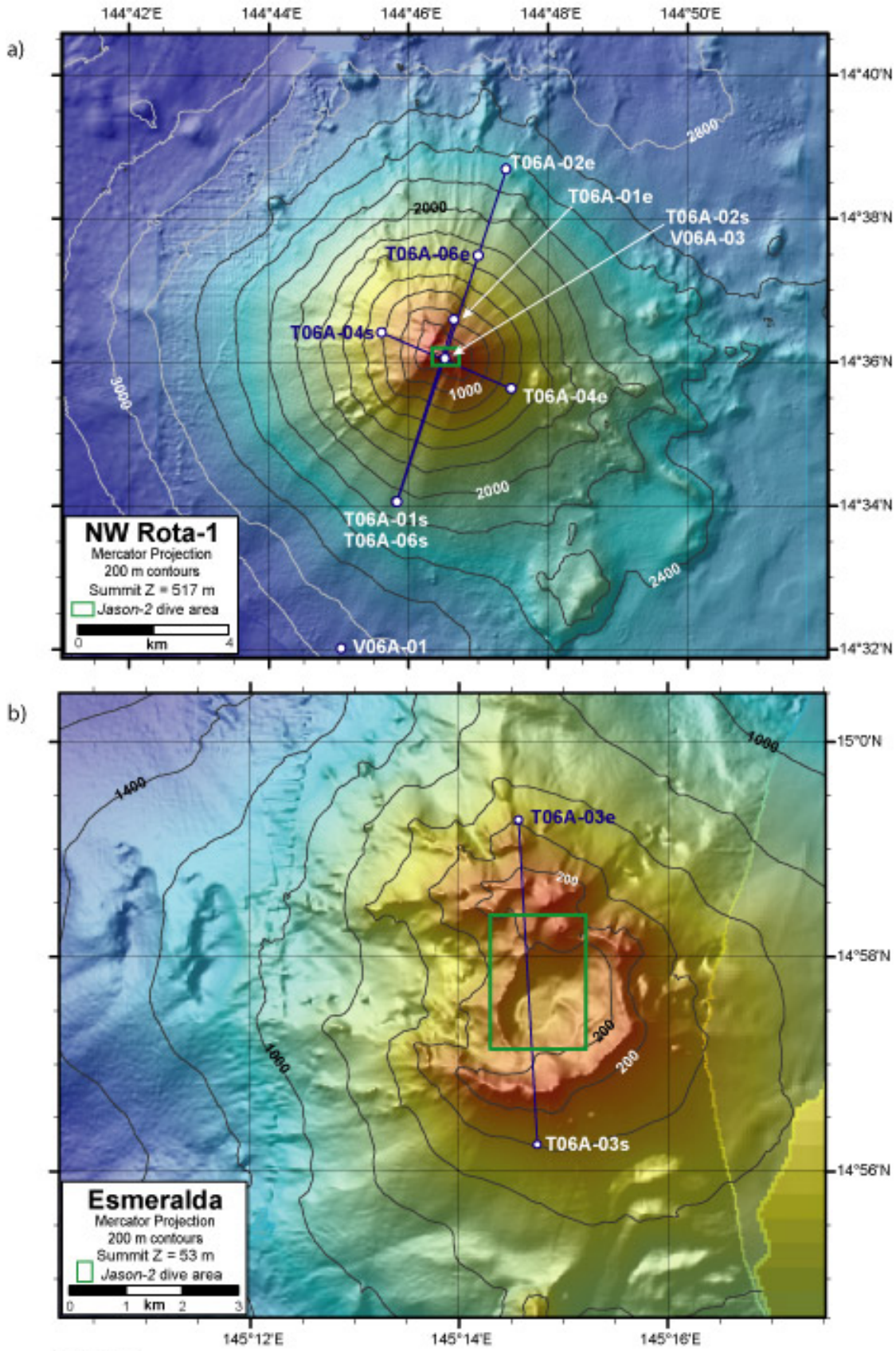
a)
144°42'E
144°44'E
144°46'E
144°48'E
144°50'E
14°40'N
14°38'N
14°36'N
14°34'N
14°32'N
T06A-02e
T06A-01e
T06A-02s
V06A-03
T06A-06e
T06A-04s
T06A-04e
T06A-01s
T06A-06s
V06A-01
2800
2000
1000
3000
2400
NW Rota-1
Mercator Projection
200 m contours
Summit Z = 517 m
Jason-2 dive area
0
km
4
b)
15°0'N
14°58'N
14°56'N
145°12'E
145°14'E
145°16'E
1000
1400
T06A-03e
200
T06A-03s
Esmeralda
Mercator Projection
200 m contours
Summit Z = 53 m
Jason-2 dive area
0
1
km
2
3

Figure 8

Figure 8 back

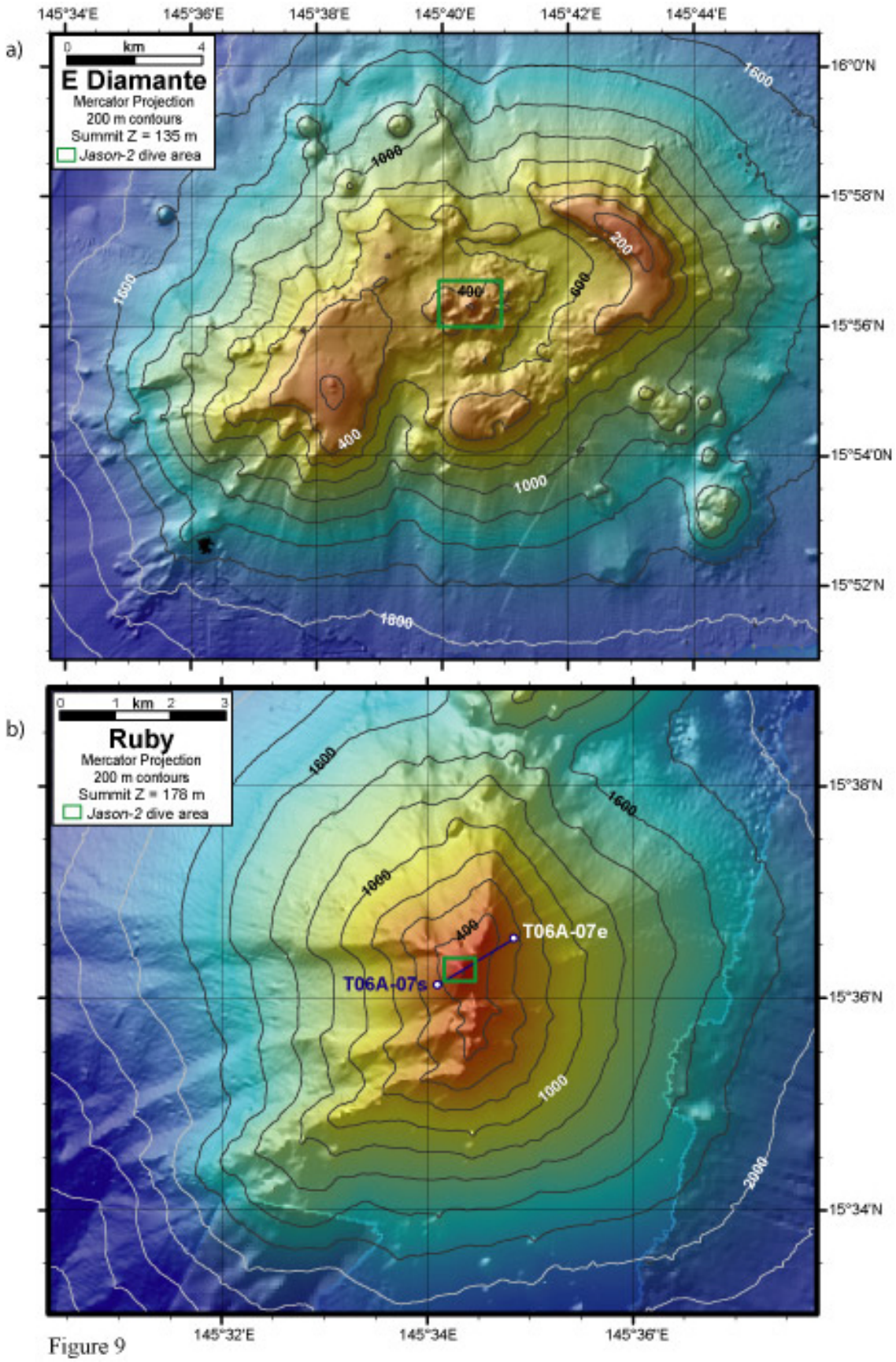
a)
0 km 4
E Diamante
Mercator Projection
200 m contours
Summit Z = 135 m
Jason-2 dive area
145°34'E
145°36'E
145°38'E
145°40'E
145°42'E
145°44'E
16°0'N
15°58'N
15°56'N
15°54'0N
15°52'N
1600
1000
200
400
600
400
1000
1600
b)
0 1 km 2 3
Ruby
Mercator Projection
200 m contours
Summit Z = 178 m
Jason-2 dive area
15°38'N
15°36'N
15°34'N
1600
1600
1000
400
T06A-07e
T06A-07s
1000
2000
145°32'E
145°34E
145°36'E

Figure 9

Figure 9 back

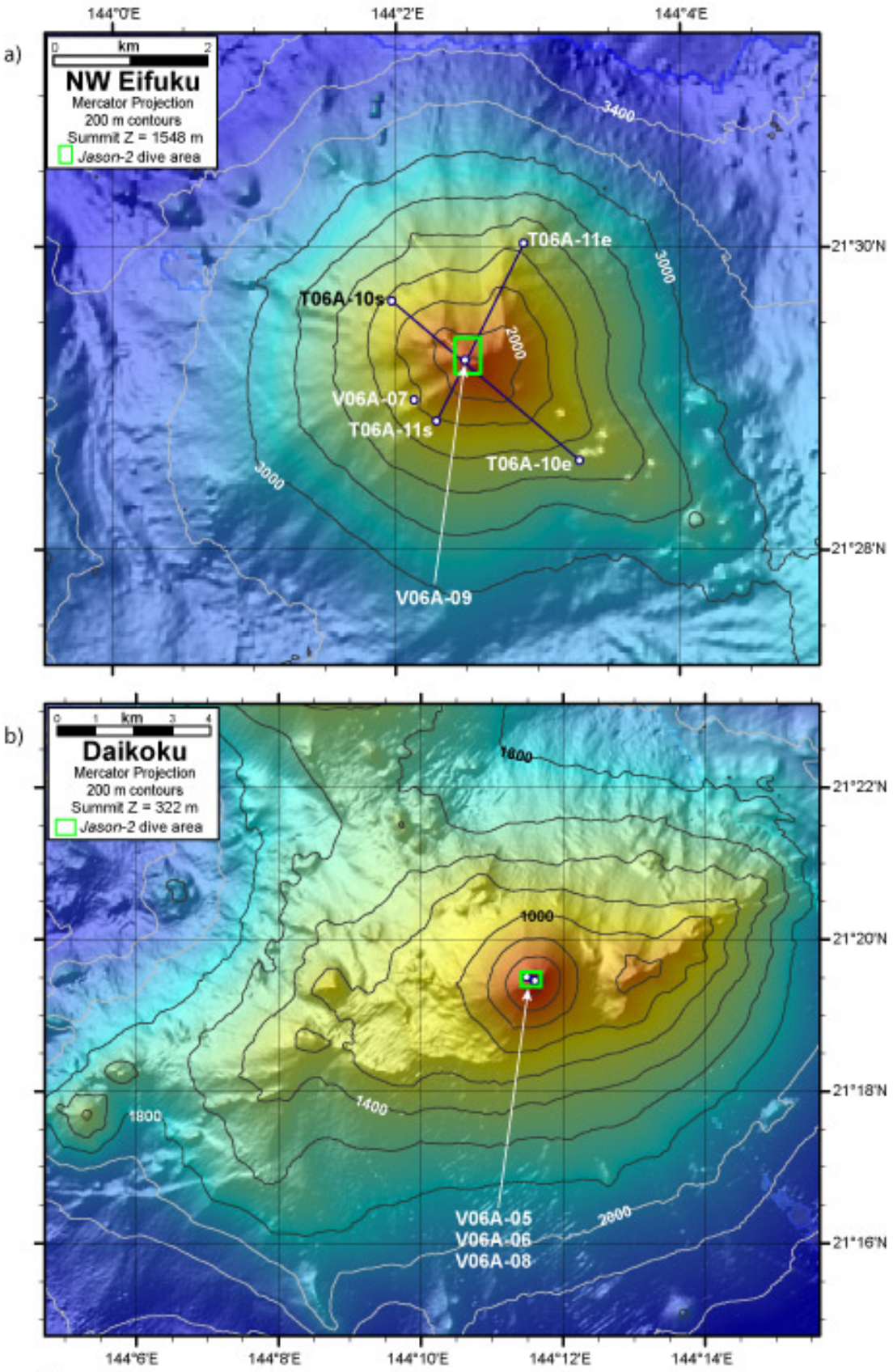
a)
NW Eifuku
Mercator Projection
200 m contours
Summit Z = 1548 m
Jason-2 dive area
km
144°0'E
144°2'E
144°4'E
21°30'N
21°28'N
3400
3000
2000
T06A-11e
T06A-10s
V06A-07
T06A-11s
T06A-10e
V06A-09
b)
Daikoku
Mercator Projection
200 m contours
Summit Z = 322 m
Jason-2 dive area
km
1800
1000
1400
2000
V06A-05
V06A-06
V06A-08
21°22'N
21°20'N
21°18'N
21°16'N
144°6'E
144°8'E
144°10'E
144°12'E
144°14'E

Figure 10

Figure 10 back

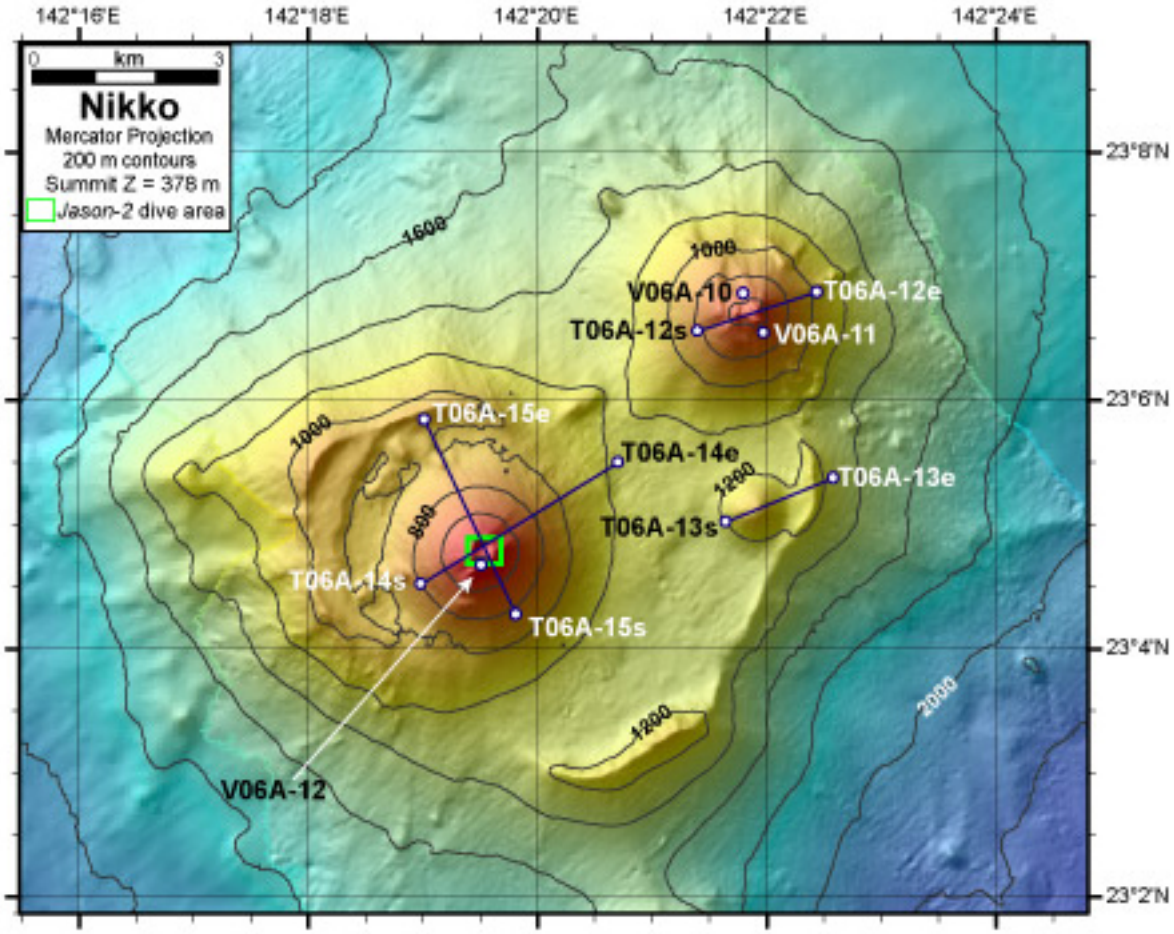
142°16'E
142°18'E
142°20'E
142°22'E
142°24'E
23°8'N
23°6'N
23°4'N
23°2'N
0 km 3
Nikko
Mercator Projection
200 m contours
Summit Z = 378 m
Jason-2 dive area
1600
1000
1000
1200
800
1200
2000
V06A-10
T06A-12e
T06A-12s
V06A-11
T06A-15e
T06A-14e
T06A-13e
T06A-13s
T06A-14s
T06A-15s
V06A-12

Figure 11

Figure 11 back

Figure 12

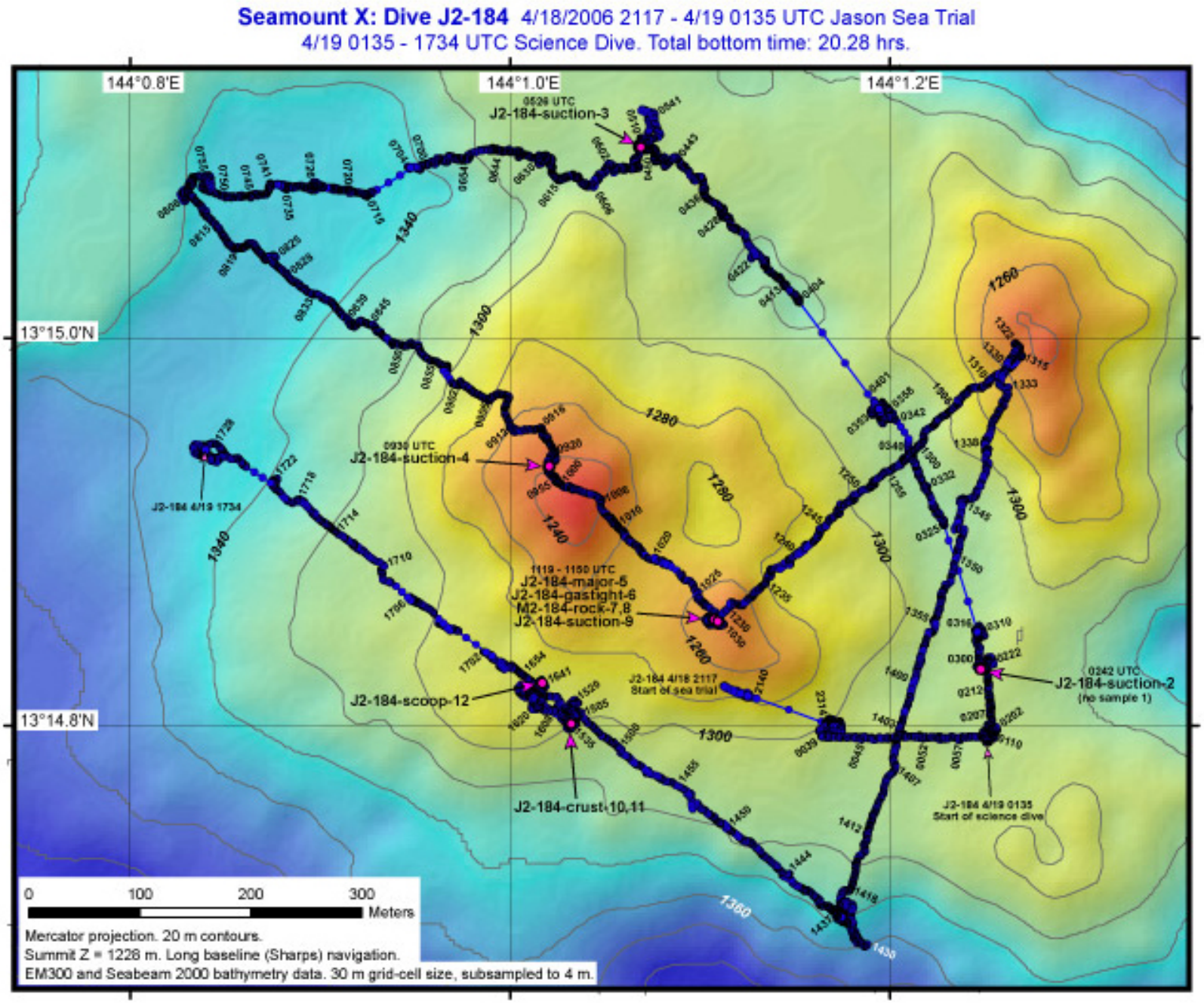
Seamount X: Dive J2-184 4/18/2006 2117 - 4/19 0135 UTC Jason Sea Trial
4/19 0135 - 1734 UTC Science Dive. Total bottom time: 20.28 hrs.
144°0.8'E
144°1.0'E
144°1.2'E
13°15.0'N
13°14.8'N
0528 UTC
J2-184-suction-3
0930 UTC
J2-184-suction-4
1119 - 1150 UTC
J2-184-major-5
J2-184-gastight-6
M2-184-rock-7,8
J2-184-suction-9
J2-184-scoop-12
J2-184-crust-10,11
J2-184 4/18 2117
Start of sea trial
J2-184 4/19 1734
0242 UTC
J2-184-suction-2
(no sample 1)
J2-184 4/19 0135
Start of science dive
0 100 200 300
Meters
Mercator projection. 20 m contours.
Summit Z = 1226 m. Long baseline (Sharps) navigation.
EM300 and Seabeam 2000 bathymetry data. 30 m grid-cell size, subsampled to 4 m.

Figure 12 back

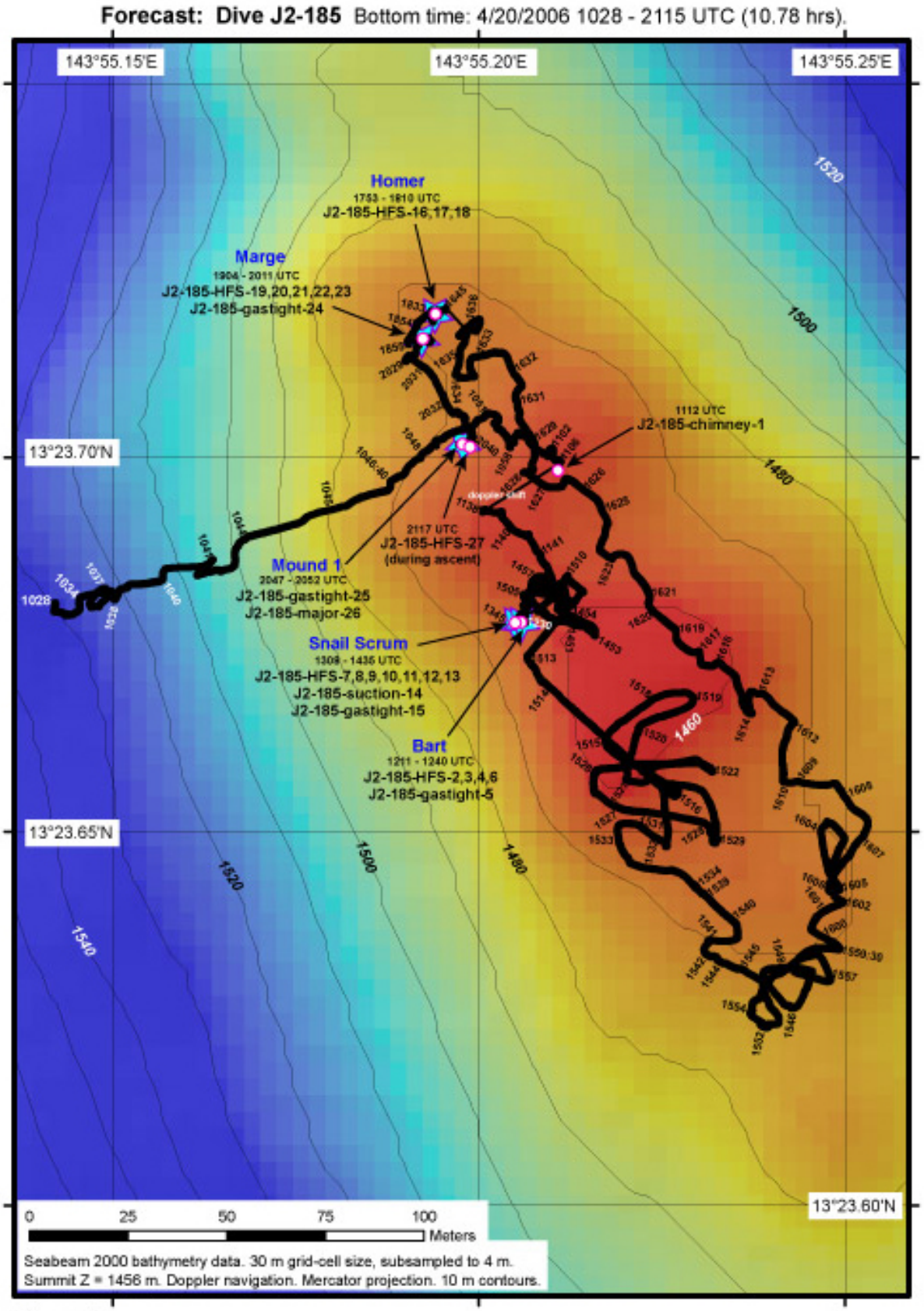
Forecast: Dive J2-185 Bottom time: 4/20/2006 1028 - 2115 UTC (10.78 hrs).
143°55.15'E
143°55.20'E
143°55.25'E
13°23.70'N
13°23.65'N
13°23.60'N
Homer
1753 - 1810 UTC
J2-185-HFS-16,17,18
Marge
1904 - 2011 UTC
J2-185-HFS-19,20,21,22,23
J2-185-gastight-24
1112 UTC
J2-185-chimney-1
2117 UTC
J2-185-HFS-27
(during ascent)
Mound 1
2047 - 2052 UTC
J2-185-gastight-25
J2-185-major-26
Snail Scrum
1309 - 1435 UTC
J2-185-HFS-7,8,9,10,11,12,13
J2-185-suction-14
J2-185-gastight-15
Bart
1211 - 1240 UTC
J2-185-HFS-2,3,4,6
J2-185-gastight-5
1028
1520
1500
1480
1460
1540
0
25
50
75
100
Meters
Seabeam 2000 bathymetry data. 30 m grid-cell size, subsampled to 4 m.
Summit Z = 1456 m. Doppler navigation. Mercator projection. 10 m contours.

Figure 13

Figure 13 back

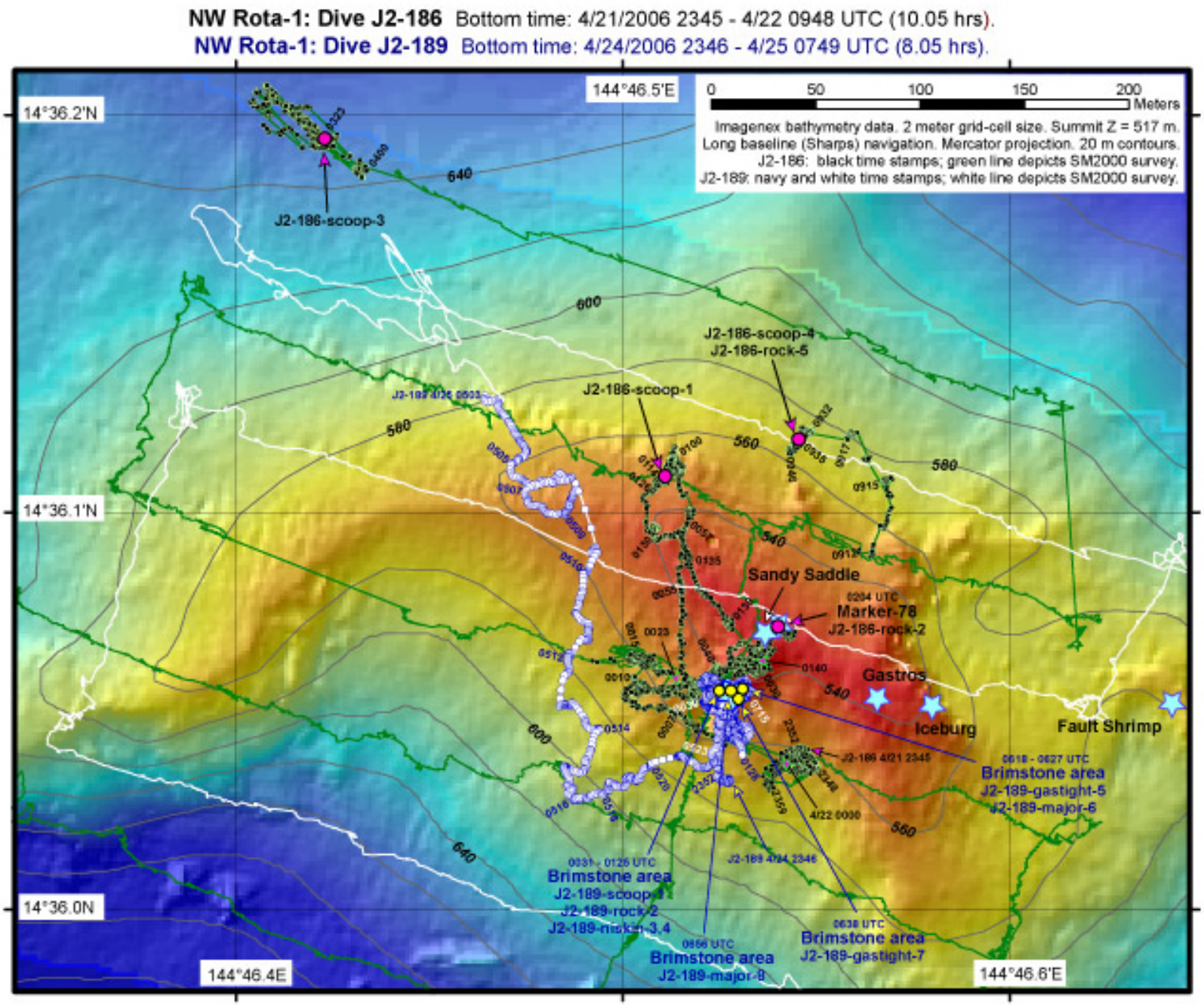
NW Rota-1: Dive J2-186 Bottom time: 4/21/2006 2345 - 4/22 0948 UTC (10.05 hrs).
NW Rota-1: Dive J2-189 Bottom time: 4/24/2006 2346 - 4/25 0749 UTC (8.05 hrs).
144°46.5'E
14°36.2'N
14°36.1'N
14°36.0N
144°46.4E
144°46.6'E
0 50 100 150 200 Meters
Imagenex bathymetry data. 2 meter grid-cell size. Summit Z = 517 m.
Long baseline (Sharps) navigation. Mercator projection. 20 m contours.
J2-186: black time stamps; green line depicts SM2000 survey.
J2-189: navy and white time stamps; white line depicts SM2000 survey.
J2-186-scoop-3
J2-186-scoop-4
J2-186-rock-5
J2-186-scoop-1
Sandy Saddle
0204 UTC
Marker-78
J2-186-rock-2
Gastros
Iceburg
Fault Shrimp
J2-186 4/21 2345
0618 - 0627 UTC
Brimstone area
J2-189-gastight-5
J2-189-major-6
4/22 0000
J2-189 4/24 2346
0031 - 0126 UTC
Brimstone area
J2-189-scoop-1
J2-189-rock-2
J2-189-rock-3,4
0856 UTC
Brimstone area
J2-189-major-8
0638 UTC
Brimstone area
J2-189-gastight-7
640
600
580
560
540

Figure 14

Figure 14 back

Figure 15

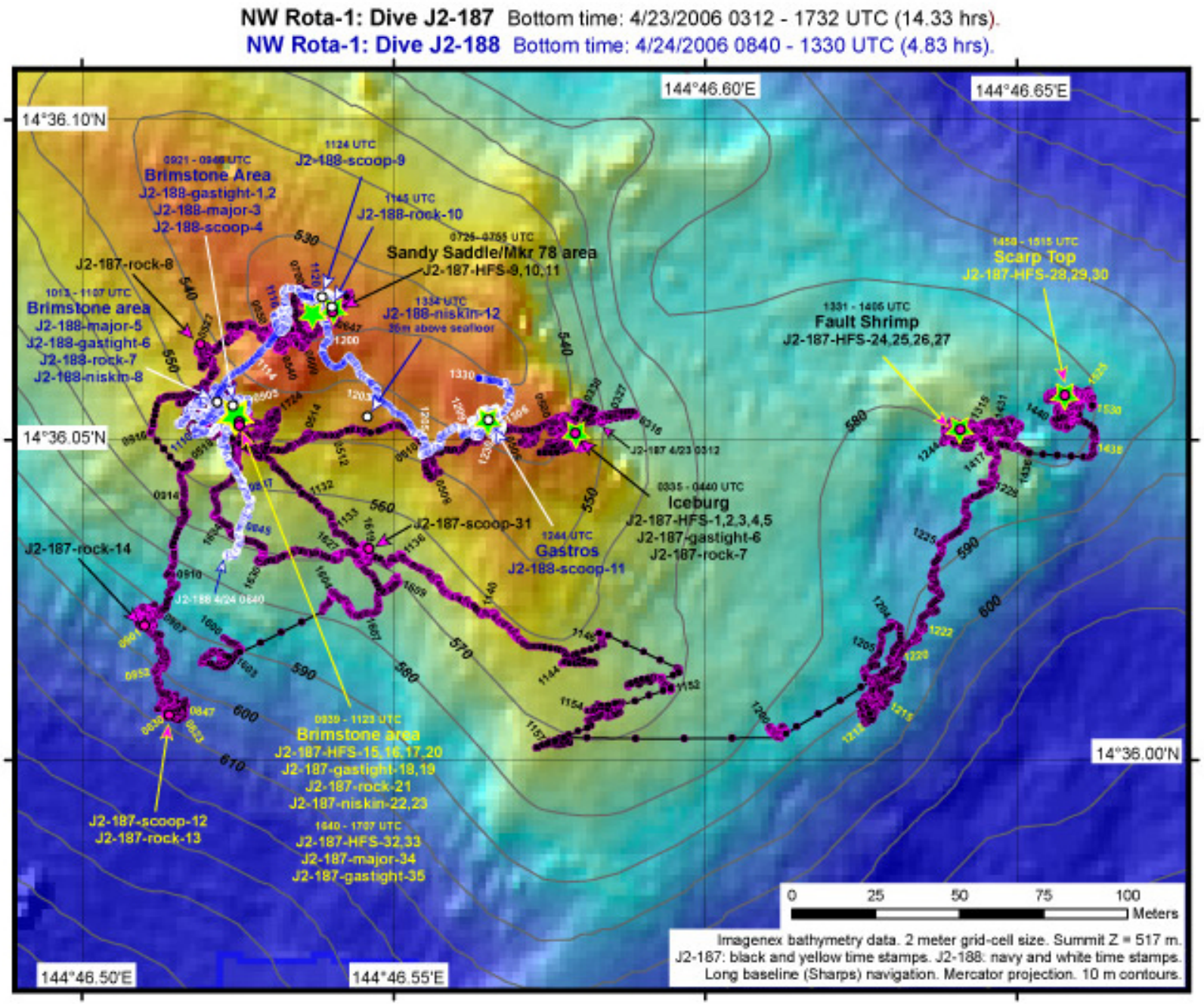
NW Rota-1: Dive J2-187 Bottom time: 4/23/2006 0312 - 1732 UTC (14.33 hrs).
NW Rota-1: Dive J2-188 Bottom time: 4/24/2006 0840 - 1330 UTC (4.83 hrs).
144°46.60'E
144°46.65'E
14°36.10'N
14°36.05'N
14°36.00'N
144°46.50'E
144°46.55'E
1124 UTC
J2-188-scoop-9
0921 - 0948 UTC
Brimstone Area
J2-188-gastight-1,2
J2-188-major-3
J2-188-scoop-4
1145 UTC
J2-188-rock-10
0725 - 0755 UTC
Sandy Saddle/Mkr 78 area
J2-187-HFS-9,10,11
J2-187-rock-8
1013 - 1107 UTC
Brimstone area
J2-188-major-5
J2-188-gastight-6
J2-188-rock-7
J2-188-niskin-8
1332 UTC
J2-188-niskin-12
25m above seafloor
1458 - 1515 UTC
Scarp Top
J2-187-HFS-28,29,30
1331 - 1406 UTC
Fault Shrimp
J2-187-HFS-24,25,26,27
J2-187 4/23 0312
0335 - 0440 UTC
Iceberg
J2-187-HFS-1,2,3,4,5
J2-187-gastight-6
J2-187-rock-7
J2-187-scoop-31
1244 UTC
Gastros
J2-188-scoop-11
J2-187-rock-14
J2-188 4/24 0640
0939 - 1123 UTC
Brimstone area
J2-187-HFS-15,16,17,20
J2-187-gastight-18,19
J2-187-rock-21
J2-187-niskin-22,23
J2-187-scoop-12
J2-187-rock-13
1640 - 1707 UTC
J2-187-HFS-32,33
J2-187-major-34
J2-187-gastight-35
0 25 50 75 100
Meters
Imagenex bathymetry data. 2 meter grid-cell size. Summit Z = 517 m.
J2-187: black and yellow time stamps. J2-188: navy and white time stamps.
Long baseline (Sharps) navigation. Mercator projection. 10 m contours.

Figure 15 back

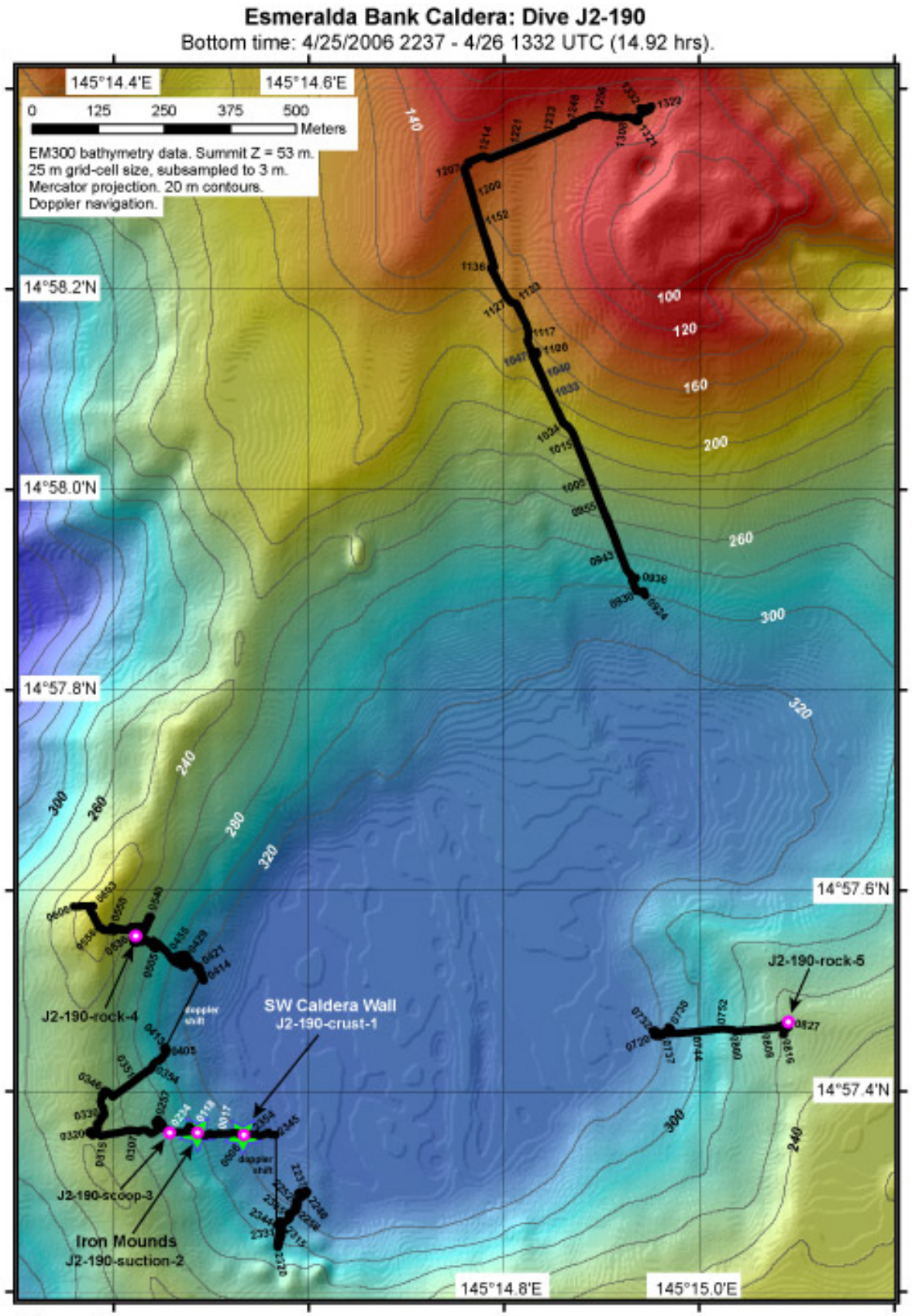
Esmeralda Bank Caldera: Dive J2-190
Bottom time: 4/25/2006 2237 - 4/26 1332 UTC (14.92 hrs).
145°14.4'E
145°14.6'E
0 125 250 375 500
Meters
EM300 bathymetry data. Summit Z = 53 m.
25 m grid-cell size, subsampled to 3 m.
Mercator projection. 20 m contours.
Doppler navigation.
14°58.2'N
14°58.0'N
14°57.8'N
14°57.6'N
14°57.4'N
145°14.8'E
145°15.0'E
J2-190-rock-4
SW Caldera Wall
J2-190-crust-1
J2-190-rock-5
J2-190-scoop-3
Iron Mounds
J2-190-suction-2

Figure 16

Figure 16 back

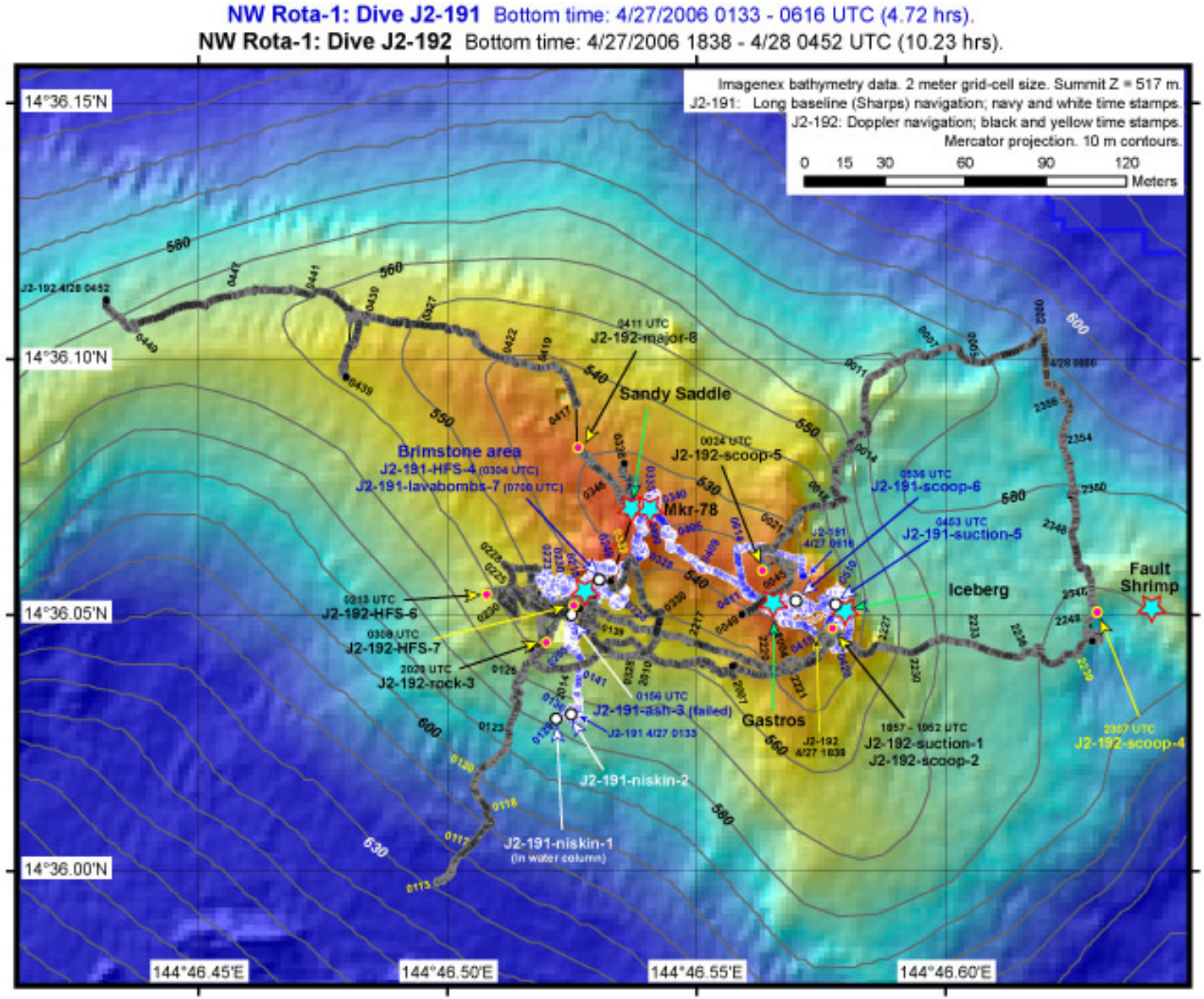
NW Rota-1: Dive J2-191 Bottom time: 4/27/2006 0133 - 0616 UTC (4.72 hrs).
NW Rota-1: Dive J2-192 Bottom time: 4/27/2006 1838 - 4/28 0452 UTC (10.23 hrs).
Imagenex bathymetry data. 2 meter grid-cell size. Summit Z = 517 m.
J2-191: Long baseline (Sharps) navigation; navy and white time stamps.
J2-192: Doppler navigation; black and yellow time stamps.
Mercator projection. 10 m contours.
0 15 30 60 90 120
Meters
14°36.15'N
14°36.10'N
14°36.05'N
14°36.00'N
144°46.45'E
144°46.50'E
144°46.55'E
144°46.60'E
J2-192 4/28 0452
0411 UTC
J2-192-major-8
Sandy Saddle
Brimstone area
J2-191-HFS-4 (0304 UTC)
J2-191-lavabombs-7 (0708 UTC)
0024 UTC
J2-192-scoop-5
0536 UTC
J2-191-scoop-6
0453 UTC
J2-191-suction-5
Mkr-78
J2-191 4/27 0516
Iceberg
Fault Shrimp
0213 UTC
J2-192-HFS-6
0308 UTC
J2-192-HFS-7
2028 UTC
J2-192-rock-3
0156 UTC
J2-191-ash-3 (failed)
J2-191 4/27 0133
Gastros
J2-192 4/27 1838
1857 - 1952 UTC
J2-192-suction-1
J2-192-scoop-2
2357 UTC
J2-192-scoop-4
J2-191-niskin-2
J2-191-niskin-1
(in water column)

Figure 17

Figure 17 back

Figure 18

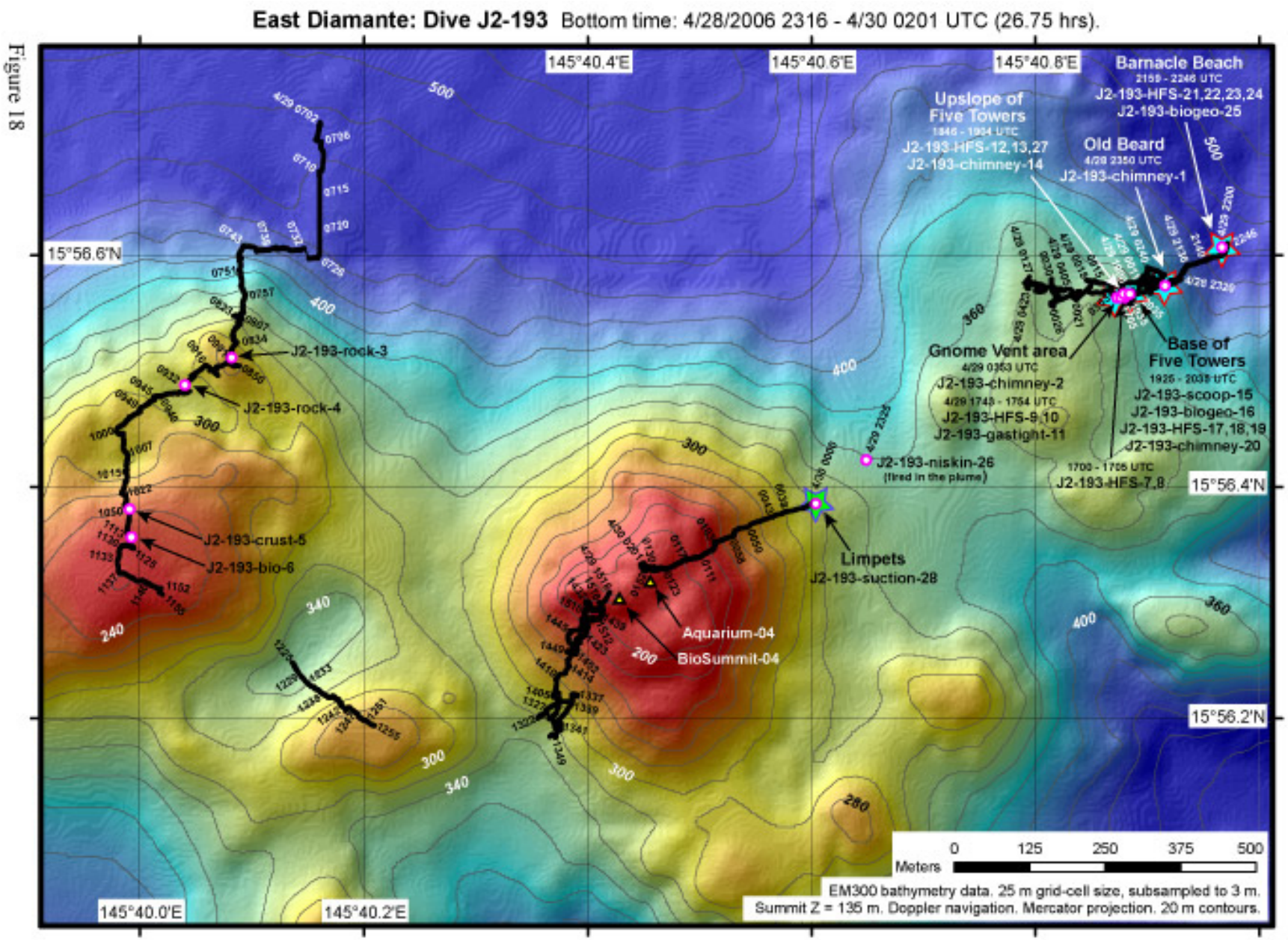
East Diamante: Dive J2-193 Bottom time: 4/28/2006 2316 - 4/30 0201 UTC (26.75 hrs).
145°40.4'E
145°40.6'E
145°40.8'E
15°56.6'N
15°56.4'N
15°56.2'N
145°40.0'E
145°40.2'E
Barnacle Beach
2159 - 2246 UTC
J2-193-HFS-21,22,23,24
J2-193-biogeo-25
Upslope of Five Towers
1846 - 1934 UTC
J2-193-HFS-12,13,27
J2-193-chimney-14
Old Beard
4/28 2350 UTC
J2-193-chimney-1
Gnome Vent area
4/29 0353 UTC
J2-193-chimney-2
4/29 1743 - 1754 UTC
J2-193-HFS-9,10
J2-193-gastight-11
Base of Five Towers
1925 - 2038 UTC
J2-193-scoop-15
J2-193-biogeo-16
J2-193-HFS-17,18,19
J2-193-chimney-20
1700 - 1705 UTC
J2-193-HFS-7,8
J2-193-niskin-26
(fired in the plume)
J2-193-rock-3
J2-193-rock-4
J2-193-crust-5
J2-193-bio-6
Limpets
J2-193-suction-28
Aquarium-04
BioSummit-04
500
400
360
340
300
280
240
200
0 125 250 375 500
Meters
EM300 bathymetry data. 25 m grid-cell size, subsampled to 3 m.
Summit Z = 135 m. Doppler navigation. Mercator projection. 20 m contours.

Figure 18 back

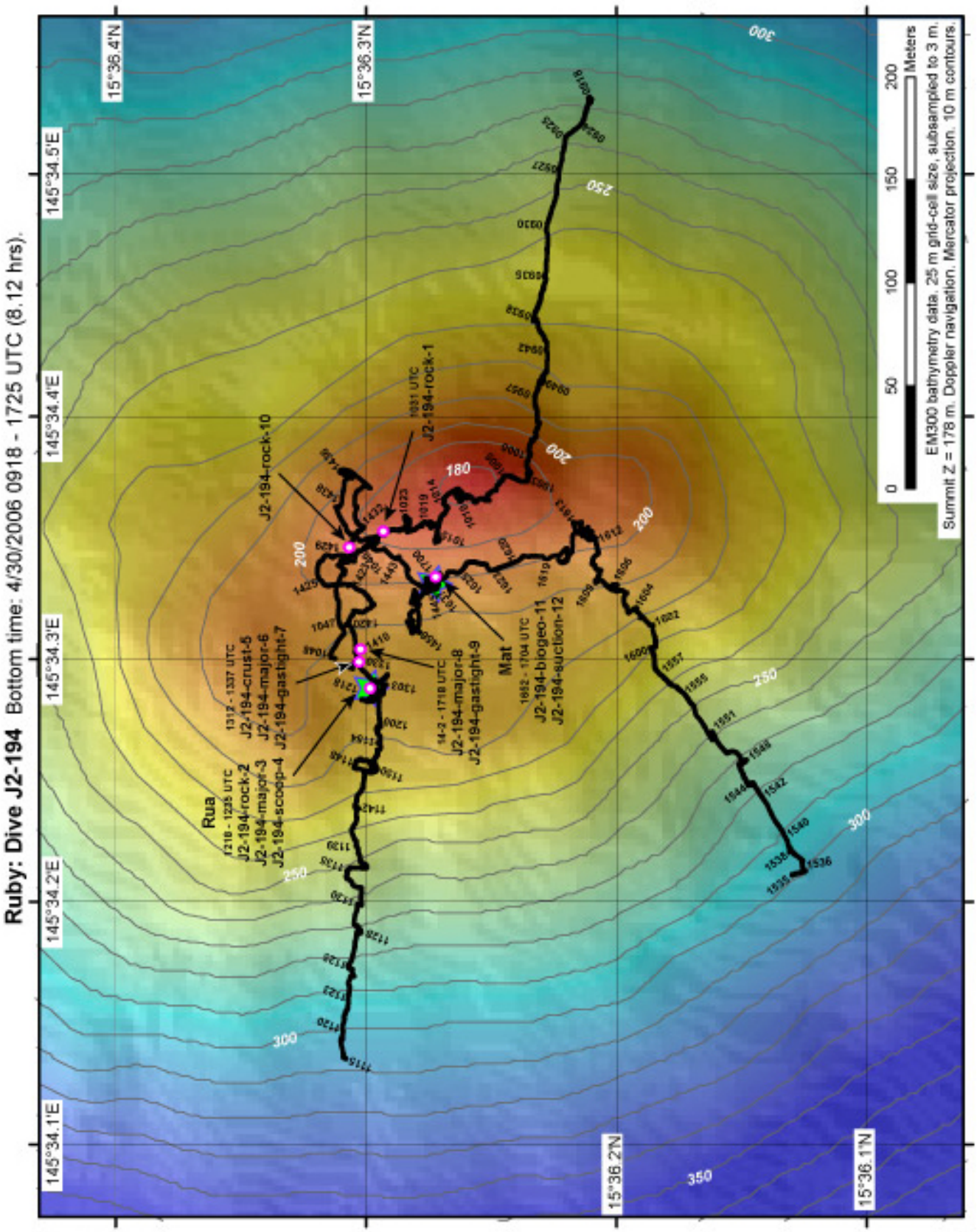
Ruby: Dive J2-194 Bottom time: 4/30/2006 0918 - 1725 UTC (8.12 hrs).
15°36.4'N
15°36.3'N
145°34.5'E
145°34.4'E
145°34.3'E
145°34.2'E
145°34.1'E
15°36.2'N
15°36.1'N
J2-194-rock-10
1031 UTC
J2-194-rock-1
Rua
1218 - 1235 UTC
J2-194-rock-2
J2-194-major-3
J2-194-scoop-4
1312 - 1337 UTC
J2-194-crust-5
J2-194-major-6
J2-194-gastight-7
1412 - 1718 UTC
J2-194-major-8
J2-194-gastight-9
Mat
1652 - 1704 UTC
J2-194-biogeo-11
J2-194-suction-12
0 50 100 150 200 Meters
EM300 bathymetry data, 25 m grid-cell size, subsampled to 3 m.
Summit Z = 178 m. Doppler navigation. Mercator projection. 10 m contours.

Figure 19

Figure 19 back

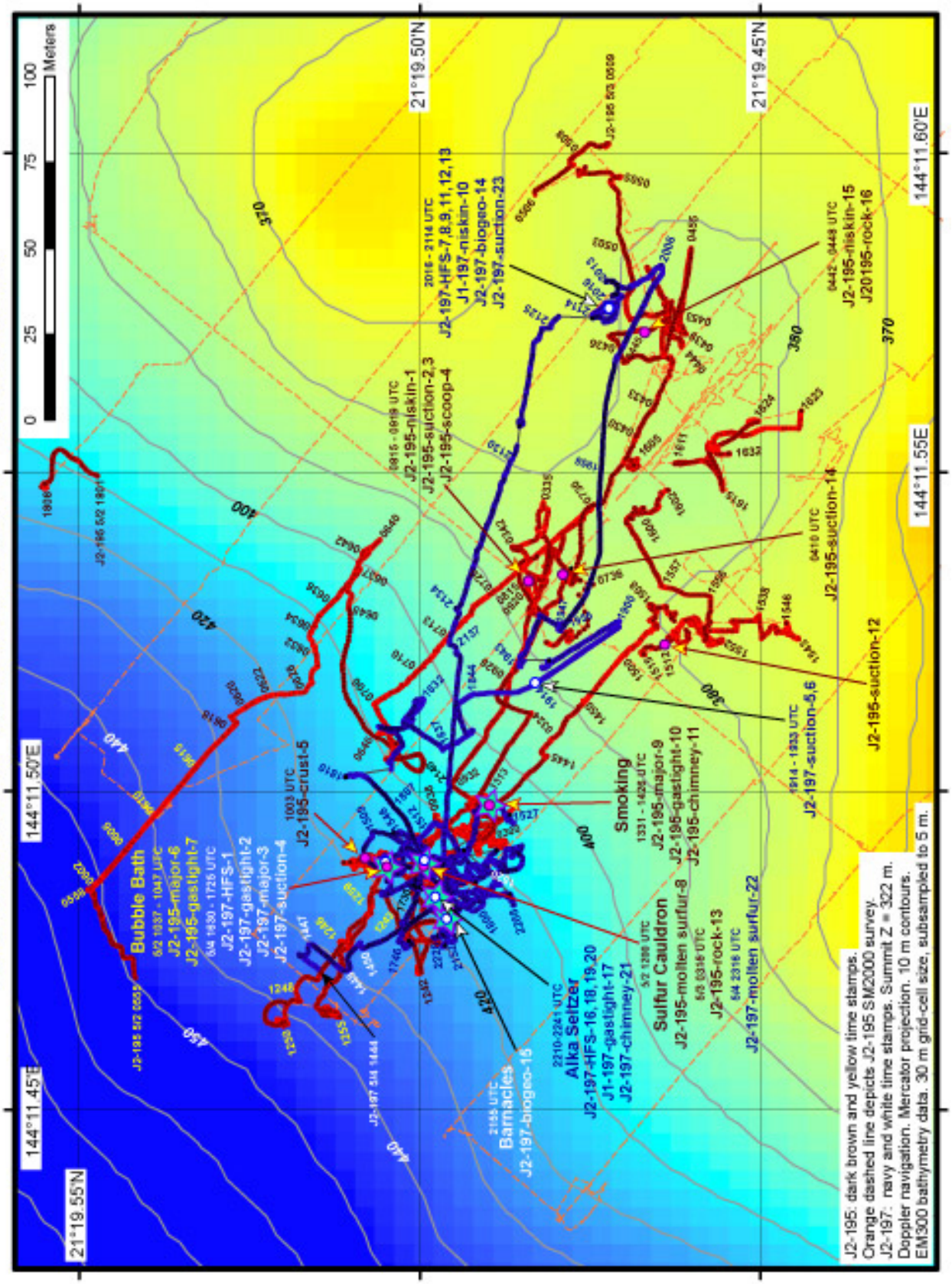
Daikoku: Dive J2-195 Bottom time: 5/2/2006 0555 - 5/3 0524 UTC (23.48 hrs).
Daikoku: Dive J2-197 Bottom time: 5/4/2006 1444 - 2343 UTC (8.98 hrs).
144°11.45'E
144°11.50'E
144°11.55E
144°11.60'E
21°19.55'N
21°19.50'N
21°19.45'N
0
25
50
75
100
Meters
Bubble Bath
J2-195-major-6
J2-195-gastight-7
J2-197-HFS-1
J2-197-gastight-2
J2-197-major-3
J2-197-suction-4
J2-195-crust-5
J2-195-niskin-1
J2-195-suction-2,3
J2-195-scoop-4
J2-197-HFS-7,8,9,11,12,13
J1-197-niskin-10
J2-197-biogeo-14
J2-197-suction-23
J2-195-niskin-15
J20195-rock-16
J2-195-suction-14
J2-195-suction-12
J2-197-suction-5,6
Smoking
J2-195-major-9
J2-195-gastight-10
J2-195-chimney-11
Sulfur Cauldron
J2-195-molten surfur-8
J2-195-rock-13
J2-197-molten surfur-22
Alka Seltzer
J2-197-HFS-16,18,19,20
J1-197-gastight-17
J2-197-chimney-21
Barnacles
J2-197-biogeo-15
J2-195: dark brown and yellow time stamps.
Orange dashed line depicts J2-195 SM2000 survey.
J2-197: navy and white time stamps. Summit Z = 322 m.
Doppler navigation. Mercator projection. 10 m contours.
EM300 bathymetry data. 30 m grid-cell size, subsampled to 5 m.

Figure 20

Figure 20 back

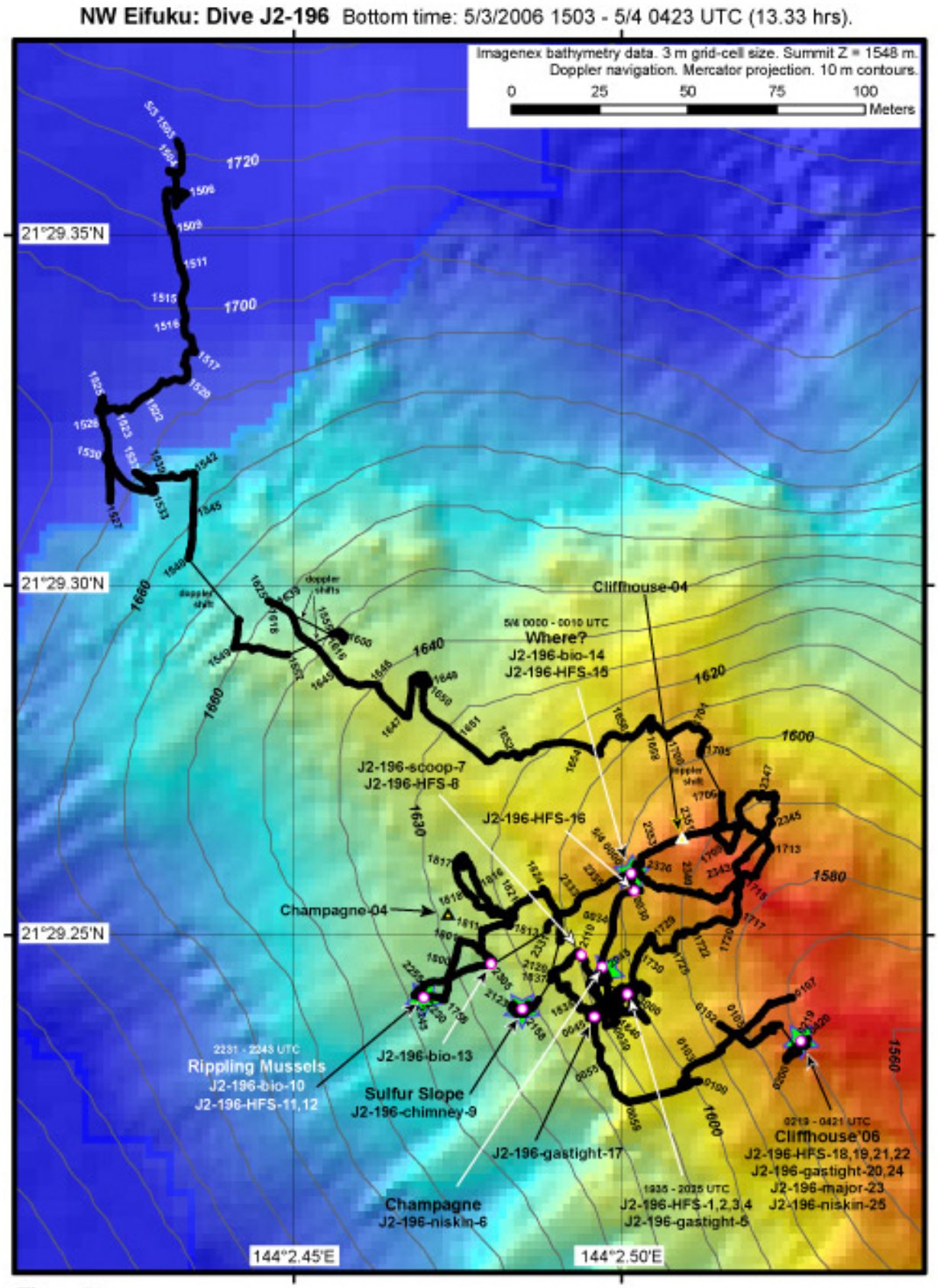
NW Eifuku: Dive J2-196 Bottom time: 5/3/2006 1503 - 5/4 0423 UTC (13.33 hrs).
Imagenex bathymetry data. 3 m grid-cell size. Summit Z = 1548 m.
Doppler navigation. Mercator projection. 10 m contours.
0 25 50 75 100
Meters
21°29.35'N
21°29.30'N
21°29.25'N
144°2.45'E
144°2.50'E
Cliffhouse-04
5/4 0000 - 0010 UTC
Where?
J2-196-bio-14
J2-196-HFS-15
J2-196-scoop-7
J2-196-HFS-8
J2-196-HFS-16
Champagne-04
2231 - 2248 UTC
Rippling Mussels
J2-196-bio-10
J2-196-HFS-11,12
J2-196-bio-13
Sulfur Slope
J2-196-chimney-9
J2-196-gastight-17
Champagne
J2-196-niskin-6
1935 - 2035 UTC
J2-196-HFS-1,2,3,4
J2-196-gastight-5
0213 - 0421 UTC
Cliffhouse'06
J2-196-HFS-18,19,21,22
J2-196-gastight-20,24
J2-196-major-23
J2-196-niskin-25

Figure 21

Figure 21 back

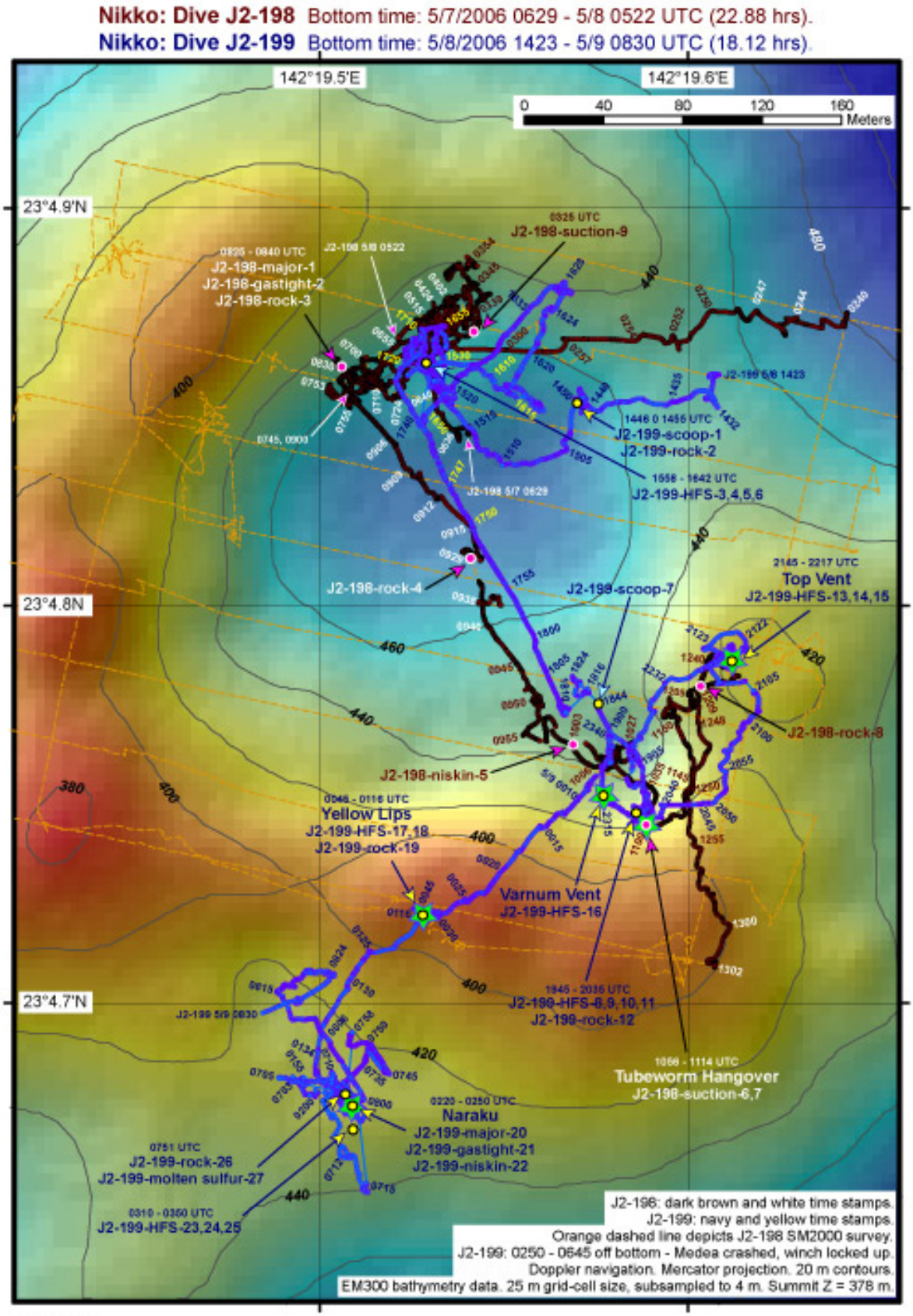
Nikko: Dive J2-198 Bottom time: 5/7/2006 0629 - 5/8 0522 UTC (22.88 hrs).
Nikko: Dive J2-199 Bottom time: 5/8/2006 1423 - 5/9 0830 UTC (18.12 hrs).
142°19.5'E
142°19.6'E
0 40 80 120 160 Meters
23°4.9'N
23°4.8'N
23°4.7'N
0325 UTC
J2-198-suction-9
0825 - 0840 UTC
J2-198-major-1
J2-198-gastight-2
J2-198-rock-3
J2-198 5/8 0522
J2-199 6/8 1423
1446 0 1456 UTC
J2-199-scoop-1
J2-199-rock-2
1658 - 1642 UTC
J2-199-HFS-3,4,5,6
J2-198 5/7 0629
J2-198-rock-4
J2-199-scoop-7
2145 - 2217 UTC
Top Vent
J2-199-HFS-13,14,15
J2-198-rock-8
J2-198-niskin-5
0048 - 0116 UTC
Yellow Lips
J2-199-HFS-17,18
J2-199-rock-19
Varnum Vent
J2-199-HFS-16
1945 - 2035 UTC
J2-199-HFS-8,9,10,11
J2-199-rock-12
1056 - 1114 UTC
Tubeworm Hangover
J2-198-suction-6,7
J2-199 5/9 0830
0220 - 0250 UTC
Naraku
J2-199-major-20
J2-199-gastight-21
J2-199-niskin-22
0751 UTC
J2-199-rock-26
J2-199-molten sulfur-27
0310 - 0350 UTC
J2-199-HFS-23,24,25
J2-196: dark brown and white time stamps.
J2-199: navy and yellow time stamps.
Orange dashed line depicts J2-198 SM2000 survey.
J2-199: 0250 - 0645 off bottom - Medea crashed, winch locked up.
Doppler navigation. Mercator projection. 20 m contours.
EM300 bathymetry data. 25 m grid-cell size, subsampled to 4 m. Summit Z = 378 m.

Figure 22

Figure 22 back