

NeMO 2000 Cruise Report

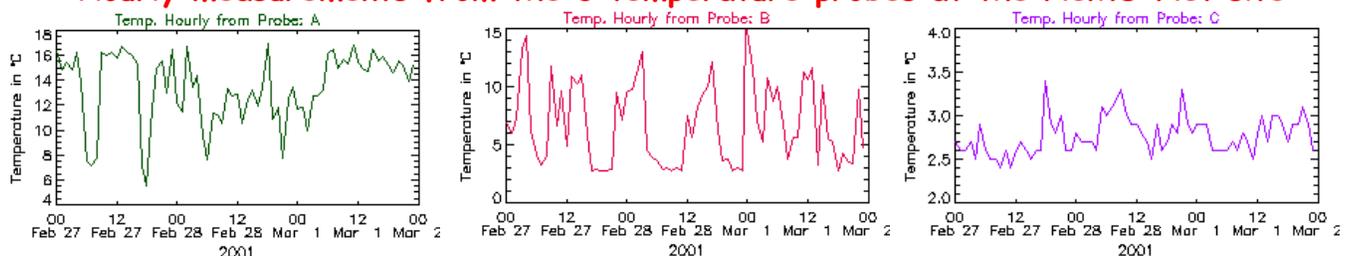
Cruise RB-00-05 Leg II
June 29 - July 18
Newport, OR - Victoria, BC
JDF Ridge, Axial Volcano

NeMO Net 2000 image of tube worm bush at Bag City Vent



APRIL 2014: REPORT REVISED TO CREATE PDF.
INSERTED DIVE MAPS, DIVE LOGS, ETC. WHERE APPROPRIATE.

Hourly measurements from the 3 temperature probes at the NeMO Net site



Report compiled by Susan Merle, assisted by Robert Embley and William Chadwick

TABLE OF CONTENTS

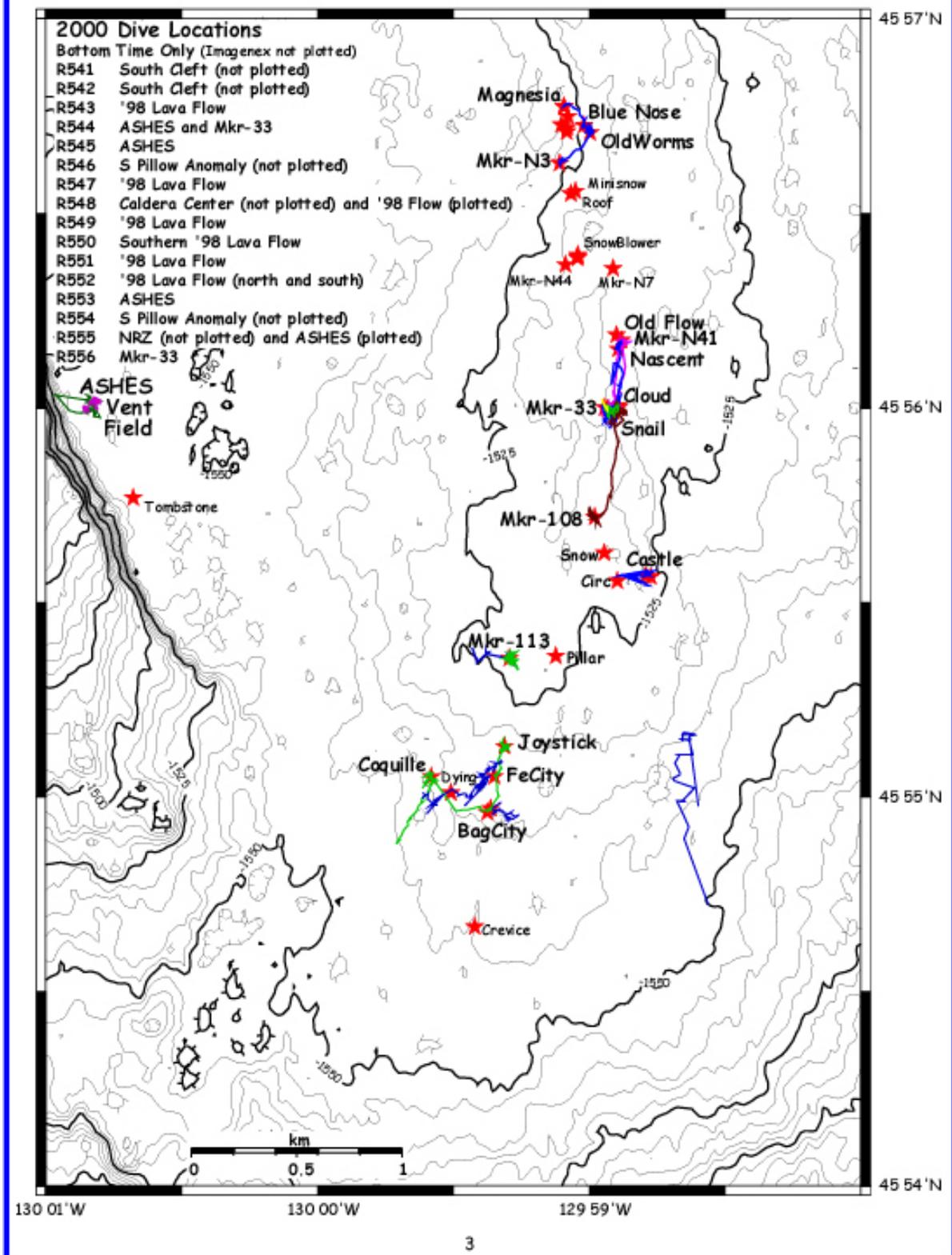
	NeMO 2000 Dives at Axial Caldera Figure.....	3
	Participating Organizations.....	5
	Participating Scientists.....	5
1	OVERVIEW of NeMO 2000 - Embley.....	6
2	DISCIPLINE SUMMARIES.....	7
2.1	VOLCANOLOGY.....	7
2.1a	NeMO 2000 Cruise Summary for Geology and Volcanology - WW Chadwick.....	7
2.2	CHEMISTRY.....	8
2.2a	Ron Brown, ROPOS 2000 Cruise Report - Butterfield.....	8
2.2b	Gas Sampling - Leigh Evans.....	9
2.2c	Studies of Dissolved Gasses from Hydrothermal Fluids - Larson.....	9
2.2d	NeMO 2000 Sample Report - Gendron.....	10
2.3	MICROBIOLOGY.....	10
2.3a	Microbiological Sampling for Molecular Microbial Ecology Analysis - Moyer/Engebretson.....	10
2.3b	Hydrothermal Fluid Microbiology - Mehta/Huber.....	12
2.4	MACROBIOLOGY.....	13
2.4a	Macrofauna Ecology Report - Marcus/Metaxas/Tunncliffe.....	13
	Macrobiology Sample List - NeMO 2000.....	15
2.4b	Food Web Dynamics deposit Feeding by Sulfide Worms and collection of Sulphides for Study - Juniper Lab.....	16
2.5	IRON OXIDES AND BIOMINERALIZATION.....	17
2.5a	The Role of Bacterial Surfaces in Fe-Oxide Formation - Fortin.....	17
2.5b	Bacterial Biomineralization: Fe-Oxides - Kennedy.....	18
2.6	BASALT SAMPLING.....	19
2.6a	NeMO 2000 Cruise Basalt Sampling Program - J Chadwick.....	19
	2000 Axial Wax Cores Table.....	20
2.7	ENGINEERING.....	20
2.7a	PMEL-EDD Accomplishments on RHB Vents Leg I- Meinig.....	20
2.8	PUBLIC OUTREACH.....	21
2.8a	NeMO 2000 Website and Public Outreach - Goodrich/Goodrich/Merle/Bobbitt.....	21
3	NAVIGATION OVERVIEW AND POSITION INFORMATION.....	22
3.1	Navigation Overview for NeMO 2000 - Merle/WW Chadwick/Getsiv/Crowder.....	22
3.2	NeMO '00 Final Calibrated Transponder Positions.....	23
3.3	Vent and Marker Location Table.....	23
3.4	Pressure Benchmark Locations at Axial Volcano.....	26
4	NeMO 2000 OPERATIONS.....	26
4.1	NeMO '00 Dive Statistics.....	26
4.2	NeMO '00 Dive Dates, Locations, Bottom Times, Summaries and Nav Info.....	27
4.3	NeMO '00 ROPOS SAMPLES (R542 - R556).....	29
4.4	NeMO '00 EXPERIMENTS DEPLOYED/RECOVERED.....	45
5	DIVE LOGS AND DIVE MAPS (R540 - R556).....	49
5.1	Dive Map Information.....	49
5.2	Experiment/Sample Explanations and Abbreviations.....	49

DIVE MAPS: ROPOS Dives R541 - R556 pages 51 - 67
DIVE LOGS: ROPOS Dives R540 - R556 pages 68 - 231

**APRIL 2014: REPORT REVISED TO CREATE PDF.
INSERTED DIVE MAPS, DIVE LOGS, ETC. WHERE APPROPRIATE.**

Cover Images: NeMO Net is a breakthrough in ocean engineering utilizing an acoustic modem to relay data from three temperature probes and a camera to a moored buoy, which in turn sends the data to NOAA's Pacific Marine Environmental Laboratory via a GOES satellite. The prototype system, operational for one month in 1999 was succeeded in July 2000 by a more advanced system. The new system uses an ORBCOMM satellite system to SEND AND RECEIVE COMMANDS AND DATA FROM SHORE TO THE SEAFLOOR!

NeMO 2000 Dives at Axial Caldera



BACK OF MAP (FOR PRINTING)

PARTICIPATING ORGANIZATIONS

NOAA Pacific Marine Environmental Lab (PMEL)
 Oregon State University (OSU)
 Western Washington State University
 University of Washington
 University of Victoria
 University of Quebec at Montreal
 University of Toronto
 University of Florida
 Geological Survey of Canada
 University of Ottawa
 Dalhousie University
 Western Washington University
 Geological Survey of Canada

PARTICIPATING SCIENTISTS

NAME	TITLE	SEX	NAT.	INSTITUTION
Bob Embley	Chief Scientist	M	US	PMEL/NOAA
Bill Chadwick	Geologist	M	US	OSU/CIMRS
Susan Merle	Research Asst.	F	US	OSU/CIMRS
Julia Getsiv-Clemons	Research Asst.t	F	US	OSU/CIMRS
Lisa Crowder	Navigation	F	US	National Sci. Found.
Dave Butterfield	Chemist	M	US	UW/JISAO
Kevin Roe	Chemist	M	US	UW/JISAO
Julie Huber	GS/Microbiol	F	US	UW
Mausmi Mehta	GS/Microbiol	F		UW
Verena Tunnicliffe	Biologist	F	CAN.	UVIC
Jean Marcus	GS/Biol.	F	CAN.	UVIC
Anna Metaxas	Biologist	F	CAN.	Dalhousie U.
Craig Moyer	Microbiol.	M	US	WWU
Jeff Engebretson	GS/Microbiol.	M	US	WWU
Kim Juniper	Biologist	M	CAN	UQUE
Marie Maineaux	GS/Biol.	F	CAN	UQUE
Jeff Goodrich	Teacher	M	US	Lake Oswego H.S.
Chris Kennedy	GS/Geologist	M	CAN	UTOR
Danielle Fortin	Geologist	F	CAN	UOT
Jim Gendron	Chemist	M	US	NOAA/PMEL
Leigh Evans	Chemist	M	US	NOAA/PMEL
John Chadwick	Geologist	M	US	UFLOR
Chris Meinig	Engineer	M	US	NOAA/PMEL
Mike Stapp	Engineer	M	US	NOAA/PMEL
Mark Lindley	Engineer	M	US	NOAA/PMEL
Nick Delich	Engineer	M	US	NOAA/PMEL
Ben Larson	Chemist	M	US	UW
Keith Shepherd	ROPOS Team Leader	M	CAN	CSSF
Bob Holland	ROPOS	M	CAN	CFO
Keith Tamburri	ROPOS	M	CAN	Contractor
Kim Wallace	ROPOS	M	CAN	CSSF
Mike Dempsey	ROPOS	M	CAN	CSSF
Ian Murdock	ROPOS	M	CAN	CSSF

1 OVERVIEW of NeMO 2000 - Bob Embley

NeMO 2000 is the third expedition to the site of the 1998 eruption at Axial Volcano. This expedition has also been the most productive in terms of bottom time and efficiency. The lava flow area is still very active, but we have seen evidence at several sites on the '98 lava flow for a continued cooling off of the vents. However, since the caldera of Axial Volcano sits over a supply of magma delivered from deep within the earth, so it's likely that there will remain extensive active venting. Dives with the submersibles PISCES IV and ALVIN and the ROV ROPOS during the decade before the eruption revealed venting on the East Side and the ASHES vent field has been going on for at least 16 years (since its discovery). Although some of the biological communities were covered over with '98 lavas, their offspring continue to thrive in the new vents (how they colonize the new vents has been a focus of several studies on NeMO2000 (including a new study of larval dispersion by Anna Metaxas). It is clear from this years dives that the system has cooled down from the high level of activity in 1998 and the volcano may be returning to some baseline of activity. The temperature record obtained at the Cloud vent shows this particularly well. The suite of samples and measurements collected during the past three NeMO expeditions tell us much about the effects of the eruptions on the chemical and biologic systems but we also need to understand the state of the system between eruptions. The microbial community has been shown to be highly diverse during the past two years. Is this normal or was this diversity stimulated by the 1998 event? Do changes in the microbial and macrofaunal (e.g., tubeworms) communities correlate with changes in the chemistry of the hydrothermal system? How long will it be to the next eruption? Will there be signs of activity building before the eruption? For example, Hawaiian volcanoes gradually inflate (as in balloon) for a period of time preceding an eruption and then deflate when magma rises to the surface and is discharged. The deflation of Axial was measured by a pressure meter during the 1998 eruption and was about 10 feet. This year we've deployed a series of benchmarks and begun an annual program of precision depth measurements. These measurements, the bottom pressure meter placed in the center of the caldera, maintenance of the array of temperature sensors (MTRs and Hobo probes), and the annual suite of chemical and biological samples will continue to monitor the state of the volcano into the next cycle.

We have accomplished much on the three NeMO expeditions since 1998 but one of the key questions still remains. What happens during the first few hours to day of the event? Certainly, large quantities of heat and hot fluid are expelled from the seafloor during that period, but a response team has not yet arrived at a site on the Juan de Fuca Ridge soon enough to capture any of the initial fluids. The NeMO Net technology is a first step towards placement of an autonomous event response system on Axial. In 2001, we will place a chemical sampling and sensing system (probably at Cloud vent) that will send realtime chemical data back to shore. If there is an unusual event, the sampler can also be activated to recover samples for later analysis. In succeeding years, we plan to add a remote-controlled water column sampling system and dock an autonomous vehicle within the caldera.

The scientific party is grateful to the ROPOS group and the personnel of the *Ronald H. Brown* that has made this expedition a great success.

2 DISCIPLINE SUMMARIES

2.1 VOLCANOLOGY

2.1a NeMO 2000 Cruise Summary for Geology and Volcanology- Bill Chadwick and Bob Embley

We started the NeMO2000 cruise at the southern Cleft segment, and during ROPOS dives R541 and R542 we deployed 11 new extensometer instruments in a linear array across the floor of the axial valley. These extensometers will make daily measurements of the distance to their neighbors up and down the 1.2-km long array to within about 1 cm. We are using the instruments to look for horizontal deformation across the axis of spreading that might accompany magmatic or tectonic events. These new extensometers are a modified design from the prototype instruments that we have been using at Axial Volcano with NeMO. The new instruments have 5-year battery lifetimes and are placed into permanent benchmarks on the seafloor (the benchmarks were deployed last summer during the Cleft99 cruise with Jason). The extensometers will need to be revised by an ROV in future years to retrieve their recorded data via an infrared data port. In addition to placing the extensometers in the benchmarks, we also made precision pressure measurements at each benchmark to monitor for vertical deformation across the array, and we recovered and deployed HOBO temperature probes at two active hydrothermal chimneys at Vent 1. This monitoring effort at south Cleft is funded by the NSF/RIDGE Program.

At Axial, we are continuing our instrumental monitoring efforts to measure inflation and deflation of the volcano. We had extraordinary success measuring the deflation that accompanied the 1998 eruption with a combination of rumbleometers and extensometers, and now we are trying to see if Axial is re-inflating between eruptive events. We are employing several strategies to do this. First, we deployed a new Bottom Pressure Recorder (BPR) near the center of the caldera (where the maximum uplift or subsidence presumably occurs), because the old rumbleometer instruments were retired last year (there was no BPR monitoring at Axial between 1999-2000). In addition, we used a precision pressure sensor on the ROPOS vehicle for the first time and made pressure measurements at a series of 5 benchmarks that we deployed in a radial line. The benchmarks are located at the caldera center, Magnesia vent, Marker 33, Bag City vent, and the southern anomaly lava flow (10 km from the caldera center). The pressure sensor can measure the relative depths between benchmarks to within a few cm, so by making annual measurements at these benchmarks and assuming that the outer-most benchmark is stable, we will be able to see if the benchmarks closer to the caldera are moving up or down relative to the outermost one (evidence for volcanic inflation or deflation). The third prong of our instrumental monitoring effort is our prototype extensometer array, that we deployed again on Axial's north rift zone. This array measured part of the deflation signal during the 1998 eruption, but could also potentially measure extension across the north rift zone if a diking event occurred there. These prototype extensometers have to be recovered and re-deployed every year. Eventually we hope to build and deploy some of our new benchmark extensometers at Axial instead.

The other main focus of our work at Axial during NeMO2000 was continued geologic mapping of the 1998 eruption site. As during the last 2 years, this involved a combination of Imagenex sonar mapping (to produce high-resolution bathymetric maps) and visual transects on the seafloor. Imagenex data were collected during ROPOS dives R546 (14.0 hrs), R550 (11.6 hrs), R551 (4.0 hrs), R552 (4.3 + 5.5 hrs), and R554 (11.3 hrs), adding up to a total of 50.7 hrs of Imagenex survey time during the cruise. This mapping was divided between 3 separate survey areas: 1) extending our previous coverage from Marker 113 south to Bag

City vent (21.1 hrs), 2) collecting a new survey at the southern anomaly lava flow (25.3 hrs), and 3) extending our previous coverage northwest of Marker 113 (4.3 hrs). The Imagenex data were processed and displayed at sea, and we again found that our seafloor mapping efforts were much more productive when they can be viewed in the context of previously collected high-resolution bathymetry. The southern anomaly survey revealed that this lava flow is transitional in morphology between pillow and more fluid sheets. We had previously seen the pillow flow extending to the east of the axis, but this year we explored the very fluid and drained out parts of the flow near the eruptive vent on the south rift zone. The Bag City and M113 surveys helped finally convince us that the very young lavas extending from M113 southward to Joystick, Bag City and Crevice vents on the western side of what we had previously mapped as all 1998 lava - are definitely in pre-1998 lava. Visually these pre-1998 lavas are indistinguishable from the 1998 lavas, but the collapse features we see in the Imagenex survey between M113 and Crevice can be identified as pre-existing features in high-resolution sidescan sonar collected in 1987. We still think there is 1998 lava on the east side of this young pre-1998 lava, but we have not yet determined how far south the 1998 lava extends. We are still sure that the southern anomaly flow is 1998 lava (because there was a clear SeaBeam depth anomaly there), but some of the young lavas that we mapped last year between the southern anomaly flow and the known 1998 lavas are probably also pre-1998 flows. Examining pre-1998 camera tows and Alvin dives in this area will help us nail down these conclusions.

2.2 CHEMISTRY

2.2a Ron Brown, ROPOS 2000 Cruise Report -Dave Butterfield

The vent fluid sampling program has two main goals this year: 1) to re-sample the diffuse vents along the 1998 eruption zone and adjacent older lavas and 2) to re-sample hot vents within the ASHES vent field. The samples collected will allow us to evaluate sub-seafloor reaction processes, contribute to our understanding of the nature of different sub-seafloor hydrothermal reservoirs, and relate the chemistry of hydrothermal fluids to the geologic surroundings and the microbial community structure. We are tracking the evolution of fluid composition at Axial to understand long-term and post-eruption changes in the hydrothermal system. The fluid chemistry data provide important environmental constraints for the study of macrofaunal and microbial communities.

The primary sampling tool for vent fluids is once again the Hydrothermal Fluid and Particle Sampler, commonly known as The Beast. The Beast has a $\frac{1}{2}$ " outer diameter fluid flow pathway of titanium and teflon, 6 PVC pistons (5 used for gas analysis and 1 for general chemistry), 8 bag samplers (Kynar inert plastic). There are 10 filter sets to collect particles without water, and the default filter setup for this cruise has been four 0.45 micron polycarbonate membrane XRF filters, one 0.2 micron lipid filter, 2 double in-line 3 micron/sterivex combination filters, two 0.2 micron membrane filters for Fluorescent In-Situ Hybridization (FISH), and one sterivex filter for DNA extraction. In addition, two of the bag samples had in-line 0.45 micron polycarbonate filters. The Beast was transferred to the Brown on July 4th from the Atlantis, along with Dave Butterfield, Kevin Roe, and Ben Larson. Chris Meinig and Nick Delich provided important shipboard support. The Beast provides samples for fluid chemistry (Dave Butterfield, Kevin Roe), particle chemistry (Jim Gendron/Richard Feely), microbiology (Julie Huber, Mausmi Mehta), rare gas chemistry (Leigh Evans/John Lupton), shipboard methane/hydrogen/nitrous oxide measurement by GC (Ben Larson/Marv Lilley), carbon isotopes (Kim Juniper), and various other analyses. Samples are divided and preserved for extensive shore-based analysis.

Shipboard analysis this year included gas chromatography for methane/hydrogen and nitrous oxide, pH and alkalinity, hydrogen sulfide, ammonia, and chloride. Once again, we sampled vents along most of the hydrothermally active portion of the 1998 lava flow. The northernmost active site this year was marker N3, south of Magnesia, which appeared totally inactive. Output at marker 33 appeared somewhat diminished from 1999, and the marker 108 area was dying out. Joystick was also much less active, and temperatures were less than 6 degrees C. A new site venting 10 degree C fluids between Joystick and Bag City, dubbed Iron City, was sampled and had H₂S below the detection limit (< 1 micromol/liter). A preliminary look at the shipboard data indicates no striking changes in chemistry from 1999, but further analysis is needed for a meaningful comparison.

2.2b Gas Sampling - Leigh Evans

The goal of this year's gas sampling is to build time series observations with NeMO '98 and '99 at as many vents as possible. These include several diffuse venting sites from the eastern part of the volcano's caldera and high temperature vents at Ashes vent field in the west. In some cases, a lack of venting at the precise sites from previous years necessitated sampling vents in the same neighborhood.

Vent fluids were sampled by two methods, gastight bottles and the PMEL Hot Fluid Sampler. Their gas contents were extracted into glass ampules for chemical analysis on land. These include helium concentration and isotope ratio, hydrogen, methane, carbon dioxide and others. The liquids leftover will be analyzed for magnesium and possible silica to determine the degree of dilution by seawater.

2.2c Studies of Dissolved Gasses from Hydrothermal Fluids - Ben Larson

Our research involves the study of dissolved gasses from hydrothermal vent systems. The measurements essential to this study were accomplished on this cruise via an SRI 8610C gas chromatograph using samples obtained from Dave Butterfield's vent fluid sampler. Concentrations of methane, hydrogen, and nitrous oxide were measured in fluid samples ranging in temperature from 4°C at Joystick vent to 302.2°C at Inferno vent. Dissolved methane and hydrogen are an important diagnostic tool for the microbial activity occurring within the hydrothermal vent community as hydrogen is consumed and methane is produced in the microbial process known as methanogenesis. The methane and hydrogen concentrations from this cruise data will be analyzed in the context of the ongoing data set acquired from previous cruises to this region. In addition to methane and hydrogen, a new dissolved gas, nitrous oxide, was measured as well. Our current method of N₂O measurement precludes measurement of this gas in fluids having high CO₂ concentrations such as those fluids from high temperature vents, however, we were able to collect N₂O data on several of the diffuse flow vents. N₂O concentrations are interesting because N₂O is an intermediate in the denitrification process that removes dissolved nutrients from the water, thus making them unavailable for biological uptake. The N₂O data collected on this cruise will be further analyzed to determine what conclusions, if any, can be made regarding denitrification in diffuse flow environments.

2.2d NeMO 2000 Sample Report - Jim Gendron

During the NeMO 2000 cruise I collected 18 filters for XRF analysis, and 15 filters for SEM analysis back at PMEL. I also analyzed 17 vent fluid samples for pH, and 25 for alkalinity on board ship.

2.3 MICROBIOLOGY

2.3a Microbiological Sampling for Molecular Microbial Ecology Analysis. Western Washington University, Biology Dept. - Craig L. Moyer & Jeff Engebretson.

Introduction

A challenge to microbial ecologists is the accurate description and identification of microbial populations within their respective communities. Because hydrothermal vent communities are so obviously dependent on their respective microbial populations, understanding the abundance and diversity in the vent environment is very important for integrated biological studies. Furthermore, scientists have recently hypothesized that if life were to exist on other global systems it would likely be analogous to hydrothermal vent systems here on earth. Perhaps modern communities at hydrothermal vents are evolved directly from the first microbial communities on early earth. To address the challenge, molecular biological techniques using small-subunit ribosomal RNA (ssu rRNA) gene sequences have been applied to describe the structure and diversity of different microbial communities. The current endeavor is to examine specific habitats with known biogeochemical characteristics (e.g., S, Fe, Mn) to learn more about the dominant microorganisms residing therein. The focus of this study at Axial Volcano is to assess the microbial community structure at local hydrothermal vent habitats (i.e., vent-associated sediments, free-living microbial mats, microbes associated with subsurface floc-ejecta). Succession in the microbial community will also be analyzed with the data collected via Nemo'98, '99 and '00. This study will also allow for the enhanced development of a comprehensive global perspective regarding the diversity of deep-sea microbial communities.

Selective enrichment culture has severe limitations as an approach to the study of naturally-occurring microbial populations. The majority (typically >90-99%) of microbes in nature have not yet been cultivated using traditional techniques. A further exacerbation is that "weedy" or opportunistic microorganisms preferentially grow in the relatively nutrient-rich media used for isolations. Consequently, it is very unlikely that collections of microbial isolates are representative of *in situ* diversity and community structure. The approach, herein, is to ascertain a microbial community's primary members through molecular (i.e. cell component) means and then to attempt to further characterize their respective phylogeny or natural history. These lessons can then be used to focus selective enrichment culture techniques toward related, previously-identified ecologically significant taxa. This approach has been successfully used to isolate the dominant iron-oxidizer bacterial taxon found within the microbial community at hydrothermal systems located at Loihi Seamount, North Gorda Ridge, and other habitats (Emerson and Moyer, 1997; unpublished results).

Cell component analyses provide a culture-independent means of investigating microorganisms as they occur at hydrothermal vent systems (Moyer *et al*, 1994; 1995; 1998). The focus of our study will be to analyze the SSU rRNA gene. Each SSU rRNA gene contains regions which are highly conserved (the same from one organism to another) and regions that are variable. The variable regions will allow us to not only

discern one organism from another but also to identify how closely related they are. In addition, the phylogenetically described taxa or "phylotypes" can be placed in a synecology context through the examination of SSU rRNA clone libraries generated from a microbial community and habitat diversity can be analyzed through rarefaction (Moyer *et al*, 1998). The phylotypes at Axial volcano will be analyzed with other microorganisms in an evolutionary context by the use of an online database called the Ribosomal Database Project (RDP) at NSF's Center for Microbial Ecology at Michigan State University. The RDP currently contains over 15,000 partial and whole SSU rRNA sequences.

Experimental Design and Methods

Shipboard Processing and Storage of Samples

Microbial sampling occurred by three approaches. First, a suction device was used to obtain free-living and microbial mats from the surface of various hydrothermal vent habitats. The samples were contained in a sample bottle by the use of 202 mm nylon mesh. During NeMO 2000, suction samples were obtained from Marker 33, Cloud vent, Bag City, Marker 113, Hillock/Phoenix vent, Hell vent and an Fe-hydride site at the base of the west wall of the ASHES vent field.

Second, the deployment and recovery of microbial traps at diffuse-flow vents. Microbial traps were constructed using glass wool as a substrate for microbial growth placed inside a cluster of three 3" sections of 4" o.d. plexiglass tubing, surrounded top and bottom by a 202 mm nylon mesh (Nytex) to exclude macrofauna and meiofauna grazing. These were deployed with the idea of achieving a time-series on both a short-term (days) and long-term (annual) scale. The objective was successfully achieved with long-term recoveries made at Marker #33, Gollum, Ropos and Mushroom vents. Short-term recoveries were also made from Marker 33 and Cloud vent. Traps deployed for long-term recovery were at Marker #33, Gollum and Ropos vents. Overall, Marker 33 and Cloud vent are the sites where we will be getting thorough time-series data as both short- and long-term recoveries were made at these sites from NeMO'98 through NeMO'00.

A third method of collection was with the use of an osmotic pump which was deployed at Marker #33 during NeMO '99. A small diameter (1.2 mm) capillary was used to continuously collect free-floating bacteria for approximately one year. Preliminary results show that approximately 0.8 mls of diffuse-flow vent fluid were collected per day.

Microbial samples collected were each independently processed. Microbial biomass preservation was achieved by quick-freezing in liquid nitrogen and storing on dry ice until return to the laboratory. These samples will be used for the direct extraction of nucleic acids. A series of subsamples were also (i) cryo-preserved (again using liquid nitrogen quick-freezing) with 40% glycerol, and (ii) aliquots were stored at 4° C, both for enrichment culture and selection. Another series of subsamples were fixed with 2.5% EM grade glutaraldehyde for examination with SEM and epifluorescence microscopy.

Laboratory Processing and Molecular Biology Analyses

Initially, all samples will be examined by epifluorescence microscopy to ascertain biomass estimates and examine morphological diversity. A subset of these will also be examined through SEM and an analysis of extractable lipids, which provides an estimate of microbial biomass and initial clues into community structure. The overall DNA-analysis strategy used will be essentially that of Moyer *et al*. (1994, 1995, 1998) with a few technical and logistical improvements. The first step will be the efficient and direct extraction of high molecular weight nucleic acids from quick-frozen samples. This will be followed by polymerase chain reaction amplification of SSU rDNAs using previously defined conditions to maximize the equal representation from each population contained within a respective community. The concept is to proportionally amplify from the total genomic DNA with the use of oligonucleotide primers that are universally conserved among all eubacteria. Representative amplification products are then cloned in order to construct a clone library of

the community's SSU rDNA genes. Clone libraries will then be examined through the use of Amplified Ribosomal DNA Restriction Analysis (ARDRA) and by using rarefaction as a metric for organismal diversity (Moyer *et al.*, 1998). This approach, using tetrameric restriction endonucleases, has been shown to detect >99% of the taxa (i.e. phylotypes) present within a model data set with maximized diversity (Moyer *et al.*, 1996). SSU rDNA sequences will also be subjected to phylogenetic analyses (using distance matrix and maximum likelihood algorithms) to estimate the affiliated ancestral lineage for each dominant community member thereby yielding clues as to their respective evolutionary history and potential physiology.

References:

Emerson, D., and C.L. Moyer. 1997. Isolation and characterization of novel iron-oxidizing bacteria that grow at circumneutral pH. *Appl. Environ. Microbiol.* 63:4784-4792.

Moyer, C.L., F.C. Dobbs and D.M. Karl. 1994. Estimation of diversity and community structure through restriction fragment length polymorphism distribution analysis of bacterial 16S rRNA genes from a microbial mat at an active, hydrothermal vent system, Loihi Seamount, Hawaii. *Appl. Environ. Microbiol.* 60:871-879.

Moyer, C.L., F.C. Dobbs and D.M. Karl. 1995. Phylogenetic diversity of the bacterial community from a microbial mat at an active, hydrothermal vent system, Loihi Seamount, Hawaii. *Appl. Environ. Microbiol.* 61:1555-1562.

Moyer, C.L., J.M. Tiedje, F.C. Dobbs and D.M. Karl. 1996. A computer-simulated restriction fragment length polymorphism of bacterial SSU rRNA genes: efficacy of selected tetrameric restriction enzymes. *Appl. Environ. Microbiol.* 62:2501-2507.

Moyer, C.L., J.M. Tiedje, F.C. Dobbs and D.M. Karl. 1998. Diversity of deep-sea hydrothermal vent Archaea. *Deep-Sea Res. II.* 45:303-317.

2.3b Hydrothermal Fluid Microbiology - Mausmi Mehta and Julie Huber, University of Washington

Because so little is known about the subsurface biosphere, scientists use a variety of "windows" to peer into this world, such as looking for evidence of microbial activity in deep sea basalts or examining diversity in hot springs on land. Our work at Axial uses diffuse fluids as a window into the subsurface and combines molecular, culture, and microscopic techniques to characterize and quantify microorganisms in diffuse fluids and examine their link to fluid chemistry in the subsurface biosphere at Axial Seamount over both time and space. This research will allow us to better understand the interactions between microbes and hydrothermal fluids, as well as examine the possibility of subsurface biotopes and how these biotopes may be related to one another, if at all, at Axial Seamount.

Using the hot fluid sampler, we have collected over 15 samples of diffuse fluids from the southeast rift zone and the ASHES vent field, as well as some higher temperature fluids from ASHES. We attempted to re-sample vents we have previously sampled in 1998 and 1999 to continue our time series study of changes in the microbial community and chemistry of fluids at Axial after the dike-eruptive event in January 1998. The diffuse fluids were used for culturing mesophiles, thermophiles, and hyperthermophiles on board in a variety of media, mostly anaerobic. The fluids were also preserved for microscopic counts on land, and we once again performed a number of quantitative enrichments (MPNs, Most-Probable Number technique) to monitor the presence of hyperthermophiles at certain vents over time. Preliminary results indicate there are still high numbers of anaerobic, heterotrophic, sulfur-using, hyperthermophiles at Marker 33, Marshmallow, and Cloud N6 vents, as well as significant numbers of hyperthermophilic methanogens at these vents and Gollum vent. The high numbers of cultures obtained from Marshmallow is especially surprising due to the high temperature of the fluid, with a maximum measured temperature of 150 °C.

With the hot fluid sampler, we were also able to obtain a variety of in-situ filtered fluid samples for DNA extraction to look at microbial diversity, FISH (Fluorescent In-Situ Hybridization) to quantify and

track certain microbes within and between vents, and lipid analysis to quantify and determine the physiological state of microbes. These filtered samples will be used in the time series study, as well as some new projects we are starting at Axial Seamount. One new aspect of our work is the search for nitrogen-fixing microorganisms that could be providing a source of fixed organic nitrogen to the rest of the vent community. The nitrogen cycle at hydrothermal vents has not been thoroughly investigated, but nitrogen isotope data indicate that nitrogen-fixation could be occurring at hydrothermal vents; and the fact that several thermophilic methanogens that have been isolated from vents possess the nitrogen fixation gene suggests that nitrogen fixation may be an important process here. One of the techniques that are being used in this search is an in-situ nitrogen fixation assay that involves using acetylene instead of nitrogen gas as the substrate for nitrogenase - the enzyme responsible for fixing nitrogen. Another method is to amplify and sequence the nitrogenase gene from the filtered fluid samples in order to get an estimate of the importance and diversity of nitrogen-fixing microorganisms at hydrothermal vents. These new methods, combined with our time series work, will allow us to better understand the microbial ecology of hydrothermal fluids.

Due to its variety of hydrothermal fluids and our ability to sample it over time, Axial provides an excellent window into the subsurface environment. By using a combination of molecular and culture methods to examine the unique microorganisms living in the subsurface, as well as working with geologists and chemists, we hope to better constrain the subsurface environment at Axial Seamount.

2.4 MACROBIOLOGY

2.4a Macrofaunal Ecology Report - Marcus, Metaxas, Tunnicliffe

NEMO 2000 was a very successful cruise for the macrobiology collections and observations. Dive coordination and ROV configuration plans allowed us to retrieve a large number of varied samples (see attached list) for numerous projects. The fauna are directly linked to geological, hydrological and microbial dynamics. In that sense, the interdisciplinary nature of the NEMO program is essential to understanding the setting of the Axial community and the response to the 1998 eruption. Three of the major studies in this program include: Time-series on the new lavas - Temporal change of community composition on the new lavas is the subject of Jean Marcus' PhD dissertation. This third year of collection has been vital to the sequence, especially as the tubeworm is establishing in all sites. She was able to replicate eight sites from 1999 and six from 1998. While the numbers remain a statistical challenge, it is the first time anyone has examined the complete faunal sequence of new vents. Corresponding information from water chemistry, temperature records and microbial dynamics will form a uniquely complete picture.

We had the opportunity to sample not only the tubeworms but the peripheral zonation of one vent. It is possible that spatial displacement of some taxa may occur with time. The time-lapse camera was recovered from Marker 33 after a second year-long deployment at this site. We will have 550 images over the two years to examine faunal changes.

We will continue to examine conditions of optimal growth and recruitment of tubeworms. The 1998 samples from Nascent/N41 showed very large numbers of recruits appearing but high mortality (likely grazing). Repeat sampling from 1999 and 2000 will allow us to follow the growth of cohorts and changing recruit abundance as water chemistry shifts.

Larval Dynamics - One of the missing pieces to the puzzle of community development at vents is the role of larval supply. Our long-term goal (3 years) is to examine spatial variability in larval supply and recruitment among vents with different histories. A series of plankton collections were done using different sampling

devices, to obtain a preliminary synoptic view of larval abundance in different areas of Axial Seamount. Net tows over the South Pillow Mound and near Bag City showed greater larval abundance near the vents than over SPM. We collected several samples with a pump, over South Pillow Mound, while transiting between vents (Bag City to Joystick), and at Cloud vent, where we found the greatest larval abundance. Additionally, we deployed passive larval traps at ASHES and Mkr 33 for 10 and 13 days, respectively. Preliminary examination of the samples indicates that gastropods and polychaetes were the most abundant larvae, using all collection methods. Copepods, ostracods and foraminiferans were the most abundant taxa in the samples. We will use this year's data to design a more detailed sampling scheme for next year.

Gastropod Ecology - The most abundant animals on Juan de Fuca Ridge vents are two species of gastropods (the limpet and glob snail). Nothing is known of their ecology, requirements or interactions. A new student's thesis will be built on this theme. The extant sample suites will be examined for population characteristics and interactions of these two species. Some fine close-up video will augment habitat information, as will the time-lapse images. We were able to collection these and several other gastropod species for physiological analysis by a Washington State colleague. He (Ray Lee) will meet the ship to retrieve live specimens for respiration measurements.

Highlights

New Lava Communities - There are notable changes in the community composition at vents on the new lavas over the 30 months since the January 1998 eruption. While only a small sample could be analyzed on the ship the table below gives an impression of the marked shift in animal representation that has occurred. Some polychaete groups predominated at the initial phases, then pandora and palmworms moved in but the numbers of snails and limpets increased to predominate the current sample.

Marker 33, Southeast Rift Zone: suction samples from the venting crack.

Taxon	7 months	18 months	30 months
tubeworm	not present	Present	present
alvinellid worms	12.90%	22.10%	2.84%
Polynoid scaleworms	43.11%	3.55%	0.96%
other polychaetes	40.18%	7.11%	2.42%
Snails and limpets	1.76%	62.54%	87.26%
copepods/ostracods	2.05%	4.69%	6.04%
Sea spiders	0.00%	0.00%	0.48%
Total	100.00%	100.00%	100.00%

New Species - It is always exciting to find new species - in the past, some new vent species have represented major finds for systematists. While we cannot know what we have until the specialists see them, there are three animals that warrant close attention. On the new lavas, a small golden snail has appeared in several samples. It is unusual as it is always associated with tiny attached juveniles as if it is brooding its young. Secondly, two specimens of a high spired limpet were found near Castle - sampling outside the immediate vent are often turns up overlooked species. Thirdly, and most interesting, is the blueberry mat seen at Oldworms, Marker 113 and other locations. Its coverage resembled a known single-celled protozoan but it is clearly a metazoan with haemoglobin. Observed closely in video, the anterior end extends far from the tube and synchronized retraction is observed. Lastly, the new scaleworm (*Bathybahamas* sp. nov.) that was so common on the new lavas was rarely observed this year.

New Approaches - The biggest failure in the cruise was a timed pumping system to be deployed for a year to gather larvae and particulates. It failed on the deck. However, we had the loan of a filtration system on the submersible for large volume samples. Hundreds of litres were pumped through meshes fine enough to capture larvae. Secondly, two plankton tows with a small net in the submersible arm gave excellent returns. Thirdly, coordinated visual observations during Imagenex runs will allow us to document larger animals in the waters above the vents. And lastly, the cruise allows the first experimental deployment of collecting tubes for settling larvae. All these techniques together will allow us to develop a project to examine the dispersal of vent organisms through larval stages and their interaction with the overlying zooplankton.

Macrobiology Sample List - NeMO 2000

Investigators: J. Marcus, A. Metaxas, V. Tunnicliffe

This listing includes samples targeted for us, samples shared with others and subsamples from other types of samples

South Cleft

1. R542-1: **Extensometer #2**, wood block riddled with boring bivalves and polychaetes
2. R542-7: **Chimney #327**, tube worm grab from chimney

South Rift Zone, Axial Seamount

Suction Samples

3. R543-8: **Mkr 33**, suction where tube worm grab was taken
4. R546-1: **Benchmark 66**, suction of mud on South Pillow Mound
5. R547-23: **Snail**, suction of fauna
6. R547-31: **Mkr N6 (Cloud)**, suction of fauna on vent periphery
7. R548-6: **Bag City**, suction of fauna on vent periphery
8. R548-10: **Joystick**, suction where tube worm grab was taken
9. R548-11: **Joystick**, suction of fauna on vent periphery
10. R549-9: **Mkr N6 (Cloud)**, suction of fauna an intermediate distance from vent
11. R549-14: **Mkr 108**, suction of fauna
12. R551-13: **Mkr N6 (Cloud)**, suction of fauna a far distance from vent
13. R551-14: **Mkr 113**, suction of fauna
14. R556-033: **Mkr 113**, suction of peripheral fauna
15. R556-06: **Mkr 113**, suction of live animals

Tube worm grabs

16. R543-11: **Mkr 33**, spot near time-lapse camera site, deployed MTR # 3289 in same spot
17. R543-18: **Nascent**, grab from spot where MTR #3175 was, deployed MTR #3287 and Mkr "N"
18. R543-19: **Mkr N41**, two grabs separated by ~ 5m, recovered MTR #3041, deployed MTR #3334
19. R548-2: **Bag City**, grab near Mkr 36 where MTR #3049 recovered and MTR #3315, 3197 deployed
20. R548-8: **Joystick**, tiny grab of worms down in pit, vent appears to be dying
21. R549-5: **Mkr N6/21 (Cloud)**, grab on edge of pit where MTRs # 3208, 4101 deployed, VEMCO #1108 and MTR #3157 recovered
22. R549-12: **Snail**, small grab of only existing clump of tube worms

23. R552-1: Mkr 113, grab from edge of collapsed pit ~5m from fallen marker; MTR#4126 deployed a few metres away.

McLane pump plankton samples

24. R546-3: Imagenex lines on Southern Pillow Mound, pumped for first half of lines, ~4985 liters, 125 micron mesh
25. R548-13: Bag City to Joystick vent, pumped 306 liters, 125 micron mesh
26. R549-10: Cloud area, during video survey by Juniper, 320 liters pumped, 125 micron mesh
27. R552-4: Imagenex lines south of Bag City, 1612 liters pumped, 63 micron mesh

Plankton net samples

28. R546-4: Imagenex lines on Southern Pillow Mound, towed net for all lines.
29. R552-5: Imagenex lines south of Bag City, towed for ~5 hours at $\frac{1}{2}$ knot speed

Larval traps

30. R556-1: Mkr 33, larval trap #2
31. R556-2: Mkr 33, larval trap #1
32. R556-3: Mkr 33, larval trap #4
33. R556-4: Mkr 33, larval trap #3

Others

- R543-21: Mkr 33, time lapse camera recovered after year-long deployment
34. R547-36: Castle, limpets and snails on sulphide chimney grab
35. R549-16: Mkr 108, blue mat, limpets and polychaetes on rock sample

ASHES, Axial Seamount

36. R544-14: Mushroom, McLane pump of flange, 125 micron mesh
37. R545-5: Ropos vent, limpets, anemones on basalt piece
38. R545-2: Gollum, suction sample for *Provanna* snails
39. R545-10: Hell, *Temnocinclis* limpets on dead sulphide spire

Larval traps

40. R555-1: Larval trap #8
41. R555-2: Larval trap #6
42. R555-3: Larval trap #7
43. R555-4: Larval trap #5

2.4b Food Web Dynamics, Deposit Feeding by Sulphide Worms and Collection of Sulphides for Study - Kim Juniper Lab

Kim Juniper and Marie Morineaux from the GEOTOP Centre at the University of Quebec at Montreal participated in the NeMO 2000 ROPOS cruise. Fieldwork focused on themes of food web dynamics, deposit feeding by the sulphide worm and the collection of sulphides for a laboratory-based study of microbial weathering.

Food Web Dynamics

Samples were collected for the third field season of a study of the post-eruptive development of food webs at new hydrothermal vents. This study is primarily being conducted by PhD

student Christian Levesque. The study is using stable carbon, nitrogen and sulphur isotope analyses of animal tissues and detrital material to identify food sources and trophic levels within the faunal community. Close collaboration and sample sharing with Jean Marcus and Verena Tunnicliffe will permit this work to be correlated with their study of colonization of new vents and subsequent community change. The stable isotope work is being complemented with lipid analysis in both animal tissues and particulate material. During the NeMO 2000 field program we sampled fauna from 10 vents on the 1998 lava flow.

Sulphide Worm Feeding

Work continued this summer on the deposit-feeding behavior of the sulphide worm, *Paralvinella sulfincola*. This work is the focus of a MSc thesis in oceanography by Marie Morineaux. Video observations were concentrated on the comparison of sites of low and high flow rate, to examine environmental influences on feeding activity. We also made use of the zoom lens on the ROPOS 3-CCD camera to document the collection of particles by the sulphide worm. Close-up imagery clearly showed the animal to be picking up particles of microbial mat with its oral tentacles, frequently collecting several pieces of mat at once before retiring to its tube where presumably the material was ingested.

A large, intact piece of sulphide worm habitat was collected and sampled for molecular and lipid analysis of the adhering biofilms. The portion of the study is aimed at characterizing the microbial community colonizing the exterior mineral surfaces in the sulphide worm habitat. Comparison of microbial assemblages on bare rock as opposed to those living on the tubes of the sulphide worm will also enable us to identify the influence of the animal on microbial succession.

Microbial Weathering of Sulphide

Samples of sulphide were collected to begin a study of the microbial weathering of sulphides by Richard Leveille, a CanRidge post-doctoral fellow who will begin work in September 2000 at UQAM. Richard will also collaborate on the project with Steve Scott and Grant Ferris at the University of Toronto and Anthony Williams-Jones of McGill University. This study will be laboratory based, using a pair of high temperature/high pressure chambers to weather sulphides over long incubation periods in the presence and absence of microorganisms. The work will be complemented with electron microscopic studies of the spatial and textural relationship between microorganisms and mineralization patterns in weather sulphides.

2.5 IRON OXIDES AND BIOMINERALIZATION

2.5a The Role of Bacterial Surfaces in Fe-Oxide Formation - Danielle Fortin, University of Ottawa

Bacteria possess a very reactive cell wall which is composed of numerous surface binding sites, such as carboxyl, hydroxyl, phosphate and amine groups. These binding sites show acid-base properties and interact strongly with dissolved elements such as metals. Bacterial cell walls are known to sorb large amounts of metals, but can also nucleate various minerals under solution saturation conditions. Such minerals are often called biogenic minerals and include Fe- and Mn-oxides, silicates, sulfides and carbonates. Biogenic minerals are generally small (1-50 nm in diameter), poorly ordered and in close association with the outer layer of the cell wall. Due to their small size and poorly

crystalline structure, they are believed to be highly reactive toward other dissolved species. The question is then, how do biogenic minerals form and how different are they from abiotic minerals, i.e., minerals formed in the absence of bacteria?

Bacteria have been shown to exist under a wide range of physico-chemical conditions in hydrothermal sea vent environments. They are observed in the vents where they are involved in redox reactions and away from the vents, at much lower temperature. Fe-oxides are also widely present in such environments. They are found on high temperature sulfide chimneys, low temperature chimneys, in close association with microbial mats and even on pillow lava on the sea floor. How do they form and what is the role of bacteria in their formation? We hope to answer these questions by studying the formation of Fe-oxides under two sets of laboratory experiments. The first experiment will deal with systems showing chemical conditions mimicking the aqueous chemistry of the sample location and use "in situ" bacterial strains. We have inoculated a basic marine growth medium with each Fe-oxide sample collected at Axial (see table), in order to obtain "in situ" strains that can be chemically characterized (through acid-base titration) and used as bacterial surfaces for mineral nucleation. Results from this experiment will be compared to the mineralogical, physical and chemical characteristics of Fe-oxides collected at Axial, a study by Chris Kennedy from the University of Toronto. The second experiment will use the same bacterial strains to study basalt weathering. Sample collection at Axial has indeed shown that some old pillow lava show signs of surface weathering and that Fe-oxides are formed 1 to 2 mm below the surface of the rock. Sterile small fragments of old lava collected at Castle and Coquilles will be exposed to the "in situ" bacterial strains and compared to abiotic systems. Both systems will be analyzed overtime for mineral dissolution (i.e., Fe release) and Fe-oxide formation, in order to assess the microbial weathering. Results from this experiment will be compared to SEM (scanning electron microscopy) and X-ray diffraction analysis performed on the weathered basalt samples from both sites.

2.5b Bacterial Biomineralization: Fe-Oxides - Chris Kennedy, University of Toronto

What initially was seen as an orange "fluff" sitting on freshly formed basalt was later shown through SEM and TEM studies from the 1998 and 1999 NeMO cruises to have a microbial component to it. The composition was determined to be iron oxyhydroxide, more specifically ferrihydrite, a mostly amorphous mineral. It is formed on bacterial surfaces and is found in many different environments such as acid mine drainage sites, soils and now around hydrothermal vents. Fe-oxides are capable of absorbing many types of environmentally toxic chemicals, and as a result, there is much interest into the formation of Fe-oxides. Their presence around vent systems generates both curiosity and many questions as to their formation which this study hopes to provide some answers for.

Ferrihydrite is thought to form on nucleation sites provided by bacterial cell walls, but whether bacteria are playing a direct or indirect role is still unknown in hydrothermal vent systems. Past studies have shown bacteria's metabolism to be involved in the formation of Fe-oxides (i.e. in acid mine drainage sites at low pH) and as a result, the question arises as to whether bacteria at hydrothermal vents are metabolically driving the nucleation of minerals. Danielle Fortin will attempt to answer this question as a part of her research at the University of Ottawa, but regardless of the bacteria's metabolic role in mineral formation, an association exists between bacteria and minerals and it is this association that will be the focus of this study.

The first objective will be to determine the chemical and mineralogical nature of the samples obtained (see attached table). The samples recovered contained both a "fluffy" Fe-oxide (found as deposits on the seafloor) and a weathering Fe-oxide product on pillow lava. Are they formed through the same processes, is there even a microbial origin for basalt weathering? TEM and SEM will be done to provide an indication as to the extent of the bacteria present in the Fe-oxide samples. The mineralogical structure will be analyzed by XRD to determine if indeed all the Fe-oxide is the amorphous ferrihydrite, or if the Fe-oxides are more crystalline. For any samples with a crystalline structure, it will be important to determine if any bacteria are present. ICP-MS will be done to determine the relationship between the Fe-oxides and the trace elements sorbed to them.

From here, other questions will attempted to be answered based on the initial characterization of the obtained samples. Are there differences in Fe-oxide minerals related to the age of the samples? Fe-oxides at Ashes have been around for years while at Magnesia, Fe-oxides are only a year old. What inhibits or enhances the formation of Fe-oxides? The origins of the Fe-oxides would also be interesting to look at as some Fe-oxides form in mounds such as at Fe-city and Fe-hyde while some Fe-oxides are the by-product of Fe-sulfide oxidation. Another potentially interesting idea is bacterial fossilization. As these bacteria are forming iron type sheaths around them, the potential for fossilization is quite good. From obtaining an understanding as to the extent of preserved bacteria in these samples, future work could include looking at other modern day hydrothermal sulfide deposits and determining if bacteria have been preserved within. If positive results are obtained, looking at other older deposits for bacteria would be attempted. From here the imagination begins to wander as to the possibilities this could lead to, who knows, this study could even assist in the search for evidence of life in our solar system....

2.6 BASALT SAMPLING

2.6a NeMO 2000 Cruise Basalt Sampling Program - John Chadwick

The basalt sampling program obtained 13 wax core samples (11 at Axial, 2 on the southern Cleft segment of the Juan de Fuca ridge) between ROPOS dives, and 35 samples from ROPOS itself. The total for the three-year NeMO program is 124 obtained by wax corer and 105 collected by the submersible, for a total of 229. These basalts are being used to 1) characterize the geochemical gradients in the Axial seamount and rift zone areas, to identify the effects of fractionation and magma mixing in these areas, and to understand how Axial interacts with the Juan de Fuca ridge; 2) to understand the age relationships in the rift zones; and 3) to characterize the geochemical variations in the 1998 lava flow.

Major element, trace element, and isotopic data for the basaltic glass samples are being collected using X-ray fluorescence, electron microprobe, thermal ionization mass spectrometer, and laser ablation techniques. Combined with morphologic and tectonic information from sonar maps, the geochemical data has been used to identify spatial and temporal patterns in geochemistry in the region, as well as different magma sources for the Axial rift zone eruptives.

The intensive basalt sampling program at Axial has revealed geochemical gradients that peak in the caldera region and decline into the northern and southern rift zones, trends that are similar to other hotspot/ridge interactions. The rift zones are composed of parallel-trending sets of dike-fed ridges that emanate from the flanks of Axial seamount and have been suggested to be acting as a segment of the Juan de Fuca ridge, albeit a magmatically oversupplied one. However, age

relations discovered by the NeMO sampling suggest that the basalts are increasingly younger from west to east (indicated by the amount of weathering of the samples, amount of sediments recovered with them, and bathymetry), observations that are inconsistent with a normal symmetrical spreading center. The recent interaction of the ridge and hotspot (only 200,000 to 500,000 years) suggests that the upper mantle portion of the magma plume that feeds Axial may be adjusting to the new tectonic setting, and may be temporarily migrating to the east.

2000 Axial Wax Cores							
number	lat	lat_min	long	long_min	sample	location	
RC 111	44	40.002	130	25.6	sediment	South Cleft	
RC 112	44	35.002	130	25.799	basalt	South Cleft	
RC 113	45	54.991	129	58.949	fresh-1	1998 flow	
RC 114	45	54.1	129	51.454	altered-3	E. of Axial	
RC 115	45	53.412	129	51.618	altered-3	E. of Axial	
RC 116	45	49.699	130	1.9	less alter-2	SRZ	
RC 117	45	49.138	130	1.01	fresh-1	SRZ	
RC 118	45	55.001	129	58.102	check	E. of 1998	
RC 119	46	3.37	129	59.57	fresh-1	NRZ	
RC 120	46	3.712	130	0.555	less alter-2	NRZ	
RC 121	46	4.2	130	1.649	altered-3	NRZ	
RC 122	46	3.303	130	0.802	less alter-2	NRZ	worry about the large chunk...it was on the deck
RC 123	45	50.39	129	59.09	less alter-2	E. of SRZ	

2.7 ENGINEERING

2.7a PMEL-EDD Accomplishments on RHB Vents Leg II - Chris Meinig

(These are in no particular order)

- Extensive work was done in port to remove a Trackpoint II transducer and install and test an Edgetech PS-8000 transducer on the extensible mast of the RHB. The PS-8000 rangemeter electronics was installed in the CME office and cables were run to the ROV control room.
- The NemoNet 2000 camera was tested, deployed and positioned with ROPOS near Marker 33. A temperature tripod with two RTD was place in the clump of tubeworms. Nominal temperature in the worms was 11 deg C. Several tiles and temperatures were taken to make sure camera was operating properly.
- The NemoNet surface buoy was deployed about 300m due west of the camera. Buoy electronics was monitored while the camera was interrogated from the RHB. All tests checked out ok. Anchor position was surveyed from the surface.

- The NemoNet 1999 camera was recovered using a dropped mooring with a line canister. The 1999 camera was moved near the mooring and made fast by ROPOS with a snap hook. The acoustic release was tripped from the surface and the entire mooring was successfully recovered.
- Eleven Benchmark Acoustic Extensometers were deployed to the seafloor in two elevator drops. Each elevator drop had to be surveyed in from the surface to provide a dive target. The extensometers were then placed in steel benchmarks already on the seafloor. Instruments #2-9 were interrogated via infrared link and the data was downloaded to a computer.
- 4 "classic" extensometers were deployed via the elevator and placed by ROPOS at predetermined positions. Elevator was successfully recovered.
- The hot fluid sampler was installed on three ROPOS dives. Several minor problems with telemetry and power were troubleshot and solved.
- 5 mini-benchmarks were deployed on two separate ROV dives. The cage was rigged to drop the mini-benchmark from an actuated cylinder.
- An MTR mooring was surveyed from the surface using Workboat and found to have the wrong acoustic release. #49 & #50 had been switched.
- Two flooded Hobo temperature probes were diagnosed for data recovery. No data was recovered. Instruments should be sent to the manufacturer.
- Three TR-6000 acoustic beacons were deployed and recovered.

Please give special thanks to CME Mike Gowan and the ship's engineers for helping to repair several instrument brackets on short notice and giving us access to their shop and tools.

2.8 PUBLIC OUTREACH

2.8a NeMO 2000 Website and Public Outreach

<http://newport.pmel.noaa.gov/nemo/> - Jeff Goodrich, Mike Goodrich, Susan Merle, Andra Bobbitt

The goal of the outreach portion of NeMO was to create an educational web site used by secondary students, teachers, and the general public. The web site offered daily updates on the cruise and allowed interested individuals to follow progress of the scientific expedition at Axial Volcano. The updates included a daily science report written by Bill Chadwick and a weekly science summary written by Chief Scientist Bob Embley. The web site featured a daily interview by "Teacher At Sea" participant Jeff Goodrich that highlighted an individual from the science party, the ROPOS team, or the ship's crew and a daily "Teacher At Sea Log" also written by Jeff.

Susan Merle coordinated the updates and included relevant digital images. They were sent from the ship to HMSC and were added to the web site on a daily basis by Andra Bobbitt. The updated information and pictures were also included in daily presentations for the general public at HMSC, twice daily, by the teacher on shore, Mike Goodrich. Feedback and questions from the public were sent to the ship and answered by the scientific staff. The questions were primarily from HMSC presentation audiences and family members of science and ROPOS personnel.

3 NAVIGATION OVERVIEW AND POSITION INFORMATION

3.1 Navigation Overview for NeMO 2000 - Susan Merle, Bill Chadwick, Julia Getsiv, Lisa Crowder

For the NeMO 2000 Cruise we made use of the *R/V Ron Brown's* extendable through hull transducer pole. While in Newport prior to the cruise, the NOAA range meter was mounted on the pole so it could be used for transponder calibrations. ROPOS also had a spare range meter that was mounted on the cage. The extendable through hull transducer pole method eliminated the need to use "El Guapo" for calibration of transponder nets. The bad micro-processor in the NOAA PS-8000 that was a problem last year was replaced prior to the 2000 cruise and worked well this year throughout the cruise.

As in previous years, all ROPOS dives were navigated using long-baseline transponder nets with the Seascope navigation software. The navigation computer had three main inputs into Seascope to aid in ROPOS navigation: P-code GPS from the *R/V Ron Brown*, ROPOS sensor data and the PS8000 data from the range meter. Customized output files were created to save additional ROV sensor information for Imagenex processing (such as depth, altimeter, gyro, pitch and roll).

Transponders were already in place for the South Cleft, ASHES and the North Rift Zone (NRZ) nets. Deployed in 1998, the expendable transponders should have five year lifetimes. The transponders for those three nets only needed to be enabled. A fourth net, at the Southern Pillow Anomaly at 45° 52'N was added with three recoverable transponders.

One issue that was more problematic in 2000 than in the past was "cage-motor noise". When the cage motor was on navigation was sporadic, at best. When the cage motor was turned off nav improved dramatically. This year the ROPOS crew did not want to turn the cage motor off very often, as they were afraid they wouldn't be able to start it back up again because of other changes related to their new cable. There were also problems with deckset errors which made it necessary to quit out of nav and cycle the PS8000, usually resulting in good ranges when the program was restarted. For the last 3 years we have had a persistent problem with the RMS errors being inexplicably much higher (RMS=12-25) on the ROPOS fixes than on the cage fixes (RMS=1-2). The range legs to ROPOS are all consistently long, which is problematic because it causes fixes to jump large distances depending on which transponders are heard. The low cage RMS suggests the transponder calibration is fine, plus we have this problem in all our nets, and we have double checked all the transponder parameters. We do not know if this is a hardware problem (perhaps if the relay on ROPOS actually has a different turn around time than indicated, for example) or if it is a software problem somehow.

Navigation fixes are recorded in UTM x/y (meters) in the log files and were processed by Julia Getsiv using the IDL program *navedit2* (written by Bill Chadwick). The processed navigation was

brought into GMT (generic mapping tools) by Susan Merle for dive map production. The dive maps are a useful guide to determine navigation gaps, bad navigation, etc. When acoustic nav was not available GPS ship nav was used.

3.2 NeMO '00 Final Calibrated Transponder Positions

XP=Transponder Frequency

South Cleft Net

XP	UTM X	UTM Y	Latitude	Longitude	Depth(m)	
8.5	394569.87	4949335.07	44° 41.37830		130° 19.83128	1919.9
9.5	393718.81	4947296.1	44° 40.26972		130° 20.45012	1908.3
10.0	392492.04	4943450.03	44° 38.18189		130° 21.33007	1947.2
10.5	393070.28	4945529.36	44° 39.30990		130° 20.91876	1934.8
11.5	391107.96	49476546.57	44°40.44089		130° 22.43046	1919.4
12.5	391657.37	4941553.62	44°37.15031		130° 21.93730	2010.4

North Rift Net

XP	UTM X	UTM Y	Latitude	Longitude	Depth (m)	
9.5	420814.65	5098603.9	46° 02.1857'		130° 01.3988'	1433.9
10.5	422722.92	5097596.31	46° 01.6548'		129° 59.9096'	1395.43
8.0	420055.52	5095969.44	46° 00.7580'		130° 01.9608'	1377.93
7.5	422074.85	5094971.24	46° 00.2330'		130° 00.3862'	1294.46

ASHES Net

XP	UTM X	UTM Y	Latitude	Longitude	Depth (m)	
11.5	424283.25	5087181.51	45° 56.0418'		129° 58.6011'	1305.4
10.5	424221.58	5084426.79	45° 54.5540'		129° 58.6227'	1340.36
9.5	422490.35	5086188.55	45° 55.4937'		129° 59.9789'	1324.67
11.0	422556.72	5088014.47	45° 56.4800'		129° 59.9453'	1330.85

Southern Pillow Flow

XP	UTM-X (m)	UTM-Y (m)	Latitude	Longitude	Depth (m)	
10.0	421724.58	5081207.57	45° 55.6778		130° 0.5720	1476.74
8.5	423360.49	5079719.36	45° 54.8853		129° 59.2921	1548.25
12.5	421060.96	5079245.12	45° 54.6137		130° 1.06616	1508.08

3.3 Vent and Marker Location Table

Vents and Markers	Area/Vent	Longitude	Latitude	UTM X	UTM Y	Depth
Bag City Vent Mkr-36	nSRZ	-129.98943	45.91617	423271	5085209	1534
Blue Nose Vent	98 lava flow	-129.98370	45.94544	423755	5088451	1524
Bob Vent	NRZ	-130.01283	46.03892	421629.2	5098870.2	1590
Castle Vent	98 lava flow	-129.97990	45.92613	424022.7	5086305.8	1520
Castle Mkr-N5(Flattop)	Castle	-129.97960	45.92610	424043	5086306	1516
Circ Vent	98 lava flow	-129.98165	45.92592	423887	5086283	
Cloud Vent	98 lava flow	-129.98156	45.93335	423904	5087110	1524

Vents and Markers	Area/Vent	Longitude	Latitude	UTM X	UTM Y	Depth
Cloud Mkr-N4	Cloud	-129.98167	45.93342	423896	5087119	1523
Cloud Mkr-N6/21	Cloud	-129.98160	45.93340	423901.4	5087116	1524
Coquille Vent	98 lava flow	-129.99306	45.91753	422991	5085365	1537
Crack Vent	ASHES	-130.01355	45.93330	421424	5087135	1547
Crevice	SRZ	-129.99040	45.91110	423175	5084648	1538
Dave's Vent	ASHES	-130.01377	45.93352	421408.3	5087158.6	
Dying Vent	98 lava flow	-129.99185	45.91685	423083.7	5085286.4	
Easy Vent	98 lava flow	-129.98472	45.94533	423676.5	5088443.2	1532
FeCity Vent	nSRZ	-129.98919	45.91754	423291	5085361	1535
Fe-Hyde Vent	ASHES	-130.01378	45.93298	421406	5087099.7	
Gollum Vent	ASHES	-130.01358	45.93358	421422	5087166.1	1546
Hairdo Vent	ASHES	-130.01398	45.93350	421390.7	5087156.8	1546
Hell Vent	ASHES	-130.01423	45.93330	421372	5087135	1544
Hillock/Phoenix Vent	ASHES	-130.01398	45.93325	421390.9	5087130.4	1544
Inferno Vent	ASHES	-130.01390	45.93355	421397.2	5087162.2	1547
Joystick Vent Mkr-42	nSRZ	-129.98856	45.91884	423341.5	5085505	1536
Magnesia Vent Mkr-67	98 lava flow	-129.98493	45.94623	423660.7	5088544.7	1530
Marshmallow Vent	ASHES	-130.01362	45.93370	421420.4	5087179	1547
Medusa Vent	ASHES	-130.01393	45.93335	421394.7	5087141.1	1546
Milky Vent Mkr-N2	98 lava flow	-129.98475	45.94514	423673	5088424	1527
Minisnow Vent Mkr-N9	98 lava flow	-129.98422	45.94262	423711	5088141	1522
Mkr-I	ASHES	-130.01367	45.93370	421416	5087180	
Mkr-108 Vent	98 lava flow	-129.98303	45.92865	423784	5086589	1520
Mkr-113 Vent	98 lava flow	-129.98817	45.92266	423377	5085929	1524
Mkr-2	ASHES	-130.01397	45.93330	421392	5087136	
Mkr-33 Vent	98 lava flow	-129.98225	45.93327	423850.3	5087101.1	1524
Mkr-D	ASHES	-130.01393	45.93325	421399	5087129	
Mkr-L	ASHES	-130.01432	45.93333	421365	5087140	
Mkr-N1	98 lava flow	-129.98408	45.93980	423718	5087828	1521
Mkr-N3	98 lava flow	-129.98520	45.94380	423637	5088278	
Mkr-N41	98 lava flow	-129.98138	45.93622	423922.4	5087428.2	1520
Mkr-N44	98 lava flow	-129.98483	45.93947	423658	5087792	

Vents and Markers	Area/Vent	Longitude	Latitude	UTM X	UTM Y	Depth
Mkr-N7	98 lava flow	-129.98190	45.93930	423886	5087774	1520
Mkr-65	near BagCity	-129.98963	45.9160141	423255	5085192	1534
Mushroom Vent	ASHES	-130.01380	45.93360	421405.3	5087167.9	1548
Nascent Vent Mkr-M	98 lava flow	-129.98160	45.93584	423905	5087387	1520
Old Flow Vent	98 lava flow	-129.98170	45.93645	423897.5	5087454.7	1534
OldWorms Vent	98 lava flow	-129.98331	45.94510	423785	5088418	1528
Ouzo Vent	98 lava flow	-129.98468	45.94582	423679.6	5088496.8	1526
Oxide Vent	98 lava flow	-129.98508	45.94545	423647.9	5088456.4	1543
Pillar Vent	98 lava flow	-129.98542	45.92270	423591	5085929.1	
Roof Vent	98 lava flow	-129.98448	45.94250	423689.8	5088129.1	1523
ROPOS Vent	ASHES	-130.01405	45.93328	421386.1	5087134.1	1547
Snail Vent	98 lava flow	-129.98188	45.93317	423878.6	5087089.7	1525
Snail Mkr-N8	Snail	-129.98190	45.93320	423877	5087088	1523
Snow Vent	98 lava flow	-129.98245	45.92712	423827	5086417	
SnowBlower Vent	98 lava flow	-129.98407	45.93987	423719	5087835	1521
SteveMound	ASHES	-130.01342	45.93325	4214348	5087128.6	
Styx Vent	ASHES	-130.01370	45.93328	421412.2	5087132.2	
ThePit Vent	98 lava flow	-129.98408	45.93975	423718.2	5087823.2	1521
Tombstone Vent	ASHES	-130.01133	45.92948	421590	5086597	
Tunncliffe Vent	ASHES	-130.01582	45.93367	421248.7	5087178	1544
VirgDaut Vent	ASHES	-130.01340	45.93375	421436	5087184	1547
Virgin Vent	ASHES	-130.01348	45.93365	421430	5087174	1547
White Vent	ASHES	-130.01363	45.93373	421419	5087182.9	
91Vent	NRZ	-130.01242	46.03860	421661.4	5098834.3	
Shepherd Vent	CASM	-130.02668	45.98990	420486.4	5093373.6	1583
SoCasm Vent	CASM	-130.02625	45.98870	420518.6	5093304.6	1583
AX-BM63	Cald center	-130.01017	45.95522	421717	5089568	1530
AX-BM1	Magnesia	-129.98490	45.94622	423663	5088544	1524
AX-BM5	Mkr-33	-129.98242	45.93335	423838	5087111	1523
AX-BM4	Bag City	-129.98963	45.91601	423255	5085192	1534
AX-BM66	South Anom	-130.00371	45.86315	422089	5079332	1723
BPR	Caldera center	-130.01017	45.95522	421717	5089568	1530

3.4 Pressure Benchmark Locations at Axial Volcano (deployed during NeMO 2000 cruise - Dives R546 and R548)

Name	Location	UTM X	UTM Y	Lat	Long	Depth (m)	Radial distance (m) from caldera center	Site Description
AX-BM63	Caldera center	421717	5089568	45.95522	-130.01017	~1530	0	Located right next to NeMO2000 BPR mooring, perhaps 50 m north of Paw Flow (flat ropy sheets) in low lobates. Marker 63 is attached to the benchmark.
AX-BM1	Magnesia	423663	5088544	45.94622	-129.98490	1524	2199	Right next to Marker 67 (Magnesia), which is on uncollapsed roof surrounded by collapse. No marker on benchmark.
AX-BM5	Marker 33	423838	5087111	45.93335	-129.98242	1523	3245	15 meters NW of Marker 33 (visible). No marker on benchmark.
AX-BM4	Bag City	423255	5085192	45.91601	-129.98963	1534	4638	17 m south and 16 m west of Bag City (Marker 36). Marker 65 is located at the benchmark.
AX-BM66	South Anomaly	422089	5079332	45.86315	-130.00371	1723	10243	Located on the western lip of the 1998 eruptive fissure where the new lava is 1-2 m below the rim. In very flat sheet flow. Marker 66 is attached to benchmark.

4 NeMO 2000 OPERATIONS

4.1 NeMO '00 Dive Statistics

NeMO Cruise dates: 6/29/00 - 7/18/00

ROPOS Dives R540 - R556 (17 dives including 1 with no bottom time and 1 "bounce" dive)

265 hours wet time

231 hours bottom time

Arrived on station 6/30 2000 UTC. Departed Axial 7/17 0600 UTC. 18 hours of transit time. 15.6 days on site. Spent 70% of time in the water, 61% of time on the bottom (about 15 hours per day).

50 experiments were deployed on the cruise. 210 samples were collected (including 19 experiments that were recovered). Samples were of vent fluids, vent chemistry, vent biology and geology. 35 of the ROPOS samples were rock samples. 13 more rock samples were collected using a wax corer.

4.2 NeMO '00 Dive Dates, Locations, Bottom Times, Summaries and Nav Info

Dive	Area	on btm	off btm	Dive Summary	Nav information
R540	South Cleft			No real bottom time	no nav

Dive	Area	on btm	off btm	Dive Summary	Nav information
R541	South Cleft	JD183 (7/1) 1245	JD184 (7/2) 0150	Deployed Extensometers 2-7 (Clft E2-E7) at Benchmarks 2-7 . Pressure measurement at Bmrk-3. No samples.	1245-1253 nav gap
R542	South Cleft	JD184 (7/2) 1042	JD185 (7/3) 1423	Deployed Extensometers 8-12 (Clft E8-E12). Pressure measurements at Bmrks 1-12. Infrared link with all extensometers, Clft E2 - E12. (Clft E1 was not deployed). Vent 1 Chimney 284 -Recovered 2 Hobos. Vent 1 Chimney 342 - Deployed 1 Hobo. Samples: 2 gtb, 2 twg, 1 sulfide.	Ship nav only (ps8000 troubles)
R543	98 Lava Flow	JD186 (7/4) 0506	JD186 (7/4) 1455	Mkr 33 - Deployed 3 MTR's, 2 bacraps, 4 larval tubes (positioned 1 and 2). Recovered 3 osmos 2 bacraps, '99 Time Lapse Camera. Samples: 4 ss, 1 twg, 1gtb. Cloud (N4 and N6/21) - Deployed 2 bacraps, 3 MTR's, and Mkr-21. Recovered VEMCO and MTR. Samples: 2 ss, 1 gtb. Nascent - Deployed Mkr-M, 1 MTR. Recovered 1 MTR. Sample: 1 twg. Mkr-N41 - Deployed 1 MTR. Recovered 1 MTR. Sample: 1 twg.	
R544	ASHES and Mkr-33	JD187 (7/5) 0705	JD187 (7/5) 1732	Hell (porkchop 1 & 2)-Samples: 5 ss, 1 rk, 1 sulfide flange. Sulfide worm observations and spider temp probe measurements. Mushroom -Recovered 3 bacraps. Samples: 3 ss, 2 gtb. Sulfide worm observations and spider temp probe measurements. Mkr-33 -Position larval tubes 3 and 4. Elevator recovery near Mkr-33 (deployed on R543).	Nav starts at 0712. 0705-1422 ASHES (part1). 1422-1647 transit ASHES to Mkr-33. 1647 - 1732 Mkr-33 (part2).
R545	ASHES	JD188 (7/6) 0610	JD188 (7/6) 1435	Gollum - Deployed MTR, bacrtp. Repositioned bacrtp. Recovered bacrtp. Sample: 1 ss. Hillock/Phoenix - Searched for bacrtps but couldn't find them. Samples: 2 ss. Crack - Deployed, positioned larval tubes 5-8. Recovered VEMCO. Observed Johnson flow meter platform. ROPOS - Deployed MTR, bacrtp. Recovered 2 bacrtps. Hel I - Samples: 1 ss, 1 sulfide. Caldera wall - Sample: 1 ss (FeO). NW of Inferno -Deployed MTR. Mushroom - Sample: 1 gtb. Virgin - Recovered Hobo. Magnesia - Recovered Hobo.	0659 - 0713 transit. 1144 - 1217 nav gap. 1237 - 1304 transit Wall to Inferno.
R546	S Pillow Flow at 45 52'N	JD188 (7/6) 2019	JD189 (7/7) 1417	Deployed Bmrk-66 at fissure edge. Bmrk-66 pressure measurement. Samples: 2 ss. Imagenex (Lines 9-18) - Samples: Plankton net tow, McLane pump.	188/2020-2040 nav gap. 189/1253-1340 transit Imagenex to Bmrk-66.
R547	98 Lava Flow	JD190 (7/8) 0541	JD191 (7/9) 0009	Magnesia - (it's dead this year) Deployed Mkr-67. New Vent found/named BlueNose . Old Worms - Deployed MTR. Samples: 2 hfs. Mkr-N3 - Deployed 2 MTRs. Samples: 3 hfs. Mkr-N41 - Samples: 2 hfs, 1 ss. Nascent - Samples: 2hfs, 1 ss. Mkr-33 - Samples: 1 ss, 8 hfs. Snail - Deployed 2 MTRs. Samples: 1 hfs, 2 ss. Cloud - Samples: 5 hfs, 1 gtb, 2 ss, McLane pump. Castle - Deployed MTR. Samples: 1 hfs, 1 gtb, 1 ss, 1 sulfide.	Nav sporadic all dive. 0936-1045 Loss of coms. 1430-1500 poor nav. 2145-2239 transit Cloud to Castle.

Dive	Area	on btm	off btm	Dive Summary	Nav information
R548	Caldera center and nSRZ	JD191 (7/9) 0836	JD192 (7/10) 0255	BPR (near center of caldera) - Deployed Bmrk-66. Pressure measurement. Magnesia - Deployed Bmrk-1 and performed pressure measurement. Sample: 1 ss. Moved osmosampler from Magnesia to Mkr-N41. Mkr-N41 -Deployed MTR. Connected NeMONet'99 camera to release mooring. Mkr-33 - Deployed Bmrk-5 and performed pressure measurement. Transit to BagCity - close call with water column mooring in transit. BagCity - Deployed Bmrk-4 and performed pressure measurement. Deployed 2 MTRs. Samples: 3 ss, 1 twg. Recover 1 MTR. Found/named FeCity Vent. Sample: 1 ss. Joystick - Samples: 2 rk, 1 twg, 2 ss. McLane pump Bag City to Joystick.	0957-1154 transit BPR to Magnesia. 1342-1358 transit Magnesia to mooring. 1641-1723 transit mooring to Mkr-33. 1828-2010 transit Mkr-33 to BagCity.
R549	98 Lava Flow	JD192 (7/10) 0748	JD192 (7/10) 1630	Mkr-33 - Deployed 2 bactrps. Recovered 2 bactrps. Cloud - Deployed 2 bactrps, Recovered 2 bactrps, video traverse. Samples: 1 fish, 1 twg, 4 ss, 1 McLane. Snail -Samples 1 twg, 1 ss. Mkr-108 - Samples: 2 ss, 1 rk. Recovered NeMO Net'99 camera from Nascent after dive.	1428-1516 transit on bottom from Snail to Mkr-108. (great geology)
R550	BagCity Area	JD193 (7/11) 0241	JD193 (7/11) 1523	Imagenex survey BagCity area and north to join with southern portion of previous coverage (Lines BC8-BC16). Sample: McLane pump BagCity area. Saw huge pinkish mystery jelly, later determined to be <i>Deepstaria enigmata</i> .	1425 transit to Mkr-33 aborted due to HFS problems.
R551	98 Lava Flow	JD193 (7/11) 2015	JD194 (7/12) 1556	Mkr-33 - Samples: 7 hfs. Snail - Sample: 1 hfs. Cloud - Samples: 3 hfs, 1 gtb, 1 ss. Mkr-113 - Deployed MTR. Samples: 3 ss, 1 hfs, 1 gtb. Joystick - Samples: 1hfs, 1 ss. FeCity - Samples: 2 hfs, 1 ss. Beautiful octopus on pillar when leaving FeCity. Bag City - Samples: 6 hfs, McLane. Coquille - Deployed 2 MTRs, Samples: 3 hfs, 1 rk. Imagenex (Lines BC17-BC19).	193/2317-194/0113 transit Cloud to Mkr-113. 0411-0449 transit Mkr-113 to Joystick. 0929-1016 Nav gap.
R552	98 Lava Flow	JD194 (7/12) 2358	JD195 (7/13) 2327	Mkr-113 - Sample: 1 twg. Imagenex (Lines W8 - W15) northwest of Mkr-113. Coquille - Sample: 1 ss. GeoTransect Coquille and lava highway (A&B). BagCity - Deploy/position NeMO Net'00 camera and temp probes. Reposition MTR. Imagenex (Lines BC20-BC23) finished south of BagCity. Samples during survey: McLane, Plankton net tow. GeoTraverse © area), looking for contacts.	0552-0614 transit Imagenex to Coquille area. 0945-1013 transit B to BagCity area. 1230-1412 transit BagCity to Imagenex. 1959-2327 Nav problems: 1959-2018 nav gap. 2109-2150 nav gap. 1 nav fix after 2249. 2019-2108 transit to C.
R553	ASHES	JD196 (7/14) 1408	JD197 (7/15) 0014	near Crack - Deployed Johnson flow/temp meter . Marshmallow - Samples: 5 hfs. Gollum -Samples: 7 hfs, McLane pump. Virgin - Samples: 4 hfs, 1 gtb. Mushroom - Sample: 1 hfs. Inferno - Samples: 4 hfs, 1 gtbs. Hell - Samples 3 hfs, 1 ss. Sulfide worm observations.	
R554	S Pillow Flow at 45 52'N	JD197 (7/15) 0612	JD197 (7/15) 2130	Imagenex (Lines 1-8) survey of south pillow flow . GeoTraverse points A, B, C, D (and near F, G). Followed large fissure and several smaller fissures to establish contacts.	1731-1746 transit Imagenex to A.

Dive	Area	on btm	off btm	Dive Summary	Nav information
R555	NRZ and ASHES	JD198 (7/16) 0335	JD198 (7/16) 1348	Deployed extensometers E1-E4 on NRZ. NW of Crack - Recovered larval tubes 5-8. Virgin - Deployed 2 Hobos. Sample: 2 gtb.	0758 - 1222 transit NRZ to ASHES.
R556	Mkr-33	JD198 (7/16) 2112	JD198 (7/16) 2334	Bounce Dive. Mkr-33 -Recover Larval Tubes 1-4 NE of Mkr-33. Samples: 2 ss.	No good acoustic nav.

4.3 NeMO '00 ROPOS SAMPLES (R542 - R556)

Sample	Vent/Mkr	UTM X	UTM Y	long (deg)	lat (deg)	Z (m)	UTC Time	Description	PI	Sub Smp
R542										
R542-BIO-001	Bmrk-2	392622	4946457	-130.35449	44.6634467	2215	08:17 Jul03 '00	0819 chunk of wood that has been sitting under Bmrk-2 for a year. Going into biobox.	Tunncliffe	Embley
R542-Hobo_133-002	Vent 1 Chimney 284	391831	4945927	-130.36436	44.6585583	2209	12:14 Jul03 '00	Hobo probe #133 has been recovered and placed into the box (deployed Clft '98). FeOxide scrapings subsample.	Chadwick	Fortin
R542-Hobo_134-003	Vent 1 Chimney 284	391824	4945930	-130.36444	44.6585867	2208	12:30 Jul03 '00	HOBO probe #134 recovered and placed into container (deployed Clft '99).	Chadwick	
R542-SF-004	Vent 1 Chimney 342	391827	4945923	-130.36439	44.4918583	2210	13:27 Jul03 '00	Sulfide from Chimney 342 (Vent 1).	Chadwick	
R542-GTB-005	Vent 1 Chimney 342	391827	4945923	-130.36441	44.658525	2210	13:52 Jul03 '00	Both gas tight bottles fired in same location as HOBO probe #129 deployment. Time is 1353.	Evans	Butterfield/ Lilley
R542-GTB-006	Vent 1 Chimney 342	391827	4945923	-130.36441	44.658525	2210	13:53 Jul03 '00	Both gas tight bottles fired in same location as HOBO probe #129 deployment. Time is 1353.	Evans	Butterfield/ Lilley
R542-TW6-007	Vent 1 Chimney 342	391827	4945923	-130.36441	44.658525	2210	14:20 Jul03 '00	Tube worm grab at Chimney 342. FeOxide subsamples.	Tunncliffe/ Marcus	Fortin/ Metaxas
R543										
R543-osmo_gas-0001	Mkr-33	423850	5087101	-129.98225	45.93327	1520	06:01 Jul04 '00	0605 Putting osmo with green tape into elevator. Probably the "gas-osmo".	Moyer for Wheat	
R543-osmo_bio-0002	Mkr-33	423850	5087101	-129.98225	45.93327	1520	06:22 Jul04 '00	0628 Second osmo placed in elevator. The "bio" osmo.	Moyer for Wheat	
R543-osmo_analyzer-0003	Mkr-33	423850	5087101	-129.98225	45.93327	1520	06:52 Jul04 '00	Put osmoanalyzer into elevator	Moyer for Wheat	

Sample	Vent/Mkr	UTM X	UTM Y	long (deg)	lat (deg)	Z (m)	UTC Time	Description	PI	Sub Smp
R543-SS_fl-J6-0004	Mkr-33	423850	5087101	-129.98225	45.93327	1520	07:17 Jul04 '00	0721 Beginning slow suction on bottle #6 (202 um). Temperature is around 10 or 11 C. At the big crack pumping for FLUID.	Huber/ Mehta	
R543-SS_bio-J5-0005	Mkr-33	423850	5087101	-129.98225	45.93327	1520	07:31 Jul04 '00	0733 Sucking into Bottle #5 (202 um). BIO sample. Sucking in the crack where there are lots of limpets, mat worms, etc.	Moyer	Marcus
R543-BT_41-0006	Mkr-33	423850	5087101	-129.98225	45.93327	1520	07:57 Jul04 '00	0759 Picking up Bacterial Trap #41 and putting into port side of biobox.	Moyer	Marcus/ Juniper
R543-BT_42-0007	Mkr-33	423850	5087101	-129.98225	45.93327	1520	07:59 Jul04 '00	0800 Placing Bacterial Trap #42 into port side of biobox.	Moyer	Marcus/ Juniper
R543-SS_bio-J3-0008	Mkr-33	423850	5087101	-129.98225	45.93327	1520	08:04 Jul04 '00	0806 Sucking into Jar #3 (225 um). BIO: worms; limpets; etc	Marcus	
R543-SS_bio-01-0009	Mkr-33	423850	5087101	-129.98225	45.93327	1524	08:11 Jul04 '00	0813 Suction sample into Jar #1 (200 um) for more critters (BIO)	Juniper	
R543-GTB-0010	Mkr-33	423850	5087101	-129.98225	45.93327	1520	08:25 Jul04 '00	0825 Triggered port side gas tight (#2) in same area where worms were suctioned and MTR's were deployed.	Evans	
R543- TWG-0011	Mkr-33	423850	5087101	-129.98225	45.93327	1520	08:56 Jul04 '00	0857 Tube worm grab into portable biobox A.	Marcus	
R543-GTB-0012	Cloud (Mkr-N6/21)	423901	5087116	-129.9816	45.9334	1526	10:17 Jul04 '00	1018 Firing starboard gas tight bottle at Mkr-N6 (the pit).	Evans	
R543-SS_fl-J7-0013	Cloud (Mkr-N6/21)	423901	5087116	-129.9816	45.9334	1526	10:21 Jul04 '00	1023 Starting to pump into Jar #7 for FLUID over Mkr-N6 (the pit).	Huber/ Mehta	
R543-Vemco_108-0014	Cloud (Mkr-N6/21)	423901	5087116	-129.9816	45.9334	1526	10:48 Jul04 '00	Mkr-21 with MTR/VEMCO attached to it recovered from Cloud. VEMCO#1108 recovered. (marker stayed in place).	Embley	
R543-MTR_3157-0015	Cloud (Mkr-N6/21)	423901	5087116	-129.9816	45.9334	1527	11:07 Jul04 '00	11:10-MTR probe #3157 recovered at Mkr-21 by ripping apart rope(was attached to Vemco). The marker was left in place. FeSulfide slime sub-sample.	Embley	Fortin
R543-SS_mat-J4-0016	Cloud (Mkr- N4)	423896	5087119	-129.98167	45.93342	1525	11:37 Jul04 '00	11:38-Suction sample at marker N4. Bacterial floc (MAT) being sampled some bio probably in there too. (ROCK subsample)	Moyer	J Chadwick
R543-MTR_3175-0017	Nascent	423905	5087387	-129.88152	45.93577	1520	12:50 Jul04 '00	12:51-Recovery of MTR 3175 and putting it into biobox.	Embley	
R543-TWG-0018	Nascent	423905	5087387	-129.88152	45.93577	1520	12:55 Jul04 '00	12:58-Tube worm grab at Nascent placed in portabox.	Tunncliffe/ Marcus	Juniper

Sample	Vent/Mkr	UTM X	UTM Y	long (deg)	lat (deg)	Z (m)	UTC Time	Description	PI	Sub Smp
R543-TWG-0019	near Nascent Vent	423922	5087428	-129.98138	45.93621	1520	13:56 Jul04 '00	13:57-Tube worm grab at Mkr-N41.	Tunncliffe/ Marcus	Juniper
R543-MTR_3041- 0020	Mkr- N41	423922	5087428	-129.98138	45.93622	1519	14:06 Jul04 '00	14:09-Recovery of MTR-3041 at marker N41.	Embley	
R543-TLC-0021	Mkr-33	423850	5087101	-129.98225	45.93327	1520	14:49 Jul04 '00	14:51- retrieving Time Lapse Camera at Mkr-33 after its one year deployment. (BIO - animals on frame to Juniper)	Tunncliffe	Juniper
R544										
R544-SS_fl-J1- 0001	Hell	421372	5087135	-130.01423	45.9333	1544	09:09 Jul05 '00	Suction sample of WATER and PARTICULATES over Hell at a little ledge of Hell we're calling Hell 1 into Jar J1. Suction began at 0917 ended at 0926	Juniper	
R544-SS_bio-J2- 0002	Hell	421372	5087135	-130.01423	45.9333	1544	09:24 Jul05 '00	Suction sample of worms (BIO) at Hell 1 into Jar2. Suction began at 0927 ends 0934.	Juniper	
R544-RK- 0003	Hell	421372	5087135	-130.01423	45.9333	1544	09:43 Jul05 '00	Piece/rubble of a flange with worms etc. on it from Hell 2, into port side of biobox taken at 0945	Juniper	
R544-SS_fl-J3- 0004	Hell	421372	5087135	-130.01423	45.9333	1544	11:06 Jul05 '00	11:09-Taking suction sample (SUSPENDED PARTICULATES) for 5 minutes at this point into jar 3. (New porkchop 1 or 2?) time 1059 - 1105	Juniper	
R544-SS_bio-J4- 0005	Hell	421372	5087135	-130.01423	45.9333	1544	11:14 Jul05 '00	11:19 thru 11:20? - suction sample (SULFIDE WORMS - BIO) taken from another focused site of venting at New Porkchop 1 and 3.	Juniper	
R544-SS_bio-J5- 0006	Hell	421372	5087135	-130.01423	45.9333	1544	11:18 Jul05 '00	11:22-11:29 New Prkchop2. Suction Sample (SULFIDE WORM - BIO).	Juniper	
R544-SF- 0007	Hell	421372	5087135	-130.01423	45.9333	1544	11:36 Jul05 '00	11:38- arm has picked up piece of vent chimney (SULFIDE). New Porkchop - at the top.	Juniper	
R544-SS_bio-J6- 0008	Mush-room	421405	5087167	-130.0138	45.9336	1548	13:11 Jul05 '00	13:13-13:21 Suction Sample (SULFIDE WORM - BIO) into jar #6 where spider probe was taken. Mushroom 2	Juniper	
R544-BT_29-0009	Mush-room	421405	5087167	-130.0138	45.9336	1548	13:25 Jul05 '00	13:30-RECOVER bacterial trap (29 30 31?) which are heavily encrusted with organisms. Mushroom	Moyer	
R544-BT_30-0010	Mush-room	421405	5087167	-130.0138	45.9336	1548	13:26 Jul05 '00	13:32-RECOVER 2 of 3 bacterial traps here at Mushroom	Moyer	

Sample	Vent/Mkr	UTM X	UTM Y	long (deg)	lat (deg)	Z (m)	UTC Time	Description	PI	Sub Smp
R544-BT_31-0011	Mushroom	421405	5087167	-130.0138	45.9336	1548	13:36 Jul05 '00	13:34-RECOVER bacterial trap 3 of 3. Mushroom 13:36 frame grab -Craig's bacterial traps with loads 'o organisms encrusted	Moyer	
R544-GTB-0012	Mushroom	421405	5087167	-130.0138	45.9336	1548	13:41 Jul05 '00	13:43-took two gas tight bottles (GTB) at spider probe location.	Evans	Butterfield/ Lilley
R544-GTB-0013	Mushroom	421405	5087167	-130.0138	45.9336	1548	13:41 Jul05 '00	13:43-took two gas tight bottles (GTB) at spider probe location.	Evans	Butterfield/ Lilley
R544-SS_bio-J7-0014	Mushroom	421405	5087167	-130.0138	45.9336	1548	14:11 Jul05 '00	14:13-14:21 Suction Sample (SULFIDE WORM - BIO) in location of spider probe data.	Juniper	
R545										
R545-BT_45-0001	Gollum	421422	5087166	-130.01358	45.93358	1546	06:25 Jul06 '00	0625 RECOVERING bacteria trap 45 put into port side of biobox.	Moyer	
R545-SS_bio-J4-0002	Gollum	421422	5087166	-130.01358	45.93358	1546	06:44 Jul06 '00	Start suction sample of provaniid snails (BIO) at 0646 into Jar#4. Stop suction at 0652. (Basalt chips sub sample)	Tunncliffe	Chadwick
R545- VEMCO-0003	Near Crack	421424	5087135	-130.01355	45.9333	1545	07:30 Jul06 '00	0730 - VEMCO into port biobox- it's not really in flow but surrounded by shimmery flow. (Deployed on an Alvin dive 3245 in 1998)	Embley	
R545-BT_27-0004	ROPOS	421386	5087134	-130.01405	45.93328	1547	08:52 Jul06 '00	0852 Bacterial trap #27 from ROPOS into port side of biobox. The traps are majorly covered in gunk and when we lifted it up two little octopi swam out from under it!	Moyer	
R545-BT_28-0005	ROPOS	421386	5087134	-130.01405	45.93328	1547	09:01 Jul06 '00	0902 ROPOS Vent recovering bacterial trap #28 or a chunk of basalt with worms limpets anemeones on it. Into the starboard side of the biobox (BIO RK subsamples)	Moyer	Tunncliffe/ J Chadwick
R545-SS_mat-J7-0006	Hillock/ Phoenix	421390	5087130	-130.01398	45.93325	1547	09:23 Jul06 '00	0924 Beginning to Suction sample of BACTERIAL MAT at Phoenix into Jar #7 Ended suction at 0930 z=1544	Moyer	
R545-SS_FeO-J1-0007	Hillock/ Phoenix	421390	5087130	-130.01398	45.93325	1547	09:35 Jul06 '00	0937 Suction sample of IRON OXIDE (FeO) into Jar #1 It's just a little beehive mound standing by itself; looks like it is laminated. Suction ended at 0940	Fortin	

Sample	Vent/Mkr	UTM X	UTM Y	long (deg)	lat (deg)	Z (m)	UTC Time	Description	PI	Sub Smp
R545-SS_FeO-J6- 0008	Fe-Hyde	421406	5087099	-130.01378	45.93298	1547	10:08 Jul06 '00	1008 Slurp sample of IRON OXIDE (FeO) into jar #6. Suctioning began at 1021. Suction ended at 1022. At Fe-Hyde site	Moyer/ Fortin	
R545-SS_FeO-J2- 0009	Fe-Hyde	421406	5087099	-130.01378	45.93298	1547	10:36 Jul06 '00	1037 - Slurp sample of IRON OXIDES (FeO) into jar #2. Started suctioning at 1040. Suction ended at 1041	Fortin	
R545-SF- 0010	Hell	421372	5087135	-130.01423	45.9333	1547	10:56 Jul06 '00	10:59 - oxidized SULFIDE sample. z=1544	Fortin	
R545-SS_mat-J5- 0011	Hell	421372	5087135	-130.01423	45.9333	1547	11:04 Jul06 '00	Suction sample of orange MICROBIAL MAT at base of Hell vent. Start suction 11:09 end suction 11:12.	Moyer	
R545-SS_FeO-J3- 0012	Wall of Caldera	421226	5087206	-130.01612	45.93391	1546	12:18 Jul06 '00	Going to take of IRON OXIDE (FeO) at wall of Caldera. Suction began at 12:25 and ended at 12:35.	Fortin	Moyer
R545-GTB-0013	Mush-room	421405	5087168	-130.0138	45.9336	1547	14:02 Jul06 '00	14:03 - start of GTB sampling at bottom of Mushroom vent. 14:03.5 end of GTB.	Evans	Lilley/ Butterfield
R545-Hobo_130-0014	Virgin	421430	5087174	-130.01348	45.93365	1545	14:26 Jul06 '00	RECOVERY of HOBO #130 at Virgin Mound. Vent has been active at least since 1986.	Embley	
R545- McLane-0015	ASHES	421430	5087174	-130.01348	45.93365		15:21 Jul06 '00	McLane Pump sucked 2714 liters of fluid this dive. (position given is only 1 fix)	Tunncliffe/ Metaxas	
R546										
R546-SS_sed-J3- 001	S Pillow Anomaly	422091	5079330	-130.00369	45.86313	1723	22:04 Jul06 '00	2212 Suction Sample Jar 3 PELAGIC SEDIMENT at Bmrk-66 - Fissure. z-1723	Juniper/ Tunncliffe	
R546-SS_rk-J2- 0002	S Pillow Anomaly	422091	5079330	-130.00369	45.86313	1723	22:04 Jul06 '00	2217 Suction sample flush into jar 2 basalt chips (Rk) at Bmrk-66 Fissure.	J Chadwick	
R546-net-0003	S Pillow Anomaly	422091	5079330	-130.00369	45.86313	1722	13:42 Jul07 '00	Back on bottom at Bmrk-66. Putting plankton net in port side of biobox. (position given is only 1 fix)	Tunncliffe/ Metaxas	
R546- McLane-004	S Pillow Anomaly	422091	5079330	-130.00369	45.86313	1723	14:17 Jul07 '00	McLane pump sample. Volume=? Pumping at 7 liters/minute. (position given is only 1 fix)	Tunncliffe/ Metaxas	
R547										
R547- HFS-4-0001	Old Worms	423780	5088420	-129.98331	45.94511	1525	07:47 Jul08 '00	Fluid sampler: gas piston T1=7.5 T2=5.9 Tmax=8. Start time: 07:50 Stop time: 07:51. Vol filtered 150 ml.	Evans	Butterfield/ Lilley

Sample	Vent/Mkr	UTM X	UTM Y	long (deg)	lat (deg)	Z (m)	UTC Time	Description	PI	Sub Smp
R547- HFS-8-0002	Old Worms	423780	5088420	-129.98331	45.94511	1525	07:53 Jul08 '00	Fluid sampler: unfiltered fluid (bag). T1=6.1;T2=5.4. Start time: 07:54:14; Stop time: 07:57. Restarting 07:57:43; Stop 08:00:25. Vol 700 ml. Tmax=8.1. White floc in crack.	Butterfield/ Huber/ Mehta/ Larson	
R547- HFS-9-0003	Mkr-N3	423637	5088278	-129.9852	45.9438	1527	08:53 Jul08 '00	Fluid sampler: unfiltered water (bag 9). T1=17.0 T2=13.0; Start time: 08:53; Stop time: 09:00. Vol 698ml. Tmax=20.2.	Butterfield/ Huber/ Mehta/ Larson	
R547- HFS-24-0004	Mkr-N3	423637	5088278	-129.9852	45.9438	1528	09:01 Jul08 '00	Fluid sampler: gas piston. T1=18.0 T2=136.0. Start time: 09:01 Stop time: 09:04. Vol 150ml. Tmax=20.2.	Evans	Butterfield/ Lilley
R547- HFS-1-0005	Mkr-N3	423637	5088278	-129.9852	45.9438	1528	09:06 Jul08 '00	Fluid sampler: XRF filter T1=16.0 T2= 2.0. Start time: 09:06 Stop time 09:10. Tmax=18.8. Vol filtered: 500ml.	Gendron	
R547 -HFS-11-0006	near Mkr-N41	423924	5087418	-129.98136	45.93612	1520	11:16 Jul08 '00	HFS-11 bag filter for chemistry and microbiology. Start sample at 11:16. T1=12.3 T2=9.0. A couple metres from N41. End time is 11:24. Volume is 698 ml. Tmax=13.2.	Gendron/ Butterfield/ Huber/ Larson	
R547- HFS-5-0007	near Mkr-N41	423924	5087418	-129.98136	45.93612	1520	11:26 Jul08 '00	Taking a gas piston number 5 starting at 11:26 at marker N41. T1=12.0 T2=9.0 Tmax=12.8. Stop at 11:29. Volume pumped was 230 ml.	Evans	Butterfield/ Lilley
R547-SS_ptl-J 1- 0008	near Mkr-N41	423922	5087428	-125.8524	45.93725	1520	12:22 Jul08 '00	Start of suction sample near marker N41 for PARTICULATES only at 12:21. End of suction sample at 12:33. Measured temperatures of 18-20 degrees.	Juniper	
R547-SS_ptl-J 2- 0009	Nascent	423905	5087387	-129.88152	45.93577	1520	12:45 Jul08 '00	Taking suction sample approximately 0.5m south of NeMO '99 camera for PARTICULATES at active vent. Began at 12:44 end suction at 12:59.	Juniper	
R547- HFS-2-0010	Nascent	423905	5087387	-129.88152	45.93577	1520	13:06 Jul08 '00	13:06-starting HFS in valve 2 , filter for XRF. End sampling at 13:13. T1=14.4 T2=10.4. Volume=600ml. Tmax=14.8	Gendron	
R547 -HFS-14-0011	Nascent	423905	5087387	-129.88152	45.93577	1520	13:14 Jul08 '00	Start sample 13:14 for HFS bag sample #14. End sample at 13:22 T1=14.6 T2=10.1 Tmax=14.7. Volume=700ml.	Butterfield/ Huber/ Mehta/ Larson	
R547-SS_mat-7- 0012	Mkr-33	423850	5087101	-129.98225	45.93327	1524	15:15 Jul08 '00	Suction sample: MICROBIAL MAT and BIO (limpets worms) into Jar 7. Start time 15:21. End time 15:32.	Moyer	J Chadwick
R547- HFS-3-0013	Mkr-33	423850	5087101	-129.98225	45.93327	1524	15:46 Jul08 '00	Fluid sampler: FISH filter. T1=28.0 T2=20.0. Start time: 15:47:49 End time: 15:56:45. Vol filtered=1 litre. Tmax=34.7	Huber	

Sample	Vent/Mkr	UTM X	UTM Y	long (deg)	lat (deg)	Z (m)	UTC Time	Description	PI	Sub Smp
R547- HFS-6-0014	Mkr-33	423850	5087101	-129.98225	45.93327	1523	15:57 Jul08 '00	Fluid sampler: Lipid filter. T1=28 T2=20. Start time: 15:57 End time: 16:06. Vol filtered=1 L. Tmax=37.9	Huber	
R547- HFS-10-0015	Mkr-33	423850	5087101	-129.98225	45.93327	1523	16:07 Jul08 '00	Fluid sampler: 2 filter DNA. T1=25.0 T2=18.5. Start time: 16:07 End time: 16:16. Vol filtered=1 L. Tmax=36.8.	Huber	
R547- HFS-12-0016	Mkr-33	423850	5087101	-129.98225	45.93327	1523	16:16 Jul08 '00	Fluid sampler: sterivex DNA filter. T1=28.0 T2=20.0. Start time: 16:16 End time: 16:25. Vol filtered=1 L. Tmax=35.2	Mehta	
R547- HFS-15-0017	Mkr-33	423850	5087101	-129.98225	45.93327	1523	16:26 Jul08 '00	Fluid sampler: XRF filter. T1=28.0 T2=20.0. Start time: 16:26 End time: 16:32. Vol filtered=700 ml. Tmax=38.5.	Gendron	
R547- HFS-16-0018	Mkr-33	423850	5087101	-129.98225	45.93327	1523	16:33 Jul08 '00	Fluid sampler: unfiltered water (bag). T1=25.0 T2= 20.0 Start time: 16:33 End time: 16:40. Vol:=700 ml. Tmax= 33.4	Butterfield/ Huber/ Mehta/ Larson	
R547- HFS-20-0019	Mkr-33	423850	5087101	-129.98225	45.93327	1523	16:40 Jul08 '00	Fluid sampler: gas piston. T1=30.0 T2=15.0. Start time: 16:45 End time: 16:47. Vol=150 ml?. Tmax=38.8.	Evans	Butterfield/ Lilley
R547- HFS-22-0020	Mkr-33	423850	5087101	-129.98225	45.93327	1523	16:48 Jul08 '00	Fluid sampler: piston. T1=27.0 T2=15.0. Start time: 16:48 End time: 16:53. Vol:=852 ml. Tmax=39.0.	Butterfield/ Huber/ Mehta / Larson	
R547- HFS-19-0021	Snail (Mkr- N8)	423877	5087088	-129.9819	45.9332	1523	17:43 Jul08 '00	Fluid sampler: bag unfiltered water. T1=11.8 T2=78.0. Start time: 17:44 End time: 17:48. Vol=651 ml. Tmax=11.8.	Butterfield/ Huber/ Mehta/ Larson	
R547-SS_bio- J3- 0022	Snail (Mkr- N8)	423877	5087088	-129.9819	45.9332	1523	17:56 Jul08 '00	Suction sample into Jar 3: BIO. Start time: 17:57 End time: 18:03	Juniper	
R547-SS_bio- J5- 0023	Snail (Mkr- N8)	423877	5087088	-129.9819	45.9332	1523	18:04 Jul08 '00	Suction sample into Jar 5: BIO. Start time: 18:06 End time: 18:13	Marcus	J Chadwick
R547- HFS-7-0024	Cloud (Mkr- N6/21)	423901	5087116	-129.9816	45.9334	1525	19:32 Jul08 '00	HFS FISH filter #7. Begin 19:32:29; End 19:41:01. Vol=1000 ml. T1=15.9 T2=11.3 Tmax =15.9.		
R547- McLane- 0025	Cloud (Mkr- N6/21)	423901	5087116	-129.9816	45.9334	1525	19:34 Jul08 '00	McLane pump 5.7 L/min initial flow rate. Begin time 1933 end time 2022.	Tunncliffe/ Metaxas	
R547- HFS-13- 0026	Cloud (Mkr- N6/21)	423901	5087116	-129.9816	45.9334	1525	19:42 Jul08 '00	HFS 13 for DNA (two filters). Begin 19:42:24 End 19:51:20. T1=15.9 T2=11.3 Tmax=15.9. Vol=1000 ml.	Huber	
R547- HFS-18- 0027	Cloud (Mkr- N6/21)	423901	5087116	-129.9816	45.9334	1524	19:53 Jul08 '00	HFS bag sample. Begin 19:52:16 End 19:59:04. T1=15.7 T2=11.2 Tmax=15.9. Vol=700 ml.	Butterfield/ Huber	
R547- HFS-21- 0028	Cloud (Mkr- N6/21)	423901	5087116	-129.9816	45.9334	1524	20:01 Jul08 '00	XRF filter Begin 20:00:45 End 20:04:21. T1=15.8 T2=11.5 Tmax=15.9. Vol=400 ml.	Gendron	

Sample	Vent/Mkr	UTM X	UTM Y	long (deg)	lat (deg)	Z (m)	UTC Time	Description	PI	Sub Smp
R547- HFS-23-0029	Cloud (Mkr-N6/21)	423901	5087116	-129.9816	45.9334	1524	20:06 Jul08 '00	Gas piston 23. Begin 20:05:28 end 20:07:46. T1 =15.8 T2=11.4 Tmax=15.9. Vol=250 ml.	Evans	Butterfield/Lilley
R547-GTB-0030	Cloud (Mkr-N6/21)	423901	5087116	-129.9816	45.9334	1524	20:07 Jul08 '00	20:05:05 Starboard Gas Tight Bottle #7 (GTB)	Evans	Butterfield/Lilley
R547-SS_bio-J4- 0031	Cloud (Mkr-N6/21)	423901	5087116	-129.9816	45.9334	1524	20:54 Jul08 '00	Scale worms collected by suction sampler (BIO). 20:55 begin suction. End 21:06. Also basalt chips (RK)	Marcus/J Chadwick	Juniper
R547-SS_ptl-J6- 0032	Cloud (Mkr-N6/21)	423901	5087116	-129.9816	45.9334	1524	21:24 Jul08 '00	Suction sampling for PARTICULATES at about 1/3 pump. Begin 21:24 End 21:33.	Juniper	
R547- HFS-17-0033	Castle	424023	5086306	-129.9799	45.92613	1520	23:10 Jul08 '00	Anhydrite bag sample with filter #17. Begin 23:10:04 End 23:12:20. T1=272.2 T2=150.0 Tmax=272.6. Vol=250ml.	Butterfield	
R547-GTB-0034	Castle	424023	5086306	-129.9799	45.92613	1520	23:12 Jul08 '00	port gastight bottle #6. Anhydrite 272.6 deg C	Evans	Butterfield/Lilley
R547-SS_rk-J8- 0035	Castle	424023	5086306	-129.9799	45.92613	1520	23:20 Jul08 '00	Anhydrite base minerals to flushing bottle. z=1520 (Basalt subsample)	Fortin	Butterfield/J Chadwick
R547-SF- 0036	Castle	424023	5086306	-129.9799	45.92613	1520	23:42 Jul08 '00	SULFIDE chimney sample from very near anhydrite	Fortin	Juniper/Tunncliffe
R547-RK- 0037	NE of Castle	423974	5086299	-129.98053	45.92606	1521	00:07 Jul09 '00	Old basalt chunk (RK).	J Chadwick	Fortin/Tunncliffe
R548										
R548-SS_FeO-J1- 0001	Magnesia (Mkr-67)	423661	5088545	-129.98493	45.94623	1531	12:29 Jul09 '00	Start suciton 12:28 for FeO. Appears very fluffy - looks like last years bacterial flock is now covered with FeO. Suction ended 12:31. (Rock chips subsample)	Fortin	J Chadwick
R548-TWG-0002	BagCity (Mkr- 36)	423271	5085209	-129.98943	45.91617	1534	21:43 Jul09 '00	Tube worm grab near the base of Mkr-36. In port biobox. (Microbial mat and basalt chip sub samples)	Tunncliffe/Marcus	Moyer/J Chadwick
R548-MTR_3049-0003	BagCity (Mkr- 36)	423271	5085209	-129.98943	45.91617	1534	21:56 Jul09 '00	recovering MTR #3049 (depl '99)	Embley	
R548-SS_ptl-J2- 0004	BagCity (Mkr- 36)	423271	5085209	-129.98943	45.91617	1535	22:12 Jul09 '00	Sucion Sample - J2 near base of where TWG was taken. Filter #4 - 1.0 um (PARTICULATES) start time 2211 end time 2226	Juniper	
R548-SS_mat-J3- 0005	BagCity (Mkr- 36)	423271	5085209	-129.98943	45.91617		22:27 Jul09 '00	Suction Sample -Jar 3 Same spot as previous slurp sample for MICROBIAL MAT. Start time 2226 end time 2236	Moyer	

Sample	Vent/Mkr	UTM X	UTM Y	long (deg)	lat (deg)	Z (m)	UTC Time	Description	PI	Sub Smp
R548-SS_bio-J4-0006	BagCity (Mkr- 36)	423271	5085209	-129.98943	45.91617	1534	22:46 Jul09 '00	Obtaining peripheral fauna around tubeworms (BIO). Beginning Suction Sample into jar 4 at 22:46 ending at 22:52.	Tunncliffe/Marcus	
R548-SS_mat/rk-J5-0007	FeCity	423291	5085361	-129.98919	45.91754	1535	01:16 Jul10 '00	orange MICROBIAL MAT and BASALT CHIPS into Suction sampler jar 5. Start time 0111 end time 0130	Juniper	J Chadwick
R548-TWG-0008	Joystick (Mkr- 42)	423342	5085505	-129.98856	45.91884	1538	02:06 Jul10 '00	tube worm grab delivered to stbd Bio Box. Scale worm new species in grab - 1 vestimentiferen (sp?)	Marcos	Juniper
R548-RK-0009	Joystick (Mkr- 42)	423342	5085505	-129.98856	45.91884	1538	02:20 Jul10 '00	Wormy basalt glass grab to stbd Bio Box (Rock and Bio)	J Chadwick	Tunncliffe
R548-SS_bio-J6-0010	Joystick(Mkr- 42)	423342	5085505	-129.98856	45.91884	1538	02:27 Jul10 '00	suction sample of the limpit among the tube worms (BIO) jar #6. Start time 0226 end time 0236	Marcus	J Chadwick
R548-SS_bio-J7-0011	Joystick (Mkr- 42)	423342	5085505	-129.98856	45.91884	1538	02:37 Jul10 '00	suction sample bottle 7 peripheral fauna and mat in and around tube worms (BIO and MAT)	Juniper	
R548-RK-0012	Joystick (Mkr- 42)	423342	5085505	-129.98856	45.91884	1538	02:48 Jul10 '00	Basalt into stbd bio box	J Chadwick	
R548- McLane-0013	BagCity area	423342	5085505	-129.98856	45.91884		05:01 Jul10 '00	McLane pump. 118 liters fluid. Started at BagCity turned off intermittently. shut down at Joystick. Sampled BagCity, FeCity and Joystick areas. (position given is only 1 fix)	Metaxas/Tunncliffe	
R549										
R549-BT_44-0001	Mkr-33	423850	5087101	-129.98225	45.93327	1520	08:37 Jul10 '00	Bacterial Trap #44 from Mkr-33 into port side of biobox	Moyer	
R549-BT_46-0002	Mkr-33	423850	5087101	-129.98225	45.93327	1523	08:43 Jul10 '00	Bacterial trap #46 into port side of biobox	Moyer	
R549-BT_48-0003	Cloud (Mkr-N4)	423896	5087119	-129.98167	45.93342	1523	10:15 Jul10 '00	Bacterial trap #48 into port side of biobox from Cloud N4.	Moyer	
R549-BT_47-0004	Cloud (Mkr- N4)	423896	5087119	-129.98167	45.93342	1523	10:16 Jul10 '00	Bacterial trap #47 into port side of biobox from Cloud N4	Moyer	
R549-TWG-0005	Cloud (Mkr -N6/21)	423904	5087110	-129.98156	45.93335	1524	10:45 Jul10 '00	Tube Worm grab at Cloud Mkr-21 into starboard side of biobox	Marcus	
R549-SS_fl-J4-0006	Cloud (Mkr-N6/21)	423904	5087110	-129.98156	45.93335	1524	11:00 Jul10 '00	Suction Sample (FLUID) Jar #4. Start suction 11:00 for Butterfield water sample. End suction at 11:05.	Butterfield	

Sample	Vent/Mkr	UTM X	UTM Y	long (deg)	lat (deg)	Z (m)	UTC Time	Description	PI	Sub Smp
R549-SS_fl/m-at-J3-0007	Cloud (Mkr-N6/21)	423904	5087110	-129.98156	45.93335	1524	11:09 Jul10 '00	Suction Sample Jar #3. Start suction at 11:10 for Craig water plus bacterial mat (FLUID and MAT) . End suction at 11:16.	Moyer	
R549-SS_bio-J1- 0008	Cloud (Mkr-N6/21)	423904	5087110	-129.98156	45.93335	1524	11:19 Jul10 '00	Start suction (BIO) for Juniper at 11:17 for little animals. End suction at 11:21.	Juniper	Marcus
R549-SS_bio-J2- 0009	Cloud (Mkr-N6/21)	423904	5087110	-129.98156	45.93335	1524	11:25 Jul10 '00	Start suction (BIO) for Tunncliffe at 11:25 for semi-periferal fauna. End suction at 11:32. This site had a high abundance of scale worms.	Marcus/Tunncliffe	
R549- McLane-0010	Cloud (Mkr-N6/21)	423904	5087110	-129.98156	45.93335	1524	11:44 Jul10 '00	Start of McLane pump at 11:44 for (WATER) sample during video survey. Pump was turned off at 12:48.	Metaxas	
R549-Bio-0011	Cloud (Mkr- N4)	423896	5087119	-129.98167	45.93342	1523	12:59 Jul10 '00	Suction of a vent fish (BIO) off the seafloor. Can't unclog the line so will attempt to leave it in the line. At 13:24 line was unclogged and fish put into jar #8.	Juniper	Tunncliffe
R549- RK/bio-0012	Snail (Mkr- N8)	423877	5087088	-129.9819	45.9332	1524	13:59 Jul10 '00	Picked up rock samples coated with organisms for Tunncliffe. (BIO and RK)	Tunncliffe/Marcus	J Chadwick
R549-SS_FeO-J2- 0013	10m S of Snail	423882	5087073	-129.98184	45.9330112	1524	14:19 Jul10 '00	Suction sample of FeO. Start of suction at 14:20 end suction at 14:26. (subsample basalt RK)	Kennedy	J Chadwick
R549-SS_bio-J5- 0014	Mkr-108	423784	5086589	-129.98303	45.92865	1524	15:38 Jul10 '00	Suction sample of BIO (limpets worms) Started suctioning: 15:36 Ended suctioning: 15:42. (subsample basalt chips RK)	Marcus	J Chadwick
R549-SS_bio-J1- 0015	Mkr-108	423784	5086589	-129.98303	45.92865	1524	15:43 Jul10 '00	Suction sample: BIO. Started: 15:48 Ended: 15:51	Juniper	
R549- RK/bio-0016	Mkr-108	423784	5086589	-129.98303	45.92865	1524	15:54 Jul10 '00	ROCK with a blue mat on it. Some limpets and worms (BIO)are on it too. Will carry up in arm.	Tunncliffe/J Chadwick	
R549- McLane-0017	Cloud	423904	5087110	-129.98156	45.93335	1524	17:21 Jul10 '00	McLane pump. Volume=330 liters. Pumped fluid during video survey at Cloud Vent. (position given is only 1 fix)	Tunncliffe/Metaxas	
R549- TLC'99-0018	Nascent	423905	5087387	-129.9816	45.93584	1520		Retrieved NeMO Net'99 Time Lapse Camera after Dive R549.	Tunncliffe	
R550										
R550- McLane-0001	BagCity area	423271	5085209	-129.98943	45.91617	1519	02:29 Jul 11 '00	2:23 McLane pump started @ 6 L/min during Imgnx Line BC16. Goal is a ~400 liter sample. (position given is only 1 fix)	Metaxas/Tunncliffe	
R551										

Sample	Vent/Mkr	UTM X	UTM Y	long (deg)	lat (deg)	Z (m)	UTC Time	Description	PI	Sub Smp
R551- HFS-6-0001	Mkr-33	423850	5087101	-129.98225	45.93327	1520	21:29 Jul 11 '00	filter-Lipids: start 21:29:02 stop 21:40:28 T1=27 T2= 9.0 Tmax=31.5. Vol=1 liter.	Huber	
R551- HFS-10-0002	Mkr-33	423850	5087101	-129.98225	45.93327	1523	21:41 Jul 11 '00	two filter DNA: start 21:41:25 stop 21:49:25. T1=27.0 T2=20 Tmax=31. Vol=1 liter.	Huber	
R551- HFS-4-0003	Mkr-33	423850	5087101	-129.98225	45.93327	1523	21:47 Jul 11 '00	gas piston: start 21:03:47 stop 21:04:27. T1=27.0 T2=19.4 Tmax=28.4. Vol=113 liters.	Evans	Butterfield/ Lilley
R551- HFS-12-0004	Mkr-33	423850	5087101	-129.98225	45.93327	1523	21:50 Jul 11 '00	sterivex filter: start 21:49:58 stop 21:57:38. T1=26.0 T2=19.0 Tmax=31.1. Vol=1 liter.	Huber	
R551- HFS-8-0005	Mkr-33	423850	5087101	-129.98225	45.93327	1523	21:52 Jul 11 '00	HFS bag: start 21:05:19 stop 21:11:07. T1=25.0 T2=19.0 Tmax=29.5. Vol=700 ml.	Butterfield	
R551- HFS-1-0006	Mkr-33	423850	5087101	-129.98225	45.93327	1523	21:54 Jul 11 '00	HFS XRF filter: start 21:12:10 stop 21:17:55. T1=25.0 T2=18.0 Tmax=30.6. vol = 500 ml.	Gendron	
R551- HFS-3-0007	Mkr-33	423850	5087101	-129.98225	45.93327	1523	21:56 Jul 11 '00	HFS FISH filter #3: start 21:18:44 stop 21:28:05. T1=24.0 T2=19.0 Tmax=28.9. Vol=1 liter.	Huber	
R551- HFS-9-0008	Snail (Mkr- N8)	423877	5087088	-129.9819	45.9332	1525	22:23 Jul 11 '00	HFS bag 9: start 22:23:22 stop 22:29:24. T1=15.5 T2=9.5 Tmax=17.2. vol =748 ml.	Butterfield	
R551- HFS-15-0009	Cloud (Mkr- N6/21)	423901	5087116	-129.9816	45.9334	1526	22:42 Jul 11 '00	Hfs 15 filter #15 for XRF: start 22:42 stop 22:46. Tmax=16 T1=15.9 T2=12.5. Volume=500 ml	Gendron	Huber
R551- HFS-11-0010	Cloud (Mkr- N6/21)	423901	5087116	-129.9816	45.9334	1526	22:46 Jul 11 '00	HFS bag #11 with filter: start 22:47:13 stop 22:52:59. Tmax=15.9 T1=15.8 T2=12.7. volume=700 ml.	Butterfield	Huber
R551- HFS-24-0011	Cloud (Mkr- N6/21)	423901	5087116	-129.9816	45.9334	1525	22:53 Jul 11 '00	HFS gas piston #24: start 22:54:13 stop 22:55:05. Tmax=15.9 T1=15.8 T2=12.6. Volume=109 ml.	Evans	Lilley/ Butterfield
R551- GTB-5-0012	Cloud (Mkr- N6/21)	423901	5087116	-129.9816	45.9334	1526	22:55 Jul 11 '00	GAS Tight Bottle #5 stbd. time 2255.	Evans	Lilley/ Butterfield
R551-SS_bio-J4- 0013	Cloud (Mkr- N6/21)	423901	5087116	-129.9816	45.9334	1524	23:07 Jul 11 '00	Suction Sample jar #4. 250 micron filter. Peripheral fauna (BIO). 5 meters east of Mkr-21. start time 2307 stop time 2314.	Tunncliffe	J Chadwick
R551-SS_mat-J1- 0014	Mkr-113	423370	5085922	-129.98827	45.9226	1525	01:44 Jul12 '00	suction sampler btl #1 . 250 microns white (BIO/MAT) stuff. start 0144 end 02:24.	Marcus	

Sample	Vent/Mkr	UTM X	UTM Y	long (deg)	lat (deg)	Z (m)	UTC Time	Description	PI	Sub Smp
R551- HFS-14-0015	Mkr-113	423370	5085922	-129.98827	45.9226	1525	02:35 Jul12 '00	HFS bag sample bag#14: start 02:35:36 end 02:43:56. Tmax=19.8 T1= 7.9 T2=12.0. Volume=700 ml.	Butterfield	
R551- GTB-2-0016	Mkr-113	423370	5085922	-129.98827	45.9226	1525	02:44 Jul12 '00	port gastight bottle #2. 19 deg C time 0244.	Evans	Lilley/ Butterfield
R551-SS_mat-J6- 0017	Near Mkr-113	423377	5085929	-129.98821	45.9227137	1525	03:21 Jul12 '00	Starting to suction into bottle #6 (MAT/BIO?). start 0326 finish 0345. Trying to get blue protozoan mat. z=1524 (subsample basalt chips RK)	Moyer/ Juniper	J Chadwick
R551-SS_mat-J7- 0018	Near Mkr-113	423377	5085929	-129.98821	45.9227137	1525	03:48 Jul12 '00	Suction sample into jar#7 in same spot for same stuff. Moving a couple meters away to get more blue mat. start time 0348 stop 0408. (MAT - got some BIO too)	Moyer/ Juniper	
R551- HFS-19-0019	Joystick (Mkr- 42)	423341	5085505	-129.98856	45.91884	1537	05:54 Jul12 '00	Begin fluid sample at 0554 into bag #19: T1=3.9 T2=3.3 Tmax=4. Stopping sample at 0601. volume=723 ml. Depth = 1537m.	Butterfield	Huber
R551-SS_bio-J2- 0020	Joystick (Mkr- 42)	423341	5085505	-129.98856	45.91884	1537	06:26 Jul12 '00	Suction sample into J2. at start 0606 stop at 0625. Tried for a fish but couldn't get it. (BIO?)	Juniper	
R551- HFS-17-0021	FeCity	423300	5085364	-129.98919	45.91754	1535	07:04 Jul12 '00	Fluid Sample Bag #17 with filter: T1=9.3 T2=6.8 Tmax=10.1. Volume=670 ml. start 07:04:29 end 07:12:11.	Butterfield	Huber/ Gendron
R551- HFS-20-0022	FeCity	423300	5085364	-129.98919	45.91754	1535	07:12 Jul12 '00	HFS Gas Piston #20: start 07:13:03 end 07:14:25. T1=10 T2=7.6 Tmax=10.3. Volume=144 ml.	Evans	
R551-SS_bio-J1- 0023	FeCity	423300	5085364	-129.98919	45.91754	1535	07:13 Jul12 '00	Suction of nemertean worms (BIO) into J1. Also getting FeO, basalt, and some other worms. start 07:17 stop suctioning at 07:35.	Juniper	
R551- HFS-2-0024	BagCity (Mkr- 36)	423271	5088209	-129.98943	45.91617	1535	08:10 Jul12 '00	HFS XRF filter #2: start 08:16:51 stop at 08:19:35. T1=9 T2=14.8 Tmax=19.1. vol =500 ml.	Gendron	
R551- HFS-5-0025	BagCity (Mkr- 36)	423271	5088209	-129.98943	45.91617	1535	08:20 Jul12 '00	HFS gas piston #5: start 08:20:59 stop 08:21:57. T1=19.1 T2=14.1 Tmax=19.3. vol=101 ml.	Evans	Butterfield/ Lilley
R551- HFS-7-0026	BagCity (Mkr- 36)	423271	5088209	-129.98943	45.91617	1535	08:23 Jul12 '00	HFS FISH filter #7: start 8:22:45 stop 08:32:38. T1=18.9 T2=14.5 Tmax=19.2. vol=1 liter.	Huber	
R551- HFS-13-0027	BagCity (Mkr- 36)	423271	5088209	-129.98943	45.91617	1535	08:33 Jul12 '00	HFS Filter set 2 DNAs #13: start 08:33:36 stop 08:42:32. T1=18.9 T2=14.4 Tmax=19.2. vol=1 liter.	Huber	
R551- HFS-18-0028	BagCity (Mkr- 36)	423271	5088209	-129.98943	45.91617	1535	08:41 Jul12 '00	HFS Bag #18: start 08:44:08 stop 08:50:15. T1=18.9 T2=14.3 Tmax=19.2. vol=700 ml.	Butterfield	Larson/ Huber/ Mehta

Sample	Vent/Mkr	UTM X	UTM Y	long (deg)	lat (deg)	Z (m)	UTC Time	Description	PI	Sub Smp
R551- HFS-22-0029	BagCity (Mkr- 36)	423271	5088209	-129.98943	45.91617	1535	08:50 Jul12 '00	HFS piston #22: start 08:51:00 stop 08:4:42. T1=18.7 T2=14.3 Tmax=19.0 . vol=700 ml.	Butterfield	Larson/ Huber/ Mehta
R551- McLane-0030	BagCity (Mkr- 36)	423271	5088209	-129.98943	45.91617	1531	09:34 Jul12 '00	McLane pump stopped at 8:56:46. 403 liters pumped.	Metaxas/ Tunncliffe	
R551- HFS-16-0031	Coquille	422991	5085365	-129.99306	45.91753	1536	09:50 Jul12 '00	HFS bag #16: start 9:50:25 end suction at 9:56:42. T1=31.0 T2=20.8 Tmax=32.0. Volume=700 ml.	Butterfield	
R551- HFS-21-0032	Coquille	422991	5085365	-129.99306	45.91753	1536	09:57 Jul12 '00	HFS filter #21 for XRF analyses: T1=31.8 T2=21.3 Tmax= 31.8. 0957 start end suction 1001. Volume=500 ml.	Gendron	
R551- HFS-23-0033	Coquille	422991	5085365	-129.99306	45.91753	1536	10:03 Jul12 '00	HFS for gas piston #23: T1=30.7 T2=20.9 Tmax=30.9. volume=112 ml. start at 10:02 end at 10:03.	Evans	Butterfield/ Lilley
R551-RK- 0034	Coquille	422991	5085365	-129.99306	45.91753	1533	10:53 Jul12 '00	Picked up rock sample (Rk) from floor of glassy basalt.	J Chadwick	
R552										
R552- TWG-0001	Mkr-113	423377	5085929	-129.98817	45.92266	1525	00:33 Jul13 '00	Tube worm grab on edge of cleft. (subsample basalt chips RK)	Marcus	J Chadwick
R552-SS_bio- J8- 0002	S of Coquille	422976	5085284	-129.99324	45.91681	1538	07:08 Jul13 '00	Suction of clams (BIO)into Jar J8. Start 0707 Finish 0712. (Basalt chips subsample for Chadwick Oxidized basalt chips for Kennedy)	Juniper	J Chadwick/ Kennedy
R552-RK- 003	SW of FeCity	423246	5085343	-129.98977	45.917372	1538	08:38 Jul13 '00	In port biobox. 10cm long or so broke in 2 pieces right side on top of worms SW of B near collapse at edge of lineated sheet flows seen in 1987.	J Chadwick	
R552- McLane-0004	S of BagCity	424300	5084850	-129.9761	45.9130152	1550	14:14 Jul13 '00	Starting McLane pump on Imagenex run. Pump stopped at 18:14. Vol=1624 liters. (position given is only 1 fix)	Tunncliffe/ Metaxas	
R552-net-0005	S of BagCity	424300	5084850	-129.9761	45.9130152	1550	14:17 Jul13 '00	Plankton net tow during Imagenex survey. (position given is only 1 fix)	Tunncliffe/ Metaxas	
R552-RK- 0006	~1000 m SE of BagCity	424300	5084750	-129.97609	45.9121524	1550	20:03 Jul13 '00	Glassy basalt sample (rk) for J. Chadwick. sample placed in STB side lower left Bio box.	J Chadwick	
R552-RK- 0007	~1000 m NE of BagCity	424186	5085523	-129.97768	45.9190962	1537	21:31 Jul13 '00	Lava (Rk) placed in the right front of stb bio box. sample is almost square.	J Chadwick	

Sample	Vent/Mkr	UTM X	UTM Y	long (deg)	lat (deg)	Z (m)	UTC Time	Description	PI	Sub Smp
R552-RK-0008	~1000 m SE of BagCity?	424301	5084736	-129.97607	45.9120265	1545	23:13 Jul13 '00	Chunk of old lava from a patch which is sticking up out of the new lava. Fumbled with one sample and went back for more. Port bio box @~23:26 (no good fixes for this sample)	J Chadwick	
R553										
R553- HFS-8-0001	Marsh-mallow	421420	5087179	-130.01362	45.9337	1545	14:46 Jul14 '00	HFS bag 8: start 14:46 end sampling at 14:32. T1=127 T2=74 Tmax=136.3. Volume=500 ml.	Butterfield	
R553- HFS-4-0002	Marsh-mallow	421420	5087179	-130.01362	45.9337	1545	14:53 Jul14 '00	HFS gas piston #4: start 14:53 end sampling at 14:54. T1=129.3 T2=71.9 Tmax=130.3. Volume=110 ml.	Evans	Butterfield/Lilley
R553- HFS-7-0003	Marsh-mallow	421420	5087179	-130.01362	45.9337	1545	14:55 Jul14 '00	HFS FISH filter #7. start 14:55 end 15:06. T1=140 T2=80 Tmax=152.5. volume=1 L.	Huber	
R553- HFS-13-0004	Marsh-mallow	421420	5087179	-130.01362	45.9337	1545	15:07 Jul14 '00	HFS 2 DNA filter #13: start 15:12 end 15:19. T1=134 T2=75 Tmax=152. Vol=1 L.	Huber	
R553- HFS-15-0005	Marsh-mallow	421420	5087179	-130.01362	45.9337	1545	15:20 Jul14 '00	HFS XRF filter#15: start 15:20 end 15:25. T1=129 T2=72 Tmax=132.4 Vol=500 ml.	Gendron	
R553- HFS-2-0006	Gollum	421422	5087166	-130.01358	45.93358	1545	15:44 Jul14 '00	HFS XRF filter #2: start time: 15:43 end 15:49. T1=28.4 T2=19.3 Tmax=30.7 Vol=500 ml	Gendron	
R553- McLane-0007	Gollum	421422	5087166	-130.01358	45.93358	1545	15:52 Jul14 '00	McLane pump started 15:57 end 17:12. Vol=400 L at Gollum.	Metaxas	
R553- HFS-3-0008	Gollum	421422	5087166	-130.01358	45.93358	1545	16:13 Jul14 '00	HFS FISH filter #3: start 16:13 end: 16:22. T1=25 T2=17 Tmax=26.8. Vol=1 L.	Huber	
R553- HFS-20-0009	Gollum	421422	5087166	-130.01358	45.93358	1545	16:22 Jul14 '00	HFS gas piston #20: start 16:23 end 16:24. T1=34 T2=24 Tmax=25.9 Vol=122 ml.	Evans	Butterfield/Lilley
R553- HFS-22-0010	Gollum	421422	5087166	-130.01358	45.93358	1545	16:24 Jul14 '00	HFS piston #22: start 16:25 end 16:30. T1=29 T2=19 Tmax=39. Vol=560 ml.	Butterfield	
R553- HFS-12-0011	Gollum	421422	5087166	-130.01358	45.93358	1545	16:31 Jul14 '00	HFS Sterivex filter #12: start 16:31 end 16:40. T1=37 T2=24 Tmax=38.2. Vol=1 L.	Mehta	
R553- HFS-10-0012	Gollum	421422	5087166	-130.01358	45.93358	1545	16:41 Jul14 '00	HFS 2 DNA filter #10: start 16:41 end 16:50. T1=30 T2=20 Tmax=33.7. Vol=1 L.	Huber	
R553- HFS-6-0013	Gollum	421422	5087166	-130.01358	45.93358	1545	16:50 Jul14 '00	HFS lipid filter #6: start 16:51 end 17:00. T1=31 T2=20 Tmax=32.7. Vol=1 L.	Huber	
R553- HFS-1-0014	Virgin	421430	5087174	-130.01348	45.93365	1546	17:37 Jul14 '00	HFS XRF filter #1: start 17:52 end 17:56. T1=299 T2=120 Tmax=300.6. Vol=500 ml.	Gendron	
R553- GTB-0015	Virgin	421430	5087174	-130.01348	45.93365	1546	17:46 Jul14 '00	Gas tight bottle #7 fired. Temp=300	Evans	Butterfield/Lilley

Sample	Vent/Mkr	UTM X	UTM Y	long (deg)	lat (deg)	Z (m)	UTC Time	Description	PI	Sub Smp
R553- HFS-24-0016	Virgin	421430	5087174	-130.01348	45.93365	1546	17:48 Jul14 '00	HFS gas piston #24: start 17:49 end 17:50. T1=295 T2=122 Tmax=299.7. Vol=140 ml.	Evans	Butterfield/ Lilley
R553- HFS-9-0017	Virgin	421430	5087174	-130.01348	45.93365	1546	17:57 Jul14 '00	HFS bag #9: start 17:57 end 18:01. T1=300 T2=116 Tmax=300.6. Vol=375 ml.	Butterfield	
R553- HFS-16-0018	Virgin	421430	5087174	-130.01348	45.93365	1546	18:03 Jul14 '00	HFS bag #16: start 18:02 end 18:05. T1=297 T2=52 Tmax=297.6. Vol=350 ml.	Butterfield	
R553- HFS-14-0019	Mush-room	421405	5087168	-130.0138	45.9336	1545	19:06 Jul14 '00	HFS bag #14: start 19:06 stop 19:10. T1=107 T2=60 Tmax=112.1. Vol=500 ml.	Butterfield/ Huber	
R553-GTB-0020	Inferno	421397	5087162	-130.0139	45.93355	1544	20:36 Jul14 '00	Port gas tight bottle #6	Evans	Butterfield/ Lilley
R553- HFS-5-0021	Inferno	421397	5087162	-130.0139	45.93355	1544	20:37 Jul14 '00	HFS gas piston #5: start 20:37 stop 20:38. T1=298 T2=139 Tmax=300.8. vol=150 ml.	Evans	Butterfield/ Lilley
R553- HFS-11-0022	Inferno	421397	5087162	-130.0139	45.93355	1544	20:39 Jul14 '00	HFS filter bag #11: start 20:39:40 stop 20:43. T1=301 T2=140 Tmax=302.2. vol=478 ml.	Butterfield/ Huber	
R553- HFS-21-0023	Inferno	421397	5087162	-130.0139	45.93355	1544	20:45 Jul14 '00	HFS XRF filter #21: start 20:45:09 stop 20:47. T1=301 T2=137 Tmax=301.8. vol=250 ml.	Gendron	
R553- HFS-19-0024	Inferno	421397	5087162	-130.0139	45.93355	1544	20:48 Jul14 '00	HFS bag #19: start 20:48:04 stop 20:52:09. T1=301 T2=137 Tmax=301.7. vol 450 ml.	Butterfield/ Huber	
R553- HFS-17-0025	Hell	421372	5087130	-130.01423	45.9333	1544	21:42 Jul14 '00	HFS filter bag #17: start 21:41 stop 21:46. T1=70-105 T2=65 Tmax=112.7. vol=500ml.	Butterfield/ Huber	
R553- HFS-18-0026	Hell	421372	5087135	-130.01423	45.9333	1544	22:02 Jul14 '00	HFS bag #18: start 22:03:43 stop 22:07:13. T1=80-130 T2=66 Tmax=144. vol=500 ml.	Butterfield/ Huber	
R553- HFS-24-0027	Hell	421372	5087135	-130.01423	45.9333	1544	22:08 Jul14 '00	HFS gas piston #24. start 22:08 stop 22:09:17. T1=113 T2=69 Tmax=129. vol=118 ml.	Evans	Butterfield/ Lilley
R553-SS_sf-J4-0028	Hell	421372	5087135	-130.01423	45.9333	1546	23:09 Jul14 '00	Suction 200 micron mesh: base of sulfide spire (SULFIDE AND PARTICULATES) at the base of PorkChop. Sulfide worm neighborhood before and after knocking down their spire. start 23:09 end 23:16.	Juniper	
R554										
R554- McLane-0001	S pillow mound anomaly	422000	5079900	-130.00495	45.868249	17252	05:19 Jul15 '00	McLane pump on at 6 liters/min for 400 liters. Area of south pillow mounds - Imagenex survey area. Total time = 5322 seconds. Lowest voltage was 27.7 volts DC. (position given is only 1 fix at middle of survey area)	Metaxas/ Tunnicliffe	

Sample	Vent/Mkr	UTM X	UTM Y	long (deg)	lat (deg)	Z (m)	UTC Time	Description	PI	Sub Smp
R554-RK-0002	S pillow mound anomaly	422532	5080519	-129.9982	45.87388	1717	18:09 Jul15 '00	Big rock of older pillow lava from the east side of the fissure sampled at the contact. In the stbd biobox.	J Chadwick	
R554-RK-0003	S pillow mound anomaly	422526	5080523	-129.99827	45.8739153	1720	18:17 Jul15 '00	New lava from the eastern side of the fissure. It's a flat piece of crust with drips on the bottom. Stbd biobox.	J Chadwick	
R554-RK-0004	S pillow mound anomaly	422365	5079931	-130.00025	45.8685697	1723	20:03 Jul15 '00	Piece of shiny newer lava with glass in jumbled collapse flow. (~50 meters NW of point D) Putting it in the purse. It's mammoth. (Bacterial subsample)	J Chadwick	Moyer
R554-RK-0005	S pillow mound anomaly	422263	5079699	-130.00153	45.8664704	1728	21:07 Jul15 '00	Lava - contact at western edge of depression (east side of high ridge).	J Chadwick	
R554-RK-0006	S pillow mound anomaly	422263	5079699	-130.00153	45.8664704	1728	21:10 Jul15 '00	New chunk of lava, lots of glass. Contact western edge of the depression - eastern edge of high ridge.	J Chadwick	
R555										
R555-LT_8-0001	between Crack and Daves	421417	5087156	-130.03648	45.933481	1545	12:47 Jul16 '00	Cork pushed in a bit too far. Larval Tube #8 placed in larval limo.	Metaxas	
R555-LT_6-0002	between Crack and Daves	421417	5087156	-130.03648	45.933481	1545	12:49 Jul16 '00	Larval Tube #6 placed in larval limo.	Metaxas	
R555-LT_7-0003	between Crack and Daves	421417	5087156	-130.03648	45.933481	1545	13:07 Jul16 '00	Larval Tube #7 placed in larval limo.	Metaxas	
R555-LT_5-0004	between Crack and Daves	421417	5087156	-130.03648	45.933481	1545	13:15 Jul16 '00	Larval Tube #5 placed in larval limo. All ready for trip to surface.	Metaxas	
R555-6TB-0005	Virgin	421430	5087174	-130.01348	45.93365	1545	15:36 Jul16 '00	Gas Tight Bottle #2 fired over flow at Virgin.	Evans	Butterfield/ Lilley
R555-6TB-0006	Virgin	421430	5087174	-130.01348	45.93365	1545	15:37 Jul16 '00	Gas Tight Bottle #5 fired in the same place.	Evans	Butterfield/ Lilley
R556										
R556-LT_2-0001	N of Mkr-33	423847	5087111	-129.9823	45.9333493	1405	21:29 Jul16 '00	21:39 official cap time for Larval Tube #2.	Metaxas	
R556-LT_1-0002	N of Mkr-33	423847	5087111	-129.9823	45.9333493	1405	21:49 Jul16 '00	21:49 - 7 function arm has put the top on Larval Tube #1. The cap is crooked.	Metaxas	
R556-SS_bio-J3-0003	near Mkr-33	423850	5087101	-129.98225	45.93327	1405	21:58 Jul16 '00	SS of fauna (BIO) near the bottom start at 21:58 stop 22:05.	Juniper/ Marcus	
R556-LT_4-0004	N of Mkr-33	423847	5087111	-129.9823	45.9333493	1405	22:16 Jul16 '00	Using the 7 function to cap the Larval Tube #4 at 22:16. Top does not appear to be completely capped. Repositioning to get closer to trap 4 which tipped over and is lying on the bottom.	Metaxas	

Sample	Vent/Mkr	UTM X	UTM Y	long (deg)	lat (deg)	Z (m)	UTC Time	Description	PI	Sub Smp
R556-LT_3-0005	N of Mkr-33	423847	5087111	-129.9823	45.9333493	1405	22:30 Jul16 '00	The 7 function has capped the Larval Tube #3 at 22:30. Very deep on the cap.	Metaxas	
R556-SS_bio-J5-0006	near Mkr-33	423850	5087101	-129.98225	45.93327	1405	23:08 Jul16 '00	suction sample of fauna; palm worms and limpets (BIO). start=~23:08 end=23:17. Not a successful sample for palm worms; extra limpets and sulfide worms added. Sample near MTR_3300.	Juniper	Tunncliffe

4.4 NeMO '00 EXPERIMENTS DEPLOYED/RECOVERED

Vent/Marker	Experiment etc.	Dive Deployed	Dive Recovered	Sample #
Mkr-33 area (15 m NW)	Benchmark 5	R548		
Mkr-33	Bac Trp 51	R549		
Mkr-33	Bac Trp 52	R549		
Mkr-33	BacTrps 41,42	R484	R543	R543-0006, R543-0007
Mkr-33	Grn&Cu OsmoSampler	R483	R543	R543-0001
Mkr-33	BioOsmoSampler	R491	R543	R543-0002
Mkr-33	OsmoAnalyzer	R495	R543	R543-0003
Mkr-33	Time Lapse Camera	R501	R543	R543-0021
Mkr-33	BacTrp 46	R543	R549	R549-0002
Mkr-33	BacTrp 44	R543	R549	R549-0001
Mkr-33	MTR 3292	R543		
Mkr-33	MTR 3300	R543		
Mkr-33	MTR 3289	R543		
Mkr-33 (NW of mkr)	Larval Tubes 1-4 (positioned R543 and R544)	R543	R556	R556-0001 - 0004
Mkr-113	MTR 4126	R551		
Mkr-113	BacTrp 19	R464	couldn't find	
Mkr-113	BacTrap 4	R461	couldn't find	
Mkr-N3	MTR 3176	R547		
Mkr-N3	MTR 3045	R547		
near Mkr-M (Nascent area)	MTR 3309	R548		

Vent/Marker	Experiment etc.	Dive Deployed	Dive Recovered	Sample #
3 m S of Mkr-N41 (near Nascent)	Mtr-3211	R548		
Mkr-N41 (near Nascent)	MTR 3041	R491	R543	R543-0020
Mkr-N41 (near Nascent)	MTR 3334	R543		
Bag City (SW of vent)	Mkr-65	R548		
Bag City (SW of vent)	Benchmark 4	R548		
Bag City/Mkr-36 (near nemonet cam)	MTR 3315 (reposition R552)	R548		
Bag City/Mkr-36	MTR 3049	R495	R548	R548-0003
Bag City/Mkr-36	MTR 3197	R548		
Bag City/Mkr-36	NeMO Net'00 Camera	R552		
Castle Vent (near Anhydrite spire)	MTR 3196	R547		
Castle Vent	BacTrap 24	R464	couldn't find	
Caldera center (more or less) next to BPR	Benchmark 63	R548		
Caldera center (more or less)	Bottom Pressure Recorder (BPR)	between R545/R546		
Cloud (in the pit) near Mkr-N4	Mkr 21	R543		
Cloud/Mkr-N4	BacTrap 53	R549		
Cloud/Mkr-N4	Bac Trap 54	R549		
Cloud/Mkr-N4	BacTrap 47	R543	R549	R549-0004
Cloud/Mkr-N4	BacTrap 48	R543	R549	R549-0003
Cloud/Mkr-N4	MTR 4001	R543		
Cloud/Mkr-N6/21	MTR3157 & VEMCO1108	R491	R543	R543-0015, R543-0014
Cloud/Mkr-N6/21	MTR 3208	R543		
Cloud/Mkr-N6/21	MTR 4101	R543		
Coquille	MTR 3317	R551		
Coquille	MTR 4108	R551		
between Crack and Daves Vents x=421417, y=5087156	Larval Tubes 5,6,7,8	R545	R555	R555-0001 - 0004
NW of Crack x=421418, y=5087140	Johnson Flow/Temp Meter	R553		
Crack Vent	VEMCO	Alvin 3246	R545	R545-0003

Vent/Marker	Experiment etc.	Dive Deployed	Dive Recovered	Sample #
Easy Vent	BacTrap 17	R463		
Gollum Vent	MTR 3026	R545		
Gollum Vent	BacTrap 50	R545		
Gollum Vent	BacTrap 45	R503	R545	R545-0001
Gollum Vent	BacTrap 33	R471	reposition R545	
Hell Vent1	Hobo	R502		
Hillock/Phoenix	BacTraps 25,26	R466	couldn't find	
NW of Inferno Vent x=421387, y=5087175	MTR 3048	R545		
Inferno Vent	Hobo 128	R503		
Inferno Vent	Osmosampler (didn't work)	R503		
Inferno Vent	VEMCO 98-223	Alvin3246		
Magnesia/Mkr-67	Benchmark 1	R548		
Magnesia	Mkr-67	R547		
Magnesia	OsmoSampler	R499	moved to Mkr-N41 (R548)	?recovered on subsequent cruise?
Milky Vent	BacTrap 35	R475		
Milky/Mkr-N2	OsmoSampler	R474		
Milky/Mkr-N2	BacTrap 35	R476		
Mushroom Vent	BacTraps 29,30,31	R471	R544	R544- 0009-0011
Nascent Vent	MTR 3175	R491	R543	R543-0017
Nascent Vent	Mkr-M (at modified Nascent position)	R543		
Nascent Vent	NeMO Net '99 Camera and Probes	Sept '99 Chadwick cruise	after R549	R549-0018
Nascent Vent/Mkr-M	MTR 3287	R543		
North Rift Zone	Extensometers 1-4	R555		
Old Worms	MTR 4128	R547		
ROPOS Vent	MTR 3201	R545		
ROPOS Vent	BacTrap 49	R545		
ROPOS Vent	BacTraps 27&28	R466	R545	R545- 0004-0005
Snail/Mkr-N8 (nearby)	MTR 3087	R547		
Snail/Mkr-N8 (nearby)	MTR 3320	R547		
S Pillow Anomaly	Benchmark 66	R546		

Vent/Marker	Experiment etc.	Dive Deployed	Dive Recovered	Sample #
Virgin Vent	Hobo 127 (Moyer)	R555		
Virgin Vent	Hobo 130 (Embley)	R503	R545	R545-0014 (Redeployed R555)
T&S Spires	MTR 3017	R497		
SOUTH CLEFT (NeMO 2000)				
South Cleft	Benchmarks 1 - 12	Sept '99 Chadwick		
South Cleft	Extensometers 2 -7	R541		
South Cleft	Extensometers 8-12	R542		
Vent 1 Chimney 284	Hobo 133	Cleft'98	R542	
Vent 1 Chimney 284	Hobo 134	Cleft'99	R542	
Vent 1 Chimney 342	Hobo 129	R542		

5 DIVE LOGS AND DIVE MAPS (R540 - R556)

5.1 Dive Map Information

Dive maps will precede dive logs, for all dives with bottom time.

Dives on the '98 lava flow are plotted on top of Imagenex bathymetry (2 meter grid cell resolution).

The dive maps depict:

- Vents and Markers visited
- samples collected on each dive
- instruments/experiments deployed and recovered
- Nav information such as transit times, nav gaps, etc.
- Other pertinent, and perhaps not so pertinent, information

Dive Map Nomenclature

Nomenclature Example: R543-SS-J4-0004

R543 Dive number

SS Sample type

J4 suction sample into jar 4

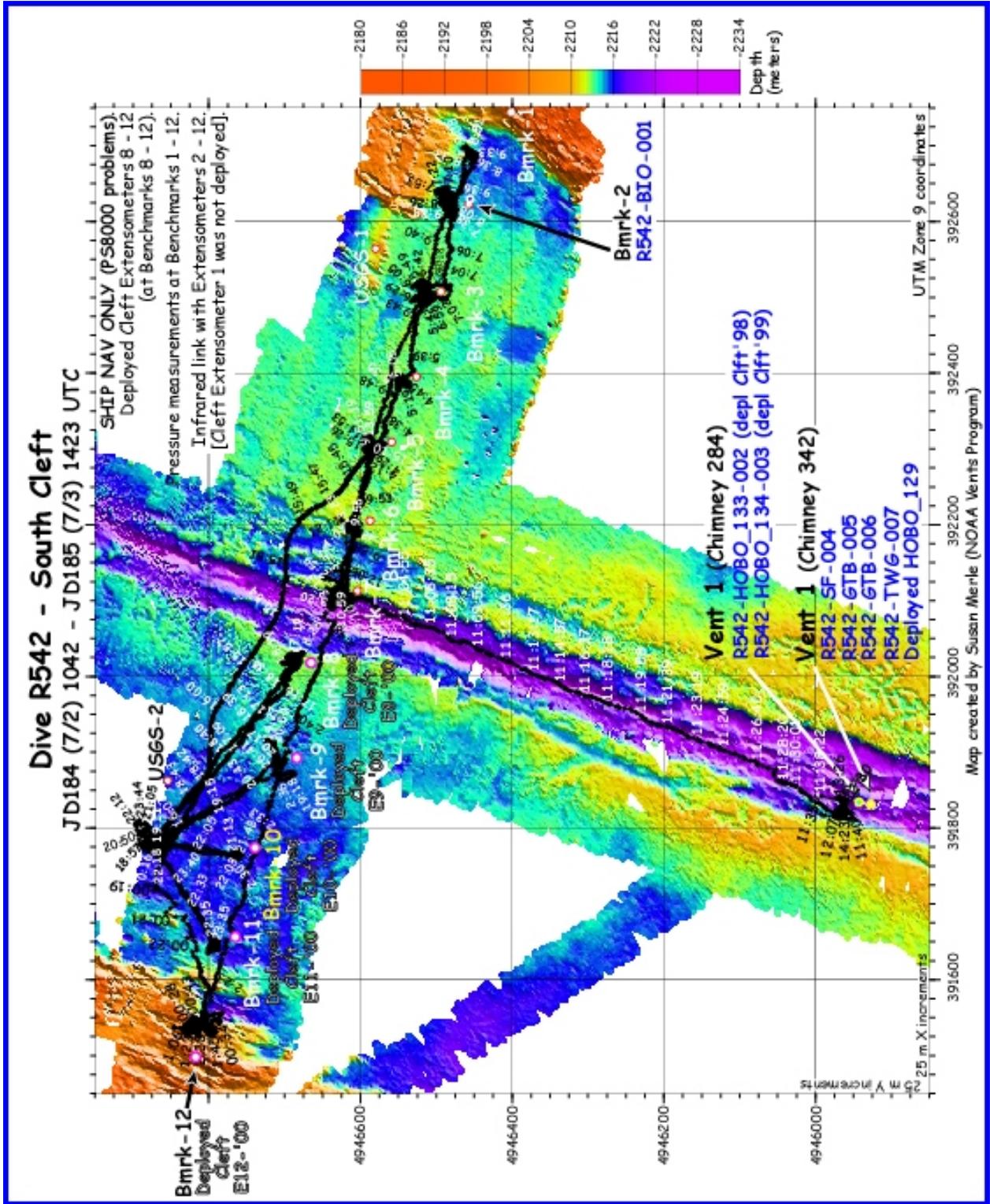
0004 Sample number for that dive

5.2 Experiment/Sample Explanations and Abbreviations

SS	Suction Sample	jar number follow SS (ex. SS-J4)
HFS	Hot Fluid Sampler	filter number follows HFS (ex. HFS-9)
GTB	Gas Tight Bottle	
BT	Bacteria Trap	trap number follows BT (ex. BT_4)
BIO	Biological Sample	
TWG	Tube Worm Grab	
RK	Rock	
SF	Sulfide	
FeO	Iron Oxide	
McLane	McLane pump	(mounted on ROPOS for collection of water column
net	Plankton net	bio-particulates, larvae)
TLC	time lapse camera	
osmo	osmo (sampler or analyzer)	

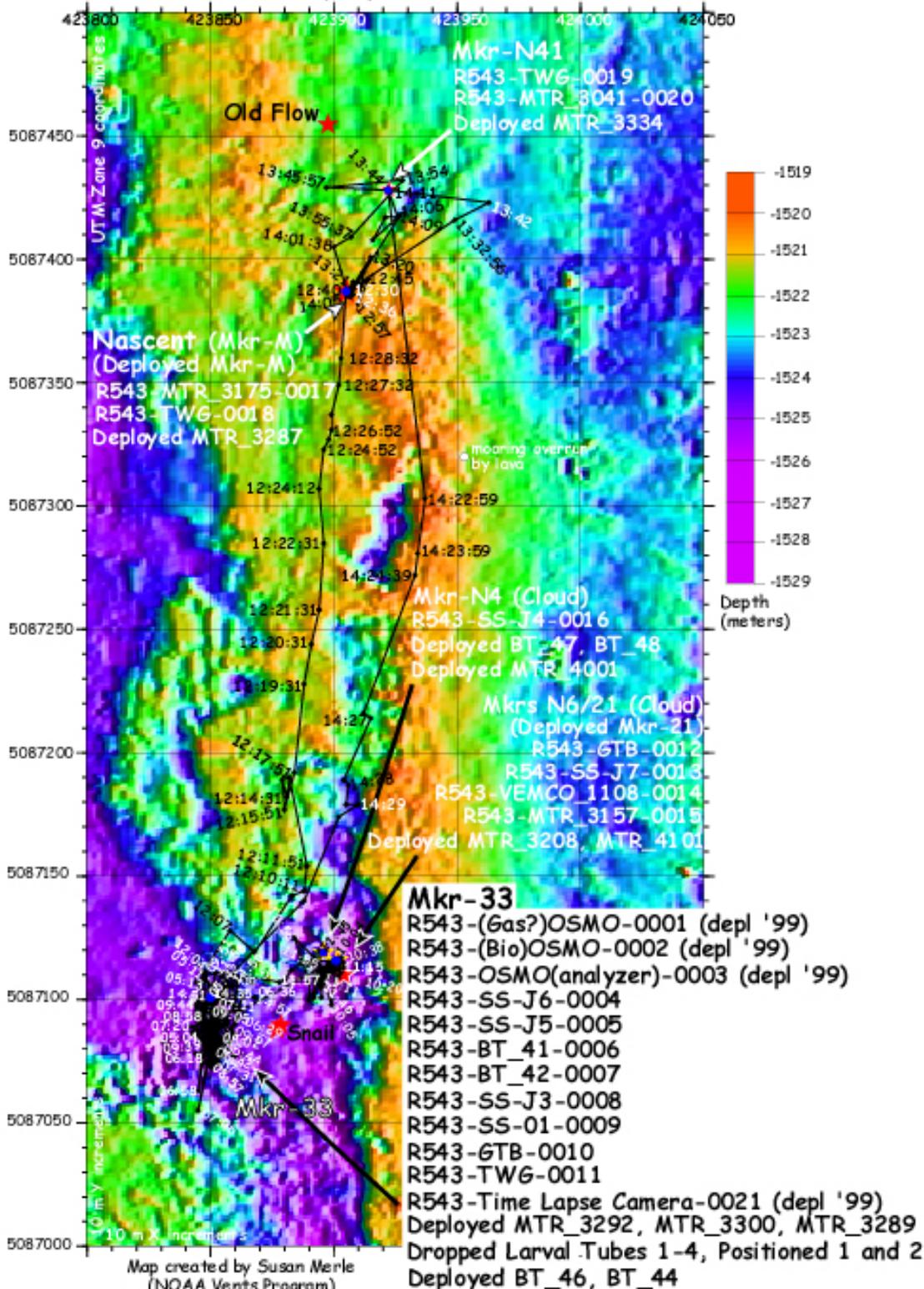
Temperature Probes:

HOBO	temperature probe (152 - 419C)	instrument number follows temp probe (ex. MTR_3208)
VEMCO	temperature probe (0 - 50C)	
MTR	temperature probe (2 - 34C for probes deployed prior to 2000, 2-70C for probes deployed in 2000)	

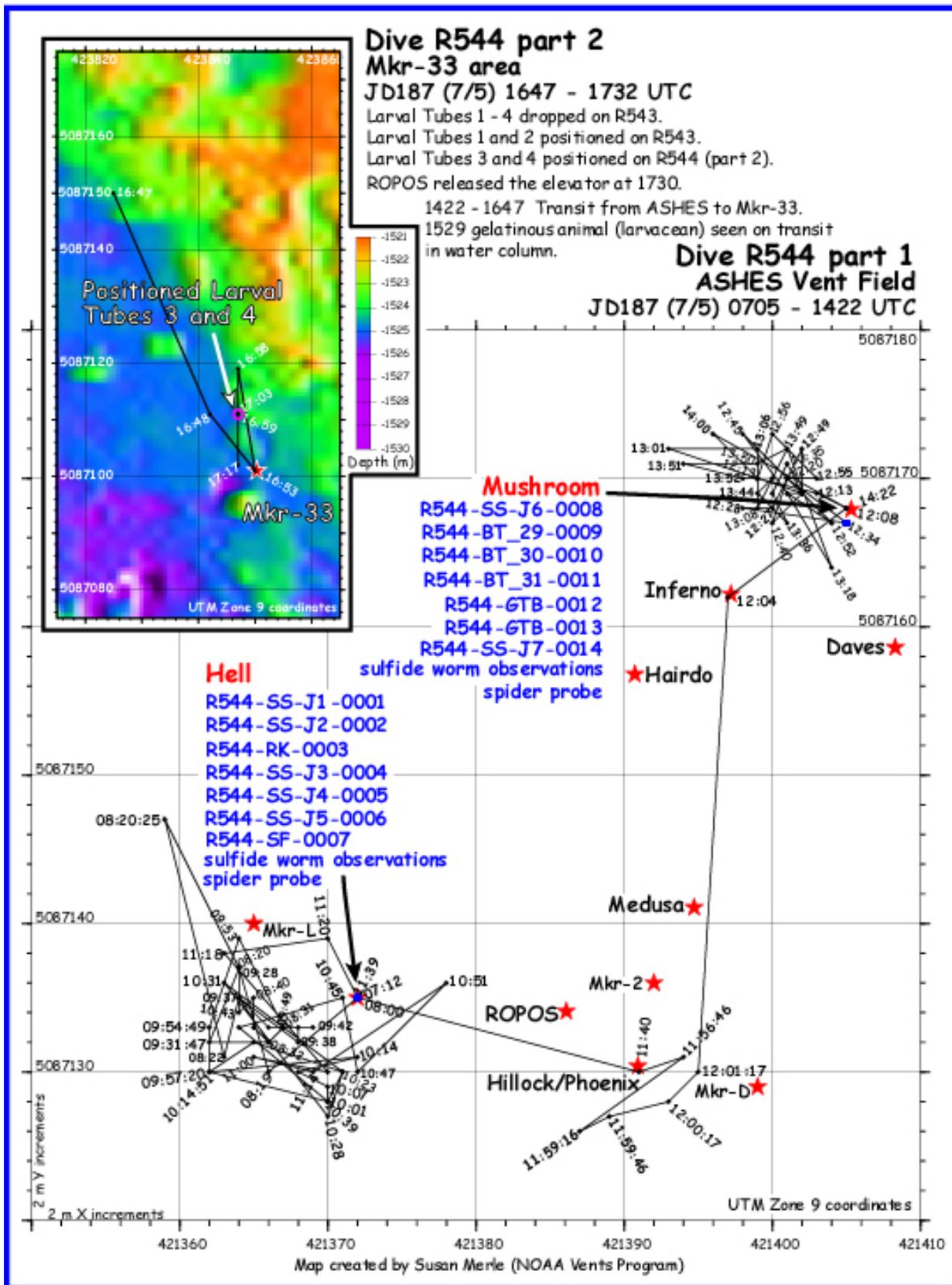


Dive R543 - '98 Lava Flow (nsrz)

JD186 (7/4) 0506 - 1455 UTC

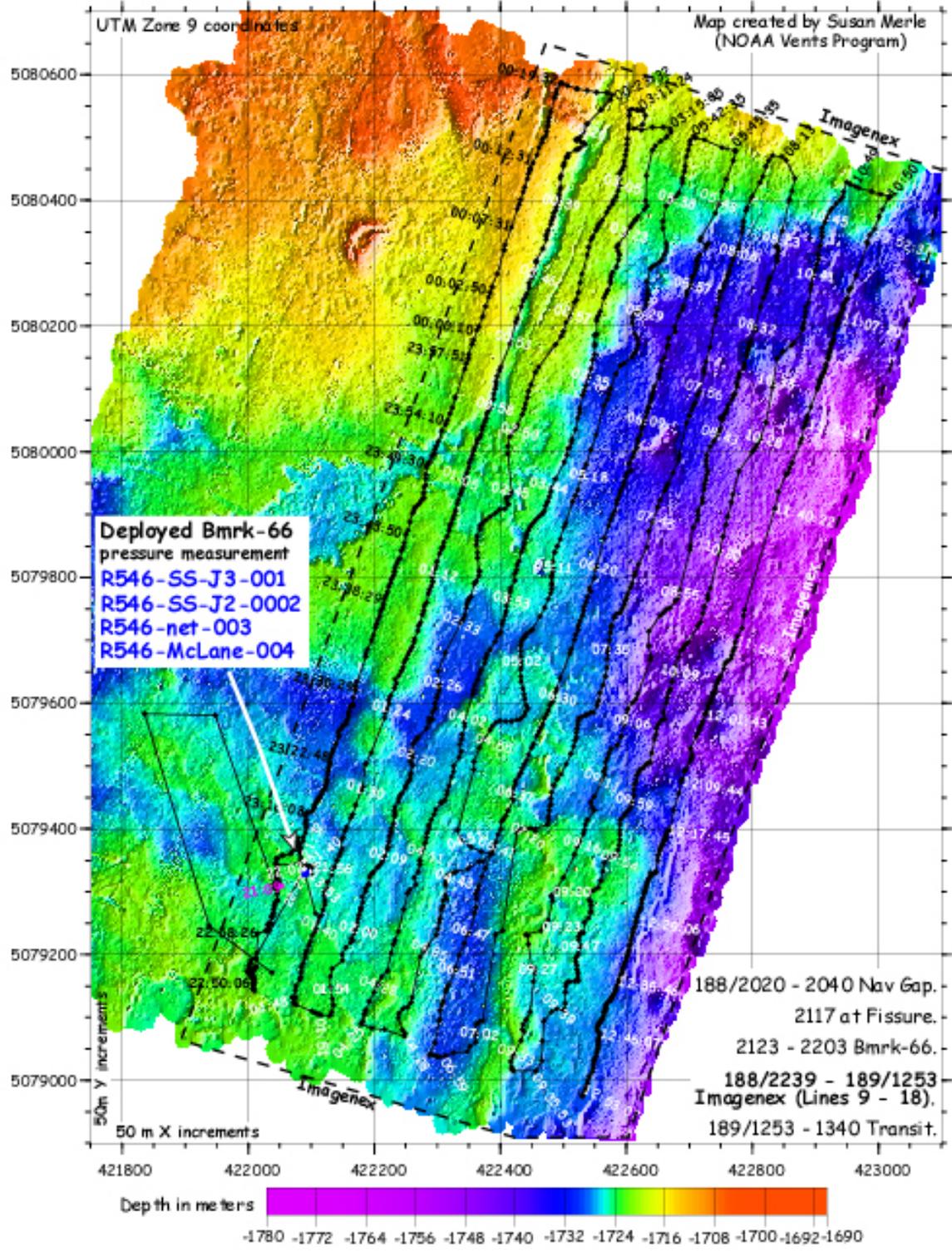


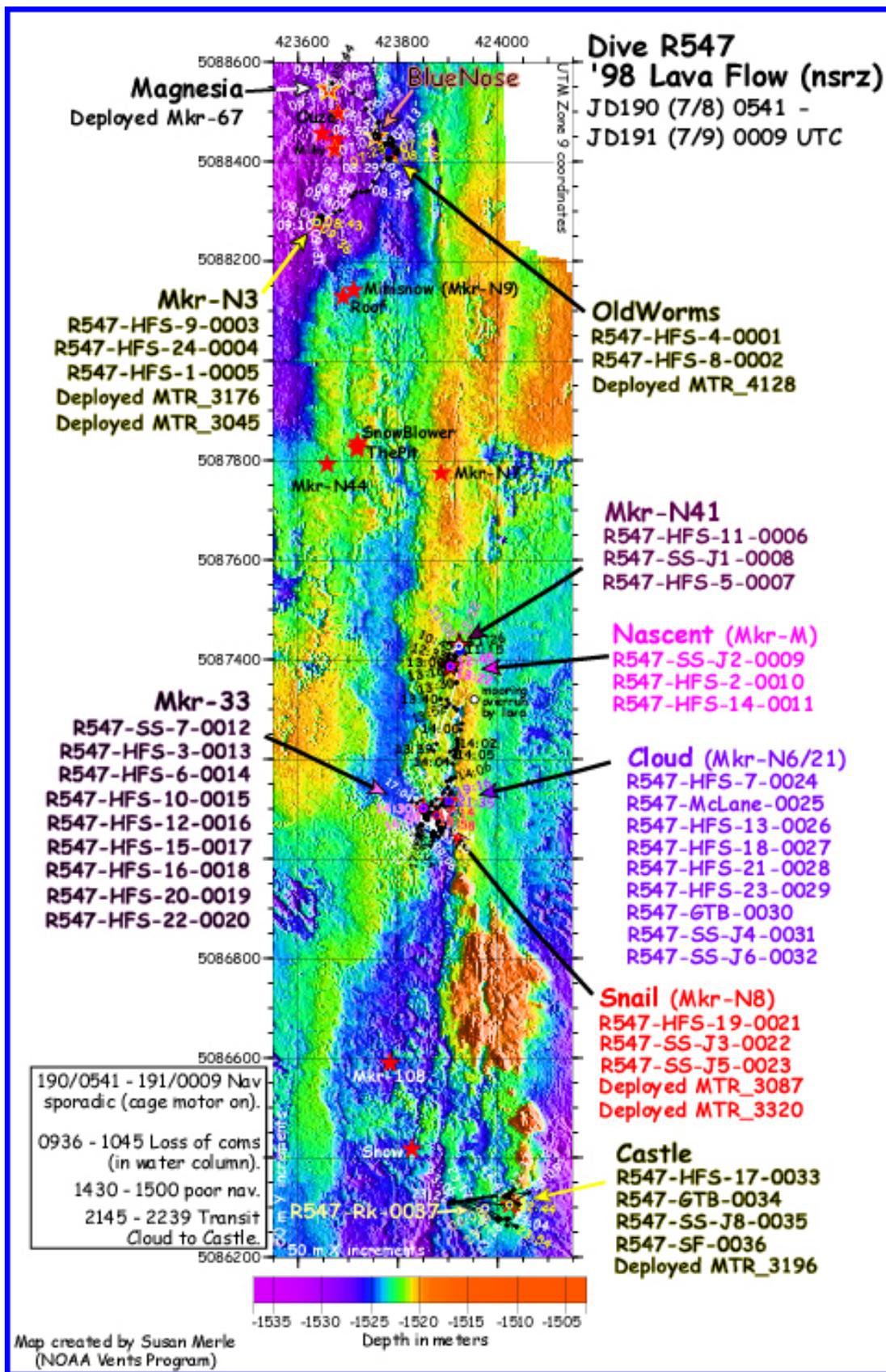
Tried to acoustically release elevator after ROPOS back on deck but gave up after 1 hour.

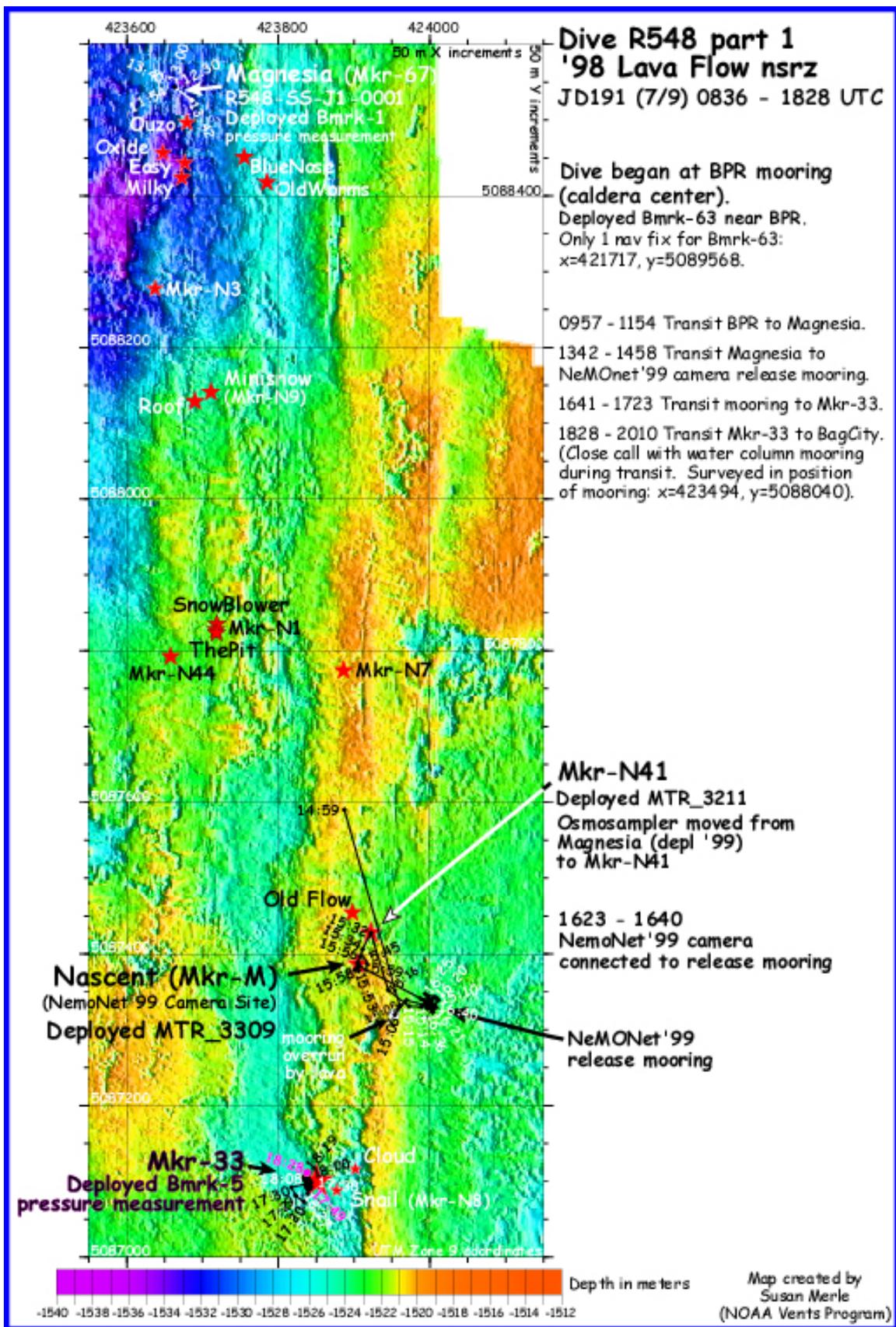


Dive R546 - Southern Pillow Flow at 45 52'N

JD188 (7/6) 2019 - JD189 (7/7) 1417 UTC

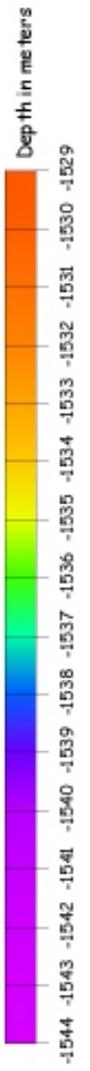
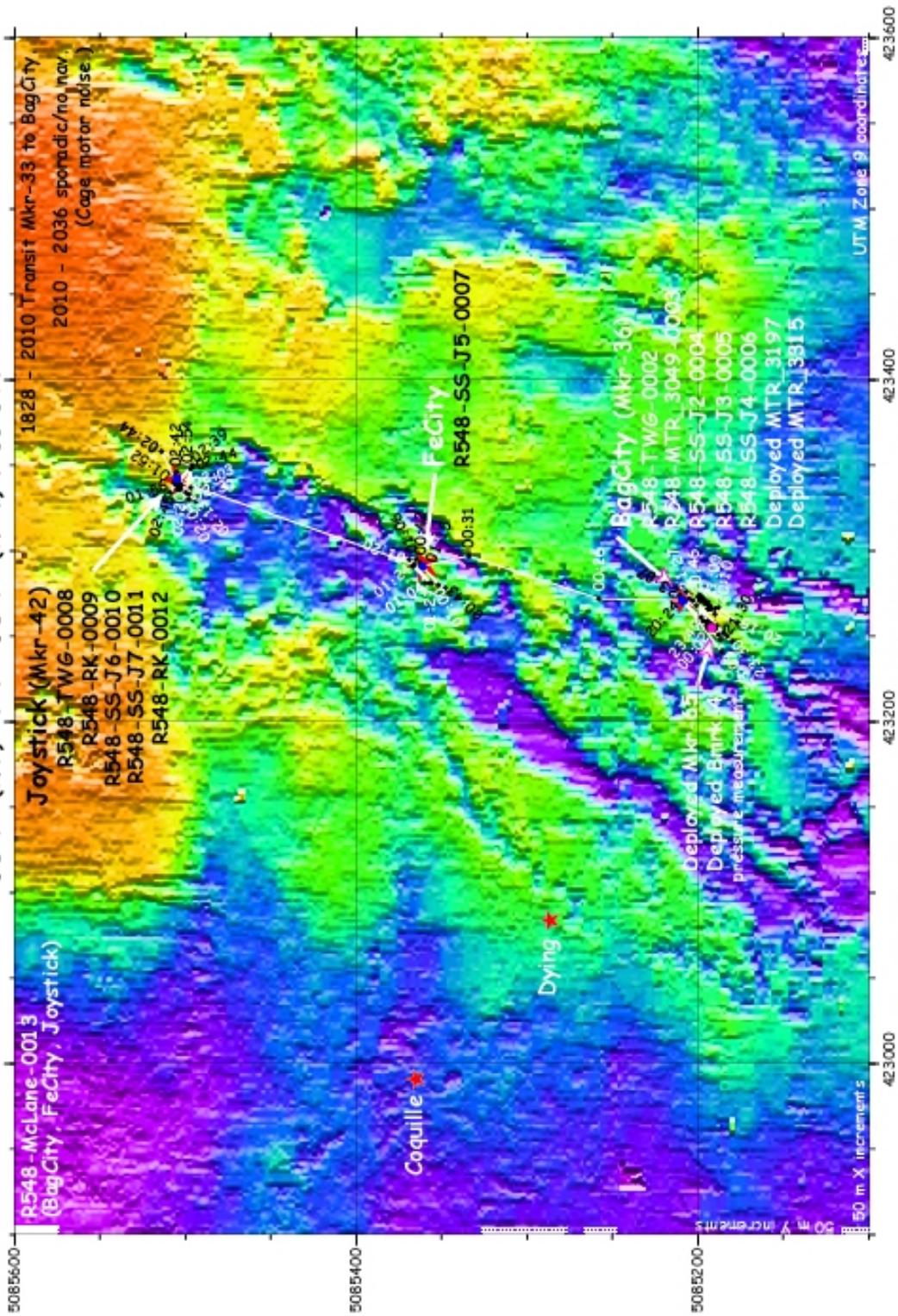






Dive R548 part 2 - Southern '98 Lava Flow

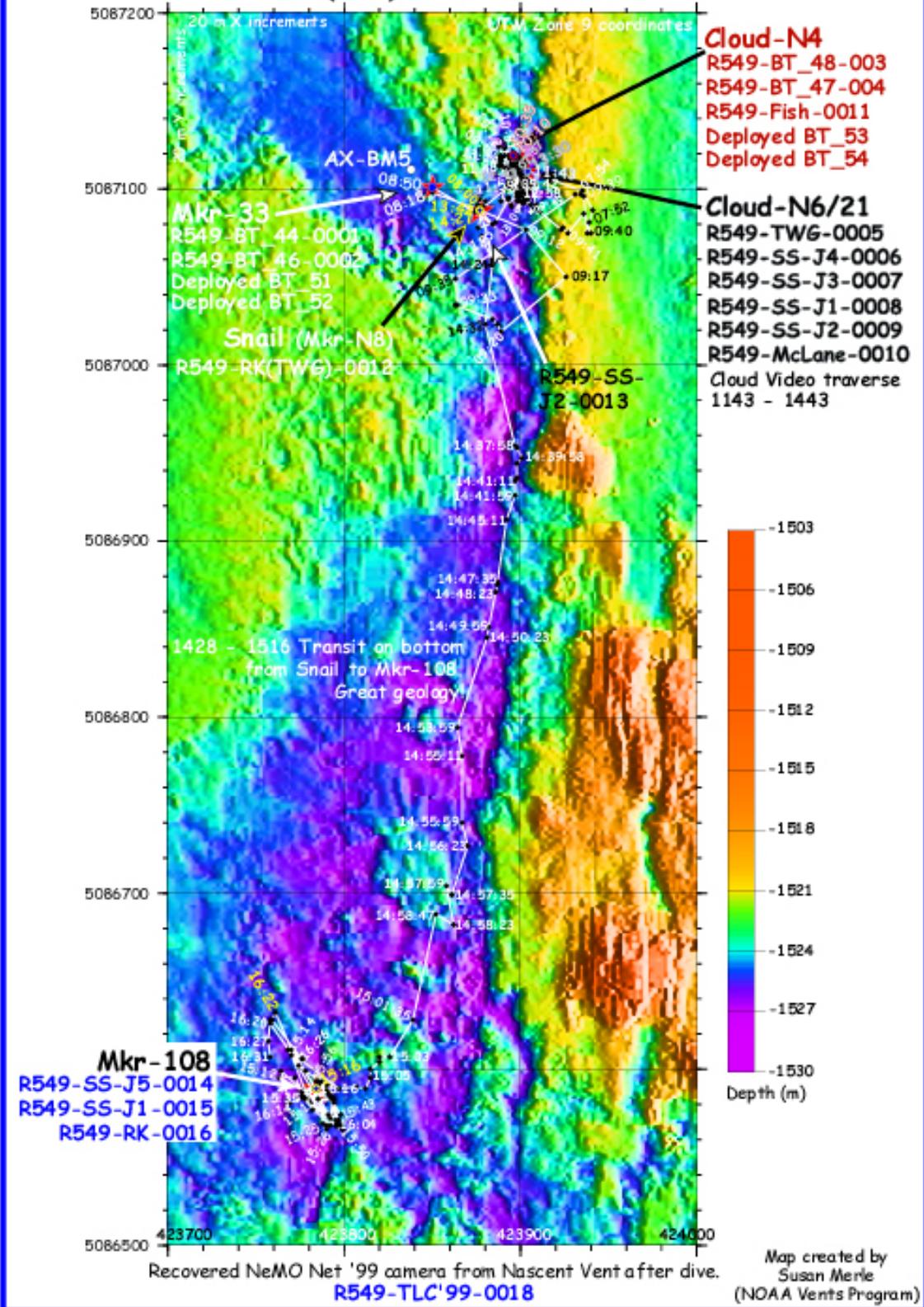
JD191 (7/9) 2010 - JD192 (7/10) 0255 UTC



Map created by Susan Merle (NOAA Vents Program)

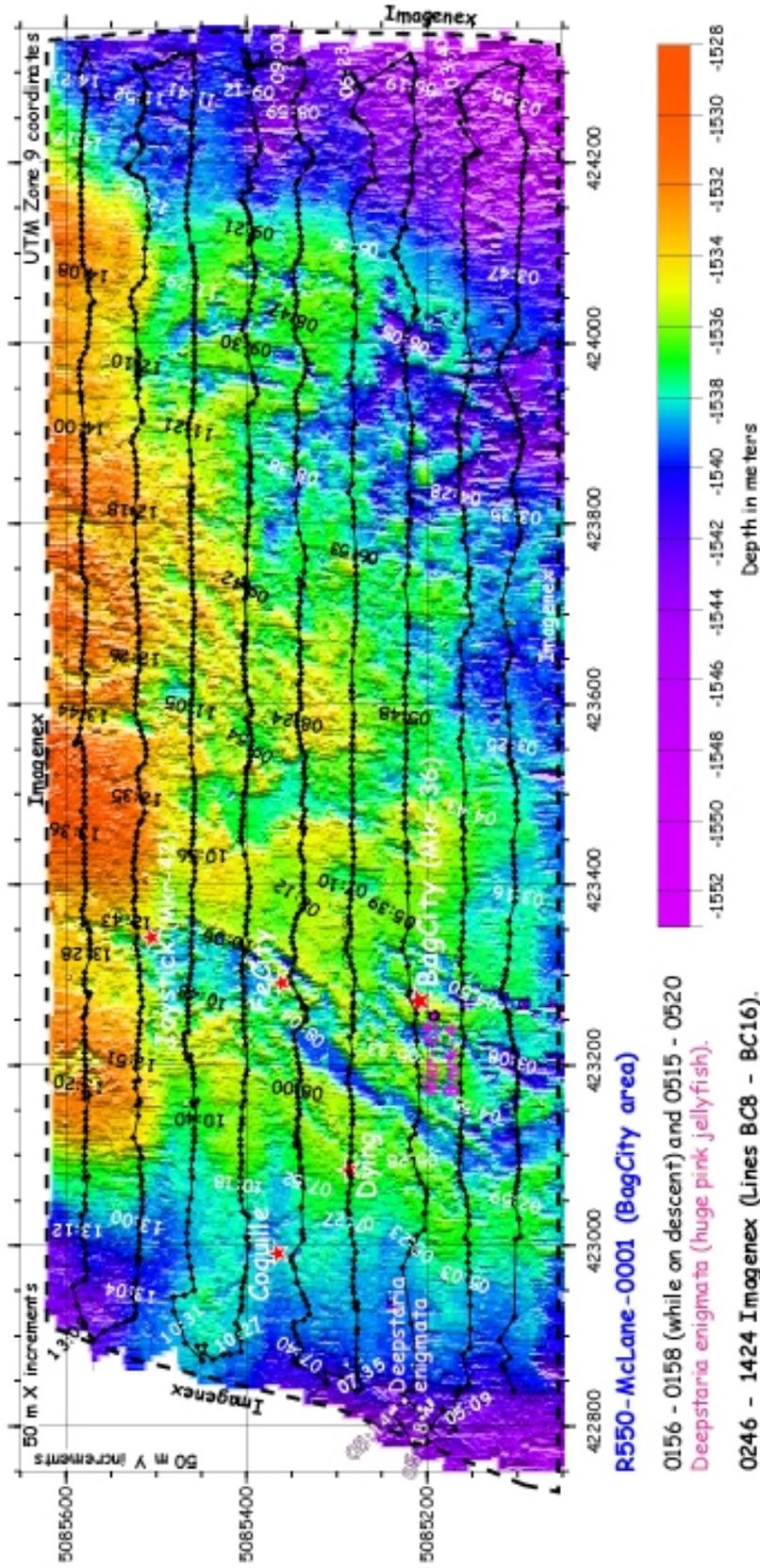
Dive R549 - '98 Lava Flow nsrz

JD192 (7/10) 0748 - 1630 UTC



Dive R550 - Southern '98 Lava Flow

JD193 (7/11) 0156 - 1519



R550-McLane-0001 (BagCity area)

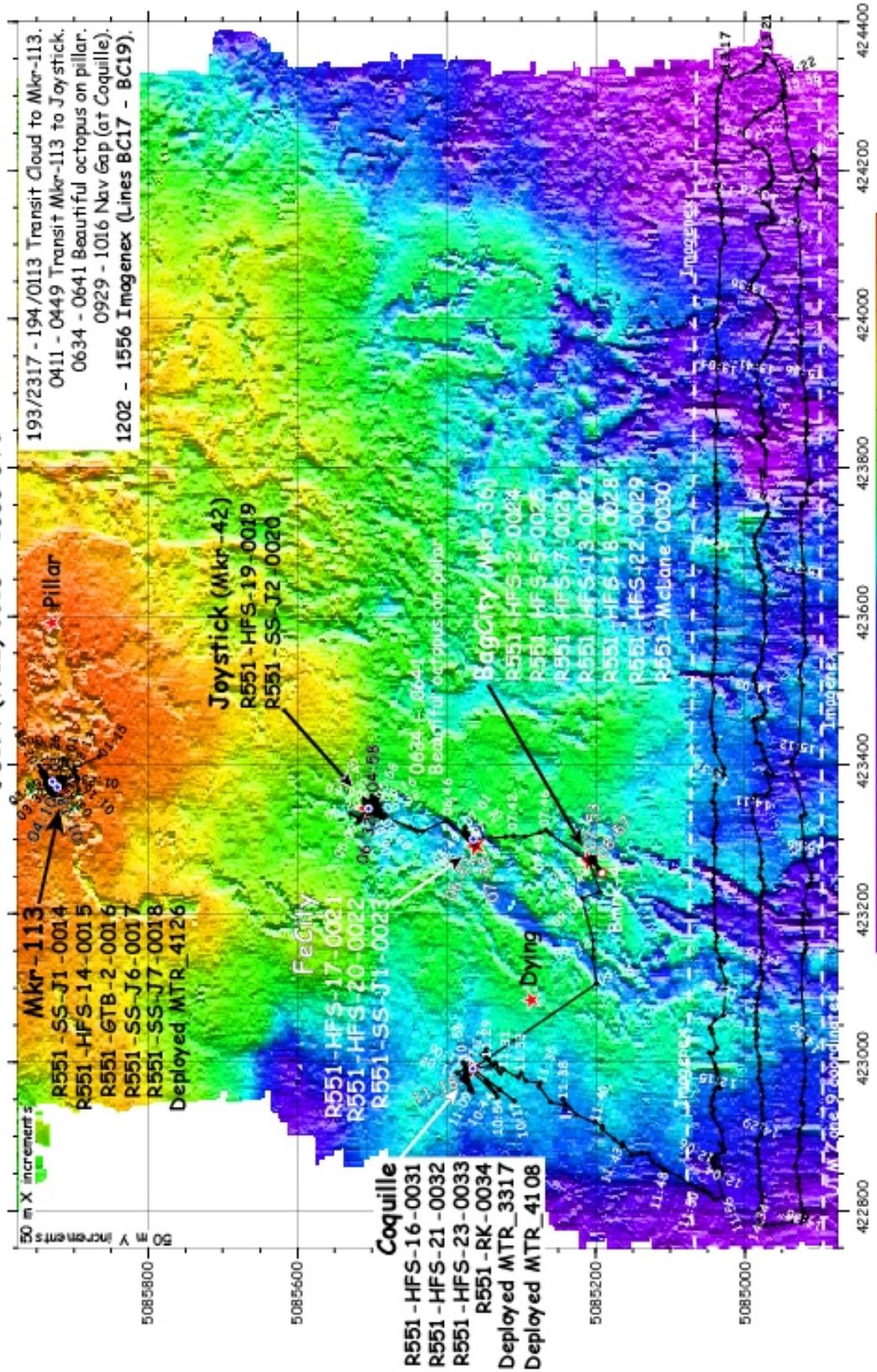
- 0156 - 0158 (while on descent) and 0515 - 0520 *Deepstaria enigmata* (huge pink jellyfish).
- 0246 - 1424 Imagenex (Lines BC8 - BC16).

Nav starts 0241, ends 1426.
 1425 Transit to Mkr-33 for HFS sampling.
 1511 HFS not operating.
 1519 end of dive.

Map created by Susan Merile
 (NOAA Vents Program)

Dive R551 part 2 - Southern '98 Lava Flow

JD194 (7/12) 0018 - 1556 UTC



193/2317 - 194/0113 Transit Cloud to Mkr-113.
 0411 - 0449 Transit Mkr-113 to Joystick.
 0634 - 0641 Beautiful octopus on pillar.
 0929 - 1016 Nav Gap (at Coquille).
 1202 - 1556 Imogenex (Lines BC17 - BC19).

Mkr-113
 R551-SS-J1-0014
 R551-HFS-14-0015
 R551-GTB-2-0016
 R551-SS-J6-0017
 R551-SS-J7-0018
 Deployed MTR_4126

Joystick (Mkr-42)
 R551-HFS-19-0019
 R551-SS-J2-0020

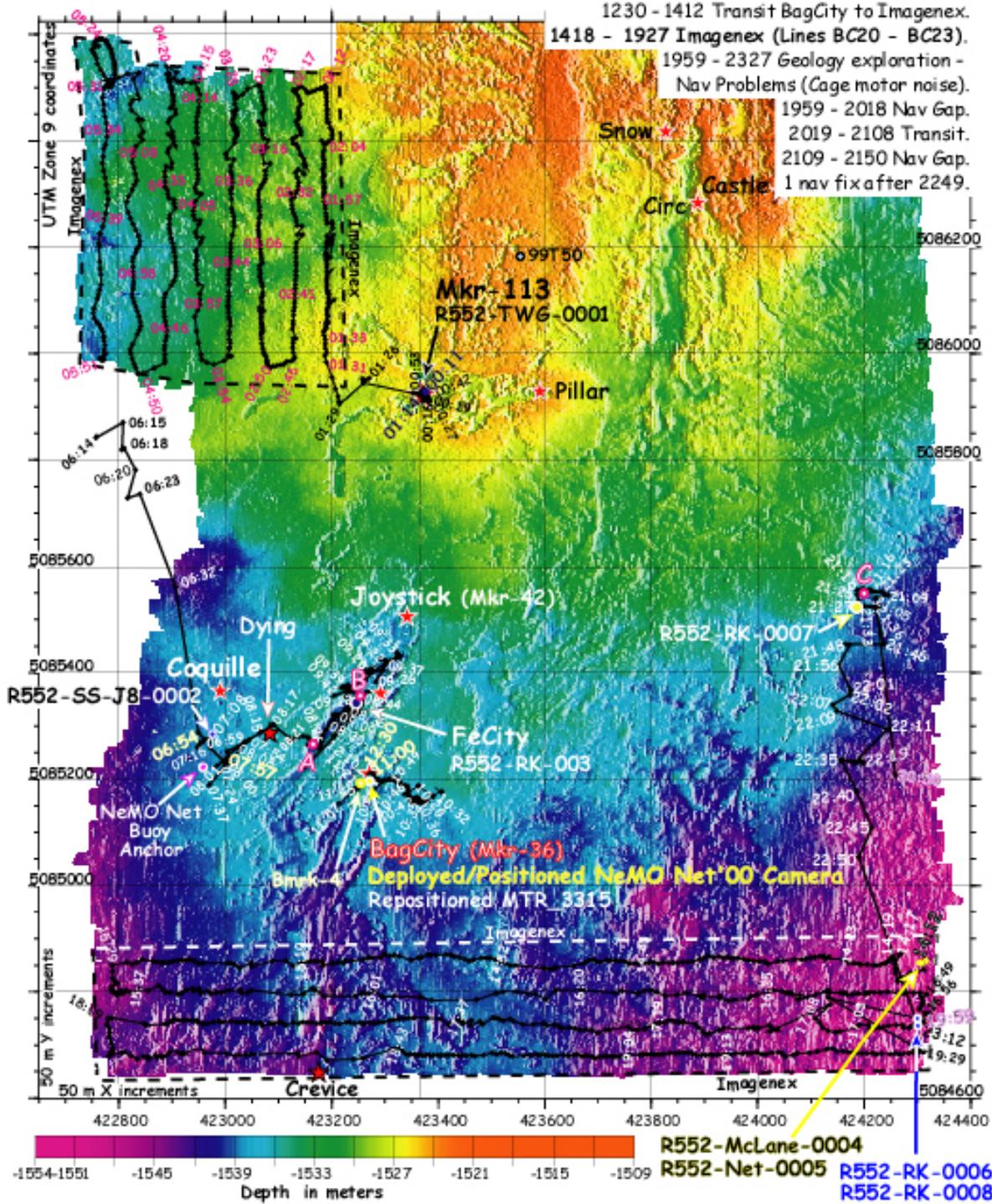
Coquille
 R551-HFS-16-0031
 R551-HFS-21-0032
 R551-HFS-23-0033
 R551-RK-0034
 Deployed MTR_3317
 Deployed MTR_4108

BagCity (Mkr-36)
 R551-HFS-2-0024
 R551-HFS-5-0025
 R551-HFS-7-0026
 R551-HFS-13-0027
 R551-HFS-18-0028
 R551-HFS-22-0029
 R551-McLane-0030

Map created by Susan Merile
 (NOAA Vents Program)

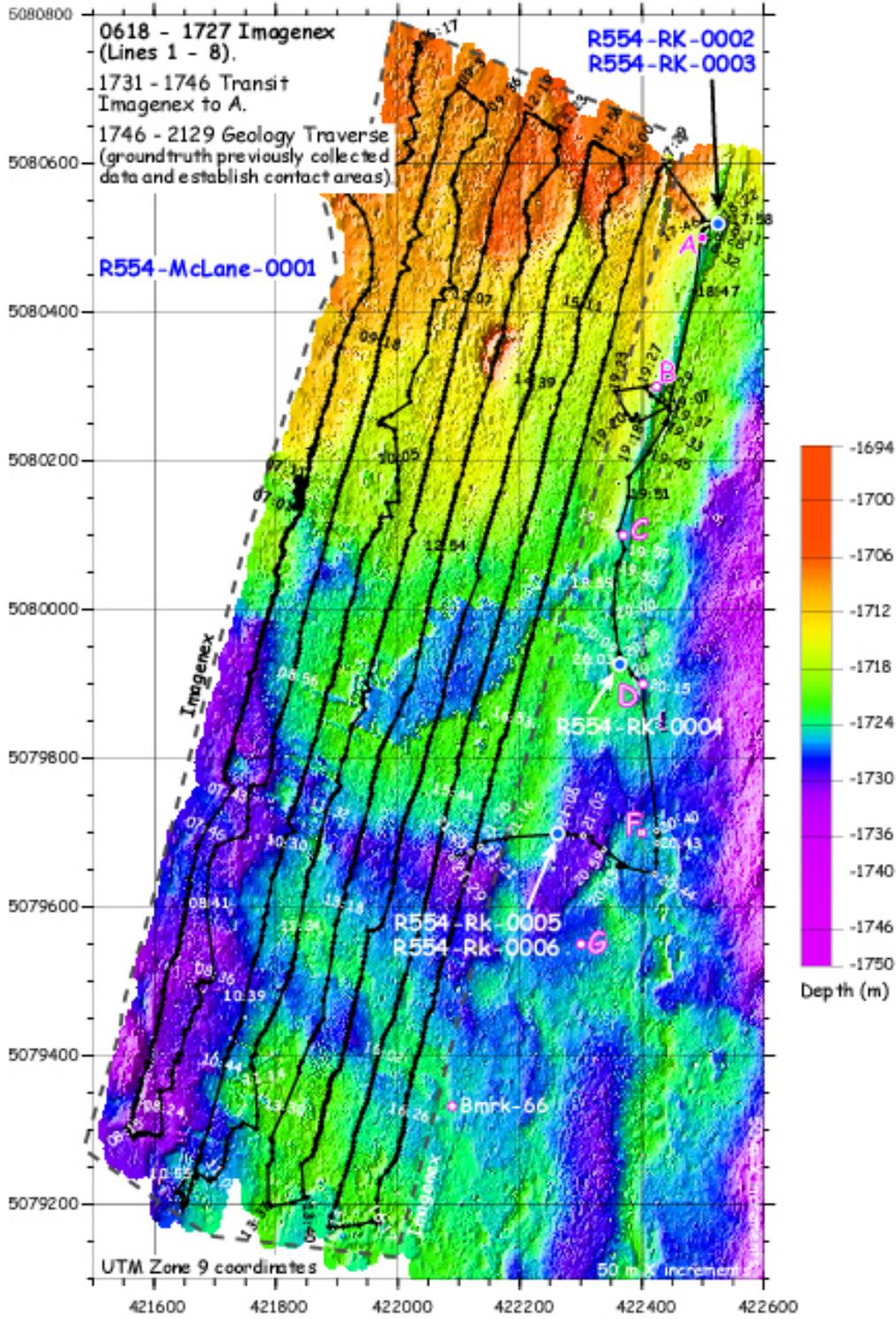
Dive R552
Southern '98 Lava Flow
JD194 (7/12) 2358 - JD195 (7/13) 2327 UTC

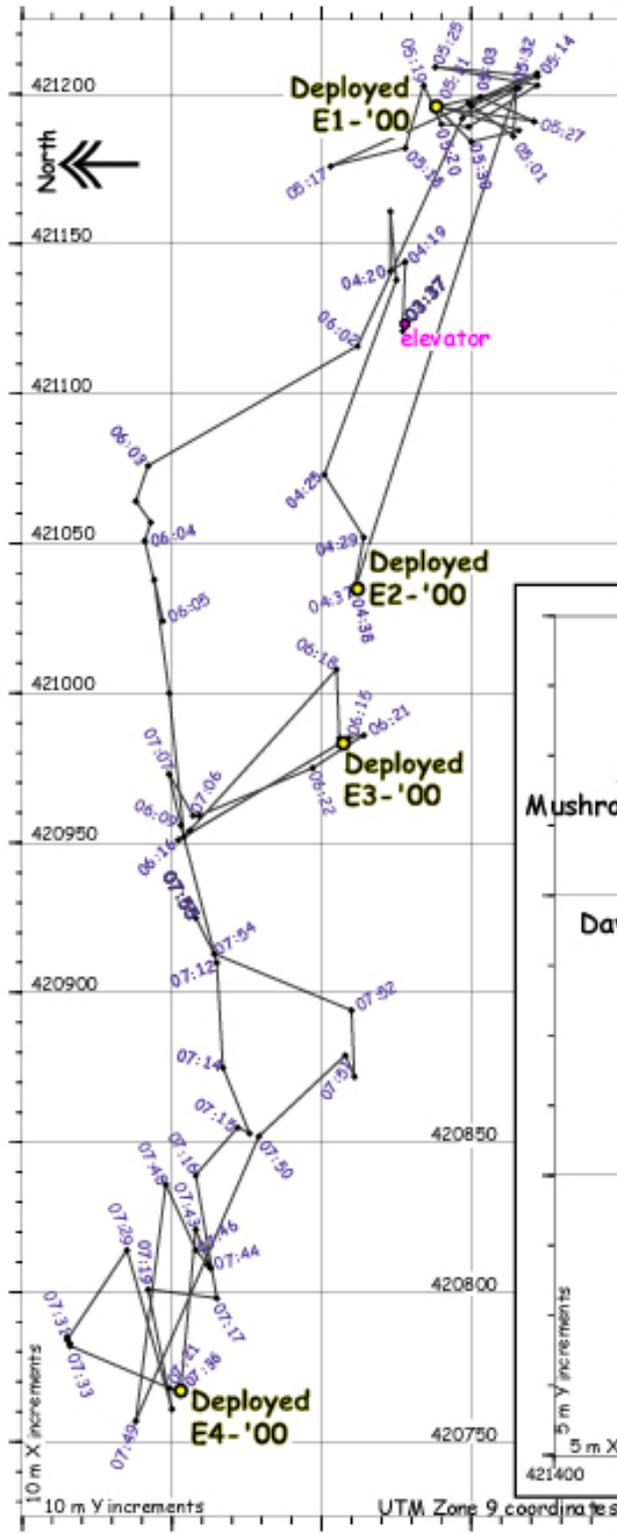
Dropped NeMO Net'00 Camera before Dive R552 and surveyed in camera position.
 195/0132 - 0552 Imagenex (Lines W8 - W15).
 0552 - 0614 Transit in water column.
 0715 - 0945 Geology (Coquille and Lava Hwy).
 0945 - 1013 Transit in water column.
 1013 - 1226 Positioned NeMO Net'00 camera and temperature probes.
 1230 - 1412 Transit BagCity to Imagenex.
 1418 - 1927 Imagenex (Lines BC20 - BC23).
 1959 - 2327 Geology exploration -
 Nav Problems (Cage motor noise).
 1959 - 2018 Nav Gap.
 2019 - 2108 Transit.
 2109 - 2150 Nav Gap.
 1 nav fix after 2249.



Dive R554 - Southern Pillow Flow at 45 52'N

JD197 (7/15) 0612 - 2130 UTC





Dive R555 part 1 - NRZ

JD198 (7/16) 0335 - 0758 UTC

Nav noisy and sporadic for this dive
(Cage motor noise).

0335 - 0758 Deployed Extensometers
E1 - E4 (North Rift Zone).

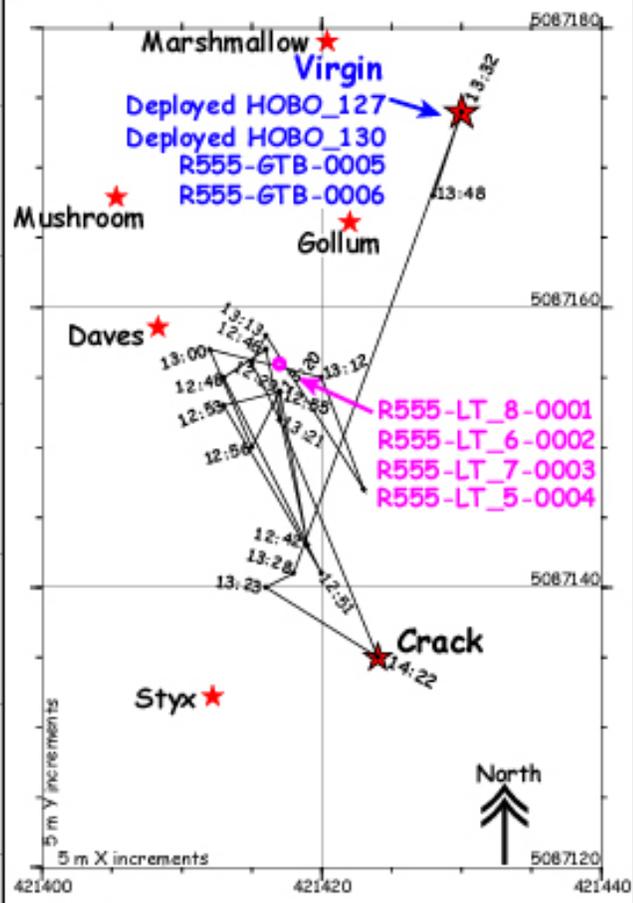
0758 - 1222 Transit NRZ to ASHES.

1222 - 1348 Recovered Larval Tubes at ASHES.

Post-dive recovered elevator on NRZ.
1840 elevator on board.

Dive R555 part 2 - ASHES

JD198 (7/16) 1222 - 1348 UTC

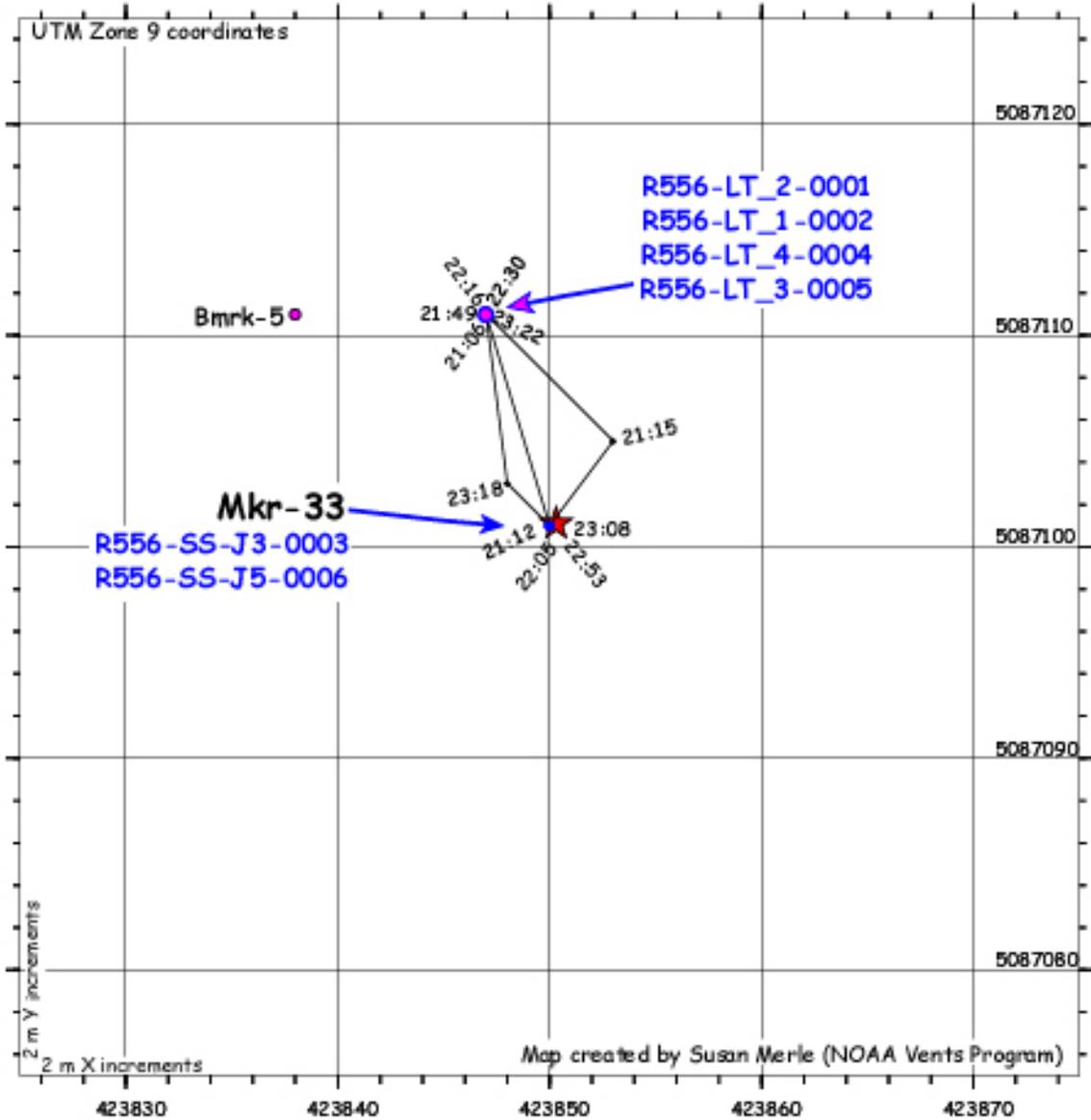


Map created by Susan Merle (NOAA Vents Program)

Dive R556 - Mkr-33 Area

JD198 (7/16) 2112 - 2334 UTC

Bounce Dive



Navigation and ROPOS logging system messed up on this dive.
No good acoustic nav! Created xy nav file from logbook information.

ROPOS Dive Logs

R540 Dive Log

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R540 (South Cleft Area)	Samples	PI	Sub Smps	Fr Grb#
					Automated Logging System not giving accurate information!! All auto time, heading, depth and utm position information inaccurate! CORRECT TIME AND POSITION ENTRIES ARE FOUND IN COMMENTS COLUMN.	No samples this dive.			
					Tasks: Look over Cleft site and deploy extensometers.	Bottom time: none			
					1730 - extensomet34 elevator in the water				
					Depth is not logging correctly. This station is reading about 1/2 what it should be. X and Y seem to be close to correct. Heading is also incorrect.				
					2023 - ROPOS is back in the cage, ready to begin descent.				
					2059 - ROPOS is returning to surface due to low oil pressure.				
					2210 - ROPOS is back in the water heading down. Dive number is still R540.				
					4:21 pm - Ever get that sinking feeling? ROPOS isn't,, coming back up for oil, wishing for fish.				
					date and time appear to be fixed				
					back in the water after motor compensation				
					on deck				
					Firing up ROPOS and cage				
					time is 0533, depth 555m, heading 107. turns out this is really dive R541 so we're going to go start a new dive log.				
					2002 - UTC is the correct time ROPOS is in the water. Time and date that is being logged automatically are incorrect!				
					2013 - all stopped at 199 meters. ROPOS is leaving the cage. There is an intermittent ground fault on the cage lights.				
					2056 - ROPOS is passing 1000 meters. Auto logging is incorrect.				
					2134 - ROPOS is at the surface. Auto logging of time, date, depth and heading are still incorrect. 2137 - ROPOS is on deck.				
					2023 - Auto logging for time, date, depth and heading are still not working.				
					could data logging routine be working better? Sighting of new heading and depth.				
					on the deck again				
					yo yo ma, back to the garage				
					R540 Dive Summary: Lots of floundering with ROPOS and the logging system. DIVE aborted. No bottom time, no samples.				

R541 Dive Log

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R541 (South Cleft Area)	Samples	PI	Sub Smps	Fr Grb#
					Automated Logging System not giving accurate information!! All auto time, heading, depth and utm position information inaccurate! CORRECT TIME AND POSITION ENTRIES ARE FOUND IN COMMENTS COLUMN. Positions in utm x/y columns are automated and not flagged for accuracy. Consult dive maps for final position data. !!BAD ACOUSTIC NAV THIS DIVE!!	No samples this dive.			
					Tasks: Deploy Cleft Extensometers 2-7 at benchmarks 2-7.	Bottom time: JD183(7/1) 1245-JD184(7/2) 0150			
					In the water, off the deck at 11:04 ish. The time, heading, and depth are not working properly right now.				
					1201 - Seascope died at 12:01.				
12:17:06 Jul 01 '00	1493	72	39240 3	4946612	Depth, time, and heading are now correct.				
12:19:26 Jul 01 '00	1543	97	39240 0	4946610	We are at 1550m, so far so good.				
12:34:48 Jul 01 '00	1854	66	39238 2	4946591	Seascope is back up and fine.				
12:36:48 Jul 01 '00	1893	82	392391	4946591	Time is 5 minutes slow and depth is 70 meters low.				
12:41:08 Jul 01 '00	1978	66	39237 9	494658 5	Bill is momentarily taking Seascope down.				
12:41:08 Jul 01 '00	1978	66	39237 9	494658 5	1250 - Seascope is back up at 1250.				
12:41:48 Jul 01 '00	1989	71	39238 3	494659 2	Julia is logging off seascope real quick.				
12:41:48 Jul 01 '00	1989	71	39238 3	494659 2	Leaving the cage at 2170m.				
12:41:48 Jul 01 '00	1989	71	39238 3	494659 2	Heading down to the bottom, out of cage. Cage is 40 m off the bottom.				
12:41:48 Jul 01 '00	1992	69	39238 3	494659 2	Back up on seascope and starting logging.				
12:42:28 Jul 01 '00	200 4	76	39237 7	494659 0	1255 - Time is actually 12:55, depth 2200 m.				
12:43:18 Jul 01 '00	202 0	56	391814	494570 8	Bottom in sight- 2210 m.				
12:44:28 Jul 01 '00	204 4	66	391884	494597 8	Getting range to elevator so we can find the extensometers.				
12:54:38 Jul 01 '00	220 2	115	39230 3	494654 2	Elevator is about 100 m away. Heading east.				
12:55:28 Jul 01 '00	2210	105	39232 6	494650 4	Good fix for ROPOS x392371 y=4946579				
12:55:58 Jul 01 '00	2213	102	392321	494650 4	Heading northeast.				
12:56:48 Jul 01 '00	2213	101	39229 5	494654 0	Range between us and elevator got a bit bigger.				
12:58:48 Jul 01 '00	2213	177	391923	494498 8	Moving ship 50 m NE				
13:04:08 Jul 01 '00	2212	51	39236 0	494657 7	1314 - Still waiting for ship to move to find the elevator. Coming up in the water column to see if we can see the elevator in the sonar.				
13:06:58 Jul 01 '00	2212	55	39247 7	494665 0	Moving ship 75 m due west.				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R541 (South Cleft Area)	Samples	PI	Sub Smps	Fr Grb#
13:07:48 Jul 01 '00	2212	55	39249 0	494662 8	1319 - Seems like we might be getting closer to the elevator now. Moving northwest.				
13:09:20 Jul 01 '00	2214	55	39246 8	494658 5	Range is definitely decreasing- we're heading in the right direction.				
13:09:40 Jul 01 '00	2212	55	392461	494655 5	x=392440 y=496643 approximate cage fix. x=392353 y=496643 approximate elevator drop.				
13:12:10 Jul 01 '00	2213	351	39235 2	494659 0	Range is starting to go back up again.				
13:13:50 Jul 01 '00	220 5	352	39243 8	494666 4	Moving ship 50 m southwest.				
13:15:00 Jul 01 '00	220 6	184	39263 6	494823 7	1328 - Consistently getting 80 m range.				
13:21:20 Jul 01 '00	2213	265	39246 7	494667 8	After moving 50m south-west ship further away from elevator-- now moving ship 50m south-east				
13:24:40 Jul 01 '00	2213	270	39247 4	494668 3	Now moving ship north-east, elevator minimum range from cage				
13:28:30 Jul 01 '00	2213	273	39247 0	494670 3	Moving ship another 50m north-east				
13:35:32 Jul 01 '00	2212	94	39238 6	494660 0	1354 - Distance is decreasing to elevator, approximately 100m away, still moving to the north-east.				
13:42:02 Jul 01 '00	2212	2	39234 2	494654 7	Still moving north-east, distance still decreasing to elevator, approximately 100m. Note that previous distance was a gross estimate.				
13:44:02 Jul 01 '00	2212	2	39233 4	494655 7	Holding ship's position				
13:47:22 Jul 01 '00	2212	341	39262 2	494824 3	Moving ship another 50m north-east.				
13:50:52 Jul 01 '00	2214	326	39240 8	494666 8	1413 - LOP (line of position) north-west, distance has begun increasing. Moving ship due west.				
13:56:12 Jul 01 '00	2213	37	391968	494626 4	Closing fast on the elevator, ROPOS is north-west of the cage and has begun heading due west.				
13:59:22 Jul 01 '00	2212	38	39240 5	494668 6	Moving ship north, distance to elevator from cage is approximately 60m.				
14:02:22 Jul 01 '00	2213	38	391910	4946198	50m to elevator, holding ships position				
14:03:54 Jul 01 '00	2213	43	39250 5	494674 6	1429 - Elevator is in ROPOS visual range.				
14:05:44 Jul 01 '00	2212	43	392441	494670 2	Three of the six extensometers are missing. One of three remaining is almost out of elevator.				
14:07:24 Jul 01 '00	2212	44	39244 5	4946718	Extensometer #5, #2, and #4 are the remaining ones.				
14:12:14 Jul 01 '00	2213	340	392914	494687 7	Performing search for other extensometers.				
14:13:14 Jul 01 '00	2213	316	391659	494927 3	ROPOS is currently due south of cage and heading due north for first transect.				
14:18:54 Jul 01 '00	2210	319	392521	494680 7	Added a target called ELEV X=392407.3 Y=4946787.7 depth is 2215m. Have gone 60m north of elevator, found nothing.				
14:25:34 Jul 01 '00	220 9	3	39070 0	494923 7	ROPOS picked up the first extensometer and heading to Bench Mark 4, 250 meters south of the elevator				
14:28:54 Jul 01 '00	2212	278	39240 7	494678 8	ship is moving to Benchmark 4				
14:34:56 Jul 01 '00	2214	232	39246 2	4946817	1509 - x=392481 y=4946784 z=2210m				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R541 (South Cleft Area)	Samples	PI	Sub Smps	Fr Grb#
14:40:16 Jul 01 '00	220 3	314	39247 8	4946831	reset the deck set to a cycle of 15 sec				
14:43:06 Jul 01 '00	220 9	1	39247 6	494684 4	1520 - x=392481 y=4946654 depth is 2210				
14:48:36 Jul 01 '00	220 9	2	391769	494627 0	ship is stopping				
14:52:06 Jul 01 '00	220 6	165	391810	494624 2	1532 - x=392452 y=4946544 z=2211. all fixes have been two transponder fixes, so they are questionable.				
14:53:36 Jul 01 '00	220 7	283	392410	494676 9	time is now 40 minutes behind				
14:59:18 Jul 01 '00	2212	177	39240 6	494679 2	there it is! (Benchmark 4)				
15:01:28 Jul 01 '00	2210	191	39239 2	494676 5	1545 - our position offset 400 meters SW.				
15:04:18 Jul 01 '00	2210	185	39248 4	494683 7	successfully placed extensometer 4 onto Bmrk-4				
15:05:08 Jul 01 '00	2210	182	39248 4	494683 7	x=392396 y=4946526 is the actual position for Bmrk-4				
15:57:53 Jul 01 '00	2215	114	39240 9	494655 5	positioned arm outside hole in extensometer; talking to extensometer				
15:57:53 Jul 01 '00	2215	114	39240 9	494655 5	tried using transducer in the well instead of the cage for a relay, but not getting any fixes from ROPOS. ROPOS can't hear the transducer in the well				
15:57:53 Jul 01 '00	2215	114	39240 9	494655 5	not getting any acoustic nav				
15:57:53 Jul 01 '00	2215	114	39240 9	494655 5	ship moving to the elevator position, time 16:18				
15:57:53 Jul 01 '00	2215	114	39240 9	494655 5	about 50 meters from the elevator start position				
15:57:53 Jul 01 '00	2215	114	39240 9	494655 5	positioned arm outside hole in extensometer; talking to extensometer				
15:57:53 Jul 01 '00	2215	114	39240 9	494655 5	tried using transducer in the well instead of the cage for a relay, but not getting any fixes from ROPOS. ROPOS can't hear the transducer in the well				
15:57:53 Jul 01 '00	2215	114	39240 9	494655 5	not getting any acoustic nav				
15:57:53 Jul 01 '00	2215	114	39240 9	494655 5	1618 - ship moving to the elevator position.				
15:57:53 Jul 01 '00	2215	114	39240 9	494655 5	about 50 meters from the elevator start position				
16:27:25 Jul 01 '00	2211	356	39240 9	494655 5	1629 - x=392409 y=4946632 believable fix depth=2210				
16:30:25 Jul 01 '00	2211	360	392412	494665 6	time caught up because of reboot, but will continue to drift				
16:35:55 Jul 01 '00	2210	355	391941	494626 8	found 2 extensometers! stopped the ship				
16:37:11 Jul 01 '00	2211	359	39234 6	494667 9	moving the ship 50 meters south				
16:38:11 Jul 01 '00	2210	3	39234 7	494668 6	1641 - x=392352 y=4946705 time, depth=2212				
16:46:57 Jul 01 '00	2214	266	391170	494605 2	picked up extensometer #7 (in the right arm) and #3 (in the left arm)				
16:54:41 Jul 01 '00	220 7	39	39236 2	494669 8	ROPOS headed back to the elevator				
16:58:27 Jul 01 '00	2212	22	39434 6	494605 6	moving ship to the elevator position				
16:59:13 Jul 01 '00	2211	15	39434 6	494605 6	1702 - ROPOS fix x=392404 y=4946729, depth 2210.				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R541 (South Cleft Area)	Samples	PI	Sub Smps	Fr Grb#
17:00:43 Jul 01 '00	2211	7	39240 6	494672 7	1708 - put down both extensometers; picked up Exten-3 in right arm.				
17:00:43 Jul 01 '00	2211	7	39240 6	494672 7	ROPOS is 5 meters to the SW of the elevator				
17:12:13 Jul 01 '00	2215	80	392412	494673 6	moving the ship south-southeast to Bmrk-3				
17:19:13 Jul 01 '00	2211	165	393961	4946621	lava pit - between elevator and Bmrk-3				R541-001
17:20:59 Jul 01 '00	2213	167	39437 6	494603 0	fish				R541-002
17:32:31 Jul 01 '00	2212	162	39249 3	494667 8	no ROPOS nav since we left elevator				
17:34:01 Jul 01 '00	2213	164	39249 3	494667 8	what is it?				R541-003
17:35:01 Jul 01 '00	2213	165	39249 3	494667 8	1742 - ROPOS fix x=392483 y=4946533; depth=2213.				
17:36:45 Jul 01 '00	2214	166	39205 2	494626 3	at Bmrk-3 position, looking for it				
17:46:59 Jul 01 '00	2213	188	39245 8	494648 0	Bmrk-3 sighted!				
17:48:29 Jul 01 '00	2213	211	39250 6	494649 4	Bmrk-3 sighted				R541-004
17:49:29 Jul 01 '00	2216	193	39250 6	494649 4	putting exten in Bmrk-3				R541-005
17:49:59 Jul 01 '00	2215	193	39247 5	4946513	almost in!				R541-006
17:49:59 Jul 01 '00	2215	193	39247 5	4946513	contd.				R541-007
17:50:45 Jul 01 '00	2215	193	39250 6	494649 4	finil				R541-008
17:53:29 Jul 01 '00	2215	188	393166	494440 4	doing a pressure check				
17:54:15 Jul 01 '00	2215	188	392142	4946130	1757 - actual position of Bmrk-3. x=392507 y=4946495				
18:02:31 Jul 01 '00	2215	26	39252 6	4946517	pressure sensor at Bmrk-3				R541-009
18:12:01 Jul 01 '00	2215	21	394147	4945881					R541-010
18:12:01 Jul 01 '00	2215	21	394147	4945881					R541-011
18:12:17 Jul 01 '00	2215	21	394147	4945881					R541-012
18:12:47 Jul 01 '00	2215	21	394147	4945881					R541-013
18:13:01 Jul 01 '00	2215	21	394147	4945881					R541-014
18:13:31 Jul 01 '00	2216	21	394147	4945881					R541-015
18:22:17 Jul 01 '00	2215	21	392531	494652 3	1827 - end of the pressure measurement.				
18:28:47 Jul 01 '00	2213	354	39250 6	494649 4	putting pressure sensor back				R541-0016
18:31:33 Jul 01 '00	2215	308	392521	4946515					R541-0017
18:32:03 Jul 01 '00	2215	308	39250 7	494649 4	1839 - x=392495 y=4946502 decent ROPOS fix.				
18:38:49 Jul 01 '00	2215	215	39249 5	494650 2	Extensometer at Bmrk-3				R541-0018
18:39:03 Jul 01 '00	2216	205	39249 5	494650 2	Bmrk-3				R541-0019
18:40:03 Jul 01 '00	2215	185	39249 5	494650 2	extensometer in Bmrk-3				R541-0020

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R541 (South Cleft Area)	Samples	PI	Sub Smps	Fr Grb#
18:45:49 Jul 01 '00	2216	197	393117	494439 7	beautiful pit near Bmrk-3				R541-0021
18:47:49 Jul 01 '00	2216	199	394144	494588 5	asking ship to move 100m NW				
19:00:21 Jul 01 '00	2211	318	39246 9	494653 4	ROPOS good fix 392435 4946537				
19:01:35 Jul 01 '00	220 6	314	39247 4	4946515	asking ship to move to Drop, then to Found then to Elevator				
19:05:37 Jul 01 '00	2211	305	392441	494662 5	Appears to be a 4 min 20 sec offset in the Auto logged time. Auto logged is slow. Auto logged heading is off by a few degrees as well.				
19:09:51 Jul 01 '00	2211	310	39234 4	494654 8	Asking ship to move due north now, toward the elevator. Still looking for last extensometer.				
19:14:37 Jul 01 '00	2211	324	39243 4	494663 6	good fix on cage 392375 4946620				
19:19:23 Jul 01 '00	2211	359	39238 9	4946621	Found last extensometer (number 6). Stopping the ship.				
19:19:53 Jul 01 '00	2210	353	39238 9	4946621	Exten-6				R541-0022
19:20:37 Jul 01 '00	220 9	358	39238 9	4946621	good cage fix 392374 4946694				
19:22:53 Jul 01 '00	2212	355	39238 9	4946621	Exten-6 in the arms of ropos				R541-0023
19:23:07 Jul 01 '00	2211	2	39238 9	4946621	grabbed extensometer #6. heading to Bmrk-6				
19:31:53 Jul 01 '00	2213	341	39239 2	494680 2	Increasing ship speed to 3/4 knot.				
19:40:55 Jul 01 '00	2214	221	39235 2	494675 8	Auto logged time offset is now about 11 min. ROPOS is transiting to Bmrk-6.				
20:00:57 Jul 01 '00	2216	239	39220 9	494659 0	basalted pillow lava flows ... collapsed				R541-0024
20:01:43 Jul 01 '00	2212	1	390851	4946124	ROPOS is using the 5 function to remove line from inside the Bmrk-6 target hole.				
20:01:43 Jul 01 '00	2214	1	390851	4946124	removing the cord on bmk six				
20:03:57 Jul 01 '00	220 7	96	39223 0	4946621	ROPOS is repositioning it's grip on the extensometer.				
20:07:57 Jul 01 '00	2210	29	39223 4	494657 7	found Bmrk-6				
20:08:11 Jul 01 '00	220 9	54	39223 4	494657 7	benchmark six is located				
20:13:57 Jul 01 '00	2215	47	392164	494657 5	underwater baseball ... on benchmark #6				
20:16:27 Jul 01 '00	2216	48	392158	494656 6	ROPOS is setting the extensometer down on the bottom in order to remove the wood/line inside BM6.				
20:19:43 Jul 01 '00	2215	47	392511	494830 5	the sixth extensometer is placed (the benchmark was not a good fit)				
20:19:57 Jul 01 '00	2216	48	392317	494669 0	ROPOS is using the 7 function arm to grab the wood block that is under Bmrk-6. lifting the line that wood is attached to. Rotten 2x4 just crumbled and the line was easily removed. ROPOS is now picking up the extensometer.				
20:26:59 Jul 01 '00	2216	37	39230 5	494667 8	2034 - Positioning the extensometer in the BM. Extensometer is now deployed in the Benchmark.				
20:27:43 Jul 01 '00	2216	37	39220 6	494658 7	placing extensometer 6 in benchmark 6				R541-0029
20:28:13 Jul 01 '00	2216	37	39220 0	494654 4	the marriage of Exten-6 and Bmrk-6				R541-0030

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R541 (South Cleft Area)	Samples	PI	Sub Smps	Fr Grb#
20:28:13 Jul 01 '00	2216	37	39220 4	494658 7	2034 - backing up to check the angle of inclination of the extensometer.				
20:28:29 Jul 01 '00	2216	37	39220 4	494658 7	20:34 - outside Bmrk-6 Where is FrGrb 32???				R541-0031
20:28:43 Jul 01 '00	2216	36	39220 4	494658 7	Bmrk-6				R541-0033
20:28:59 Jul 01 '00	2215	37	39220 4	494658 7	pulling away from Bmrk-6				R541-0034
20:29:13 Jul 01 '00	2215	36	39220 4	494658 7	the last of Bmrk-6				R541-0035
20:30:29 Jul 01 '00	2216	36	39220 4	494658 7	2037 - Bmrk-6				R541-036
20:30:29 Jul 01 '00	2216	37	39220 4	494658 7	2037 - tapes are being changed.				
20:30:59 Jul 01 '00	2216	51	39220 4	494658 7	the last last of Bmrk-6 / Exten-6				R541-037
20:30:59 Jul 01 '00	2216	51	39220 4	494658 7	ROPOS is positioning in order to return to the elevator. Asking the ship to move to the elevator at 1 knot.				
20:34:15 Jul 01 '00	2216	33	39220 4	494658 6	the cage				R541-038
20:35:15 Jul 01 '00	2212	45	39220 4	494658 6	cage closer up ...				R541-039
20:40:29 Jul 01 '00	2201	4	392215	4946614	2049 - good cage fix 392248 4946639. archive tapes (VHS and beta) change is completed				
20:54:31 Jul 01 '00	2173	51	39233 2	494672 3	2055 - still transiting to the elevator.				
21:09:13 Jul 01 '00	2175	281	39239 7	4946791	Auto logged time is reasonably good. It seems to be with in a 1/2 min of the correct time. ROPOS is searching for the elevator.				
21:11:43 Jul 01 '00	2210	337	392511	494833 8	good fix on cage392397 4946790				
21:13:13 Jul 01 '00	220 9	307	39236 3	494678 9	ROPOS has elevator in sight.				
21:20:13 Jul 01 '00	2211	350	39244 7	4946801	ROPOS is positioning to remove extensometer #2 from the elevator. 2123 - grabbing Exten-2.				
21:22:59 Jul 01 '00	2211	82	39240 5	494679 0	Ropos is placing Exten-2 on the bottom. It ended up somewhat upright. ROPOS is positioning to remove Exten-5 from the elevator.				
21:28:45 Jul 01 '00	2212	300	39242 6	494674 8	ROPOS is grabbing Exten-5 at 2132, going for the mast, removing it from the elevator. 2134 positioning Exten-5 on the bottom in order to get a new grep.				
21:35:29 Jul 01 '00	2213	58	392416	494674 7	ROPOS is picking up Exten-5 for transit to Bmrk-5.				
21:39:01 Jul 01 '00	2212	53	39244 8	494680 4	Asking ship to move to Bmrk-5 at 1 knt.				
21:39:45 Jul 01 '00	2212	27	39244 8	494679 8	the cage...				R541-0040
21:42:45 Jul 01 '00	2181	301	39243 8	494680 4	gauges				R541-0041
21:53:01 Jul 01 '00	2179	221	39239 2	494672 3	Looking for Benchmark 5.				
22:06:03 Jul 01 '00	2214	138	39239 5	494664 7	Located Bmrk-5. ROPOS is positioning to remove the line from the benchmark. Small sea star under the Bmrk-5.				
22:06:17 Jul 01 '00	2214	117	392312	4946571	Bmrk-5				R541-0042

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R541 (South Cleft Area)	Samples	PI	Sub Smps	Fr Grb#
22:07:03 Jul 01 '00	2214	280	392401	494664 5	approaching Bmrk-5				R541-0043
22:09:03 Jul 01 '00	2216	176	39230 9	494655 9	ROPOS is using the 5 function to remove the line. Benchmark was moved about 2 cm during the attempt at removing the wood.				
22:09:47 Jul 01 '00	2215	170	39230 9	494655 9	prepping to remove the cord/2x4 ballast from Bmrk-5				R541-0044
22:10:19 Jul 01 '00	2215	152	39230 9	494655 9	cord is pulled to break through the waterlogged 2x4 on bmrk-5				R541-0045
22:11:19 Jul 01 '00	2216	155	39230 9	494655 9	Exten-5 about to be placed ..				R541-0046
22:11:19 Jul 01 '00	2216	155	39230 9	494655 9	2214 - extensometer 5 positioned in Bmrk-5. 2218 ROPOS is attempting to nudge the extensometer to ensure that it's positioned correctly (centered) in the benchmark. The extensometer settled into positioned.				
22:12:19 Jul 01 '00	2216	158	39232 7	494658 5	Exten-5 in place				R541-0047
22:13:03 Jul 01 '00	2216	156	39234 3	494658 7	2216 - Exten-5 in place				R541-0048
22:15:49 Jul 01 '00	2216	127	39230 2	494652 3	Exten-5 fully in place (previous settlement efforts were askance)				R541-0049
22:20:03 Jul 01 '00	2216	113	39228 0	494654 6	Asking the ship to move back to the elevator.				
22:22:19 Jul 01 '00	2180	335	39230 3	494653 3	cage w/ cable				R541-0050
22:26:19 Jul 01 '00	2181	82	39230 2	494656 6	ROPOS is transitting to the elevator.				
22:32:05 Jul 01 '00	2192	64	39236 2	494667 3	archive tapes are changed. ROPOS still looking for the elevator.				
22:46:21 Jul 01 '00	2212	203	39242 6	494682 6	Exten-2 & ?				R541-0051
22:47:07 Jul 01 '00	2211	240	39242 5	4946817	coordinates of elevator target have moved x=392428.2, y=946790.8 back to pick up Exten-2				
22:48:07 Jul 01 '00	220 7	221	39242 5	4946817	picking up Exten-2				R541-0052
22:48:37 Jul 01 '00	2210	51	39242 5	4946817	Exten-2 grabbeth				R541-0053
23:02:37 Jul 01 '00	2177	141	39243 5	494673 0	time check off ROPOS 'sit cam' screen 23:13:00				
23:23:09 Jul 01 '00	2211	135	39252 0	494650 4	23:27 (23:23 data log time) sighting of sea cliff dive weight				
23:31:55 Jul 01 '00	2213	79	39257 5	494647 0	crinoid - underwater nerd				R541-0054
23:37:25 Jul 01 '00	2214	203	392190	4943199	rattail fish				R541-0055
23:45:41 Jul 01 '00	2216	65	38937 7	494772 0	Bmrk- 2 in sight				
23:45:57 Jul 01 '00	2216	159	38937 7	494772 0	found Bmrk-2				R541-0056
23:47:11 Jul 01 '00	2214	224	38937 7	494772 0	benchmark 2				R541-0057
23:50:27 Jul 01 '00	2216	14	392141	494600 5	ROPOS is positioning extensometer #2 to place it in Bmrk-2.				
23:54:57 Jul 01 '00	2216	287	39248 6	494465 3	benchmark 2				R541-0058
23:55:13 Jul 01 '00	2217	283	39248 6	494465 3	Extensometer is centered in the benchmark.				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R541 (South Cleft Area)	Samples	PI	Sub Smps	Fr Grb#
23:56:57 Jul 01 '00	2217	309	39248 6	494465 3	Hydraulic fluid is leaking. ROPOS will return to the cage.				
23:58:13 Jul 01 '00	2217	295	39246 7	494638 3	Exten-2 in place				R541-059
00:32:25 Jul 02 '00	2192	1	39252 9	494669 2	Exten-7 about to be abducted (the last of a series of 6)				
00:33:25 Jul 02 '00	2197	68	39252 9	494669 2	funky rocks ... lobate flows				R541-060
00:35:09 Jul 02 '00	220 7	63	39252 9	494669 2	Exten-7 being grabbeth ... (of 6)				R541-061
00:36:55 Jul 02 '00	220 8	81	39242 6	494677 6	en route to Bmrk-7				
01:01:50 Jul 02 '00	2177	123	391864	494624 0	edge of cleft bathtub rings (collapsed tube)				R541-062
01:10:06 Jul 02 '00	2178	179	39224 3	4946681	benchmark 7 in sight				
01:13:36 Jul 02 '00	220 3	279	392163	494664 0	#7 in transit to bmrk				R541-063
01:14:06 Jul 02 '00	220 9	275	392163	494664 0	#7 in transit to bmrk (closer)				R541-064
01:16:06 Jul 02 '00	220 8	65	39247 2	494830 8	#7 closer to placement				R541-065
01:17:06 Jul 02 '00	220 6	65	39246 7	494830 9	about to deposit #7				R541-066
01:19:52 Jul 02 '00	2214	71	392103	494660 0	placing #7 ... soon!				R541-067
01:22:06 Jul 02 '00	2212	204	39026 5	494640 0	Exten-7 nearly in place maybe a rock obstructing the full penetration of the plug. Time to burn rubber.				R541-068
01:26:06 Jul 02 '00	2215	312	392152	494654 5	Exten-7 a tad askance ..				R541-069
01:28:22 Jul 02 '00	2211	305	39240 5	494839 7	Heading back to the cage.				
01:31:52 Jul 02 '00	2213	304	39209 2	494660 7	cage motor is off				
01:36:08 Jul 02 '00	2214	315	39209 2	494660 7	cage is in view				
01:38:38 Jul 02 '00	2214	300	39209 2	494660 7	ropos is in the cage.				
01:40:08 Jul 02 '00	2214	302	39209 2	494660 7	heading up to the surface				
01:44:38 Jul 02 '00	2214	321	39209 6	494660 8	tapes off				
					0306 - sub on deck.				
					0309 - elevator at surface.				
					R541 Dive Summary: Deployed Extensometers 2-7 (Clft E2-E7) at Benchmarks 2-7. Pressure measurement at Bmrk-3. No samples.				

R542 Dive Log

UTC	Z (m)	Hdg	UTM X	UT M Y	Comments - Dive R542 (South Cleft Area)	Samples	PI	Sub Smps	Fr Grb#
					Automated Logging System not giving accurate information!! All auto time, heading, depth and utm position information inaccurate! CORRECT TIME AND POSITION ENTRIES ARE FOUND IN COMMENTS COLUMN. !!NO ACOUSTIC NAV THIS DIVE! SHIP NAV ONLY!!				
					Tasks: Deploy Cleft extensometers 8-12 at benchmarks 8-12. Pressure measurements and infared links with extensometers.	Bottom time: JD184(7/2) 1042 - JD185(7/3) 1423			
					09:06 ROPOS in Water				
10:38:09 Jul 02 '00	2170	294			50 metres above bottom. 10:39. Ropos has left the cage.				
10:40:23 Jul 02 '00	2193	287			10:42:20 - Landed right next to extensometer 7!				
10:44:17 Jul 02 '00	2215	166			10:46 - we are going to move Bmrk-7 with the extensometer because it had tilted since we left it at the end of dive 541.				
10:57:17 Jul 02 '00	2214	143			1100 - At edge of cleft, part of rim gave way when ROPOS set down, now looking for another place to set the extensometer down so that benchmark can be adjusted, pulling slider open as it is closed slightly.				
11:00:17 Jul 02 '00	2215	224			ROPOS will attempt to hold on to extensometer while the slider on the benchmark is adjusted.				
11:01:53 Jul 02 '00	2215	225			1104 - ROPOS has the benchmark in its "hand".				
11:08:29 Jul 02 '00	2215	65			1110 - Moving both the extensometer and benchmark to a flatter location as old position was too much of a mound to get a solid footing.				
11:11:27 Jul 02 '00	2214	79			11:14 - ROPOS has set the benchmark down on a flatter location and is now working to insert the extensometer in it. Its new location is about 1m away. The slider is now open which will now allow for the extensometer to be inserted properly.				
11:14:11 Jul 02 '00	2215	55			11:17 - Extensometer 7 has been inserted into Bmrk-7 .				
11:18:13 Jul 02 '00	2214	71			Downloading data from extensometer #7 . Frame grab taken of infrared link.				
11:21:57 Jul 02 '00	2214	72			downloading data from/to extensometer #7 via infrared				R542-007
11:27:27 Jul 02 '00	2215	70			11:28 - Moving ROPOS to take a pressure measurement.				
11:32:59 Jul 02 '00	2214	317			11:35 - begin pressure measurement at extensometer 7, frame grab taken. Facing north, north-west. Heading 335, end cap is right on the edge of the benchmark's nose.				
11:33:13 Jul 02 '00	2214	317			beginning pressure measurements on Exten-7. Heading 335 and facing NNW.				R542-008
11:48:07 Jul 02 '00	2214	335			Ending pressure measurements on ext.#7				R542-009
11:48:53 Jul 02 '00	2214	335			11:55 - end of pressure measurement. Retracting pressure measurement guage.				
11:49:51 Jul 02 '00	2214	334			Frame grabs of extensometer, benchmark and surrounding area.				
11:50:07 Jul 02 '00	2214	335			surroundings of Exten-7				R542-010
11:50:23 Jul 02 '00	2215	334			surroundings of Exten-7				R542-011

UTC	Z (m)	Hdg	UTM X	UT M Y	Comments - Dive R542 (South Cleft Area)	Samples	PI	Sub Smps	Fr Grb#
11:51:07 Jul 02 '00	2215	334			surroundings of Exten-7				R542-012
11:51:53 Jul 02 '00	2214	335			surroundings of Exten-7				R542-013
11:52:07 Jul 02 '00	2214	335			1158 - Backing away from extensometer/benchmark and continuing to take more frame grabs.				
11:54:47 Jul 02 '00	2214	335			surroundings of Exten-7				R542-014
11:55:27 Jul 02 '00	2215	334			ROPOS is heading back up to the cage for transit to Bmrk-6.				
11:56:07 Jul 02 '00	2212	26			1201 - Moving ship to Bmrk-6.				
12:11:07 Jul 02 '00	2179	85			12:13 - going to start turning off the video during transits between sites, and turning it on again once we get back to the bottom.				
12:20:23 Jul 02 '00	2191	94			1222 - ROPOS is back on the bottom, turning video back on.				
12:21:43 Jul 02 '00	220 7	93			12:23 - Exten-6 has been spotted, frame grabs taken of surroundings and ext.				
12:22:23 Jul 02 '00	220 8	123			surroundings of Exten-6 upon arrival				R542-015
12:22:37 Jul 03 '00	2211	87			ROPOS has grabbed the wire for the second probe and is attempting to get it off the vent.				
12:23:25 Jul 02 '00	220 8	360			12:27 - Ext/benchmark is south-east of a 3-4m wide pit. ROPOS is on bottom beside instrument #6 and is stowing pressure instrument so that infrared download can be done.				
12:23:25 Jul 02 '00	220 8	360			surroundings of ext. 6				R542-016
12:23:25 Jul 02 '00	220 8	360			surroundings of Exten-6.				R542-017
12:23:25 Jul 02 '00	220 8	360			3-4 m pit to NW of Exten-6				R542-018
12:37:33 Jul 02 '00	2214	42			1240 -Working on getting infrared link, experiencing some telemetry difficulties.				
12:45:45 Jul 02 '00	2213	42			1249 - Continuing to work on telemetry problem.				
12:57:47 Jul 02 '00	2214	43			13:01- still can't get infrared link, going to take pressure measurement instead.				
12:57:47 Jul 02 '00	2214	43			13:06-start of pressure measurement. End cap of instrument is on the nose of the benchmark. Frame grab taken of pressure measurement.				
12:57:47 Jul 02 '00	2214	43			Wind gust moved ship off position. 1st pressure reading was abandoned at 13:13, will have to begin again when until placement is secured.				
13:18:43 Jul 02 '00	2214	291			13:19- pressure measurement started again.				
13:18:43 Jul 02 '00	2214	291			beginning of pressure reading on Exten-6.				R542-019
13:23:43 Jul 02 '00	2214	288			13:40 - end pressure measurement and stowing of pressure instrument in cradle.				
13:42:47 Jul 02 '00	2213	295			1343 - Seascope was shut down for 20 minutes. ROPOS is having trouble with putting pressure instrument back in cradle.				
13:44:47 Jul 02 '00	2213	295			13:48 - ROPOS has put the pressure instrument back in its cradle.				
13:44:47 Jul 02 '00	2213	295			Now bringing ROPOS back to the cage for the transit to benchmark #5. Video has been turned off. Ship has been instructed to move to benchmark 5 at 1 knot.				
13:57:31 Jul 02 '00	2178	180			1400 -Ship has arrived at requested location, ROPOS is going back down to get visual.				

UTC	Z (m)	Hdg	UTM X	UT M Y	Comments - Dive R542 (South Cleft Area)	Samples	PI	Sub Smps	Fr Grb#
14:03:03 Jul 02 '00	220 3	173			14:03 - ROPOS is on the bottom looking for extensometer 5. Video is back on (at 14:00).				
14:04:33 Jul 02 '00	220 7	318			14:05 - Exten-5 is found and ROPOS to bottom				
14:05:23 Jul 02 '00	220 6	146			arrival at Exten-5				R542-020
14:06:33 Jul 02 '00	2211	61			arrival at Exten-5				R542-021
14:06:53 Jul 02 '00	2211	28			arrival at Exten-5				R542-022
14:07:03 Jul 02 '00	2212	12			arrival at Exten-5				R542-023
14:07:23 Jul 02 '00	2210	19			arrival at Exten-5				R542-024
14:07:53 Jul 02 '00	220 9	20			14:09 - attempting infrared (IR) communication with Exten-5.				
14:07:53 Jul 02 '00	220 9	20			14:13 - ROPOS guys are calibrating the arm to get better control with IR aiming.				
14:07:53 Jul 02 '00	220 9	20			14:13 - Restart attempt of IR read on Exten-5.				
14:15:38 Jul 02 '00	2214	15			14:17 - pressure readings have stopped.				
14:19:37 Jul 02 '00	2214	15			14:22 - pressure readings are back on-line.				
14:30:55 Jul 02 '00	2214	18			14:31 - still trying to get infrared link...				
14:35:55 Jul 02 '00	2214	18			1437 - Pressure data had stopped coming in.				
14:41:37 Jul 02 '00	2214	16			1444 - Position off of the stern is X=392307 Y=4946564, depth is 2214m.				
14:44:43 Jul 02 '00	2214	17			ROPOS is moving pressure instrument onto benchmark #5, pressure data is coming back in.				
14:46:13 Jul 02 '00	2213	13			14:49 - pressure reading commencement. All is ok.				
14:46:37 Jul 02 '00	2214	13			pressure reading on Exten-5				R542-025
15:07:51 Jul 02 '00	2214	11			1511 - End of pressure reading				
15:08:23 Jul 02 '00	2214	12			1516 - Trying IR again. Positioning arm.				
15:17:35 Jul 02 '00	2214	11			15:11 to 15:18 - The pressure sensor was locked up.				
15:24:15 Jul 02 '00	2213	12			15:29 - pressure sensor locked up again. Giving up on the IR.				
15:26:47 Jul 02 '00	2214	12			ROPOS headed back towards the cage.				
15:30:37 Jul 02 '00	2214	12			1539 - Moving ship to the elevator position, at 1 knot. 15:39. The plan is to deploy the other extensometers now. Video turned off from 15:33 to 16:27.				
15:54:38 Jul 02 '00	2175	343			1607 - Pressure sensor was locked up again. 50 m away from the elevator.				
16:12:58 Jul 02 '00	2173	322			1614 - Ship has arrived at the elevator position.				
16:20:44 Jul 02 '00	2188	179			1627 - Found the elevator! (all 5 extensometers present!)				
16:24:30 Jul 02 '00	2199	153			1628 - Elevator position: X=391786 Y=4946852 depth 2207m				
16:25:30 Jul 02 '00	2201	1			elevator				R542-026
16:25:50 Jul 02 '00	220 2	1			elevator				R542-027

UTC	Z (m)	Hdg	UTM X	UT M Y	Comments - Dive R542 (South Cleft Area)	Samples	PI	Sub Smps	Fr Grb#
16:26:10 Jul 02 '00	2201	4			1631 - elevator				R542-028
16:26:40 Jul 02 '00	2201	7			elevator				R542-029
16:30:26 Jul 02 '00	2211	335			1631 - frame grabs of elevator				
16:41:24 Jul 02 '00	2215	33			1648 - Grabbing Exten-8				
16:42:24 Jul 02 '00	2215	76			grabbing Exten-8				R542-030
16:42:24 Jul 02 '00	2215	76			grabbing Exten-8				R542-031
16:48:10 Jul 02 '00	2213	318			16:58 - ROPOS off the bottom, headed back to the cage, with Exten-8 in hand.				
16:49:20 Jul 02 '00	2210	268			natural bridge				R542-032
16:49:30 Jul 02 '00	2210	266			natural bridge NW pit				R542-033
16:51:56 Jul 02 '00	2215	263			Ship headed to Bmrk-8, at 1 knot. 17:00				
16:55:46 Jul 02 '00	2215	249			1704 - Video turned off.				
17:18:12 Jul 02 '00	2175	138			1720 - Ship has arrived at Bmrk-8				
17:22:18 Jul 02 '00	2183	91			1724 - ROPOS on the bottom.				
17:23:02 Jul 02 '00	2197	79			1725 - Video turned on.				
17:25:42 Jul 02 '00	2209	356			Visually searching for Bmrk-8.				
17:27:54 Jul 02 '00	2209	323			1731 - Found it!				
17:28:14 Jul 02 '00	2210	256			Bmk-8 position X=392018 Y=4946665 depth 2211				
17:28:58 Jul 02 '00	2210	171			Bmrk-8				R542-034
17:30:14 Jul 02 '00	2209	162			big spider crab				R542-035
17:42:16 Jul 02 '00	2214	278			putting Exten-8 in				R542-036
17:42:42 Jul 02 '00	2214	275			still Exten-8				R542-037
17:43:02 Jul 02 '00	2214	2			1749 - Repositioned Bmrk-8				
17:43:16 Jul 02 '00	2214	42			Bmrk-8				R542-038
17:43:52 Jul 02 '00	2215	42			1751 - Placed Exten-8 onto Bmrk-8 at 17:51				
17:43:56 Jul 02 '00	2215	41			putting Exten-8 in				R542-039
17:44:58 Jul 02 '00	2214	43			Exten-8 is in				R542-040
17:46:02 Jul 02 '00	2215	289			Exten-8 and crab				R542-041
17:46:22 Jul 02 '00	2215	288			Exten-8				R542-042
17:51:44 Jul 02 '00	2215	118			1759 - Getting ready to do a pressure check.				
18:02:12 Jul 02 '00	2215	185			1801 - Reset time				
18:04:02 Jul 02 '00	2215	191			1804 - Starting pressure check.				

UTC	Z (m)	Hdg	UTM X	UT M Y	Comments - Dive R542 (South Cleft Area)	Samples	PI	Sub Smps	Fr Grb#
18:04:02 Jul 02 '00	2215	191			pressure read on Bmrk-8				R542-043
18:15:00 Jul 02 '00	2215	191			spider crab on Exten-8				R542-044
18:17:20 Jul 02 '00	2215	191			spider crab!				R542-045
18:17:24 Jul 02 '00	2215	192			spider crab!				R542-046
18:18:00 Jul 02 '00	2215	192			spider crab!				R542-047
18:19:56 Jul 02 '00	2215	191			sponges on older lava kipuka near Bmrk-8				R542-048
18:20:40 Jul 02 '00	2215	191			sponges on older lava kipuka near Bmrk-8				R542-049
18:23:36 Jul 02 '00	2215	191			18:28 - end pressure measurement				
18:25:26 Jul 02 '00	2215	191			1830 - ROPOS headed back to the cage.				
18:26:32 Jul 02 '00	2215	191			1830 - Video turned off.				
18:28:12 Jul 02 '00	2212	200			1833 - Ship moving back to the elevator at 1 knot.				
18:48:36 Jul 02 '00	220 6	121			starting archive tapes 1848. ROPOS is back on the bottom looking for the elevator.				
18:54:32 Jul 02 '00	220 7	328			1156 - Found the elevator. ROPOS is moving in to grab extensometer #9.				
18:56:24 Jul 02 '00	2212	336			elevator before grabbing Exten-9				R542-050
18:59:44 Jul 02 '00	2215	100			1902 ROPOS has grabbed Exten-9 and is removing it from the elevator.				
19:01:10 Jul 02 '00	2214	334			1903 - ROPOS set Exten-9 on the bottom and regripped near the bottom. the bottom is jumbled sheet flows. 1905 - Moving to Bmrk-9.				
19:05:10 Jul 02 '00	2217	74			1908 - Asking the ship to move to Bmrk-9 at 1 knot.				
19:23:10 Jul 02 '00	2211	78			1923 - ROPOS is back at the bottom, archive tapes are on, looking for Bmrk-9.				
19:34:12 Jul 02 '00	2215	144			1936 - Found Bmrk-9. Moving to position the extensometer.				
19:37:48 Jul 02 '00	2216	63			positioning Exten-9				R542-051
19:38:08 Jul 02 '00	2217	63			1941 - Placing Exten-9 in the benchmark. 1944 - Exten-9 is centered in the bmrk. ROV leaving the bottom.				
19:40:42 Jul 02 '00	2217	32			Exten-9 IN				R542-052
19:42:14 Jul 02 '00	2218	17			1946 - ROPOS is positioning to nudge the extensometer, it is slightly uncentered. 1948 repeating above.				
19:44:38 Jul 02 '00	2218	11			1949 - ROPOS is positioning to attempt to establish an IR link w/ Exten-9. 1955 - IR link is established temporarily. 1957- link is intermittent. Link is operational.				
19:50:04 Jul 02 '00	2218	287			COMMUNICATING with Exten-9 USING THE IR LINK				R542-053
19:55:22 Jul 02 '00	2218	284			2002 - IR link data exchange complete. ROPOS is repositioning to deploy the pressure sensor. 2004 - Ropos is nudging the base of the extensometer. 2005 - ROPOS is repositioning and sitting on the bottom, attempting to grab the extensometer and recenter it.				
20:06:04 Jul 02 '00	2216	160			Area surrounding Exten-9.				R542-054

UTC	Z (m)	Hdg	UTM X	UT M Y	Comments - Dive R542 (South Cleft Area)	Samples	PI	Sub Smps	Fr Grb#
20:08:50 Jul 02 '00	2218	341			2010 - ROPOS is lifting the Bmrk in an attempt to see if something is between the base and the Bmrk. ROPOS nudged the extensometer with the 5 function and it settled into the center of the Bmrk.				
20:10:50 Jul 02 '00	2218	341			2013 - Using the 7 function arm in order to position the depth probe. 2016 - Depth probe is sitting on the Bmrk. 2016 - Beginning of the pressure measurement.				
20:12:40 Jul 02 '00	2218	347			beginning of pressure reading Exten-9				R542-055
20:29:52 Jul 02 '00	2218	347			2035 - End of pressure measurement. Removing the pressure probe and replacing it in the holder. Tapes off and change tapes.				
20:30:42 Jul 02 '00	2218	346							R542-056
20:32:12 Jul 02 '00	2218	346			2038 - ROPOS is leaving the bottom, returning to the elevator.				
20:33:32 Jul 02 '00	2218	347			2039 - asking the ship to move back to the elevator at 1 knot.				
20:51:08 Jul 02 '00	2186	343			2053 - ROPOS is on the bottom looking for the elevator.				
20:53:38 Jul 02 '00	2215	343			2055 - found the elevator, positioning to remove Exten-10.				
20:56:00 Jul 02 '00	2215	29			2059 - ROPOS is removing Exten-10. Repositioning to set the extensometer on the bottom to get a grip near the bottom.				
20:59:10 Jul 02 '00	2214	118			Ropos taking Exten-10 at elevator.				R542-057
20:59:10 Jul 02 '00	2214	118			2102 - ROPOS has grabbed #10 and is moving off the bottom to transit to Bmrk-10.				
21:02:10 Jul 02 '00	2216	161			2106 - Asking the ship to move to Bmrk-10.				
21:09:24 Jul 02 '00	2178	100			2016 - ROPOS is on the bottom looking for the Bmrk-10.				
21:14:44 Jul 02 '00	2182	130			2120 - Found Bmrk-10. Small piece of line is in the centre of the benchmark. ROPOS is positioning to remove the line with the 5 function arm.				
21:15:34 Jul 02 '00	220 2	132							R542-058
21:19:26 Jul 02 '00	2217	139			2126 - ROPOS is positioning to attempt to place Exten-10 into Bmrk-10 . 2130 - Exten-10 is centered in the benchmark.				
21:22:56 Jul 02 '00	2217	256			Exten-10 in				R542-059
21:23:36 Jul 02 '00	2217	235			2131 - ROPOS is moving around the site. 2132 - grabbing the pressure probe. 2135 - Pressure probe is in position. 2136 - Begin pressure measurement. Sensor had a little bit of a rough landing when it was dropped onto the benchmark.				
21:29:46 Jul 02 '00	2217	281			Bmrk-10 pressure measurement				R542-060
21:37:58 Jul 02 '00	2218	334							R542-061
21:50:06 Jul 02 '00	2217	333							R542-062
21:50:36 Jul 02 '00	2217	334			glass sponges				R542-063
21:50:56 Jul 02 '00	2217	333			glass sponges				
21:55:18 Jul 02 '00	2217	333			2156 - End of pressure measurement. ROPOS is lifting off the bottom and will return to the elevator.				

UTC	Z (m)	Hdg	UTM X	UT M Y	Comments - Dive R542 (South Cleft Area)	Samples	PI	Sub Smps	Fr Grb#
21:58:18 Jul 02 '00	220 8	337			area around # 10				R542-064
21:58:28 Jul 02 '00	220 8	337			area around #10				R542-065
22:01:48 Jul 02 '00	2194	213			2201 - asking the ship to move to the elevator.				
22:10:10 Jul 02 '00	2192	27			2211 - ROPOS is near the bottom looking for the elevator.				
22:11:50 Jul 02 '00	2213	29			2213 - Found the elevator. ROPOS is positioning to grab #11.				
22:13:30 Jul 02 '00	2215	23			2215 - ROPOS has Exten-11 in the grasp of the 7 function arm. Now lifting the extensometer out. 2218 - Exten-11 is on the bottom.				
22:17:32 Jul 02 '00	2213	101			2220 - ROPOS is attempting to grab Exten-11. 2221 - Grab complete, lifting off the bottom, beginning to move to Bmrk-11. Archive tapes off.				
22:21:16 Jul 02 '00	2217	221			2224 - Asking the ship to move to Bmrk-11.				
22:35:50 Jul 02 '00	2193	212			2236 - ROPOS is on the bottom looking for Bmrk-11. Archive video is on.				
22:47:58 Jul 02 '00	2216	261			2248 Bmrk-11 in sight				
22:49:34 Jul 02 '00	2215	265			Bmrk-11 approach				R542-066
22:54:14 Jul 02 '00	2217	324			Exten-11 getting near the bmrk				R542-067
22:55:36 Jul 02 '00	2217	322			closeup of Bmrk-11 with extensometer, robot arm retracting				R542-068
22:55:56 Jul 02 '00	2217	323			2257 - Exten-11 in place				
22:56:16 Jul 02 '00	2217	324			retracting from Bmrk-11				R542-001
22:56:46 Jul 02 '00	2217	326			#11 (again)				R542-069
22:56:56 Jul 02 '00	2217	318			Bmrk-11, better angle ... in place!				R542-070
22:57:16 Jul 02 '00	2217	311			Bmrk-11 with Exten-11 in place - another angle (wood & cord ballast to the left)				R542-071
22:58:06 Jul 02 '00	2216	293			Bmrk-11, stable & in place (yay!)				R542-072
22:59:36 Jul 02 '00	2217	268			moving pressure sensor into place at Bmrk-11				R542-073
22:59:46 Jul 02 '00	2217	273			pressure sensor nearing Bmrk-11				R542-074
23:00:26 Jul 02 '00	2216	257			2303 - pressure measurement apparatus in place				
23:00:36 Jul 02 '00	2217	256			Bmrk-11 pressure reading (le finale)				R542-075
23:08:48 Jul 02 '00	2217	264			test				R542-002
23:30:02 Jul 02 '00	2214	292			2333 - Ship will start dragging the cage & sub back to the elevator.				
23:48:16 Jul 02 '00	2212	42			2350 - ROPOS is near the bottom, looking for the elevator.				
23:51:08 Jul 02 '00	2211	63			2353 - Found the elevator. ROPOS is positioning to remove the last extensometer #12.				
23:54:08 Jul 02 '00	2212	65							R542-003
23:59:08 Jul 02 '00	2213	56			0002 - ROPOS has grabbed the last extensometer. ROPOS is Exten-12 on the bottom.				
01:18:12 Jul 03 '00	2193	300			0120 - Bmrk-12 found				

UTC	Z (m)	Hdg	UTM X	UT M Y	Comments - Dive R542 (South Cleft Area)	Samples	PI	Sub Smps	Fr Grb#
01:21:54 Jul 03 '00	2199	256			Bmrk-12 located!				R542-004
01:22:44 Jul 03 '00	2199	216			Bmrk-12				R542-005
01:30:56 Jul 03 '00	2199	40			Bmrk-12 with Exten-12 nearly in place ...				R542-006
01:31:06 Jul 03 '00	2199	41			Exten-12 in place.				
01:31:26 Jul 03 '00	2199	40			Exten-12 almost in place ...				R542-077
01:32:56 Jul 03 '00	2197	240			Exten-12 nearly in place ... base abit off ...				R542-078
01:33:26 Jul 03 '00	2199	243			OK, now Exten-12 is in place				
01:34:26 Jul 03 '00	2199	235			Exten-12 stable and set ! (go keith!)				R542-079
01:45:18 Jul 03 '00	2199	246			moving the pressure reading device into place at Bmrk-12				R542-080
01:49:40 Jul 03 '00	2199	236			in position for pressure measurement.				
01:49:40 Jul 03 '00	2199	236			official beginning for the pressure read on Bmrk-12.				R542-081
01:52:30 Jul 03 '00	2199	235			pressure sensor on Bmrk-12 (abit adrift - high seas)				R542-082
02:09:44 Jul 03 '00	2199	235			further motion in the pressure sensor on Bmrk-12				R542-083
02:11:04 Jul 03 '00	2199	235			0212 pressure measurement done.				
02:11:24 Jul 03 '00	2199	235			pullback shot of Bmrk-12 with pressure monitor in hand.				R542-084
02:16:56 Jul 03 '00	2165	133			0217 - move to Bmrk-7				
02:53:34 Jul 03 '00	2195	89			0255 - Bmrk-7 x=392113 y=4946604 depth 2213				
02:58:54 Jul 03 '00	2213	14			Bmrk-7				R542-085
03:00:44 Jul 03 '00	2214	343			pressure check at Bmrk-7				R542-086
03:01:24 Jul 03 '00	2214	344			Same pressure check at Bmrk-7				R542-087
03:01:34 Jul 03 '00	2214	343			0303 - start pressure measurement at Bmrk-7				
03:17:48 Jul 03 '00	2214	344			Pressure check at Bmrk-7				R542-088
03:22:20 Jul 03 '00	2214	343			0324 - stop pressure measurement at Bmrk-7				
03:23:10 Jul 03 '00	2214	344			Leaving Bmrk-7				R542-089
03:29:10 Jul 03 '00	220 6	64			0330 - Getting ready to move to Bmrk-6 - heading 99 degrees for 93 meters.				
03:34:12 Jul 03 '00	2211	96			0332 ship moving to new position				
03:35:12 Jul 03 '00	2212	96			garage?				R542-090
03:37:52 Jul 03 '00	2212	101			0338 - at Bmrk-6				
03:38:12 Jul 03 '00	2211	104			Bmrk-6				R542-091
03:41:48 Jul 03 '00	220 9	35			0343 - Ropos at Bmrk-6, position 392205, 4946587, depth 2215m.				
03:42:08 Jul 03 '00	220 9	344			Benchmark 6				R542-092

UTC	Z (m)	Hdg	UTM X	UT M Y	Comments - Dive R542 (South Cleft Area)	Samples	PI	Sub Smps	Fr Grb#
03:47:48 Jul 03 '00	2215	352			0340 - changing tapes: putting in tape #7 for both hi-8 and S-VHS. Trying to communicate with Exten-6 every 3 seconds....not working yet.				
03:53:50 Jul 03 '00	2215	12			0355 - got a hit, then lost it.				
03:54:50 Jul 03 '00	2215	12			0356 - Got it locked in for the infrared information transmission. Staying locked in.				
03:56:20 Jul 03 '00	2215	11			Infrared info. transmission at Bmrk-6.				R542-093
04:03:02 Jul 03 '00	2215	12			0404 - Finished data transmission, backing off.				
04:04:12 Jul 03 '00	2215	12			0406 - Moving the ship to benchmark 5.				
04:14:34 Jul 03 '00	220 9	105			0417 - position is 392309, 4946559, depth 2215m for Ropos at Bmrk-5. Note: tapes were turned off trasiting between BM6 and BM5.				
04:17:36 Jul 03 '00	2213	15			Shrimp at Bmrk-5				R542-094
04:17:46 Jul 03 '00	2214	2			Note: recorded time fell behind by 2 minutes in last 10 minutes.				
04:21:16 Jul 03 '00	2215	18			0422 - Locked in, data is being transfered.				
04:21:26 Jul 03 '00	2215	18			Doing IR at Bmrk-5				R542-095
04:27:08 Jul 03 '00	2215	18			0428 Finished infrared data transfer at Bmrk-5. Moving off and getting ready to move to Bmrk-4.				
04:31:08 Jul 03 '00	220 5	85			0432 - Stop recording tapes while travelling from BM5 to BM4.				
04:33:28 Jul 03 '00	220 9	105			0435 - Moving ship to BM4. On bottom again so turning video back on.				
04:45:22 Jul 03 '00	220 9	109			0446 - At Bmrk-4 : position 392395, 4946526, Ropos depth is 2216 m. Setting up for infrared transmission.				
04:46:02 Jul 03 '00	2214	92			Arrival at Bmrk-4				R542-076
05:01:04 Jul 03 '00	2216	107			0502 - Locked in, infrared data transfer commencing at BM4.				
05:03:16 Jul 03 '00	2216	108			IR at Bmrk-4				R542-096
05:07:26 Jul 03 '00	2216	108			0507 - approx. data transfer complete. Now trying to position for pressure measurement.				
05:10:36 Jul 03 '00	2216	129			0512 - Pressure check at Bmrk-4				R542-097
05:10:46 Jul 03 '00	2216	128			0512 - Locked in for pressure measurement.				
05:31:18 Jul 03 '00	2216	126			0532 - Finished pressure measurement at Bmrk-4. Moving off and will now head to Bmrk-3.				
05:32:38 Jul 03 '00	2216	127			0535 - Moving the ship to Bmrk-3.				
05:43:10 Jul 03 '00	2211	108			0545 - Ship arrives at Bmrk-3.				
05:54:12 Jul 03 '00	2211	104			0556 - changing SVHS and Hi-8 tapes, putting in #8 for both. Still looking for Bmrk-3.				
05:59:54 Jul 03 '00	2212	154			0601 - At Bmrk-3 , position 392507, 4946494, Ropos depth 2216m.				
06:01:44 Jul 03 '00	2210	113			06:03 - at Bmrk-3				R542-098
06:07:05 Jul 03 '00	2216	24			0607 - Locked in at Bmrk-3 for pressure measurements				
06:09:47 Jul 03 '00	2216	23			06:07 - Pressure Measurement at Bmrk-3				R542-099

UTC	Z (m)	Hdg	UTM X	UT M Y	Comments - Dive R542 (South Cleft Area)	Samples	PI	Sub Smps	Fr Grb#
06:27:51 Jul 03 '00	2216	22			0629 - finished pressure measurement. Repositioning for infrared measurement at Bmrk-3.				
06:49:01 Jul 03 '00	2216	176			0650 - Locked in to Bmrk-3 for the infrared transmission.				
06:51:51 Jul 03 '00	2216	177			IR at Bmrk-3				R542-100
06:53:41 Jul 03 '00	2216	176			0655 - IR done go to Bmrk-2				
06:55:41 Jul 03 '00	2215	173			moving the ship to Bmrk-2				
07:18:07 Jul 03 '00	2215	132			ship is kind of moving about, still waiting for it to settle.				
07:29:15 Jul 03 '00	2215	234			0729 - grey coldfish.				R542-101
07:30:15 Jul 03 '00	2216	345			0731 - Looking for Bmrk-2 now that the ship is done moving.				
07:33:15 Jul 03 '00	2216	310			0734 - we've found Exten-2.				
07:34:47 Jul 03 '00	2213	121			0737 - Preparing to set down at #2 to do IR. Jason coordinates here are X 392622 Y 4946457, Jason depth 2215. Ropos depth 2218. We already have communication with #2.				
07:34:47 Jul 03 '00	2213	121			07:36 - Exten-2				R542-102
07:38:37 Jul 03 '00	2218	360			We're still talking to it.				
07:45:29 Jul 03 '00	2218	1			Still talking to #2.				
07:49:57 Jul 03 '00	2218	2			0750 - Done doing IR. Now we're going to do pressure.				
07:52:47 Jul 03 '00	2218	186			0754 - Taking a pressure reading at Exten-2				
07:55:27 Jul 03 '00	2218	187			0757 - whats that? extensometer 2				R542-103
08:16:43 Jul 03 '00	2216	164			0819 - Wood at Exten-2				R542-104
08:17:23 Jul 03 '00	2217	233			0819 - chunk of wood that has been sitting under Bmrk-2 for a year. Going into biobox. Benchmark-2 x=392622 y=4946457 z=2215.	R542-BIO-001	Tunncliffe	Embley	
08:18:23 Jul 03 '00	2218	244			0821 - wood at Exten-2.				R542-105
08:19:33 Jul 03 '00	2218	244			Going back to the cage.				
08:22:13 Jul 03 '00	2218	170			Moving the ship just short of Benchmark #1 up against the wall.				
08:35:49 Jul 03 '00	2161	76			Ship is done moving, we're waiting for the cage to settle out.				
08:38:29 Jul 03 '00	2162	81			Heading down to 2195 then going east.				
08:45:01 Jul 03 '00	2194	100			Looking for the wall on sonar so we don't smoosh into it.				
08:49:57 Jul 03 '00	2194	121			We found the wall and now we are looking for Bmrk-1.				
08:50:47 Jul 03 '00	2196	127			Found Bmrk-1 quite quick- we're old pros at this.				
08:51:57 Jul 03 '00	2196	155			Nice pillow lavas, a cool crinoid, no extensometer here.				
08:52:17 Jul 03 '00	2197	166			0853 - Exten-1 and crinoid.e				R542-106
08:52:47 Jul 03 '00	2196	125			Putting the pressure instrument on Bmrk-1.				

UTC	Z (m)	Hdg	UTM X	UT M Y	Comments - Dive R542 (South Cleft Area)	Samples	PI	Sub Smps	Fr Grb#
08:54:17 Jul 03 '00	2198	51			08:56 - Bmrk-1				R542-107
08:55:27 Jul 03 '00	2199	53			0857 - Pressure reading starting.				
08:57:39 Jul 03 '00	2198	63			Repositioning the pressure thing because the sub moved.				
08:57:39 Jul 03 '00	2198	63			09:00 - Bmrk-1				R542-108
09:04:19 Jul 03 '00	2198	65			0905 - Beginning pressure measurement				
09:04:19 Jul 03 '00	2198	65			09:05. Bmrk-1				R542-109
09:06:21 Jul 03 '00	2199	90			09:08 - wood on Bmrk-1				R542-110
09:14:09 Jul 02 '00	128	338			Ropos descending				
09:23:43 Jul 03 '00	2199	93			0925 - Pressure measurement finished. Going back to the cage then moving the ship.				
09:24:13 Jul 03 '00	2199	93			09:25 - quit Bmrk-1				R542-111
09:26:43 Jul 02 '00	426	356			500 m				
09:29:45 Jul 03 '00	2181	325			Moving the ship to Bmrk-7				
09:48:57 Jul 02 '00	983	8			1000 m				
09:56:55 Jul 03 '00	2174	289			Ship is at Benchmark #7 and we're going to go to the bottom to find the extensometer to get a pressure measurement.				
10:01:17 Jul 03 '00	2173	287			Bmrk-7 in site!??				
10:01:27 Jul 03 '00	2173	286			10:06 - Bmrk-6				R542-112
10:06:47 Jul 03 '00	2214	263			Positioning for pressure measurement				
10:11:39 Jul 03 '00	2210	125			We think we might be at Bmrk-6 by mistake... we'll see.				
10:12:49 Jul 03 '00	2211	106			Yes, we're at Bmrk-6 by mistake- we're going to go and find Bmrk-7 now.				
10:12:49 Jul 03 '00	2211	106			1014 - Bmrk-6				R542-113
10:15:59 Jul 03 '00	2201	297			Ship position is jumping around a bit, but we have successfully landed at Bmrk-7.				
10:16:19 Jul 03 '00	220 6	296			10:12. Bmrk-7				R542-114
10:16:39 Jul 03 '00	220 8	292			We are settling in to commence pressure measurements.				
10:19:11 Jul 03 '00	2216	357			10:21 - Bmrk-7				R542-115
10:23:31 Jul 03 '00	2216	354			1026 - Starting pressure measurement.				
10:23:41 Jul 03 '00	2216	2			10:26 - Bmrk-7				R542-116
10:43:45 Jul 03 '00	2216	22			Done with pressure measurement at 1046. Heading back to the cage.				
10:47:57 Jul 03 '00	2210	30			Turning the video off while we transit to Vent 1 vent site.				
10:50:57 Jul 03 '00	220 7	17			Moving the ship south/southwest approximately 700m.				
11:35:57 Jul 03 '00	2161	228			Ship has arrived at Vent 1 site, ROPOS is waiting 5 minutes prior to descent.				

UTC	Z (m)	Hdg	UTM X	UT M Y	Comments - Dive R542 (South Cleft Area)	Samples	PI	Sub Smps	Fr Grb#
11:38:17 Jul 03 '00	2166	195			11:40 - ROPOS is heading down to the bottom, water looks smokey, video has been turned back on.				
11:41:19 Jul 03 '00	2187	222			ROPOS has visual contact with bottom.				
11:55:41 Jul 03 '00	2219	143			Looking at a very large vent, doesn't appear to be active.				
11:56:21 Jul 03 '00	222 2	144							R542-117
11:56:21 Jul 03 '00	222 2	144			HOBO probe has been spotted on Vent 1 .				
11:57:31 Jul 03 '00	2217	153			Part of vent is active, black smoke is being emitted...amazing.				
11:57:41 Jul 03 '00	2214	153			Vent 1 with some smoke at the left				R542-118
11:58:23 Jul 03 '00	2210	157			hobo probe				R542-119
12:01:43 Jul 03 '00	2211	305			1202 - Frame grabs being taken of vent.				
12:02:03 Jul 03 '00	2211	311			hobo probe 'in motion'				R542-120
12:02:53 Jul 03 '00	2211	314			Mostly dead tube worms on active part of chimney. Active area with sulphide worm and scale worms, low flow vent.				
12:04:13 Jul 03 '00	2211	327			ROPOS has gotten the probe in its grip, difficult to get out.				
12:05:23 Jul 03 '00	2210	314			hobo probe not actually in motion,,, it was just resisting removal				R542-121
12:07:15 Jul 03 '00	2210	294			The pulling on the probe is making a small smoker.				
12:10:25 Jul 03 '00	2210	244			ROPOS arm has broken the wire attachment to the HOBO probe. Now attempting recovery.				
12:11:55 Jul 03 '00	2212	311			ROPOS arm has caught HOBO probe from side of vent.				
12:14:35 Jul 03 '00	2212	319			HOBO probe has been recovered and placed into the box. Probe #133. Time is correct. depth = 2209. Vent 1 Chimney 284 x=391831 y=4945927. (FeOxide scrapings subsmpl)	R542-HOBO-002.	W Chadwick	Fortin	
12:16:23 Jul 02 '00	2178	52			12:17 - ROPOS is heading down to bottom to begin search for Exten-6.				
12:17:17 Jul 03 '00	2211	307			Another HOBO probe has been spotted but is covered with precipitate.				
12:17:47 Jul 03 '00	2211	320			Frame grab has been taken from Chimney 284.				
12:17:47 Jul 03 '00	2211	320			Chimney 284				R542-122
12:23:47 Jul 03 '00	2211	96			hobo tug-o-war at Chimney 284				R542-123
12:26:19 Jul 03 '00	2211	91			Once again the wire is stuck into the chimney. ROPOS is going to grab the probe and free it from the wire.				
12:28:19 Jul 03 '00	2212	90			Probe is free from wire and about to be placed into the container.				
12:30:39 Jul 03 '00	2210	100			Hobo #134 being put away				R542-124
12:30:39 Jul 03 '00	2210	100			1231 - HOBO probe #134 recovered and placed into container. Depth=2208 (Chimney 284)	R542-HOBO-003	W Chadwick		
12:33:49 Jul 03 '00	2210	196			cool smoking vent				R542-125
12:33:49 Jul 03 '00	2210	196			Vent is active with no animals.				
12:36:51 Jul 03 '00	222 0	129			more smoking				R542-126

UTC	Z (m)	Hdg	UTM X	UT M Y	Comments - Dive R542 (South Cleft Area)	Samples	PI	Sub Smps	Fr Grb#
12:37:21 Jul 03 '00	2218	142			smoking Chimney 342: APPROXIMATE position x=391827 y=4945923 44 39.5115, 130 21.8644				R542-127
12:37:21 Jul 03 '00	2218	142			Beautiful active black smoker #342...awesome!				
12:38:01 Jul 03 '00	2213	134			Chimney 342				R542-128
12:39:01 Jul 03 '00	220 8	204			serious smokin baby				R542-129
12:40:11 Jul 03 '00	220 8	284			Chalcopyrite visible on side of vent, sparkles.				
12:41:51 Jul 03 '00	220 5	210			Highlights being taken of these amazing vents.				
12:42:41 Jul 03 '00	220 6	222			Highlights off.				
12:52:13 Jul 03 '00	220 9	239			Teather is wrapped around chimney, Keith is attempting to untangle the mess.				
12:54:05 Jul 03 '00	2212	154			Tether has been freed by the granddaddy of ROPOS, big Keith.				
12:58:35 Jul 03 '00	2193	60			Highlights on of active smoker, Chimney 342.				
13:02:45 Jul 03 '00	220 9	124			Anhydrite column.				
13:05:17 Jul 03 '00	220 6	128			Dead tube worms.				
13:05:27 Jul 03 '00	220 6	114			Black smoker with dead worms. Chimney 342 at Vent 1.				R542-130
13:06:37 Jul 03 '00	220 6	239			Good footage of active black smoker.				
13:07:07 Jul 03 '00	220 6	238			Chimney 342 cont.				R542-131
13:10:07 Jul 03 '00	220 6	284			Highlights off.				
13:12:49 Jul 03 '00	220 6	283			DEPLOYMENT of HOBO probe 129 onto Chimney 342. Approximate position: 391827, 4945923 44 39.5115, 130 21.8644				
13:15:09 Jul 03 '00	220 6	284			handshake for sampling Chimney 342				R542-132
13:15:49 Jul 03 '00	220 5	284			sampler inplace for Chimney 342 ...				R542-133
13:18:29 Jul 03 '00	220 5	283			handshaking back at Chimney 342 .				R542-134
13:27:01 Jul 03 '00	220 5	284			Sulfide chimney sample taken from Chimney 342.				
13:27:01 Jul 03 '00	220 5	284			got rock?				R542-135
13:27:01 Jul 03 '00	220 5	284			1328 - Sulfide from Chimney 342. x=391827 y=4945923 z=2210	R542-SF-00 4	W Chadwick		
13:38:23 Jul 03 '00	220 9	70			Further attempts at deploying Hobo probe 129.				
13:48:27 Jul 03 '00	220 8	350			Sea spider on side of active vent.				
13:49:57 Jul 03 '00	220 9	358			HOBO probe 129 has been deployed in Chimney 342.				
13:50:27 Jul 03 '00	220 9	356			probe 129 in place at Chmny-342				R542-136
13:50:47 Jul 03 '00	220 9	358			another angle, probe 129 inplace at Chimney 342				R542-137
13:51:37 Jul 03 '00	220 9	3			dropping Leigh's gas tight				R542-138

UTC	Z (m)	Hdg	UTM X	UT M Y	Comments - Dive R542 (South Cleft Area)	Samples	PI	Sub Smps	Fr Grb#
13:51:37 Jul 03 '00	220 9	3			1353 - Both gas tight bottles fired in same location as HOBO probe 129 deployment. Approximate depth = 2210. Vent 1 Chimney 342	R542-GTB-005 R542-GTB-006	Evans	Butterfield / Lilley	
13:56:27 Jul 03 '00	2210	16			probe 129 in place at 342 (from afar)				R542-139
13:56:57 Jul 03 '00	2210	13			spooky dead worms near Chimney 342				R542-140
13:57:17 Jul 03 '00	2211	336			closeup of ? at 342 (down lower)				R542-141
13:57:49 Jul 03 '00	2213	297			Lots of tube worms on side of chimney.				
13:59:39 Jul 03 '00	2214	313			tubeworm closeup				R542-142
14:09:31 Jul 03 '00	2201	4			14:12 - Ropos is back at cage				
14:15:21 Jul 03 '00	2210	339			Attempting a grab of some live tube worms.				
14:19:33 Jul 03 '00	2215	340			1420 - Tube worm grab at Chimney 342 Vent 1. Approximate depth = 2210 (FeO subsample)	R542-TWG-007	Tunncliffe / Marcus	Fortin / Metaxas	
14:21:43 Jul 03 '00	2215	341			End of dive.				
14:23:13 Jul 03 '00	2215	341			Video stopped,				
14:26:05 Jul 03 '00	2198	252			ROPOS is heading back to cage.				
14:29:15 Jul 03 '00	2182	204			ROPOS is back in the cage.				
14:43:27 Jul 03 '00	1962	230			Got chimney sample and tubeworm grab at Vent 1 Chimney 327. 1450 - ROPOS coming up.				
					R542 Dive Summary: Deployed Extensometers 8-12 (Clft E8-E12). Pressure measurements at Bmrks 1-12. Infrared link with all extensometers, Clft E2 - E12. (Clft E1 was not deployed). Vent 1 Chimney 284-Recovered 2 Hobos. Vent 1 Chimney 342-Deployed 1 Hobo. Samples: 2 gtb, 2 twg, 1 sulfide.				

R543 Dive Log

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R543	Samples	PI	Sub Smps	Fr Grb#
					Automated Logging System not giving accurate information!! All auto time, heading, depth and utm position information inaccurate! CORRECT TIME AND POSITION ENTRIES ARE FOUND IN COMMENTS COLUMN. As always, positions in utm x/y columns are automated and not flagged for accuracy. Consult dive maps for final position data.				
					Tasks: Recover osmos, deploy and recover bactraps, suction samples, gtb's, deploy MTR's, larval tubes and bactrps. Vents to visit: Mrk-33, Cloud, Nascent and Mkr-N41.	Bottom time: JD186(7/4) 0506-1455			
					0311 - Ropos in the water, elevator attached to bottom of cage.				
03:41:02 Jul 04 '00	363	341	42384 5	508709 9	0343 - The purse full of MTRs is opening and closing with descent - looks like we lost two MTRs so far.				
04:06:34 Jul 04 '00	738	349	42384 4	508709 5	0424 - Just lost the larval traps - the milk crate broke.				
04:55:50 Jul 04 '00	1438	318	42382 7	508707 7	0459 - Ropos coming out of cage, nearing bottom.				
05:04:00 Jul 04 '00	1497	87	42384 3	508708 8	0505 - Bottom in sight, time lapse camera in view at Mkr-33 .				
05:06:40 Jul 04 '00	1515	74	42384 6	5087105	0508 - Looking around for a good site to place the elevator.				
05:10:02 Jul 04 '00	1509	103	42384 6	5087105	0513 - Elevator on the bottom near Mkr-33 (a few m at bearing of 140 deg from Mkr 33).				
05:11:34 Jul 04 '00	1519	287	42385 3	508709 5	0537 - Tons of limpets, mat, a few scale worms...don't see any tube worms yet. Zooming in on osmos and crack. Still vigorous shimmering flow.				
05:12:12 Jul 04 '00	1518	118	42384 8	5087110	elevator. time 5:15 depth 1520 (a couple of meters from Mkr-33)				R543-001
05:14:02 Jul 04 '00	1519	119	42384 4	5087108	0517 - At elevator, preparing to take out milk crate with 2 larval traps.				
05:16:32 Jul 04 '00	1519	4	42384 5	508705 5	0520 - Elevator position near Mkr-33 : x=423847 y=5087102 z=1520.				
05:22:12 Jul 04 '00	1520	300	42385 5	5087106	Elevator with larval traps 05:23 1519 meters.				R543-002
05:25:22 Jul 04 '00	1520	145	42384 7	508706 5	0527 - Milk crate out of elevator with larval traps #1&2. Moving it to Mkr-33.				
05:30:02 Jul 04 '00	1521	98	423851	5087103	0530 - Milk crate placed on seafloor right below elevator - traps will be deployed later.				
05:31:32 Jul 04 '00	1521	50	42383 7	508705 5	05:32 - osmoanalyzers at Mkr-33				R543-003
05:31:42 Jul 04 '00	1521	57	42383 7	508705 5	0532 - Video of crack with time lapse camera, osmos, bact. traps., right at the Marker.				
05:31:42 Jul 04 '00	1521	57	42383 7	508705 5	05:33 - osmos, tlc, and bactraps at Mkr-33				R543-004
05:32:02 Jul 04 '00	1520	47	42383 9	5087051	05:33 - osmos, tlc, and bactraps at Mkr-33				R543-005
05:34:32 Jul 04 '00	1517	242	42384 2	508705 4	Mkr-33				R543-006
05:35:24 Jul 04 '00	1520	312	42385 3	508709 5	osmos in the crack				R543-007
05:35:54 Jul 04 '00	1522	252	42384 6	508706 0	shimmery flow at Mkr-33				R543-008
05:38:24 Jul 04 '00	1524	245	42384 4	508705 7	osmos at Mkr-33				R543-009

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R543	Samples	PI	Sub Smps	Fr Grb#
05:38:34 Jul 04 '00	1523	247	42384 4	508705 7	0539 - Betacam highlights on. Palm worms, now we see some baby tubeworms, tons of limpets covering everything.				
05:38:44 Jul 04 '00	1523	247	42384 4	508705 7	osmos at Mkr-33				R543-010
05:40:24 Jul 04 '00	1524	236	42383 8	508703 0	0540 - Close up of tubeworms, scale worms, palm worms, tons of limpets - directly in crack by osmos. Tubeworms only appear to be 10-20 cm long.				
05:40:35 Jul 04 '00	1524	236	42385 6	508707 6	tube worms at Mkr-33				R543-011
05:42:04 Jul 04 '00	1524	236	42385 0	5087101	time lapse camera covered in stuff.				R543-012
05:42:54 Jul 04 '00	1523	281	42384 3	508705 3	0545 - Positioning to move the TLC out of the way - it is covered with filamentous bacteria. Position: 423850, 5087101 at Mkr 33.				
05:44:24 Jul 04 '00	1524	184	42385 8	508708 5	0546 - Highlights off. TLC being moved out of the way, placed by the elevator at 0550.				
05:48:54 Jul 04 '00	1521	176	42386 3	5087120	0550 - From Ropos the heading from the TLC to the elevator is 240, just a few meters from elevator.				
05:51:14 Jul 04 '00	1514	49	42382 0	5087143	0553 - Juniper and Tunnicliffe svhs tapes off while moving osmos from Mkr-33 to elevator.				
05:53:45 Jul 04 '00	1524	227	42385 6	508706 6	0555 - In process of recovering an osmo, we aren't sure which it is: the osmo or the gas-osmo. The osmos appear covered with limpets.				
05:56:24 Jul 04 '00	1523	225	42384 4	508705 5	Osmo- @ Mkr-33 05:59				R543-013
05:59:44 Jul 04 '00	1524	24	423851	508707 6	0601 Picked up osmo with green tape, heading to the elevator to deposit it.				
06:00:45 Jul 04 '00	1521	112	42384 0	508705 4	0605 Putting osmo with green tape into elevator. Probably the "gas-osmo". Mkr-33 x=423850 y=5087101 z=1520m	R543-OSMO -0001	Moyer for Wheat		
06:05:57 Jul 04 '00	1519	280	42384 6	508705 5	0608 - Trying to get the dangling hose of the osmosampler into the elevator.				
06:11:07 Jul 04 '00	1520	264	42386 4	508709 2	0612 - Finished putting osmo with green tape in elevator.				
06:11:57 Jul 04 '00	1521	236	42386 4	508709 2	0613 - Heading back to Mkr-33 to pick up a second osmo.				
06:19:27 Jul 04 '00	1524	54	42384 0	508705 3	0619 - Picked up the second osmo, it has only one cylinder pump with black tape. Moving it to the elevator. Moyer thinks the first osmo with green tape was the "gas-osmo" and this one is the "bio" osmo.				
06:22:06 Jul 04 '00	1520	340	42386 3	508708 2	0628 - Second osmo placed in elevator. The "bio" osmo. (Mkr-33)	R543-OSMO -0002	Moyer for Wheat		
06:33:09 Jul 04 '00	1521	316	42383 3	5087149	0634 - Heading back to vent to pick up the 3rd and last osmo.				
06:36:59 Jul 04 '00	1517	138	42383 8	5087061	osmo at Mkr-33				R543-014
06:39:19 Jul 04 '00	1523	220	42385 4	5087108	bac trap 41(?) at Mkr-33				R543-015
06:39:39 Jul 04 '00	1524	222	42385 4	5087108	bactraps at Mkr-33				R543-016
06:39:49 Jul 04 '00	1524	223	42385 4	5087108	Sitting at the marker taking frame grabs of the 3rd osmo and the bact. traps. Again, they are just covered with limpets. Tunnicliffe tape turned back on at 0641.				
06:41:49 Jul 04 '00	1524	222	423831	508709 9	osmo in a box at Mkr-33				R543-017
06:43:09 Jul 04 '00	1524	223	423841	508705 4	0644 - Highlights off.				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R543	Samples	PI	Sub Smps	Fr Grb#
06:44:19 Jul 04 '00	1524	223	42384 6	508709 6	0645 - Trying to pick up the 3rd osmo, the "bio-osmo".				
06:45:09 Jul 04 '00	1524	224	42384 0	508705 4	0646 - Tunncliffe tape off.				
06:46:59 Jul 04 '00	1524	32	42385 3	508707 6	0650 - we have the osmoanalyzer in the arm and are moving to the elevator.				
06:51:29 Jul 04 '00	1520	155	42384 4	508706 3	Setting osmoanalyzer in elevator 06:52				R543-018
06:51:39 Jul 04 '00	1520	158	42384 4	508706 3	Put osmoanalyzer into elevator time is 0653 (Mkr-33)	R543-OSMO -0003	Moyer for Wheat		
06:52:49 Jul 04 '00	1520	302	42384 7	508705 4	0655 - Considering pulling the bungees over the side of the elevator with the osmos, but first we need to move one of the osmos.				
06:57:11 Jul 04 '00	1520	36	42385 5	5087104	0658 - Repositioning osmo in elevator				
06:58:41 Jul 04 '00	1520	276	42385 7	5087119	0700 - Done repositioning osmos in elevator, preparing to pull bungee over them				
07:04:41 Jul 04 '00	1521	276	42385 7	5087111	0706 - Fiddling with bungees				
07:07:51 Jul 04 '00	1524	188	42384 7	5087061	0710 - pulled one bungee over				
07:09:41 Jul 04 '00	1521	234	42384 6	508706 4	0712 - done with the bungees and the elevator. back to Mkr-33.				
07:11:51 Jul 04 '00	1521	350	42385 2	508709 7	Bact traps - 0715				R543-019
07:12:41 Jul 04 '00	1519	289	42385 8	508709 5	0716 - Settling down at Mkr-33. Turning on thermistor in slurp intake- temperatures are 4 degrees C low. Preparing to suck into bottle #6 for fluid sample.				
07:16:41 Jul 04 '00	1524	238	42384 6	508708 8	slow suction sample on bottle #6 (7:20) Tunncliffe tapes went on at 0720.				R543-020
07:16:41 Jul 04 '00	1524	238	42384 6	508708 8	0721 - Beginning slow suction on bottle #6 (202 um) at Mkr-33. Temperature is around 10 or 11 C. we're at the big crack pumping for FLUID. (Mkr-33)	R543-SS-J6 -0004	Huber/ Mehta		
07:21:41 Jul 04 '00	1524	238	42384 4	508708 7	07:22 - tubeworms & limpets				R543-0251
07:22:21 Jul 04 '00	1524	238	423851	508707 9	Bob thinks the flow isn't quite as fast/direct as last year.				
07:22:51 Jul 04 '00	1524	238	42383 6	508703 9	0723 - Stopped suctioning. Max temp around 14 C				
07:25:13 Jul 04 '00	1524	237	42383 8	508704 5	0726 - Preparing to remove bacterial traps from biobox.				
07:25:43 Jul 04 '00	1524	237	42384 5	508708 9	0727 - Picking up one of bacterial traps #42 and moving it out of the way				
07:27:23 Jul 04 '00	1524	236	423841	508705 6	0729 - Moving bacterial trap #41				
07:28:03 Jul 04 '00	1524	236	42382 2	5087147	Preparing to suction sample where the bacterial traps were.				
07:30:33 Jul 04 '00	1524	233	42383 9	508704 0	0733 - Sucking into Bottle #5 (202 um). BIO sample. Sucking in the crack where there are lots of limpets, mat, worms, etc. (Mkr-33).	R543-SS-J5 -0005	Moyer	Marcus	
07:32:03 Jul 04 '00	1524	221	42384 3	508708 6	0735 - So we were beginning to suck when the ship jerked, and we got pulled so we are going back to the elevator to make sure the cable is okay.				
07:33:33 Jul 04 '00	1524	219	423851	5087071	0736 - Going back to Mkr-33 to do the suction sample in jar #5				
07:33:53 Jul 04 '00	1524	220	423851	5087071	bact traps (moved out of crack) (07:37)				R543-022
07:36:43 Jul 04 '00	1524	240	42384 5	508705 5	0738 - Sucking off the wall at Mkr-33 for mat. Mostly limpets, but some mat there too.				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R543	Samples	PI	Sub Smps	Fr Grb#
07:39:13 Jul 04 '00	1524	233	42383 6	5087041	0741 - Beginning to slurp again for mat. Getting some worms				
07:40:33 Jul 04 '00	1524	209	42383 6	508703 9	0742 - Flow is definitely not as vigorous as last year.				
07:42:53 Jul 04 '00	1524	207	42383 6	508705 0	0745 - Looking at Jar #5- looks good so we're done suctioning. Temperature didn't move at all-stayed ambient.				
07:43:43 Jul 04 '00	1524	208	42383 6	508705 0	0746 - Positioning ourselves to deploy new bacterial traps and MTR from biobox.				
07:46:03 Jul 04 '00	1524	246	42383 8	508705 4	0748 - Taking #44 from port side of biobox.				
07:47:43 Jul 04 '00	1524	246	42384 0	508705	DEPLOYING bact trap # 44 07:49				R543-023
07:48:13 Jul 04 '00	1524	246	42383 7	508704 8	0749 - Bacterial trap #44 deployed. Getting another one #46 from the port side of biobox.				
07:49:55 Jul 04 '00	1524	246	42383 4	508702 7	0751 - DEPLOYING bacterial trap #46 next to #44 at crack in Mkr-33.				
07:51:55 Jul 04 '00	1525	246	42383 7	508704 7	0753 - Nudging bacterial traps around				
07:52:05 Jul 04 '00	1525	246	42383 6	508704 5	Pulling out MTR 3292 to deploy in crack at Mkr-33.				
07:52:35 Jul 04 '00	1525	246	42383 7	508704 6	MTR # 3292 DEPLOYED near bacterial trap #46 7:55				R543-024
07:52:45 Jul 04 '00	1525	246	42385 0	508707 9	MTR 3292 was deployed right next to bacterial trap #46 in the crack at Mkr-33.				
07:53:45 Jul 04 '00	1525	246	42383 8	508704 9	0756 - Finished positioning bacterial traps. Now we are going around to the other side to pick up the two previous bacterial traps we moved there.				
07:54:05 Jul 04 '00	1525	246	42384 5	5087091	old and new bacterial traps 7: 57				R543-025
07:57:25 Jul 04 '00	1525	78	42385 3	5087071	0759 - Picking up Bacterial Trap #41 and putting into port side of biobox. (Mkr-33).	R543-BT41-0006	Moyer	Marcus / Juniper	
07:58:55 Jul 04 '00	1525	76	42383 8	508704 5	0800 - Placing Bacterial Trap #42 into port side of biobox. (Mkr-33).	R543-BT42-0007	Moyer	Marcus / Juniper	
08:01:45 Jul 04 '00	1524	56	42385 3	508706 8	0803 - We are moving about to suction worms, limpets, etc into Jar #3.				
08:03:35 Jul 04 '00	1525	253	42383 9	508705 2	0806 - Sucking into Jar #3 (225 um). BIO: worms, limpets, etc	R543-SS-J3-0008	Marcus		
08:06:15 Jul 04 '00	1525	247	42383 5	508704 8	suction bottle # 3 8:07				R543-026
08:06:25 Jul 04 '00	1525	246	42383 5	508704 8	0807 - Starting suction sample into Bottle #3. Temperature is jumping around between 3 and 8 C. (Mkr-33)				
08:09:05 Jul 04 '00	1524	233	42385 0	508707 3	0810 - Still sucking into Jar #3				
08:09:35 Jul 04 '00	1524	234	42385 0	508707 3	0811 - See pycnogonids- sea spiders. They are new.				
08:10:45 Jul 04 '00	1525	248	42383 7	508704 8	0812 - Looking at Jar #3- pretty clogged with worms and stuff. Done with the sample.				
08:11:15 Jul 04 '00	1525	243	42383 7	508704 8	0813 - Suction sample into Jar #1 (200 um) for more critters-BIO. (Mkr-33)	R543-SS-01-0009	Juniper		
08:13:35 Jul 04 '00	1525	240	42383 9	5087051	0816 - Positioning and sucking into Jar #1				
08:17:25 Jul 04 '00	1525	230	42383 7	508705 0	0818 - Trying to suck up the new scale worm.				
08:17:45 Jul 04 '00	1525	225	42383 6	508704 4	08:19 - suction sampler at Jar #1				R543-027
08:18:27 Jul 04 '00	1525	229	42385 4	508707 7	0820 - Sample in Jar #1 is complete. Flushing now.				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R543	Samples	PI	Sub Smps	Fr Grb#
08:19:27 Jul 04 '00	1525	225	42383 6	508704 6	0821 - Determining where to deploy a MTR where the worm suction samples took place.				
08:21:17 Jul 04 '00	1525	222	42383 7	508704 6	08:23 - Jar #1				R543-028
08:24:27 Jul 04 '00	1525	216	42383 7	508704 7	0822 - We DEPLOYED MTR 3300 at same crack where tube worms were taken. Mkr-33 423850, 5087101				
08:24:47 Jul 04 '00	1525	216	42383 7	508704 7	0825 - Triggered port side gas tight (#2) in same area where worms were taken and MTR places (Mkr-33)	R543-GTB-0 010	Evans	Butter field / Lilley	
08:26:17 Jul 04 '00	1525	213	42382 9	5087100	0829 - Going back to the elevator to get the portable bioboxes out.				
08:32:07 Jul 04 '00	1521	99	42385 7	508708 3	0833 - Taking bioboxes out of elevator and placing (dropping) on seafloor.				
08:33:47 Jul 04 '00	1521	61	42384 0	508704 3	0836 - Placing second biobox on seafloor and checking on the first one we dropped there.				
08:33:47 Jul 04 '00	1521	61	42384 0	508704 3	08:35 - biobox from elevator.				R543-029
08:34:57 Jul 04 '00	1521	67	42385 0	5087104	0837 - Going back to the elevator for the third portable biobox that we will take with us to Mkr-33.				
08:41:57 Jul 04 '00	1521	248	42384 4	508705 5	0843 - Still trying to get portable biobox #3 out of elevator- having trouble grabbing it.				
08:43:19 Jul 04 '00	1521	244	42384 6	5087061	0845 - Got the third portable biobox out of the elevator				
08:45:59 Jul 04 '00	1520	236	42384 5	5087061	0848 - Going back to Mkr-33 with the portable biobox to do a tube worm grab.				
08:47:49 Jul 04 '00	1519	118	42384 2	508705 7	08:50 - biobox A				R543-030
08:48:39 Jul 04 '00	1522	226	42384 5	5087100	0851 - Putting the biobox down near the crack at Mkr-33.				
08:53:39 Jul 04 '00	1525	228	42383 6	508703 8	08:55 - biobox A				R543-031
08:54:09 Jul 04 '00	1525	227	423851 4	508709	0855 - Trying to open the portable biobox				
08:55:09 Jul 04 '00	1525	228	423841 2	508705	0856 - opened the biobox				
08:55:49 Jul 04 '00	1525	230	42383 9	508704 6	0857 - Tube worm grab into portable biobox A from Mkr-33.	R543-TWG- 0011	Marcus		
08:56:09 Jul 04 '00	1525	233	42383 9	508704 6	08:57 - tube worm grab for biobox A				R543-032
08:56:49 Jul 04 '00	1525	233	42383 9	508704 6	0858 - Going back for another grab of tube worms- bigger than we thought they were.				
08:58:09 Jul 04 '00	1525	234	42384 8	508709 5	08:59 - tube worms into biobox A				R543-033
08:58:59 Jul 04 '00	1525	233	42383 9	508704 7	0859 - Grab #3				
08:59:19 Jul 04 '00	1525	230	42385 2	508708 3	0901 - Trying for Grab #4				
09:00:19 Jul 04 '00	1525	227	42384 9	508709 3	0902 - Stopping the squishing of the tube worms.				
09:00:59 Jul 04 '00	1525	227	42385 3	508707 6	09:02 - area for grab tube worms. Mkr-33				R543-034
09:02:09 Jul 04 '00	1525	229	423841 5	508705	0905 - trying to pick out another MTR to deploy here at Mkr-33-3289				
09:03:09 Jul 04 '00	1525	226	42383 7	508704 3	0906 - Deploying MTR 3289 in flow at Mkr-33.				
09:04:49 Jul 04 '00	1525	226	42384 0	508705 5	0908 - DEPLOYED MTR 3289 in hole at Mkr-33				
09:04:49 Jul 04 '00	1525	226	42384 0	508705 5	0908 - Closing lid of portable biobox				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R543	Samples	PI	Sub Smps	Fr Grb#
09:10:49 Jul 04 '00	1525	227	42383 9	508704 7	0912 - Still trying to close the portable biobox				
09:11:51 Jul 04 '00	1525	227	423851 9	508707 9	0913 - Closed the lid of the portable biobox				
09:13:41 Jul 04 '00	1525	228	42385 3	508707 5	09:13 - end for biobox A				R543-035
09:14:01 Jul 04 '00	1525	228	42384 0	5087051	0915 - Putting portable biobox back into elevator.				
09:16:21 Jul 04 '00	1524	298	42383 9	508704 9	0918 - Placing portable biobox A into elevator.				
09:17:01 Jul 04 '00	1520	46	42384 3	508705 5	0918 - Now we're going to go position the larval traps				
09:18:21 Jul 04 '00	1520	304	42384 7	5087061	0920 - Joystick (as in the one on land, not the vent) popped an o-ring or something- we're fixing that.				
09:20:31 Jul 04 '00	1525	304	42383 7	508703 9	0922 - Joystick is fixed, thus we can continue our quest with the larval tubes.				
09:20:51 Jul 04 '00	1525	292	42383 7	508703 9	09:21 - larval tubes				R543-036
09:25:11 Jul 04 '00	1525	310	42383 7	508703 3	0926 - Taking larval traps 1,2 in the milk crate to the opposite side of Mkr-33 from where we've been sampling.				
09:30:01 Jul 04 '00	1524	237	42385 7	508708 2	0932 - DEPLOYING the larval tubes approximately 3 METERS NW OF MKR-33. We need to remove the lids and put them in place now.				
09:31:21 Jul 04 '00	1525	240	42384 8	508707 9	0933 - Pulled out little key to release bungee				
09:32:51 Jul 04 '00	1525	239	42383 6	508705 2	0935 - Grabbing larval tube #2				
09:35:31 Jul 04 '00	1525	239	42383 8	508709 0	09:34 - grabbing larval tube #2 (N of Mkr-33)				R543-037
09:36:31 Jul 04 '00	1525	239	42384 8	508707 9	0937 - Successfully removed larval tube #2 from milk crate				
09:38:23 Jul 04 '00	1525	239	42384 4	508709 4	0940 - Finding a flat place to put larval tube #2				
09:39:03 Jul 04 '00	1525	239	42385 0	508708 2	09:38 - Position of larval tube #2				R543-038
09:39:13 Jul 04 '00	1525	241	42385 0	508708 2	0941 - Going back for larval tube #1- removing it from the milk crate				
09:39:53 Jul 04 '00	1525	229	423851 9	508707 9	0941 - Larval tube #1 successfully removed from milk crate				
09:40:43 Jul 04 '00	1525	222	423851 9	508707 9	09:42 - Position of larval tube #1 (N of Mkr-33)				R543-039
09:41:13 Jul 04 '00	1525	205	423851 9	508707 9	0943 - Preparing to uncork the larval tubes				
09:42:03 Jul 04 '00	1525	241	42382 2	5087145	0944 - larval tube #2 cork popped quite easily				
09:42:53 Jul 04 '00	1525	220	42384 4	508708 8	0945 - Putting cap #2 into the milk crate				
09:45:13 Jul 04 '00	1525	188	42383 7	508705 6	09:46 - particles around larval tube #2				R543-040
09:45:23 Jul 04 '00	1525	187	42383 7	508705 6	0946 - Pulling the cork out of #1				
09:46:23 Jul 04 '00	1525	243	42384 4	508709 4	09:48 - cork out of larval tube #1 (N of Mkr-33)				R543-041
09:46:33 Jul 04 '00	1525	243	42384 4	508709 3	0948 - Popped the cork out of #2 right away- ROPOS is strong man- Alvin is weak				
09:47:13 Jul 04 '00	1525	242	42384 4	508709 3	0948 - Cork #1 going back into milk crate				
09:48:33 Jul 04 '00	1525	217	42383 7	508704 7	09:50 -both larval tubes				R543-042

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R543	Samples	PI	Sub Smps	Fr Grb#
09:49:13 Jul 04 '00	1523	246	42383 7	508704 7	0951 - One of Craig's traps got moved about so we are going to reposition it.				
09:50:03 Jul 04 '00	1523	235	42385 3	508708 3	09:53 - bacterial trap (Mkr-33)				R543-043
09:50:43 Jul 04 '00	1525	250	42385 3	508708 3	0953 - Done repositioning bacterial trap #44				
09:50:43 Jul 04 '00	1525	250	42385 3	508708 3	09:53 - bacterial traps 44 and 46. (Mkr-33)				R543-044
09:52:03 Jul 04 '00	1525	246	424108	5087610	0954 - Going to pick up the milk crates and deposit it in the elevator.				
09:56:43 Jul 04 '00	1521	284	42384 7	508705 9	0957 - Done putting milk crate in. Heading to Cloud Mkr-N6. Heading 75, 56 m.				
09:58:23 Jul 04 '00	1521	73	42385 9	5087110	0959 - Quite fresh looking lavas- possibly they just collapsed because we see pillars and such that we didn't see before. The pillars are covered in mat.				
09:58:43 Jul 04 '00	1522	68	42386 3	508709 6	09:57 - road to Cloud				R543-045
09:59:13 Jul 04 '00	1524	73	42385 6	508706 6	1001 - The water is super murky- very very cloudy.				
09:59:53 Jul 04 '00	1520	73	42386 4	508706 4	1001 - Lots of tube worms amid this murky cloudiness.				
10:00:03 Jul 04 '00	1519	80	42386 4	508706 4	09:58 - road to cloud (tubeworms)				R543-046
10:00:53 Jul 04 '00	1525	73	42387 7	508706 5	1002 - Trying to figure out exactly where we are.				
10:01:23 Jul 04 '00	1525	70	423911	5087101	10:03 - road to cloud. worms				R543-047
10:01:33 Jul 04 '00	1525	70	42388 5	508707 5	1003 - Tons of tube worms and very cloudy.				
10:01:53 Jul 04 '00	1525	71	42387 3	5087119	1004 - We've spotted Mkr-21, but not sure what that is. Could have been deployed with an MTR.				
10:06:35 Jul 04 '00	1525	83	42389 3	5087109	10:08 -find the marker, Cloud Mkr-21				R543-048
10:06:45 Jul 04 '00	1525	85	42389 3	5087109	1008 - We've spotted the hole at Cloud- not sure which hole, though we think it is Mkr-N6.				
10:08:05 Jul 04 '00	1526	289	42388 5	508706 6	10:10 - tubeworms around Mkr-21				R543-049
10:08:35 Jul 04 '00	1526	286	42389 8	5087114	1010 - Cloud looks more like milky now. There are a ton more animals than last year- especially more tube worms.				
10:08:55 Jul 04 '00	1526	286	42388 8	508706	1011 - Moving the ship				
10:09:35 Jul 04 '00	1526	286	42390 2	508709 9	1011 - Mkr-21 is attached to two MTRs down in the hole.				
10:11:35 Jul 04 '00	1526	281	42389 9	508709 4	10:14 - tube worm bush				R543-050
10:11:55 Jul 04 '00	1526	343	42389 9	508709 3	1014 - Trying to fiddle with the intake for the gastights because it broke loose.				
10:13:15 Jul 04 '00	1527	324	42390 4	5087115	1015 - Got the intake for the gastights precariously perched in the 7 function arm.				
10:13:15 Jul 04 '00	1527	324	42390 4	5087115	10:16 - tubeworms bush.				R543-051
10:15:55 Jul 04 '00	1527	322	42388 9	508706 7	1017 - Positioning to take a gas tight bottle here at Cloud Mkr-N6 "The Pit".				
10:16:15 Jul 04 '00	1526	323	42390 0	5087114	10:17 - tubeworms				R543-052
10:16:45 Jul 04 '00	1526	329	42388 6	508705 3	1018 - Firing starboard gas tight bottle at Mkr-N6 (the pit)	R543-GTB-0 012	Evans	Butter field / Lilley	
10:17:35 Jul 04 '00	1526	329	423913	5087132	10:19 - tubeworms				R543-053

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R543	Samples	PI	Sub Smps	Fr Grb#
10:17:55 Jul 04 '00	1526	330	423901	508709 7	1019 - Preparing to sample into Jar #7 fluid over the Pit.				
10:20:55 Jul 04 '00	1526	326	42389 3	5087108	1023 - Starting to pump into Jar #7 for fluid over Mkr-N6 (the pit).	R543-SS-J7 -0013	Huber / Mehta		
10:22:05 Jul 04 '00	1526	318	42388 8	508706 8	1024 - Continuing slow pump into Jar 7. Temperature on second thermistor is max 7.3 degrees so far. Nice cloudy fluid.				
10:23:25 Jul 04 '00	1526	318	42390 3	5087103	1026 - Stopping the suction sample.				
10:28:05 Jul 04 '00	1527	335	42388 7	508707 0	10:29 - bacterial trap into biobox.				R543-054
10:28:15 Jul 04 '00	1527	336	42388 9	508706 8	1029 - Deciding what to do with the MTRs and Bacterial traps crowding the biobox.				
10:30:57 Jul 04 '00	1526	336	42388 2	508704 4	1033 - Taking bacterial traps out of starboard biobox and putting on the seafloor so we can also take out the new MTR and recover the old.				
10:33:27 Jul 04 '00	1526	336	42390 6	5087130	1035 - Picking up bacterial traps 47 and 48 and placing on the seafloor near Mkr-21.				
10:36:17 Jul 04 '00	1526	338	42390 2	508709 7	10:39 - MTR out of biobox.				R543-055
10:36:27 Jul 04 '00	1526	339	42390 2	508709 7	1039 - Removing weighted MTR from starboard biobox to deploy at the Pit.				
10:39:27 Jul 04 '00	1526	337	42387 5	5087122	1040 - This weighted MTR thing has 2 MTR's on it - one of which is #3208 the other is #4101. They will be deployed at Cloud Vent soon.				
10:44:07 Jul 04 '00	1526	339	423901 7	508709 7	1046 - Trying to get in place to recover Mkr-21 with MTRs attached				
10:44:47 Jul 04 '00	1526	337	423901 7	508709 7	10:47 - Recovering VEMCO 1108				R543-056
10:46:57 Jul 04 '00	1526	336	42389 9	508709 5	1048 - We've got the MTR/VEMCO/Mkr-21 in our grip. Going to stuff into starboard side of biobox.				
10:47:37 Jul 04 '00	1526	342	42388 6	508705 8	Mkr-21 with MTR/VEMCO attached to it recovered from Cloud Vent Mkr-N6/21 . VEMCO#1108 recovered.	R543-VEMC O-0014	Embley		
10:48:47 Jul 04 '00	1526	14	42387 5	5087161	1050 - the ship is jumping about, hold off on the stuffing of Mkr-21 into biobox.				
10:50:37 Jul 04 '00	1524	347	42388 7	508706 0	1052 - Moving the ship 30 m northwest.				
10:53:37 Jul 04 '00	1523	350	42389 0	5087100	10:55 - tubeworm around Mkr-21.				R543-057
10:55:47 Jul 04 '00	1526	356	42388 5	508707 4	10:57 - bacterial trap and tubeworms				R543-058
10:58:17 Jul 04 '00	1526	356	42386 6	5087128	10:59 - Attempting collection of MTR at Mkr-21...hopefully its still on the end of the string.				
10:59:59 Jul 04 '00	1526	355	42388 5	5087122	11:01 - MTR is in ROPOS' grip.				
10:59:59 Jul 04 '00	1526	355	42388 5	5087122	11:01 - MTR collection				R543-059
11:01:19 Jul 04 '00	1527	3	42389 7	5087111	10:03 - MTR collection				R543-060
11:02:19 Jul 04 '00	1527	2	42389 7	5087111	10:05 - MTR collection				R543-061
11:02:39 Jul 04 '00	1527	3	42389 4	5087107	11:04 - attempting to pull apart MTR rope.				
11:03:09 Jul 04 '00	1527	3	42389 4	5087107	11:05 - MTR collection				R543-062
11:05:19 Jul 04 '00	1527	2	42389 4	5087107	11:07- rope pulled apart by ROPOS.				
11:07:09 Jul 04 '00	1527	3	42387 6	5087118	11:10 - MTR probe#3157 recovered at marker by ripping apart rope. The marker (21) was left in place. WILL NOW BE CALLED CLOUD Mkr-N6/21. FeSulfide-slime subsamp.	R543-MTR-0 015	Embley	Fortin	

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R543	Samples	PI	Sub Smps	Fr Grb#
11:09:19 Jul 04 '00	1527	3	42390 0	5087112	11:12 - bacterial trap 48				R543-063
11:09:49 Jul 04 '00	1526	2	423901 6	508709	11:13 - bacterial trap 48				R543-064
11:15:59 Jul 04 '00	1526	344	42390 3	5087101	11:17 - MTR moving				R543-065
11:17:59 Jul 04 '00	1526	358	42388 8	508705 9	11:18 - DEPLOYING MTR's #3208 and #4101 into position in the vent "hole" at Mkr-N6/Mkr-21. Cloud Vent, 423904, 5087110				
11:21:59 Jul 04 '00	1526	328	42390 4	508709 6	11:23 - grabbing bacterial trap #48 and #47 for deployment.				
11:24:19 Jul 04 '00	1526	328	42389 6	5087116	11:26 - taking bacterial traps to Mkr-N4, a couple metres north-north-west of our position.				
11:25:39 Jul 04 '00	1526	329	42390 2	508709 5	11:27 - Mkr-N4 has been spotted.				
11:32:21 Jul 04 '00	1525	243	42388 9	5087114	Good fix X=423893 Y=5087120 at 11:33 for Mkr-N4.				
11:33:01 Jul 04 '00	1525	258	42389 3	5087120	11:34 - placement of bac traps in the hole at Mkr-N4				R543-066
11:34:21 Jul 04 '00	1525	259	423881 3	508707 3	11:36 - DEPLOYED bacterial traps #47 and 48 into hole at Mkr-N4.				
11:36:31 Jul 04 '00	1525	259	42387 8	508704 7	1139 - bactraps in place at N4				R543-067
11:36:41 Jul 04 '00	1525	259	42387 8	508704 7	11:38 - Suction sample at Mkr-N4. Bacterial floc (MAT) being sampled, some bio probably in there too. (ROCK subsample). Cloud Mkr-N4 x=423896 y=5087119	R543-SS-J4 -0016	Moyer	J Chadwi ck	
11:42:31 Jul 04 '00	1524	258	42386 3	5087178	11:23 - suction sample at N4 where two bactraps were placed. Sucking bacterial floc. Lots of scale worms in here too.				R543-068
11:42:51 Jul 04 '00	1525	260	42386 3	5087178	11:45 - Suction sample hit the motherload!! See frame grab.				
11:44:21 Jul 04 '00	1525	259	42388 9	5087115	11:47 - DEPLOYING MTR 4001 beside bacterial traps #47 and #48, at Mkr-N4 Cloud Vent. 423896, 5087119				
11:47:31 Jul 04 '00	1525	260	42388 0	5087138	11:51 - MTR4001 deployed at N4 just next to bactraps 47 and 48. Cloud Mkr-N4		Moyer / Embley		R543-069
11:47:51 Jul 04 '00	1525	261	42388 9	5087112	11:52 - transit back to elevator at Mkr-33 .				
11:57:43 Jul 04 '00	1523	225	42385 5	5087111	11:59 - at Mkr-33, picking up portabox H and E.				
12:01:11 Jul 04 '00	1523	246	42385 5	5087111	12:02 - have spotted larva traps that have fallen out.				
12:02:31 Jul 04 '00	1521	267	42384 6	508707 2	12:03 - drove north and slightly west from elevator X=423847 Y=5087111. DEPLOYMENT position is for larva traps #3 & #4. Larva trap #3 had the lid off on the floor.				
12:04:11 Jul 04 '00	1524	241	42382 9	5087122	12:05 - Larval tubes found that were lost going down in ROPOS arm.				R543-070
12:06:01 Jul 04 '00	1521	345	42383 6	508707 4	12:07 - moving ship so that stern is over Nascent vent.				
12:08:01 Jul 04 '00	1518	50	42387 2	5087116	12:09 - basalt overhang on the way to Nascent.				R543-071
12:13:21 Jul 04 '00	1519	9	42387 6	5087107	12:13 - crabs while en route to Nascent				R543-072
12:14:11 Jul 04 '00	1519	8	42386 9	5087120	12:14 - en route to nascent vent seeing lots of spider crabs.				
12:14:41 Jul 04 '00	1519	8	423881 5087182	5087182	12:17 - crabs mating(?) en route to Nascent				R543-073
12:15:01 Jul 04 '00	1519	8	423881 5087182	5087182	12:15 - six spider crabs all congregated together. Highlights have started. X=423884 Y=5087192 was a good fix from nav.				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R543	Samples	PI	Sub Smps	Fr Grb#
12:15:11 Jul 04 '00	1519	5	423881	5087182	12:17 - 6+ crabs en route to Nascent				R543-074
12:15:11 Jul 04 '00	1519	5	423881	5087182	same group of crabs				R543-075
12:15:21 Jul 04 '00	1519	5	423879	5087189	crabs				R543-076
12:15:21 Jul 04 '00	1519	5	423879	5087189	le crabs				R543-077
12:15:31 Jul 04 '00	1518	8	423879	5087189	and crabs				R543-078
12:15:41 Jul 04 '00	1519	5	423862	5087222	12:17 - transit to Nascent. crabs				R543-079
12:18:51 Jul 04 '00	1520	5	423866	5087246	12:20 - highlights off.				
12:27:11 Jul 04 '00	1520	16	423899	5087331	12:29 - approximately 20m from nascent vent.				
12:30:51 Jul 04 '00	1518	65	423900	5087370	12:31 - NeMO net camera is sight. MTR as well.				
12:30:51 Jul 04 '00	1518	65	423900	5087370	12:31 - NemoNet '99 camera at Nascent.				R543-080
12:32:41 Jul 04 '00	1520	30	423905	5087375	12:33 - overall view of Nascent and tube worms.				R543-081
12:33:53 Jul 04 '00	1520	29	424726	5087118	12:34 - NemoNet camera at Nascent.				R543-082
12:33:53 Jul 04 '00	1520	29	424726	5087118	12:34 - moving to get TWG.				
12:35:53 Jul 04 '00	1520	333	423908	5087386	12:37- crab and tubeys keeping nemonet company.				R543-083
12:38:03 Jul 04 '00	1520	322	423897	5087399	12:39 - dropping portabox E so that ROPOS can pick up MTR.				
12:39:13 Jul 04 '00	1520	314	423890	5087395	12:40 - Nascent target-> X=423905 Y=5087387 which has changed from the last years target - Old target moved 10 meters.				
12:39:23 Jul 04 '00	1520	312	423890	5087395					R543-084
12:39:33 Jul 04 '00	1520	312	423890	5087395					R543-085
12:39:33 Jul 04 '00	1520	312	423890	5087395	Tube worm clump and MTR at Nascent in front of NeMO Net '99 Camera.				R543-086
12:42:43 Jul 04 '00	1520	303	423891	5087393					R543-087
12:48:23 Jul 04 '00	1520	336	424275	5086687	12:50 - DEPLOYING Mkr-M at location of MTR 3175, Nascent Vent.				
12:50:19 Jul 04 '00	1520	336	424275	5086687	12:51 - RECOVERING MTR 3175 and putting it into biobox. Nascent Vent, 423905, 5087387	R543-MTR-0017	Embley		
12:55:11 Jul 04 '00	1520	313	423895	5087392	12:58 - worm grab at Nascent.				R543-088
12:55:21 Jul 04 '00	1520	313	423895	5087391	12:58 - Tube worm grab at Nascent placed in portabox. (Nascent)	R543-TWG-0018	Tunncliff / Marcus	Juniper	
12:57:21 Jul 04 '00	1520	311	423910	5087382	13:00 - 2ND GRAB On same pile. Notice long worms underneath.				R543-089
12:59:51 Jul 04 '00	1520	311	423892	5087396	13:03 - stuffing tube worms into portabox.				
13:00:21 Jul 04 '00	1520	314	423892	5087396	13:04 - Frame grab of portabox replete with tubeworms.				R543-090
13:11:01 Jul 04 '00	1520	326	423895	5087394	13:12 - some of the tube worms were knocked out of the portabox. Went back for another TWG to fill box back up.				
13:17:53 Jul 04 '00	1519	323	423891	5087390	13:21 - portabox closed.				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R543	Samples	PI	Sub Smps	Fr Grb#
13:21:53 Jul 04 '00	1520	321	42389 5	508740 0	DEPLOYING MTR-3287 where old MTR-3175 was recovered earlier. Nascent Vent, 423905, 5087387				
13:31:33 Jul 04 '00	1519	12	42398 2	508752 2	13:32 - heading towards Mkr-N41, approximately 40m away, north-north-east.				
13:43:05 Jul 04 '00	1518	345	42393 8	508742 7	13:44 - spotted Mkr-N41 across a fissure.				
13:43:55 Jul 04 '00	1517	266	42393 8	508742 7	13:44 - ARRIVAL at Mkr N41				R543-091
13:44:45 Jul 04 '00	1518	326	42393 8	508742 7	13:45 - mats at Mkr-N41				R543-092
13:45:25 Jul 04 '00	1519	336	42393 8	508742 7	13:45 - mats at Mkr-N41				R543-093
13:45:35 Jul 04 '00	1518	311	42393 8	508742 7	13:45 - mats at Mkr-N41				R543-094
13:51:25 Jul 04 '00	1519	338	42397 0	508750 4	13:52 - ROPOS is manipulating portabox E for sample recovery.				
13:54:45 Jul 04 '00	1519	290	42387 3	508736 3	13:56 - worm grab at Mkr-N41				R543-095
13:55:35 Jul 04 '00	1518	296	42392 8	508743 2	13:57 - worm grab at Mkr-N41				R543-096
13:55:55 Jul 04 '00	1519	290	42392 8	508743 2	13:57 - Tube worm grab at Mkr-N41, near Nascent Vent x=423922 y=5087428 z=1520	R543-TWG-0019	Tunnclif fe / Marcus	Juniper	
14:00:35 Jul 04 '00	1518	283	42388 6	508740 6	14:01 - 2bd worm grab from Mkr-N41				R543-097
14:05:25 Jul 04 '00	1519	269	42390 6	508738 5	14:07- portabox closed				
14:06:15 Jul 04 '00	1519	270	42390 6	508738 5	14:09 - RECOVERY of MTR-3041 at Mkr-N41. z=1520	R543-MTR-0020	Embley		
14:09:55 Jul 04 '00	1519	14	42392 6	5087417	14:10 - DEPLOYED MTR-3334 at Mkr-N41 is location of recovered MTR-3041.				
14:12:07 Jul 04 '00	1519	326	42392 6	5087417	14:13 - previously dropped biobox back in the grip of ROPOS, now moving ship back to elevator.				
14:33:07 Jul 04 '00	1517	166	42390 0	5087165	14:35 - elevator in sight of ROPOS				
14:44:19 Jul 04 '00	1519	35	42384 4	5087061	14:45 - crab attempting to steal our yummy worm catch.				R543-098
14:45:19 Jul 04 '00	1522	64	42384 4	508706 3	14:46 - putting first portabox in the elevator.				
14:49:19 Jul 04 '00	1519	83	42383 9	5087140	14:51 - Retrieving Time Lapse Camera at Mkr-33, after its one year deployment. (BIO - animals on frame to Juniper)	R543-TLC-0021	Tunnclif fe	Juniper	
14:53:10 Jul 04 '00	1522	105	42385 3	508707 2	14:55 - bac mat on Time Lapse Camera at Mkr-33.				R543-099
14:53:40 Jul 04 '00	1522	104	42385 3	508707 2	14:55 - coming off the bottom; headed toward the cage. End of dive.				
15:13:02 Jul 04 '00	1199	21	42384 7	508706 8	1605 - ROPOS on deck, with the TLC in tow.				
15:13:02 Jul 04 '00	1199	21	42384 7	508706 8	1604 - ROPOS on deck. Tried to acoustically release the elevator but after one hour gave up. Will release with ROPOS tomorrow when return to this site.				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R543	Samples	PI	Sub Smps	Fr Grb#
					<p>R543 Dive Summary: Mkr 33-Deployed 3 MTR's, 2 bactraps, 4 larval tubes (positioned 1 and 2). Recovered 3 osmos 2 bactraps, '99 Time Lapse Camera. Samples: 4 ss, 1 twg, 1gtb. Cloud (N4 and N6/21)-Deployed 2 bactraps, 3 MTR's, and Mkr-21. Recovered VEMCO and MTR. Samples: 2 ss, 1 gtb. Nascent-Deployed Mkr-M, 1 MTR. Recovered 1 MTR. Sample: 1 twg. Mkr-N41-Deployed 1 MTR. Recovered 1 MTR. Sample: 1 twg.</p>				

R544

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R544	Samples	PI	Sub Smps	Fr Grb#
					Automated Logging System not giving accurate information!! All auto time, heading, depth and utm position information inaccurate! CORRECT TIME AND POSITION ENTRIES ARE FOUND IN COMMENTS COLUMN. As always, positions in utm x/y columns are automated and not flagged for accuracy. Consult dive maps for final position data.				
					Tasks: ASHES: Suction samples, gtb's, bactrps, sulfide worm observations, spider probes. Transit to Mkr-33 and deploy larval tubes. Release elevator near Mkr-33 at end of dive.	Bottom time: JD187(7/5) 0705-1422, 1647-1732			
					0537 - Lifting off. ROPOS in the water at 0542.				
					0658 - ROPOS leaving the cage at 1500m				
					0702 - On the bottom Depth 1544 m				
07:04:17 Jul 05 '00	1543	271	421403	5087131	0704 - Moving the seven function arm out of the way.				
07:04:37 Jul 05 '00	1546	269	421403	5087131	Approaching a crab and rat tail here at ASHES.				
07:05:37 Jul 05 '00	1546	276	421403	5087131	0706 - Checking out the white crab with reddish legs.				
07:06:47 Jul 05 '00	1546	268	421403	5087131	0706 - crab upon arrival at Ashes.				R544-001
07:07:17 Jul 05 '00	1546	269	421403	5087131	Trying to get to Phoenix/Hillock.				
07:11:33 Jul 05 '00	1546	189	421403	5087131	0711 - Clumps of tube worms, sponges, a crab, not near a vent, though.				
07:12:21 Jul 05 '00	1545	195	421403	5087131	0712 - Looks like we've spotted Phoenix... or Hell. Let's see.				
07:12:33 Jul 05 '00	1545	267	421403	5087131	0712 - approach to Hell				R544-002
07:12:57 Jul 05 '00	1545	133	421403	5087131	0713 - Nope, it's Hell. Looks very beautiful, still a hot smoker at the top, covered in tube worms, white stuff.				
07:13:45 Jul 05 '00	1545	137	421403	5087131	07:14 - baffles covered with worms at Hell.				R544-003
07:13:57 Jul 05 '00	1546	142	421403	5087131	0713 - Photo 1 of Hell tube worms				
07:14:57 Jul 05 '00	1545	167	421403	5087131	0715 - We're investigating Hell to check things out. Photo 2 of tube worms.				
07:17:21 Jul 05 '00	1544	219	421403	5087131	0718 - Fiddling around to see if we could sit here to use the spider probe if neccessary				
07:18:21 Jul 05 '00	1545	201	421403	5087131	0720 - Looking at scale worms, tube worms, sulfide, and palm worms at Hell. Photo 3 of this.				
07:18:45 Jul 05 '00	1544	205	421403	5087131	0720 - observing worms at Hell				R544-004
07:20:45 Jul 05 '00	1545	201	421403	5087131	0722 - Cool shimmery flow pooling up under a ledge				
07:20:45 Jul 05 '00	1545	201	421403	5087131	0722 - lower portion of flange providing flow to worms in previous pic				R544-005
07:22:09 Jul 05 '00	1545	201	421403	5087131	0724- Looking at sulfide worms				
07:24:57 Jul 05 '00	1545	201	421402	508708 7	Photo 4 of sulfide worms at Hell				
07:25:45 Jul 05 '00	1545	201	421402	508708 7	0726 - Sitting at Hell observing at a group of sulfide worms . Kim's beta cam tape on- he wants to call it Hell1 .				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R544	Samples	PI	Sub Smps	Fr Grb#
07:26:09 Jul 05 '00	1545	201	421402	508708 7	0726 - begin observe at Hell1.				R544-006
07:42:23 Jul 05 '00	1545	201	421403	5087129	0742 - Zooming away from those and going to observe at Hell2. There are sulfide, tube, scale, and palm worms.				
07:44:47 Jul 05 '00	1545	201	421403	5087129	07:46 - Starting observation of Hell2.				R544-007
07:54:25 Jul 05 '00	1545	200	421403	5087129	0757 - Zooming in on one particularly large formerly sleeping sulfide worm emerging from his tube.				
08:02:37 Jul 05 '00	1546	201	421403	5087129	0806 - Zooming around to find someplace else to look... still at Hell2 doing individual portraits.				
08:16:13 Jul 05 '00	1546	198	421403	5087129	0817 - Trying to position ourselves to spider Hell1				
08:20:49 Jul 05 '00	1546	199	421359	5087147	0822 - Still trying to manipulate spider probe at Hell1. We sort of just hit it... oops.				
08:28:01 Jul 05 '00	1546	198	423691	508706 6	0829 - Going to try to spider Hell2 because we can't spider Hell 1 without moving the sub which messes up scale.				
08:31:13 Jul 05 '00	1546	199	421366	5087133	spider at Hell2				R544-008
08:31:37 Jul 05 '00	1546	200	421367	5087133	0833 - Part of spider probe is in at Hell2 Logging temperature for 5 minutes or so				
08:35:25 Jul 05 '00	1546	200	421355	5087156	pullback shot of spider at Hell2				R544-009
08:36:01 Jul 05 '00	1546	200	421358	5087133	0837 - Spider Log at Hell2 is Spider01.log. It's doing something funny- jumping then flatlining, so we're moving it.				
08:45:49 Jul 05 '00	1546	200	421354	5087117	0847 - Just completed spider02.log at Hell2. Max temperature was about 34 degrees or so.				
08:46:25 Jul 05 '00	1546	200	421354	5087117	a slightly different position				R544-010
08:47:25 Jul 05 '00	1546	199	421354	5087117	0849 - Going to try to maneuver sub to get better position for temperature measurement at Hell1.				
08:48:25 Jul 05 '00	1546	199	421354	5087117	0850 - Photos 5 and 6 of Hell				
08:52:49 Jul 05 '00	1545	197	421371	5087135	0853 - Maneuvering about Hell1 to position spider probe.				
08:59:37 Jul 05 '00	1545	198	421371	5087135	0901 - Just completed spider at Hell 1 into files spider03.log and spider03a.log. Max temp was 60 C, but saw mostly around 30.				
09:01:49 Jul 05 '00	1545	198	421371	5087135	0903 - Going to try to suction at Hell1.				
09:05:01 Jul 05 '00	1546	174	421371	5087135	0907 - Still trying position vehicle to suction at Hell1.				
09:07:01 Jul 05 '00	1546	163	421371	5087135	0909 - Preparing to suction water and particulates over Hell1 in to Bottle J1.				
09:08:37 Jul 05 '00	1546	160	421371	5087135	Suction sample of WATER and PARTICULATES over Hell, at a little ledge of Hell we're calling Hell1, into Jar J1. Suction began at 0917, ended at 0926 z=1544 x=421372, y=5087135	R544-SS-J1 -0001	Juniper		
09:17:13 Jul 05 '00	1546	126	421371	5087135	0918 - As we suction over Hell 1, the thermistors of the suction sampler are showing no temperature above ambient.				
09:18:37 Jul 05 '00	1546	126	421371	5087135	9:18 - suction sample on Hell1.				R544-011
09:23:31 Jul 05 '00	1546	126	421371	5087135	0926 - Preparing to suction worms from Hell1 into jar J2.				
09:24:01 Jul 05 '00	1546	132	421371	5087135	Suction sample of worms (BIO) at Hell1 into Jar2. Suction began at 0927 ends 0934. z=1544	R544-SS-J2 -0002	Juniper		
09:25:01 Jul 05 '00	1546	138	421371	5087135	suction sample at Hell1				R544-012

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R544	Samples	PI	Sub Smps	Fr Grb#
09:33:01 Jul 05 '00	1546	133	421361	5087130	0933 - Thermistors in suction sampler appear to be working again. Max we've seen is 4 C.				
09:34:31 Jul 05 '00	1546	135	421359	5087134	0935 - Flushing jar...				
09:36:17 Jul 05 '00	1546	135	421366	5087132	0937 Going to try to get a flange with worms on it from Hell2				
09:37:03 Jul 05 '00	1546	135	421366	5087132	0938 - Opening the biobox and then gently ramming into the flange called Hell 2 in the hopes that it will drop into the biobox.				
09:39:03 Jul 05 '00	1546	135	421368	5087132	0941 - Subs moving about- they moved away from the attempted ram.				
09:39:47 Jul 05 '00	1546	168	421368	5087132	0941 - Trying again to do the ram into the biobox at Hell2.				
09:42:17 Jul 05 '00	1545	181	42204 3	508940 2	0944 - We're properly under the ledge- getting ready to put it in the biobox, port side.				
09:43:03 Jul 05 '00	1545	179	421369	5087133	Piece/rubble of a flange with worms and such on it from Hell2 into port side of biobox taken at 0945 z=1544 x=421372 y=5087135.	R544-RK-00 03	Juniper		
09:45:33 Jul 05 '00	1545	185	421369	5087133	0948 - Looking for Porkchop now.				
09:51:19 Jul 05 '00	1546	78	421367	5087133	0955 - We have found what we will call New Porkchop.				
09:51:49 Jul 05 '00	1547	86	421367	5087133	New pork chop unsure whether it is THE Porkchop.				R544-013
09:52:49 Jul 05 '00	1547	87	421984	508937 9	0957 - Going around Hell the other way to clear the tether. Settling back down at New Porkchop which is at the base of Hell.				
09:59:35 Jul 05 '00	1547	357	421362	5087130	1000 - Settled down in front of New Porkchop to observe sulfide worms.				
10:01:49 Jul 05 '00	1548	2	421370	5087128	1002 - Beginning observations of New Porkchop1 sulfide worms on Beta Cam (Hell)				
10:11:35 Jul 05 '00	1548	3	421368	5087130	1013 - Photo 8 of sulfide worms at New Porkchop				
10:13:21 Jul 05 '00	1548	3	42203 7	5089401	1015 - Looking around for a different group of worms to look at. Starting New Porkchop2 at 1015.				
10:27:51 Jul 05 '00	1548	3	421368	5087131	1032 - Starting New Porkchop3 looking at worms. (Hell).				
10:28:07 Jul 05 '00	1548	3	421370	5087127	starting new Porkchop3				R544-014
10:38:37 Jul 05 '00	1548	3	421371	5087130	1039 - Ended New Pork Chop 3, max temp 43 C, ready for spider at New Porkcop1.				
10:41:23 Jul 05 '00	1548	3	421370	5087128	1042 - Trying to position spider probe for New Porkchop1.				
10:43:09 Jul 05 '00	1548	7	421370	5087128	1043 - spider probe on new porkchop3				R544-015
10:44:23 Jul 05 '00	1548	7	421364	5087133	10:44 - spider probe on porkchop3				R544-016
10:45:39 Jul 05 '00	1548	6	421371	5087135	1048 - Logged spider into file spider04.log for New Porkchop1.				
10:46:09 Jul 05 '00	1548	7	422012	508938 5	1048 - Positioning for New Porkchop2 spider probe				
10:52:39 Jul 05 '00	1548	7	422127	508760 9	10:53 - spider log completed and filed as spider005.				
10:54:25 Jul 05 '00	1547	354	421369	5087130	10:55 - still photo #9 taken.				
10:57:25 Jul 05 '00	1547	16	421909	508483 4	10:59 - about to start SS.				
11:05:55 Jul 05 '00	1548	347	421372	5087135	11:09 - Taking suction sample (SUSPENDEd PARTICULATES) for 5 minutes at this point into jar 3. New Porkchop at Hell. time 1059 - 1105, z=1544 x=421372, y=5087135.	R544-SS-J3 -0004	Juniper		

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R544	Samples	PI	Sub Smps	Fr Grb#
11:10:25 Jul 05 '00	1548	347	421372	5087135	11:15 - flushed sample jar #3 with vent fluid.				
11:14:11 Jul 05 '00	1548	345	421372	5087135	11:19 thru 11:20? - suction sample (SULFIDE WORMS - BIO) taken from another focused site of venting at New Porkchop 1&3 . z=1544 (Hell Vent)	R544-SS-J4-0005	Juniper		
11:16:27 Jul 05 '00	1548	347	421368	5087125	11:21 - getting ready to take another SS.				
11:17:41 Jul 05 '00	1548	347	421368	5087125	11:22-11:29 - New Porkchop2 . Suction Sample (SULFIDE WORM - BIO). z=1544 (Hell Vent)	R544-SS-J5-0006	Juniper		
11:23:11 Jul 05 '00	1548	347	42340 0	508923 2	11:29 - suction sample stopped.				
11:32:27 Jul 05 '00	1547	348	423214	508934 0	11:33 - ROPOS is attempting to "push" some sample from the penthouse of New Porkchop into biobox.				
11:36:27 Jul 05 '00	1547	347	423214	508934 0	11:38 - arm has picked up piece of vent chimney (SULFIDE). New Porkchop - at the top. z=1544 (Hell Vent)	R544-SF-0007	Juniper		
11:37:27 Jul 05 '00	1547	7	423214	508934 0	11:39 - still photo 10, 11, 12 taken				
11:38:13 Jul 05 '00	1547	7	423214	508934 0	11:40 - moving over to Phoenix.				
11:44:59 Jul 05 '00	1547	146	42365 2	508704 3	At 11:41, went into GPS mode.				
11:49:45 Jul 05 '00	1548	205	42365 2	508704 3	Back into relay mode at 11:50.				
11:58:01 Jul 05 '00	1547	288	421394	5087131	12:00 - no suitable sites at Phoenix for sampling and now heading for Mushroom.				
12:01:15 Jul 05 '00	1546	254	421392	5087126	12:04 - driving past inferno-lots of instrumentation.				
12:04:31 Jul 05 '00	1543	46	421526	508699 7	12:08 - looking for a suitable site to sample at mushroom.				
12:11:17 Jul 05 '00	1546	301	42348 3	5087051	11:15 - still trying to get good position on mushroom to sample.				
12:11:47 Jul 05 '00	1546	297	42348 3	5087051	12:16 - starting video recording of mushroom.				
12:17:47 Jul 05 '00	1545	307	421953	5086716	12:18 - thrusters are interfering with video recording, trying another location.				
12:20:17 Jul 05 '00	1546	267	421401	5087170	11:22 - Mushroom				R544-017
12:20:47 Jul 05 '00	1545	263	421931	508672 8	11:22 - Mushroom. Paralvinella sulfincola				R544-018
12:20:47 Jul 05 '00	1545	263	421931	508672 8	12:22 - mushroom video 1 being taken, this time with no thruster interference.				
12:25:47 Jul 05 '00	1545	254	421931	508672 8	12:28 - ship has lost GPS, ship has gone off position.				
12:30:33 Jul 05 '00	1545	74	421398	5087168	12:31 - Mushroom				R544-019
12:31:03 Jul 05 '00	1545	13	42033 4	508377 3	12:32 - Mushroom				R544-020
12:31:19 Jul 05 '00	1545	330	42033 4	508377 3	12:33 - Mushroom				R544-021
12:31:33 Jul 05 '00	1544	272	42033 4	508377 3	12:34 - Mushroom				R544-022
12:34:33 Jul 05 '00	1545	268	421405	5087167	12:36 -recording worm observations at Mushroom2 .				
12:36:35 Jul 05 '00	1545	250	421405	5087167	12:39 - Mushroom2. Paralvinella sulfincola				R544-023
12:46:05 Jul 05 '00	1545	248	421398	5087173	12:47 - end video recording, about to start spider 006 recording.				
12:47:05 Jul 05 '00	1545	249	421398	5087173	12:49 - spider probe at Mushroom.				R544-024

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R544	Samples	PI	Sub Smps	Fr Grb#
12:55:21 Jul 05 '00	1545	250	421403	5087170	12:58 - spider became too hot and had to stop recording. Logged at spider006. Will try again and be logged at spider007.				
13:10:37 Jul 05 '00	1545	261	421399	5087168	13:12 - logging of spider probe stopped, filed as spider007.				
13:11:07 Jul 05 '00	1545	263	421399	5087168	13:13-13:21 Suction Sample (SULFIDE WORM - BIO) into jar #6 where spider probe was taken. Mushroom2. z=1548 x=421405 y=5087167	R544-SS-J6-0008	Juniper		
13:17:37 Jul 05 '00	1545	238	421401	5087172	flushing suction sampler.				
13:21:53 Jul 05 '00	1545	235	421404	5087164	13:26 - Craig's bacterial traps have been spotted, now retrieving them.				
13:24:39 Jul 05 '00	1546	202	421402	5087169	13:30 - RECOVER bacterial trap (29, 30, 31?) which are heavily encrusted with organisms. Mushroom, z=1548	R544-BT-0009	Craig Moyer		
13:26:23 Jul 05 '00	1546	28	423350	5086809	13:32 - RECOVER 2 of 3 bacterial traps here at Mushroom, z=1548	R544-BT-0010	Craig Moyer		
13:35:55 Jul 05 '00	1547	30	421401	5087171	13:34 - RECOVER bacterial trap 3 of 3. Mushroom, z=1548. 13:36 - frame grab -Craig's bacterial traps with loads 'o organisms encrusted.	R544-BT-0011	Craig Moyer		R544-025
13:40:39 Jul 05 '00	1547	28	422271	5089422	13:43 - took two gas tight bottles (GTB) at spider probe location. Mushroom z=1548 x=421405 y=5087167	R544-GTB-0012 R544-GTB-0013	Evans,	Butterfield/Lilly	
13:51:25 Jul 05 '00	1546	66	421399	5087170	13:55 - Start of video for more mushroom footage of the worms.				
13:56:57 Jul 05 '00	1546	83	421387	5087179	14:02 - betacam on.				
14:10:27 Jul 05 '00	1546	83	421393	5087174	14:12 - end of spider probe at Mushroom. Logged as spider009.				
14:11:27 Jul 05 '00	1546	84	421393	5087174	14:13-14:21 Suction Sample (SULFIDE WORM - BIO) in location of spider probe data. z=1548 (Mushroom)	R544-SS-J7-0014	Kim Juniper		
14:15:43 Jul 05 '00	1546	97	421429	5087168	14:18 - Betacam has been turned off..approximately 2 minutes ago.				
14:18:13 Jul 05 '00	1546	101	421398	5087175	14:22 - end of first part of dive (ASHES area), heading towards cage and transit to Mkr-33 .				
14:58:03 Jul 05 '00	1395	68	421705	5087102	14:30 - ship left for elevator position 2450 meters from where we are.				
14:58:49 Jul 05 '00	1395	53	421739	5087097	15:09 - X=421960, Y=5087091 good ROPOS fix (transit)				
15:07:05 Jul 05 '00	1391	72	421876	5087094	15:19 - x=422191 y=5087085 Good ROPOS fix (transit)				
15:14:51 Jul 05 '00	1390	77	422078	5087085	15:29 - gelatinous animal (larvacean)				R544-026
16:00:55 Jul 05 '00	1389	94	423106	5087066	16:23 - x=423627 y=5087079 good ROPOS fix z=1452 (transit)				
16:02:09 Jul 05 '00	1389	83	423164	5087056	16:24 - ROPOS heading down towards the bottom.				
16:10:39 Jul 05 '00	1391	76	423367	5087073	16:34 - x=423832, y=5087107 ROPOS fix, near the elevator z=1458				
16:17:41 Jul 05 '00	1391	98	423516	5087076	16:43 - Headed to the bottom				
16:20:41 Jul 05 '00	1431	89	423566	5087079	16:47 - ROPOS at the bottom z=1521				
16:21:41 Jul 05 '00	1449	81	423590	5087077	16:48 - Photo #15 taken				
16:23:57 Jul 05 '00	1454	85	423385	5086887	16:50 - photo #16 taken				
16:24:27 Jul 05 '00	1459	84	423649	5087065	16:51 - Photo #17 taken				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R544	Samples	PI	Sub Smps	Fr Grb#
16:26:11 Jul 05 '00	1455	79	42367 9	508706 6	16:53 - Near Mkr-33, elevator in sight.				
16:55:13 Jul 05 '00	1522	27	42385 8	508709 2	16:55 - Photo #18 taken				
16:55:59 Jul 05 '00	1520	67	42384 4	508705 6	16:56 - Photo #19 taken				
16:58:15 Jul 05 '00	1522	23	42385 2	5087132	16:59 - At larval tubes, and let go of spider probe in order to uncap larval trap #4.				
16:59:59 Jul 05 '00	1522	27	42384 5	5087119	17:01 - Uncapped larval trap #4				
17:00:29 Jul 05 '00	1522	28	42385 3	5087101	17:02 - Photo #20 taken				
17:02:15 Jul 05 '00	1522	27	42384 5	5087123	17:03 - Spider probe and larval trap lids NW of Mkr-33.				R544-027
17:05:15 Jul 05 '00	1522	27	42385 2	5087108	17:08 - If elevator had been released on the last dive (if the acoustic release had worked), it would have been caught anyway.				
17:06:15 Jul 05 '00	1522	280	42385 3	5087101	17:08 - Video being turned on now (WHOOPS).				
17:07:45 Jul 05 '00	1518	92	42385 2	5087114	17:10 - Released the elevator drop line.				
17:11:15 Jul 05 '00	1517	67	42360 6	5086931	17:14 - Making sure elevator won't hit cage on the way up.				
17:12:31 Jul 05 '00	1521	117	42385 4	5087114	17:17 Stopping acoustic nav, so that elevator can be tracked to the surface. GPS mode only.				
17:23:01 Jul 05 '00	1522	55	423841 0	508706 0	17:28 Release of elevator imminent.				
17:24:01 Jul 05 '00	1522	55	423841 0	508706 0	17:30 ROPOS releasing Elevator near of Mkr-33.				R544-028
17:24:47 Jul 05 '00	1522	55	423841 0	508706 0	17:30 Elevator released. Headed back to the cage.				
17:25:47 Jul 05 '00	1522	59	423841 0	508706 0	17:32 ROPOS on its way up.				
17:29:03 Jul 05 '00	1521	49	423841 0	508706 0	17:35 ROPOS slides into the cage. Coming up.				
17:31:03 Jul 05 '00	1522	58	423841 0	508706 0	17:48 Elevator at 1000m				
17:31:03 Jul 05 '00	1522	58	423841 0	508706 0	18:22 elevator at surface; 18:25 elevator spotted; 18:30 ROPOS on deck.				
					<p>R544 Dive Summary: Hell (porkchop 1 & 2)-Samples: 5 ss, 1 rk, 1 sulfide flange. Sulfide worm observations and spider temp probe measurments. Mushroom-Recovered 3 bacraps. Samples: 3 ss, 2 gtb. Sulfide worm observations and spider temp probe measurments. Mkr-33-Position larval tubes 3 and 4. Elevator recovery near Mkr-33 (deployed on R543).</p>				

R545

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R545	Samples	PI	Sub Smps	Fr Grb#
					Automated Logging System not giving accurate information!! All auto time, heading, depth and utm position information inaccurate! CORRECT TIME AND POSITION ENTRIES ARE FOUND IN COMMENTS COLUMN. As always, positions in utm x/y columns are automated and not flagged for accuracy. Consult dive maps for final position data.				
					Tasks: Deploy larval tubes, Hobos, MTRs, bactraps. Recover bactraps, hobos. Suction sampling of sulfides, gtb's, McLane pump and more at ASHES Vent Field and the caldera wall.	Bottom time: JD188(7/6) 0610-1435			
					ROPOS in the water at 0519				
					05:23 'Tunncliffe tape' is on starting at ~85 meters				
06:08:48 Jul 06 '00	1525	326	421440	5087140	0610 - On bottom.				
06:10:08 Jul 06 '00	1539	334	421440	5087140	0611 - Start Embley tapes. At crack vent at ASHES where the column experiment was. Start Tunncliffe tapes too at 0613.				
06:13:48 Jul 06 '00	1545	44	421441	5087140	0615 - Photo #21 of ropy sheet flow lavas between Gollum and Crack Vents. NOTE: The counter for photos was just reset, so the next photo will be #1.				
06:14:08 Jul 06 '00	1545	6	421441	5087140	0617 - Milk crate with 4 larval traps put down on the seafloor, will come back to get them after we deploy bacteria traps at Gollum. Moving North to Gollum now.				
06:14:38 Jul 06 '00	1545	9	421441	5087140	The official larval tubes of major league baseball, deployed between Gollum and Crack Vents.				R545-001
06:19:30 Jul 06 '00	1544	4	421441	5087140	0620 Navigation is not working well. Photo 1, 2, 3 of Gollum and bacteria traps.				
06:19:50 Jul 06 '00	1543	15	421441	5087140	Gollum bacterial traps before recovery				R545-002
06:21:14 Jul 06 '00	1545	330	421441	5087140	0622 - Positioning to pick up bacteria trap 45 at Gollum. Photo 4 taken of bacteria trap 45 at Gollum.				
06:24:40 Jul 06 '00	1545	324	421441	5087140	0625 - RECOVERING bacteria trap 45, put into port side of biobox. Gollum x=421422 y=5087166 depth=1546m.	R545-BT-00 01	Moyer		
06:26:30 Jul 06 '00	1545	341	421441	5087140	bac trap 33 old position				R545-003
06:26:30 Jul 06 '00	1545	341	421441	5087140	0627 - Repositioning bacteria trap #33 at Gollum vent because it wasn't in the flow when deployed in 1998.				
06:28:40 Jul 06 '00	1545	311	421424	5087165	bac trap 33 new position				R545-004
06:30:10 Jul 06 '00	1545	301	421430	5087164	0630 - DEPLOYING MTR 3026 AT GOLLUM VENT.				
06:30:50 Jul 06 '00	1545	301	421430	5087164 add MTR 3026				R545-005
06:32:30 Jul 06 '00	1545	301	421408	5087169	0633 - DEPLOYING BACTERIA TRAP #50 AT GOLLUM VENT, right over the MTR (#3026).				
06:33:20 Jul 06 '00	1545	308	421416	5087165	adding new bac trap				R545-006
06:37:34 Jul 06 '00	1545	311	421401	5087187	0637 - Good video of Gollum vent. Tons of limpets covering tube worms with palm worms interspersed.				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R545	Samples	PI	Sub Smps	Fr Grb#
06:40:44 Jul 06 '00	1546	310	421221	508752 9	0641 - Positioning to take a suction sample of provannid snails on periphery of Gollum vent. Need to move the sub a bit to get a good angle for suction.				
06:43:34 Jul 06 '00	1546	299	421423	5087166	Start suction sample of provaniid snails (BIO) at 0646 into Jar#4. Stop suction at 0652. (Basalt chips sub sample). Gollum	R545-SS-J4-0002	Tunncliffe	J Chadwick	
06:46:36 Jul 06 '00	1545	299	421423	5087166	0647 - Very stark demarkation between clumps of limpets, tubeworms, palm worms etc. which live right in the flow versus the provaniids which live on the bare basalt on vent periphery.				
06:50:56 Jul 06 '00	1546	303	421403	5087184	0651 - Suctioning snails at Gollum .		Tunncliffe		R545-007
06:54:06 Jul 06 '00	1546	307	421422	5087166	0655 - Gollum site where we suctioned snails and deployed a trap.				R545-008
06:56:56 Jul 06 '00	1546	307	421422	5087166	0659 - Going back to the cage to wait for everything to settle out. Turned off Tunncliffe tape.				
07:00:26 Jul 06 '00	1531	199	421405	5087173	0701 -GPS is jumping around so we're having trouble figuring out where we are.				
07:03:46 Jul 06 '00	1493	285	421405	5087173	0705 - Turned the McLane pump on and it is currently pumping water for particles and larvae				
07:08:56 Jul 06 '00	1499	73	421405	5087173	0709 - Ship seems to have settled down, GPS is back, so we're going back down to find the larval columns near Crack.				
07:11:56 Jul 06 '00	1520	309	421411	5087111	0713 - Coming back down to the bottoms and looking for the column at Crack to then find the larval traps.				
07:12:46 Jul 06 '00	1530	309	421411	5087111	0714 - We're looking at Hillock/Phoenix .				
07:14:28 Jul 06 '00	1542	323	421411	5087111	0716 - We've found some clams, but most of them look dead. Also a sea cucumber.				
07:15:08 Jul 06 '00	1543	8	421411	5087111	dead clams at Phoenix				R545-009
07:15:28 Jul 06 '00	1543	58	421411	5087111	dead clams behind Phoenix				R545-010
07:17:18 Jul 06 '00	1546	74	421411	5087111	0719 - Still waiting for the ship to settle out- it seems to be moving back now.				
07:20:48 Jul 06 '00	1546	66	422166	508758 2	Holothuria at Phoenix				R545-011
07:20:58 Jul 06 '00	1546	66	422166	508758 2	0721 - Photo 5 of holothurian near the dead clams near Phoenix				
07:22:08 Jul 06 '00	1539	308	421411	5087111	0715 -The ship is drifting to the south, which is messing up our navigation and ability to maneuver.				
07:22:28 Jul 06 '00	1546	65	422166	508758 2	0723 - We're watching the hole on the holothurian...wow				
07:23:28 Jul 06 '00	1546	64	422166	508758 2	0724 - Enough of that fun- back to looking for the column and larval traps.				
07:24:58 Jul 06 '00	1545	37	422166	508758 2	0726 - We see an octopus! Photo #6, Highlights on.				
07:24:58 Jul 06 '00	1545	37	422166	508758 2	octopus on the way to Gollum.				R545-012
07:25:48 Jul 06 '00	1545	74	422166	508758 2	octopus				R545-013
07:26:18 Jul 06 '00	1545	89	422166	508758 2	0727 - Photo 7 Another picture of the octopus				
07:28:58 Jul 06 '00	1545	81	421404	5087133	0729 - We've found the Johnson column near Crack . We're going to recover the Vemco from here.				
07:30:08 Jul 06 '00	1545	55	421418	5087139	0730 - VEMCO into port biobox- it's not really in flow but surrounded by shimmery flow. (Deployed on an Alvin dive 3245 in 1998). Near Crack Vent x=421424 y=5087135.	R545-VEMCO-0003	Embley		

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R545	Samples	PI	Sub Smps	Fr Grb#
07:31:38 Jul 06 '00	1546	58	421418	5087145	0731 - Highlights off				
07:31:58 Jul 06 '00	1546	57	421418	5087145	0732 - Looking at Paul Johnson's cement block at Crack- seems to be shimmery flow coming through the hole where the column used to be, as well as flow around the base.				
07:33:38 Jul 06 '00	1546	58	421419	5087144	0734 - Now going to look for larval tubes				
07:34:08 Jul 06 '00	1546	58	421384	5087176	0735 - Photo #8 of Paul Johnson's Crack Vent column				
07:34:08 Jul 06 '00	1546	58	421384	5087176	Paul Johnson's biocolumn at crack vent				R545-014
07:34:28 Jul 06 '00	1546	57	421384	5087176	0735 - The larval tubes are in view. Tunnicliffe tape is on. We're getting acoustic navigation intermittently.				
07:35:18 Jul 06 '00	1546	58	421384	5087176	0738 - We are going to get one of the larval traps out of the milk crate to deploy it to the west.				
07:39:28 Jul 06 '00	1546	29	421420	5087136	Picking up larval tubes near Crack Vent.				R545-015
07:39:38 Jul 06 '00	1546	29	421420	5087136	0746 - Photo 9 of manipulating the milk crate with larval traps.				
07:41:00 Jul 06 '00	1546	29	421420	5087136	0741 - Larval tube 6 is out of the crate and on the seafloor.				
07:42:30 Jul 06 '00	1546	29	421384	5087181	0743 - Larval tube #8 is out of the milk crate and in the 7 function arm.				
07:43:30 Jul 06 '00	1546	27	421420	5087135	0744 - We are putting larval tube #8 from the seven function arm into the 5.				
07:44:00 Jul 06 '00	1546	28	421420	5087135	0745 - Now we're picking up larval tube #6 in the seven function arm.				
07:44:40 Jul 06 '00	1546	29	421458	5087094	0746 - Now we're heading west from just north of crack to find a place to deploy the traps.				
07:46:10 Jul 06 '00	1546	29	421444	5087182	0747 - Setting down west/northwest from crack column to deploy the traps.				
07:49:00 Jul 06 '00	1546	256	421420	5087135	0749 - Larval tube #6 fell over when we put it down-oops.				
07:50:10 Jul 06 '00	1546	258	421420	5087135	0750 - Photo #10 of larval tube being picked up.				
07:50:30 Jul 06 '00	1546	257	421417	5087138	0751 - Larval tube #6 fell out again and rolled into a group of tube worms that look dead.				
07:52:10 Jul 06 '00	1546	239	421383	5087172	0753 - Putting larval tube #8 into the other arm.				
07:54:10 Jul 06 '00	1546	270	421417	5087138	0755 - Trying to find a flat place for larval tube #8.				
07:59:00 Jul 06 '00	1546	271	421407	5087139	0759 - We're still trying to find a flat spot for larval tube #8.				
08:01:40 Jul 06 '00	1546	62	421410	5087140	0802 - Larval tube #8 DEPLOYED is now on a flat surface and we are going to take the cap off.				
08:02:30 Jul 06 '00	1546	45	421404	5087145	0803 - Fix for where we are putting the tube X 421406 Y5087138.				
08:03:30 Jul 06 '00	1546	45	421404	5087145	0804 - Removed the cap for #8, leaving it on the ground Photo #11 of Tube #8.				
08:04:20 Jul 06 '00	1546	47	421404	5087145	0806 - We're going to go pick up larval tube #6 to put it in place.				
08:07:40 Jul 06 '00	1545	238	421410	5087139	0808 - picking up Tube #6 (larval trap).				
08:07:40 Jul 06 '00	1545	238	421410	5087139	08:08 - near Crack. near bacterial trap #6.				R545-016
08:09:42 Jul 06 '00	1546	344	421401	5087134	0810 - We have successfully picked up larval tube #6, travelling back to the flat spot to deploy it.				
08:12:42 Jul 06 '00	1545	103	421410	5087145	0813 - Deploying tube #6 near #8. Changed out Embley tape.				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R545	Samples	PI	Sub Smps	Fr Grb#
08:13:32 Jul 06 '00	1546	30	421410	5087145	0815 - Larval tube DEPLOYING #6 is now on the bottom and we will remove the cap now.				
08:15:32 Jul 06 '00	1546	40	421377	5087181	0817 - Cap for tube #6 is out on the seafloor.				
08:15:52 Jul 06 '00	1546	40	421377	5087181	0817 - We are going back to the milk crate to get the other larval tubes.				
08:15:52 Jul 06 '00	1546	40	421377	5087181	08:18 - Larval tube #6 near Crack.				R545-017
08:19:22 Jul 06 '00	1546	137	421415	5087144	0819 - Fiddling with the larval tubes in the milk crate.				
08:21:42 Jul 06 '00	1546	135	421409	5087144	0822 - Larval tube #5 is being removed from the milk crate and DEPLOYED.				
08:24:12 Jul 06 '00	1546	136	421409	5087144	08:25 - larval tube #5 at Crack.				R545-018
08:27:42 Jul 06 '00	1546	103	421409	5087144	0828 - Removing larval tube #7 from milk crate now.				
08:31:02 Jul 06 '00	1546	229	421421	5087142	0832 - Larval tube #7 has been removed. Now placing the milk crate near the column at Crack.				
08:31:22 Jul 06 '00	1546	226	421421	5087142	08:32 - biocolumn box at crack.				R545-019
08:31:52 Jul 06 '00	1546	233	421421	5087142	0833 - Going back to uncap larval tube #5 and #7.				
08:33:12 Jul 06 '00	1546	207	421421	5087142	0834 - Good fix for larval tubes position x=421417 y=5087156, between Crack and Daves .				
08:33:32 Jul 06 '00	1546	207	421421	5087142	08:35 - larval tube #7 near Crack.				R545-020
08:33:52 Jul 06 '00	1544	308	421421	5087142	0835 - Removing larval tube cap #7.				
08:35:22 Jul 06 '00	1546	274	422146	508938 7	0837 - Now removing larval tube cap #5.				
08:38:34 Jul 06 '00	1546	184	421418	5087138	0838 - Larval tube cap #5 removed.				
08:38:34 Jul 06 '00	1546	184	421418	5087138	08:39 - larval tube #5 near Crack.				R545-021
08:39:24 Jul 06 '00	1546	183	421418	5087138	Photo #13 of the larval tube set up looking south.				
08:39:44 Jul 06 '00	1546	183	421418	5087138					R545-022
08:40:04 Jul 06 '00	1545	188	421418	5087138	08:40 - larval tubes near Crack.				R545-023
08:40:24 Jul 06 '00	1544	197	421418	5087138	0841 - Now we're going to go to Phoenix area to do microbial trap stuff.				
08:44:34 Jul 06 '00	1544	136	42207 4	508938 7	0845 - We think we're at Phoenix.				
08:46:44 Jul 06 '00	1545	243	421405	5087133	0849 - Photo 14 of Phoenix, which we are indeed at, although we're still looking for the bact traps.				
08:46:44 Jul 06 '00	1545	243	421405	5087133	08:49 - Phoenix				R545-024
08:50:24 Jul 06 '00	1546	327	421387	5087120	0850 - We're looking for Craig's traps now at Phoenix. I think we're at ROPOS now- yes, we've spotted the traps at ROPOS Vent.				
08:50:34 Jul 06 '00	1545	17	421387	5087120	08:51 - bactrap at ROPOS.				R545-025
08:50:54 Jul 06 '00	1546	302	421387	5087120	0851 - The traps are completely encrusted in worms, limpets, gunk, etc.				
08:51:14 Jul 06 '00	1546	249	421387	5087120	08:52 - bactrap at ROPOS.				R545-026
08:51:34 Jul 06 '00	1547	173	421387	5087120	08:52 - bactrap at ROPOS. When we lifted it up, two little octopi swam out from under it!				R545-027

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R545	Samples	PI	Sub Smps	Fr Grb#
08:51:54 Jul 06 '00	1547	170	421387	5087120	0852 - Bacterial trap #27 from ROPOS into port side of biobox. The traps are majorly covered in gunk and when we lifted it up, two little octopi swam out from under it! z=1547. ROPOS Vent	R545-BT-0004	Moyer		
08:53:44 Jul 06 '00	1547	167	421387	5087120	08:55 - bacstrap at ROPOS.				R545-028
08:56:04 Jul 06 '00	1547	167	421386	5087134	0856 - The line of this recovered trap is covered in feathery white microbial stuff.				
08:57:14 Jul 06 '00	1547	168	421386	5087134	0857 - We're searching for the other microbial trap here at ROPOS- where's the trap?				
08:57:44 Jul 06 '00	1547	162	421386	5087134	08:58 - ROPOS Vent				R545-029
08:57:54 Jul 06 '00	1547	165	421386	5087134	0858 - We've dug up another microbial trap- once again completely covered in white, worms, limpets, etc.				
08:57:54 Jul 06 '00	1547	165	421386	5087134	08:59 - ROPOS				R545-030
08:59:34 Jul 06 '00	1547	151	421381	5087126	0900 - We can't find the rope to this trap so we're going to just pick it up.				
09:00:24 Jul 06 '00	1547	147	421381	5087126	09:01 - bacstrap (?) at ROPOS				R545-031
09:00:44 Jul 06 '00	1547	148	421381	5087126	0901 - So I've decided that this isn't actually a trap, but we're putting it in the biobox anyway.				
09:01:14 Jul 06 '00	1547	147	421381	5087126	0902 - ROPOS Vent recovering bacterial trap #28 or a chunk of basalt with worms, limpets, anemones on it. Into the starboard side of the biobox (BIO, RK subsamples). ROPOS Vent x=421386, y=5087134.	R545-BT-0005	Moyer	Tunncliffe/ J Chadwick	
09:02:24 Jul 06 '00	1547	130	421381	5087126	We've seen white crabs that we don't normally see.				
09:05:16 Jul 06 '00	1548	191	421381	5087126	0905 - We're surveying ROPOS to find a place to put an MTR.				
09:05:28 Jul 06 '00	1547	1	421387	5087122	0932 - We are no longer going to search for the missing traps at Phoenix- they have been assimilated into the structure.				
09:05:46 Jul 06 '00	1548	190	421381	5087126	09:04 - ROPOS				R545-032
09:05:56 Jul 06 '00	1548	162	421381	5087126	09:06 - worms at ROPOS				R545-033
09:06:56 Jul 06 '00	1548	164	421381	5087126	0907 - We see lots of anemones, worms, limpets, diffuse flow, etc. Also looking for an area to slurp.				
09:08:36 Jul 06 '00	1547	168	421386	5087134	0909 - We're looking at worms, crabs, etc. Galatheids are the name of the crab we're seeing that we haven't seen there before. They are white and furry- very strange looking.				
09:08:36 Jul 06 '00	1547	168	421386	5087134	0909 - worms at ROPOS				R545-034
09:08:56 Jul 06 '00	1548	168	421386	5087134	0909 - galatheids at ROPOS				R545-035
09:10:46 Jul 06 '00	1548	168	421386	5087134	0910 - We're looking at a furry blob thing that looks like it might be an egg case or something of the crab? I don't know- maybe it's a tunicate? hmmm...Photo 15 of this site.				
09:10:56 Jul 06 '00	1548	167	421386	5087134	0909 - unknown organism at ROPOS vent.				R545-036
09:11:56 Jul 06 '00	1548	168	421386	5087134	0912 - Furry tube worm cases				
09:12:16 Jul 06 '00	1548	168	421386	5087134	0913 - We now think that furry thing is a closed up sea anemone				
09:13:26 Jul 06 '00	1548	167	421386	5087134	0914 - We're spinning around to look at Phoenix for Craig's missing traps				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R545	Samples	PI	Sub Smps	Fr Grb#
09:16:46 Jul 06 '00	1548	136	421379	5087125	0917 - Checking out the worms, limpets, anemones, and mat at Phoenix				
09:16:56 Jul 06 '00	1548	134	421379	5087125	09:17 - Phoenix				R545-037
09:19:16 Jul 06 '00	1547	67	421379	5087125	0920 - We're still checking out Phoenix				
09:20:26 Jul 06 '00	1547	33	421379	5087125	Photo 16 of Phoenix				
09:20:36 Jul 06 '00	1547	33	421372	5087113	09:22 - worms at Phoenix				R545-038
09:21:16 Jul 06 '00	1547	13	422005	5089383	09:22 - worms at Phoenix				R545-039
09:22:06 Jul 06 '00	1547	11	421382	5087121	0923 - We're preparing to suction mat into Jar 7				
09:23:16 Jul 06 '00	1547	12	421387	5087122	0924 - Beginning to Suction sample of BACTERIAL MAT at Phoenix into Jar #7 Ended suction at 0930 z=1544. Hillock/Phoenix x=421390 y=5087130	R545-SS-J7-0006	Moyer		
09:30:06 Jul 06 '00	1547	1	421387	5087122	0930 - We are done suctioning mat from Phoenix so are going back to ROPOS to deploy a bacterial trap and VEMCO.				
09:30:06 Jul 06 '00	1547	1	421387	5087122	09:30 - suction sample of mat at Phoenix (bottle #7).				R545-040
09:33:58 Jul 06 '00	1547	52	421369	5087123	0935 - We are going to suction this little mound of oxide next to Phoenix.				
09:34:28 Jul 06 '00	1547	49	421369	5087123	9:36 - taking a SS of Fe-oxide at Phoenix Vent.				R545-041
09:34:48 Jul 06 '00	1547	49	421369	5087123	0936 - Going to suction into Jar #1.				
09:35:18 Jul 06 '00	1547	53	421369	5087123	0937 - Suction sample of IRON OXIDE (FeO) into Jar #1 It's just a little beehive mound standing by itself; looks like it is laminated. Suction ended at 0940. Hillock/Phoenix.	R545-SS-J1-0007	Fortin		
09:38:18 Jul 06 '00	1548	98	421379	5087125	09:39 - suction sampler at the base of Phoenix.				R545-042
09:39:08 Jul 06 '00	1548	100	421379	5087125	09:40 - suction sampler at the base of Phoenix (bottle #J1).				R545-043
09:40:08 Jul 06 '00	1548	100	421379	5087125	09:41 - bottle #7 and 8. suction sample for #8 at the base of Phoenix.				R545-044
09:40:18 Jul 06 '00	1548	100	421379	5087125	0941 - Flush jar is full of Fe oxide stuff also				
09:40:58 Jul 06 '00	1548	100	421379	5087125	09:42 - post slurp FeO				R545-045
09:41:18 Jul 06 '00	1548	100	421379	5087125	0942 - Heading back to ROPOS vent to deploy a bacterial trap.				
09:42:58 Jul 06 '00	1547	207	421379	5087125	0944 - DEPLOYING bacterial trap #49 from starboard side of biobox to ROPOS vent.				
09:44:38 Jul 06 '00	1547	123	421379	5087125	09:46 - deploying Bacterial trap #49 at ROPOS				R545-046
09:46:18 Jul 06 '00	1547	122	421379	5087125	0948 - Bacterial trap #49 DEPLOYED at ROPOS Vent				
09:46:38 Jul 06 '00	1547	122	421379	5087125	09:49 - deploying bacterial trap #49 at ROPOS				R545-047
09:49:08 Jul 06 '00	1547	123	421386	5087134	0949 - Our heading here is 124 at ROPOS Vent looking at the trap.				
09:49:48 Jul 06 '00	1547	121	421386	5087134	0950 - DEPLOYING MTR 3201 at ROPOS Vent				
09:50:28 Jul 06 '00	1547	130	421386	5087134	09:51 - MTR near bacterial trap #49. ROPOS				R545-048
09:51:38 Jul 06 '00	1547	143	421074	5085854	09:52 - MTR near bacterial trap #49. ROPOS				R545-049
09:53:58 Jul 06 '00	1547	144	421386	5087134	0955 - Done positioning MTR 3201				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R545	Samples	PI	Sub Smps	Fr Grb#
09:58:08 Jul 06 '00	1547	139	421378	5087126	0958 - Photo #17 of microbial trap and MTR at ROPOS vent.				
09:58:30 Jul 06 '00	1547	137	421378	5087126	0958 - Going back east to Steve Mound.				
09:58:30 Jul 06 '00	1547	137	421378	5087126	09:58 - bacterial trap at ROPOS				R545-050
10:00:00 Jul 06 '00	1545	119	421381	5087129	1000 - I think we see an old portable biobox from last year.				
10:01:10 Jul 06 '00	1546	103	421381	5087129	1001 - Still looking for Steve's mound area.				
10:03:30 Jul 06 '00	1546	96	421407	5087132	1004 - Traversing about this southern area to look for the iron oxides.				
10:04:00 Jul 06 '00	1546	141	421407	5087132	10:05 - bacterial FeO				R545-051
10:04:20 Jul 06 '00	1545	148	421420	5087127	1005 - We've found a little mound of iron oxide to slurp up.				
10:07:10 Jul 06 '00	1546	177	421430	5087130	x=421419 y=5087126 Fix for where we're slurping.				
10:07:40 Jul 06 '00	1547	191	421430	5087130	1008 - Slurp sample of IRON OXIDE (FeO) into jar #6. Suctioning began at 1021. Suction ended at 1022. Fe-Hyde Vent , x=421406 y=5087099.	R545-SS-J6 -0008	Moyer/ Fortin		
10:08:50 Jul 06 '00	1547	185	421430	5087130	1009 - We stopped suctioning because the tether was getting pulled. going to check that out.				
10:09:50 Jul 06 '00	1540	232	421430	5087130	1010 - Embley tapes changed.				
10:13:00 Jul 06 '00	1525	73	421379	5087157	1014 - Trying to get back to the iron oxide mound we were just at to slurp.				
10:17:30 Jul 06 '00	1547	179	421418	5087137	1019 - We've found the spot where we were previously going to suction.				
10:20:40 Jul 06 '00	1547	176	421412	5087116	10:21 - iron oxide. south of Crack				R545-052
10:22:20 Jul 06 '00	1547	174	421412	5087116	1022 - We sucked the iron oxide up. Photo #18 of the site with iron oxide. X=421409 Y=5087115 Fe-Hyde Vent.				
10:24:20 Jul 06 '00	1547	170	421409	5087115	Photo #20 of this Fe-Oxide area.				
10:25:10 Jul 06 '00	1547	170	421099	5088121	10:26 - mound of iron oxide with cricket. south of Crack				R545-053
10:25:20 Jul 06 '00	1547	168	421099	5088121	1027 - Staring at a mound with a cricket thing on it. There's roaches at ASHES - Craig M				
10:25:40 Jul 06 '00	1547	130	421099	5088121	10:27 - cricket south of Crack				R545-054
10:27:32 Jul 06 '00	1547	134	421415	5087115	1029 - We're going to try to break open one of these Fe-oxide mound things to see if it is hollow inside.				
10:27:52 Jul 06 '00	1547	133	421415	5087115	10:30 - iron oxide. south of Crack				R545-055
10:28:22 Jul 06 '00	1547	133	421415	5087115	1030 - No center to this mound thing- this thing is straight nugget - Mike D				
10:31:22 Jul 06 '00	1547	125	421422	5087106	10:32 - iron oxide. south of Crack				R545-056
10:32:02 Jul 06 '00	1547	124	421415	5087115	1032 - Trying to smoosh one of these iron oxide mounds again to see if it hollow. It looks laminated and like there may be a hole in the middle.				
10:32:12 Jul 06 '00	1547	122	421415	5087115	10:33 - iron oxide. south of Crack				R545-057
10:32:52 Jul 06 '00	1547	124	421419	5087102	1033 - Trying again to smoosh these things				
10:33:32 Jul 06 '00	1547	125	421419	5087102	10:34 - FeO mound was broken by ROPOS arm and channel is visible in center. south of Crack				R545-058

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R545	Samples	PI	Sub Smps	Fr Grb#
10:34:22 Jul 06 '00	1547	125	421415	5087115	1035 - So we're giving up on smooching them and now we're going to take a slurp sample of the iron oxides				
10:35:02 Jul 06 '00	1547	124	421415	5087115	10:36 - iron oxide. south of Crack				R545-059
10:35:32 Jul 06 '00	1547	124	421415	5087115	1036 - Photo #20 of Fe-Hyde area				
10:36:12 Jul 06 '00	1547	125	421415	5087115	1037 - Slurp sample of IRON OXIDES (FeO) into jar #2. Started suctioning at 1040. Suction ended at 1041. FeHyde	R545-SS-J2-0009	Fortin		
10:37:22 Jul 06 '00	1547	131	422057	5089377	10:39 - iron oxide. south of Crack, southeast of Phoenix.				R545-060
10:44:02 Jul 06 '00	1547	138	421414	5087111	1044 - Photo #21 and 22 of Fe-Hyde area. Just checking things out.				
10:46:42 Jul 06 '00	1547	176	421416	5087118	1047 - We want to go to Hell.				
10:50:02 Jul 06 '00	1544	272	421420	5087111	1051 - We're at Hell vent and are going to look around the base for oxidized sulfide material.				
10:53:02 Jul 06 '00	1547	231	421391	5087130	10:55 - oxidized sulfide at the base of hell vent.		Fortin		R545-061
10:54:02 Jul 06 '00	1547	230	421367	5087137	10:56 - ROPOS arm is attempting to retrieve a sulfide rock sample.				
10:56:04 Jul 06 '00	1548	220	421372	5087135	10:59 - oxidized SULFIDE sample. z=1544. Hell vent X=421372 Y=5087135	R545-SF-0010	Fortin		
10:58:44 Jul 06 '00	1547	219	421363	5087136	11:02 - moving clockwise around vent.				
11:00:04 Jul 06 '00	1547	219	421363	5087136	11:03 - Smoker at the base of Hell.				R545-062
11:01:24 Jul 06 '00	1547	220	421363	5087136	11:05 - orange mat from hell.				R545-063
11:02:34 Jul 06 '00	1547	268	421370	5087134	11:06 - orangish microbial mat to be suctioned from Hell.				R545-064
11:02:44 Jul 06 '00	1547	278	421370	5087134	11:06 - observing microbial mat, beautiful orange colour near the base of hell vent. Going to prepare for slurp.				
11:03:54 Jul 06 '00	1547	357	421370	5087134	Suction sample of orange MICROBIAL MAT at base of Hell vent. Start suction 11:09 end suction 11:12.	R545-SS-J5-0011	Moyer		
11:18:04 Jul 06 '00	1547	64	422112	5087609	11:18 - heading over to the caldera wall from hell vent top look for some more Fe-oxide and to place an MTR. Heading south-southwest.				
11:20:34 Jul 06 '00	1545	186	421375	5087131	11:21 - observing lava flows from rift zone en route to the Caldera wall.				
11:35:18 Jul 06 '00	1542	272	421378	5087111	11:39 - sheet flows near Caldera wall-arrival after journey 50m to west by ship movement.				
11:40:38 Jul 06 '00	1546	269	421330	5087115	11:45 - looking for wall of caldera.				
11:41:38 Jul 06 '00	1546	268	421323	5087117	11:46 - observing clams near the base of the caldera wall. Just arrived at base of wall. Photo taken of wall, #23. Talus blocks observed.				
11:42:18 Jul 06 '00	1546	269	421323	5087117	11:47-photo #24 taken of talus, some outcropping lava. Photo #25 taken of more outcrop lavas.				
11:43:18 Jul 06 '00	1546	269	421323	5087117	11:48-moving ship 25 metres to the west. Talus slope on wall being observed.				
11:53:30 Jul 06 '00	1546	289	421292	5087128	11:54-more recent talus and Fe-oxide, still going along base of wall.				
11:58:30 Jul 06 '00	1545	288	421292	5087128	12:00-experiencing typical morning GPS jumps, repositioning ship and returning to base of wall.				
12:05:20 Jul 06 '00	1547	320	421292	5087128	12:10-sponges covering talus-good indication that there has been little disturbance at this site in the recent past.				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R545	Samples	PI	Sub Smps	Fr Grb#
12:12:46 Jul 06 '00	1547	302	421292	5087128	12:13-moving ship another 25m at a bearing of 300 degrees.				
12:15:32 Jul 06 '00	1548	308	421292	5087128	12:17-getting really close to Tunncliffe---so says Keith.				
12:16:32 Jul 06 '00	1547	309	421292	5087128	12:18-looking for a place to SS some more FeO. Photo taken (#26) of wall with FeO. Going to sample this location.				
12:16:46 Jul 06 '00	1547	316	421292	5087128	Fe-oxides on the edge of the wall.				R545-065
12:17:02 Jul 06 '00	1547	329	421292	5087128	Fe-oxide on the floor of the wall.				R545-066
12:17:32 Jul 06 '00	1546	305	421292	5087128	Going to take of IRON OXIDE (FeO) at wall. Suction began at 12:25 and ended at 12:35. Wall of Caldera x=421226 y=5087206	R545-SS-J3-0012	Fortin	Moyer	
12:22:32 Jul 06 '00	1548	355	421226	5087206	Suction Fe-oxides on the floor or Wall.				R545-067
12:31:48 Jul 06 '00	1548	346	422217	5087138	12:32 - At base of wall NW of Tunncliffe. Sucking up FeO with bacterial mats.				R545-068
12:35:48 Jul 06 '00	1547	338	421226	5087206	12:37 - heading back to the cage. Photo #27 taken of FeO at wall of Caldera, north-west of Tunncliffe.				
12:58:20 Jul 06 '00	1496	24	421420	5087170	13:01 - after transit to Inferno vent, now heading back down to bottom from cage.				
13:00:50 Jul 06 '00	1494	98	421420	5087170	13:04 - at bottom near Inferno vent. X=421414 Y=5087171.				
13:04:50 Jul 06 '00	1542	184	421420	5087170	13:08 - observing lots of FeO, looking for some crabs.				
13:06:38 Jul 06 '00	1547	7	421420	5087170	13:11 - in no clam land, going to Mushroom. Photo taken #28 of worms in transit to Mushroom from Inferno. Looking pretty droopy.				
13:11:50 Jul 06 '00	1545	198	421389	5087197	13:17 - fresh bunch of tube worms near Mushroom or Gollum.				
13:18:02 Jul 06 '00	1547	190	421380	5087182	13:18 - photo #29 taken of fresh tube worms and vent with nice diffuse flow. Going to DEPLOY a MTR at this site.				
13:18:14 Jul 06 '00	1547	189	421380	5087182	13:18 - close up of tube worms on diffuse flow vent				R545-069
13:18:38 Jul 06 '00	1547	189	421380	5087182	13:18 - far off grab of tube worms sitting over diffuse flow near mushroom. Notice dead tube worm casings on foundation of new growth				R545-070
13:19:50 Jul 06 '00	1547	213	421380	5087182	13:20 - DEPLOYING MTR #3048 NW of Inferno, W of Mushroom. Highlights turned on.				
13:23:26 Jul 06 '00	1547	214	421388	5087172	MTR 3048 in flow among tube worms. W of Mushroom.				R545-071
13:24:26 Jul 06 '00	1547	214	421379	5087175	13:26 - highlights turned off.				
13:29:02 Jul 06 '00	1547	272	422248	5089420	13:31 - observing Inferno, osmo on side of chimney Inferno which doesn't allow for retrieval of MTR close to it.				
13:30:26 Jul 06 '00	1546	124	422248	5089420	old osmo at the bottom of Inferno.				R545-072
13:36:14 Jul 06 '00	1547	324	421389	5087160	13:40 - unable to find last year's HOBO, going to attempt to try a GTB at the top of Inferno which is looking more active than last year.				
13:39:02 Jul 06 '00	1544	109	421389	5087160	13:43 - ROPOS had to do some tether management. Will head back to Inferno for GTB sample when done.				
13:41:38 Jul 06 '00	1542	269	421375	5087176	13:46 - Now back at Inferno. HOBO probe was spotted but not retrieved. Marked for later retrieval.				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R545	Samples	PI	Sub Smps	Fr Grb#
13:49:26 Jul 06 '00	1543	64	421375	5087170	13:55 - leaving Inferno vent as it's a blazing inferno and too hot for the ROPOS arm to sit in for measurement. Heading towards Mushroom vent.				
13:59:02 Jul 06 '00	1543	95	421391	5087179	13:59 - now at what B. Embley believes is Mushroom. Going to take a GTB here. Embley describes a different top to the vent.				
14:02:14 Jul 06 '00	1547	88	421405	5087168	14:03 - start of GTB sampling at bottom of Mushroom x=421405 y=5087168. 14:03.5 end of GTB.	R545-GTB-0013	Evans	Butterfield/Lilley	
14:08:26 Jul 06 '00	1500	99	421120	5088131	en route to virgin mound.				
14:15:50 Jul 06 '00	1546	28	421405	5087180	14:17 - got sidetracked looking at clam shells but all appear to be dead so will not sample. Keep moving to virgin mound				
14:20:38 Jul 06 '00	1545	164	421407	5087179	14:21 - cruising by Gollum. Coming up on Virgin mound, the darn HOB0 has fallen off. X=421430 Y=5087171.				
14:21:50 Jul 06 '00	1544	69	421407	5087179	virgin mound				R545-073
14:22:14 Jul 06 '00	1545	68	421407	5087179	virgin mound				R545-074
14:22:14 Jul 06 '00	1545	68	421407	5087179	14:23 - Highlights on. Virgin mound, vapour phase, very rare. Anhydrite is precipitating and falling off and re-dissolving. If venting stopped, the entire structure would mostly dissolve as there is very little metal in the structure.				
14:25:50 Jul 06 '00	1546	43	421429	5087175	RECOVERY of HOB0 #130 at Virgin x=421430 y=5087174. Vent has been active at least since 1986.	R545-HOB0-0014	Embley		
14:30:34 Jul 07 '00	1448	289	422102	5079341	Coming back up to adjust balast.				
14:32:26 Jul 06 '00	1546	188	421423	5087141	14:33 - Highlights off. Photos 30 - 32.				
14:34:04 Jul 06 '00	1546	185	421420	5087143	14:35 - heading for cage to begin ascent to surface. Tapes off.				
15:19:55 Jul 06 '00	195	191	421507	5087495	15:29 - ROPOS on deck.				
15:20:31 Jul 06 '00	174	195	421507	5087495	McLane Pump sucked 2714 liters of fluid this dive (ASHES Vent Field)	R545-McLane-0015	Metaxas/Tunnicliffe		
					R545 Dive Summary: Gollum-Deployed MTR, bactrp. Repositioned bactrp. Recovered bactrp. Sample: 1 ss. Hillock/Phoenix-Searched for bacrtps - couldn't find them. Samples: 2 ss. Crack-Deployed, positioned larval tubes 5-8. Recovered VEMCO. Observed Johnson flow meter platform. ROPOS-Deployed MTR, bactrp. Recovered 2 bacrtps. Hell-Samples: 1 ss, 1 sulfide. Caldera wall-Sample: 1 ss (FeO). NW of Inferno-Deployed MTR. Mushroom-Sample: 1 gtb. Virgin-Recovered Hobo. McLane pump ASHES.				

R546

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R546	Samples	PI	Sub Smps	Fr Grb#
					AUTOMATED LOGGING SYSTEM FIXED ON THIS DIVE!!! All auto time, heading, depth and utm position information inaccurate before JD188/2300, when auto logging system was fixed. AUTO LOGGING INFO SHOULD BE CORRECT AFTER 2300. As always, positions in utm x/y columns are automated and not flagged for accuracy. Consult dive maps for final position data.				
					Tasks: Imagenex survey of Axial Southern Pillow Flow at 45 52' N . McLane pump and plankton net during survey. Suction sampling, place benchmark at fissure .	Bottom time: JD188(7/6) 2019- JD189(7/7) 1417			
19:14:29 Jul 06 '00	1	192	430881	5092123	1915 - ROPOS is in the water. start dive				
19:50:15 Jul 06 '00	978	153	430881	5092123	1951 - ROPOS is passing 1000m.				
20:14:29 Jul 06 '00	1672	220	430881	5092123	2015 - ROPOS is leaving the cage. Bottom depth is 1720m. Not currently getting fixes.				
20:18:09 Jul 06 '00	1704	44	430881	5092123	2019 - ROPOS is on the bottom. Bottom is pillow flow with a little sediment.				
20:20:19 Jul 06 '00	1718	46	430881	5092123	2024 - Nav is now functioning again. 1 or 2 ranges out of 3 are good so far.				
20:28:51 Jul 06 '00	1718	47	430881	5092123	2031 - ROPOS is looking for the fissure in order to place the benchmark. 2032 asking ship to move toward the fissure.				
20:37:23 Jul 06 '00	1717	316	42207 6	5079214	2041 - Sheet flow next to pillows. A basket star.				
20:40:23 Jul 06 '00	1717	317	422178	507924 2	2044 - ROPOS is still moving along the bottom looking for the fissure. The ship is over the fissure according to NAV. Not much particulate in the water. Very clear.				
20:43:13 Jul 06 '00	1718	317	42206 4	507923 6	2048 - stalked crinoid. ROPOS is still looking for the fissure.				
20:44:33 Jul 06 '00	1718	320	42205 4	507924 5	2050 - a small ray				R546-001
20:45:23 Jul 06 '00	1719	317	42205 4	507924 5	2051 - stalked crinoid				R546-002
20:46:33 Jul 06 '00	1719	317	421834	5078411	2052 - a bunch of little brittle stars, and the ray				
20:52:23 Jul 06 '00	1720	346	421827	507843 5	2059 - asking the ship to move an additional 50m West. Bottom is ropy flows.				
20:57:43 Jul 06 '00	1719	282	419165	507952 4	2105 - asking the ship move 100 m 060deg. Lots of basket stars.				
21:03:15 Jul 06 '00	1715	281	42206 0	507922 5	2109 - archive tapes both started.				
21:13:45 Jul 06 '00	1721	58	422011	507928 7	2114 - still looking for the fissure. Bottom is sheet flows.				
21:16:45 Jul 06 '00	1721	57	42205 4	5079310	2117 - located fissure . Heading a little north. lava from the 1998 flow is evident in the bottom of the fissure.				
21:18:15 Jul 06 '00	1721	32	42205 4	5079310	2117 - the fissure				R546-003
21:20:25 Jul 06 '00	1721	14	42205 4	5079310	2122 - ROPOS is setting down on the bottom. getting ready to DEPLOY the benchmark.				
21:21:35 Jul 06 '00	1722	118	42205 4	5079310	fissure (benchmark legs in foreground)				R546-004

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R546	Samples	PI	Sub Smps	Fr Grb#
21:21:45 Jul 06 '00	1722	136	42205 4	5079310	2123 - positioning to DEPLOY Bmrk-66.				
21:24:15 Jul 06 '00	1722	119	422213 7	507934	2126 - placing the pressure sensor on the benchmark.				
21:26:15 Jul 06 '00	1722	108	42204 0	507929 9	2129 - still positioning pressure sensor on the benchmark.				
21:27:27 Jul 06 '00	1722	110	42204 0	507929 9	2130 - Begin pressure sensor measurement.				
21:28:07 Jul 06 '00	1722	109	42204 0	507929 9	2130 - begin pressure sensor measurement. Bmrk-66 x=422091 y=5079330.				R546-005
21:29:17 Jul 06 '00	1722	117	42204 0	507929 9	2132 - cage motor off. checking to see if we have good nav fixes.				
21:35:17 Jul 06 '00	1722	109	42225 5	507943 9	2140 - ophiuroids				R546-006
21:36:27 Jul 06 '00	1723	109	422317 7	507946	tunicate, worm casing, 2 ophiuroids and a polychaete				R546-007
21:38:07 Jul 06 '00	1722	108	42225 5	5079441	limpet				R546-008
21:48:17 Jul 06 '00	1723	108	42225 3	507944 5	2154 - coralline				R546-009
21:48:57 Jul 06 '00	1723	108	42225 3	507944 5	2155 - the fissure at bm 66				R546-010
22:03:07 Jul 06 '00	1723	108	42225 7	507943 8	Location: Bmrk-66 at fissure. Crinoid				R546-011
22:03:07 Jul 06 '00	1723	108	42225 7	507943 8	2203 - end of pressure sensor measurement.				
22:03:37 Jul 06 '00	1723	108	42225 3	507944 6	2204 - ROPOS is repositioning. Update will be down for a few minutes. Returning pressure sensor to it cradle.				
22:03:37 Jul 06 '00	1723	108	42225 3	507944 6	Bmrk-66 and the fissure				R546-012
22:03:37 Jul 06 '00	1723	108	42225 3	507944 6	collapse in fissure				R546-013
22:03:37 Jul 06 '00	1723	108	42225 3	507944 6	2207 - pressure sensor is secure. ROPOS is moving to an area to suction sediments.				
22:03:37 Jul 06 '00	1723	108	42225 3	507944 6	2210 - ROPOS is on the bottom preparing to sample with the SS. 2212 - jar J3 is in position 200 um mesh. 2212 - pump is on, positioning arm to collect sample.				
22:03:37 Jul 06 '00	1723	108	42225 3	507944 6	suction sample bottle J-3 with filter 200um				R546-014
22:03:37 Jul 06 '00	1723	108	42225 3	507944 6	2212 Suction Sample Jar 3 PELAGIC SEDIMENT area of the fissure. Z=1723. Bmrk-66 x=422091, y=5079330.	R546-SS-J3-001	Juniper/ Tunncliffe		
22:03:37 Jul 06 '00	1723	108	42225 3	507944 6	2216 pump off				
22:03:37 Jul 06 '00	1723	108	42225 3	507944 6	2217 Suction sample flush into jar 2, basalt chips (Rk) z=1723. Fissure, Bmrk-66.	R546-SS-J2-0002	J Chadwick		
22:03:37 Jul 06 '00	1723	108	42225 3	507944 6	2217 - Flush into jar 2. Caught a few basalt chips.				
22:20:13 Jul 06 '00	1723	87	422081 5	507937	2220 - NAV is working?.				
22:22:03 Jul 06 '00	1723	87	42209 0	507933 3	2222 - This is a good fix for the BM location: x=422089 y=5079332 depth=1723. ROPOS is 2 m from Bmrk-66.				
22:23:13 Jul 06 '00	1723	87	422100 5	5079281					R546-015

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R546	Samples	PI	Sub Smps	Fr Grb#
22:27:13 Jul 06 '00	1723	87	42209 5	507933 5	2227 start McLane pump at 7 liter/min				
22:30:33 Jul 06 '00	1723	87	42208 9	507933 4	2230 - Imagenex is collecting good data. ROPOS is going to the south end of line 9 to begin survey.				
22:35:33 Jul 06 '00	1716	205	42204 6	507920 4	2235 - asking ship to move the South end of line 9.				
22:44:15 Jul 06 '00	1698	203	421407	507833 8	2241 - main tapes off, Tunncliffe tape on				
23:00:55 Jul 06 '00	1698	27	42203 7	507925 9	NOTE: AT 2300 AUTOMATED LOGGING SYSTEM WAS FIXED!!! FROM THIS POINT ON THE TIME, HEADING, DEPTH INFO SHOULD BE CORRECT. LOCATION INFO IS STILL ONLY RAW NAVIGATION.				
23:02:15 Jul 06 '00	1698	23	42204 0	507927 2	2250 - Imagenex line 9 starts about this time.				
23:18:17 Jul 06 '00	1703	39	422109	507944 5	Imagenex survey started at about 2300.				
00:19:01 Jul 07 '00	1699	32	42249 0	508057 6	EOL #9 Imagenex at 0018 GMT; 422486/5080563 ROPOS 3 transponder fix, RMS 11.9				
00:24:51 Jul 07 '00	1699	224	42253 9	508052 2	SOL #10 at 0024; 422539/5080522 ROPOS 3 transponder fix, RMS 11.6				
01:45:07 Jul 07 '00	1701	207	421900	507993 7	EOL #10 at 0144; 422075/5079143 ROPOS 3 transp. fix, RMS 2.8				
01:53:17 Jul 07 '00	1701	25	422135	5079119	SOL #11 at 0152; 422133/5079109, RMS 2.0				
02:34:21 Jul 07 '00	1705	19	42234 6	5079751	0235 Still doing Imagenex. Ship is making funky designs on the screen.				
03:09:34 Jul 07 '00	1696	20	42260 4	508052 0	EOL 11				
03:17:34 Jul 07 '00	1696	202	42270 6	508054 2	SOL 12 at 0317				
04:25:10 Jul 07 '00	1700	204	422185	5079100	End of Line 12				
04:30:00 Jul 07 '00	1701	8	42224 6	5079114	SOL 13				
04:53:42 Jul 07 '00	1697	27	42235 8	507950 7	McLane pump turned off.				
05:43:24 Jul 07 '00	1696	105	422710	508049 9	EOL 13, moving to the east for line 14 which runs NE to SW				
05:46:34 Jul 07 '00	1696	204	42277 0	508046 3	SOL 14				
06:56:20 Jul 07 '00	1702	197	419968	507985 0	0658 End of Line #14				
07:03:40 Jul 07 '00	1702	21	42236 2	507908 9	Begin Line #15, South to North				
08:11:36 Jul 07 '00	1697	33	42282 2	508045 4	EOL 15				
08:21:26 Jul 07 '00	1714	199	42288 7	5080381	SOL 16 at 08:15, ship having a little trouble getting on the line after the turn. Driving north to south.				
08:51:08 Jul 07 '00	1722	199	42268 6	507983 7	ROPOS guys concerned because main oil reservoir pressure is rising...				
09:01:30 Jul 07 '00	1718	207	42262 3	507965 5	Verena's video tape was stopped at 8:50 because the ROPOS guys wanted to watch the main reservoir gauge for a while.				
09:33:22 Jul 07 '00	1701	199	422417	507903 0	EOL 16, turning east for line 17. Oil pressure holding...				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R546	Samples	PI	Sub Smps	Fr Grb#
09:36:32 Jul 07 '00	1701	96	42246 6	5079031	SOL 17				
10:47:58 Jul 07 '00	1699	51	42297 9	5080451	EOL 17.				
10:51:28 Jul 07 '00	1707	202	42300 6	508038 5	SOL 18. Heading south.				
12:09:04 Jul 07 '00	1721	209	42268 6	507948 7	Oil pressure seems to be holding. Started Verena's color camera video back up at 12:08. We're 2/3 down line 18.				
12:19:44 Jul 07 '00	1722	201	42265 7	507937 5	12:18 Color cam video tape changed for Verena.				
12:52:56 Jul 07 '00	1714	195	42253 7	507898 9	12:53 EOL 18. End of Imagenex survey. We will now transit back to Bmrk-66, where we started the dive to make a final pressure measurement. ROPOS will go up to the cage for the transit.				
12:55:56 Jul 07 '00	1689	80	42253 4	507899 0	12:54 Turned Verena's video tapes off.				
13:00:06 Jul 07 '00	1669	304	42253 6	507900 0	Time on SIT camera is ~45 sec fast.				
13:04:18 Jul 07 '00	1669	290	42250 2	5079012	transiting to Bmrk-66				
13:38:20 Jul 07 '00	1672	154	422153	507926 7	Ship in position at Bmrk-66, ROPOS going down to bottom.				
13:39:30 Jul 07 '00	1692	164	422108	507932 4	Will put larvae net in biobox after we get to bottom.				
13:41:50 Jul 07 '00	1722	169	422108	507932 4	Back on bottom at Bmrk-66 . Putting plankton net in port side of biobox. (S Pillow Flow at 45deg 52')	R546-net-0003	Tunncliff e/ Metaxa		
13:45:40 Jul 07 '00	1723	171	421075	507820 7	Larvae net in biobox. Critters visible in glass tip. Embley color and SIT video tapes turned back on.				
13:47:30 Jul 07 '00	1723	163	42209 8	507928 9					R546-016
13:47:30 Jul 07 '00	1723	163	42209 8	507928 9	Bmrk-66				R546-017
13:48:30 Jul 07 '00	1722	201	42209 8	507928 9	Bmrk-66				R546-018
13:48:50 Jul 07 '00	1722	242	42209 8	507928 9	Bmrk-66				R546-019
13:49:10 Jul 07 '00	1723	295	42209 8	507928 9	Bmrk-66				R546-020
13:50:00 Jul 07 '00	1722	182	422106	5079281	Bmrk-66				R546-021
13:50:40 Jul 07 '00	1723	177	422106	5079281	Now sitting next to Bmrk-66 . Lots of frame grabs on the way in. Marker has reflective tape on it, and that helped spot it.				
13:52:50 Jul 07 '00	1723	158	422104	507928 0	13:53 - Start of pressure reading at Bmrk-66.				
13:54:40 Jul 07 '00	1723	157	42446 3	507899 2	pressure measurement at Bmrk-66 at end of dive				R546-022
14:13:12 Jul 07 '00	1723	158	422103	507925 8	14:13 - End pressure measurement at Bmrk-66.				
14:16:42 Jul 07 '00	1723	147	422101	507925 9	McLane pump sample. Volume=? Pumping at 7 liters/minute. (S Pillow Flow at 45deg 52')	R546-McL ane-004	Tunncliff e/ Metaxas		
14:17:32 Jul 07 '00	1723	150	42209 8	507933 2	ROPOS off the bottom, going back to the cage. End of dive R456. Embley videos off.				
14:30:34 Jul 07 '00	1448	289	422102	5079341	ROPOS on deck at 1514				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R546	Samples	PI	Sub Smps	Fr Grb#
14:30:34 Jul 07 '00	1448	289	422102	5079341	jellyfish layer (while ascending through water column)				R546-023
14:30:34 Jul 07 '00	1448	289	422102	5079341	more jellies (while ascending to surface)				R546-024
					R546 Dive Summary: Deployed Bmrk-66 at fissure edge. Bmrk-66 pressure measurement. Samples: 2 ss. Imagenex (Lines 9-18)-Samples: Plankton net tow , McLane pump (both during Imagenex survey).				

R547

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R547	Samples	PI	Sub Smps	Fr Grb#
					Positions in utm x/y columns are automated and not flagged for accuracy. Consult dive maps for final position data.				
					Tasks: HFS and Suction sampling in area of '98 lava flow, Deploy MTR's: Magnesia, Mkr-N3, OldWorms, Mkr-N41, Nascent, Mkr-33, Cloud, Snail, Castle.	Bottom time: JB190(7/8) 0541- JB191(7/9) 0009			
	1448	289	422102	5079341	0255 Ropos in the water.				
03:15:27 Jul 08 '00	0	194	423681	5088509	0314 Ropos back on deck.				
03:07:27 Jul 08 '00	41	308	423850	5087101	303 Coming back up to adjust balast.				
03:13:37 Jul 08 '00	0	168	423681	5088509	0313 Back on surface.				
04:14:19 Jul 08 '00	1	185	423681	5088509	0414 Ropos back in water.				
04:30:43 Jul 08 '00	157	5	423681	5088509	Started recording water column on Tunncliffe tape at 4:19.				
05:40:37 Jul 08 '00	1521	191	423646	5088562	0540 On bottom. Starting Embley tapes.				
05:44:37 Jul 08 '00	1525	106	423663	5088563	Waiting for a Ropos fix to find out where we are - WAIT!! There's the osmo sampler, we must be at Magnesia. There is no visible flow.				
05:46:47 Jul 08 '00	1527	225	423663	5088563	A lot of iron oxides in the area. We are looking around, but it appears that the whole area at and around Magnesia is dead - no flow!				
05:45:47 Jul 08 '00	1525	186	423663	5088563	Magnesia osmo				R547-001
05:45:47 Jul 08 '00	1525	186	423663	5088563	near Magnesia				R547-002
05:46:27 Jul 08 '00	1525	215	423663	5088563	Near Magnesia - pillar and bathtub rings with collapse pit in the distance.				R547-003
05:47:17 Jul 08 '00	1526	216	423664	5088556	near Magnesia				R547-004
05:48:37 Jul 08 '00	1523	223	423664	5088556	Positioning to deploy at Marker here.				
05:49:37 Jul 08 '00	1526	128	423664	5088556	near Magnesia				R547-005
05:55:47 Jul 08 '00	1523	120	423664	5088551	Mkr-67 at Magnesia				R547-006
05:50:17 Jul 08 '00	1527	121	423664	5088556	The osmo is sitting down in the pit - we are now DEPLOYING Mkr-67 on the top of the ledge above the osmo. The heading is 120 looking down at the marker and the osmo is right below the ledge.				
05:56:37 Jul 08 '00	1523	211	423664	5088551	Osmo at Magnesia (Mkr-67 at top right).				R547-007
05:57:57 Jul 08 '00	1524	195	423048	5089150	Heading down towards the osmo in the pit at Magnesia to see if there is any visible flow at all.				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R547	Samples	PI	Sub Smps	Fr Grb#
05:59:37 Jul 08 '00	1528	35	423054	5089141	osmo at Magnesia				R547-008
05:59:37 Jul 08 '00	1528	35	423054	5089141	osmo at Magnesia				R547-009
06:00:27 Jul 08 '00	1529	357	423057	5089135	osmo at Magnesia				R547-010
05:59:57 Jul 08 '00	1529	8	423057	5089135	Photo one, photo two of Magnesia. Heading 355 looking at the marker on the top of the pit with the osmo at the base of the hole.				
06:01:07 Jul 08 '00	1529	1	423057	5089135	Photos 3, 4, 5 at Magnesia, looking into the pit.				
06:01:57 Jul 08 '00	1529	6	423057	5089135	There is a scale worm swimming.				
06:02:47 Jul 08 '00	1529	2	423662	5088543	Photo 6 of Magnesia, some more scale worms.				
06:02:17 Jul 08 '00	1529	4	423057	5089135	pit at Magnesia				R547-011
06:02:37 Jul 08 '00	1529	3	423662	5088543	pit at Magnesia				R547-012
06:04:07 Jul 08 '00	1530	359	423662	5088543	Fix for Magnesia: x=423661 y=5088545. z=1529m. Navigation is not working well right now. Looking into the hole that used to be venting in '98 and '99. There is no visible flow and the only macrofauna. Appears to be a few scale worms.				
06:06:17 Jul 08 '00	1529	354	423662	5088543	A spider crab.				
06:05:57 Jul 08 '00	1529	354	423662	5088543	Magnesia (iron oxide biofilm?)				R547-013
06:07:07 Jul 08 '00	1529	355	423668	5088557	Magnesia (iron oxide biofilm?)				R547-014
06:07:17 Jul 08 '00	1529	354	423668	5088557	The close up view shows some amphipods and/or copepods swimming around. The video is flickering a bit.				
06:13:49 Jul 08 '00	1529	355	423668	5088557	Lavasicles at Magnesia.				R547-015
06:13:49 Jul 08 '00	1529	355	423668	5088557	lavasicles				R547-016
06:10:19 Jul 08 '00	1529	354	422989	5089166	Magnesia				R547-017
06:09:19 Jul 08 '00	1529	356	423668	5088557	Magnesia				R547-018
06:10:39 Jul 08 '00	1529	24	422989	5089166	Looking around at the geology - lava pillars around the sunken pit where venting used to be. Now moving to Oldworms, about 175 meters away at a bearing of 135. Picture 7 of Magnesia pit.				
06:11:59 Jul 08 '00	1528	262	422989	5089166	spider crab at Magnesia				R547-019

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R547	Samples	PI	Sub Smps	Fr Grb#
06:12:19 Jul 08 '00	1528	242	422989	5089166	Highlights off.				
06:14:09 Jul 08 '00	1525	133	422989	5089166	Moving to Oldworms.				
06:15:20 Jul 08 '00	1526	139	422989	5089166	Moving over lava pillars, sunken pits with jumbles flow on the floor. The whole northern part of the '98 flow seems to have have stopped venting.				
06:16:09 Jul 08 '00	1527	138	422989	5089166	Moving the ship to position for drive to Oldworms.				
06:18:29 Jul 08 '00	1526	137	422989	5089166	Photo 8 of lava pillars between Magnesia and edge of lava flow (where Oldworms is). This is probably one of the primary eruptive fissures of the '98 flow.				
06:23:10 Jul 08 '00	1524	134	423075	5089141	Ship is now starting to move.				
06:25:00 Jul 08 '00	1524	138	423075	5089141	Heading to Oldworms located at 423785, 5088418, depth 1528m. Still going over lava pillars and collapsed area.				
06:26:50 Jul 08 '00	1523	134	423075	5089141	Nav sucks.				
06:27:30 Jul 08 '00	1525	134	423684	5088560	Moving out towards the eastern edge of the lava flow. Jumbled flow with intermittent lava pillars.				
06:29:50 Jul 08 '00	1524	123	423709	5088538	A couple rattails, now on the roof with pillows.				
06:32:00 Jul 08 '00	1525	133	423709	5088538	Sponges on the old lava on the way to Oldworms.				R547-020
06:31:40 Jul 08 '00	1524	131	423709	5088538	Photo 9 of sponges and a holothurian - we must be on old lavas now (biogeo wisdom). Lots of sediment - diatomaceous?				
06:33:50 Jul 08 '00	1525	136	423735	5088506	White mat in cracks, evidence of venting! Photo 10. Zooming in on a crack, there are a few limpets and some bacteria mat.				
06:34:20 Jul 08 '00	1526	135	423760	5088477	On the way to Oldworms.				R547-021
06:34:50 Jul 08 '00	1526	137	423760	5088478	On the way to Oldworms				R547-022
06:35:30 Jul 08 '00	1525	143	423745	5088494	Tubeworms on the way to Oldworms				R547-023
06:36:12 Jul 08 '00	1525	145	423745	5088494	Tubeworms on the way to Oldworms				R547-024
06:36:22 Jul 08 '00	1525	175	423745	5088494	Tubeworms and protozoan mats on the way to Oldworms				R547-025
06:36:42 Jul 08 '00	1524	198	423745	5088494	Tubeworms and protozoan mat on the way to Oldworms				R547-026
06:35:30 Jul 08 '00	1525	143	423745	5088494	Following the cracks. Found a few small tube worms, and protozoan mat. More tube worms and blue protozoan mats covering large areas of basalt. This seems to be a fairly extensive area. Position :x=423750 y=5088454, depth 1523m.				
06:40:02 Jul 08 '00	1525	166	423754	5088467	Dead clams about 50m from Oldworms				R547-027

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R547	Samples	PI	Sub Smps	Fr Grb#
06:39:42 Jul 08 '00	1524	165	423754	5088467	Bed of clams in same area. Looking to see if any are alive. They look all dead unfortunately, but some might be sleeping!				
06:41:12 Jul 08 '00	1525	168	423758	5088462	Spider crab near protozoan mat on the way to Oldworms				R547-028
06:41:32 Jul 08 '00	1525	216	423763	5088456	On the way to Oldworms				R547-029
06:42:02 Jul 08 '00	1524	248	423763	5088456	Considering naming this new site "Blue Lagoon", but settled on BlueNose .				R547-030
06:43:02 Jul 08 '00	1526	208	425645	5087401	Tube worms at BlueNose.				R547-031
06:41:02 Jul 08 '00	1526	166	423758	5088462	More blue protozoan? mat around crack. White mat seems to be right in the crack with the blue mat on the periphery. Now we are at a tubeworm bunch. We are going to call this site "Blue Nose" (Blunose).				
06:45:12 Jul 08 '00	1524	285	423760	5088458	We just got pulled off site by the ship. Stirring up sediment, rising off the bottom until it settles and the ship repositions.				
06:46:12 Jul 08 '00	1516	301	423760	5088458	This area, "Blue Nose", is 50 m to the NW of Oldworms.				
06:49:52 Jul 08 '00	1525	325	423762	5088446	Blunose				R547-032
06:50:02 Jul 08 '00	1525	314	423762	5088446	Tube worms at Blunose.				R547-033
06:51:32 Jul 08 '00	1526	329	423753	5088449	Tubeworms at Blunose.				R547-034
06:50:32 Jul 08 '00	1526	328	423762	5088446	Photo 12 at Blunose. Close up of tubeworms, limpets, blue globs.				
06:52:32 Jul 08 '00	1525	328	423753	5088449	Blunose				R547-035
06:53:02 Jul 08 '00	1525	329	421633	5088895	Background temp. is 2.5. Limpets are right around crack openings with the blue mat on the top of the basalts. Tube worms are nestled in the crack with some polynoids. Trying to get a good temperature measurement to see if it's worth taking a fluid sample.				
06:57:02 Jul 08 '00	1525	329	423754	5088451	Now trying to measure the temperature over the blue mat. Moving the sub caused a bunch of floc to come out of the crack. Waiting for it to settle so we can see.				
07:01:22 Jul 08 '00	1526	267	421649	5088911	Couldn't detect any temp. anomaly about blue mat. Moving SE towards Oldworms.				
07:03:22 Jul 08 '00	1525	128	423759	5088447	Moving over pillows, some are blown out dotted with blue mat and white staining. Back into a shallow collapsed area. Spider crab.				
07:04:18 Jul 08 '00	1523	120	423759	5088447	Photo 13 of collapse pit with lava pillars.				
07:07:08 Jul 08 '00	1524	112	423778	5088437	Fishing net near Oldworms?				R547-036

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R547	Samples	PI	Sub Smpls	Fr Grb#
07:06:48 Jul 08 '00	1523	83	423778	5088437	We think we might be at Oldworms. Picture 14 of a net on the seafloor wrapped around a pillow. It may be a fishing net.				
07:08:38 Jul 08 '00	1523	109	423778	5088437	Tubeworms at Oldworms(?)				R547-037
07:08:38 Jul 08 '00	1523	109	423778	5088437	Photo 15 of big tube worm bush. The tubeworms are very long and skinny and stick-like. Their plumes are out but they are not bushy. A lot of bacteria mat/floc. Ropos is fixing on this site at 20 m North of "Oldworms" - but the site seems to be a big one,				
07:10:58 Jul 08 '00	1525	89	423790	5088438	Mats near Oldworms.				R547-038
07:12:18 Jul 08 '00	1525	88	423785	5088436	vent fish near Oldworms				R547-039
07:13:58 Jul 08 '00	1525	88	423786	5088436	crab near Oldworms				R547-040
07:11:08 Jul 08 '00	1525	87	423790	5088438	Beautiful lava outcrop covered in limpets, blue protozoan mat, a few tubeworms and a vent fish (zoarcid). There is an opening with flow and limpets are stacked up to 10 on top of each other down into the flow. There are also a few galatheid crabs.				
07:15:28 Jul 08 '00	1525	180	423789	5088439	Tried to get into this hole to sample flow, but Ropos couldn't reach. Moving on to another patch of tubeworms to find some good flow.				
07:17:18 Jul 08 '00	1525	127	423784	5088433	Photo 16 of tubeworms in same area as above.				
07:17:58 Jul 08 '00	1525	114	423784	5088428	Coordinates for where Ropos has been fixing lately: 423785, 5088436 roughly.				
07:18:58 Jul 08 '00	1525	114	423785	5088429	Found a new bush with visible flow, going in to take a temperature sample. Highlights off.				
07:21:08 Jul 08 '00	1525	114	423791	5088430	Temperature anomaly is about 0.3 degrees.				
07:22:58 Jul 08 '00	1525	110	423787	5088430	07:23. OldWorms				R547-041
07:24:08 Jul 08 '00	1525	155	423786	5088427	07:24. vent fish at OldWorms.				R547-042
07:27:08 Jul 08 '00	1524	189	421713	5089003	Looking for a place to settle so we can do something about these two MTRs dragging off the purse.				
07:32:30 Jul 08 '00	1523	153	423797	5088416	ROPOS has one of the MTRs in the port arm and the other still dangling.				
07:35:00 Jul 08 '00	1524	329	423799	5088425	Limpets at OldWorms				R547-043
07:36:20 Jul 08 '00	1523	227	423799	5088425	Embley tapes changed.				
07:39:00 Jul 08 '00	1525	39	423799	5088425	Found some flow at OldWorms.				
07:40:10 Jul 08 '00	1525	36	423781	5088417	Spider crab. Southern end of Oldworms area.				R547-044

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R547	Samples	PI	Sub Smpls	Fr Grb#
07:40:40 Jul 08 '00	1525	31	423781	5088422	Going to take temperature measurements in flow area.				
07:42:30 Jul 08 '00	1525	35	425615	5087275	Max temp anomaly 2.5 degrees C				
07:44:10 Jul 08 '00	1525	29	423780	5088420	Taking temp. at another flow site: max temp 8.2				
07:45:50 Jul 08 '00	1525	29	423780	5088420	Fix x=423780 y=5088420				
07:46:50 Jul 08 '00	1525	30	423779	5088422	Fluid sampler: gas piston. T1=7.5; T2=5.9; Tmax=8. Start time: 07:50 Stop time: 07:51. Vol filtered 150 ml. OldWorms x=423780 y=5088420.	R547-HFS-4-0001	Evans	Butterfield/Lilley	
07:53:10 Jul 08 '00	1525	30	423784	5088417	Fluid sampler: unfiltered fluid (bag). T1 6.1; T2 5.4; Start time: 07:54:14; Stop time: 07:57. Restarting 07:57:43; Stop 08:00:25. Vol 700 ml. Tmax 8.1. White floc in crack. OldWorms x=423780 y=5088420.	R547-HFS-8-0002	Butterfield/Huber/Mehta/Larson		
08:01:02 Jul 08 '00	1525	29	423784	5088417	Changed Tunnicliffe tape.				
08:05:02 Jul 08 '00	1525	22	423780	5088420	MTR 4128 DEPLOYED at sampled site.				
08:04:52 Jul 08 '00	1525	24	425623	5087278	MTR 4128 at OldWorms.				R547-045
08:05:32 Jul 08 '00	1525	19	423780	5088420	Photos 17, 18, and 19 taken at site where MTR 4128 was deployed.				
08:12:02 Jul 08 '00	1524	20	423769	5088424	MTR maintenance in progress.				
08:12:52 Jul 08 '00	1524	18	423769	5088432	Headed to Mkr-N3; range 200m, bearing 225				
08:17:02 Jul 08 '00	1524	246	423791	5088419	Moving ship to Mkr-N3.				
08:36:14 Jul 08 '00	1527	243	423710	5088332	Ship positioned over Mkr-N3				
08:39:44 Jul 08 '00	1526	259	423706	5088330	Reddish (iron oxide?) sedimented region near N3				
08:41:44 Jul 08 '00	1527	280	423089	5089052	various types of Fe-oxides based on color and vent fish on our way to N3				R547-046
08:43:44 Jul 08 '00	1526	250	425558	5087275	N3 site				R547-047
08:43:14 Jul 08 '00	1526	236	425558	5087275	Mkr-N3 spotted. White microbial mats, tube worms, scale worms, and purple protozoan mats. Photo 20, 21 taken here. Shimmery flow.				
08:44:14 Jul 08 '00	1527	241	425558	5087275	Shimmery flow at N3.				R547-048
08:46:44 Jul 08 '00	1528	231	423645	5088286	Temperature measurement being taken at N3. Max temp 18.5 degrees.				
08:54:26 Jul 08 '00	1528	233	423639	5088277	fluid sampler at Mkr-N3				R547-049

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R547	Samples	PI	Sub Smps	Fr Grb#
08:59:36 Jul 08 '00	1528	234	423645	5088283	Mkr-N3				R547-050
08:53:24 Jul 08 '00	1528	233	423646	5088293	Fluid sampler: unfiltered water (bag 9). T1: 17.0 T2: 13.0; Start time: 08:53; Stop time: 09:00 Vol=698 ml. Max temp: 20.2. Mkr-N3 x=423637 y=5088278.	R547-HFS-9-0003	Butterfield/Huber/Mehta/Larson		
09:00:36 Jul 08 '00	1528	234	423644	5088285	Fluid sampler: gas piston. T1:18.0 T2:136.0 Start time: 09:01 Stop time: 09:04 Vol 150ml Max temp 20.2 degrees. Mkr-N3.	R547-HFS-24-0004	Evans	Butterfield/Lilley	
09:08:46 Jul 08 '00	1528	234	423641	5088281	scale worms at Mkr-N3				R547-051
09:05:46 Jul 08 '00	1528	233	423642	5088281	Fluid sampler: XRF filter T1:16.0 T2: 12.0 Start time: 09:06 Stop time: 09:10 Max temp: 18.8 Vol=500 ml. Mkr-N3.	R547-HFS-1-0005	Gendron		
09:11:36 Jul 08 '00	1528	233	423643	5088283	Getting ready to deploy 2 MTRs at Mkr-N3.				
09:11:46 Jul 08 '00	1528	233	423643	5088283	Mkr-N3				R547-052
09:11:56 Jul 08 '00	1528	233	423643	5088283	ROPOS fix (cluster) x=423642 y=5088282				
09:12:16 Jul 08 '00	1528	232	423642	5088280	Mkr-N3				R547-053
09:13:26 Jul 08 '00	1527	251	423642	5088280	microbial mat at Mkr-N3.				R547-054
09:14:36 Jul 08 '00	1528	263	423642	5088280	Getting ready to deploy MTR 3176.				
09:14:36 Jul 08 '00	1528	263	423642	5088280	MTR 3176 ar Mkr-N3.				R547-055
09:15:26 Jul 08 '00	1528	266	423642	5088280	Mkr-N3				R547-056
09:16:36 Jul 08 '00	1528	265	423642	5088280	MTR 3176 at Mkr-N3.				R547-057
09:19:38 Jul 08 '00	1528	246	423642	5088280	vent fish at Mkr-N3.				R547-058
09:23:08 Jul 08 '00	1528	252	423642	5088280	MTR 3045 DEPLOYED at Mkr-N3				
09:23:38 Jul 08 '00	1528	263	423642	5088280	MTR 3045 at Mkr-N3				R547-059
09:24:58 Jul 08 '00	1528	256	423642	5088280	Fiddling with MTR 3045.				
09:25:08 Jul 08 '00	1528	253	423642	5088280	Photo #22 of MTR 3045.				
09:25:48 Jul 08 '00	1528	250	423642	5088280	Photo #23 of Mkr N3 and the MTRs there.				
09:26:38 Jul 08 '00	1527	251	423642	5088280	Phot #24, 25 of Mkr N3.				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R547	Samples	PI	Sub Smpls	Fr Grb#
09:29:18 Jul 08 '00	1528	7	423640	5088276	Highlights on.				
09:30:28 Jul 08 '00	1528	37	425550	5087307	Photo #26 adn #27 of Mkr-N3.				
09:31:48 Jul 08 '00	1527	129	423639	5088279	Photo #28 Lots of mat, blue protist stuff, big collapse, as we are leaving N3. Moving into areas of less flow now.				
09:32:38 Jul 08 '00	1526	161	423639	5088279	Drive south/southwest until we leave the stained area, then will move the ship to go to Nascent.				
09:33:08 Jul 08 '00	1524	185	423647	5088292	Stopping highlights				
09:34:38 Jul 08 '00	1524	217	423645	5088278	930 m, bearing 160 degrees to Nascent Vent				
09:35:08 Jul 08 '00	1524	220	423635	5088264	Going to stick close to the bottom for 50 m or so before going up to the cage				
09:25:38 Jul 08 '00	1528	252	423642	5088280	Mkr-N3				R547-060
09:25:58 Jul 08 '00	1528	249	423642	5088280	MTR 3045 at Mkr-N3				R547-061
09:26:18 Jul 08 '00	1527	251	423642	5088280	2 MTR at Mkr-N3				R547-062
09:26:38 Jul 08 '00	1527	251	423642	5088280	vent fish at Mkr-N3				R547-063
09:26:58 Jul 08 '00	1526	124	423642	5088280	Mkr-N3				R547-064
09:26:58 Jul 08 '00	1526	124	423642	5088280	2 MTR at Mkr-N3				R547-065
09:27:28 Jul 08 '00	1526	40	423642	5088280	2 MTR at Mkr-N3				R547-066
09:28:08 Jul 08 '00	1529	25	423642	5088280	2 MTR at Mkr-N3				R547-067
09:30:08 Jul 08 '00	1528	16	425550	5087307	2 MTR at Mkr-N3				R547-068
09:30:28 Jul 08 '00	1528	37	425550	5087307	2 MTR at Mkr-N3				R547-069
09:31:38 Jul 08 '00	1528	147	423640	5088283	fall at Mkr-N3				R547-070
09:36:38 Jul 08 '00	1528	215	423634	5088260	Mkr-N3				R547-071
09:39:08 Jul 08 '00	1527	184	421449	5088284	change of tapes svhs & hi-8 main Embley tapes.				
09:41:18 Jul 08 '00	1496	42	423050	5087029	loss of communication.				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R547	Samples	PI	Sub Smpls	Fr Grb#
09:46:58 Jul 08 '00	1485	259	423029	5086987	shutting off power to science can to restart scientific telemetry system.				
09:49:00 Jul 08 '00	1485	285	423030	5087002	telemetry back on, moving toward Nascent.				
10:00:20 Jul 08 '00	1483	193	423033	5087000	Tunncliffe tape changed.				
10:22:02 Jul 08 '00	1479	163	423793	5087833	plume and some flock in the water column observed in water column.				
10:29:22 Jul 08 '00	1477	164	423858	5087644	more heavy plumage				
10:34:22 Jul 08 '00	1478	169	423895	5087586	yet more plumage				
10:38:42 Jul 08 '00	1517	181	423879	5087437	sub is on the bottom				
10:43:42 Jul 08 '00	1517	177	423897	5087427	photo 29				
10:43:52 Jul 08 '00	1518	175	423897	5087427	photo 30				
10:43:42 Jul 08 '00	1517	177	423897	5087427	close to Nascent				R547-072
10:46:14 Jul 08 '00	1518	254	423922	5087419	close to Nascent				R547-073
10:47:04 Jul 08 '00	1520	323	423922	5087419	close to Nascent				R547-074
10:48:04 Jul 08 '00	1520	341	423922	5087419	venting worms? close to Nascent				R547-075
10:48:14 Jul 08 '00	1520	340	423922	5087419	venting, worm tube and baguettes spotted.				
11:01:26 Jul 08 '00	1520	249	423908	5087380	11:01-looking for marker, appears to be Nascent area, unsure at this point. Lots of those blue mats and tube worms.				
11:02:36 Jul 08 '00	1518	351	423908	5087380	11:02-have spotted Mkr-N41 (near Nascent) and MTR's.				
11:04:36 Jul 08 '00	1520	165	423922	5087428	11:04-hairy crab-stone crab				
11:04:36 Jul 08 '00	1520	165	423922	5087428	1104- stone crab at N41. White body with dark legs				R547-076
11:06:06 Jul 08 '00	1520	166	423922	5087428	11:06-shimmer has been spotted throughout the area.				
11:09:56 Jul 08 '00	1520	240	423922	5087428	11:10-pump for fluid sampler has been turned on at Mkr-N41.				
11:15:38 Jul 08 '00	1520	241	423922	5087428	HFS-11 bag filter for chemistry and microbiology. Start sample at 11:16. T1=12.3 T2=9.0. A couple metres from N41. End time is 11:24. Volume is 698 ml. Maximum temperature is 13.2. Near Mkr-N41 x=423924 y=5087418.	R547-HFS-1 1-0006	Gendron /Butterfield/ Huber/Larson		

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R547	Samples	PI	Sub Smpls	Fr Grb#
11:26:18 Jul 08 '00	1520	239	423958	5087486	Taking a gas piston number 5 starting at 11:26 at Mkr-N41. T1=12.0 T2=9.0 Max T=12.8. Stop at 11:29. Volume pumped was 230 ml. Near Mkr-N41 x=423924 y=5087418.	R547-HFS-5-0007	Evans	Butterfield/Lilley	
11:31:08 Jul 08 '00	1520	239	423923	5087418	Photo 31 taken of N41.				
11:34:48 Jul 08 '00	1520	242	423448	5087277	Flow coming up in area, either from cavern or pillars.				
11:40:28 Jul 08 '00	1520	240	423903	5087412	Good fix X=423914 Y=5087405 which came in a 11:39.				
11:46:40 Jul 08 '00	1520	339	423898	5087406	West of marker, tube worms at vent has temperature of 13.4.				
11:53:50 Jul 08 '00	1520	225	423898	5087406	Photo 32 and 33 taken of collapsed pillow lava.				
12:12:32 Jul 08 '00	1519	323	423918	5087417	Looking for a location to stop and sample for slurp...having very little luck as the vents are all in crevases.				
12:16:22 Jul 08 '00	1520	87	423918	5087417	Can see NemoNet '99 camera, must be close to Nascent.				
12:21:52 Jul 08 '00	1520	182	423918	5087417	Start of suction sample near Mkr-N41 for PARTICULATES only at 12:21. End of suction sample at 12:33. Measured temperatures of 18-20 degrees. Near Mkr-N41 which is X=433922 Y=5087428.	R547-SS-J1-0008	Juniper		
12:36:32 Jul 08 '00	1520	179	423900	5087399	Photo #34 & #35 taken of this sample site.				
12:40:34 Jul 08 '00	1518	234	423994	5087524	Looking for an appropriate location to perform a suction sample but topography is too varied and vents in the crevases.				
12:45:24 Jul 08 '00	1520	1	423994	5087524	Taking suction sample approximately 0.5m south of NeMO camera for PARTICULATES at active vent. Began at 12:44 end suction at 12:59. Nascent x=423905 y=5087387.	R547-SS-J2-0009	Juniper		
12:56:24 Jul 08 '00	1521	1	423899	5087399	Photo #36 taken of suction sample 0009 in progress.				
12:58:54 Jul 08 '00	1521	1	423899	5087399	Encrustation of NeMO net camera in location of SS, sample 0009.				R547-077
13:05:44 Jul 08 '00	1520	260	423897	5087388	Looking for good site for HFS.				
13:06:16 Jul 08 '00	1520	260	423897	5087388	13:06-starting HFS in valve 2, filter for XRF. End sampling at 13:13 T1=14.4, T2=10.4 volume=600ml, max temp=14.8. Nascent.	R547-HFS-2-0010	Gendron		
13:14:16 Jul 08 '00	1520	260	423966	5087493	Start sample 13:14 for HFS bag sample #14. End sample at 13:22 T1=14.6, T2=10.1 max temp.= 14.7 volume=700ml. Nascent.	R547-HFS-14-0011	Butterfield/Huber/Mehtra/Larson		
13:26:16 Jul 08 '00	1517	196	424341	5087609	Heading south, looking for more shimmering flow to sample.				
13:27:46 Jul 08 '00	1518	201	424678	5087349	Good fix-X=423197 Y=5087354.				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R547	Samples	PI	Sub Smpls	Fr Grb#
13:30:16 Jul 08 '00	1518	199	423530	5087756	Moving the ship 50m due south.				
13:34:18 Jul 08 '00	1520	166	423908	5087335	13:34- photo 38 taken of skylight				
13:38:28 Jul 08 '00	1518	250	423876	5087231	Now moving to the northwest.				
13:39:58 Jul 08 '00	1518	43	423885	5087321	Wondering if iron oxide deposits that were seen here the last two years have changed to this present day material. No visible venting. Will try going east.				
13:44:48 Jul 08 '00	1519	72	423914	5087305	Now heading north in search of the elusive oxide and venting.				
13:45:48 Jul 08 '00	1518	327	423900	5087311	Some venting observed on the port side of the sub.				
13:46:38 Jul 08 '00	1519	358	423900	5087311	Not seeing the desired oxide, now leaving the area on a course for Mkr-33, bearing 190.				
14:00:28 Jul 08 '00	1520	194	423925	5087259	photo 35 collapse feature				
14:03:10 Jul 08 '00	1519	190	423917	5087221	Photo 40 on our way to Mkr-33 of collapsed lava.				
14:09:00 Jul 08 '00	1522	219	423906	5087135	Currently in an area of sheet flow.				
14:15:30 Jul 08 '00	1519	216	424099	5087603	Now entering a more active area.				
14:18:50 Jul 08 '00	1521	347	423841	5087062	Mkr-33 has been spotted and now attempting to find an area of highest flow for sampling.				
14:25:40 Jul 08 '00	1524	246	423842	5087055	Bac traps being attacked by a dreaded worm, Long crack venting lots of hot fluids. Mkr-33, at long crack.		Juniper		R547-078
14:29:40 Jul 08 '00	1524	245	423850	5087101	More bac traps on crack at Mkr-33 venting.		Juniper		R547-079
14:38:32 Jul 08 '00	1524	253	423843	5087050	14:38 Mkr-33 temp prob.				R547-080
14:39:52 Jul 08 '00	1524	254	423843	5087050	14:40- still probing for high temps around BTs at crack on Mkr-33. Temps ranging from 16-20 C.				
14:45:12 Jul 08 '00	1524	291	423850	5087101	photo 41 taken at Mkr-33				
14:45:42 Jul 08 '00	1524	343	423850	5087101	come to southern end of crack - still looking for higher temps.				
14:49:22 Jul 08 '00	1524	341	423850	5087101	photo 42, 43 taken of Mkr-33				
14:51:02 Jul 08 '00	1523	54	423850	5087101	Photo 44 taken at Mkr-33				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R547	Samples	PI	Sub Smpls	Fr Grb#
14:54:52 Jul 08 '00	1524	353	423850	5087101	Taking temperature measurements at shimmering flow on the east edge of the crack at Mkr-33. Temps: 6-10 degrees C				
14:57:02 Jul 08 '00	1524	353	423850	5087101	Photo 45 taken.				
14:57:22 Jul 08 '00	1523	311	423850	5087101	Getting very poor acoustic navigation.				
15:01:24 Jul 08 '00	1524	259	424114	5087613	Watching flow between two microbial traps at Mkr-33. Lots of white floc. Taking temperatures: 21 degrees C max.				
15:10:34 Jul 08 '00	1524	272	423852	5087092	Moving Bacterial Trap 46 out of the way so that we can start sampling.				
15:15:04 Jul 08 '00	1524	276	423849	5087095	Suction sample: MICROBIAL MAT and BIO (limpets,worms) into Jar 7. Start time: 15:21 End time: 15:32. Mkr-33 x=423850 y=5087101.	R547-SS-J7-0012	Moyer	J Chadwick	
15:34:46 Jul 08 '00	1524	243	421419	5086876	Taking temperatures at Mkr-33: Max 16.5 degrees C				
15:40:46 Jul 08 '00	1524	245	422756	5084736	Moving MTR 3289 out of the way to take more temps.				
15:45:16 Jul 08 '00	1523	250	423829	5087115	Temperatures up to 37.2 degrees!				
15:51:36 Jul 08 '00	1523	251	423873	5087091	HFS sampling in the crack at Mkr-33		Butterfield		R547-081
15:54:08 Jul 08 '00	1523	250	423842	5087053	Bactraps 44 at Mkr-33				R547-082
15:45:46 Jul 08 '00	1524	251	423621	5086813	Fluid sampler: FISH filter T1: 28.0 T2: 20.0 Start time: 15:47:49 End time: 15:56:45 Vol filtered: 1 litre Max temp: 34.7. Mkr-33	R547-HFS-3-0013	Huber		
15:57:08 Jul 08 '00	1523	250	423843	5087054	Limpets in flow at Mkr-33				R547-083
15:57:48 Jul 08 '00	1523	251	423843	5087054	Mkr-33, HFS sampling				R547-084
15:59:28 Jul 08 '00	1523	251	423843	5087054	Limpets at Mkr-33 near the crack				R547-085
16:01:48 Jul 08 '00	1523	250	423846	5087050	Two species (?) of scale worms at Mkr-33				R547-086
16:03:48 Jul 08 '00	1523	250	423846	5087050	Scale worm in crack at Mkr-33.				R547-087
15:57:18 Jul 08 '00	1523	251	423843	5087054	Fluid sampler: Lipid filter. T1: 28 T2: 20; Start time: 15:57 End time: 16:06 Vol filtered: 1 L Max temp: 37.9. Mkr-33	R547-HFS-6-0014	Huber		
16:04:38 Jul 08 '00	1523	249	423846	5087050	Palm worms and tube worms at Mkr-33.				R547-088
16:05:28 Jul 08 '00	1523	250	423846	5087050	Palm worms near crack at Mkr-33.				R547-089
16:09:28 Jul 08 '00	1523	250	423428	5084836	White floc spewed out during sampling of R547-HFS-6-0014.				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R547	Samples	PI	Sub Smps	Fr Grb#
16:06:58 Jul 08 '00	1523	250	423852	5087093	Fluid sampler: 2 filter DNA T1: 25.0, T2: 18.5; Start time: 16:07 End time: 16:16 Vol filtered: 1 L Tmax: 36.8. Mkr-33	R547-HFS-10-0015	Huber		
16:16:28 Jul 08 '00	1523	248	423678	5086857	Fluid sampler: sterivex DNA filter. T1: 28.0, T2:20.0, Start time: 16:16 End time: 16:25 Vol filtered: 1 L. Max temp: 35.2. Mkr-33	R547-HFS-12-0016	Mehta		
16:29:30 Jul 08 '00	1523	249	423828	5087154	Tapes changed at 16:23				
16:26:10 Jul 08 '00	1523	249	423845	5087056	Fluid sampler: XRF filter. T1: 28.0 T2: 20.0; Start time: 16:26 End time: 16:32 Vol filtered: 700 ml. Max temp: 38.5. Mkr-33	R547-HFS-15-0017	Gendron		
16:33:10 Jul 08 '00	1523	249	423859	5087086	Fluid sampler: unfiltered water (bag). T1: 25.0, T2: 20.0, Start time: 16:33 End time: 16:40 Vol: 700 ml. Max temp: 33.4. Mkr-33	R547-HFS-16-0018	Butterfield/Huber/Mehta/Larson		
16:40:30 Jul 08 '00	1523	250	423844	5087054	Fluid sampler: gas piston. T1:30.0, T2:15.0; Start time: 16:45 End time: 16:47 Vol: 150 ml. Max temp: 38.8. Mkr-33	R547-HFS-20-0019	Evans	Butterfield/Lilley	
16:50:42 Jul 08 '00	1523	249	423843	5087055	HFS at Mkr-33, during R547-HFS-22-0020 sampling				R547-090
16:47:50 Jul 08 '00	1523	250	423841	5087044	Fluid sampler: piston. T1: 27.0 T2: 15.0, Start time: 16:48 End time: 16:53 Vol: 852 ml. Max temp: 39.0. Mkr-33	R547-HFS-22-0020	Butterfield/Huber/Mehta/Larson		
16:54:02 Jul 08 '00	1523	249	423843	5087055	Putting bacterial trap #44 and #46 back into original positions. Finished with fluid sampling at Mkr-33. Headed to Snail now.				
17:03:12 Jul 08 '00	1523	256	423843	5087055	Snail is 31 m away at a heading of 110.				
17:07:02 Jul 08 '00	1523	225	423855	5087093	ROPOS will move slowly along the bottom at a heading of 110 to Snail.				
17:08:32 Jul 08 '00	1522	240	423845	5087047	Photo #46 taken at Mkr-33.				
17:08:42 Jul 08 '00	1521	248	423845	5087047	17:08 Tunnicliffe tapes turned on.				
17:10:12 Jul 08 '00	1522	106	423708	5086759	Photo #47 taken as ROPOS goes along crack to Snail.				
17:12:52 Jul 08 '00	1523	104	423856	5087097	Photo #48 taken.				
17:13:12 Jul 08 '00	1522	104	423856	5087097	Mkr-N8 spotted in the distance (at Snail). Photo #49 taken.				
17:14:12 Jul 08 '00	1523	84	424812	5087051	Photo #50 taken of Snail? Tube worms are here!				
17:15:02 Jul 08 '00	1521	43	424812	5087051	Photo #51 taken of Snail?				
17:10:42 Jul 08 '00	1523	104	423845	5087118	Leaving Mkr-33				R547-091
17:10:42 Jul 08 '00	1523	104	423845	5087118	Geology near Mkr-33				R547-092

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R547	Samples	PI	Sub Smpls	Fr Grb#
17:10:52 Jul 08 '00	1523	105	423847	5087058	Mkr-33				R547-093
17:12:42 Jul 08 '00	1522	102	423856	5087097	Near Snail				R547-094
17:13:42 Jul 08 '00	1523	90	423845	5087103	Snail				R547-095
17:17:12 Jul 08 '00	1524	44	423878	5087089	Focusing in on the limpets that are stacking on top of each other down INTO the flow.				
17:18:54 Jul 08 '00	1524	60	423872	5087051	Highlights on.				
17:20:14 Jul 08 '00	1524	60	423870	5087052	Focusing in on the tube worms at Snail.				
17:20:54 Jul 08 '00	1524	55	423870	5087052	Photo #52 taken of tube worms at Snail.				
17:22:04 Jul 08 '00	1524	56	423867	5087113	Scale worm at Snail				R547-096
17:25:54 Jul 08 '00	1524	57	423871	5087047	Still looking at the limpet necklaces...				
17:26:34 Jul 08 '00	1524	57	423870	5087049	Stacks of limpets at Snail.				R547-097
17:27:34 Jul 08 '00	1523	57	424127	5087585	Position for N8 (Snail): x=423877 y=5087088 z=1524. Photo #53 taken of limpet necklaces.				
17:30:44 Jul 08 '00	1523	59	423870	5087044	Crack at Snail				R547-098
17:31:14 Jul 08 '00	1523	66	423872	5087053	Photo #54 taken.				
17:31:44 Jul 08 '00	1523	79	423882	5087087	Highlights off.				
17:32:24 Jul 08 '00	1523	62	423882	5087087	Blue mat spotted in the distance at Snail.				
17:32:54 Jul 08 '00	1524	62	423882	5087087	Getting ready to take temperature measurements in the flow.				
17:34:44 Jul 08 '00	1523	60	423870	5087047	Max temperature: 17.7 degrees C				
17:45:14 Jul 08 '00	1523	59	423884	5087078	Photo #55 taken at Snail.				
17:45:14 Jul 08 '00	1523	59	423884	5087078	Hot Fluid Sample being taken at Snail				R547-099
17:42:54 Jul 08 '00	1523	59	423877	5087089	Fluid sampler: bag, unfiltered water. T1: 11.8 T2: 78.0: Start time: 17:44 End time: 17:48 Vol filled: 651 ml Max temp: 11.8. Snail Mkr-N8 x=423877 y=5087088.	R547-HFS-19-0021	Butterfield/Huber/Mehta/Larson		
17:51:06 Jul 08 '00	1523	70	423857	5087103	Starting Juniper tapes.				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R547	Samples	PI	Sub Smps	Fr Grb#
17:51:26 Jul 08 '00	1523	70	423857	5087103	Photo #56 of ugly fish.				
17:51:46 Jul 08 '00	1523	70	423857	5087103	ugly fish (brotulid?)				R547-100
17:55:16 Jul 08 '00	1523	66	423871	5087049	Flushing suction sampler jar 8				
17:56:16 Jul 08 '00	1523	39	423871	5087049	Suction sample into Jar 3: BIO Start time: 17:57 End time: 18:03. Snail Mkr-N8.	R547-SS-J3 -0022	Juniper		
18:07:06 Jul 08 '00	1523	71	423881	5087093	Photo #47 taken at Snail while suctioning.				
18:03:46 Jul 08 '00	1523	33	423878	5087089	Suction sample into Jar 5: BIO Start time: 18:06 End time: 18:13. Snail Mkr-N8.	R547-SS-J5 -0023	Marcus	J Chadwick	
18:17:48 Jul 08 '00	1523	66	423857	5087104	Planning to deploy at least one MTR at Snail.				
18:24:18 Jul 08 '00	1523	353	423871	5087050	MTR 3087 DEPLOYED at Snail near Mkr-N8				
18:24:58 Jul 08 '00	1523	353	423876	5087090	Taking temperature measurements at MTR 3087. Max temp: 16.6 degrees C				
18:28:18 Jul 08 '00	1523	343	423879	5087095	Highlights on.				
18:28:28 Jul 08 '00	1523	343	423879	5087095	Photo #59, 60, 61 taken on the way out of Snail.				
18:29:08 Jul 08 '00	1522	4	423878	5087091	Photo #62 taken.				
18:29:28 Jul 08 '00	1522	355	423878	5087094	Photo #63				
18:31:58 Jul 08 '00	1524	75	423869	5087036	Photo #64 at Snail.				
18:34:08 Jul 08 '00	1523	75	423870	5087047	Tapes changed at 18:28.				
18:23:38 Jul 08 '00	1523	0	423873	5087046	MTR deployment 3087. Snail vent. Near Mkr-N8		Embley		R547-101
18:29:08 Jul 08 '00	1522	4	423878	5087091	Overview of Snail Vent with MTR deployed.				R547-102
18:32:28 Jul 08 '00	1524	72	423871	5087049	Jean's suction sample site along crack. Bac Trap in front of MTR rope.				R547-103
18:35:28 Jul 08 '00	1523	75	423868	5087051	Photo #65 of the MTR at Snail.				
18:38:08 Jul 08 '00	1523	84	423857	5087100	Highlights off at 1837				
18:39:08 Jul 08 '00	1524	86	423868	5087046	DEPLOY MTR 3320 in a pit just down from the marker at Snail.				
18:46:20 Jul 08 '00	1523	85	423870	5087052	Good fix 4 tranponder x=423881 y=5087093 for MTR DEPLOYMENT				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R547	Samples	PI	Sub Smps	Fr Grb#
18:50:30 Jul 08 '00	1523	70	423870	5087052	suction sampler hose has a break near the nozzle.				
18:53:30 Jul 08 '00	1523	69	423882	5087076	Temp above MTR is 10C.				
18:55:30 Jul 08 '00	1523	69	423869	5087049	photo 66 of MTR in the pit.				
18:56:00 Jul 08 '00	1523	74	423870	5087049	photo 67 MTR in pit.				
18:56:40 Jul 08 '00	1522	103	423870	5087049	photo 68 MTR in pit.				
18:57:00 Jul 08 '00	1523	94	423870	5087049	Heading to Cloud vent, Mkr-21.				
18:58:10 Jul 08 '00	1519	32	423870	5087049	photo 69 sheet flow with patches of white				
18:58:50 Jul 08 '00	1521	49	423870	5087049	photo 70				
18:59:10 Jul 08 '00	1519	57	423870	5087049	photo 71 pillar w/ blue on it.				
18:57:10 Jul 08 '00	1523	87	423870	5087049	MTR #3320 deployed at second vent near Snail.				R547-104
18:59:40 Jul 08 '00	1517	50	423870	5087049	photo 72				
19:04:00 Jul 08 '00	1516	192	423896	5087109	photo 73 staining on the wall near Cloud vent				
19:07:30 Jul 08 '00	1518	29	423896	5087109	change of tapes for Tunnecliffe VHS at 1900.				
19:08:40 Jul 08 '00	1521	71	423896	5087109	No good navigation. ROPOS is going up to try to reorient and try to find Cloud.				
19:14:12 Jul 08 '00	1519	254	423892	5087064	photo 74 cloud's smoke				
19:14:42 Jul 08 '00	1523	317	423892	5087064	Arrive at Cloud Mkr-N6/21 - Big hole source of smoke.				
19:16:02 Jul 08 '00	1524	324	423892	5087065	good fix 423898 5087106 for Mkr-21				
19:28:02 Jul 08 '00	1524	356	423888	5087072	423895 5087110 good fix				
19:32:22 Jul 08 '00	1525	354	423899	5087114	HFS FISH filter #7. Begin 19:32:29; End 19:41:01; Vol 1000ml. T1 15.9; T211.3 Tmax 15.9C. Cloud Mkr-N6/21 x=423901 y=5087116.	R547-HFS-7-0024	Huber		
19:33:42 Jul 08 '00	1525	355	423663	5086823	McLane pump (MP) 5.7 L/min initial flow rate. Begin time 1933, end time 2022. Cloud Mkr-N6/21.	R547-McLane-0025	Metaxas		
19:41:34 Jul 08 '00	1525	354	423889	5087069	Change tapes 1931 Juniper VHS.				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R547	Samples	PI	Sub Smps	Fr Grb#
19:42:14 Jul 08 '00	1525	354	423889	5087070	HFS 13 for DNA (two filters) Begin 19:42:24, End 19:51:20, T1 15.9, T2 11.3, Tmax 15.9, Vol 1000ml. Cloud Mkr-N6/21.	R547-HFS-1 3-0026	Huber		
19:51:04 Jul 08 '00	1524	354	423889	5087070	STOP DNA 19:51:20				
19:52:04 Jul 08 '00	1524	357	423889	5087070	19:52:16 R547-HFS-18-27 Bag sample				
19:52:54 Jul 08 '00	1524	356	423889	5087070	bag sample Begin 19:52:16, End 19:59:04, T1 15.7, T2 11.2, Tmax 15.9, Vol 700 ml. Cloud Mkr-N6/21.	R547-HFS-1 8-0027	Butterfield/ Huber		
19:55:24 Jul 08 '00	1524	356	423889	5087068	tubeworms at Cloud				R547-105
19:56:54 Jul 08 '00	1524	356	423887	5087069	McClane pump is clogging, Reaching minimum flow and then shuts down.				
19:58:54 Jul 08 '00	1524	356	423887	5087066	stop bag at 19:59:04				
20:00:34 Jul 08 '00	1524	356	424125	5087560	20:00:45 starting XRF filter 21 Sample number R547-HFS-21-028				
20:01:24 Jul 08 '00	1524	356	424127	5087562	XRF filter Begin 20:00:45 End 20:04:21 T1 15.8 T2 11.5 Tmax 15.9 vol 400 ml. Cloud Mkr-N6/21.	R547-HFS-2 1-0028	Gendron		
20:04:04 Jul 08 '00	1524	356	423672	5086833	20:04:21 Stop XRF sample 400ml				
20:04:34 Jul 08 '00	1524	356	423672	5086833	Tubeworms at Cloud				R547-106
20:10:16 Jul 08 '00	1524	355	423903	5087097	McClane pump is still working (was clogged but became unclogged). Pump is on manual and must be continually restarted.				
20:06:16 Jul 08 '00	1524	356	423897	5087112	Gas piston 23 Begin 20:05:28 end 20:07:46, T1 15.8, T2 11.4, Tmax 15.9, Vol 250 ml. Cloud Mkr-N6/21.	R547-HFS-2 3-0029	Evans	Butterfield/ Lilley	
20:06:46 Jul 08 '00	1524	357	423888	5087068	20:05:05 Starboard Gas Tight Bottle #7 (GTB). Cloud Mkr-N6/21.	R547-GTB-0 030	Evans	Butterfield/ Lilley	
20:07:46 Jul 08 '00	1524	355	423896	5087110	Stopping piston 20:07:46 good cross check w/ GTB				
20:18:06 Jul 08 '00	1524	356	423896	5087112	Tubeworms around where we are pumping with the McClane pump. Cloud Mkr-N6/21				R547-107
20:20:06 Jul 08 '00	1524	0	423896	5087111	Same as above				R547-108
20:21:26 Jul 08 '00	1524	1	423895	5087113	McClane pump sampling is completed. 20:22				
20:23:46 Jul 08 '00	1524	7	423890	5087068	ROPOS is moving 3 meters West to Mkr-N4.				
20:27:16 Jul 08 '00	1522	338	423898	5087101	ROPOS has arrived at Cloud Mkr-N4. Repositioning to collect a suction sample.				
20:38:08 Jul 08 '00	1522	80	423868	5087160	photo 75 marker Mkr-N4				
20:44:58 Jul 08 '00	1522	100	424385	5087848	Could not reach the organisms with the suction sampler. Will return to Mkr-N6				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R547	Samples	PI	Sub Smps	Fr Grb#
20:39:18 Jul 08 '00	1522	80	423895	5087105	Photo 76 area to be suction sampled				
20:41:08 Jul 08 '00	1522	89	423891	5087115	Large quantity of scaleworms.				
20:42:08 Jul 08 '00	1522	103	423872	5087121	photo 77 scale worms				
20:44:18 Jul 08 '00	1522	99	424385	5087851	scale worms				R547-109
20:45:18 Jul 08 '00	1522	96	424385	5087848	Mkr-N4 Cloud, snails?				R547-110
20:46:48 Jul 08 '00	1521	81	424385	5087848	photo 78 worm field				
20:46:58 Jul 08 '00	1521	84	424385	5087848					R547-111
20:47:08 Jul 08 '00	1521	100	424385	5087848	photo 79 tube worms and smoke				
20:48:08 Jul 08 '00	1521	156	424385	5087848	photo 80 edge of the pit				
20:49:08 Jul 08 '00	1518	269	424385	5087848	photo 81 the pit				
20:49:48 Jul 08 '00	1523	323	424385	5087848	photo 82 blue protozoans				
20:51:08 Jul 08 '00	1524	357	424130	5087563	photo 83 down in to the pit				
20:54:08 Jul 08 '00	1524	17	423898	5087115	Scale worms collected by suction sampler (BIO). 20:55 begin suction. End 21:06. Also suctioned basalt chips (Rk). Cloud Mkr-N6/21 x=423901 y=5087116.	R547-SS-J4 -0031	Marcus/ J Chadwic k	Juniper	
20:55:28 Jul 08 '00	1524	18	423888	5087065	Suction sampler tube is torn but still working.				
21:00:20 Jul 08 '00	1524	18	423888	5087065	collecting scale worms with the suction sampler.				R547-112
21:01:50 Jul 08 '00	1524	43	423888	5087065	2100 change of tapes Tunnecliffe VHS.				
21:05:20 Jul 08 '00	1524	33	422598	5089508	scale worms and blue stuff.				R547-113
21:08:10 Jul 08 '00	1524	45	422598	5089508	2106 finish suction sampler at N6.. flushing Jar 8.				
21:19:20 Jul 08 '00	1524	55	423876	5087120	Photo 84 Cloud Vent				
21:22:00 Jul 08 '00	1521	302	423876	5087120	photos 85,86,87 of smoke in Cloud Vent				
21:24:20 Jul 08 '00	1524	310	423876	5087120	Suction sampling for PARTICULATES at about 1/3 pump. Begin 21:24, End 21:33. Cloud Mkr-N6/21.	R547-SS-J6 -0032	Juniper		

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R547	Samples	PI	Sub Smps	Fr Grb#
21:25:00 Jul 08 '00	1524	309	423876	5087120	suctioning particulates at Mkr-N6 Cloud.				R547-114
21:25:31 Jul 08 '00	1524	309	423876	5087120	2121 tapes on Juniper VHS. 2122 tapes off for Tunnecliffe.				
21:25:51 Jul 08 '00	1524	309	423885	5087044	SS of particulates at Cloud, Mkr-N6				R547-115
21:26:30 Jul 08 '00	1524	309	423895	5087109	tube worms at Mkr-N6, Cloud				R547-116
21:27:00 Jul 08 '00	1524	310	423895	5087109	tube worms at Mkr-N6, Cloud				R547-117
21:27:11 Jul 08 '00	1524	310	423895	5087109	tube worms at Mkr-N6				R547-118
21:33:12 Jul 08 '00	1525	313	423889	5087065	end of suction sampling R547-SSJ6-032 at 21:33				
21:35:13 Jul 08 '00	1525	315	423890	5087067	Moving back to the cage to transit to Castle.				
21:36:03 Jul 08 '00	1524	10	423890	5087067	photo 88				
21:36:43 Jul 08 '00	1521	108	423890	5087067	All tapes were stopped VHS Juniper, VHS Embley, Hi8 Embley at 21:35				
21:42:33 Jul 08 '00	1486	59	423849	5087068	ROPOS at cage and ship is moving at 1 knot to Castle.				
22:37:17 Jul 08 '00	1519	171	424035	5088024	photo 89 getting close to Casle, nice pillows.				
22:37:17 Jul 08 '00	1519	171	424035	5088024	pillow mound near Castle.				R547-119
22:38:47 Jul 08 '00	1519	273	424029	5086316	photo 90				
22:42:17 Jul 08 '00	1518	162	424023	5086318	photo 91 bottom				
22:42:57 Jul 08 '00	1517	158	424025	5086331	photo 92 pillows				
22:43:17 Jul 08 '00	1517	161	424025	5086331	old pillows near Castle				R547-120
22:43:57 Jul 08 '00	1515	158	424035	5086318	ROPOS has arrived at Castle Mkr-N5				
22:44:17 Jul 08 '00	1514	231	423387	5086974	photo 92 and 93 and 94 at Castle				
22:44:57 Jul 08 '00	1514	138	423387	5086974	Highlights on				
22:44:07 Jul 08 '00	1515	158	424035	5086318	Castle				R547-121
22:44:27 Jul 08 '00	1514	145	423387	5086974	Mkr-N5, is this Castle? or is it near Castle?				R547-122

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R547	Samples	PI	Sub Smps	Fr Grb#
22:48:07 Jul 08 '00	1510	289	424030	5086308	Anhydrite spire on Castle, near Mkr-N5				R547-123
22:48:47 Jul 08 '00	1515	279	423559	5086491	another of anhydrite spire				R547-124
22:50:07 Jul 08 '00	1516	316	423584	5086487	photo 95, 96 Castle anhydrite structure.				
22:50:57 Jul 08 '00	1518	309	424134	5087873	photo 97				
22:49:47 Jul 08 '00	1517	306	424039	5086302					R547-125
22:50:27 Jul 08 '00	1520	311	423584	5086487	anyhydrite structures, tube worms? and crab				R547-126
22:51:17 Jul 08 '00	1519	308	423946	5086314	more of the same				R547-127
22:51:47 Jul 08 '00	1519	302	423946	5086314	photo 97 C.A. closeup				
22:52:07 Jul 08 '00	1520	305	423946	5086314	close up, anhydrite spire, limpets and scale worms				R547-128
22:53:05 Jul 08 '00	1520	310	424029	5086316	more castle				R547-129
22:53:37 Jul 08 '00	1519	8	424029	5086316	anhydrite with lots of hot flow				R547-130
22:58:07 Jul 08 '00	1519	20	424017	5086306	photo 98, 99,100 more of the same				
22:58:37 Jul 08 '00	1519	34	423910	5086320	position check x 424017, y 5086306				
22:57:47 Jul 08 '00	1519	35	424023	5086306	anhydrite spire, 424017, 5086306				R547-131
22:59:27 Jul 08 '00	1520	30	423910	5086320	photo 101 very closeup Castle.				
23:00:07 Jul 08 '00	1520	42	424017	5086306	close up of anhydrite spire 424023, 5086306 z=1520. We're now at Castle target (not Mkr-N5) We moved about 15 meters due west of marker. There are actually 2 structures in this area.				R547-132
23:01:27 Jul 08 '00	1520	42	421534	5085999	palm worm etc at base of spire				R547-133
23:02:17 Jul 08 '00	1520	42	422919	5083031	tube worms covered with limpets (Verena)				R547-134
23:03:17 Jul 08 '00	1520	41	424010	5086299	timber - down goes the spire. HFS sampler.				R547-135
23:04:07 Jul 08 '00	1520	41	423904	5086309	highlight tape off, start probing temp with HFS				
23:06:17 Jul 08 '00	1520	41	423910	5086311	2306 highlights back on				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R547	Samples	PI	Sub Smps	Fr Grb#
23:09:47 Jul 08 '00	1520	43	424062	5086330	sample of HFS 17, 272.2 deg C				
23:10:17 Jul 08 '00	1520	43	424019	5086294	castle anhydrite bag sample with filter #17; Begin 23:10:04, End 23:12:20, T1 272.2, T2 150.0, Tmax 272.6, Vol 250 ml. z=1520. Castle x=424023 y=5086306.	R547-HFS-17-0033	Butterfield	Gendron, Huber	
23:11:47 Jul 08 '00	1520	43	424007	5086300	close up of HFS and gastight sample site at Castle				R547-136
23:12:47 Jul 08 '00	1520	43	421538	5085997	HFS and gastight				R547-137
23:12:17 Jul 08 '00	1520	44	421544	5085991	port gastight btl #6 Anhydrite, 272.6 deg C. Castle	R547-GTB-0034	Evans	Butterfield/Lilley	
23:14:37 Jul 08 '00	1520	44	422424	5084609	position x=424023, y=5086306 castle samples				
23:20:07 Jul 08 '00	1520	43	424606	5086300	Anhydrite base, minerals to flushing bottle z=1520 (Basalt subsample to J Chadwick). Castle	R547-SS-J8-0035	Fortin	Butterfield/JChadwick	
23:25:49 Jul 08 '00	1520	43	423583	5086338	MTR #3196 to be deployed. main tapes changed (Hi-8 and SVHS). photo 102				
23:32:09 Jul 08 '00	1520	328	423933	5086318	MTR 3196 deployed in the neighborhood of tube worm clump and bacterial traps, base of Castle anhydrite, photo 103				
23:39:19 Jul 08 '00	1517	356	422443	5085127	photo 104, 105 sulfide sample in transit				
23:42:09 Jul 08 '00	1511	10	422443	5085127	SULFIDE chimney sample from very near anhydrite z=1520. Castle	R547-SF-0036	Fortin	Juniper / Tunncliffe	
23:52:01 Jul 08 '00	1519	128	424581	5086284	Sampling basalt on old flow. Castle		J Chadwick		R547-138
00:07:01 Jul 09 '00	1521	291	423931	5086302	Old basalt chunk (Rk). Northeast of Castle x=423974 y=5086299	R547-Rk-0037	J Chadwick	Fortin/Tunncliffe	
23:54:21 Jul 08 '00	1510	252	424020	5086343	heading back to the sub cage				
23:55:11 Jul 08 '00	1503	235	424037	5086261	tapes off				
23:55:51 Jul 08 '00	1492	284	423656	5087009	basalt returned to natural habitat, scheme to find smaller one				
00:09:41 Jul 09 '00	1494	342	423977	5086251	Off bottom, heading for cage. Dive terminated. Full load of samples. Hot time on the Brown tonite.				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R547	Samples	PI	Sub Smpls	Fr Grb#
					<p>R547 Dive Summary: Magnesia-(it's dead this year) Deployed Mkr-67. New Vent found/named BlueNose. Old</p> <p>Worms-Deployed MTR. Samples: 2 hfs.</p> <p>Mkr-N3-Deployed 2 MTRs. Samples: 3 hfs.</p> <p>Mkr-N41-Samples: 2 hfs, 1 ss.</p> <p>Nascent-Samples: 2hfs, 1 ss.</p> <p>Mkr-33-Samples: 1 ss, 8 hfs. Snail-Deployed 2 MTRs. Samples: 1 hfs, 2 ss. Cloud-Samples: 5 hfs, 1 gtb, 2 ss, McLane pump.</p> <p>Castle-Deployed MTR. Samples: 1 hfs, 1 gtb, 1 ss, 1 sulfide.</p>				

R548

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R548	Samples	PI	Sub Smpls	Fr Grb#
					Positions in utm x/y columns are automated and not flagged for accuracy. Consult dive maps for final position data.				
					Tasks: Deploy benchmarks at caldera center near BPR, Magnesia, Mkr-33, BagCity. Move osmo from Magnesia to Mkr-N41. Hook up NemoNet '99 camera to release mooring (Mkr-N41). Deploy MTR's, suction sample, and twg's Joystick, FeCity, BagCity.	Bottom Time: JD191(7/9) 0836- JD192(7/10) 0255			
07:18:43 Jul 09 '00	0	221	424081	5086557	ROPOS in the water				
08:31:23 Jul 09 '00	1480	272	424081	5086557	We are ready to rock and roll.				
08:36:33 Jul 09 '00	1532	0	424081	5086557	Ropos on the bottom. We should be near the center of the caldera.				
08:40:33 Jul 09 '00	1532	359	421747	5089515	Photo 1. We are looking for the BPR mooring, should be 50 m to the north.				
08:40:33 Jul 09 '00	1532	359	421747	5089515	Bottom, near BPR mooring.				R548-001
08:42:13 Jul 09 '00	1530	1	421747	5089515	Traversing ropy sheet flow, some is jumbled. Flying over a few sea stars and ophiuroids.				
08:48:25 Jul 09 '00	1535	9	421747	5089515	Brittle stars and small rattail.				
08:48:25 Jul 09 '00	1535	9	421747	5089515	Ophiuroid and vent fish near BPR mooring.				R548-002
08:50:55 Jul 09 '00	1535	360	421747	5089515	Vent fish and ophiuroids at the middle of caldera.				R548-003
08:51:25 Jul 09 '00	1535	2	421747	5089515	Large gastropod on lava - looks like a white blob from the distance. Tried to get some close up video.				
09:03:37 Jul 09 '00	1527	289	421747	5089515	BPR mooring.				R548-004
09:04:07 Jul 09 '00	1534	311	421747	5089515	BPR mooring.				R548-005
09:03:07 Jul 09 '00	1526	289	421747	5089515	At the BPR mooring. Found it by coming up in the water column 5 m and used the mesotech to release it. We were unable to use the acoustic release on the mooring to talk to it. Photo 2 of BPR.				
09:06:57 Jul 09 '00	1534	328	421747	5089515	Still photos 3, 4 of BPR.				
09:07:27 Jul 09 '00	1534	309	421747	5089515	Photo 5 of BPR on lobate flows.				
09:07:47 Jul 09 '00	1535	300	421747	5089515	BPR mooring.				R548-006
09:09:49 Jul 09 '00	1535	337	421747	5089515	Benchmark-63				R548-007
09:10:19 Jul 09 '00	1535	337	421747	5089515	DEPLOYING Bmrk-63.				
09:16:19 Jul 09 '00	1535	1	421738	5089566	Photo #6 of Bmrk-63				
09:18:29 Jul 09 '00	1536	343	421738	5089566	Bmrk-63 in place.				R548-008
09:20:59 Jul 09 '00	1535	347	421738	5089566	Pressure measurement at Bmrk-63.				R548-009
09:26:21 Jul 09 '00	1536	347	421738	5089566	Bmrk-63				R548-010

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R548	Samples	PI	Sub Smpls	Fr Grb#
09:27:31 Jul 09 '00	1535	347	421738	5089566	Bmrk-63				R548-011
09:20:49 Jul 09 '00	1535	347	421738	5089566	Taking pressure measurement at Bmrk-63. Start at 09:21 end at 9:46.				
09:41:43 Jul 09 '00	1535	347	421738	5089566	Photo #7 of Bmrk-63.				
09:46:13 Jul 09 '00	1536	336	421738	5089566	Bmrk-63.				R548-012
09:46:35 Jul 09 '00	1536	332	421738	5089566	Cage motor has been turned off for a good fix for bench mark location.				
09:55:25 Jul 09 '00	1536	329	421718	5089568	Two transponder ROPOS fix for Bmrk-63 x=421717 y=5089568 . The ONLY fix.				
09:57:25 Jul 09 '00	1529	58	421718	5089568	Transit to Magnesia, going to take ~1hr. Bringing ROPOS to cage, going to "swim" in front of cage. Moving ship SE at 1 knot for 2.1 km. Video is off at 10:01.				
11:18:27 Jul 09 '00	1471	116	422508	5089153	Seeing a plume in the water column about 200 m NW of Magnesia. ROPOS is up by the cage at 1472 m.				
11:32:11 Jul 09 '00	1485	121	423655	5088579	Now over Magnesia and still seeing plume in the SIT camera 60 m off the bottom.				
11:34:23 Jul 09 '00	1489	152	423666	5088550	Heading down to bottom at Magnesia vent.				
11:37:11 Jul 09 '00	1523	142	423001	5089180	Video has been turned back on.				
11:38:51 Jul 09 '00	1526	158	423663	5088549	Looking at a "city" of pillars. Looking for Magnesia marker.				
11:43:33 Jul 09 '00	1525	257	423652	5088581	Have spotted Mkr-67 for Magnesia vent area.				
11:48:23 Jul 09 '00	1527	53	423661	5088545	Attempting to deploy Bmrk-1 at Mkr-67.				
11:54:23 Jul 09 '00	1527	183	423658	5088548	DEPLOYMENT of Bmrk-1. Going to take pressure measurement.				
11:57:13 Jul 09 '00	1527	189	423659	5088548	Pressure measurement of Bmrk-1 at Magnesia.				R548-013
11:56:13 Jul 09 '00	1528	189	423661	5088544	Pressure recording beginning at 11:57.				
12:00:13 Jul 09 '00	1527	189	423659	5088548	Photo #8 taken of pressure measurement.				
12:18:15 Jul 09 '00	1528	188	423010	5089154	Finished with pressure measurement and now looking for OSMO and place to SS.				
12:19:25 Jul 09 '00	1527	181	425637	5087836	Photos 9, 10, 11, 12 taken of Bmrk-1.				
12:20:05 Jul 09 '00	1527	68	425637	5087836	Layout for Bmrk-1 at Magnesia with Mkr-in background.				R548-014
12:20:55 Jul 09 '00	1527	48	425637	5087836	Photo 13, 14, 15 taken of osmo which is east of marker.				
12:28:45 Jul 09 '00	1531	147	423660	5088555	Preparing for FeO suction sample---Ian has created a small flurry of FeO.				
12:29:25 Jul 09 '00	1531	145	422971	5089183	Start suction 12:28 for FeO - Suction ended 12:31. Appears very fluffy, looks like last years bacterial flock is now covered with FeO. (Rock chips subsmpl). Magnesia Mkr-67 - x=423661 y=5088545 .	R548-SS- J1-0001	Fortin	J Chadwick	
12:33:15 Jul 09 '00	1531	146	422971	5089183	Beautiful lava pillar at Magnesia.				R548-015
12:35:05 Jul 09 '00	1531	144	422962	5089175	Now going to pick up osmosampler.				
12:35:25 Jul 09 '00	1531	145	422962	5089175	Photo #13 taken.				
12:36:37 Jul 09 '00	1528	222	422973	5089171	Bmrk-1 does not look flat.				R548-016

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R548	Samples	PI	Sub Smps	Fr Grb#
12:37:47 Jul 09 '00	1529	239	423664	5088553	While in transit to osmosampler, bmrk looked on a slant and as a result will reposition.				
12:43:47 Jul 09 '00	1528	245	422976	5089169	Benchmark has been moved and now positioning pressure measuring device to take a reading.				
12:48:37 Jul 09 '00	1528	241	423660	5088548	Pressure measurement of Bmrk-1 at new position Magnesia.				R548-017
12:45:37 Jul 09 '00	1528	240	423660	5088548	Start of pressure measurement at 12:46. End pressure measurement at 12:58				
12:58:47 Jul 09 '00	1527	247	422977	5089165	ROPOS was pulled off bmrk while taking pressure reading and the bmrk was jarred so must reposition bmrk again.				
13:08:20 Jul 09 '00	1528	351	425665	5087756	3rd take of pressure measurement on Bmrk-1 at Magnesia.				R548-018
13:05:59 Jul 09 '00	1528	350	425665	5087756	Bmrk-1 has been repositioned and pressure measurement must be taken again...start time 13:07 end time 13:27 Photo 17 while taking measurement. Photos 18 and 19 taken after measurement.				
13:29:40 Jul 09 '00	1526	316	425667	5087769	Final(?) position of Bmrk-1 at Magnesia				R548-019
13:34:32 Jul 09 '00	1531	325	423660	5088546	Have picked up osmosampler but it appears that some rocks have fallen on the tubing.				
13:37:42 Jul 09 '00	1531	318	423660	5088546	Osmosampler has been picked up and moving it to Nascent.				
13:42:52 Jul 09 '00	1528	48	423664	5088546	Photo 20 taken after picking up and securing the osmo sampler. Moving it over to Nascent, distance of 1187m away to SE (164 heading). Turned off Embley archive tapes.				
14:47:26 Jul 09 '00	1477	210	423793	5087244	Interesting looking snot??? in transit to Nascent				R548-020
14:50:26 Jul 09 '00	1479	212	423941	5087524	Ship has arrived at Cammoor (NeMO'99 camera release mooring).				
14:53:56 Jul 09 '00	1484	155	423941	5087524	ROPOS going to the bottom.				
14:58:08 Jul 09 '00	1520	88	423996	5087467	On the bottom, headed to the east.				
15:02:28 Jul 09 '00	1520	131	424015	5087456	MTR mooring cable has been mowed over by lava.				
15:01:48 Jul 09 '00	1519	136	424015	5087456	Line in new flow.				R548-021
15:02:38 Jul 09 '00	1520	197	424015	5087456	Mooring line covered by new flow.				R548-022
15:03:58 Jul 09 '00	1520	174	424015	5087456	MTR mooring line in the flow.				R548-023
15:06:08 Jul 09 '00	1520	135	423960	5087332	Good fix: x=423960 y=5087332. (Mooring line overrun by lava)				
15:09:18 Jul 09 '00	1517	88	424046	5087439	Found camera mooring.				
15:10:08 Jul 09 '00	1518	99	424049	5087421	Crab on Nemonet'99 camera mooring.				R548-024
15:13:08 Jul 09 '00	1515	80	423996	5087329	Headed to the Nemonet'99 camera site (near Nascent).				
15:18:48 Jul 09 '00	1518	310	423994	5087472	Moving the ship 60m to the NW.				
15:29:50 Jul 09 '00	1519	327	423846	5087237	Still looking for the Nemonet'99 camera (near Nascent - Mkr-N41)				
15:31:10 Jul 09 '00	1519	58	423846	5087237	Mkr-N41 spotted in the distance.				
15:31:50 Jul 09 '00	1518	49	423897	5087412	Photo 21 taken (counter is 2 photos behind).				
15:32:20 Jul 09 '00	1521	101	423957	5087492	Photo 22 taken.				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R548	Samples	PI	Sub Smps	Fr Grb#
15:32:40 Jul 09 '00	1521	98	423957	5087492	Set down OSMO (the one picked up at Magnesia) at Mkr-N41. Will get it at a later time.				
15:34:10 Jul 09 '00	1521	100	423911	5087406	Looking for a good place to deploy some MTRs. Found some shimmery flow.				
15:36:20 Jul 09 '00	1520	166	423911	5087406	3 meters south of Mkr-N41. Getting ready to deploy MTR_3211.				
15:37:50 Jul 09 '00	1520	167	423895	5087405	DEPLOYED MTR_3211 in a clump of tube worms and limpets (shimmery flow).				
15:39:10 Jul 09 '00	1520	156	423901	5087412	MTR positioned at Mkr-N41.				R548-025
15:42:50 Jul 09 '00	1520	159	423901	5087412	Getting ready to deploy MTR_3309.				
15:43:40 Jul 09 '00	1520	161	423901	5087412	Another MTR at Mkr-N41, buried in limpets, palm worms.				R548-026
15:43:40 Jul 09 '00	1520	161	423901	5087412	DEPLOYED MTR_3309 in another clump of tube worms and limpets (shimmery flow). About 5 m south of N41. Near Nemonet99 camera, so it's closer to Mkr-M. Photo 23 taken.				
15:45:20 Jul 09 '00	1519	205	423901	5087412	Photo 24 taken.				
15:45:30 Jul 09 '00	1519	218	423901	5087412	Photo 25 taken.				
15:45:40 Jul 09 '00	1517	221	423901	5087412	Nemonet'99 camera sitting on the bottom before being transported to its release mooring.				R548-027
15:46:10 Jul 09 '00	1518	215	423901	5087412	Photo 27, 28 taken.				
15:47:10 Jul 09 '00	1519	312	423967	5087490	Photo 29, 30, 31 taken of Nemonet'99 camera.				
15:46:30 Jul 09 '00	1517	232	423967	5087490	Fouling on the frame of Nemonet'99 camera.				R548-028
15:46:50 Jul 09 '00	1519	267	423967	5087490	Fouling on Nemonet'99 lens.				R548-029
15:49:20 Jul 09 '00	1520	356	423967	5087490	Photo 32 taken. Nemonet'99 camera is covered in gunk.				
15:52:52 Jul 09 '00	1519	11	423967	5087490	Highlights turned on.				
15:54:42 Jul 09 '00	1516	222	423906	5087377	ROPOS is grabbing the camera by it's aluminum frame.				
15:56:52 Jul 09 '00	1520	229	423909	5087397	Headed back to the camera recovery mooring. 200m away, bearing of 114.				
15:59:42 Jul 09 '00	1519	120	423907	5087384	Highlights turned off.				
16:04:42 Jul 09 '00	1520	148	423899	5087369	ROPOS is getting a better grip on the camera's frame.				
16:09:22 Jul 09 '00	1518	114	423899	5087369	Moving the ship back to Cammor (camera mooring).				
16:19:12 Jul 09 '00	1519	90	424043	5087438	Still headed to the camera mooring.				
16:23:24 Jul 09 '00	1518	134	423988	5087341	Found it! Photo 33 taken of Nemonet'99 camera next to its recovery mooring.				
16:23:54 Jul 09 '00	1515	143	424003	5087340	Highlights on.				
16:25:24 Jul 09 '00	1518	121	423997	5087344	Nemonet'99 camera and camera mooring position: x=424003, y=5087340.				
16:26:14 Jul 09 '00	1518	125	423995	5087346	Photo 34 and 35 taken.				
16:25:44 Jul 09 '00	1518	129	423995	5087346	Crab on Nemonet'99 camera mooring.				R548-030
16:27:54 Jul 09 '00	1518	41	423995	5087346	Photo 36 taken.				
16:31:34 Jul 09 '00	1521	150	424008	5087330	Photo 37 taken.				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R548	Samples	PI	Sub Smps	Fr Grb#
16:32:54 Jul 09 '00	1519	344	424008	5087330	Photo 38 taken of Nemonet'99 camera.				
16:33:14 Jul 09 '00	1519	298	424008	5087330	Hooking up the Nemonet'99 camera to the recovery mooring.				
16:32:14 Jul 09 '00	1518	46	424008	5087330	Nemonet'99 camera on the release mooring.				R548-031
16:32:44 Jul 09 '00	1519	19	424008	5087330	Close up of Nemonet'99 camera on release mooring.				R548-032
16:35:54 Jul 09 '00	1520	332	424004	5087323	Photo 39 taken.				
16:36:54 Jul 09 '00	1521	339	424004	5087323	Hooked up camera recovery mooring to the camera. Photo 40 taken.				
16:36:54 Jul 09 '00	1521	339	424004	5087323	Hooking release mooring line onto the Nemonet'99 camera.				R548-033
16:38:04 Jul 09 '00	1521	337	424004	5087323	Photo 41,42 taken of the camera.				
16:40:04 Jul 09 '00	1517	149	424004	5087323	Photo 43, 44 taken.				
16:39:04 Jul 09 '00	1519	72	424004	5087323	Nemonet'99 on release mooring.				R548-034
16:40:04 Jul 09 '00	1517	149	424004	5087323	Nemonet'99 hooked up to release mooring.				R548-035
16:40:54 Jul 09 '00	1517	110	424004	5087323	Headed to Mkr-33 now. Going back to the cage first, to transit in water column. Highlights off 16:41.				
16:42:54 Jul 09 '00	1489	66	422792	5087277	Ship moving to Mkr-33: Range of 276, bearing of 213.				
16:45:24 Jul 09 '00	1488	169	423963	5087235	All tapes off.				
17:16:50 Jul 09 '00	1488	283	423823	5087041	Taking a look at the cage; going down to the bottom now. We're about 40 meters SW of Mkr-33.				
17:19:40 Jul 09 '00	1521	311	423834	5087060	At the bottom now.				
17:23:00 Jul 09 '00	1488	45	423813	5087082	Went back up to the cage. 20 m SW of Mkr-33.				
17:25:50 Jul 09 '00	1489	288	423807	5087058	Two benchmarks (tied together) tossed out of the cage, 25 M SW of Mkr-33. Tapes on again.				
17:31:10 Jul 09 '00	1524	55	423813	5087056	ROPOS at the bottom, looking at the benchmarks.				
17:32:00 Jul 09 '00	1524	54	423813	5087053	Photo 45 taken of benchmarks.				
17:32:20 Jul 09 '00	1524	53	423813	5087053	Picked up the two benchmarks.				
17:33:30 Jul 09 '00	1520	63	423819	5087058	Headed east to get closer to Mkr-33, benchmarks in hand.				
17:35:10 Jul 09 '00	1522	90	423824	5087051	Larval traps and Mkr-33 in view!				
17:37:00 Jul 09 '00	1523	60	423830	5087059	Put the benchmarks down, separating the two benchmarks.				
17:39:40 Jul 09 '00	1523	51	423831	5087057	Turned Bmrk-4 right side up.				
17:40:00 Jul 09 '00	1523	51	423831	5087057	Turned Bmrk-5 right side up.				
17:44:12 Jul 09 '00	1523	68	423831	5087058	Picked up /bmrk-4 in left hand, Bmrk-5 in right hand, going around to look for a place to put one where there is no flow.				
17:46:32 Jul 09 '00	1523	49	423835	5087106	Photo 46 taken.				
17:46:52 Jul 09 '00	1523	45	423827	5087063	Bmrk-5 DEPLOYED at Mkr-33				
17:54:02 Jul 09 '00	1523	44	423836	5087107	Waiting for the GPS to settle down before we start pressure measurement.				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R548	Samples	PI	Sub Smps	Fr Grb#
17:55:02 Jul 09 '00	1523	44	423825	5087066	Tapes changed at 17:52				
17:56:02 Jul 09 '00	1523	48	423829	5087066	Getting ready to start the pressure measurement.				
17:58:02 Jul 09 '00	1523	44	423841	5087090	Placing pressure sensor on Bmrk-5				
17:59:12 Jul 09 '00	1523	44	423839	5087110	Started pressure measurement.				
18:00:22 Jul 09 '00	1523	44	423838	5087109	Benchmark 5 position: x=423838 y=5087111 z=1523. 15 m NW of Mkr-33 at a bearing of 306.				
18:00:32 Jul 09 '00	1523	45	423838	5087109	Pressure measurement at Bmrk-5 at Mkr-33.				R548-036
18:20:24 Jul 09 '00	1523	44	423839	5087108	End of pressure reading.				
18:23:04 Jul 09 '00	1523	64	424547	5087574	Putting pressures sensor back.				
18:24:54 Jul 09 '00	1523	64	423816	5087114	Coming off the bottom, headed up to the cage. Benchmark 4 in hand. Tapes off.				
18:28:44 Jul 09 '00	1488	77	423819	5087059	Ship moving from Mkr-33 to BagCity at one knot. 2 km away, at a bearing of 195. ROPOS transiting in water column.				
20:10:02 Jul 09 '00	1522	12	423465	5085372	Arrived on bottom at BagCity. starting archive tapes, Juniper and Tunncliffe.				
20:13:02 Jul 09 '00	1532	14	422999	5084529	Highlights turned on.				
20:23:44 Jul 09 '00	1533	11	423294	5085211	Photo 47 taken.				
20:16:14 Jul 09 '00	1533	131	423196	5085116	Collapsed pit with jumbled flow on bottom and lobate flow on roof.				
20:19:24 Jul 09 '00	1533	1	423200	5085120	No bags yet but small communities in cracks. photo 49 and 50 taken.				
20:20:34 Jul 09 '00	1533	356	424064	5085660	Photo 51 taken.				
20:20:54 Jul 09 '00	1533	3	424064	5085660	Photo 52 taken.				
20:23:14 Jul 09 '00	1533	3	423268	5085203	Looking around at BagCity. Good fix for BagCity area is x=423271, y=5085209, fix at 23:04.				R548-037
20:21:54 Jul 09 '00	1533	2	424064	5085660	Photo 53-60 taken				
20:24:54 Jul 09 '00	1532	91	423196	5085146	Heading NE; photo 61, 62 taken. Still no 'bags'.				
20:25:34 Jul 09 '00	1530	156	423200	5085146	Photo 63-68 taken. Amphisamytha (polychaete) in brown tubes over top of basalt.				
20:30:14 Jul 09 '00	1534	57	423206	5085132	Tube worms, limpids at BagCity				R548-038
20:27:34 Jul 09 '00	1533	181	423177	5085116	photo 69-74 taken. Replete with tubeworms.				
20:31:54 Jul 09 '00	1534	61	423179	5085106	Bags at BagCity.				R548-039
20:31:54 Jul 09 '00	1534	61	423179	5085106	Photo 75 taken. Lots of shimmery flow.				
20:35:34 Jul 09 '00	1533	104	423272	5085208	Photo 76-80 taken. Looking for camera deployment site				
20:39:24 Jul 09 '00	1534	123	423198	5085124	More bags and tube worms at BagCity.				R548-040
20:39:24 Jul 09 '00	1534	123	423198	5085124	Photo 81 taken.				
20:43:46 Jul 09 '00	1534	122	423204	5085129	Surveying potential NemoNet'00 camera site at BagCity. x=423271 y=5085197.				
20:49:36 Jul 09 '00	1534	121	423206	5085134	Photo 82 taken. DEPLOYING MTR_3315 at camera site.				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R548	Samples	PI	Sub Smps	Fr Grb#
20:56:36 Jul 09 '00	1534	85	423204	5085131	Highlight turned off.				
21:02:56 Jul 09 '00	1534	110	423271	5085197	Site of deployment of MTR at NeMOnet camera at BagCity.				R548-041
21:02:26 Jul 09 '00	1534	111	423271	5085197	MTR DEPLOYED just to the left of the camera field of view.				
21:05:16 Jul 09 '00	1534	93	423717	5083297	Highlights on at 2106 for healthy worms.				
21:05:26 Jul 09 '00	1534	93	423717	5083297	Tube worms in the flow.				R548-042
21:06:26 Jul 09 '00	1534	94	423717	5083297	Limpids on tube worms.				R548-043
21:06:56 Jul 09 '00	1534	94	423717	5083297	Scale worm on tube worm.				R548-044
21:15:18 Jul 09 '00	1531	18	423187	5085121	Mkr-36 and MTR.				R548-045
21:10:08 Jul 09 '00	1534	93	423190	5085117	Scale worm on tube worm.				R548-046
21:13:58 Jul 09 '00	1533	80	423811	5083413	BagCity				R548-047
21:16:28 Jul 09 '00	1531	19	423707	5083300	MTR at Mrk-36.				R548-048
21:14:08 Jul 09 '00	1532	44	423811	5083413	Photo 83 of Mkr-36 at BagCity.				
21:16:48 Jul 09 '00	1532	33	423707	5083300	Bags at BagCity beneath MTR.				R548-049
21:17:08 Jul 09 '00	1534	28	423707	5083300	Tubeworms and MTR at BagCity.				R548-050
21:17:48 Jul 09 '00	1534	30	422989	5084569	Tube worm bushes at BagCity.				R548-051
21:19:18 Jul 09 '00	1534	29	422989	5084569	Site of deployment of NeMO net 2000 camera at base of Mkr-36.				R548-052
21:20:38 Jul 09 '00	1534	29	423710	5083296	More tube worms at BagCity.				R548-053
21:19:18 Jul 09 '00	1534	29	422989	5084569	Looking at potential NeMO net camera deployment site. photo 84 taken.				
21:23:08 Jul 09 '00	1534	37	423272	5085205	one more				R548-054
21:23:38 Jul 09 '00	1534	18	423707	5083296	Jean's future tube worms.				R548-055
21:24:38 Jul 09 '00	1534	21	423200	5085130	MTR in tube worm bush at base of Mkr-36.				R548-056
21:25:08 Jul 09 '00	1534	20	423199	5085132	Photo 84 taken.				
21:26:48 Jul 09 '00	1534	21	423196	5085125	Highlights turned off.				
21:27:18 Jul 09 '00	1534	20	423276	5085207	DEPLOYING MTR_3197 about 1 meter east of MTR that we will pick up.				
21:25:48 Jul 09 '00	1534	20	423246	5085197	MTR foreground, in tube worm bush (bags too).				R548-057
21:32:58 Jul 09 '00	1534	20	423200	5085129	MTR_3197 at BagCity deployed for Embley.				R548-058
21:38:20 Jul 09 '00	1534	16	423708	5083301	2134 the embley archive tapes were changed.				
21:43:10 Jul 09 '00	1534	20	423541	5085469	Tube worm grab near the base of Mkr-36. In port biobox. (Microbial mat and basalt chip sub samples). BagCity Mkr-36 - x=423271 y=5085209.	R548-TW G-0002	Tunncliffe /Marcus	Moyer/ J Chadwick	
21:42:50 Jul 09 '00	1534	20	423541	5085469	frame grab				R548-059
21:44:40 Jul 09 '00	1534	32	423533	5085459	Jean's worms, for sure.				R548-060

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R548	Samples	PI	Sub Smpls	Fr Grb#
21:45:50 Jul 09 '00	1534	31	423536	5085466	Tube worm sample at Mkr-36, BagCity.				R548-061
21:48:20 Jul 09 '00	1534	31	423527	5085454	Photo 85 taken.				
21:52:50 Jul 09 '00	1534	29	422985	5084541	Recovering MTR_3049 at BagCity				R548-062
21:52:00 Jul 09 '00	1534	24	422985	5084541	recovering MTR_3049 with some tube worms to boot. Placing in port biobox.				
21:55:30 Jul 09 '00	1534	25	423748	5083334	recovering MTR_3049. BagCity Mkr-36 - x=423271 y= 5085209.	R548-MT R-0003	Embley		
22:03:52 Jul 09 '00	1534	27	423179	5085111	repositioning MTR_3197				
22:09:42 Jul 09 '00	1534	25	423719	5085667	handing Bmrk- from 5 function to 7 function arm so we can SS.				
22:11:52 Jul 09 '00	1535	24	423538	5085464	Suction Sample - J2 near base of where TWG was taken. Filter #4 1.0 um (PARTICULATES) start time 2211, end time 2226. BagCity Mkr-36 - x=423271 y= 5085209.	R548-SS- J2-0004	Juniper		
22:14:22 Jul 09 '00	1534	26	423186	5085123	Changed Tunnicliffe and Juniper archive tapes at 2208.				
22:18:42 Jul 09 '00	1534	48	422334	5085521	Slurping for Juniper at BagCity.				R548-063
22:26:02 Jul 09 '00	1534	46	423268	5085201	SS for 2 turned off.				
22:30:54 Jul 09 '00	1534	46	423205	5085134	Suction at Mkr-36 for Moyer.				R548-064
22:27:12 Jul 09 '00	1534	46	422892	5084791	Suction Sample - Jar 3 Same spot as previous slurp sample for MICROBIAL MAT. Start time 2226, end time 2236.	R548-SS- J3-0005	Moyer		
22:35:14 Jul 09 '00	1534	46	423197	5085124	SS for 6 turned off.				
22:36:04 Jul 09 '00	1534	47	423210	5085143	Stop Juniper tape 22:26.				
22:39:24 Jul 09 '00	1532	166	423202	5085138	Photo 86 taken				
22:39:24 Jul 09 '00	1532	166	423202	5085138	Polysaccharides(?) and tubeworms at BagCity.				R548-065
22:39:44 Jul 09 '00	1533	179	423281	5085209	polysaccharides(?) and tubeworms at BagCity.				R548-066
22:45:44 Jul 09 '00	1534	332	423535	5085463	Suction for bottle #4 at BagCity				R548-067
22:45:34 Jul 09 '00	1534	329	423535	5085463	Obtaining peripheral fauna around tubeworms (BIO). Beginning Suction Sample into jar 4 at 22:46, ending at 22:52. BagCity Mkr-36 - x=423271 y= 5085209.	R548-SS- J4-0006	Tunnicliffe /Marcus		
22:51:04 Jul 09 '00	1534	332	423533	5085465	End of suction for bottle #4 at Mkr-36 (BagCity).				R548-068
23:07:36 Jul 09 '00	1532	274	423242	5085184	Edge of Pit at BagCity.				R548-069
23:07:36 Jul 09 '00	1532	274	423242	5085184	Edge of pit at BagCity.				R548-070
23:08:56 Jul 09 '00	1533	266	423195	5085131	Looking for a spot to place a benchmark.				
23:09:26 Jul 09 '00	1533	276	423195	5085131	Photo 89.				
23:12:06 Jul 09 '00	1534	247	421335	5085665	DEPLOY Benchmark 4.				
23:12:26 Jul 09 '00	1534	248	423197	5085135	Bmrk-4 tentative placement.				R548-071
23:13:06 Jul 09 '00	1534	247	423188	5085124	Photo 90 Bmrk-4 in place				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R548	Samples	PI	Sub Smps	Fr Grb#
23:16:16 Jul 09 '00	1534	255	423542	5085472	Pressure measurement at Bmrk-4 starts.				
23:18:06 Jul 09 '00	1534	255	423218	5083695	Photo 91 pressure measurement in progress.				
23:19:56 Jul 09 '00	1534	255	423185	5085122	Highlights on. Female spider crab ventilating her eggs.				
23:16:46 Jul 09 '00	1534	255	423542	5085472	Start of pressure measurement at Bmrk-4.				R548-072
23:20:56 Jul 09 '00	1534	256	423200	5085138	Crab ventilating eggs, BagCity				R548-073
23:23:38 Jul 09 '00	1534	256	423207	5085144	Amphisamytha tubes in background on periphery of BagCity.				R548-074
23:26:08 Jul 09 '00	1534	254	423785	5083405	Taking close ups of animals on lava while we sit waiting for the pressure measurement.				
23:27:28 Jul 09 '00	1534	255	423719	5083342	Tentacles of Amphisamytha hanging out of tube. Periphery of BagCity, at Bmrk-4				R548-075
23:30:18 Jul 09 '00	1534	255	422884	5084787	Close up video of a scale worm and Amphisamytha tubes. Highlights were off for the last few minutes, now back on to video scale worm.				
23:29:28 Jul 09 '00	1534	254	423017	5084110	Rock near BagCity bmrk with worms.				R548-076
23:30:08 Jul 09 '00	1534	253	422884	5084787	Close up of rock near BagCity with scale worm.				R548-077
23:31:18 Jul 09 '00	1534	254	423251	5085159	Scale worm near BagCity.				R548-078
23:32:18 Jul 09 '00	1534	255	423547	5085479	Another one -scale worm.				R548-079
23:37:18 Jul 09 '00	1534	255	423237	5085196	Amphisamytha gills on right side in flow. (Bmrk-4)				R548-080
23:39:08 Jul 09 '00	1534	253	423162	5085101	End of pressure measurement at Bmrk- 4.				
23:42:08 Jul 09 '00	1534	251	423192	5085129	Stowing pressure sensor in bracket on front of sub.				
23:43:08 Jul 09 '00	1534	244	423185	5085121	Photo 92 of Bmrk-4.				
23:43:28 Jul 09 '00	1534	252	423185	5085121	DEPLOYING Mkr-65 at Bmrk-4. After we are heading to Joystick - 300 m away at a bearing of 18 degrees.				
23:47:58 Jul 09 '00	1534	252	424029	5084250	Mkr-65.				
23:52:30 Jul 09 '00	1534	251	423255	5085192	Good fix for Bmrk-4 x=423255 y= 5085192 z=1534 time 2352. (Mkr-65 area)				
23:57:40 Jul 09 '00	1534	251	423256	5085193	5.5L/min McLane pump starts				
23:55:50 Jul 09 '00	1534	251	423716	5085666	Bmrk-4 & Mkr-65				R548-081
23:58:50 Jul 09 '00	1534	253	423257	5085192	Bmrk-4 & Mkr-65				R548-082
23:59:30 Jul 09 '00	1533	250	423256	5085193	Bmrk-4 & Mkr-65				R548-083
23:58:40 Jul 09 '00	1534	251	423257	5085192	Photos 93, 94, 95 Bmrk-4 & Mkr-65 pull out shots.				
00:02:10 Jul 10 '00	1525	66	423252	5085185	Transit to Joystick.				
00:12:02 Jul 10 '00	1532	16	423207	5085151	Bottom is in view.				
00:12:12 Jul 10 '00	1531	16	423207	5085151	Lobate flows, some sediment.				
00:15:12 Jul 10 '00	1531	14	423271	5085209	Rope creature.				R548-084
00:16:52 Jul 10 '00	1531	12	421344	5085692	Lava age difference?				R548-085

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R548	Samples	PI	Sub Smpls	Fr Grb#
00:17:22 Jul 10 '00	1531	12	423190	5085152	Eruptive fissure				
00:18:12 Jul 10 '00	1532	12	422967	5084561	Eruptive fissure				R548-086
00:19:02 Jul 10 '00	1532	12	422967	5084561	Eruptive fissure				R548-087
00:28:12 Jul 10 '00	1533	8	423272	5085258	What the hell is that?				R548-088
00:29:32 Jul 10 '00	1534	3	423172	5085211	Restart McLane pump for another 30 min.				
00:30:52 Jul 10 '00	1534	19	422885	5084907	Lava drainage and collapsed areas.				
00:31:12 Jul 10 '00	1534	15	423297	5085334					R548-089
00:32:32 Jul 10 '00	1534	9	423452	5086880	Transit BagCity to Joystick.				R548-090
00:33:34 Jul 10 '00	1534	15	425384	5085061	Stains between pillows (FexOy), need I say more?				
00:34:44 Jul 10 '00	1534	11	425384	5085061	Near Joystick.				R548-091
00:36:14 Jul 10 '00	1534	15	423436	5085508	McLane pump stopped at 31.5 L.				
00:36:34 Jul 10 '00	1534	15	423436	5085509	Photo 96 ~80 m south of Joystick.				
00:38:04 Jul 10 '00	1534	17	423543	5083275	Photo 97 venting area in the yellow stuff.				
00:38:14 Jul 10 '00	1534	12	423543	5083275	80m from Joystick.				R548-092
00:38:54 Jul 10 '00	1534	17	423162	5085240	Between BagCity and Joystick.				R548-093
00:40:34 Jul 10 '00	1534	15	423392	5085464	BagCity to Joystick oxides.				R548-094
00:40:44 Jul 10 '00	1534	15	423392	5085464	Start Juniper tape and beta highlight tape.				
00:42:14 Jul 10 '00	1534	10	423291	5085362	Photo 98.				
00:42:34 Jul 10 '00	1534	8	423291	5085362	FeCity x=423291 y=5085362 time 0042.				
00:47:54 Jul 10 '00	1534	281	423133	5085210	Beta highlights are off.				
01:03:26 Jul 10 '00	1533	148	423293	5085363	Between BagCity and Joystick.				R548-095
01:03:16 Jul 10 '00	1533	219	423441	5085510	Moving around to find a suction sampling site: photos 99, 100 & 101				
01:04:36 Jul 10 '00	1534	38	425339	5085296	Younger lava on left?				R548-096
01:09:06 Jul 10 '00	1535	64	423142	5085218	Photo #2 venting area w/ Iron Oxides.				
01:11:36 Jul 10 '00	1535	63	423159	5085238	.Suction sampling to bottle 5				
01:12:16 Jul 10 '00	1535	62	423159	5085238	FeCity Vent, sucking..				R548-097
01:15:36 Jul 10 '00	1535	63	423728	5085737	Orange MICROBIAL MAT and BASALT CHIPS into Suction sampler jar 5. Start time 0111, end time 0130. FeCity x=423291 y=5085361.	R548-SS-J5-0007	Juniper	J Chadwick	
01:29:48 Jul 10 '00	1535	61	423292	5085366	Continue transit north to Joystick.				
01:31:58 Jul 10 '00	1534	358	423144	5085250	McLane pump turned on. Beautiful arch while in transit.				
01:30:08 Jul 10 '00	1535	68	421383	5085815	Between BagCity and Joystick - FeCity (just near the site of suction bottle #5).				R548-098

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R548	Samples	PI	Sub Smpls	Fr Grb#
01:31:48 Jul 10 '00	1533	353	423144	5085250	Door at the south of Joystick.				R548-099
01:32:08 Jul 10 '00	1533	20	423144	5085250	A door south of Joystick.				R548-100
01:32:38 Jul 10 '00	1534	24	423144	5085250	Enter of the house south of Joystick.				R548-101
01:44:38 Jul 10 '00	1535	16	423392	5085573	Ropy lava with iron oxides.				
01:47:18 Jul 10 '00	1535	84	423108	5085278	Transition to sheet flow.				
01:52:28 Jul 10 '00	1533	24	423345	5085504	Arrival at Joystick - Mkr-42.				
01:54:48 Jul 10 '00	1536	68	423419	5085576	118 Liters McLane pump stopped. photo 101 Joystick.				
01:56:08 Jul 10 '00	1538	95	423341	5085505	Near Joystick				R548-102
01:56:50 Jul 10 '00	1538	97	423340	5085507	fix x=423340 y=5085507				
02:06:00 Jul 10 '00	1538	96	423336	5085503	Tube worm grab delivered to stbd Bio Box. Scale worm new species in grab - 1 vestimentiferen (sp?). Joystick Mkr-42, x=423342 y=5085505.	R548-TW 6-0008	Marcus	Juniper	
02:20:30 Jul 10 '00	1538	91	423336	5085505	ROPOS handshake (straightening the finger).				R548-103
02:19:40 Jul 10 '00	1538	91	421375	5085735	Wormy basalt glass grab to stbd Bio Box (Rock and Bio). Joystick Mkr-42.	R548-RK- 0009	J Chadwick	Tunncliffe	
02:26:52 Jul 10 '00	1538	88	423079	5085252	Suction sample of the limpet among the tube worms (BIO), jar #6. Start time 0226, end time 0236. Joystick Mkr-42.	R548-SS- J6-0010	Marcus	J Chadwick	
02:35:42 Jul 10 '00	1538	82	423421	5085584	Crab and small fish.				R548-104
02:36:32 Jul 10 '00	1538	83	423421	5085584	Finished with SS #6.				
02:36:52 Jul 10 '00	1538	82	423421	5085584	Suction sample bottle 7 peripheral fauna and mat in and around tube worms (BIO and MAT). Joystick Mkr-42.	R548-SS- J7-0011	Juniper		
02:42:02 Jul 10 '00	1538	83	423179	5086969	Suction at Joystick (bottle #7).				R548-105
02:44:22 Jul 10 '00	1538	83	423349	5085496	Done with bottle 7 and the dive est fini.				
02:45:02 Jul 10 '00	1538	83	423334	5085509	Avalanche at Joystick.				R548-106
02:45:32 Jul 10 '00	1538	81	423346	5085505	Vent fish looking at the avalanche at Joystick.				R548-107
02:46:12 Jul 10 '00	1538	82	423284	5085476	Sighting of sea spiders (I think its the D.T.'s).				
02:47:12 Jul 10 '00	1538	84	421004	5088265	Chunk of Joystick basalt in the 5 function arm.				
02:47:32 Jul 10 '00	1538	83	422528	5086367	Piece of rock in the arm.				R548-108
02:48:12 Jul 10 '00	1538	83	423324	5085500	Basalt into stbd bio box. Joystick Mkr-42.	R548-RK- 0012	J Chadwick		
02:51:04 Jul 10 '00	1538	84	426053	5087077	Photo 103 still more Joystick.				
					McLane pump. 118 liters fluid. Started at BagCity, turned off intermittently, shut down at Joystick. (BagCity, Iron City, Joystick area).	R548-McL ane-0013	Metaxas		
02:55:00 Jul 10 '00					ROPOS off the bottom heading to surface. On deck at 0348.				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R548	Samples	PI	Sub Smps	Fr Grb#
					<p>R548 Dive Summary: BPR (near center of caldera)-Deployed Bmrk-66. Pressure reading. Magnesia-Deployed Bmrk-1 and performed pressure reading. Sample: 1 ss. Moved osmosampler from Magnesia to Mkr-N41. Mkr-N41-Deployed MTR. Connected NeMONet'99 camera to release mooring. Mkr-33- Deployed Bmrk-5 and performed pressure reading. Transit to BagCity -close call with water column mooring in transit. BagCity-Deployed Bmrk-4 and performed pressure reading. Deployed 2 MTRs. Samples: 3 ss, 1 twg. Recover 1 MTR. Found/named FeCity vent. Sample: 1 ss. Joystick-Samples: 2 rk, 1 twg, 2 ss. McLane pump Bag City to Joystick.</p>				

R549

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R549	Samples	PI	Sub Smps	Fr Grb#
					Positions in utm x/y columns are automated and not flagged for accuracy. Consult dive maps for final position data.				
					Tasks: Worm grabs, suction samples, depl/rec bactrps Cloud, Mkr-33, Snail, Mkr-108. Video survey of Cloud.	Bottom Time: JD192(7/10) 0748-1639			
06:21:29 Jul 10 '00	11	162	423395	5085573	ROPOS in water at 0619.				
07:43:57 Jul 10 '00	1497	285	424154	5087568	Tunncliffe tape has been on since 0632.				
07:46:17 Jul 10 '00	1519	340	424169	5087562	We can see the bottom.				
07:47:47 Jul 10 '00	1519	339	424169	5087562	Embley tapes on at 0740.				
07:48:17 Jul 10 '00	1518	341	424169	5087562	Looks like the hose came off the arm for the suction sampler.				
07:51:29 Jul 10 '00	1519	358	423924	5087051	Heading north to Snail Vent.				
07:54:49 Jul 10 '00	1518	345	423930	5087064	Our fixes are way off to the east.				
07:57:39 Jul 10 '00	1523	307	423889	5087096	We're at Cloud , but we want to be at Snail.				
07:58:49 Jul 10 '00	1521	219	423886	5087057	Bottom at Cloud.				R549-001
07:59:49 Jul 10 '00	1521	274	423880	5087051	Cracks lined with white mat, putting the portabox down at Mkr-N8 at Snail Vent.				
08:00:19 Jul 10 '00	1522	297	423880	5087051	Mkr-N8.				R549-002
08:01:49 Jul 10 '00	1523	184	423873	5087053	We're trying to re-grab the suction hose before heading over to Mkr-33				
08:04:29 Jul 10 '00	1523	184	423872	5087057	We can't get the hose back in the five function.				
08:05:59 Jul 10 '00	1523	187	423874	5087051	Using the seven function to put the hose in the five function.				
08:08:59 Jul 10 '00	1523	186	423873	5087052	We aren't having much luck transferring the hose to the five function.				
08:10:09 Jul 10 '00	1523	185	423873	5087058	We have the hose in the five function arm.				
08:13:59 Jul 10 '00	1523	330	423873	5087048	Photo 107 of a really big fish at Snail.				
08:13:59 Jul 10 '00	1523	330	423873	5087048	big fish. Snail				R549-003
08:14:19 Jul 10 '00	1522	339	423873	5087048	big fish. Snail				R549-004
08:15:29 Jul 10 '00	1523	14	423868	5087040	Big blue eyes fish.				R549-005
08:15:49 Jul 10 '00	1523	21	423849	5087149	Going to Mkr-33, 30m away.				
08:17:51 Jul 10 '00	1521	295	423866	5087047	We can see Mkr-33.				
08:19:41 Jul 10 '00	1520	216	423866	5087047	Photo 108 of Mkr-33 .				
08:19:51 Jul 10 '00	1521	244	423866	5087047	MTR and bacterial trap.				R549-006
08:20:21 Jul 10 '00	1523	211	423851	5087101	Bacterial trap in the fall.				R549-007
08:21:11 Jul 10 '00	1523	211	423851	5087101	Opening the port side of the biobox to take out two of the bactraps.				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R549	Samples	PI	Sub Smps	Fr Grb#
08:23:49 Jul 10 '00	1517	358	423920	5087045	bottom				R549-008
08:24:31 Jul 10 '00	1523	251	423843	5087052	Trying to get trap out of port side of biobox.				
08:26:41 Jul 10 '00	1523	252	423843	5087054	DEPLOYING BACTERIAL TRAP #52.				
08:29:01 Jul 10 '00	1523	214	423842	5087056	Placed bacterial trap #52				
08:29:01 Jul 10 '00	1523	214	423842	5087056	Bactrap #52 deployed.				R549-009
08:30:21 Jul 10 '00	1523	219	423851	5087101	Removing another bacterial trap from the port side of the biobox.				
08:32:01 Jul 10 '00	1523	220	423843	5087056	DEPLOYING BACTERIAL TRAP #51 AT Mkr-33.				
08:33:21 Jul 10 '00	1523	220	423842	5087049	RETRIEVING BACTERIAL TRAP from Mkr-33.				
08:35:01 Jul 10 '00	1523	217	423842	5087049	Little tubeworms under the crack behind the bac traps at Mkr-33.				R549-010
08:37:11 Jul 10 '00	1523	217	423829	5087111	Bacterial Trap #44 from Mkr-33 into port side of biobox z=1520. Mkr-33 x=423950, y=5087101.	R549-BT-0001	Moyer		
08:37:41 Jul 10 '00	1523	219	423842	5087053	Bactrp #44 into port biobox.				R549-011
08:41:51 Jul 10 '00	1523	214	423841	5087054	RETRIEVING BACTERIAL TRAP #46.				
08:42:51 Jul 10 '00	1523	214	423841	5087054	Bacterial trap #46 into port side of biobox. Mkr-33 x=423950, y=5087101.	R549-BT-0002	Moyer		
08:48:23 Jul 10 '00	1523	218	423842	5087055	Going to Cloud now.				
08:48:43 Jul 10 '00	1523	218	423842	5087047	Photo 109 of traps at Mkr-33.				
08:48:43 Jul 10 '00	1523	218	423842	5087047	Bac traps 51 and 52 deployed at Mkr-33.				R549-012
08:52:03 Jul 10 '00	1522	338	423874	5087036	We're at Snail but we want to be at Cloud.				
08:52:13 Jul 10 '00	1522	346	423870	5087034	Huge rattail between Mkr-33 and Cloud.				R549-013
08:59:13 Jul 10 '00	1521	2	423887	5087055	Going back to the cage because we can't find Cloud and we want a good fix.				
09:06:13 Jul 10 '00	1518	108	423905	5087062	We're still looking for Cloud.				
09:11:03 Jul 10 '00	1519	237	423912	5087037	Towers on the way for Cloud.				R549-014
09:11:33 Jul 10 '00	1519	260	423912	5087037	Shutting the cage motor off!!!!				
09:17:35 Jul 10 '00	1518	255	423926	5087050	We are still looking for Cloud.				
09:21:15 Jul 10 '00	1519	238	423882	5087060	Going back to the cage again - still trying to get to Cloud.				
09:24:05 Jul 10 '00	1505	10	423873	5087032	Dropping down from the cage again and going 020 to look for Cloud				
09:25:05 Jul 10 '00	1521	21	423886	5087029	Passage on the road to Cloud.				R549-015
09:28:05 Jul 10 '00	1517	276	423904	5087046	Lateralling from the south looking west for Cloud.				
09:29:35 Jul 10 '00	1515	92	423903	5087012	We're going back to Mkr-33 to start again to look for Cloud.				
09:33:25 Jul 10 '00	1516	252	423863	5087034	Shutting off the cage motor again to figure out where we are.				
09:34:15 Jul 10 '00	1512	224	423863	5086997	We are way south - oops.				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R549	Samples	PI	Sub Smps	Fr Grb#
09:35:35 Jul 10 '00	1519	15	423863	5087049	Oops- we just ran into a lava pillar. We're a bit frustrated.				
09:36:25 Jul 10 '00	1521	15	423863	5087049	Totem on the road to Cloud.				R549-016
09:38:25 Jul 10 '00	1517	17	423893	5087100	Turning the cage motor off again.				
09:41:57 Jul 10 '00	1518	276	423893	5087142	Shutting the cage motor down again.				
09:43:57 Jul 10 '00	1516	278	423923	5087077	The compass on the sub was offset by 40 degrees - that's why we've been getting lost. we have corrected that so we are now trying north				
09:47:57 Jul 10 '00	1519	3	423900	5087108	OH MY GOD we see a Marker- we really think it is Cloud!				
09:50:57 Jul 10 '00	1523	290	423901	5087104	We see Mkr-21. -We are now going to Mkr-N4 at Cloud to do bacterial trap stuff.				
09:52:57 Jul 10 '00	1525	258	423890	5087061	Embley tapes changed at 0945.				
09:59:47 Jul 10 '00	1524	281	423888	5087067	We're still looking for Mkr-N4.				
10:06:47 Jul 10 '00	1523	258	423877	5086826	Still trying for Mkr-N4.				
10:08:21 Jul 10 '00	1523	271	423886	5087075	We think we see Mkr-N4.				
10:09:33 Jul 10 '00	1522	104	423879	5087075	Tubeworms at Mkr-N4.				R549-017
10:10:57 Jul 10 '00	1522	104	423880	5087073	We definitely see Mkr-N4 Cloud - now we need to get in position for getting the traps.				
10:14:21 Jul 10 '00	1523	99	423880	5087078	RETRIEVING BACTERIAL TRAPS AT CLOUD Mkr-N4.				
10:14:57 Jul 10 '00	1523	97	423882	5087073	Bacterial trap #48 into port side of biobox from Cloud Mkr-N4. z=1523. x=423896, y=5087119	R549-BT-003	Moyer		
10:14:57 Jul 10 '00	1523	97	423882	5087073	Bactraps #47 and #48 at Cloud.				R549-018
10:15:45 Jul 10 '00	1523	97	423880	5087071	Bacterial trap #47 into port side of biobox from Cloud Mkr-N4. x=423896, y=5087119.	R549-BT-004	Moyer		
10:19:33 Jul 10 '00	1523	97	423881	5087074	We are done retrieving bacterial traps.				
10:23:45 Jul 10 '00	1522	135	423893	5087104	We are now DEPLOYING bacterial traps #53 and #54 at Mkr-N4.				
10:24:21 Jul 10 '00	1522	122	423880	5087073	Deploying bactraps #53 and 54 at Mkr-N4.				R549-019
10:28:23 Jul 10 '00	1523	72	423894	5087103	Final position for bactraps #53 and 54 at Mkr-N4				R549-020
10:28:35 Jul 10 '00	1523	72	423888	5087113	We are done deploying bacterial traps 53 and 54 at Mkr-N4.				
10:31:11 Jul 10 '00	1523	71	423881	5087074	We're going to Mkr-N6.				
10:32:33 Jul 10 '00	1522	71	423881	5087072	We are readjusting bacterial trap #54				
10:35:35 Jul 10 '00	1522	71	423880	5087075	We're done adjusting the bacterial traps at Mkr-N4 and are now going to Mkr-N6 for worm suction and video.				
10:35:35 Jul 10 '00	1522	71	423880	5087075	Modification after final position of bactraps.				R549-021
10:37:47 Jul 10 '00	1524	310	423901	5087098	We are moving Mkr-21 back to the big hole because it was moved earlier and is annoying us				
10:38:23 Jul 10 '00	1524	321	423896	5087107	Tunncliffe tape on				
10:42:11 Jul 10 '00	1524	354	423887	5087070	We are preparing to grab tubeworms at Mkr-21.				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R549	Samples	PI	Sub Smps	Fr Grb#
10:43:23 Jul 10 '00	1524	355	423899	5087113	"If i didn't have my shoes all laced up I would take one off and beat you!" - Kim j to anna m.				
10:45:11 Jul 10 '00	1524	357	423865	5087128	Tube Worm grab at Cloud Mkr-21 into starboard side of biobox. X=423904, y=5087110.	R549-TW G-0005	Marcus	null	
10:48:35 Jul 10 '00	1524	359	423900	5087101	Grab at Mkr-N4 for Jean.				R549-022
10:51:23 Jul 10 '00	1525	2	423874	5086828	Still grabbing worms.				
10:53:23 Jul 10 '00	1525	2	423880	5087065	This is some serious floc action going on here.				
10:54:59 Jul 10 '00	1525	14	423886	5087077	There are tube worms and ropes hanging out of the biobox which will disturb Kim's ability to do a video survey.				
11:00:23 Jul 10 '00	1524	332	423874	5087153	Suction Sample (FLUID) Jar #4. Start suction 11:00 for Butterfield water sample. End suction at 11:05. Cloud Mkr-21 x=423904, y=5087110	R549-SS- J4-0006	Butterfield		
11:09:23 Jul 10 '00	1525	334	423875	5086822	Suction Sample, Jar #3. Start suction at 11:10 for Craig water plus bacterial mat (FLUID and MAT). End suction at 11:16. z=1524. Cloud Mkr-21 x=423904, y=5087110 .	R549-SS- J3-0007	Moyer		
11:19:11 Jul 10 '00	1524	354	423887	5087069	Start suction (BIO) for Juniper at 11:17 for little animals. End suction at 11:21. Cloud Mkr-21 x=423904, y=5087110.	R549-SS- J1-0008	Juniper	Marcus	
11:24:59 Jul 10 '00	1524	4	423888	5087074	Start suction (BIO) for Tunncliffe at 11:25 for semi-periferal fauna. End suction at 11:32. This site had a high abundance of scale worms. Cloud Mkr-21 x=423904, y=5087110.	R549-SS- J2-0009	Marcus/Tu nnicliff		
11:31:23 Jul 10 '00	1524	5	423887	5087074	Video of TW slurp at Cloud.				R549-023
11:35:35 Jul 10 '00	1524	5	423888	5087072	Photo #110 taken of tube worms and venting field.				
11:41:35 Jul 10 '00	1524	295	423668	5086825	Looking at Mkr-21.				
11:43:59 Jul 10 '00	1524	296	423892	5087070	Start of McLane pump at 11:44 for (WATER) sample during video survey. Pump was turned off at 12:48. Cloud Mkr-21 x=423904, y=5087110	R549-McL ane-0010	Metaxas		
11:45:47 Jul 10 '00	1522	293	423903	5087100	Video mapping commenced for Juniper and the Tunncliffe tape has been turned off.				
11:48:23 Jul 10 '00	1522	291	423888	5087113	Redoing one line of transect to the east. Going to move the ship 50m south of cloud.				
11:51:11 Jul 10 '00	1524	345	423904	5087096	Moving ROPOS back to original starting point of video taping while the ship moves. Video will traverse east to west.				
11:55:23 Jul 10 '00	1523	289	423890	5087072	Have commenced video survey again.				
12:12:35 Jul 10 '00	1524	286	423891	5087071	4th line of survey commenced on 285 heading.				
12:37:23 Jul 10 '00	1520	288	423880	5087062	Still performing Juniper's video survey.				
12:49:35 Jul 10 '00	1523	293	423881	5087041	Stopping the Beta Cam.				
12:54:11 Jul 10 '00	1523	300	423875	5087111	fish blocked in the aspirator?				R549-024
12:56:47 Jul 10 '00	1523	300	423884	5087065	Attempting to suck up fish, but there are rocks blocking the line.				
12:58:35 Jul 10 '00	1523	298	423883	5087059	The fish after time in the aspirator.				R549-025
12:58:59 Jul 10 '00	1523	301	423883	5087059	Suction of a vent fish (BIO) off the sea floor. Can't unlog the line so will attempt to leave it in the line. At 13:24 line was unlogged and fish put into jar #8. Cloud Mkr-N4 x=423896, y=5087119	R549-FIS H-0011	Juniper	Tunnclif fe	

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R549	Samples	PI	Sub Smps	Fr Grb#
13:02:47 Jul 10 '00	1524	14	423887	5087055	Beta cam has been turned on.				
13:02:59 Jul 10 '00	1524	14	423900	5087109	Mkr-21				R549-026
13:03:35 Jul 10 '00	1524	14	423898	5087107	Tubeworms near Mkr- 21.				R549-027
13:05:11 Jul 10 '00	1524	357	423888	5087066	Mkr-N21				R549-029
13:11:59 Jul 10 '00	1524	19	423895	5087107	The Mkr-21				R549-029
13:12:47 Jul 10 '00	1524	19	423670	5086821	approach of Mkr-21				R549-031
13:19:35 Jul 10 '00	1524	346	423878	5087136	Beta cam has been turned off.				
13:20:23 Jul 10 '00	1525	353	423878	5087120	Tubeworms and so much blue near Mkr-N21.				R549-031
13:22:47 Jul 10 '00	1525	323	423876	5087155	The fish is finally inside the flush bottle.				R549-032
13:25:35 Jul 10 '00	1525	324	423898	5087111	Environment of the Mkr- N21.				R549-033
13:26:47 Jul 10 '00	1525	324	423880	5087118	Beta cam has been turned back on for last "fly across the field" for Juniper's video survey.				
13:29:23 Jul 10 '00	1523	288	423898	5087114	Beta cam has been turned off as well as the Juniper tape which signals the end of the video survey by Juniper.				
13:32:47 Jul 10 '00	1486	125	423891	5087052	Video has been turned off for transit to Snail.				
13:36:47 Jul 10 '00	1517	222	423885	5087053	Now at snail.				
13:42:35 Jul 10 '00	1521	219	423635	5086917	Crack near empty biobox at Snail				R549-034
13:46:47 Jul 10 '00	1524	183	423873	5087053	Photo taken of Snail area.				
13:48:11 Jul 10 '00	1524	30	423880	5087093	Good fix X=423880 Y=5087093				
13:58:47 Jul 10 '00	1524	75	423840	5087178	Picked up rock samples coated with organisms for Tunnicliffe. (BIO and RK). Near Snail - Mkr-N8 x=423877, y=5087088	R549-RK(TWG)-001 2	Tunnicliffe /Marcus	J Chadwic k	
14:12:35 Jul 10 '00	1523	173	423869	5087051	Two photos taken of iron oxides. x=423882 y=5087073 at 14:15 was a good fix for location of photos.				
14:18:35 Jul 10 '00	1524	113	423630	5086900	Suction sample of FeO. Start of suction at 14:20, end suction at 14:26. (subsampling basalt RK). Near Snail - Mkr-N8 x=423877, y=5087088.	R549-SS- J2-0013	Kennedy	J Chadwic k	
14:28:59 Jul 10 '00	1524	46	423860	5087074	Transiting to Mkr-108 along the ground, 490 meters away.				
14:30:47 Jul 10 '00	1524	191	423856	5087067	2 photos taken				
14:32:11 Jul 10 '00	1521	198	423880	5087023	Photo taken				
14:34:23 Jul 10 '00	1522	194	423885	5086962	Photo				
14:35:59 Jul 10 '00	1525	191	423886	5086956	Photo				
14:38:11 Jul 10 '00	1523	188	423897	5086954	Photo				
14:41:11 Jul 10 '00	1524	193	423898	5086936	2 photos				
14:42:11 Jul 10 '00	1524	192	423897	5086926	Photo				
14:43:11 Jul 10 '00	1524	190	423889	5086906	Photo				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R549	Samples	PI	Sub Smps	Fr Grb#
14:43:35 Jul 10 '00	1523	190	423889	5086906	Photo				
14:43:35 Jul 10 '00	1523	190	423889	5086906	Photo				
14:44:23 Jul 10 '00	1522	188	423887	5086901	2 photos taken				
14:46:11 Jul 10 '00	1521	192	423887	5086876	2 photos				
14:48:47 Jul 10 '00	1522	189	423886	5086871	3 photos taken				
14:50:23 Jul 10 '00	1522	188	423882	5086851	2 photos taken				
14:53:23 Jul 10 '00	1522	192	423872	5086791	3 photos taken of more recreational geology.				
14:55:11 Jul 10 '00	1522	194	423860	5086765	Another 3 photo's taken by crazy Camera girl Jean Marcus.				
14:56:11 Jul 10 '00	1523	190	423867	5086740	Jean took yet another photo.				
14:57:11 Jul 10 '00	1521	212	423857	5086713	5 photos taken of lava pillars.				
14:57:59 Jul 10 '00	1519	213	423861	5086699	Photo taken of another pillar.				
14:59:59 Jul 10 '00	1524	222	423841	5086655	2 more photos taken.				
15:00:35 Jul 10 '00	1521	223	423832	5086646	Photo taken.				
15:01:11 Jul 10 '00	1522	221	423832	5086646	Photo taken.				
15:01:47 Jul 10 '00	1523	222	423839	5086628	Photo taken.				
15:01:59 Jul 10 '00	1523	219	423839	5086628	Photo taken.				
15:02:23 Jul 10 '00	1524	221	423820	5086621	2 Photos taken.				
15:02:35 Jul 10 '00	1525	221	423818	5086616	Geology				R549-035
15:03:23 Jul 10 '00	1525	231	423826	5086607	Photo taken.				
15:03:35 Jul 10 '00	1525	231	423826	5086607	3 photos taken.				
15:03:47 Jul 10 '00	1523	230	423820	5086607	Geology				R549-036
15:04:23 Jul 10 '00	1521	230	423820	5086604	Pillar				R549-037
15:04:59 Jul 10 '00	1521	232	423815	5086600	Photo taken.				
15:05:35 Jul 10 '00	1522	231	423815	5086595	Photo.				
15:06:23 Jul 10 '00	1520	292	423794	5086588	8 photos taken of pillars				R549-038
15:07:11 Jul 10 '00	1521	299	423444	5087244	5 photos taken.				
15:07:35 Jul 10 '00	1521	271	423797	5086589	On the way to Mkr-108				R549-039
15:08:23 Jul 10 '00	1521	268	423494	5086501	Photo taken.				
15:08:35 Jul 10 '00	1521	350	423797	5086593	Photo				
15:09:59 Jul 10 '00	1522	268	423768	5086611	15:05 Tunncliffe tapes changed.				
15:10:35 Jul 10 '00	1525	263	423763	5086595	Photo				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R549	Samples	PI	Sub Smps	Fr Grb#
15:12:11 Jul 10 '00	1525	86	423792	5086558	Photo.				
15:16:35 Jul 10 '00	1521	202	423843	5086312	Scanning the pillars for Mkr-108. Can't find it. We found an Alvin weight at the bottom of a pillar. Lots of white floc in the water. 3 photos taken.				
15:16:47 Jul 10 '00	1521	185	423843	5086312	Spider crab on pillar around Mkr-108 .				R549-040
15:20:23 Jul 10 '00	1521	112	423787	5086593	Four transponder fixes put us right on top of the target.. we think the marker may be gone.				
15:21:35 Jul 10 '00	1521	351	424608	5088213	Photo.				
15:23:47 Jul 10 '00	1521	36	423846	5086616	Site at Mkr-108				R549-041
15:26:23 Jul 10 '00	1521	201	423790	5086566	Photo taken.				
15:31:23 Jul 10 '00	1524	154	423782	5086593	Location of Jean's suction sample at Mkr-108.				R549-042
15:31:47 Jul 10 '00	1524	153	424452	5088069	Focusing in on white microbial mats and blue protozoan mats. Looking for fauna to suction. Photo taken.				
15:32:23 Jul 10 '00	1524	154	423776	5086584	Jean's suction sample, Mkr-108.				R549-043
15:35:11 Jul 10 '00	1524	167	423791	5086587	Position for Mkr-108, even though we can't find it. x=423784 y=5086589 z=1524.				
15:37:35 Jul 10 '00	1524	166	423818	5086539	Suction sample of BIO (limpets, worms). Started suctioning: 15:36 Ended suctioning: 15:42. (subsample basalt chips RK). Mkr-108 x=423784 y=5086589	R549-SS-J5-0014	Marcus	J Chadwick	
15:38:35 Jul 10 '00	1524	163	423795	5086568	Jean's suction sampling at 108				R549-044
15:42:35 Jul 10 '00	1524	165	423810	5086545	Suction sample: BIO. Started: 15:48 Ended: 15:51. Mkr-108 x=423784 y=5086589	R549-SS-J1-0015	Juniper		
15:43:59 Jul 10 '00	1524	181	423514	5086895	Photo taken.				
15:54:11 Jul 10 '00	1524	246	424456	5087955	Pretty rock at Mkr-108				R549-045
15:54:23 Jul 10 '00	1524	247	424456	5087955	ROCK with a blue mat on it. Some limpets and worms (BIO) are on it too. Will carry up in arm. Mkr-108 x=423784 y=5086589	R549-RK-0016	Tunncliffe / J Chadwick		
16:00:47 Jul 10 '00	1524	260	423752	5086594	Sampling a rock with blue mat.				R549-046
16:00:59 Jul 10 '00	1524	258	423780	5086594	Photo taken while sampling rock with blue mat on it.				
16:09:23 Jul 10 '00	1524	289	423267	5086339	Rock sample.				R549-047
16:16:23 Jul 10 '00	1522	83	423773	5086574	Picked up portabox and headed somewhere else to rearrange things.				
16:19:59 Jul 10 '00	1523	167	423758	5086631	All tapes off at 16:08				
16:21:35 Jul 10 '00	1523	164	423763	5086600	Photo taken.				
16:36:59 Jul 10 '00	1486	290	423762	5086582	ROPOS parked in the cage.				
16:40:11 Jul 10 '00	1382	224	423770	5086584	Coming up.				
16:41:23 Jul 10 '00	1339	241	423770	5086587	Moving the ship 200m south of the camera recovery mooring. (Camera mooring near Mkr-N41, NE of Nascent.				
17:21:29 Jul 10 '00	1	207	423790	5086606	McLane pump. Volume=330 liters. Pumped fluid during video survey at Cloud Vent.	R549-McLane-0017	Metaxas		

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R549	Samples	PI	Sub Smps	Fr Grb#
					Recovered NeMO Net'99 camera after this dive. Mkr-N41, NE of Nascent.	R549-TLC-0018	Tunncliffe		
					R549 Dive Summary: Mkr-33-Deployed 2 bactrps. Recovered 2 bactrps. Cloud- Deployed 2 bactrps, Recovered 2 bactrps, video traverse. Samples: 1 fish, 1 twg, 4 ss, 1 McLane. Snail- Samples 1 twg, 1 ss. Mkr-108- Samples: 2 ss, 1 rk. Recovered NemoNet'99 camera after dive from Nascent Vent.	1428-1516 transit on bottom from Snail to Mkr-108. (great geology)			

Dive R550

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R550	Samples	PI	Sub Smps	Fr Grb#
					Positions in utm x/y columns are automated and not flagged for accuracy. Consult dive maps for final position data.				
					Tasks: Imagenex survey at the southern end of the previous Imagenex coverage. HFS sampling on '98 lava flow.	Bottom Time: JD193(7/11) 0156-1519			
					ROPOS has lifted off the deck. 22:05				
22:06:32 Jul 10 '00	1	113	423790	5086606	ROPOS is in the water at the surface.				
22:25:34 Jul 10 '00	3	161	423790	5086606	ROPOS is trying to troubleshoot a communication problem with the Fluid Sampler.				
22:54:52 Jul 10 '00	3	149	423790	5086606	sub coming back up for a HFS cable check... lack of com				
00:22:40 Jul 11 '00	1	178	423790	5086606	display of telemetry string has had a steady rhythm for ~15 min after change of HFS com cable and a lot of wiggling				
00:36:18 Jul 11 '00	1	143	423790	5086606	sub is getting wet again				
02:23:10 Jul 11 '00	1518	345	422751	5085059	start McLane pump on at 6 liters per minute				
01:56:56 Jul 11 '00	1387	339	422797	5085102	circle approaching				R550-002
01:56:56 Jul 11 '00	1387	339	422797	5085102	or is it a shroom?				R550-003
01:58:20 Jul 11 '00	1385	257	422797	5085102	aha! Its a German army helmet with medulla.				R550-004
					0156 - 0158 mysterious jelly. Post-cruise wisdom: The jellyfish we observed was a Deepstaria enigmata, according to Verena.				
02:28:34 Jul 11 '00	1519	2	422762	5085020	actual time 2:23 McLane pump started @ 6 L/min during Imagenex Line 16, goal is a ~400 liter sample. Bag City area	R550-McL ane-0001	Metaxas/T unncliffe	null	
02:29:46 Jul 11 '00	1518	140	422754	5085078	Getting ready to start Imagenex Line BC16				
02:41:22 Jul 11 '00	1519	89	422800	5085096	Start of Imagenex line BC16, west to east.				
02:46:58 Jul 11 '00	1519	88	422862	5085114	Verena's video tapes started.				
03:36:22 Jul 11 '00	1515	91	423823	5085101	McLane pump stopped after sampling 400 litres.				
03:56:22 Jul 11 '00	1525	92	424286	5085107	Eastern end of line 16 at 03:57: x=424290, y=5085096				
03:59:22 Jul 11 '00	1526	118	424268	5085165	Start of line 15 at x=424268, y=5085165. Going from east to west.				
04:38:58 Jul 11 '00	1514	273	423562	5085164	Changing Tunncliffe tapes, putting in #2.				
05:07:58 Jul 11 '00	1514	277	422842	5085164	End of line 15 at x=422834, y=5085166.				
05:14:58 Jul 11 '00	1518	207	422828	5085225	Start of line 14 (BC) at position: x=422837, y=5085227 at time 5:19.				
05:19:46 Jul 11 '00	1517	96	422839	5085216	Just came across a mysterious jelly? a few minutes ago - see frame grabs.				
05:15:46 Jul 11 '00	1518	79	422818	5085196	close-up of mysterious jelly				R550-005

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R550	Samples	PI	Sub Smpls	Fr Grb#
05:15:46 Jul 11 '00	1518	79	422818	5085196	Side of mysterious jelly				R550-006
05:15:46 Jul 11 '00	1518	79	422818	5085196	mysterious jelly				R550-007
05:15:58 Jul 11 '00	1518	45	422818	5085196	mysterious jelly				R550-008
05:15:58 Jul 11 '00	1518	45	422818	5085196	close-up of mysterious jelly				R550-009
05:16:10 Jul 11 '00	1517	348	422824	5085195	mysterious jelly				R550-010
05:16:22 Jul 11 '00	1518	249	422824	5085195	mysterious jelly				R550-011
05:16:34 Jul 11 '00	1517	207	422828	5085198	mysterious jelly?				R550-012
05:16:46 Jul 11 '00	1518	146	422828	5085198	close-up of mysterious jelly				R550-013
05:16:58 Jul 11 '00	1517	100	422821	5085200	Mystery jelly again				R550-014
05:36:10 Jul 11 '00	1513	100	423278	5085221	Right now we are over Bag City Vent , good 4 transponder fix: 423278, 5085221.				
06:19:10 Jul 11 '00	1519	102	424290	5085215	EOL BC14 x=424310 y=5085214				
06:45:58 Jul 11 '00	1513	272	423949	5085301	Changing Tunncliffe tapes, putting in tape #3. Five photos were taken of the mysterious jelly.				
06:23:34 Jul 11 '00	1520	272	424301	5085285	SOL BC 13 424295x, 5085279y				
07:34:35 Jul 11 '00	1512	274	422866	5085278	End of line BC13				
07:39:35 Jul 11 '00	1512	80	422872	5085348	Start of line BC12. 422878; 5085244				
08:48:48 Jul 11 '00	1512	95	424056	5085345	little medusa (?) on the left side (of course you can see it!)				R550-015
09:01:24 Jul 11 '00	1516	98	424310	5085336	EOL BC12 (east end).				
09:05:24 Jul 11 '00	1516	9	424308	5085391	Changing Tunncliffe tapes at 8:59, putting #4				
09:10:00 Jul 11 '00	1516	272	424307	5085399	Start of line BC11				
10:26:36 Jul 11 '00	1510	284	422902	5085410	EOL BC11 (west end).				
10:31:36 Jul 11 '00	1512	78	422911	5085474	SOL BC10 (west end)				
11:42:00 Jul 11 '00	1513	92	424291	5085458	EOL BC10 (east end).				
11:47:36 Jul 11 '00	1515	295	424304	5085519	SOL BC9 (east end).				
12:56:12 Jul 11 '00	1507	277	423124	5085528	Verena's tapes have been switched, now on tape 6.				
13:04:12 Jul 11 '00	1513	277	422948	5085523	EOL BC9				
12:41:54 Jul 11 '00	1513	79	424294	5085583	EOL BC8 (east end). End of Imagenex survey. Now transit to Mkr-33.				
14:24:50 Jul 11 '00	1492	51	423687	5087725	Verena's video tapes off.				
15:04:56 Jul 11 '00	1367	16	424102	5086356	Still transiting to Mkr-33. Fluid sampler's valve not responding. Bad news.				
15:11:32 Jul 11 '00	1368	19	424043	5086558	ROPOS needs to be recovered.				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R550	Samples	PI	Sub Smps	Fr Grb#
15:15:44 Jul 11 '00	1375	16	424003	5086667	Ship stopped, ROPOS parking in the cage...				
15:23:32 Jul 11 '00	1383	249	423987	5086823	ROPOS is in the cage. Coming up.				
15:30:20 Jul 11 '00	1151	285	423972	5086832	ROPOS will be on deck in 30 minutes				
16:08:22 Jul 11 '00	2	160	423767	5089430	ROPOS at the surface 1605				
					R550 Dive Summary: Imagenex survey BagCity area and north to join with southern portion of previous coverage (Lines BC8-BC16). Sample: McLane pump BagCity area. Saw huge pinkish mystery jelly, later determined to be <i>Deepstaria enigmata</i> . HFS problems so dive was aborted after Imagenex.				

R551 Dive Log

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R551	Samples	PI	Sub Smps	FrGrb#
					Positions in utm x/y columns are automated and not flagged for accuracy. Consult dive maps for final position data.				
					Tasks: HFS, suction, gtb, rock, McLane sampling on '98 lava flow (Mkr-33, Cloud, Snail, Mkr-113, Joystick, FeCity, Coquille, BagCity). Deploy MTR's. Imagenex survey south of BagCity.	Bottom Time: JD193(7/11) 2015-2317 JD194(7/12) 0018-556			
19:22:41 Jul 11 '00	1	143	423767	5089430	ROPOS is lifting off the deck				
19:24:05 Jul 11 '00	1	84	423767	5089430	ROPOS is in the water.				
19:58:21 Jul 11 '00	993	114	423767	5089430	ROPOS is passing 1000m.				
20:13:11 Jul 11 '00	1492	112	423859	5087103	ROPOS is out of the cage. Looking for the bottom.				
20:14:59 Jul 11 '00	1514	94	423874	5087069	ROPOS is at the bottom. Looking for Mkr-33.				
20:17:47 Jul 11 '00	1517	355	423871	5087066	Not getting good navigation.				
20:19:59 Jul 11 '00	1519	284	423850	5087072	Good fix at the larval settling traps.				
20:23:23 Jul 11 '00	1520	191	423842	5087065	ROPOS is at Mkr-33 , looking for a good parking place.				
20:28:35 Jul 11 '00	1523	241	423850	5087101	ROPOS is rebooting STS.				
20:35:35 Jul 11 '00	1523	241	423850	5087101	ROPOS is still trying to get the STS working.				
20:37:23 Jul 11 '00	1523	240	423850	5087101	STS is up.				
20:38:49 Jul 11 '00	1523	240	423850	5087101	Using the temperature probe to look for a good sampling site.				
21:02:37 Jul 11 '00	1523	224	423842	5087046	Starting gas piston #4 21:03:47; Stop 21:04:27. T1=27, T2=20, Tmax=28.4, vol 113 ml.				
21:06:37 Jul 11 '00	1523	224	423842	5087054	423849 5087099 Mkr-33 fix.				
21:11:49 Jul 11 '00	1523	225	423848	5087093	sample 1 XRF, start 21:12:10, stop 21:17:55, T1=25, T2= 18, Tmax= 31.6, vol 500.				
21:28:37 Jul 11 '00	1523	224	423842	5087054	filter-Lipids, start 21:29:02, stop 21:40:28. T1=27 T2=19.0 Tmax=31.5, vol 1 liter, z=1520. (Mkr-33 x=423850, y=5087101)	R551-HFS -6-0001	Huber		
21:41:01 Jul 11 '00	1523	224	423854	5087099	two filter DNA, start 21:41:25, stop 21:49:25, T1=27.0, T2=20, Tmax=31, Vol 1 liter. (Mkr-33)	R551-HFS -10-0002	Huber		
21:46:37 Jul 11 '00	1523	224	423864	5087119	gas piston, start 21:03:47, stop 21:04:27, T1=27.0, T2=19.4, Tmax=28.4, vol 113liters. (Mkr-33)	R551-HFS -4-0003	Evans	Butterfield/ Lilley	
21:49:37 Jul 11 '00	1523	224	423837	5087034	sterivex filter -start 21:49:58, stop 21:57:38, T1=26.0, T2 19.0, Tmax=31.1, vol 1 liter. (Mkr-33)	R551-HFS -12-0004	Huber		
21:51:49 Jul 11 '00	1523	225	423849	5087099	HFS bag, start 21:05:19, stop 21:11:07, T1=25.0, T2=19.0, Tmax=29.5, vol 700 ml. (Mkr-33)	R551-HFS -8-0005	Butterfield		
21:53:49 Jul 11 '00	1523	224	423842	5087055	HFS XRF filter, start 21:12:10, stop 21:17:55, T1=25.0, T2=18.0, Tmax=30.6, vol =500 ml. (Mkr-33 x=423850, y=5087101)	R551-HFS -1-0006	Gendron		
21:55:37 Jul 11 '00	1523	225	423840	5087056	HFS FISH filter #3, start 21:18:44, stop 21:28:05, T1=24.0, T2=19.0, Tmax=28.9, vol 1 liter. (Mkr-33)	R551-HFS -3-0007	Huber		

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R551	Samples	PI	Sub Smps	FrGrb#
22:03:37 Jul 11 '00	1523	246	423840	5087055	ROPOS is replacing the Bactraps. Now leaving Mkr-33 and heading for Snail vent.				
22:14:37 Jul 11 '00	1522	125	423868	5087083	ROPOS has arrived at Snail vent. Positioning for a sampling spot.				
22:18:25 Jul 11 '00	1524	83	423869	5087046	ROPOS is positioning the temperature probe to find a sampling spot.				
22:20:25 Jul 11 '00	1524	83	423860	5086993	change of tapes VHS and Hi8, at 22:15.				
22:23:25 Jul 11 '00	1524	82	423883	5087074	HFS bag 9, start 22:23:22, stop 22:29:24 , T1=15.5 , T2=9.5 , Tmax=17.2 , vol 748??. z=1525 (Snail Mkr-N8 x=423877 y=5087088)	R551-HFS -9-0008	Butterfield		
22:30:13 Jul 11 '00	1524	83	423876	5087094	snail vent				R551-001
22:30:25 Jul 11 '00	1524	83	423876	5087094	snail vent				R551-002
22:30:25 Jul 11 '00	1524	83	423876	5087094	snail vent				R551-003
22:30:49 Jul 11 '00	1524	82	423880	5087075	Leaving Snail vent heading for Cloud vent.				
22:30:49 Jul 11 '00	1524	82	423880	5087075	snail vent				R551-004
22:35:49 Jul 11 '00	1523	32	423889	5087117	Positioning for a good sample site at Cloud vent				
22:39:37 Jul 11 '00	1524	268	423894	5087066	arrival at cloud marker 21 formerly known as N6				
22:41:37 Jul 11 '00	1524	281	423889	5087072	Hfs 15 filter #15 for XRF; start 22:42, stop 22:46. Tmax=16, T1=15.9, T2=12.5, volume 500 ml z=1526. (Cloud Mkr-N6/21)	R551-HFS -15-0009	Gendron	Huber	
22:46:01 Jul 11 '00	1525	283	424125	5087559	HFS bag #11 with filter, start 22:47:13, stop 22:52:59: T1=max =15.9, T2=12.7, volume=700ml, z=1526 (Cloud Mkr-N6/21 x=423901 y=5087116)	R551-HFS -11-0010	Butterfield	Huber	
22:52:37 Jul 11 '00	1525	283	423889	5087071	HFS gas piston #24: start 22:54:13, stop 22:55:05. Tmax=15.9, T1=15.8, T2=12.6, volume 109 ml. (Cloud Mkr-N6/21)	R551-HFS -24-0011	Evans	Butterfield/ Lilley	
22:55:01 Jul 11 '00	1525	281	423900	5087096	GAS Tight Bottle, stbd gtb#5, time 2255, z=1526 (Cloud Mkr-N6/21)	R551-GTB -5-0012	Evans	Butterfield/ Lilley	
22:59:01 Jul 11 '00	1524	282	423898	5087110	Tunncliffe tapes turned on.				
23:03:13 Jul 11 '00	1524	254	423902	5087119	Verena is looking for something to suction at the edge of Cloud.				
23:07:13 Jul 11 '00	1524	254	423892	5087072	Suction Sample jar #4, 250 micron filter, peripheral fauna (BIO): 5 meters east of Mkr-21. start time 2307 stop time 2314.	R551-SS- J4-0013	Tunncliffe	J Chadwick	
23:16:13 Jul 11 '00	1524	253	423900	5087118	transit to Mkr-113				
23:27:53 Jul 11 '00	1279	45	423842	5087056	Tunncliffe Tapes off				
23:45:41 Jul 11 '00	898	97	423836	5087109	ufo				R551-005
00:22:20 Jul 12 '00	897	203	422805	5087178	visual of phantom jellyfish in transit to Mkr-113				R551-006
01:18:12 Jul 12 '00	1524	187	423411	5085936	no marker yet but we're in the neighborhood of Mkr-113				
01:18:36 Jul 12 '00	1524	179	422645	5085133	tube worms near Mkr-113				R551-007
01:19:00 Jul 12 '00	1524	174	422711	5085252	Temperature measurement max 11.2 deg C at diffuse venting in marginal tube worm area. Tunncliffe tape is on.				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R551	Samples	PI	Sub Smpls	FrGrb#
01:21:00 Jul 12 '00	1524	171	422713	5085253	several white patches of venting				
01:23:00 Jul 12 '00	1524	197	423384	5085896	some blue, "protozoan" patches noted				
01:31:12 Jul 12 '00	1523	34	425481	5088197					R551-008
01:31:24 Jul 12 '00	1523	31	425481	5088197	Mkr-113 (UW 94) proper (a pillar), a fair amount of rock fall has altered the position of the marker				
01:31:48 Jul 12 '00	1524	69	423371	5085915	marker 113				R541-009
01:32:12 Jul 12 '00	1525	85	423379	5085925	photos 1 & 2 (counter says 8 & 9)				
01:32:48 Jul 12 '00	1524	48	422634	5085138	Mkr-113				R541-010
01:34:12 Jul 12 '00	1526	18	422634	5085138	top of pillar				R551-011
01:35:00 Jul 12 '00	1524	19	422478	5084533	good fix x=423371 y=5085915 at 01:31				
01:44:12 Jul 12 '00	1525	46	421586	5085990	suction sampler btl #1, 250 microns white (BIO/MAT) stuff. start 0144 end 02:24. (Mkr-113 x=423377 y=5085929)	R551-SS-J1-0014	Marcus		
02:04:36 Jul 12 '00	1526	15	423368	5085928	good fix x 423368, y 5085923 at 02:03				
02:05:12 Jul 12 '00	1525	18	423376	5085914	cross section of pillow lava				R551-012
02:21:48 Jul 12 '00	1525	13	423391	5085966	change of tapes: Tunncliffe and SVHS, Hi-8				
02:35:12 Jul 12 '00	1525	319	423377	5085936	HFS bag sample bag#14. start 02:35:36, end 02:43:56. Tmax=19.8, T1= 7.9, T2=12.0, volume 700 ml (Mkr-113)	R551-HFS-14-0015	Butterfield		
02:44:00 Jul 12 '00	1525	319	423424	5086093	port gastight bottle #2 19 deg C, time 0244 (Mkr-113)	R551-GTB-2-0016	Evans	Butterfield/ Lilley	
02:49:00 Jul 12 '00	1525	309	423374	5085932	highlights off				
02:54:00 Jul 12 '00	1525	318	423374	5085937	HFS temperature measurements for MTR placement = 11.8 deg C				
02:58:12 Jul 12 '00	1525	318	423373	5085933	DEPLOYING MTR #4126 AT fix x=423377 y=5085929 (good for sample too), down in hole where tubeworms were mistakenly grabbed earlier.				
03:06:36 Jul 12 '00	1525	334	423371	5085931	MTR #4126 @ Mkr-113				R551-013
03:11:24 Jul 12 '00	1525	3	423384	5085912	MTR #4126 in good position in flow. Now positioning to suction sample 'blue protozoan mat' just behind where the MTR is for Moyer.				
03:15:36 Jul 12 '00	1525	358	423375	5085927	Near Mkr-113				R551-014

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R551	Samples	PI	Sub Smps	FrGrb#
03:16:24 Jul 12 '00	1525	17	423393	5085943	MTR #4126 near Mkr-113				R551-015
03:17:24 Jul 12 '00	1525	8	423375	5085928	Blue protozoan mat near. Mkr-113				R551-016
03:17:48 Jul 12 '00	1525	12	423392	5085943	Proto mat near. Mkr-113				R551-017
03:20:12 Jul 12 '00	1525	353	423347	5085938	Blue goo near. Mkr-113				R551-018
03:20:48 Jul 12 '00	1525	353	423398	5085966	Starting to suction into bottle #6 (MAT/BIO?) start 0326, finish 0345. Trying to get blue protozoan mat. z=1524 (subsample basalt chips RK) near Mkr-113.	R551-SS-J6-0017	Moyer, Juniper	J Chadwick	
03:21:36 Jul 12 '00	1525	352	423383	5085919	Blue goo near Mkr-113				R552-019
03:21:48 Jul 12 '00	1525	353	423383	5085919					R551-020
03:22:48 Jul 12 '00	1525	352	423373	5085932	polynoid on blue protozoan mat at Mkr-113				R551-021
03:24:24 Jul 12 '00	1525	357	423399	5085969	the same				R551-022
03:25:36 Jul 12 '00	1525	7	423383	5085913	Highlights on at 03:20, Highlights off at 03:25.				
03:31:00 Jul 12 '00	1525	15	423347	5085937	Still trying to suction sample blue mat - we're getting scale worms and limpets, but not really blue stuff yet. Now slurping some sea spiders too.				
03:32:00 Jul 12 '00	1525	15	423358	5085928	Same place with sea spider				R551-023
03:35:48 Jul 12 '00	1525	14	423372	5085934	NOTE: Before suction sample began we took some some close up video of mat with grazing scale worms, spiders on periphery.				
03:38:24 Jul 12 '00	1525	21	423371	5085931	Same place				R551-024
03:47:26 Jul 12 '00	1525	18	423381	5085920	Suction sampling in the same place (Near Mkr-113)				R551-025
03:48:14 Jul 12 '00	1525	21	423385	5085922	Suction sampling again				R551-026
03:48:26 Jul 12 '00	1525	22	423382	5085920	Suction sample into jar#7 in same spot for same stuff. Moving a couple meters away to get more blue mat. start time 0348, stop 0408. (MAT - got some BIO too) near Mkr-113	R551-SS-J7-0018	Moyer/Juniper		
03:48:38 Jul 12 '00	1525	22	423382	5085920	Suction sampling near. Mkr-113				R551-027
03:54:38 Jul 12 '00	1525	11	423382	5085914	That is a beautiful bunch of blue mat - suck it up says Susan.				
03:54:38 Jul 12 '00	1525	11	423382	5085914	near Mkr-113				R551-028
04:02:26 Jul 12 '00	1525	115	423379	5085922	near Mkr-113				R551-029

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R551	Samples	PI	Sub Smps	FrGrb#
04:02:38 Jul 12 '00	1525	111	423379	5085922	near Mkr-113				R551-030
04:03:02 Jul 12 '00	1525	86	423379	5085920	near Mkr-113				R551-031
04:03:50 Jul 12 '00	1525	73	423382	5085920	Still looking around for a suitable spot to suction more blue mat.				
04:05:02 Jul 12 '00	1525	86	423330	5086038	near Mkr-113				R551-032
04:05:50 Jul 12 '00	1525	87	423392	5085949	Suctioning once again into bottle #7 for more blue mat - looks like we're getting some <i>Amphisamytha galapagensis</i> too.				
04:08:50 Jul 12 '00	1525	82	423107	5086889	We're going to head to Joystick soon. Bearing of 184 degrees for 423 meters.				
04:10:50 Jul 12 '00	1525	82	423395	5085963	Stopping all tapes for the transit to Joystick.				
04:14:14 Jul 12 '00	1492	151	423387	5085906	Back at the cage, the ship is starting to move. Transiting through the water column.				
04:21:38 Jul 12 '00	1447	145	422316	5087105	The ship is moving slowly - it's not a ferrari.				
04:49:16 Jul 12 '00	1528	190	423336	5085498	On the bottom. We should be near Joystick.				
04:50:16 Jul 12 '00	1535	181	423334	5085504	Embley tapes back on.				
04:51:40 Jul 12 '00	1535	143	423344	5085500	Around 6 spider crabs and a rattail along periphery of Joystick vent.				
04:53:16 Jul 12 '00	1536	115	423344	5085500	Marker 42 (Joystick) in view.				
04:58:04 Jul 12 '00	1535	143	423342	5085503	Looking around in the collapsed area which is the only venting left at Joystick. Trying to find a good place to fluid and suction sample.				
05:00:40 Jul 12 '00	1536	137	423596	5086102	Fluid sampler at Joystick				R551-033
05:03:04 Jul 12 '00	1536	137	423338	5085502	Something is wrong with Ropos - telemetry is down.				
05:12:52 Jul 12 '00	1534	130	423329	5085515	Ropos is back on line. Now looking for Joystick again.				
05:15:16 Jul 12 '00	1536	147	423352	5085498	Back at Joystick.				
05:26:52 Jul 12 '00	1537	154	423346	5085495	A flying spider crab and two vent fish. Probing for temperature in the venting hole at Joystick...temperature maxing at 2.6. We're going to look around some more for some better flow.				
05:28:52 Jul 12 '00	1537	153	423343	5085492	Crab @ Joystick				R551-034
05:29:04 Jul 12 '00	1537	155	423343	5085492	Ditto				R551-035
05:29:52 Jul 12 '00	1536	154	423339	5085492	Highlights on. Close up video of female spider crab - there are limpets on its legs...hitchhiking (phoresy?). Is it GRAVID asks Bob?				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R551	Samples	PI	Sub Smps	FrGrb#
05:30:28 Jul 12 '00	1537	156	423341	5085492					R551-036
05:31:04 Jul 12 '00	1537	154	423346	5085492					R551-037
05:31:28 Jul 12 '00	1537	156	423346	5085492					R551-038
05:32:52 Jul 12 '00	1536	107	423354	5085488	Highlights off.				
05:34:04 Jul 12 '00	1536	75	423342	5085500	Bathtub rings at Joystick				R551-039
05:49:40 Jul 12 '00	1537	139	422347	5087289	Tube Worms at Joystick				R551-040
05:54:28 Jul 12 '00	1537	131	423335	5085495	Begin fluid sample at Joystick at 0554 into bag #19. T1=3.9 T2=3.3 Tmax=4. Stopping sample at 0601. Total volume pumped was 723 ml. Depth=1537m. (Joystick Mkr-42 x=423341 y=5085505)	R551-HFS-19-0019	Butterfield	Huber	
05:54:52 Jul 12 '00	1537	132	423426	5085594	Fluid sampling at Joystick				R551-041
05:57:52 Jul 12 '00	1537	131	423358	5085500	Scale Worm at Joystick				R551-042
05:58:04 Jul 12 '00	1537	132	423353	5085495	Ditto on the scale worm at Joystick				R551-043
05:58:52 Jul 12 '00	1537	131	423343	5085503	Close up video of scale worms, Amphisamytha tube with gills sticking out and a copepod hopping on the rock.				
06:04:52 Jul 12 '00	1537	123	423362	5085504	Positioning to suction sample at Joystick where fluid sample was just taken, into J2 jar with a 200 micro mesh.				
06:07:04 Jul 12 '00	1537	155	423347	5085507	Suction sampling at Joystick				R551-044
06:19:52 Jul 12 '00	1536	154	423425	5085591	We're chasing zoarcid vent fish for Kim. Oh no....				
06:21:16 Jul 12 '00	1536	159	423358	5085491	Fish at Joystick				R551-045
06:26:04 Jul 12 '00	1537	156	423341	5085500	Suction sample into J2. at start 0606 stop at 0625. Tried for a fish but couldn't get it. (BIO?) Joystick Mkr-42.	R551-SS-J2-0020	Juniper		
06:32:28 Jul 12 '00	1533	201	423433	5085583	Moving to "Iron City" (FeCity)				
06:34:16 Jul 12 '00	1535	202	423323	5085454	octopus, just leaving Joystick heading to Bag City				R551-046
06:34:28 Jul 12 '00	1535	200	423316	5085449	Close up of an octopus on a pillar - beautiful!!!				
06:34:40 Jul 12 '00	1535	205	423316	5085449	octopus				R551-047
06:35:16 Jul 12 '00	1535	247	421373	5085686	save me				R551-048

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R551	Samples	PI	Sub Smps	FrGrb#
06:35:52 Jul 12 '00	1534	265	421373	5085686	closer up octopus				R551-049
06:35:52 Jul 12 '00	1534	265	421373	5085686	keep me				R551-050
06:36:04 Jul 12 '00	1534	267	424434	5084466	yippee				R551-051
06:37:28 Jul 12 '00	1536	296	423430	5085556	beautiful octopus and pillars				R551-052
06:38:16 Jul 12 '00	1536	287	423432	5085556	Highlights on.				
06:39:16 Jul 12 '00	1536	290	423430	5085555	belly of octopus				R551-053
06:40:04 Jul 12 '00	1536	285	423090	5085220	stretched out octopus				R551-054
06:40:04 Jul 12 '00	1536	285	423090	5085220	beautiful shot of octopus				R551-055
06:40:52 Jul 12 '00	1536	286	423475	5085616	Highlights off. Ship moving to "Iron City".				
06:50:28 Jul 12 '00	1534	199	423438	5085505	We think we are near iron city				
06:51:28 Jul 12 '00	1533	193	423144	5085211	We are at FeCity admist pillars and collapsed lavas.				
06:53:52 Jul 12 '00	1533	83	422187	5087314	We are positioning to sample fluid around iron oxide deposits				
06:59:16 Jul 12 '00	1535	116	423273	5085345	iron oxide				R551-056
07:00:04 Jul 12 '00	1535	151	423303	5085367	We are in some sort of cave or something in iron city- can see some fluid trickling out near the entrance				
07:02:40 Jul 12 '00	1535	158	423337	5085404	temperature =7 degree				R551-057
07:03:04 Jul 12 '00	1535	157	423354	5085421	We're probing this little spot in the wall for a temperature.				
07:03:40 Jul 12 '00	1535	158	423159	5085233	Fluid Sample Bag #17 with filter T1=9.3 T2=6.8 Tmax=10.1 Volume=670 ml. Started 07:04:29 Ended 07:12:11 (FeCity x=423300 y=5085364)	R551-HFS -17-0021	Butterfield	Huber/ Gendron	
07:07:52 Jul 12 '00	1535	157	423304	5085374	Halloween in iron oxide at Joystick				R551-058
07:08:16 Jul 12 '00	1535	163	423309	5085373	We see lots of nemertean- worms				
07:12:28 Jul 12 '00	1535	158	423245	5085342	HFS Gas Piston #20 started 07:13:03 T1=10 T2=7.6 Tmax=10.3, Volume=144 ml - Ended 07:14:25 (FeCity)	R551-HFS -20-0022	Evans		
07:12:52 Jul 12 '00	1535	161	423245	5085342	Lisa is out of nav so we won't be getting live updates				
07:12:52 Jul 12 '00	1535	161	423245	5085342	We are now preparing to suction here				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R551	Samples	PI	Sub Smps	FrGrb#
07:12:52 Jul 12 '00	1535	161	423245	5085342	Preparing to suction into jar J1				
07:12:52 Jul 12 '00	1535	161	423245	5085342	Suction of nemertean worms (BIO) into Jar J1. We're also getting iron oxides, basalt, and some other worms. Suction started at 07:17 Stopped suctioning at 07:35 (FeCity)	R551-SS-J1-0023	Juniper		
07:12:52 Jul 12 '00	1535	161	423245	5085342	Juniper tape on				
07:12:52 Jul 12 '00	1535	161	423245	5085342	suction sample (bottle #1) and scar? worm.				R551-059
07:22:34 Jul 12 '00	1535	159	423245	5085342	We're trying to store the seven function arm to get it out of the way for suctioning				
07:22:56 Jul 12 '00	1535	159	423321	5085394	Nav is back up				
07:26:44 Jul 12 '00	1535	159	423256	5085328	We are still suctioning				
07:35:08 Jul 12 '00	1535	158	423303	5085372	Stopped Juniper tape				
07:35:20 Jul 12 '00	1533	156	423444	5085515	Heading to BagCity, 150 m away.				
07:52:44 Jul 12 '00	1534	264	423266	5085152	Now at BagCity				
07:55:32 Jul 12 '00	1535	312	423204	5085133	Preparing to suck water, McLane pump starting, pumping 7 liters/min				
07:56:20 Jul 12 '00	1535	348	423204	5085133	Action of the McLane pump at BagCity				R551-060
07:57:56 Jul 12 '00	1535	299	423249	5085180	See the worms, see the marker, see the MTR, see the shimmering water				
07:57:56 Jul 12 '00	1535	299	423249	5085180	Tubeworms at BagCity				R551-061
08:02:08 Jul 12 '00	1535	259	423181	5083757	Probing for temperature, fluid sampler				
08:07:08 Jul 12 '00	1535	264	423525	5085453	Loss of coms!				
08:10:08 Jul 12 '00	1535	263	423538	5085468	HFS XRF filter #2, starting at 08:16:51 T1=19 T2=14.8 stop at 08:19:35. Tmax=19.1 vol=500 ml (BagCity x=423271 y=5088209)	R551-HFS-2-0024	Gendron		
08:11:44 Jul 12 '00	1535	265	423543	5085469	zoom of 2 tubeworms				R551-062
08:12:44 Jul 12 '00	1535	264	423543	5085469	Couldn't start sample...loss of coms!				
08:12:56 Jul 12 '00	1535	264	423560	5084918	Head of tubeworm in the flux at BagCity				R551-063
08:16:20 Jul 12 '00	1535	264	423210	5085141	Head of one tubeworm				R551-064
08:17:08 Jul 12 '00	1535	265	423204	5085135	Head of tube worm				R551-065

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R551	Samples	PI	Sub Smps	FrGrb#
08:19:56 Jul 12 '00	1535	264	422987	5084576	Head of 2 tube worms and limpets				R551-066
08:20:08 Jul 12 '00	1535	264	423142	5083817	Retraction of the head of tube worm and limpets				R551-067
08:20:08 Jul 12 '00	1535	264	423142	5083817	Retraction of the head of one tube worm and limpets				R551-068
08:20:20 Jul 12 '00	1535	265	423142	5083817	HFS gas piston #5, start: 08:20:59, T1=19.1 T2=14.1, Tmax=19.3, vol=101 ml, stop 08:21:57 (BagCity)	R551-HFS -5-0025	Evans	Butterfield/ Lilley	
08:22:44 Jul 12 '00	1535	265	423268	5085220	HFS FISH filter #7, start 8:22:45, T1= 18.9, T2=14.5, Tmax=19.2, vol=1 liter, stop 08:32:38 (BagCity)	R551-HFS -7-0026	Huber		
08:26:08 Jul 12 '00	1535	264	423212	5085145	Heads of tube worms at Bag city				R551-069
08:26:44 Jul 12 '00	1535	264	423200	5085131	Heads of tube worms at Bag city				R551-070
08:29:08 Jul 12 '00	1535	265	422988	5084558	highlights on..tube worms				
08:29:08 Jul 12 '00	1535	265	422988	5084558	Heads of tubeworms at Bag city				R551-071
08:33:08 Jul 12 '00	1535	265	423259	5085209	HFS Filter set 2 DNAs #13, start 08:33:36, T1=18.9, T2=14.4, Tmax=19.2, vol=1 liter. stop 08:42:32 (BagCity)	R551-HFS -13-0027	Huber		
08:40:56 Jul 12 '00	1535	265	423275	5085202	HFS Bag #18, start 08:44:08, T1=18.9 T2=14., Tmax=19.2, vol=700 ml, stop 08:50:15 (BagCity)	R551-HFS -18-0028	Butterfield	Larson/ Huber/ Mehta	
08:50:22 Jul 12 '00	1535	264	423264	5085205	HFS piston #22. start 08:51:00, T1=18.7, T2=14.3, Tmax=19.0, vol=700 ml, stop 08:4:42. (BagCity)	R551-HFS -22-0029	Butterfield	Larson/ Huber/ Mehta	
08:58:22 Jul 12 '00	1532	71	423188	5085117	Going' to Coquille				
09:23:58 Jul 12 '00	1533	310	425020	5085662	Almost at Coquille- see some eaten clam shells				
09:30:58 Jul 12 '00	1536	267	422746	5086551	At Coquille and probing around for fluid sample.				
09:33:30 Jul 12 '00	1535	262	423287	5085199	McLane pump stopped at 8:56:46, 403 liters pumped, z=1531 (BagCity area)	R551-McL ane-0030	Metaxas		
09:36:34 Jul 12 '00	1536	263	422731	5084063	fauna at Coquille				R551-072
09:40:46 Jul 12 '00	1536	263	423325	5084578	There was a problem with STS which has now been solved.				
09:50:10 Jul 12 '00	1536	259	422992	5085364	HFS bag #16, 9:50:25 start time. T1=31.0 T2=20.8 Tmax=32.0. End suction at 9:56:42 with a volume pumped of 700 ml (Coquille x=422991 y=5085365)	R551-HFS -16-0031	Butterfield		
09:57:10 Jul 12 '00	1536	261	422948	5085280	HFS filter #21 for XRF analyses. T1=31.8, T2=21.3, Tmax=31.8 - 0957 start of sampling, end suction 1001 with a volume of 500 ml. (Coquille)	R551-HFS -21-0032	Gendron		
10:03:22 Jul 12 '00	1536	261	423251	5083239	HFS - start at 10:02 for gas piston #23, T1=30.7, T2=20.9, Tmax=30.9, volume is 112 ml, end at 10:03. (Coquille)	R551-HFS -23-0033	Evans	Butterfield/ Lilley	

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R551	Samples	PI	Sub Smps	FrGrb#
10:07:22 Jul 12 '00	1536	163	423241	5083244	DEPLOYING MTR's at Coquille, X=422991 Y=5085365. MTR #3317.				
10:23:46 Jul 12 '00	1536	27	422002	5085321	DEPLOYING MTR #4108, north west of MTR#3317				
10:28:10 Jul 12 '00	1536	22	422963	5085329	X=422963 Y=5085329 which is a good fix for the deployment of MTR 4108.				
10:33:22 Jul 12 '00	1536	26	423786	5084969	repositioning MTR				
10:33:34 Jul 12 '00	1536	24	423786	5084969	MTR has been re-placed into a slightly more active vent area. Co-ordinates from previous fix are still good...MTR only moved a few inches.				
10:33:58 Jul 12 '00	1536	26	423433	5085805	Deployment of MTR#4108 near Coquille.				R551-073
10:50:34 Jul 12 '00	1536	310	424914	5084373	Having trouble opening purse for rock sample...				
10:52:34 Jul 12 '00	1533	327	423358	5085721	Picked up rock sample (Rk) from floor of glassy basalt. (Coquille)	R551-RK-0034	J Chadwick		
10:53:58 Jul 12 '00	1535	331	423357	5085730	Purse is now open and ready to receive the rock sample.				
11:08:22 Jul 12 '00	1536	294	422959	5085365	A rip in the suction line has been detected, suction sampling no longer possible.				
11:14:58 Jul 12 '00	1536	302	423000	5085381	This concludes the sampling for tonight's show...on to Imagenex.				
11:18:46 Jul 12 '00	1505	200	422969	5085323	Moving ship at 1 knot to west end of Imagenex line BC17.				
11:27:58 Jul 12 '00	1494	254	423519	5085702	Cage motor has been turned off for navigation fixes.				
11:54:10 Jul 12 '00	1498	216	422815	5085041	Tapes for Tunnicliffe have been turned on for the start of Imagenex.				
11:55:46 Jul 12 '00	1514	91	422815	5085041	Cage motor on and has been brought up to 1490m.				
12:01:34 Jul 12 '00	1515	93	421975	5085100	Cage motor has been turned off for Imagenex.				
12:02:46 Jul 12 '00	1515	95	422874	5085047	Ship is commencing movement for mapping.				
12:41:10 Jul 12 '00	1512	91	423497	5085041	Noticed clock on SIT camera is 50 seconds fast.				
13:16:34 Jul 12 '00	1521	99	424306	5085035	End of BC17, about to commence BC18.				
13:23:10 Jul 12 '00	1521	354	424282	5084966	started line BC18				
13:54:59 Jul 12 '00	1514	280	423692	5084986	Verena Tunnicliffe's have been switched.				
14:33:11 Jul 12 '00	1514	277	422829	5084980	End of BC18, moving to commence BC19				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R551	Samples	PI	Sub Smps	FrGrb#
14:37:11 Jul 12 '00	1516	92	422784	5084925	starting line BC19				
15:56:01 Jul 12 '00	1522	90	424284	5084947	End of line BC19, x=424300 y=5084950				
15:58:01 Jul 12 '00	1513	266	424429	5084933	Headed back to the cage.				
16:07:37 Jul 12 '00	1490	168	424722	5084269	ROPOS pulling into the cage.				
16:14:49 Jul 12 '00	1304	189	424729	5084344	ROPOS on the way up.				
16:59:55 Jul 12 '00	2	60	424991	5085030	ROPOS on deck at 1658				
					R551 Dive Summary: Mkr-33-Samples: 7 hfs. Snail-Sample: 1 hfs. Cloud-Samples: 3 hfs, 1 gtb, 1 ss. Mkr-113-Deployed MTR. Samples: 3 ss, 1 hfs, 1 gtb. Joystick-Samples: 1hfs, 1 ss. FeCity-Samples: 2 hfs, 1 ss. Beautiful octopus on pillar when leaving FeCity. Bag City-Samples: 6 hfs, McLane. Coquille-Deployed 2 MTRs, Samples: 3 hfs, 1 rk. Imagenex (Lines BC17-BC19).				

R552 Dive Log

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R552	Samples	PI	Sub Smps	FrGrb#
					Positions in utm x/y columns are automated and not flagged for accuracy. Consult dive maps for final position data.				
					Tasks: Mkr-113 and Coquille - biological sampling. Imagenex west of Mkr-113. Geologic traverses. Locate NeMO Net'00 camera and bring it to BagCity where it will be repositioned. Finish up with Imagenex south of BagCity.	Bottom Time: JS194(7/12) 2358-JD1 95(7/13) 2327			
22:49:06 Jul 12 '00	0	60	424991	508503 0	ROPOS in the water at 2248				
23:00:32 Jul 12 '00	1	82	424991	508503 0	Bringing ROPOS back on board to adjust ballast.				
23:58:40 Jul 12 '00	1517	212	42336 3	5085910	On Bottom				
23:59:40 Jul 12 '00	1521	51	42336 3	5085910	Arrive on bottom just south of marker site				
00:02:38 Jul 13 '00	1518	251	42336 3	5085910	Photo 1, near Mkr-113, but can't find marker yet.				
00:03:14 Jul 13 '00	1521	217	42336 3	5085910	Photo 2 near Mkr-113.				
00:13:36 Jul 13 '00	1525	55	42335 4	508592 6	At Mkr-113 , photo 9 of pillar				
00:14:36 Jul 13 '00	1523	39	42339 3	508594 3	going to MTR site				
00:16:12 Jul 13 '00	1524	342	42339 8	508596 4	Mkr-113				R552-001
00:16:12 Jul 13 '00	1524	342	42339 8	508596 4	photo 10, looking for sample spot				
00:16:12 Jul 13 '00	1524	342	42339 8	508596 4	marker 113				R552-002
00:17:12 Jul 13 '00	1524	60	42338 0	5085911	photo 11				
00:17:24 Jul 13 '00	1523	64	42338 0	5085911	photo 12				
00:18:36 Jul 13 '00	1522	102	42347 6	508674 4	photo 13				
00:18:48 Jul 13 '00	1523	68	423381	5085913	photo 14, MTR				
00:21:12 Jul 13 '00	1523	84	425315	508583 0	photo 15, side of collapse, photo 16 fallen Mkr-113				
00:24:12 Jul 13 '00	1526	92	42338 4	5085917	photo 17				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R552	Samples	PI	Sub Smps	FrGrb#
00:25:24 Jul 13 '00	1523	43	42339 3	508596 9	photo 18				
00:26:48 Jul 13 '00	1525	24	42272 3	508709 5	photo of sample site, #19, #20				
00:27:24 Jul 13 '00	1525	32	42338 2	5085911	sample site				R552-003
00:28:48 Jul 13 '00	1525	28	425418	5085611	photo 21, sample site worms				
00:29:48 Jul 13 '00	1525	17	423371	508592 7	x=423371, y=5085927, time=00:29				
00:31:24 Jul 13 '00	1525	18	423371	508592 7	harvesting worms clinging to the edge of the wall				
00:32:00 Jul 13 '00	1525	19	423371	508592 7	photo 22, 23, harvesting worms				
00:32:00 Jul 13 '00	1525	19	423371	508592 7	twg, the jaws close				R552-004
00:33:00 Jul 13 '00	1525	20	422129	508705 0	Tube worm grab (BIO) - (subsample basalt chips RK) Mkr-113 x=423377 y=5085929	R552-TW G-0001	Marcus	J Chadwic k	
00:33:12 Jul 13 '00	1525	20	423031	508664 2	tube worms in captivity				R552-005
00:34:36 Jul 13 '00	1525	19	422961	508676 6	grabbing worms, two claw-fulls, in port biobox				
00:36:00 Jul 13 '00	1525	18	42285 6	508520 5	photo 24, 25, sample site after worm removal				
00:38:12 Jul 13 '00	1525	34	42357 9	508522 2					R552-006
00:43:24 Jul 13 '00	1525	58	421438	508600 7					R552-007
00:43:24 Jul 13 '00	1525	58	421438	508600 7	Third and fourth chomps of worms, to left of first two				
00:44:24 Jul 13 '00	1525	65	421439	508600 5	grab part II delivery				R552-008
00:45:12 Jul 13 '00	1525	71	421618	508650 9	twg3				R552-009
00:47:36 Jul 13 '00	1523	34	42479 5	508774 5	Photo 26 taken of TWG site.				
00:50:24 Jul 13 '00	1522	280	42340 0	508596 4	Photo 27 taken.				
00:54:24 Jul 13 '00	1524	281	42339 0	508594 6	Taking close up video of blue mat...looks like its waving.				
00:55:24 Jul 13 '00	1524	283	42338 5	5085914	blue mat animal at Mkr-113				R552-010
00:57:36 Jul 13 '00	1524	282	424129	508634 0	Highlights have been turned on.				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R552	Samples	PI	Sub Smps	FrGrb#
00:58:36 Jul 13 '00	1524	281	424129	508634 0	The blue mat seems to be an animal as the organism is retracting into its tube occasionally.				
01:04:24 Jul 13 '00	1524	282	421579	508598 9	Photo 28 taken of blue mat animals.				
01:04:48 Jul 13 '00	1524	282	421705	508670 8	Highlights have been turned off.				
01:06:36 Jul 13 '00	1524	283	421372	5086102	Highlights have been turned back on.				
01:11:00 Jul 13 '00	1524	282	42339 0	5085910	highlights on - fuzzy blue animal- and then off again				
01:12:00 Jul 13 '00	1524	283	42274 4	508522 8	photo 29, 30				
01:27:48 Jul 13 '00	1500	1	42264 2	5085291	heading to Imagenex traverses				
01:31:48 Jul 13 '00	1501	6	423187	508599 6	Imagenex Line W8 begins. 423191/5086002				
02:11:48 Jul 13 '00	1504	9	423189	508649 3	EOL W8 (north end). 423189/5086498				
02:12:24 Jul 13 '00	1504	270	423188	508650 4	Switch tapes for Tunnicliffe (02:05)				
02:16:48 Jul 13 '00	1504	265	423137	508649 9	start of line W9 (North end) 423129/5086496				
02:46:24 Jul 13 '00	1504	191	423128	508600 2	EOL W9 (South end) 423127/5086002				
02:52:12 Jul 13 '00	1504	7	42307 7	508599 4	SOL W10 (Southern Exposure). 423074/5085999				
02:52:48 Jul 13 '00	1504	6	42307 2	508600 3	start of line W10 position x423074 y 5085999				
03:23:00 Jul 13 '00	1505	5	42306 8	508649 2	End of line W10 at 03:23, position: 423065x, 5086501y.				
03:25:12 Jul 13 '00	1505	247	423015	508649 0	Start of line W11 at 03:25, position: 423015x, 5086490y.				
03:52:36 Jul 13 '00	1507	196	42300 8	5086010	End of line W11 at 03:53. Position: 423005x, 5085995y.				
03:55:24 Jul 13 '00	1507	2	42295 5	508599 8	Start of line W12 at 03:55. Position: 422949x, 5086020y				
04:15:00 Jul 13 '00	1508	4	42294 8	508649 7	end of line EOL12 X = 422948 Y = 5086497				
04:21:00 Jul 13 '00	1510	188	42289 5	508652 6	SOL 13 x=422895, y=5086513				
04:47:54 Jul 13 '00	1509	185	42288 7	5086015	end of line W13, X=422886 Y=5086008				
04:52:06 Jul 13 '00	1509	5	42282 3	508600 0	start line W 14 X= 422822 Y= 5095999 at 04:52				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R552	Samples	PI	Sub Smps	FrGrb#
05:14:18 Jul 13 '00	1511	354	42282 7	5086516	End of line W14. Position: 422825x, 5086516y.				
05:31:06 Jul 13 '00	1507	182	42278 7	508650 6	Start of line W15 at 05:31. Position: 422777x, 5086507y				
05:37:42 Jul 13 '00	1511	180	42277 7	5086317	Captain slowed down the ship to 0.75 knots from 1.3				
05:50:30 Jul 13 '00	1514	181	42277 3	508600 0	End of the line W15 at 05:50. X=422772, Y=5086000. Finished with Imagenex west of Mkr-113				
05:52:54 Jul 13 '00	1514	180	42276 9	508598 9	We are going to Coquille, range =680 m				
05:55:42 Jul 13 '00	1510	349	422815	508606 9	Tunncliffe VHS off				
06:15:48 Jul 13 '00	1535	184	421962	508538 9	Photo 34 of diffuse venting at Coquille . A lot of old tube worm bushes, limpets. Photo 35, 36. Wow. A large sea star right in between the tube worm bushes.				
06:19:30 Jul 13 '00	1476	153	421980	508587 4	We just drove through a plume - lots o' smoke, baby!				
06:23:54 Jul 13 '00	1473	95	42277 8	508565 7	More smoke.				
06:44:54 Jul 13 '00	1527	186	421881	508546 6	Back on the bottom, near Coquille site. We are trying to find live clams to suction. Photo 33. All tapes back on.				
06:47:32 Jul 13 '00	1536	187	421962	508538 9	Coquille				R552-011
06:47:56 Jul 13 '00	1537	181	421962	508538 9	Sea star @ Coquille				R552-012
06:48:30 Jul 13 '00	1538	183	421962	508538 9	Photo 37, 38. Spider crabs, clams, scattered tubeworm bushes. Moving to the southern end of the field.				
06:49:42 Jul 13 '00	1537	185	421962	508538 9	Clams are interspersed between the pillows in sediment pockets. Photo 39. Shimmering flow. Photo 40.				
06:50:20 Jul 13 '00	1537	189	421962	508538 9	Coquille				R552-013
06:50:54 Jul 13 '00	1536	183	422917	508530 4	This is a quite extensive area of low temperature venting , Photo 41. Tons of limpets, tubeworms, clams, photo 42.				
06:51:56 Jul 13 '00	1537	182	421505	508620 8	Tube Worms. on older lava at Coquille				R552-014
06:52:08 Jul 13 '00	1537	182	421505	508620 8	Photo 45 and 46 of this traverse over Coquille old lavas.				
06:52:30 Jul 13 '00	1538	190	422931	508528 9	Photos 47 and 48 over old lavas, large tube worm bushes, white stuff.				
06:52:30 Jul 13 '00	1538	190	422931	508528 9	Tube worm bushes				R552-015
06:53:20 Jul 13 '00	1536	180	42293 6	508527 7	Photo 49 over Coquille area				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R552	Samples	PI	Sub Smps	FrGrb#
06:53:20 Jul 13 '00	1536	180	42293 6	508527 7	Tube worms @ Coquille				R552-016
06:53:44 Jul 13 '00	1536	188	42295 0	508528 7	Photo 50 of this area, tube worms, limpets, clams, old lavas				
06:54:08 Jul 13 '00	1536	188	421469	5086106	Going to stop here while we move the ship to sample the clams				
06:54:20 Jul 13 '00	1535	195	421469	5086106	Photo 51 of clams				
06:54:44 Jul 13 '00	1537	211	42294 0	508525 8	Clam Shells @ Coquille				R552-017
06:55:32 Jul 13 '00	1538	213	422961	508527 5	Seem to be on the dying periphery of the southern end				
06:56:08 Jul 13 '00	1538	199	42294 9	508525 8	Tube worms. & Clam Shells				R552-018
06:56:32 Jul 13 '00	1538	204	42294 8	5085261	Same				R552-019
06:56:44 Jul 13 '00	1538	207	42294 8	5085261	some of these clams have been eaten, but some are alive because we can see their siphons sticking out.				
06:56:56 Jul 13 '00	1538	202	421453	5086166	Clams				R552-020
06:57:32 Jul 13 '00	1538	204	421453	5086166	Tube worms.				R552-021
06:58:08 Jul 13 '00	1538	227	42293 4	508524 9	Preparing to suction clams into flush jar #8				
07:02:44 Jul 13 '00	1538	222	42305 9	5085321	We are at x=422976 y=5085284. Photo 52 of this clam area with old flow, worms, etc.				
07:04:32 Jul 13 '00	1538	219	42294 6	508525 7	The ship is going to move 50 m south and we are going to look for clams else where				
07:08:20 Jul 13 '00	1538	230	421970	508529 8	Suction of clams (BIO) into Jar J8. Started suction at 0707. Done suctioning at 0712. (Basalt chips subsample for Chadwick, Oxidized basalt chips for Kennedy). South of Coquille x=422976 y=5085284	R552-SS-J8-0002	Juniper	J Chadwick/ Kennedy	
07:13:20 Jul 13 '00	1538	231	421465	5086138	Going to continue video traverse to the southern extremity of the field				
07:13:32 Jul 13 '00	1538	230	421465	5086138	Beta cam turned on				
07:14:08 Jul 13 '00	1538	231	421457	508627 7	Photo 53 as we head further south				
07:14:56 Jul 13 '00	1537	210	42298 9	508528 5	Photo 54 of worms, old lava, dirty sedimented old lavas, crab, rat tail				
07:15:44 Jul 13 '00	1537	179	42298 9	508528 5	Photos 55 and 56 of same area, one with fish				
07:16:20 Jul 13 '00	1537	178	42294 8	508524 7	Photo 57 Looks like area is getting more active again. White floc, mat and tube worms in cracks.				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R552	Samples	PI	Sub Smps	FrGrb#
07:16:20 Jul 13 '00	1537	178	42294 8	508524 7	Coquilles bushes				R552-022
07:17:20 Jul 13 '00	1537	179	42352 6	5085615	Photos 58, 59, and 60 of this more active area with worms, old sedimented lava, etc				
07:17:56 Jul 13 '00	1537	181	42352 6	5085615	Juniper tape went on around 0700 More clams, no more tube worms, less mat. Photo 61				
07:18:20 Jul 13 '00	1537	180	42264 6	508723 8	Photo 62 and 63 of this same area - clams, lavas, etc.				
07:18:56 Jul 13 '00	1537	179	42357 3	508604 5	Photo 64. We have contact with newer lava. Shiny sausage shaped new lava				
07:18:56 Jul 13 '00	1537	179	42357 3	508604 5	Contact just beyond Coquille.				R552-023
07:19:44 Jul 13 '00	1537	177	42357 3	508604 5	Contact with new lavas				R552-024
07:20:20 Jul 13 '00	1537	178	42346 9	508569 2	We think this could be 98 flow				
07:21:32 Jul 13 '00	1537	177	42295 2	508523 8	We are 130 m south of coquille X 423003 Y 5085230				
07:22:32 Jul 13 '00	1537	179	42300 3	508523 0	fresh flow contact--98? lava 130 m south coquille				R552-025
07:24:08 Jul 13 '00	1537	178	423001	508522 9	We are going to follow the contact west to look for fried animals				
07:25:08 Jul 13 '00	1536	222	421969	508522 3	There is some staining of white mat, minor sediments, very shiny lava on the new flow. Low albedo.				
07:26:08 Jul 13 '00	1537	231	421969	508522 3	Contact area is really irregular. Old stuff on right is heavily sedimented while new lava on the left is shinier, some staining, clams, and a few worms. It looks like we can see some squished tube worms at the contact.				
07:26:20 Jul 13 '00	1536	185	421969	508522 3	Contact with the new lava at Coquille				R552-026
07:26:56 Jul 13 '00	1537	177	421969	508522 3	Clams and worms				R552-027
07:27:08 Jul 13 '00	1537	176	421969	508522 3	We are not sure of what we're looking at really- definitely a contact but we're not sure which ones.				
07:27:44 Jul 13 '00	1537	176	42299 4	508522 9	Contact with new lava				R552-028
07:28:56 Jul 13 '00	1537	176	42299 4	508522 9	limpets at Coquille				R552-029
07:31:32 Jul 13 '00	1537	180	42209 4	5085156	Verena really thinks the clams have been here longer than two years				
07:32:56 Jul 13 '00	1537	181	422011	5085191	We can see limpets on the newer lava				
07:32:56 Jul 13 '00	1537	181	422011	5085191	Limpets at Coquille				R552-030

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R552	Samples	PI	Sub Smps	FrGrb#
07:33:32 Jul 13 '00	1537	182	42348 8	5085711	We are continuing south to look at the contact.				
07:34:08 Jul 13 '00	1537	141	422971	5085190	Can see some shimmery flow up on the newer lava, white, limpets, more redder sediment as opposed to the dirt colored sediment on the older.				
07:34:08 Jul 13 '00	1537	141	422971	5085190	Contact with the new lava at Coquille				R552-031
07:35:08 Jul 13 '00	1537	108	422971	5085190	Contact with the new lava and tubeworms at Coquille				R552-032
07:35:44 Jul 13 '00	1537	107	422971	5085190	It kind of looks like the newer lava ran over a couple of these tube worms. These tube worms are dead, but how they died, well, that we do not know.				
07:36:20 Jul 13 '00	1537	107	422971	5085190	Contact with the new lava, limpets and tube worms at Coquille				R552-033
07:37:44 Jul 13 '00	1537	125	42297 0	5085190	Photo 65 of the contact. We're looking around at the contact still, not moving really.				
07:38:08 Jul 13 '00	1537	107	42300 4	508520 8	Worm at the contact with the new lava at Coquille				R552-034
07:39:08 Jul 13 '00	1537	116	42276 4	508455 2	Worm at the contact with the new lava at Coquille				R552-035
07:39:32 Jul 13 '00	1537	117	42275 9	508457 5	Looking closely at the contact area				
07:42:08 Jul 13 '00	1537	64	42297 2	5085189	Contact with the new lava at Coquille (zoom)				R552-036
07:42:44 Jul 13 '00	1537	65	42349 0	508570 9	Photo 66 of contact area. Zooming in on some tube worms, limpets, shimmery flow, etc.				
07:42:56 Jul 13 '00	1537	67	42349 0	508570 9	Worm and limpets at the contact with the new lava at Coquille (zoom)				R552-037
07:43:56 Jul 13 '00	1537	67	42202 2	5085187	Heading east into the new lava				
07:44:20 Jul 13 '00	1537	75	42224 4	5084111	Photo 67 of new lava. It is covered in sediment-like stuff, no more white stuff. Nice pillows, patches of white stuff				
07:44:32 Jul 13 '00	1536	75	42276 5	508456 6	New lava at Coquille.				R552-038
07:45:08 Jul 13 '00	1536	99	421418	5085915	Contact with the new lava at Coquille				R552-039
07:45:20 Jul 13 '00	1534	85	421418	5085915	Photo 68 of pockets of clams on old lava pocket surrounded by newer lava				
07:46:56 Jul 13 '00	1535	173	42298 8	508520 6	Groups of tube worms and white stuff on old lava along a contact				
07:47:20 Jul 13 '00	1535	83	42298 8	508520 6	Tube worms at the contact with the new lava at Coquille				R552-040
07:48:20 Jul 13 '00	1537	91	42298 7	508520 5	We're debating old vs. new lava				
07:49:20 Jul 13 '00	1537	91	421989	508522 9	We've decided that this clump of tube worms is on a contact, possibly partially run over by the new lava. They don't look especially happy				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R552	Samples	PI	Sub Smps	FrGrb#
07:49:32 Jul 13 '00	1537	92	421989	508522 9	Worms and limpets at the contact with the new lava at Coquille				R552-041
07:51:32 Jul 13 '00	1535	63	42346 4	508567 4	Photo 70 of contact with tube worms and mats of limpets				
07:56:08 Jul 13 '00	1535	348	42256 6	5087199	We are heading north, northeast				
07:57:08 Jul 13 '00	1535	14	42302 9	508523 7	Going to Target A , which is north, northeast from here approximately 150 m. Beta cam off				
07:58:56 Jul 13 '00	1537	68	42300 6	508526 2	Looking at more contact where the new lava looks like it might have pushed the bush of tube worms. Photo 71				
07:58:56 Jul 13 '00	1537	68	42300 6	508526 2	Small patch of old lava surrounded by new lava.				R552-042
08:00:20 Jul 13 '00	1537	72	423501	508573 6	Trying to figure out if these tube worms are alive				
08:01:20 Jul 13 '00	1537	73	42297 7	508522 2	Verena thinks these tube worms have relatively fresh tubes- if this was from 98 flow, the tube worms should be decaying by now.				
08:02:32 Jul 13 '00	1537	75	42298 5	508522 2	We think we've found a live tube worm... no, we haven't. They're not alive				
08:03:44 Jul 13 '00	1537	75	42298 5	508522 2	We are now going to target A				
08:04:44 Jul 13 '00	1536	100	42208 4	5085179	We just saw tube worms in the young flow- not sure if they're alive, though.				
08:05:32 Jul 13 '00	1536	109	421859	5085310	More tube worms that look squished. Photo #72, 73 of these squished looking tube worms that are probably dead.				
08:05:44 Jul 13 '00	1537	128	421859	5085310	What appears to be "squished" tube worms.				R552-043
08:06:20 Jul 13 '00	1536	164	421859	5085310	Photo 73 of these squished tube worms at the contact				
08:06:20 Jul 13 '00	1536	164	421859	5085310	More squished tube worms.				R552-044
08:08:20 Jul 13 '00	1537	192	42302 2	508525 9	We are now going to Target A, 160 m bearing 076				
08:10:44 Jul 13 '00	1535	88	423512	508586 3	Seeing lobate flows with minor amount of sediments, possibly not as glassy as near the contact. Very few animals or hydrothermal staining.				
08:14:44 Jul 13 '00	1535	85	42303 4	5085261	Beta cam changed to #6, Photo #74 as we go to Target A				
08:16:08 Jul 13 '00	1536	89	42309 0	508530 2	Brittle stars, holothurians on this flow, more than before				
08:17:32 Jul 13 '00	1535	134	42300 7	508522 6	Now on some sheet flows that look old-ish - they have sponges, crab, etc.				
08:18:20 Jul 13 '00	1535	144	42306 5	508527 8	Chunk of old amidst the newer lava				
08:18:32 Jul 13 '00	1534	141	42306 5	508527 8	Contact with new and old lava; south of Coquille				R552-045

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R552	Samples	PI	Sub Smps	FrGrb#
08:19:32 Jul 13 '00	1534	137	42305 0	508524 5	Younger lava, southeast of Coquille				R552-046
08:19:44 Jul 13 '00	1534	136	42305 6	508525 3	Down in a collapse pit area, then back on top of the younger lava. Photo #75 of the fresh looking stuff with few animals and some sediment. Photos #76 and 77				
08:19:44 Jul 13 '00	1534	136	42305 6	508525 3	Younger lava, southeast of Coquille.				R552-047
08:21:20 Jul 13 '00	1535	139	423121	508527 7	Seeing a lot of oxide material between pillows. Photos #78 and 79				
08:21:20 Jul 13 '00	1535	139	423121	508527 7	New lava, south of Coquille				R552-048
08:21:56 Jul 13 '00	1534	124	423118	508527 2	Nice collapse, Photo #80				
08:21:56 Jul 13 '00	1534	124	423118	508527 2	Younger lava, south est of Coquille				R552-049
08:22:44 Jul 13 '00	1534	101	423138	508528 0	ophiuroids on older lava				
08:23:32 Jul 13 '00	1534	185	423155	508527 9	looking for lava channel seen by Alvin in earlier dive				
08:24:32 Jul 13 '00	1534	107	423162	508526 3	found deep collapse or lava channel				
08:25:08 Jul 13 '00	1536	62	423166	508526 3	photo 81,82 whirly lava				
08:25:08 Jul 13 '00	1536	62	423166	508526 3	Highway 'lava, southeast of Coquille.				R552-050
08:25:20 Jul 13 '00	1537	63	423172	5085261	heading NE along deep channel, Bob was here in 1987 with Alvin				
08:25:56 Jul 13 '00	1537	55	423176	508525 9	Lava Highway, southeast of Coquille				R552-051
08:26:20 Jul 13 '00	1538	54	423178	508526 3	photo 83, highlights on, many ophiuroids, sponges, some seds				
08:27:32 Jul 13 '00	1538	36	423182	508527 7	photo 84, driving NE up highway of lineated sheet flows				
08:28:08 Jul 13 '00	1538	36	423166	508526 3	Ophiuroids on the highway				R552-052
08:29:32 Jul 13 '00	1538	48	423184	508528 5	Highway 'lava, southeast of Coquille				R552-053
08:30:44 Jul 13 '00	1537	48	42320 0	5085310	photo 85, swirly sheet flows				
08:30:44 Jul 13 '00	1537	48	42320 0	5085310	Curl on the highway				R552-054
08:32:08 Jul 13 '00	1536	51	423217	508532 0	photo 85				
08:32:44 Jul 13 '00	1538	51	42322 5	508532 8	Crab on new lava				R552-055

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R552	Samples	PI	Sub Smps	FrGrb#
08:34:08 Jul 13 '00	1538	55	42320 7	508530 5	Lava				R552-056
08:34:20 Jul 13 '00	1536	54	42320 7	508530 5	photo 87 of pillar				
08:34:32 Jul 13 '00	1537	58	42320 7	508530 5	Pillow and old lava				R552-057
08:35:44 Jul 13 '00	1538	58	42325 0	508532 9	photos 88				
08:37:44 Jul 13 '00	1538	72	422812	5084901	In port biobox, 10cm long or so, broke in 2 pieces, right side on top of worms, halfway between A and B, near collapse at edge of lineated sheet flows seen in 1987. East of Coquille between A and B x=423246 y=5085343.	R552-RK-003	J Chadwick		
08:38:56 Jul 13 '00	1538	68	42366 3	508579 2	Sample of a piece of rock				R552-058
08:42:44 Jul 13 '00	1533	50	423153	5085251	Crab; east of Coquille				R552-059
08:43:20 Jul 13 '00	1532	47	423144	508524 6	collapse area, lots of pillars, 423269, 5085363				
08:45:32 Jul 13 '00	1533	234	423241	508534 3	photo 89,90, 91, 92 big ass rat fish				
08:45:56 Jul 13 '00	1534	224	42326 0	508534 9	Big fish; east of Coquille				R552-060
08:46:08 Jul 13 '00	1534	234	42325 4	508534 3	Big fish; east of Coquille				R552-061
08:47:32 Jul 13 '00	1536	248	42325 3	508533 4	back in lineated sheet flow, photo 93				
08:53:56 Jul 13 '00	1495	253	422821	508488 2	ship parking over "B", west of FeCity				
09:07:44 Jul 13 '00	1535	102	421612	508623 7	photo 94,95 near target B on lineated sheet flows				
09:09:20 Jul 13 '00	1534	340	42324 8	508532 3	lineations NW-SE in flow, before they were NE-SW, we are heading North				
09:10:32 Jul 13 '00	1534	56	42325 2	508532 8	photo 96,97, 98, 99 collapse and pillars				
09:17:56 Jul 13 '00	1532	7	423137	508526 2	pillars, photo 100				
09:19:20 Jul 13 '00	1531	7	42325 6	508540 4	cage motor off, getting fix				
09:20:44 Jul 13 '00	1532	6	42326 5	508540 4	heading east				
09:22:08 Jul 13 '00	1535	83	42327 6	5085401	back in lineated flows again, some broken lineated areas, turning NE and moving the ship				
09:23:44 Jul 13 '00	1534	140	423415	508552 2	Crab on door, on the way of FeCity				R552-062
09:28:44 Jul 13 '00	1537	50	42290 6	508477 2	North FeCity				R552-063

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R552	Samples	PI	Sub Smps	FrGrb#
09:30:32 Jul 13 '00	1537	43	42329 8	5085411	South of Joystick				R552-064
09:31:20 Jul 13 '00	1536	43	42329 2	508542 8	contact, younger stuff to west, older to east, 100 m from Joystick				
09:33:08 Jul 13 '00	1536	43	42332 5	508543 2	photo 102, pillar and crab				
09:33:20 Jul 13 '00	1535	47	42332 7	508543 2	Crab, south of Joystick				R552-065
09:34:08 Jul 13 '00	1534	268	42332 8	508543 2	now driving back to west				
09:35:20 Jul 13 '00	1536	268	42330 0	508543 3	small vent, photo 103, 104, 105				
09:35:20 Jul 13 '00	1536	268	42330 0	508543 3	North FeCity				R552-066
09:35:56 Jul 13 '00	1534	170	42326 2	508540 2	North FeCity				R552-067
09:36:44 Jul 13 '00	1535	255	423301	508542 3	x=423300,y=5085423, vent site				
09:37:56 Jul 13 '00	1536	261	42327 9	508542 0	Big Fish, north FeCity				R552-068
09:38:08 Jul 13 '00	1536	262	42368 9	508586 4	pillars, photo 106, 107				
09:40:56 Jul 13 '00	1535	286	423199	508535 9	Northeast of FeCity				R552-069
09:41:44 Jul 13 '00	1532	269	42320 4	508535 7	cage motor off, fix				
09:44:32 Jul 13 '00	1533	271	423221	508537 2	Going to the camera at BagCity, 250 m to the southeast				
09:45:20 Jul 13 '00	1529	77	423231	508537 7	Going back to the cage for the trip to BagCity				
09:47:08 Jul 13 '00	1495	106	42295 6	5083915	Photo 109 of water column				
09:57:44 Jul 13 '00	1495	207	42539 3	508389 3	Still on our way to Bag City for the NeMO '00 camera positioning.				
10:09:44 Jul 13 '00	1495	170	42380 8	508566 7	Going to the bottom				
10:11:44 Jul 13 '00	1526	276	423103	508456 7	We are on the bottom and we will begin looking for the camera				
10:13:08 Jul 13 '00	1533	277	422138	508485 6	I can see the bottom				
10:13:20 Jul 13 '00	1533	275	42340 6	5085175	We're going west to the supposed camera drop site				
10:14:08 Jul 13 '00	1534	278	42340 7	5085177	Nice pretty clean newer lava pillows				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R552	Samples	PI	Sub Smps	FrGrb#
10:19:08 Jul 13 '00	1532	315	42336 3	5085186	We're where the camera should be but we don't see it so we're going to keep looking, duh.				
10:20:44 Jul 13 '00	1534	315	42327 0	5085104	Photo 110 of seawhip on lava				
10:20:44 Jul 13 '00	1534	315	42327 0	5085104	Spot of the camera				R552-070
10:22:44 Jul 13 '00	1533	219	42333 6	5085172	We see something on the sonar that looks like it could be the camera so we're going in that direction				
10:23:20 Jul 13 '00	1534	180	42428 2	5085631	We see the camera! yeah!				
10:23:44 Jul 13 '00	1534	206	42526 4	508493 6	Camera				R552-071
10:23:56 Jul 13 '00	1533	208	42526 4	508493 6	Photo 111 of camera. Highlights on. Photo 112, 113, 114				
10:25:20 Jul 13 '00	1534	282	42335 9	5085160	Looking for the laser pointer on the camera				
10:26:08 Jul 13 '00	1536	168	42335 5	5085161	Fish near the camera				R552-072
10:26:20 Jul 13 '00	1536	167	42335 5	5085161	We're turning the lights on ROPOS down to see if we can see the laser				
10:27:20 Jul 13 '00	1536	167	42335 4	5085161	We turned all the lights off on ROPOS and were just barely able to see the laser on the camera, but we did.				
10:28:44 Jul 13 '00	1536	168	42335 4	5085159	We are at X 423355 Y 5085160				
10:29:20 Jul 13 '00	1536	169	42335 6	5085160	Highlights off				
10:29:45 Jul 13 '00	1534	208	42335 4	5085159	We are 97 m away from BagCity				
10:29:57 Jul 13 '00	1535	229	42335 4	5085159	We are preparing to pull a pin to release the anchor				
10:30:45 Jul 13 '00	1536	228	42335 8	5085159	The pin has been pulled out successfully, so the camera isn't anchored anymore				
10:32:33 Jul 13 '00	1534	270	423361	5085161	We are getting in position to pick up the camera				
10:32:33 Jul 13 '00	1534	270	423361	5085161	We are picking it up by the ropes on the top of the camera				
10:33:09 Jul 13 '00	1534	302	42335 8	5085156	We have the camera picked up and need to move approximately 100m, heading 229				
10:33:45 Jul 13 '00	1533	263	42336 0	5085158	We found the camera 20 m southwest of survey position				
10:34:45 Jul 13 '00	1528	269	42336 2	5085157	We have the camera in hand and are preparing to move to BagCity				
10:38:21 Jul 13 '00	1528	284	423371	5085156	Trying to grab the camera with the five function as well as the seven function				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R552	Samples	PI	Sub Smps	FrGrb#
10:40:21 Jul 13 '00	1528	291	42338 0	5085159	We are trying to move with the camera				
10:42:33 Jul 13 '00	1528	290	42335 3	5085158	Starting to move the ship over to BagCity				
10:53:20 Jul 13 '00	1528	320	42328 6	508520 0	We are nearing BagCity- we can see the Marker				
11:00:32 Jul 13 '00	1532	311	42327 6	508520 5	NeMO net camera has been placed on the ground and now checking positioning.				
11:01:56 Jul 13 '00	1534	311	42327 8	508520 6	The marker at this site is 36. (Mkr-36 BagCity)				
11:08:44 Jul 13 '00	1534	333	42327 6	508520 5	Still working on repositioning the camera.				
11:16:45 Jul 13 '00	1534	316	42327 7	508520 5	Photo 115, 116 taken of back of camera.				
11:17:33 Jul 13 '00	1534	269	42327 7	508520 9	Photo 118, 119 taken of NeMO net camera, from the side.				
11:17:57 Jul 13 '00	1533	279	42327 6	508520 9	NeMOnet camera tripod on seafloor				R552-073
11:18:21 Jul 13 '00	1532	342	42327 6	508520 6	perspective of NeMoNet camera's field of view				R552-074
11:19:21 Jul 13 '00	1532	309	42327 6	508520 8	Now happy with where camera is sitting, looking to check angles.				
11:20:09 Jul 13 '00	1532	50	42327 5	508520 4	Photo 120 taken of tube worms and MTR of what camera will be looking at for the next year.				
11:20:33 Jul 13 '00	1534	68	423271	508520 4	NeMO net camera with MTR line in foreground				R552-075
11:21:09 Jul 13 '00	1534	68	42324 4	5085183	Photo 121 taken of TW.				
11:22:21 Jul 13 '00	1534	333	42327 3	508520 3	Winter snow at BagCity				R552-076
11:24:09 Jul 13 '00	1534	346	42320 3	5085136	Highlights have been turned off. They were on for approximately 8 minutes...logger forgot to enter the start of them into the log.				
11:25:09 Jul 13 '00	1534	348	42320 2	5085135	removing temp probe from camera housing				R552-077
11:25:21 Jul 13 '00	1533	341	42320 2	5085135	Photo's 122 and 123 were taken of the camera.				
11:26:45 Jul 13 '00	1533	352	423195	5085134	Moving the temperature probe to the worms. Photo 124 has been taken of this procedure.				
11:27:33 Jul 13 '00	1534	345	42298 5	5084541	7-function placing temp probe in tube worm mound				R552-078
11:33:09 Jul 13 '00	1534	345	42320 3	5085137	Temperature probe had fallen over and now positioning it again.				
11:35:45 Jul 13 '00	1534	345	42327 9	5083616	Photo 125 has been taken of the deployment of the camera's temperature probe.				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R552	Samples	PI	Sub Smps	FrGrb#
11:35:45 Jul 13 '00	1534	345	42327 9	5083616	temp probe placed on tube worm mound				R552-079
11:39:45 Jul 13 '00	1534	63	423198	5085137	Photo 126 taken of tube worm and camera. Highlights have been turned back on.				
11:40:33 Jul 13 '00	1533	45	423194	5085129	NemoNet '00 camera				R552-080
11:40:33 Jul 13 '00	1533	45	423194	5085129	nemonet camera				R552-081
11:45:45 Jul 13 '00	1534	343	42374 5	508569 3	Now attempting to change the angle on the camera so that it points down more.				
11:48:33 Jul 13 '00	1534	349	42484 8	508558 7	Highlights have been turned off.				
11:50:45 Jul 13 '00	1534	351	42326 5	5085216	Camera has been re-positioned, now checking how it looks.				
11:54:33 Jul 13 '00	1533	311	42377 5	508573 6	Now flying around the cage to inspect.				
11:55:09 Jul 13 '00	1532	309	423531	508545 7	Photo 127 has been taken of the camera.				
11:57:45 Jul 13 '00	1532	213	42320 0	5085135	level is level on camera housing				R552-082
11:59:45 Jul 13 '00	1534	176	42320 9	5085152	Meinig is going to try and talk with the camera.				
12:04:59 Jul 13 '00	1531	207	42320 9	5085152	Moving ROPOS into position to observe the camera's light direction.				
12:07:47 Jul 13 '00	1533	83	42320 9	5085152	NeMO net camera waiting for lights to work				R552-083
12:12:23 Jul 13 '00	1533	81	42320 9	5085152	NeMO net camera lights working				R552-084
12:12:23 Jul 13 '00	1533	81	42320 9	5085152	NeMO net camera lights working				R552-085
12:12:35 Jul 13 '00	1533	81	42320 9	5085152	NeMO net camera lights working				R552-086
12:12:35 Jul 13 '00	1533	81	42320 9	5085152	NeMO net camera lights working				R552-087
12:12:35 Jul 13 '00	1533	81	42320 9	5085152	NeMO net camera lights working				R552-088
12:12:35 Jul 13 '00	1533	81	42320 9	5085152	NeMO net camera lights working				R552-089
12:12:35 Jul 13 '00	1533	81	42320 9	5085152	NeMO net camera lights working				R552-090
12:12:59 Jul 13 '00	1533	82	42320 9	5085152	Photo 128 has been taken of camera and its subject.				
12:14:35 Jul 13 '00	1534	297	42320 9	5085152	Highlights have been turned back on.				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R552	Samples	PI	Sub Smps	FrGrb#
12:17:11 Jul 13 '00	1534	296	42320 9	5085152	NeMO net camera just went on and off, all looks good.				
12:24:13 Jul 13 '00	1534	216	42320 9	5085152	Waiting for camera to go off again, for the third time to check the angle for the photos.				
12:25:37 Jul 13 '00	1534	218	42320 9	5085152	lighting from camera only (no ROPOS lights), starboard of NeMOnet camera				R552-091
12:25:37 Jul 13 '00	1534	218	42320 9	5085152	lighting from camera only (no ROPOS lights), starboard of NeMOnet camera				R552-092
12:25:37 Jul 13 '00	1534	218	42320 9	5085152	lighting from camera only (no ROPOS lights), starboard of NeMOnet camera				R552-093
12:25:37 Jul 13 '00	1534	218	42320 9	5085152	lighting from camera only (no ROPOS lights), starboard of NeMOnet camera				R552-094
12:25:37 Jul 13 '00	1534	218	42320 9	5085152	lighting from camera only (no ROPOS lights), starboard of NeMOnet camera				R552-095
12:25:37 Jul 13 '00	1534	218	42320 9	5085152	lighting from camera only (no ROPOS lights), starboard of NeMOnet camera				R552-096
12:25:49 Jul 13 '00	1534	217	42320 9	5085152	lighting from camera and ROPOS lights, starboard of NeMOnet camera				R552-097
12:25:49 Jul 13 '00	1534	217	42320 9	5085152	lighting from camera and ROPOS, starboard of NeMOnet camera				R552-098
12:25:49 Jul 13 '00	1534	217	42320 9	5085152	lighting from camera and ROPOS, starboard of NeMOnet camera				R552-099
12:25:49 Jul 13 '00	1534	217	42320 9	5085152	lighting from camera and ROPOS, starboard of NeMOnet '00 camera				R552-100
12:26:01 Jul 13 '00	1534	218	42320 9	5085152	Loads of frame grabs taken of the camera.....everyone is happy, imagine that.				
12:26:37 Jul 13 '00	1531	242	42320 9	5085152	Highlights have been turned off.				
12:27:49 Jul 13 '00	1505	242	42320 9	5085152	Heading back to the cage.				
12:30:13 Jul 13 '00	1495	239	42320 9	5085152	ROPOS is back in the cage with motor off and system by-pass. Moving the ship to the first Imagenex site, as to allow for communication between the camera and the ship.				
12:31:37 Jul 13 '00	1495	246	42320 9	5085152	All tapes have been turned off. Ship is now moving 400m at a heading of 105.				
13:05:55 Jul 13 '00	1496	36	42365 2	508500 8	Temperatures are coming back in from the temperature probe from the NeMO net camera.				
13:20:45 Jul 13 '00	1496	82	42367 7	508495 4	Two tiles came in from camera, all looks good, good job Meinig!				
14:07:21 Jul 13 '00	1524	270	42432 2	508485 6	stop the ship! getting net out of purse				
14:11:09 Jul 13 '00	1524	272	42430 3	508485 7	plankton net is deployed with 7-function arm				
14:13:21 Jul 13 '00	1524	273	424312	5084841	starting tunicliffe tapes				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R552	Samples	PI	Sub Smps	FrGrb#
14:14:21 Jul 13 '00	1524	277	424302	5084843	Starting McLane pump on Imagenex run. Pump stopped at 18:14. Vol = 1624 liters. South of BagCity	R552-McLane-0004	Tunncliffe / Metaxas		
14:16:57 Jul 13 '00	1524	273	424258	5084843	Plankton net tow (PNT) on Imagenex run	R552-net-0005	Tunncliffe / Metaxas		
14:18:57 Jul 13 '00	1523	277	423695	5084395	14:14-Imagenex line BC20 started. (424272/5084827) McLane pump turned on. McLane pump stopped at 18:14. South of Bag City				
15:27:33 Jul 13 '00	1517	281	422806	5084853	End of line BC20. x=422805 y=5084853				
15:37:21 Jul 13 '00	1520	95	422839	5084805	Starting line BC21. x=422839 y=5084805				
16:14:45 Jul 13 '00	1515	91	423529	5084761	16:13 Changed Tunncliffe tapes.				
16:48:45 Jul 13 '00	1521	93	424369	5084789	End of line BC21. x=424293 y=5084799				
16:57:57 Jul 13 '00	1525	266	424290	5084736	Start of line BC22 at 16:57, X=424302,Y=5084737				
18:07:59 Jul 13 '00	1520	268	422826	5084747	End of line BC22 x=422781 y=5084753				
18:15:11 Jul 13 '00	1519	93	422793	5084682	Start of line BC23 x=422805 y=5084685				
18:15:59 Jul 13 '00	1519	91	422806	5084685	Tunncliffe tape changed at 18:12				
19:12:25 Jul 13 '00	1520	94	423926	5084682	McLane pump stopped at 18:14				
19:27:49 Jul 13 '00	1525	93	424301	5084686	End of line BC23 x=424301 y=5084686. End of Imagenex survey.				
19:29:01 Jul 13 '00	1534	89	424311	5084690	ROPOS is stowing the plankton net in the purse.				
19:30:49 Jul 13 '00	1544	90	424300	5084694	stowing the net				R552-101
19:34:37 Jul 13 '00	1531	92	424289	5084700					R552-102
19:34:49 Jul 13 '00	1533	88	424289	5084700	Tunncliffe tape is off at 19:34				
19:39:25 Jul 13 '00	1533	317	424305	5084729					R552-103
19:41:37 Jul 13 '00	1533	308	424305	5084729					R552-104
19:42:13 Jul 13 '00	1533	303	424305	5084729	End of net tow 19:42, stowed in purse.				
19:43:01 Jul 13 '00	1533	296	424305	5084729					R552-105
19:50:25 Jul 13 '00	1530	128	424321	5084729	ROPOS is returning to the cage and then will head to the bottom to begin looking at lava flow.				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R552	Samples	PI	Sub Smps	FrGrb#
19:53:01 Jul 13 '00	1537	293	424134	508408 8	ROPOS is at the bottom. Starting the video tapes. looking at fairly young lava. photo 129 old lava engulfed in the young flow. tapes on at 19:53.				
19:54:49 Jul 13 '00	1548	215	42406 9	508470 4	Looking at the surface of the older lava, ophiuroids and sponges. photo 130 of lava.				
20:02:37 Jul 13 '00	1550	240	42406 9	508470 4	Collecting a glassy basalt sample (rk) for J. Chadwick sample, placed in STB side lower left Bio box. (SE of BagCity x=424300 y=5084750)	R552-RK-0006	J Chadwick		
20:06:49 Jul 13 '00	1548	135	42406 9	508470 4	Driving East, still in the '98 flow.				
20:07:49 Jul 13 '00	1549	92	42406 9	508470 4	photo 131 lava flow				
20:08:25 Jul 13 '00	1551	95	42406 9	508470 4	photo 132 broken sheet flow				
20:08:37 Jul 13 '00	1551	97	42406 9	508470 4	change of tapes at 20:06				
20:09:25 Jul 13 '00	1551	96	42406 9	508470 4	photo 133 ropy lineated sheet flow.				
20:09:37 Jul 13 '00	1551	94	42406 9	508470 4	lineated sheet flow. 30 m east of rock sample R552RK6				R552-106
20:10:25 Jul 13 '00	1552	96	42406 9	508470 4	photo 132 ponded area lots of sediment. photo 135				
20:11:37 Jul 13 '00	1552	94	42436 4	508472 3	photo 136 broken ropes.				
20:12:37 Jul 13 '00	1552	96	42436 4	508472 3	photo 137 small channel				
20:12:49 Jul 13 '00	1552	97	42436 4	508472 3	photo 138 broken sheet				
20:13:13 Jul 13 '00	1552	95	42436 4	508472 3	photo 139 same				
20:13:37 Jul 13 '00	1552	99	42436 4	508472 3	photo 140 ropy lava.				
20:14:25 Jul 13 '00	1552	94	42436 4	508472 3	photo 141 broken rope photo 142 more of same type of lava.				
20:16:01 Jul 13 '00	1553	93	42439 7	508473 4	photo 143 piles of jumbled lava.				
20:16:25 Jul 13 '00	1552	93	42439 7	508473 4	photo 144 more of the jumbled heading downslope				
20:16:49 Jul 13 '00	1550	94	42439 7	508473 4	photo 145 ridges of lava. we are about 100 m east of start.				
20:18:01 Jul 13 '00	1551	124	42439 7	508473 4	ROPOs will be returning to the cage to head north 800 m.				
20:20:25 Jul 13 '00	1528	234	42440 4	508473 8	tapes off 20:19				
21:02:25 Jul 13 '00	1449	32	42439 7	508549 9	ROPOS has arrived at target 'C'. Starting toward the bottom to resume the geology survey.				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R552	Samples	PI	Sub Smps	FrGrb#
21:08:13 Jul 13 '00	1528	14	42446 5	508553 6	ROPOS is at the bottom.				
21:09:01 Jul 13 '00	1535	5	42392 6	508552 7	tapes on 21:08 ROPOS is heading west ~ 50m looking for the contact between the old and new lava.				
21:11:49 Jul 13 '00	1534	274	423013	508430 2	photo 146 mixture of lobate and jumbled flow.				
21:12:01 Jul 13 '00	1536	271	423013	508430 2	old lava near target C				R552-107
21:12:37 Jul 13 '00	1536	264	42334 0	508369 3	photo 147 jumbled older flow. east of contact				
21:13:37 Jul 13 '00	1537	276	42320 4	508495 4	jumbled flow, lots of holothurians.				
21:14:49 Jul 13 '00	1536	275	42307 5	5084512	looks like the contact lots of big pillows w/o sediment. Came about 20-30 m west of the cage. photo 148 right at the contact.				
21:15:25 Jul 13 '00	1535	282	42396 6	5086105	pillow flow , contact? near target C				R552-108
21:16:25 Jul 13 '00	1536	270	424210	508555 7	contact near target C.				R552-109
21:16:49 Jul 13 '00	1536	270	423120	5084110	close-up of pillow lava. near target C				R552-110
21:17:25 Jul 13 '00	1536	270	423120	5084110	contact ! fix is as good as it gets.				
21:17:37 Jul 13 '00	1536	269	423120	5084110	close-up contact. near target C				R552-111
21:18:25 Jul 13 '00	1536	269	42400 4	508555 6	ROPOS is heading south to look for a good sample of the old lava.				
21:21:01 Jul 13 '00	1534	214	42262 2	508698 9	photo 149 fish and contact.				
21:21:25 Jul 13 '00	1535	214	42262 2	508698 9	big fish near contact				R552-112
21:22:37 Jul 13 '00	1536	251	424185	508554 5	photo 150 along the contact facing SW				
21:23:25 Jul 13 '00	1535	238	42423 2	508555 2	photo 151 farther along the contact				
21:23:49 Jul 13 '00	1535	243	424186	508554 8	good fix x=424186 y=5085548				
21:27:49 Jul 13 '00	1535	226	424181	508552 7	photo 152 older lava east of the contact, will try to get a sample.				
21:28:37 Jul 13 '00	1535	236	42402 3	508552 7	photo 153 same as above				
21:30:25 Jul 13 '00	1538	235	42402 8	508552 4	grabbing sample for John				R552-113
21:31:01 Jul 13 '00	1538	241	42403 0	508552 5	old lava sample for John				R552-114

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R552	Samples	PI	Sub Smps	FrGrb#
21:31:01 Jul 13 '00	1538	241	424030	5085525	collecting a lava (RK), placed in the right front of stb bio box. sample is almost square. SW contact of old/new flows x=424186 y=5085523	R552-RK-0007	J. Chadwick		
21:34:01 Jul 13 '00	1538	308	424200	5085525	ROPOS will continue to follow the contact to the south.				
21:36:25 Jul 13 '00	1536	263	423144	5084138	photo 154 jumbled flow.				
21:36:49 Jul 13 '00	1536	274	424221	5085521	photo 155 back on the contact. two fish on the contact.				
21:38:13 Jul 13 '00	1536	200	425552	5087308	photo 156 older lava changed character to lobate with shallow drain outs.				
21:40:01 Jul 13 '00	1537	271	425203	5084821	asking the ship to move 100m SW				
21:42:01 Jul 13 '00	1537	86	425179	5083983	Photo 157 edge of the drain out				
21:42:25 Jul 13 '00	1537	140	425179	5083983	photo 158 the old flow				
21:43:37 Jul 13 '00	1537	271	424451	5085454	fat fish contact				R552-115
21:47:13 Jul 13 '00	1538	269	425561	5088372	close-up contact fish				R552-116
21:49:25 Jul 13 '00	1537	272	424151	5085449	asking the ship to move 100m farther west				
21:50:01 Jul 13 '00	1537	273	423997	5085446	photo 159 old flow				
21:51:01 Jul 13 '00	1536	269	424062	5085449	photo 160 the contact once again.				
21:52:01 Jul 13 '00	1536	250	423603	5085475	photo 161 along the contact, back into older jumbled flow.				
21:52:01 Jul 13 '00	1536	250	423603	5085475	Yet another contact				R552-117
21:53:13 Jul 13 '00	1536	179	422618	5085219	photo 162 along the contact				
21:53:37 Jul 13 '00	1536	175	423943	5085444	photo 163 big pillows along the contact				
21:54:01 Jul 13 '00	1536	176	423993	5085441	photo 164 same				
21:54:25 Jul 13 '00	1536	174	423993	5085441	photo 165 still along the contact				
21:56:01 Jul 13 '00	1536	163	424138	5085401	photo 166 young lava lapped against a ridge of the older flow				
21:56:25 Jul 13 '00	1536	177	424152	5085414	contact between old jumbled lava and ridge				R552-118
21:58:13 Jul 13 '00	1536	193	425141	5084033	photo 167 shallow collapse in the older lava and the new was filling in				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R552	Samples	PI	Sub Smps	FrGrb#
22:02:49 Jul 13 '00	1538	149	42402 2	508535 3	photo 168 along the contact				
22:10:13 Jul 13 '00	1531	164	424149	508532 8	ROPOS is above the bottom moving south toward the cage, then back to the bottom. in older jumbled. New flow must be to the west.				
22:12:13 Jul 13 '00	1538	233	42424 3	508529 4	found the contact heading south along the contact				
22:13:49 Jul 13 '00	1540	245	424441	508523 5	photo 169 contact fish and contact				
22:15:13 Jul 13 '00	1539	270	424441	508523 5	photo 170 along the contact				
22:19:49 Jul 13 '00	1538	264	424181	508523 0	asking the ship to stop here. we will let the cage settle out.				
22:21:38 Jul 13 '00	1540	294	42420 0	508523 0	photo 171 new lava				
22:22:37 Jul 13 '00	1541	297	424194	508523 4	following contact old new				R552-119
22:23:49 Jul 13 '00	1541	306	42485 7	508376 6	photo 172 big pillow of the new lava.				
22:28:26 Jul 13 '00	1541	282	423716	508376 8	ROPOS is attempting to collect a basalt sample				
22:32:38 Jul 13 '00	1541	285	424915	508382 4	giving up on collecting a sample here. will go south.				
22:35:02 Jul 13 '00	1541	287	424158	508523 6	x=424157 y=5085236				
22:37:26 Jul 13 '00	1541	199	423714	508377 3	asking the ship to go south at 1/2 knot.				
22:38:14 Jul 13 '00	1539	182	423421	5084491	moving south and should encounter the new lava again. leaving jumbled into a very flat . photo 173 of flat older flow.				
22:40:38 Jul 13 '00	1543	182	424185	5085177	back into jumbled flow still old.				
22:42:02 Jul 13 '00	1544	188	424185	5085177	still in jumbled flow - photo 174 skate egg case.				
22:44:26 Jul 13 '00	1543	188	423512	5084491	photo 175 edge of jumbled flow, next to flat lineated sheet flow.				
22:47:14 Jul 13 '00	1546	188	42477 8	5084841	leaving flat lineated back into the jumbled.				
22:47:50 Jul 13 '00	1545	189	42477 8	5084841	photo 176 rough jumbled lavas, lots of ridges and spines.				
22:50:26 Jul 13 '00	1546	182	424190	508505 3	ROV fix x=424190 y=5085053 @ 22:50 sub dudes think that they are SW of this fix				
22:52:38 Jul 13 '00	1546	188	42420 0	508505 2	photo 177, 178 & 179 contact and fish				
22:53:02 Jul 13 '00	1546	186	42420 0	508505 2	Contact fish				R552-120

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R552	Samples	PI	Sub Smps	FrGrb#
22:53:38 Jul 13 '00	1545	182	42420 0	508505 2	tapes changed at 22:50 SVHS and Hi-8				
22:56:26 Jul 13 '00	1545	193	42403 7	508499 3	photo 180, 181 in short order; new stuff				
22:58:14 Jul 13 '00	1545	94	42403 7	508499 3	more of the ropey stuff				
23:05:50 Jul 13 '00	1545	179	42403 7	508499 3	photo 182, 183 & 184 contact again				
23:07:26 Jul 13 '00	1545	176	42470 3	508453 2	photo 185 new lava travels				
23:08:26 Jul 13 '00	1546	98	42470 3	508453 2	photo 186 contact fish				
23:08:26 Jul 13 '00	1546	98	42470 3	508453 2	Contact between 98 and older lava where starts to flow east				R552-121
23:08:38 Jul 13 '00	1545	91	42470 3	508453 2	photo 187				
23:08:38 Jul 13 '00	1545	91	42470 3	508453 2	Contact 98 lava and older where lava starts flowing east				R552-122
23:12:50 Jul 13 '00	1546	190	42470 3	508453 2	chunk of old lava from a patch which is sticking up out of the new lava. Fumbled one sample into oblivion and went back for more. Delivered to the port bio box @~23:26. contact area (no good fixes)	R552-RK-0008	J Chadwick		
23:20:26 Jul 13 '00	1543	149	42470 3	508453 2	old rock..last sample				R552-123
23:25:26 Jul 13 '00	1546	70	42470 3	508453 2	really the last sample (dropped last one)				R552-124
23:29:50 Jul 13 '00	1537	244	42470 3	508453 2	back to the cage				
23:30:14 Jul 13 '00	1528	252	42470 3	508453 2	ending cursory cage fix x=424173 y=5084888				
23:35:26 Jul 13 '00	1456	199	424613	508422 2	cagey! The winch is rolling.				
00:17:28 Jul 14 '00	1	91	424155	508487 7	sub on deck				
					Dive R552 Summary: Mkr-113-Sample: 1 twg. Imagenex (Lines W8 - W15) northwest of Mkr-113. Coquille -Sample: 1 ss. GeoTransect Coquille and lava highway (A&B). BagCity -Deploy/position NeMO Net'00 camera and temp probes. Reposition MTR. Imagenex (Lines BC20-BC23) finished south of BagCity. Samples during survey: McLane, Plankton net tow. GeoTraverse (C area), looking for contacts.				

R553 Dive Log

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R553	Samples	PI	Sub Smps	FrGrb#
					Positions in utm x/y columns are automated and not flagged for accuracy. Consult dive maps for final position data.				
					Tasks: ASHES HFS and suction sampling. Worm observations. Deploy Johnson Flow/Temp Meter , Deploy and recover Hobos.	Bottom Time: JD196(7/14) 1408- JD197(7/15) 0014			
					ROPOS is in the water at 12:51				
13:12:17 Jul 14 '00	306	300	421386	5087128	HFS lost communication about 14:10 ~300 meters				
13:22:23 Jul 14 '00	573	246	421614	5087613	HFS coms back on at 572 meters				
13:53:11 Jul 14 '00	1481	223	421422	5087129	Having problems with STS again, loss of coms on HFS program.				
14:08:13 Jul 14 '00	1534	187	421422	5087129	arrive at bottom. looking for Crack vent				
14:11:29 Jul 14 '00	1545	187	421422	5087129	emblem archive tapes (hi8 and SVHS) started.				
14:12:01 Jul 14 '00	1544	54	421422	5087129	Metaxas larval tubes spotted				
14:12:35 Jul 14 '00	1544	35	421422	5087129	lots of loose detritus on smooth surface				
14:14:13 Jul 14 '00	1545	147	421424	5087135	looking at cemented Johnson box and attempting temp probe over the top				
14:17:09 Jul 14 '00	1545	142	421419	5087137	temp probe started at 14:17 Tmax=15 ended at 14:20. good fix x=421419 y=5087137 at 14:16				
14:21:55 Jul 14 '00	1545	139	421421	5087137	DEPLOYING Johnson Flow/Temp Meter near Crack Vent.				
14:23:13 Jul 14 '00	1545	154	421417	5087139	cementing the box with the Johnson at crack.				R553-001
14:24:19 Jul 14 '00	1545	143	421421	5087139	Johnson has been placed onto the box and we are now waiting to inspect its operation.				
14:30:01 Jul 14 '00	1545	30	422019	5084840	Heading north to Gollum.				
14:32:13 Jul 14 '00	1544	353	422019	5084840	we see a crab, white stuff, no venting yet				
14:33:41 Jul 14 '00	1545	14	421407	5087166	we saw Mushroom, now we think we're at Gollum				
14:34:13 Jul 14 '00	1545	17	421407	5087166	Trying to find a place to sit at Gollum for sampling.				
14:36:03 Jul 14 '00	1545	133	421414	5087168	We're still trying to figure out exactly where Gollum is.				
14:38:05 Jul 14 '00	1543	72	421414	5087168	Looking at Mkr-2, close to Marshmallow.				
14:39:01 Jul 14 '00	1544	72	421414	5087168	sniffing for temperature reading.				
14:41:13 Jul 14 '00	1545	50	421415	5087176	Good fix X=421425 Y=5087176 for Marshmallow.				
14:50:55 Jul 14 '00	1545	49	422370	5089418	diffuse flow at Marshmallow in the ASHES vent field.				R553-002
14:46:21 Jul 14 '00	1545	50	421413	5087181	Sample into HFS bag 8 at 14:46. T1=127 T2=74 Max temp=136.3 volume=500ml. end sampling at 14:32. (Marshmallow x=421420 y=5087179)	R553-HF S-8-0001	Butterfield		

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R553	Samples	PI	Sub Smps	FrGrb#
14:52:45 Jul 14 '00	1545	49	42237 0	5089418	Fluid sampler: gas piston #4. start time: 14:53. T1=129.3 T2=71.9 Tmax=130.3, volume=110 ml. end sampling at 14:54. (Marshmallow)	R553-HF S-4-0002	Evans	Butterfield/ Lilley	
14:55:21 Jul 14 '00	1545	50	421412	5087179	Fluid sample: FISH filter at 14:55 on filter #7. T1=140 T2=80 Tmax=152.5 volume=1 L. end time: 15:06. (Marshmallow)	R553-HF S-7-0003	Huber		
14:56:59 Jul 14 '00	1545	50	421412	5087179	Marshmallow				R553-003
15:06:43 Jul 14 '00	1545	49	421711	5087178	Fluid sampler: 2 DNA filter #13. Start time: 15:12 End time: 15:19 T1=134 T2=75 Tmax=152. Vol=1 L. (Marshmallow)	R553-HF S-13-000 4	Huber		
15:19:45 Jul 14 '00	1545	50	421415	5087178	Fluid sampler: XRF filter#15. Start time: 15:20 End time: 15:25 T1=129 T2=72 Tmax=132.4 Vol=500ml. (Marshmallow)	R553-HF S-15-000 5	Gendron		
15:27:05 Jul 14 '00	1545	50	421413	5087177	Next stop Gollum				
15:30:45 Jul 14 '00	1543	181	421419	5087170	Found some Bact traps, and MTR 3026. This is Gollum .				
15:33:19 Jul 14 '00	1544	122	421417	5087169	bactraps at Gollum vent (this is a test for the logging system)				R553-004
18:20:33 Jul 14 '00	1545	315	42050 7	508560 0	Tube worms at Mushroom				R553-005
15:39:23 Jul 14 '00	1544	123	421421	5087165	Temp probing at Gollum				
15:37:33 Jul 14 '00	1544	123	421421	5087165	Fix for Gollum: 421422, 5087166				
15:54:27 Jul 14 '00	1545	131	421418	5087170	7 function arm showing pinched sampling tube				R553-006
15:44:09 Jul 14 '00	1545	123	421422	5087166	Fluid sampler: XRF filter #2. Start time: 15:43 End time: 15:49. T1=28.4 T2=19.3 Tmax=30.7 Vol=500ml (Gollum x=421422 y=5087166)	R553-HF S-2-0006	Gendron		
15:52:03 Jul 14 '00	1545	134	42230 2	508940 9	McLane pump started at: 15:57. About 400 L. Finished at 17:12. (Gollum)	R553-McL ane-0007	Metaxas		
16:11:09 Jul 14 '00	1545	125	421425	5087163	Gollum position of both suction for McLane pump and Fluid sampler probes 16:09 Tapes changed				R553-007
16:12:47 Jul 14 '00	1545	124	421424	5087162	Fluid sampler: FISH filter #3. Start: 16:13 End: 16:22. T1=25 T2=17 Tmax=26.8, Vol =1 L. (Gollum)	R553-HF S-3-0008	Huber		
16:21:59 Jul 14 '00	1545	124	421423	5087165	Fluid sample: gas piston #20. Start time: 16:23 End: 16:24 T1=34 T2=24 Tmax=25.9 Vol: 122 ml. (Gollum)	R553-HF S-20-000 9	Evans	Butterfield/ Lilley	
16:27:51 Jul 14 '00	1545	119	421424	5087165	During sampling at Gollum, temp has fluctuated from 19 degrees to 38.5				
16:24:11 Jul 14 '00	1545	121	421421	5087167	Fluid sample piston #22. Start time: 16:25 End time: 16:30 T1=29 T2=19 Tmax=39 Vol: 560 ml. (Gollum)	R553-HF S-22-001 0	Butterfield		
16:27:07 Jul 14 '00	1545	123	422221	5087612	dark mark on suction sample hose				R553-008
16:30:57 Jul 14 '00	1545	117	421420	5087167	Fluid sampler: Sterivex filter #12. Start time: 16:31 End time: 16:40. T1=37 T2=24 Tmax=38.2 Vol 1 L. (Gollum)	R553-HF S-12-0011	Mehta		
16:41:25 Jul 14 '00	1545	117	42362 8	508708 2	palm worms at Gollum				R553-009
16:40:31 Jul 14 '00	1545	116	421424	5087165	Fluid sampler: 2 DNA filter #10. start time: 16:41 end: 16:50 T1=30 T2=20 Tmax: 33.7 Vol: 1 L. (Gollum)	R553-HF S-10-0012	Huber		
16:58:07 Jul 14 '00	1545	116	421424	5087166	palm worm at Gollum				R553-010
16:59:35 Jul 14 '00	1545	115	421425	5087166	shy palm worm at Gollum				R553-011

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R553	Samples	PI	Sub Smps	FrGrb#
16:50:25 Jul 14 '00	1545	115	421425	5087167	Fluid sample: lipid filter #6. start: 16:51 end: 17:00 T1=31 T2=20 Tmax=32.7 Vol: 1 L (Gollum)	R553-HF S-6-0013	Huber		
17:07:29 Jul 14 '00	1545	115	421392	508669 0	Finishing up McLane pumping at Gollum. Cleaning off the end of the fluid sampler probe by reverse pumping.				
17:03:05 Jul 14 '00	1545	114	421424	5087169	Temperature near palm worms at Gollum				R553-012
17:17:13 Jul 14 '00	1545	139	421427	5087166	Replacing the Bactrap at Gollum.				
17:19:15 Jul 14 '00	1545	118	421425	5087168	Next stop Virgin				
17:22:33 Jul 14 '00	1546	30	421433	5087175	Knocking over anhydrite chimneys at Virgin.				
17:27:07 Jul 14 '00	1546	52	421431	5087176	Fix for Virgin x=421430 y=5087174 z=1546				
17:27:41 Jul 14 '00	1546	73	421429	5087180	Temp probing at Virgin				
17:20:53 Jul 14 '00	1546	27	421435	5087172	Virgin mound				R553-013
17:21:05 Jul 14 '00	1546	28	421435	5087172	Virgin mound				R553-014
17:29:09 Jul 14 '00	1546	72	421430	5087179	280 degrees on the half of Virgin mound				R553-015
17:37:13 Jul 14 '00	1546	70	421431	5087179	Fluid sample: XRF filter #1. Start: 17:52 end: 17:56 T1=299 T2=120 Tmax=300.6 Vol=500 ml. (Virgin x=421430 y=5087174)	R553-HF S-1-0014	Gendron		
17:46:25 Jul 14 '00	1546	70	422514	5089417	Gas tight bottle #7 fired. Temp=300. (Virgin)	R553-GTB -7-0015	Evans	Butterfi eld/ Lilley	
17:48:25 Jul 14 '00	1546	70	421765	508685 6	Fluid sample: gas piston #24. Start: 17:49 End 17:50 T1=295 T2=122 Tmax=299.7 Vol=140. (Virgin)	R553-HF S-24-001 6	Evans	Butterfi eld/ Lilley	
17:57:13 Jul 14 '00	1546	70	42334 0	508923 4	Fluid sample bag #9. start: 17:57 end: 18:01 T1=300 T2=116 Tmax=300.6 Vol=375 ml. (Virgin)	R553-HF S-9-0017	Butterfield		
18:02:33 Jul 14 '00	1546	70	42392 3	508833 8	Highlights on.				
18:03:07 Jul 14 '00	1546	70	42392 3	508833 8	Fluid sample: bag #16. Start: 18:02 End: 18:05 T1=297 T2=52 Tmax=297.6 Vol=350ml. (Virgin)	R553-HF S-16-0018	Butterfield		
18:06:25 Jul 14 '00	1546	70	423621	508709 8	Photo #4 taken				
18:06:35 Jul 14 '00	1546	70	423621	508709 8	Done sampling, need to deploy HOBO.				
18:07:09 Jul 14 '00	1546	70	421431	5087175	Highlights off.				
18:02:33 Jul 14 '00	1546	70	42392 3	508833 8	top of Virgin mound				R553-016
18:02:45 Jul 14 '00	1546	70	42392 3	508833 8	Feet of Virgin mound				R553-017
18:02:55 Jul 14 '00	1546	71	42392 3	508833 8	Virgin mound				R553-018
18:03:51 Jul 14 '00	1546	69	42392 3	508833 8	Fire?? on the head of Virgin mound				R553-019
18:06:03 Jul 14 '00	1546	70	423621	508709 8	Virgin mountain				R553-020
18:06:35 Jul 14 '00	1546	70	423621	508709 8	anhydrite chimney we knocked down to take HFS samples				R553-021
18:15:03 Jul 14 '00	1546	68	421431	5087176	tip of hobo over the vent, have to come back and reposition it with 7 function				R553-022

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R553	Samples	PI	Sub Smps	FrGrb#
18:17:25 Jul 14 '00	1546	90	421485	5087106	Couldn't position Hobo with 5-function arm; left Hobo at Virgin. Will come back with 7-function arm.				
18:18:53 Jul 14 '00	1545	252	421427	5087178	Next stop Mushroom.				
18:20:43 Jul 14 '00	1546	343	420507	5085600	Highlights on.				
18:20:55 Jul 14 '00	1546	355	420507	5085600	Photo #5 taken.				
18:21:17 Jul 14 '00	1546	32	420507	5085600	Photo #6, #7 taken at Mushroom.				
18:28:47 Jul 14 '00	1545	292	422199	5087623	Highlights off.				
18:19:27 Jul 14 '00	1545	283	421427	5087178	Mushroom				R553-023
18:19:37 Jul 14 '00	1545	280	421418	5087169	Mushroom				R553-024
18:21:39 Jul 14 '00	1545	63	420507	5085600	Tube worms at Mushroom				R553-025
18:22:11 Jul 14 '00	1545	101	421404	5087167	Tube worms at Mushroom				R553-026
18:24:01 Jul 14 '00	1544	302	421403	5087170	Tube worms at Mushroom				R553-027
18:26:03 Jul 14 '00	1545	293	422152	5086644	sulfide worms at Mushroom				R553-028
18:30:17 Jul 14 '00	1545	293	422199	5087623	Temp probing at Mushroom				
18:32:51 Jul 14 '00	1545	294	421406	5087166	18:11 Tapes changed.				
18:40:11 Jul 14 '00	1545	293	421404	5087167	Still temp probing at Mushroom. knocking over stuff				
18:34:07 Jul 14 '00	1545	292	421778	5084912	Sulfide worms at Mushroom				R553-029
18:38:43 Jul 14 '00	1545	291	421402	5087170	Sulfide worms at Mushroom (150 degrees)				R553-030
18:50:05 Jul 14 '00	1545	305	421407	5087166	Still trying to find a high temperature spot to sample at Mushroom vent.				
19:03:51 Jul 14 '00	1545	305	421181	5087617	Still searching.				
19:05:53 Jul 14 '00	1545	305	421747	5086834	bag 14 start 19:06, stop 19:10 T1=107 T2=60 Tmax=112.1 Vol=500ml. (Mushroom x=421405 y=5087168)	R553-HF S-14-0019	Butterfield /Huber		
19:11:55 Jul 14 '00	1545	305	421392	5087167	ROPOS is lifting off and moving to Inferno vent.				
19:15:25 Jul 14 '00	1542	173	421391	5087160	photo 8 Inferno vent, photo 9 same.				
19:15:59 Jul 14 '00	1547	201	421394	5087170	Inferno mid section				R553-031
19:16:21 Jul 14 '00	1546	202	421394	5087168	Inferno				R553-032
19:16:31 Jul 14 '00	1545	200	421394	5087168	Inferno				R553-033
19:18:33 Jul 14 '00	1543	116	421397	5087162	maximum flow inferneau				R553-034
19:20:33 Jul 14 '00	1544	125	421395	5087161	sample that hole right there				R553-035
19:21:17 Jul 14 '00	1544	123	421395	5087161	asking the ship to stop moving.				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R553	Samples	PI	Sub Smps	FrGrb#
19:29:23 Jul 14 '00	1537	208	421394	5087169	ship has lost positioning system. Will advise us when things are working again.				
19:33:35 Jul 14 '00	1505	79	421394	5087169	ship has lost control of the bow thruster. ROPOS is standing by until control is regained.				
19:37:27 Jul 14 '00	1505	40	421394	5087169	video tapes off at 19:45 for the duration of the delay.				
19:46:51 Jul 14 '00	1505	32	421394	5087169	Ship advises that they have the bow thruster back on line.				
20:05:57 Jul 14 '00	1543	5	421394	5087169	ROPOS has returned to the bottom.				
20:11:55 Jul 14 '00	1545	280	421394	5087169	restarting archive tapes 20:07				
20:14:13 Jul 14 '00	1544	149	421391	5087167	ROPOS is back at Inferno , getting ready to sample.				
20:14:23 Jul 14 '00	1544	141	421391	5087167	Limpets, sparse tube worms and alvinellids on Inferno				R553-036
20:16:57 Jul 14 '00	1544	145	421394	5087164	Fluid sampling at Inferno				R553-037
20:20:37 Jul 14 '00	1544	144	421394	5087164	Inferno again				R553-038
20:21:33 Jul 14 '00	1544	144	421394	5087164	Navigation crashed... still looking for a good temperature to sample Inferno .				
20:27:43 Jul 14 '00	1544	144	421126	5088195	Still searching for a good temperature site.				
20:29:43 Jul 14 '00	1544	145	421392	5087167	change of tapes at 20:26. highlight tape was turned from 20:17 to 20:24.				
20:30:39 Jul 14 '00	1544	145	421390	5087166	ROPOS is repositioning to get a better approach to the vent.				
20:35:59 Jul 14 '00	1544	121	423658	5087082	Port gas tight bottle #6. (Inferno x=421397 y=5087162)	R553-GTB -6-0020	Evans	Butterfield/ Lilley	
20:36:53 Jul 14 '00	1544	125	423656	5087081	gas piston #5, start 20:37, stop 20:38. T1=298, T2=139, Tmax=300.8 vol=150ml. (Inferno)	R553-HF S-5-0021	Evans	Butterfield/ Lilley	
20:39:17 Jul 14 '00	1544	122	423659	5087080	filter bag #11, start 20:39:40, stop 20:43 T1=301 T2=140 Tmax=302.2 vol=478 ml. (Inferno)	R553-HF S-11-0022	Butterfield /Huber		
20:44:47 Jul 14 '00	1544	122	423659	5087083	XRF filter #21. start 20:45:09 stop 20:47. T1=301 T2=137, Tmax=301.8 vol=250 ml. (Inferno)	R553-HF S-21-0023	Gendron		
20:47:43 Jul 14 '00	1544	123	425611	5087048	bag #19 start 20:48:04, stop 20:52:09. T1=301, T2=137, Tmax=301.7 vol 450 ml. (Inferno)	R553-HF S-19-0024	Butterfield /Huber		
20:41:17 Jul 14 '00	1544	122	423182	5086716	Filter Bag 11 at Inferno				R553-039
20:56:09 Jul 14 '00	1546	47	423657	5087081	ROPOS is looking around the base of Inferno looking for a lost Hobo sampler.				
20:55:15 Jul 14 '00	1545	7	423657	5087081	Left base of Inferno				R553-040
20:55:47 Jul 14 '00	1547	5	423657	5087081	Right base of Inferno				R553-041
20:58:21 Jul 14 '00	1544	237	423657	5087081	Inferno				R553-042
20:59:49 Jul 14 '00	1544	262	423664	5087081	ROPOS is heading south looking for Medusa , we missed it and are heading on to Hell .				
21:01:29 Jul 14 '00	1544	204	421770	5087142	ROPOS has arrived at Hell vent. looking for a position to sample from. looking at the top of the vent for flow.				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R553	Samples	PI	Sub Smps	FrGrb#
21:03:09 Jul 14 '00	1543	176	421375	5087142	photos 10,11 of Hell vent. photo 12 same,				
21:03:31 Jul 14 '00	1543	221	421375	5087142	photo 13 Hell looking NW. photo 14 looking North.				
21:04:03 Jul 14 '00	1543	329	421375	5087142	photo 15 Hell vent looking NE				
21:04:47 Jul 14 '00	1544	67	421368	5087128	ROPOS is settling to the bottom of the vent. new Porkchop beehive re-grown since 2 weeks ago.				
21:06:27 Jul 14 '00	1544	44	421368	5087133	photo 16 blue mat on Hell vent.				
21:08:27 Jul 14 '00	1544	264	419636	5084188	Juniper VHS on 21:08				
21:04:25 Jul 14 '00	1544	42	421375	5087142	Hell				R553-043
21:05:21 Jul 14 '00	1546	63	421368	5087128	New Porkchop (broken 2 weeks ago) on the right				R553-044
21:05:53 Jul 14 '00	1546	56	421364	5087128	Blue stuff at Hell				R553-045
21:06:27 Jul 14 '00	1544	44	421368	5087133	Hell				R553-046
21:06:59 Jul 14 '00	1543	47	421369	5087132	Hell				R553-047
21:08:27 Jul 14 '00	1544	264	419636	5084188	Hell				R553-048
21:09:23 Jul 14 '00	1545	229	421372	5087136	Hell				R553-049
21:12:29 Jul 14 '00	1543	350	421997	5089381	ROPOS is positioning to find a spot to settle on.				
21:14:41 Jul 14 '00	1543	335	421998	508938 2	highlight on 21:15				
21:17:17 Jul 14 '00	1543	337	42367 4	508704 7	Temperature probing and sulfide worms at the top of Hell (Tmax 180 degrees)				R553-050
21:20:23 Jul 14 '00	1544	335	42367 4	508704 8	beta cam off 21:20				
21:22:03 Jul 14 '00	1544	346	42367 6	5087051	beta Juniper on 21:21				
21:24:25 Jul 14 '00	1544	341	42367 7	508704 9	ROPOS is still looking for a good site to sample				
21:26:15 Jul 14 '00	1544	335	42367 4	508704 7	Tubeworms and limpets at the top Hell				R553-051
21:37:49 Jul 14 '00	1544	333	419424	508720 2	ROPOS is still searching for a high temp spot to sample				
21:41:31 Jul 14 '00	1544	332	421370	5087135	filter bag #17 - start 21:41, stop 21:46, T1=70-105 T2=65 Tmax=112.7 vol=500. (Hell x=421372 y=5087130)	R553-HF S-17-002 5	Butterfield /Huber		
21:46:27 Jul 14 '00	1544	333	421372	5087132	ROPOS is repositioning the probe to find more heat.				
21:52:19 Jul 14 '00	1544	332	421369	5087133	VHS Juniper off 21:52 Juniper beta rewind.				
21:53:15 Jul 14 '00	1544	333	421371	5087130	beta cam on Embley 21:53,, looks like gas bubbles in the flow.				
21:53:37 Jul 14 '00	1544	332	421370	5087131	Bubbles coming out of vent at Hell				R553-052
21:59:07 Jul 14 '00	1544	332	421372	5087131	highlights off 21:59				
21:58:23 Jul 14 '00	1544	332	421371	5087130	Sampling at Hell Vent, looking at bubbles? Maybe particles.				R553-053

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R553	Samples	PI	Sub Smps	FrGrb#
22:02:15 Jul 14 '00	1544	334	421929	508483 6	bag #18. start 22:03:43, stop 22:07:13 T1=80-130 T2=66 Tmax=144 vol=500 ml. (Hell)	R553-HF S-18-002 6	Butterfield /Huber		
22:07:45 Jul 14 '00	1544	331	421931	508483 8	gas piston #24, start 22:08, stop 22:09:17 T1=113 T2=69 Tmax=129 vol=118. (Hell)	R553-HF S-24-002 7	Evans	Butterfield/ Lilley	
22:10:41 Jul 14 '00	1541	82	422138	508760 8	ROPOS is repositioning to the back side of Hell to look for bubbles or something that looks like them.				
22:15:39 Jul 14 '00	1544	60	421371	5087134	Hell vent, looking for bubbles				R553-054
22:18:23 Jul 14 '00	1544	60	421369	5087130	ROPOS is repositioning to the black cone (beehive) near the base of Hell.				
22:19:29 Jul 14 '00	1546	21	421370	5087132	VHS Juniper on at 22:18				
22:18:35 Jul 14 '00	1544	52	421370	5087133					R553-055
22:20:03 Jul 14 '00	1547	13	421087	5088177	beehive to be sampled				R553-056
22:21:09 Jul 14 '00	1547	13	421371	5087132	palm worms at the base of the black cone (beehive)				R553-057
22:23:09 Jul 14 '00	1547	14	421372	5087132	Observation 1 New Porkchop.				
22:23:43 Jul 14 '00	1546	14	421370	5087134	Observation 1 New Porkchop				R553-058
22:24:37 Jul 14 '00	1546	14	421369	5087137	New Porkchop re-colonisation by sulfide worms after 2 weeks.				R553-059
22:26:05 Jul 14 '00	1546	13	421369	5087137	change of tapes (Embley) 22:21 and Beta Juniper turned on 22:22				
22:31:03 Jul 14 '00	1546	14	421371	5087130	Photo 17 worms at the base of Porkchop				
22:33:59 Jul 14 '00	1546	14	421373	5087131	still observing the worms....				
22:42:47 Jul 14 '00	1546	14	421373	5087130	long observations of some sulfide worms in close-up				
22:48:41 Jul 14 '00	1547	13	421373	5087130	end of current sulfide worm observation 2, new Porkchop				
22:51:03 Jul 14 '00	1547	14	421368	5087136	begin observation 3, new Porkchop, another small sulfide worm team on another part of the vent				
22:52:43 Jul 14 '00	1547	13	421370	5087133	photo 18 New Pork, New Pork! It's a Hell of a vent. The NAV is screwed and the peek tube is bent.				
23:01:09 Jul 14 '00	1546	13	421243	508735 2	end observation 3				
23:05:01 Jul 14 '00	1546	14	421372	5087132	attempting to get HFS T1 measurement from the area of the worms from the base of the small sulfide spire at the base of Porkchop				
23:07:23 Jul 14 '00	1546	14	421371	5087133	prep suction sample jar 4, max temp thus far 3.8 deg C (T1)				
23:09:13 Jul 14 '00	1546	14	421369	5087131	suction sample 200 micron mesh base of sulfide spire (SULFIDE AND PARTICULATES) at the base of Porkchop, sulfide worm neighborhood before and after knocking down their spire. start time 23:09, end time 23:16. (Hell x=421372 y=5087135) - New Porkchop	R553-SS- J4-0028	Juniper		
23:12:43 Jul 14 '00	1547	13	421372	5087132	good fix x=421372 y=5087142 @23:12				
23:20:47 Jul 14 '00	1545	231	421376	5087133	a larger sulfide higher up Porkchop				R553-060

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R553	Samples	PI	Sub Smps	FrGrb#
23:21:43 Jul 14 '00	1545	230	421369	5087137	a larger sulfide higher up Porkchop				R553-061
23:21:53 Jul 14 '00	1545	230	421369	5087137	just to the left of the medium sized sulfide midway up the vent				R553-062
23:20:03 Jul 14 '00	1545	231	421376	5087133	scooping out a larger sulfide, same vent				
23:30:43 Jul 14 '00	1545	231	421368	5087139	middle of observation 4, Porkchop (the medium sized sulfide chimney)				
23:43:55 Jul 14 '00	1545	230	421374	5087133	sulfide worms changing addresses?				R553-063
23:48:41 Jul 14 '00	1545	230	421371	5087135	stop current zoom				
23:48:53 Jul 14 '00	1544	230	421371	5087135	new zoom (number 4)of more sulfide worms				
23:57:41 Jul 14 '00	1544	231	421368	5087138	zoom 5 on the baby worm.				
23:58:59 Jul 14 '00	1544	231	42294 8	508758 3	stop zoom 5,				
00:00:19 Jul 15 '00	1544	230	42367 7	508705 4	zoom 6				R553-064
23:59:43 Jul 14 '00	1544	230	42367 9	508704 8	zoom 6				
00:01:47 Jul 15 '00	1544	230	42367 7	508705 7	stop zoom 6, start zoom 7				
00:02:21 Jul 15 '00	1544	230	421371	5087134	zoom 7				R553-065
00:13:21 Jul 15 '00	1544	230	421979	508792 7	end zoom 7 and all surveyterminating dive.				
00:15:23 Jul 15 '00	1529	281	421378	5087141	all video stopped				
00:25:27 Jul 15 '00	1299	101	421435	5087128	make way for the iron sausage				R553-066
01:05:33 Jul 15 '00	2	191	421434	5087114	ROPOS on deck 0105 JD197				
					R553 Dive Summary: near Crack-Deployed Johnson flow/temp meter. Marshmallow-Samples: 5 hfs. Gollum-Samples: 7 hfs, McLane pump. Virgin-Samples: 4 hfs, 1 gtb. Mushroom-Sample: 1 hfs. Inferno-Samples: 4 hfs, 1 gtbs. Hell-Samples 3 hfs, 1 ss. Sulfide worm observations.				

R554 Dive Log

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R554	Samples	PI	Sub Smps	FrGrb#
					Positions in utm x/y columns are automated and not flagged for accuracy. Consult dive maps for final position data.				
					Tasks: Area - Southern Pillow Flow at 45 52'N. Ground-truth geology of pillow mound anomaly, Finish Imagenex survey. Rock and suction sampling.	Bottom Time: JD197(7/15) 0612-2130			
					04:49 Ropos in the water.				
05:18:30 Jul 15 '00	1008	267	422048	5080801	Cage stopped. We are going to position for start of line 1 for Imagenex survey.				
05:18:30 Jul 15 '00	1008	267	422048	5080801	Trying to get STS up.				
05:18:30 Jul 15 '00	1008	267	422048	5080801	Gumby on the gauges				R554-001
05:18:30 Jul 15 '00	1008	267	422048	5080801	Gumby on a roll				R554-002
05:18:30 Jul 15 '00	1008	267	422048	5080801	Turned McLane pump on at 6 l/min for 400 liters. Area of south pillow mounds - Imagenex survey area Total time was 5322 seconds. Lowest voltage was 27.7 volts DC. (Southern Pillow Flow at 45 52'N)	R554-Mc Lane-000 1	Metaxas		
05:18:30 Jul 15 '00	1008	267	422048	5080801	No video will be recorded until Imagenex is over.				
05:18:30 Jul 15 '00	1008	267	422048	5080801	Moving the ship to the beginning of line 1.				
05:18:30 Jul 15 '00	1008	267	422048	5080801	Time is off again. 06:12 start of Imagenex line 1.				
06:16:12 Jul 15 '00	1684	195	422032	5080760	Log info (time, depth etc.) is now correct, we had to restart the serial driver.				
06:20:12 Jul 15 '00	1684	198	422024	5080718	We are now at the correct position for the start of line 1 (422023/5080695) with Ropos, although we started recording 8 minutes ago.				
06:48:04 Jul 15 '00	1691	195	421866	5080227	The ship just had a steering failure and got a bit off the line. Ship will probably stop until it regains DP control.				
06:57:24 Jul 15 '00	1698	194	421839	5080157	Ship seems to be going down the line again.				
07:00:14 Jul 15 '00	1698	196	421831	5080137	Whoops, ship is going north...				
07:05:16 Jul 15 '00	1698	191	421841	5080156	ROPOS telemetry crashed. When it rains it pours...				
07:08:56 Jul 15 '00	1662	226	421834	5080158	ROPOS telemetry back up. ROPOS had floated up about 30-40 m.				
07:10:06 Jul 15 '00	1689	209	421837	5080166	ROPOS back down in Imagenex range.				
07:11:16 Jul 15 '00	1694	199	421837	5080177	ROPOS has gone straight backwards ~30 m along the line while the ship has been trying to regain steering control.				
07:15:46 Jul 15 '00	1696	176	421844	5080157	Ship seems to be going down the line again. Before, they couldn't keep going down the line with the orientation they had without working the thrusters too hard. So they changed heading and now it seems to be OK. Let's hope anyway...				
07:34:58 Jul 15 '00	1705	194	421755	5079892	McLane pump is off. Completed sample: 400 liters pumped. Total time was 5322 seconds. Lowest voltage was 27.7 volts DC. Pump is now sleeping. Now it is PURE IMAGENEX!				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R554	Samples	PI	Sub Smps	FrGrb#
08:12:50 Jul 15 '00	1707	194	421564	5079310	EOL 1 (south end).				
08:22:30 Jul 15 '00	1707	9	421613	5079295	SOL line 2 (south end).				
09:34:32 Jul 15 '00	1684	22	422102	5080693	End of line 2, moving to commence line 3.				
09:37:32 Jul 15 '00	1683	194	422139	5080637	Commenced line 3.				
10:49:36 Jul 15 '00	1701	197	421676	5079267	End of line, moving to get in position for line 4				
11:06:28 Jul 15 '00	1700	278	421714	5079206	Start of line 4.				
12:18:44 Jul 15 '00	1681	24	422209	5080658	End of line 4, moving to commence line 5.				
12:23:24 Jul 15 '00	1681	187	422277	5080626	Start of line cinq...that's five for the english speaking folks.				
13:35:48 Jul 15 '00	1696	211	421786	5079219	End of line 5 at 1335; x=421791 y=5079234 (2 transponder fix)				
13:39:50 Jul 15 '00	1696	25	421851	5079209	Start of line 6 at 1339; x=421856 y=5079209 (2 transp. fix)				
14:35:24 Jul 15 '00	1691	26	422189	5080230	Particulate matter in water column during imagenex				R554-003
14:55:46 Jul 15 '00	1680	112	422320	5080628	EOL 6 at 1454 x=422314 y=5080617				
14:59:46 Jul 15 '00	1681	199	422366	5080602	SOL 7 x=433469 y=5080595				
16:13:10 Jul 15 '00	1697	204	421902	5079194	EOL 7 x=421889 y=507918 time is 16:16. SOL8 x=421966 y=50789174. The last Imagenex line of NeMO 2000! Yippee!				
17:27:26 Jul 15 '00	1687	23	422427	5080581	EOL 8 x=422425 y=5080581. End of Imagenex.				
17:31:26 Jul 15 '00	1668	218	422442	5080582	Ship stopped; then headed to Point A at one knot.				
17:46:08 Jul 15 '00	1708	93	422501	5080526	On the bottom. Tapes on.				
17:47:58 Jul 15 '00	1714	269	422605	5080637	Camera count starting at 19. Photo #20 taken.				
17:48:18 Jul 15 '00	1712	266	423900	5081741	Pillows on top of something else. Photo #21.				
17:48:58 Jul 15 '00	1713	270	422500	5080522	Photo #22.				
17:49:28 Jul 15 '00	1715	266	422500	5080522	Photo #23. Sheet flow underneath.				
17:49:48 Jul 15 '00	1718	267	423857	5078568	Photo #24.				
17:49:08 Jul 15 '00	1713	267	422500	5080522	Pillows				R554-004
17:49:28 Jul 15 '00	1715	266	422500	5080522	Sheet flow under pillows				R554-005
17:50:48 Jul 15 '00	1719	267	423857	5078568	Photo #25.				
17:51:38 Jul 15 '00	1718	315	423802	5078540	Photo #26				
17:51:48 Jul 15 '00	1716	19	423802	5078540	Photo #27 of a cavern. on the western wall of the fissure.				
17:51:28 Jul 15 '00	1717	269	423802	5078540	More sheet lavas				R554-006
17:51:48 Jul 15 '00	1716	19	423802	5078540	Cavern				R554-007
17:52:08 Jul 15 '00	1718	350	423802	5078540	Fissure wall				R554-008

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R554	Samples	PI	Sub Smpls	FrGrb#
17:52:28 Jul 15 '00	1717	11	423802	5078540	Fissure wall again				R554-009
17:53:28 Jul 15 '00	1717	279	423802	5078540	Photo #29				
17:53:38 Jul 15 '00	1717	295	423802	5078540	North end of the graben				R554-010
17:54:28 Jul 15 '00	1718	110	422608	5080632	Heading east across the bottom of the canyon.				
17:54:58 Jul 15 '00	1717	90	422608	5080632	Photo 30, Photo 31				
17:55:38 Jul 15 '00	1717	76	422608	5080632	Photo 32				
17:56:08 Jul 15 '00	1715	108	422608	5080632	Photo 33 of an overhang				
17:56:38 Jul 15 '00	1719	96	422608	5080632	Photo #34 of the east wall of the graben				
17:57:18 Jul 15 '00	1719	83	422608	5080632	Photo 35				
17:57:38 Jul 15 '00	1718	210	422608	5080632	Photo 36				
17:57:48 Jul 15 '00	1718	110	422526	5080522	Photo 37 of sheet flow				
17:54:58 Jul 15 '00	1717	90	422608	5080632	East wall of graben				R554-011
17:55:28 Jul 15 '00	1717	92	422608	5080632	Top of east wall of graben				R554-012
17:56:08 Jul 15 '00	1715	108	422608	5080632	Another view				R554-013
17:56:08 Jul 15 '00	1715	108	422608	5080632	Overhang on the top of east wall				R554-014
17:56:38 Jul 15 '00	1719	96	422608	5080632	Sheet flow on east wall				R554-015
17:56:38 Jul 15 '00	1719	96	422608	5080632	Ledge of east wall of graben				R554-016
17:57:48 Jul 15 '00	1718	110	422526	5080522	More sheets on east wall				R554-017
17:57:48 Jul 15 '00	1718	110	422526	5080522	East wall				R554-018
17:58:28 Jul 15 '00	1716	90	422526	5080522	Lobate lavas				R554-019
17:59:28 Jul 15 '00	1713	94	422546	5080512	Looking at older, pillow lava on the eastern side of the fissure.				
17:59:18 Jul 15 '00	1713	91	422526	5080522	Pillows, what looks like older lava				R554-020
17:59:58 Jul 15 '00	1713	347	422548	5080512	Going back to the western wall of the fissure.				
18:00:08 Jul 15 '00	1712	256	422548	5080512	Photo 38				
18:00:28 Jul 15 '00	1714	268	422548	5080512	Photo 39				
18:00:08 Jul 15 '00	1712	256	422548	5080512	Contact on the east, few meters from the lip of east wall				R554-021
18:00:18 Jul 15 '00	1713	270	422548	5080512	Another point of contact old and new lava				R554-022
18:00:58 Jul 15 '00	1715	254	422548	5080512	Contact just a few meters over the lip of the east wall. Photo 40.				
18:01:28 Jul 15 '00	1715	108	422548	5080512	Close up of pillow lavas				R554-023
18:01:48 Jul 15 '00	1716	129	422548	5080512	Close up of old pillows				R554-024
18:02:58 Jul 15 '00	1717	108	422548	5080512	Old lava				R554-025

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R554	Samples	PI	Sub Smps	FrGrb#
18:03:38 Jul 15 '00	1717	103	422548	5080512	The canyon seems to be 10 m deep on the west side.				
18:04:28 Jul 15 '00	1717	105	422548	5080512	Trying to sample a rock for J. Chadwick.				
18:07:28 Jul 15 '00	1717	58	422538	5080509	Picked up a BIG rock				
18:07:38 Jul 15 '00	1717	57	422538	5080509	John's rock				R554-026
18:08:18 Jul 15 '00	1717	57	422538	5080509	Opening up the Biobox. Looking to see if the rock will fit.				
18:08:48 Jul 15 '00	1717	58	422623	5080620	John's (old lava) rock in the biobox				R554-027
18:08:58 Jul 15 '00	1717	59	422623	5080620	Big rock of older pillow lava from the east side of the fissure, sampled at the contact. In the stbd biobox. (Southern Pillow Flow at 45 52'N)	R554-RK-0002	J Chadwick		
18:10:50 Jul 15 '00	1717	59	422532	5080517	Old pillow lava, close up				R554-028
18:12:10 Jul 15 '00	1717	58	422536	5080523	Photo 41 taken at sample site.				
18:12:10 Jul 15 '00	1717	58	422536	5080523	More pillows				R554-029
18:12:50 Jul 15 '00	1715	91	422520	5080535	Back at the eastern end of the fissure.				
18:13:10 Jul 15 '00	1718	91	422528	5080523	Close up above the cavern				R554-030
18:13:30 Jul 15 '00	1720	71	422528	5080524	Side of cavern				R554-031
18:16:20 Jul 15 '00	1720	46	422526	5080525	Second sampling site: 422526, 5080523 - Stirring up a lot of floc.				
18:17:00 Jul 15 '00	1720	46	422538	5080515	John's rock sample of new lava				R554-032
18:17:10 Jul 15 '00	1720	46	422538	5080515	Sampling new lava from the eastern side of the fissure. It's a flat piece of crust with drips on the bottom. Starboard Biobox. (Southern Pillow Flow at 45 52'N)	R554-RK-0003	J Chadwick		
18:18:10 Jul 15 '00	1720	46	422527	5080525	Flat piece of crust with drips at the bottom				R554-033
18:22:40 Jul 15 '00	1716	262	422528	5080521	Going back west to the other side of the fissure.				
18:21:40 Jul 15 '00	1719	60	422520	5080536	Crab falling off the lip				R554-034
18:21:40 Jul 15 '00	1719	60	422520	5080536	Crab losing his grip				R554-035
18:21:50 Jul 15 '00	1718	92	422529	5080524	He is off the wall				R554-036
18:24:00 Jul 15 '00	1720	266	422505	5080532	Photo 42 of the west wall.				
18:24:40 Jul 15 '00	1718	266	420074	5080897	The fissure is 20m deep.				
18:25:20 Jul 15 '00	1714	265	420074	5080897	Fissure is about 8m deep on this side.				
18:25:50 Jul 15 '00	1713	270	420074	5080897	Looking at old pillows on the top of the western wall.				
18:26:10 Jul 15 '00	1713	268	420074	5080897	Photo 43, 44				
18:26:40 Jul 15 '00	1717	263	422371	5080378	Photo 45				
18:24:40 Jul 15 '00	1718	266	420074	5080897	West wall				R554-037
18:24:40 Jul 15 '00	1718	266	420074	5080897	West wall again				R554-038

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R554	Samples	PI	Sub Smpls	FrGrb#
18:25:10 Jul 15 '00	1716	267	420074	5080897	Old pillows on top of the western wall				R554-039
18:27:20 Jul 15 '00	1716	277	419863	5079963	Bottom of picture shows the slight overflow				R554-040
18:28:20 Jul 15 '00	1715	279	422502	5080511	Heading south-southwest along the fissure, close to the western wall. Photo 46.				
18:34:20 Jul 15 '00	1717	279	422627	5080642	Photo 47. Upper rim of the west wall.				
18:34:10 Jul 15 '00	1715	290	422627	5080642	Upper rim of the west wall				R554-041
18:35:00 Jul 15 '00	1714	236	424739	5079672	Moving the ship to target B at half a knot.				
18:41:52 Jul 15 '00	1716	281	420077	5080859	photo 49 staining on wall (west wall of fissure, drain back remnants).				
18:41:52 Jul 15 '00	1716	281	420077	5080859	West wall with drainback remnants				R554-042
18:42:02 Jul 15 '00	1715	238	420077	5080859	Look at the west wall with drainback remnants.				R554-043
18:47:12 Jul 15 '00	1716	297	422487	5080428	good fix x=422487 y= 5080428				
18:49:12 Jul 15 '00	1716	241	422459	5080406	good fix on ROPOS photo 50 western lip fissure				
18:53:02 Jul 15 '00	1715	237	423020	5079341	Western edge of wall				R554-044
18:55:22 Jul 15 '00	1716	274	422737	5078778	photo 51 pillows on the top of the western wall near target B				
18:55:12 Jul 15 '00	1716	264	422737	5078778	pillows on the western wall near target B				R554-045
18:57:02 Jul 15 '00	1716	269	422729	5078793	ROPOS is heading East about 50 meters				
18:58:02 Jul 15 '00	1716	89	421718	5078924	photo 52 eastern wall of the fissure, older lava on top				
18:58:22 Jul 15 '00	1718	86	422726	5078798	photo 53 older lava				
18:58:52 Jul 15 '00	1719	90	423735	5078684	photo 54 older lava				
18:59:02 Jul 15 '00	1718	89	423735	5078684	photo 55 eastern fissure in older flow				
18:59:32 Jul 15 '00	1717	56	423735	5078684	photo 56 looking south down the fissure				
18:59:32 Jul 15 '00	1717	56	423735	5078684	eastern fissure				R554-046
18:59:42 Jul 15 '00	1717	206	423735	5078684	eastern fissure				R554-047
19:00:42 Jul 15 '00	1719	222	423735	5078684	fissure is 2m wide, graben (small) with intact pillows on the floor				
19:01:42 Jul 15 '00	1719	232	423299	5078642	photo 57 graben in the eastern fissure				
19:02:52 Jul 15 '00	1721	251	422958	5083163	inside the fissure				R554-048
19:04:02 Jul 15 '00	1720	251	422958	5083163	photo 58 wall of the fissure				
19:06:34 Jul 15 '00	1719	240	422417	5080236	photo 59 down in the bottom of the fissure with heavy sediment.				
19:07:44 Jul 15 '00	1722	246	422444	5080273	bottom of fissure				R554-049
19:07:34 Jul 15 '00	1721	243	422444	5080273	good fix x=422444 y=5080273				
19:08:24 Jul 15 '00	1722	246	422370	5080201	bottom of fissure				R554-050
19:09:34 Jul 15 '00	1719	248	422370	5080201	photo 60 on the western lip of the older fissure				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R554	Samples	PI	Sub Smps	FrGrb#
19:13:04 Jul 15 '00	1720	228	422732	5078846	fissure				R554-051
19:13:04 Jul 15 '00	1720	228	422732	5078846	photo 61 bottom of fissure with heavy sediment				
19:14:44 Jul 15 '00	1714	205	422729	5078845	ROPOS is heading west back to the other fissure				
19:16:04 Jul 15 '00	1715	262	422412	5080218	At the eastern lip of the big fissure				
19:17:04 Jul 15 '00	1721	266	424443	5079911	Western lip of the larger fissure. Looks like new lava on the lip				
19:17:14 Jul 15 '00	1721	267	424443	5079911	western lip of the larger fissure				R554-052
19:17:34 Jul 15 '00	1719	255	424443	5079911	South of point B about 7 meters. good fix 422392/5080262				
19:18:34 Jul 15 '00	1717	271	422392	5080262					R554-053
19:18:44 Jul 15 '00	1717	271	422392	5080262					R554-054
19:19:14 Jul 15 '00	1716	264	422383	5080255	Driving northwest a little bit to get cage near us. good fix at same place., just a little bit to the west. Looks like new lava flows quite far to the west here. Past big fissure driving to west/northwest to end of tether to look for contact.				
19:20:14 Jul 15 '00	1714	312	422375	5080263	422356/5080293 good fix. At our westernmost point. Move to east and back towards older lavas. At little collapse pit. Photo 65.				
19:21:54 Jul 15 '00	1713	324	422320	5080231					R554-055
19:22:54 Jul 15 '00	1713	334	422356	5080293					R554-056
19:22:54 Jul 15 '00	1713	334	422356	5080293					R554-057
19:23:44 Jul 15 '00	1713	335	422322	5080254					R554-058
19:25:54 Jul 15 '00	1714	88	422361	5080253	Sitting right over west wall of big fissure.				
19:26:44 Jul 15 '00	1713	107	422406	5080303	422406/5080303. At western wall of larger fissure.				
19:27:54 Jul 15 '00	1715	153	422406	5080299	ROPOS perpendicular to fissures. compass reads 153, and should be about 110				
19:28:54 Jul 15 '00	1714	129	422416	5080288	Either that or the mesotech is pointing the wrong way. Now at small fissure. 422429/5080281				
19:29:44 Jul 15 '00	1718	244	422444	5080272	Moving the ship toward target C. 422447/5080266. At small fissure. (older lavas)				
19:30:24 Jul 15 '00	1716	231	422448	5080267	small fissure to the east of the main fissure				R554-059
19:32:44 Jul 15 '00	1714	227	422406	5080214	422439/5080250. Heading to point C (closer to B)				
19:34:04 Jul 15 '00	1714	227	422399	5080209	Heading south along smaller older fissure, right now about 50 meters north of where 2 fissures merge.				
19:38:26 Jul 15 '00	1716	227	422440	5080271	older eruptive fissure				R554-060
19:38:26 Jul 15 '00	1716	227	422440	5080271	photo 67. Smaller older eruptive fissure. Heading south to where the smaller and larger fissure merge.				
19:39:56 Jul 15 '00	1716	219	422392	5080195	fissure getting narrower.				R554-061

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R554	Samples	PI	Sub Smps	FrGrb#
19:39:36 Jul 15 '00	1717	222	422392	5080195	fissure is narrowing into a crack here. Photo 68. About 1 meter wide and decreasing. Looks like it steps over to the east.				
19:40:56 Jul 15 '00	1717	224	422366	5080167	Older, smaller fissure steps over into larger fissure. Photo 69, eastern lip of fissure with new lava.				
19:40:16 Jul 15 '00	1716	222	422392	5080195	end of small fissure				R554-062
19:40:26 Jul 15 '00	1716	218	422392	5080195	beginning of larger fissure				R554-063
19:40:26 Jul 15 '00	1716	218	422392	5080195	beginning of larger fissure				R554-064
19:41:36 Jul 15 '00	1717	233	422409	5080244	edge of the fissure				R554-065
19:41:36 Jul 15 '00	1717	233	422409	5080244	Photo 71. Old crack pinched off. Stepped to west another fissure branch with new lava in it. Photos 72, 73.				
19:42:46 Jul 15 '00	1717	231	422391	5080181	new lava on the edge of the pillow mound.				R554-066
19:42:46 Jul 15 '00	1717	231	422391	5080181	Now coming up to edge of pillow mound where new lava covers everything. Photo 75. Great contact.				
19:43:16 Jul 15 '00	1718	240	422378	5080173	contact between old and new lava				R554-067
19:43:56 Jul 15 '00	1720	226	422364	5080156	On the old seafloor between intermediate fissure and old flow.				
19:43:56 Jul 15 '00	1720	226	422364	5080156	contact on the seafloor between intermediate fissure and new flow				R554-068
19:45:26 Jul 15 '00	1720	226	422413	5080213	east wall of the old fissure				R554-069
19:45:26 Jul 15 '00	1720	226	422413	5080213	good fix 422413/5080213. East wall of old fissure.				
19:46:36 Jul 15 '00	1720	280	422386	5080181	Still in big fissure depression that continues on south.				
19:46:46 Jul 15 '00	1719	283	422386	5080181	edge of the fissure as it continues				R554-070
19:47:36 Jul 15 '00	1720	135	422362	5080172	Don't need to stop at point C, will keep going towards point D. about bearing of 170 degrees				
19:48:56 Jul 15 '00	1716	130	422379	5080178	eastern edge of the depression				R554-071
19:49:46 Jul 15 '00	1720	153	422359	5080146	pillows in the old fissure.				R554-072
19:49:06 Jul 15 '00	1718	170	422379	5080178	Photo 76 taken a minute ago. Looking at eastern edge of large depression. Fissure is turning into a depression, filled with pillows. Broadening out filled with pillows not sheet drainout here. Change tapes 1946				
19:50:36 Jul 15 '00	1721	203	422359	5080146	Photo 78. Looking southwest. In depression				
19:51:06 Jul 15 '00	1722	233	422379	5080151	422379/5080151. Logged fixes in comment column are all good fixes (at least as good as it gets with acoustic nav)				
19:52:56 Jul 15 '00	1723	204	422389	5080131	bottom of lineated depression				R554-073
19:52:46 Jul 15 '00	1722	203	422379	5080151	Photo 80. Driving down in bottom of depression. Went from pillows to lineated flow. Changing it's character all along. Looking like a sheet drainout again.				
19:53:36 Jul 15 '00	1724	210	422389	5080131	Photo 81. Eastern edge of the depression.				
19:53:36 Jul 15 '00	1724	210	422389	5080131	eastern edge of the depression				R554-074

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R554	Samples	PI	Sub Smps	FrGrb#
19:54:06 Jul 15 '00	1723	196	422388	5080100	close-up of eastern edge of depression				R554-075
19:54:16 Jul 15 '00	1723	196	422388	5080100	Photo 82. Younger sheet stuff. Lobate stuff on the outside.				
19:56:06 Jul 15 '00	1714	308	422363	5080105	422363/5080105.				
19:57:26 Jul 15 '00	1720	202	422372	5080081	422372/5080081. Photo 83. Island in the middle of the channel.				
19:57:26 Jul 15 '00	1720	202	422372	5080081	collapse area				R554-076
19:58:06 Jul 15 '00	1720	194	422363	5080062	Now in a larger collapse area - 422356/5080039				
19:58:56 Jul 15 '00	1720	209	422356	5080039	All jumbled sheet from here. (heading south) Broader depression draining to the east and possibly the west?				
19:59:56 Jul 15 '00	1719	204	422354	5079993	jumbled flow inside the drainout				R554-077
19:59:56 Jul 15 '00	1719	204	422354	5079993	Photo 84 inside drainout - jumbled flow. 422354/5079993				
20:00:46 Jul 15 '00	1721	198	422339	5079965	fresh lava inside of drainout				R554-078
20:02:16 Jul 15 '00	1722	204	422365	5079930	close up of fresh lava in drainout				R554-079
20:02:16 Jul 15 '00	1722	204	422365	5079930	photo 86. jumbled new flow 422365/50879931				
20:02:56 Jul 15 '00	1723	208	422358	5079965	Sampling a piece of shiny newer lava with glass in jumbled collapse flow. (~50 meters NW of point D) Putting it in the purse. It's mammoth. Bacterial subsample. (Southern Pillow Flow at 45 52'N)	R554-RK-0004	J Chadwick	Moyer	
20:06:38 Jul 15 '00	1723	212	422724	5078907	Next point with ROPOS will be D				
20:07:18 Jul 15 '00	1723	211	423101	5080739	new lava sample R554-RK-003				R554-080
20:11:18 Jul 15 '00	1722	160	422352	5079914	Photo 87, moving south along the depression. younger lavas				
20:11:48 Jul 15 '00	1724	157	422373	5079953	fractured fresh lava Freshly broken pillow lavas.				R554-081
20:11:48 Jul 15 '00	1724	157	422373	5079953	Photo 88. sort of a scarp in new lava (edge of the pit?) collapsed down. 422384/5079912				
20:12:48 Jul 15 '00	1724	155	422380	5079943	fresh broken pillow lava				R554-082
20:13:08 Jul 15 '00	1724	155	422387	5079944	Photo 89, 90. Down inside the pit at target D.				
20:13:58 Jul 15 '00	1726	151	420381	5080590	Photo 91. In some sort of a pit. Drainage tubes				
20:14:58 Jul 15 '00	1725	156	420172	5078043	Large drainage pit. Beginning of lava drainage tube? Photo 93- 95.				
20:14:38 Jul 15 '00	1725	157	420381	5080590	drainage feature at the base of the pit				R554-083
20:15:28 Jul 15 '00	1725	186	420172	5078043	drainage lava tube at the bottom of collapsed pit				R554-084
20:15:48 Jul 15 '00	1725	170	420172	5078043	close up of drainage lava tube				R554-085
20:16:18 Jul 15 '00	1726	193	420172	5078043	This drainage pit is probably at point D 422400/5079900. Photo 96 - Beautiful pillars. Photo 97				
20:17:28 Jul 15 '00	1724	206	422549	5079140	Neptune's bathtub. Photo 98. Facing southwest looking at pillars grown into the wall Photo 99				
20:16:58 Jul 15 '00	1726	234	422553	5079145	pillar near drainage pit				R554-086

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R554	Samples	PI	Sub Smps	FrGrb#
20:17:08 Jul 15 '00	1725	256	422553	5079145	close-up pillar				R554-087
20:17:08 Jul 15 '00	1725	256	422553	5079145	pillar near drainage pit				R554-088
20:17:18 Jul 15 '00	1724	249	422549	5079140	pillar and drainage pit				R554-089
20:18:58 Jul 15 '00	1720	106	422544	5079144	At the southeast edge of the drainage area. On top going east. All lobates on the top. photo 100				
20:19:28 Jul 15 '00	1721	118	422555	5079130	pillow lava with bacterial mats and Fe-oxides?				R554-090
20:21:18 Jul 15 '00	1723	111	422579	5079158	shallow drainout coming up				
20:21:28 Jul 15 '00	1722	102	422579	5079158	shallow drainout				R554-091
20:21:58 Jul 15 '00	1724	109	422586	5079160	photo 102 shallow collapse in the lobates.				
20:21:48 Jul 15 '00	1723	102	422579	5079158	shallow collapsed outside of big pit				R554-092
20:23:18 Jul 15 '00	1722	92	422595	5079142	turning from easterly (not going to 'E') heading south to target F.				
20:24:58 Jul 15 '00	1724	205	423585	5078790	ran into a second pit. continuing south				
20:26:18 Jul 15 '00	1725	205	420477	5077846	down inside the smaller pit. photo 103 beta on photo 104 down inside the smaller pit.				
20:27:18 Jul 15 '00	1727	166	422447	5079849	pillar				R554-093
20:27:28 Jul 15 '00	1727	224	422447	5079849	the pillar close up				R554-094
20:26:58 Jul 15 '00	1728	157	422447	5079849	Down inside smaller pit looking around. Alcove. Photo 106-107 Pit is about 5 meters deep. Photo 108				
20:28:18 Jul 15 '00	1726	189	423214	5078778	Photo 109. Moving on.				
20:28:38 Jul 15 '00	1726	188	420422	5077882	lava pillars and collapsed pit				R554-095
20:28:58 Jul 15 '00	1726	187	420330	5077930	Photo 110				
20:29:48 Jul 15 '00	1723	154	419502	5082470	Photo 111				
20:30:38 Jul 15 '00	1724	158	419502	5082470	photo 112. Lobates heading towards target F.				
20:32:40 Jul 15 '00	1722	193	419502	5082470	highlights off.				
20:33:10 Jul 15 '00	1723	203	419502	5082470	Photo 114, older lavas				
20:34:20 Jul 15 '00	1727	197	421659	5080620	heading to target F, seafloor, old sediments				R554-096
20:34:40 Jul 15 '00	1728	197	422445	5079823	lava whorl, old sediments				R554-097
20:33:30 Jul 15 '00	1723	173	423200	5080630	Going to sit down in this area. Heading towards point F. Lavas look old. Photos 115 and 116.				
20:35:20 Jul 15 '00	1728	303	422441	5079832	Photo 117. Photo 118 is ophuroids.				
20:37:00 Jul 15 '00	1728	313	422441	5079827	Gorgonian (soft coral) on older lava.				
20:37:00 Jul 15 '00	1728	313	422441	5079827	small gorgonian				R554-098
20:37:10 Jul 15 '00	1728	314	422441	5079827	gorgonian				R554-099
20:37:40 Jul 15 '00	1728	286	422441	5079827	These are definitely older lavas (some bio here). Whorls, pressure ridges or flow fronts over this older sheet?				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R554	Samples	PI	Sub Smpls	FrGrb#
20:39:00 Jul 15 '00	1724	235	422433	5079792	Photo 119. Getting into pillows.				
20:39:20 Jul 15 '00	1725	232	422433	5079792	older pillows				
20:39:40 Jul 15 '00	1724	233	422433	5079792	cage is off. Trying to get a fix here. yippee good fix!! 422425/5079703				
20:40:50 Jul 15 '00	1725	213	422426	5079701	unidentified fish				R554-100
20:40:50 Jul 15 '00	1725	213	422426	5079701	unidentified fish				R554-101
20:42:40 Jul 15 '00	1725	215	422426	5079700	Photo 120. Shallow collapse with lobates. Right on the edge. Photo 121.				
20:43:40 Jul 15 '00	1724	213	422424	5079675	422424/5079675 A little flatter in this area. Obviously older lavas.				
20:43:50 Jul 15 '00	1724	211	422424	5079675	stalkless crinoid				R554-102
20:44:20 Jul 15 '00	1724	212	422422	5079644	stalkless crinoid				R554-103
20:45:00 Jul 15 '00	1725	212	422401	5079725	stalk crinoid?				R554-104
20:44:40 Jul 15 '00	1725	203	422422	5079644	Appear to be in the middle of depression here.				
20:45:40 Jul 15 '00	1726	209	421434	5078530	stalked crinoid				R554-105
20:45:50 Jul 15 '00	1726	212	421434	5078530	stalked crinoid (seapen) 422422/5079644				
20:47:40 Jul 15 '00	1723	6	422477	5079355	Going back to F, we're there. Will move the ship to the west from here.				
20:48:50 Jul 15 '00	1724	298	421243	5076778	moving ROPOS SW about 50 meters.				
20:50:10 Jul 15 '00	1723	239	422469	5079308	photo 122, small fissure				
20:50:10 Jul 15 '00	1723	239	422469	5079308	small fissure				R554-106
20:51:30 Jul 15 '00	1723	248	422458	5079315	stopping to get a fix before move ship to west. Good fix 422363/5079655				
20:54:00 Jul 15 '00	1724	242	422357	5079720	Will move ship 200 meters due east.				
20:57:20 Jul 15 '00	1724	293	422354	5079729	photo 123 of pillow ridge with abrupt drop off on other side Photo 124 422359/5079635. Tectonic?				
20:58:30 Jul 15 '00	1720	20	422336	5079738	new fissure				R554-107
20:58:20 Jul 15 '00	1720	11	422336	5079738	Photo 125 of fissure on other side of ridge. Photo 126.				
20:58:40 Jul 15 '00	1720	57	422336	5079738	new fissure or fault?				R554-108
20:59:10 Jul 15 '00	1724	358	422336	5079738	photo 127. 422338/5079677. Could be a fault? Photo 128				
21:00:12 Jul 15 '00	1728	330	422332	5079680	Sheets in the middle of the low. All of this is older lavas. Now heading towards the new pillow mound.				
21:01:02 Jul 15 '00	1730	327	422320	5079687	422520/5079687. Photo 129. Sheet flows				
21:01:52 Jul 15 '00	1727	319	422303	5079743	ropey to jumbled flows, now coming up the ridge again.				
21:01:32 Jul 15 '00	1729	317	422318	5079694	ropey jumbled flows				R554-109
21:01:32 Jul 15 '00	1729	317	422318	5079694	older sheet flows				R554-110
21:02:32 Jul 15 '00	1727	305	422307	5079696	422293/5079696				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R554	Samples	PI	Sub Smps	FrGrb#
21:04:02 Jul 15 '00	1728	302	422297	5079690	biobouquet species....				R554-111
21:04:02 Jul 15 '00	1728	302	422297	5079690	unidentified species				R554-112
21:05:12 Jul 15 '00	1728	302	420359	5080351	contact on western edge. pillows with yellow coating (422278/5079699). Photo 132				
21:05:12 Jul 15 '00	1728	302	420359	5080351	contact old/new lava				R554-113
21:05:22 Jul 15 '00	1728	299	422278	5079699	close-up contact				R554-114
21:06:22 Jul 15 '00	1728	305	422263	5079699	422263/5079699 contact and sampling area.				
21:07:32 Jul 15 '00	1728	306	422263	5079697	grabbing R554-RK-005				R554-115
21:07:22 Jul 15 '00	1728	304	422263	5079697	contact at western edge of depression - east side of high ridge. (Southern Pillow Flow at 45 52'N)	R554-Rk-0005	J Chadwick		
21:10:02 Jul 15 '00	1728	322	422359	5079232	grabbing the new lava sample				R554-116
21:10:12 Jul 15 '00	1728	322	422359	5079232	grabbing the new lava sample				R554-117
21:09:52 Jul 15 '00	1728	321	422358	5079251	grabbing new chunk of lava lots of glass. Contact Western edge of the depression, eastern edge of high ridge. (Southern Pillow Flow at 45 52'N)	R554-Rk-0006	J Chadwick		
21:12:22 Jul 15 '00	1728	326	422356	5079249	Photo 133 of new pillow lavas. Heading west for high ridge.				
21:12:42 Jul 15 '00	1727	295	420192	5078286	Photo 134. More pillows.				
21:13:02 Jul 15 '00	1726	294	420192	5078286	Photo 135. more of the same. Depth about 1725.				
21:13:52 Jul 15 '00	1721	293	422332	5079252	Photo 136				
21:14:22 Jul 15 '00	1720	295	422316	5079237	new lava, heading west				R554-118
21:14:22 Jul 15 '00	1720	295	422316	5079237	extension of western side of ridge. Coming up to top of high ridge.				
21:15:42 Jul 15 '00	1721	293	422177	5079693	Sitting at the top of the ridge. 422178/5079692 - Photo 137				
21:17:02 Jul 15 '00	1723	292	422164	5079751	top of ridge				R554-119
21:18:12 Jul 15 '00	1723	295	422158	5079761	Photo 138. Going down the west side of the large ridge. Is it really an eruptive mound?				
21:18:52 Jul 15 '00	1725	293	422143	5079748	422143/5079688 heading west downhill. Will move ship another 150 meters west.				
21:21:32 Jul 15 '00	1725	292	422136	5079682	422135/5079680 - moving west				
21:24:12 Jul 15 '00	1726	292	422123	5079679	422124/5079679 Still moving west				
21:26:42 Jul 15 '00	1727	283	422119	5079673	photo 139. Weird pillow formation				
21:26:52 Jul 15 '00	1727	287	422119	5079673	weird pillow, new lava				R554-120
21:27:22 Jul 15 '00	1727	287	422105	5079668	422105/5079668 Going down slope				
21:28:24 Jul 15 '00	1727	291	422096	5079701	contact new, old lava				R554-121
21:28:44 Jul 15 '00	1729	294	422078	5079722	close-up contact				R554-122
21:28:14 Jul 15 '00	1727	284	422096	5079701	Contact. Photo 140 offset from eruptive fissure. (eruptive mound??) 422089/5079666 Very subtle				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R554	Samples	PI	Sub Smpls	FrGrb#
21:30:34 Jul 15 '00	1731	282	422105	5079664	End of the dive. <i>Geology rocks!</i>				
22:28:44 Jul 15 '00	2	94	422049	5079692	ROPOS on deck at 2223				
					R554 Dive Summary: Imagenex (Lines 1-8) survey of south pillow flow. GeoTraverse points A, B, C, D (and near F, G). Followed large fissure and several smaller fissures to establish contacts.				

R555 Dive Log

UTC	Z(m)	Hdg	UTM X	UTM Y	Comments - Dive R555	Samples	PI	Sub Smps	FrGrb#
					Positions in utm x/y columns are automated and not flagged for accuracy. Consult dive maps for final position data.				
					Tasks: Deploy extensometers on Axial's NRZ. Transit to ASHES and recover Metaxas larval tubes. Deploy Hobo at Virgin.	Bottom Time: JD198(716) 0335-1348			
02:49:19 Jul 16 '00	789	79	42204 9	507969 2	02:27 Ropos in the water.				R555-001
02:54:57 Jul 16 '00	1001	61	42204 9	507969 2	sub at 1000 metres				
03:04:41 Jul 16 '00	1362	121	42204 9	507969 2					R555-002
03:11:17 Jul 16 '00	1559	188	42204 9	507969 2	We are close to the bottom - hovering at 1560m.				
03:27:43 Jul 16 '00	1559	11	42204 9	507969 2	Nav is down, we're waiting for it to get fixed.				
03:34:41 Jul 16 '00	1592	332	421080	509686 7	Embley tapes on. We have nav and are on the bottom.				
03:36:31 Jul 16 '00	1593	281	421080	509686 7	Found the elevator with four extensometers inside (and the heads) on NRZ.				
03:40:33 Jul 16 '00	1591	10	421124	5096719	At elevator w/extensometers				R555-003
03:43:31 Jul 16 '00	1586	6	421124	5096719	Waiting for the ship to reposition and the Ropos tether is wrapped around the upper glass balls of the elevator.				
03:47:55 Jul 16 '00	1594	57	421124	5096719	Setting larval limo down				R555-004
03:47:25 Jul 16 '00	1594	60	421124	5096719	Tons of sponges on the bottom and a rattail. We are releasing the Metaxas taxi and placing it on the bottom next to the elevator. It will be picked up later and taken to Ashes to retrieve her larval traps.				
03:48:31 Jul 16 '00	1594	42	421124	5096719	Elevator				R555-005
03:55:30 Jul 16 '00	1593	182	421129	509672 4	Elevator				R555-006
03:56:05 Jul 16 '00	1594	160	421129	509672 4	Trying to rotate the elevator to access the extensometer.				
03:59:47 Jul 16 '00	1593	137	421129	509672 4	Trying to maneuver to pick the extensometers up out of the elevator - it's difficult because the elevator is down in a pit.				
04:01:55 Jul 16 '00	1594	283	421129	509672 4	Pulling the pin to release the bungy around the bottom of the extensometers.				
04:05:37 Jul 16 '00	1590	123	421129	509672 4	Extensometers in their elevator				R555-007
04:03:59 Jul 16 '00	1594	67	421129	509672 4	Pulling the parachute cord out to release the bottoms of the extensometers.				
04:09:23 Jul 16 '00	1593	162	421129	509672 4	Ripping release cord off of extensometer #2.				
04:11:35 Jul 16 '00	1593	124	421129	509672 4	Picking up extensometer #2 out of the elevator.				
04:13:25 Jul 16 '00	1591	121	421129	509672 4	Exten-2 placed on the ground so Ropos can pick it up by the aluminum stalk rather than carry it by the rope.				

UTC	Z(m)	Hdg	UTM X	UTM Y	Comments - Dive R555	Samples	PI	Sub Smps	FrGrb#
04:19:41 Jul 16 '00	1587	134	421144	509672 2	Waiting for a good fix				
04:10:43 Jul 16 '00	1593	283	421087	509675 5	Moving 55m at a bearing of 248 to placement site for E2. I think this entry was really about 20 min later - AFTER we picked up E2 by stalk.				
04:27:01 Jul 16 '00	1593	223	421019	5096861	Tons of sponges on jumbled flow of old lavas.				
04:29:29 Jul 16 '00	1592	221	421052	509673 6	Nav is not great right now. We think we are about 10 east of E2 spot. We just came up to a high ridge and will place E2 here. Close up of sponges and ophiuroids.				
04:32:13 Jul 16 '00	1592	201	421052	509673 6	DEPLOYED Exten-2 on top of a ridge. Waiting for a good fix for location. Facing south in the following frame grabs.				
04:33:05 Jul 16 '00	1591	197	421052	509673 6	extensometer 2 in place				R555-008
04:33:31 Jul 16 '00	1592	166	421052	509673 6	extensometer 2 in place				R555-009
04:33:51 Jul 16 '00	1591	175	421052	509673 6	extensometer 2, looking south				R555-010
04:33:51 Jul 16 '00	1591	175	421052	509673 6	location of extensometer 2 looking south				R555-011
04:34:47 Jul 16 '00	1592	242	421052	509673 6	Exten-2, looking northwest				R555-012
04:35:11 Jul 16 '00	1591	308	421052	509673 6	Cage motor off to facilitate getting a good fix on location of Exten-2 deployment. Position for Exten-2 deployment: x=421035 y=5096739				
04:39:13 Jul 16 '00	1591	98	421036	509673 8	Moving back to the elevator to pick up another extensometer.				
04:44:01 Jul 16 '00	1596	90	421036	509673 8	Back at the elevator.				
04:44:13 Jul 16 '00	1595	138	421036	509673 8	Positioning to pick up Exten-1.				
04:48:47 Jul 16 '00	1594	151	421121	5096721	big fish				R555-013
04:51:31 Jul 16 '00	1590	144	421121	5096721	Picked up E1. Moving 82 m at a bearing of 104 to position Exten-1.				
04:59:31 Jul 16 '00	1592	117	421121	5096721	Cage off to get better nav for Exten-1 deployment site.				
05:03:13 Jul 16 '00	1590	36	421197	5096701	Telemetry problem with Ropos.				
05:08:33 Jul 16 '00	1592	43	421184	509678 3	Telemetry back up and now waiting to get a good fix on Ropos to find Exten-1 deployment site.				
05:16:19 Jul 16 '00	1580	185	421175	5096761	We just got a good fix, we are way north. Need to move at a bearing of 156 for 66 m to Exten-1 deployment site.				
05:23:27 Jul 16 '00	1591	89	421203	509667 8	Still waiting to get a good fix, again.				
05:28:25 Jul 16 '00	1593	145	421191	509667 9	position Exten-1				R555-014
05:28:47 Jul 16 '00	1592	204	42253 6	509582 6	looking at Exten-1				R555-015
05:28:59 Jul 16 '00	1593	181	42253 6	509582 6	looking at Exten-1				R555-016
05:28:11 Jul 16 '00	1594	140	421191	509667 9	DEPLOYED Exten-1 at x=421196 y=5096711 z=1594				
05:29:43 Jul 16 '00	1592	106	421179	509674 8	Exten-1, looking east				R555-017

UTC	Z(m)	Hdg	UTM X	UTM Y	Comments - Dive R555	Samples	PI	Sub Smps	FrGrb#
05:30:05 Jul 16 '00	1593	83	421196	5096712	Exten-1, looking east				R555-018
05:31:43 Jul 16 '00	1592	161	421202	509668 4	Exten-1, looking south southeast				R555-019
05:32:27 Jul 16 '00	1593	161	421192	509670 3	Photo 1, 2 without a flash. Photo 3 looking South at Exten-1.				
05:32:49 Jul 16 '00	1593	204	421763	509609 8	Photo 4, 5 of Exten-1.				
05:33:01 Jul 16 '00	1593	188	421763	509609 8	location of base of Exten-1				R555-020
05:34:39 Jul 16 '00	1582	220	421763	509609 8	Back at the elevator.				
05:42:11 Jul 16 '00	1593	45	42235 7	509580 9	Picking up Exten-3 from elevator.				
05:43:21 Jul 16 '00	1592	308	42235 7	509580 9	Placing Exten-3 on the ground: to reposition grip on the aluminum shaft of Exten-3.				
05:46:39 Jul 16 '00	1579	20	42235 7	509580 9	The ship is going to move to Exten-2 position, and from there Ropos is going to travel to Exten-3.				
05:48:41 Jul 16 '00	1583	285	42235 7	509580 9	Tapes off at 05:49 while we are transiting to Exten-2.				
06:01:11 Jul 16 '00	1589	313	421291	509644 6	Tapes back on at 06:01.				
06:04:07 Jul 16 '00	1589	358	421057	509680 7	Heading at 237 for 109 m to Exten-3 position.				
06:11:21 Jul 16 '00	1593	269	42095 2	509679 6	Holothurian next to Exten-3 deployment site				R555-021
06:11:53 Jul 16 '00	1593	251	42095 2	509679 6	Ophiuroids next to Exten-3 deployment site				R555-022
06:12:17 Jul 16 '00	1594	238	42095 2	509679 6	Photo 6 of Exten-3 deployment site. Exten-3 DEPLOYED on side of a pit. Need to go in and reposition it. Photo 7.				
06:14:05 Jul 16 '00	1594	239	42095 2	509679 6	Exten-3 repositioned. Photo 8 of Exten-3 position . Photo 9, 10 of Exten-3 in position. Fix for Exten-3 position: x=420985x y=5096741 z=1594.				
06:15:09 Jul 16 '00	1592	267	42095 2	509679 6	Photo 10, 12 of Exten-3 site.				
06:15:57 Jul 16 '00	1591	306	42095 2	509679 6	Photo 13 of Exten-3 again.				
06:14:05 Jul 16 '00	1594	239	42095 2	509679 6	Exten-3 at Exten-3 site				R555-023
06:14:15 Jul 16 '00	1594	257	42095 2	509679 6	Exten-3 at Exten-3 site				R555-024
06:14:15 Jul 16 '00	1594	257	42095 2	509679 6	Exten-3 at Exten-3 site				R555-025
06:14:29 Jul 16 '00	1594	241	42095 2	509679 6	Exten-3 at Exten-3 site				R555-026
06:14:39 Jul 16 '00	1592	242	42095 2	509679 6	Exten-3 at Exten-3 site				R555-027
06:15:09 Jul 16 '00	1592	267	42095 2	509679 6	Exten-3 at Exten-3 site				R555-028
06:16:41 Jul 16 '00	1593	314	420951	509679 8	Exten-3 at Exten-3 site				R555-029
06:16:41 Jul 16 '00	1593	314	420951	509679 8	Photo 14 of Exten-3.				
06:22:33 Jul 16 '00	1583	202	42097 5	509675 3	Heading back to the cage, and then the elevator.				

UTC	Z(m)	Hdg	UTM X	UTM Y	Comments - Dive R555	Samples	PI	Sub Smps	FrGrb#
06:24:25 Jul 16 '00	1568	293	42097 5	509675 3	Moving the ship 50m at a bearing of 110.				
06:28:15 Jul 16 '00	1591	96	42097 5	509675 3	Back at the elevator, Metaxas taxi in view.				
06:37:15 Jul 16 '00	1594	323	42097 5	509675 3	Taking extensometer #4 out of elevator				R555-030
06:37:39 Jul 16 '00	1594	328	42097 5	509675 3	Picking up Exten-4 from the elevator.				
06:42:49 Jul 16 '00	1595	58	42097 5	509675 3	Picked up the Metaxas taxi in the 5 function arm. Will travel to E4 site with it in the 5 and E4 in the 7 function arm.				
06:45:15 Jul 16 '00	1595	60	42097 5	509675 3	Picking up Exten-4 with the 7-function arm claw.				
06:45:33 Jul 16 '00	1595	59	42097 5	509675 3	Placing Exten-4'00				R555-031
06:47:55 Jul 16 '00	1595	68	42097 5	509675 3	Transiting to Exten-4 deployment site.				
06:52:45 Jul 16 '00	1586	277	42097 5	509675 3	Moving the ship to Exten-4 site.				
06:58:41 Jul 16 '00	1586	270	42097 5	509675 3	Tapes off while we transit to Exten-4.				
07:01:01 Jul 16 '00	1586	272	42097 5	509675 3	There seems to be some oil leaking out of the five function wrist				
07:02:43 Jul 16 '00	1586	273	42097 5	509675 3	We are not going to engage the five function "jaw lock" function so that it won't bleed.				
07:10:27 Jul 16 '00	1575	77	42095 6	509679 7	We're doing tether management				
07:11:11 Jul 16 '00	1573	235	42095 6	509679 7	The larval elevator was dropped from the five function by mistake- we don't know where so we're trying to get a fix to find it.				
07:14:23 Jul 16 '00	1589	42	42087 5	509678 3	We're going to just go ahead and deploy extensometer 4 then go look for the larval elevator				
07:15:37 Jul 16 '00	1595	333	42085 5	509677 8	Tapes back on for extensometer 4 deployment				
07:23:11 Jul 16 '00	1593	254	42073 7	509687 7	We're waiting for a good fix before deploying Exten-4				
07:25:25 Jul 16 '00	1594	271	42250 3	509550 3	searching ROPOS position relative to the cage, cage motor off				
07:26:21 Jul 16 '00	1598	307	421430	509727 5	positioning extensometer 4, photo 15				
07:27:13 Jul 16 '00	1598	303	421430	509727 5	Extensometer 4				R555-032
07:27:49 Jul 16 '00	1598	305	421430	509727 5	Exten-4				R555-033
07:28:11 Jul 16 '00	1597	266	421430	509727 5	Exten-4				R555-034
07:27:59 Jul 16 '00	1598	302	421430	509727 5	photos 16, 17, looking west, southwest, photo 18. Cage motor is off, looking for fix.				
07:28:35 Jul 16 '00	1597	223	421430	509727 5	photo 19, still looking for good fix				
07:28:35 Jul 16 '00	1597	223	421430	509727 5	Area near Exten-4				R555-035
07:30:47 Jul 16 '00	1589	236	42078 4	509683 5	We've set down Exten-4 Fix X 420785 Y 5096835 depth 1598				
07:32:55 Jul 16 '00	1595	216	42078 3	509683 4	We're going to move it southwest a bit				

UTC	Z(m)	Hdg	UTM X	UTM Y	Comments - Dive R555	Samples	PI	Sub Smps	FrGrb#
07:35:09 Jul 16 '00	1598	197	42249 7	509549 3	Photo 20 of jumbled spire sticking up above lobates				
07:36:05 Jul 16 '00	1597	197	42076 8	5096801	Putting Exten-4 down again				
07:36:59 Jul 16 '00	1597	199	42077 3	509679 5	Photo 21 of Exten-4				
07:37:25 Jul 16 '00	1597	199	42072 8	509684 7	Fix? for Exten-4 x=420767 y=5096797 z=1597 m				
07:32:55 Jul 16 '00	1595	216	42078 3	509683 4	Exten-4				R555-036
07:35:09 Jul 16 '00	1598	197	42249 7	509549 3	Searching a new place for Exten-4				R555-037
07:35:43 Jul 16 '00	1596	197	420610	509745 2	Searching a new place for Exten-4				R555-038
07:36:39 Jul 16 '00	1597	194	42076 7	509679 7	New place for Exten-4				R555-039
07:39:01 Jul 16 '00	1597	203	42075 4	509677 9	Photo 22 of Exten-4 looking south, Photo 23 of Exten-4 looking southeast, Photo 24 of Exten-4 looking southeast				
07:39:37 Jul 16 '00	1595	112	421099	509897 8	We are now going to go and search for the lost larval limo				
07:40:17 Jul 16 '00	1596	112	421099	509897 8	Moving the ship 200 m due east				
07:38:49 Jul 16 '00	1597	203	42075 4	509677 9	New place for Exten-4				R555-040
07:39:01 Jul 16 '00	1597	203	42075 4	509677 9	new place for Exten-4				R555-041
07:39:11 Jul 16 '00	1597	204	421099	509897 8					R555-042
07:39:37 Jul 16 '00	1595	112	421099	509897 8	New place for Exten-4				R555-043
07:40:53 Jul 16 '00	1594	92	421099	509897 8	Turning videos off for the search				
07:49:11 Jul 16 '00	1595	122	42083 6	509680 2	Big mama fish				R555-044
07:51:47 Jul 16 '00	1593	106	42087 2	509673 9	So we're retracing our steps to go back to where we know we noticed we had lost the larval limo				
07:54:01 Jul 16 '00	1592	67	420913	509678 6	We're back where we noticed the larval limo was gone				
07:54:23 Jul 16 '00	1594	91	420913	509678 6	We found the larval limo!! Wow, I'm impressed.				
07:55:29 Jul 16 '00	1597	55	42092 5	509679 2	We're picking up the larval limo with the seven function this time				
07:56:43 Jul 16 '00	1598	67	42092 5	509679 2	larval limo in the seven function				R555-045
07:57:27 Jul 16 '00	1599	66	42092 5	509679 2	Bill is going to go turn off the transponders				
07:57:37 Jul 16 '00	1599	64	42092 5	509679 2	We are trying to position the larval limo comfortably on ROPOS				
08:02:45 Jul 16 '00	1598	6	42092 5	509679 2	Bill has turned off the transponders				
08:05:21 Jul 16 '00	1585	326	42092 5	509679 2	We are still fiddling with the larval limo.				
08:06:13 Jul 16 '00	1585	325	42092 5	509679 2	.We are going back to the cage now				
08:09:33 Jul 16 '00	1559	137	42092 5	509679 2	We're going into the cage, carefully watching the larval limo on the way just in case we need to readjust				

UTC	Z(m)	Hdg	UTM X	UTM Y	Comments - Dive R555	Samples	PI	Sub Smps	FrGrb#
08:06:35 Jul 16 '00	1561	33	42092 5	509679 2	We're in the cage and the larval limo got a bit banged around- we're readjusting it				
08:14:51 Jul 16 '00	1561	89	42092 5	509679 2	Going up to 1400 m to get ready to move				
08:17:21 Jul 16 '00	1492	39	42092 5	509679 2	ropos mascot				R555-046
08:17:21 Jul 16 '00	1492	39	42092 5	509679 2	ropos toy				R555-047
08:18:51 Jul 16 '00	1441	21	42092 5	509679 2	We're at 1400 m now				
08:18:51 Jul 16 '00	1441	21	42092 5	509679 2	We're on our way to ASHES (Transit in water column)				
12:08:55 Jul 16 '00	1389	245	421628	5089109	Coming out of cage as we are now at ASHES.				
12:11:19 Jul 16 '00	1389	323	421628	5089109	Now heading down to bottom.				
12:19:45 Jul 16 '00	1537	309	421887	5089315	Bottom is now in sight.				
12:20:09 Jul 16 '00	1542	312	421887	5089315	Tapes have been turned on....let the good times roll.				
12:28:35 Jul 16 '00	1545	335	42364 2	508704 5	Have spotted Metaxas' larva tubes, north-west of Crack.				
12:29:07 Jul 16 '00	1545	335	42364 2	508704 5	monkfish(?) at larval tube site NW of Crack				R555-048
12:41:27 Jul 16 '00	1545	66	42382 9	508890 0	Tape change at 12:38.				
12:46:27 Jul 16 '00	1545	67	421715	5087158	1st larval tube cork was pushed in a bit too far				R555-049
12:47:39 Jul 16 '00	1544	106	421416	5087157	RECOVERED larva tube #8 from ASHES and placed into milk crate. position: SE of Daves, NE of Crack x=421417 y=5087154	R555-LT-0001	Metaxas		
12:49:31 Jul 16 '00	1545	342	422719	508479 4	RECOVERED larva tube #6 and has been placed into milk crate. Position at ASHES: NW of Crack, SE of Daves	R555-LT-0002	Metaxas		
12:52:07 Jul 16 '00	1545	342	421564	508628 3	2nd larval tube (#6) with cork emplaced almost flush with top of tube				R555-050
13:02:37 Jul 16 '00	1545	283	42272 5	508479 2	Larval tube 7 with cork emplaced				R555-051
13:07:49 Jul 16 '00	1545	30	42305 7	508936 3	RECOVERED Larval tube #7 and placed into milk crate. Position: ASHES, NW of Crack, SE of Daves	R555-LT-0003	Metaxas		
13:10:25 Jul 16 '00	1545	267	424112	508855 8	about to be recovered				R555-052
13:15:11 Jul 16 '00	1545	220	42049 0	508559 4	RECOVERED Larval tube #5 and placed into milk crate. Position at ASHES: NW of Crack, SE of Daves	R555-LT-0004	Metaxas		
13:18:53 Jul 16 '00	1545	222	423431	508502 9	photo 25 taken of larval trap milk crate (larval limo)				
13:18:49 Jul 16 '00	1545	221	423431	508502 9	The four larval traps in the larva limo. Ready for its trip to the surface.				R555-053
13:19:35 Jul 16 '00	1545	220	422130	508529 5	Bottom of larva limo.				R555-054
13:21:07 Jul 16 '00	1545	219	421417	5087152	to cement-a-vent (Crack) to look at whether flow is occurring at Johnson flow meter				
13:22:57 Jul 16 '00	1545	13	421416	5087140	Johnson doesn't appear to be working.				R555-055
13:24:59 Jul 16 '00	1545	12	421416	5087140	no apparent flow coming from outlet of Johnson flow meter so we are repositioning it.				

UTC	Z(m)	Hdg	UTM X	UTM Y	Comments - Dive R555	Samples	PI	Sub Smps	FrGrb#
13:26:35 Jul 16 '00	1545	13	422134	508938 3	photo 27				
13:28:47 Jul 16 '00	1545	107	421418	5087141	going to Virgin- 40meters at a 008 heading				
13:32:09 Jul 16 '00	1542	9	421418	5087141	The VIRGIN has been spotted.				
13:32:43 Jul 16 '00	1542	347	421418	5087141	We're at Virgin				R555-056
13:48:29 Jul 16 '00	1544	14	421418	5087141	ROPOS is experiencing system troubles and the fate of the continued dive is currently up in the air.				
13:54:57 Jul 16 '00	1545	349	421418	5087141	ROPOS is heading back to the cage to attempt recovery from failing systems.				
13:58:53 Jul 16 '00	1507	188	421418	5087141	ROPOS is in the cage.				
14:06:23 Jul 16 '00	1509	164	421418	5087141	Problem is up here in the lab with ROPOS communications.				
14:22:17 Jul 16 '00	1508	145	421418	5087141	Video tapes off at 14:23				
14:46:59 Jul 16 '00	1507	52	421418	5087141	OK, telemetry back up. We are going to swim out of the cage and back down to Ashes to pick up Anna's traps and deploy a hobo at Virgin mound.				
14:49:53 Jul 16 '00	1508	196	421418	5087141	Out of the cage.				
14:53:22 Jul 16 '00	1539	187	421418	5087141	On bottom again. Tapes back on.				
14:54:20 Jul 16 '00	1542	346	421418	5087141	At the larval limo. The hobo is in the starboard biobox, waiting with baited breath to be deployed at Virgin Mound.				
14:57:50 Jul 16 '00	1544	294	421418	5087141	Picking up the larval limo.				
15:03:00 Jul 16 '00	1545	341	421417	5087154	Still trying to get a good grip on the larval limo.				
15:06:32 Jul 16 '00	1545	359	421417	5087154	Got it!				
15:09:52 Jul 16 '00	1544	8	421417	5087154	Virgin mound in sight.				
15:12:26 Jul 16 '00	1545	7	421417	5087154	Opened the biobox, getting out the hobo.				
15:13:42 Jul 16 '00	1545	6	421417	5087154	15:12 Embley archive tapes changed.				
15:16:50 Jul 16 '00	1544	254	421417	5087154	Getting ready to deploy hobo 130 at Virgin.				
15:18:28 Jul 16 '00	1544	259	421417	5087154	Hobo slipped out...picking it back up.				
15:23:06 Jul 16 '00	1544	80	421417	5087154	Oops! Knocked over remaining chimney at Virgin				
15:23:50 Jul 16 '00	1544	79	421417	5087154	Hobo 130 DEPLOYED at Virgin. Looks like probe is in the flow.				
15:28:28 Jul 16 '00	1544	290	421417	5087154	ROPOS repositioning to get ready to fire gas tight bottle.				
15:24:36 Jul 16 '00	1544	78	421417	5087154	is HOBO 130 in the heat?				R555-057
15:31:46 Jul 16 '00	1544	296	421417	5087154	Positioning gas tight bottle intake.				
15:35:04 Jul 16 '00	1544	296	421417	5087154	Gas tight intake right over the recently knocked over chimney. Right over the flow.				

UTC	Z(m)	Hdg	UTM X	UTM Y	Comments - Dive R555	Samples	PI	Sub Smps	FrGrb#
15:36:00 Jul 16 '00	1544	298	421417	5087154	GTB 2 and 5 fired at Virgin mound				R555-058
15:36:00 Jul 16 '00	1544	298	421417	5087154	Gas tight bottle #2 fired over flow at Virgin x=421430 y=5087174	R555-GTB -2-0005	Evans	Butterfi eld/ Lilley	
15:37:24 Jul 16 '00	1544	292	421417	5087154	Gas tight bottle #5 fired at the same place at Virgin.	R555-GTB -5-0006	Evans	Butterfi eld/ Lilley	
15:38:08 Jul 16 '00	1544	292	421417	5087154	Took out the other HOBO from the biobox.				
15:38:52 Jul 16 '00	1544	289	421417	5087154	Highlights on.				
15:40:34 Jul 16 '00	1544	290	421417	5087154	Getting ready to deploy HOBO 127				
15:42:34 Jul 16 '00	1544	289	421417	5087154	Positioning HOBO probe over the recently knocked over chimney				
15:47:36 Jul 16 '00	1544	287	421417	5087154	Hobo 127 DEPLOYED at Virgin , right in the flow.				
15:48:50 Jul 16 '00	1544	293	421417	5087154	Hobo 127 in deployed position at Virgin .		Embley		R555-059
15:49:02 Jul 16 '00	1544	300	421417	5087154	Photo 31 taken of Virgin mound and all it's HOBOs				
15:50:44 Jul 16 '00	1545	5	421417	5087154	ROPOS back at the larval limo, trying to pick it up.				
15:54:26 Jul 16 '00	1545	354	421417	5087154	Picked up larval limo with both arms				
15:55:32 Jul 16 '00	1538	10	421417	5087154	Highlights off				
15:58:30 Jul 16 '00	1507	245	421417	5087154	Headed back to the cage.				
15:59:48 Jul 16 '00	1510	154	421417	5087154	ROPOS in the cage, coming up.				
16:01:14 Jul 16 '00	1467	192	421417	5087154	Tapes off.				
16:15:56 Jul 16 '00	925	248	421417	5087154	ROPOS will be on deck in 30 min				
16:02:10 Jul 16 '00	1431	191	421417	5087154	Gumby				R555-060
16:41:26 Jul 16 '00	1	151	421417	5087154	ROPOS on deck at 1649				
					R555 Dive Summary: Deployed extensometers E1-E4 on Axial's NRZ. Transit to ASHES. NW of Crack-Recovered larval tubes 5-8. Virgin-Deployed 2 Hobos. Sample: 2 gtb.				

R556 Dive Log

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R556	Samples	PI	Sub Smps	FrGrb#
					Automated Logging System not giving accurate information from 2106 - 2314!! All auto time, heading, depth and utm position information inaccurate at those times! CORRECT TIME AND POSITION ENTRIES ARE FOUND IN COMMENTS COLUMN. Nav sparse to none....Consult dive maps for final position data.				
					Tasks: Recover larval tubes and suction sample at Mkr-33	Bottom Time: JD198(716) 2112-2334			
					ROPOS is in the water at 19:44.				
					ROPOS is leaving the cage for checkout. at 40 meters.				
					20:06 ROPOS and cage are descending separately to the bottom.				
					ROPOS and the cage are passing 1000 meters at 20:45.				
					20:56 ROPOS has a telemetry fault at 1280 meters.				
					A second alarm at 20:57.				
					21:02 - still descending. Depth is 1358 for the cage.				
					21:07 - another telemetry fault at 1432 meters.				
					21:12 - on the bottom with a telemetry fault. depth 15:22. ROPOS is within 3-4 meters of the marker. TIME STAMP ON AUTOMATED LOGGING SYSTEM IS STUCK!!				
					Navigation is not functioning.				
					21:15 - tapes are on. Mkr-33 is in sight.				
					larval tube at Mkr-33				R556-001
					ROPOS is positioning the milk crates for deployment. Crates are in the 5 function arm. The 7 function arm is opening the top of the crate at 21:20. The 5 function are is retracted.				
					Not getting any updates to the Nav screen at 21:23.				
					larval tube #2 north of Mkr-33				R556-002
					ROPOS is repositioning to get near the larval traps.				
					ROPOS is moving the bio box out a titch and opening at 21:26.				
					The 7 function arm has grabbed the lids for the larval traps and taken them out of the port bio box. It has picked up one of the lids and is holding it for the 5 function arm to grab the bottom of the lid shaft. The 7 function arm is grabbing the softball.				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R556	Samples	PI	Sub Smps	FrGrb#
					The 5 function arm is grabbing the larval trap in the middle to secure it at 21:36. The trap has been secured. The 7 function arm is aligning the cap and at 21:37. The 5 function has released the trap. The 7 function is lifting the trap and placing it.				
					ROPOS is repositioning to get closer to stack of milk crates. The 7 function is picking up the capped larval sample and is placing it in the top of the milk crate.				
					21:39 - official cap time for RECOVERY of larval trap 2.	R556-LT-0001	Metaxas		
					ROPOS is repositioning to pick up the second cap in the 7 function arm at 21:46. Reaching out with the 5 function arm to secure the larval trap 1. 21:48 the 5 has grabbed the larval trap.				
					capping larval tube #1 at Mkr-33				R556-003
					21:49 7 function arm has put the top on larval trap 1. The cap is crooked. The 7 has grabbed the bottom of the larval trap.	R556-LT-0002	Metaxas		
					ROPOS has repositioned to the milk crate stack and at 21:51, larval trap #1 has been placed in the milk crate.				
					2 larval tubes in the limo at Mkr-33				R556-004
					dead crab?				R556-005
					fauna suction near larval traps at Mkr-33				R556-006
					suction sample for fauna at Mkr-33				R556-007
					SS of fauna (BIO) near the bottom start at 21:58, stop 22:05.	R556-SS-J3-0003	Juniper, Marcus		
					2207 - ROPOS is repositioning to get near the stack of milk crates.				
					The 7 function arm is grabbing the handle on the side of the milk crate stack. 22:09 -moving toward the other set of larval traps.				
					ROPOS is setting the stack of milk crates on the bottom near the trap tops at 22:13. ROPOS is on the bottom near the larval traps 22:14. The 7 function is picking up the first trap top.				
					Capping larval tube 4.				R556-008
					Larval trap 4 fallen over.				R556-009
					Picking up LT4 that had fallen over				R556-010
					ROPOS is using the 7 to cap the larval tube #4 at 22:16. Top does not appear to be completely capped. ROPOS is repositioning to get closer to trap 4 which tipped over and is lying on the bottom.	R556-LT-0004	Metaxas		
					ROPOS is repositioning to allow the use of the 5 function arm at 22:22. The 7 function has picked up the trap and is transferring it to the 5 at 22:25, trap slipped down. 7 function is attempting to hammer the cap tighter. pushed it in and the trap fell				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R556	Samples	PI	Sub Smps	FrGrb#
					ROPOS is positioning the 5 function to secure the larval trap #3 . Can't reach the trap so the 7 function is picking up the trap and passing it to the 5. The 7 is picking up the top by the baseball and lifting it to the trap at 22:29.				
					The 7 function has capped the larval trap 3 at 22:30. Very deep on the cap. (north of Mkr-33)	R556-LT-0005	Metaxas		
					The 7 function is picking up the larval trap 4. Each arm has a capped trap.				
					want a ride up?				R556-011
					going inside the limo for a ride				R556-012
					22:33 - ROPOS is repositioning to the milk crate stack. A crab is attacking the larval traps in the milk crates. ROPOS has set down on the bottom. The crab is being encouraged to leave.				
					22:35 - larval trap 4 has been place in the crates. The 7 function is attempting to grab the remaining trap (3) at 22:37. Grab complete. The 7 is placing the trap in the crate at 22:37.				
					The crab is returning, ROPOS is turning the crates around to get a grip on the lid in order to close the top on the crates. 22:39 the 5 function is retracting.				
					ROPOS is using the 5 function to grab the port handle. 22:45 using the 7 function to close the top of the crates and attempting to secure the top. 22:46 top of crates is secure.				
					leaving the milk crate stack in place. 22:48 ROPOS is securing the 5 function.				
					ROPOS is moving back to Mkr-33 , leaving the crates.				
					ROPOS is approaching Mkr-3 and going past marker.				
					suctioned the rest of the first sample into jar 7				
					next suction sample is fooling around MTR 3300. It might get jossled.				
					suction sample of fauna; palm worms and limpets (BIO) start=~23:08, end=23:17 Not a successful sample for palm worms; extra limpets and sulfide worms added. Sample near MTR 3300 at Mkr-33	R556-SS-J5-0006	Juniper	Tunnicliffe	
					restore time base				
23:13:34 Jul 16 '00	1524	197	42386 4	5087106	TIME STAMP RESTORED TO LOGGING SYSTEM.				
23:16:24 Jul 16 '00	1524	216	42386 4	5087106	tapes were changed				
23:18:36 Jul 16 '00	1524	219	42386 4	5087106	microbe trap 52				R556-013
23:19:24 Jul 16 '00	1524	211	42386 4	5087106	repositioned microbial trap 52; back in the flow				
23:20:36 Jul 16 '00	1520	360	42386 4	5087106	swing around to pick up larvel traps				
23:21:48 Jul 16 '00	1524	360	42386 4	5087106	mischief				R556-014
23:32:14 Jul 16 '00	1524	114	42386 4	5087106	basket of larval traps in the clutches of both remote arms. flush suction sampler				

UTC	Z (m)	Hdg	UTM X	UTM Y	Comments - Dive R556	Samples	PI	Sub Smps	FrGrb#
23:34:14 Jul 16 '00	1521	135	42386 4	5087106	ROPOS is going back to the cage for ascent				
00:17:36 Jul 17 '00	548	14	42386 4	5087106	ROPOS dudes noticed that larval tube elevator is not grabbed very well on ascent (540meters)- attempting to re-grab.				
00:18:24 Jul 17 '00	544	10	42386 4	5087106	puck has become loose				R556-015
00:25:38 Jul 17 '00	541	42	42386 4	5087106	close call but LT elevator is gathered by both arms and all appears to be well.				
00:53:30 Jul 17 '00	1	152	42386 4	5087106	ROPOS at the surface.				
00:55:18 Jul 17 '00	1	163	42386 4	5087106	ROPOS on deck.				
					R556 Dive Summary: Bounce Dive. Mkr-33-Recover Larval Tubes 1-4 north of Mkr-33. Samples: 2 ss.				