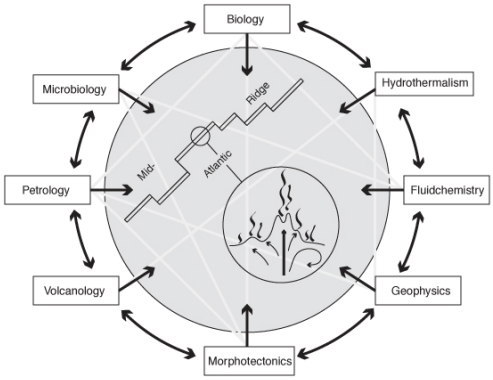
MARIA S. MERIAN

Cruise No. 04, Leg 3

Fort de France – Las Palmas, 23 January – 14 February, 2007

HYDROMAR III
Temporal and spatial variability of hydrothermal, geochemical and biological systems at the Logatchev hydrothermal vent field, Mid-Atlantic Ridge at 14°45' N



Cruise within the framework of the DFG SPP 1144:
“From Mantle to Ocean: Energy-, Material- and Life-cycles at Spreading Axes”

C. Borowski, V. Asendorf, D. Bürk, A. Collasius Jr., R. Elder, M. Fabian, P. Forte, R. Fuhrmann, S. Hansen, C.L. Jost, R. Keir, J. Kevis-Stirling, N. Kevis-Stirling, M. Perner, J.M. Petersen, H. Røy, R. Schauer, O. Schmale, K. Schmidt, D. Scott, R. Waters, P. Wefers, S. Wetzel

3.1 Participants

Name	Discipline	Affiliation
Volker Asendorf	In situ sensors	MPI-Bremen
Christian Borowski	Chief Scientist	MPI-Bremen
Dietmar Bürk	Bathymetry	IFM-GEOMAR, Kiel
Alberto Collasius Jr.	ROV team, engineer	WHOI, Woods Hole
Robert Elder Jr.	ROV team, engineer	WHOI, Woods Hole
Marcus Fabian	Geophysics	Univ. Bremen
Philip Forte	ROV, team leader/pilot	WHOI, Woods Hole
Robert Fuhrmann	ROV team, pilot	WHOI, Woods Hole
Scott Hansen	ROV team, engineer	WHOI, Woods Hole
Cristiane L. Jost	Fluid geochemistry, metals	JU-Bremen
Robin Keir	Fluid geochemistry, gases	IFM GEOMAR, Kiel
Jennifer Kevis-Stirling	ROV team, navigator	WHOI, Woods Hole
Nile Kevis-Stirling	ROV team, navigator	WHOI, Woods Hole
Mirjam Perner	Microbiology	IFM-Geomar, Kiel
Jillian M. Petersen	Hydrothermal symbioses	MPI-Bremen
Hans Røy	In situ sensors	MPI-Bremen
Regina Schauer	Microbiology	MPI-Bremen
Oliver Schmale	CTD, dissolved gases	IFM-Geomar, Kiel
Katja Schmidt	Fluid geochemistry, metals	JU-Bremen
Dara Scott	ROV team, navigator	WHOI, Woods Hole
Robert Waters	ROV team, pilot	WHOI, Woods Hole
Peggy Wefers	Fluid geochemistry, gases	IFM-Geomar, Kiel
Silke Wetzel	Hydrothermal symbioses	MPI-Bremen

MPI-Bremen	Max Planck Institute for Marine Microbiology, Celsiusstr. 1, 28359 Bremen, Germany
IfM-GEOMAR	Leibniz-Institut für Meeresforschung an der Christian-Albrechts-Universität, Wischhofstr. 1-3, 24148 Kiel, Germany
WHOI	Woods Hole Oceanographic Institutions, Woods Hole, MA 02543-1050, USA
JU-Bremen	Jacobs University Bremen, Campus Ring 8, 28759 Bremen, Germany
Univ. Bremen	University of Bremen, Bibliothekstraße 1 – 28359 Bremen, Germany

3.2 Research Program

(Christian Borowski)

The Logatchev Hydrothermal Vent Field (LHF) at 14°45’ N on the Mid-Atlantic Ridge (MAR) is one key area for the investigation of spatial and temporal heterogeneity of bio-geo interface processes in hydrothermal vents within the DFG priority program SPP 1144 “From Mantle to

Ocean: Energy-, Material- and Life-cycles". Logatchev is one of only a few ultramafic-hosted hydrothermal systems worldwide. It is located on a small plateau on the eastern flank of the rift valley in an area of the MAR that is dominated by mantle rocks with subordinate basaltic material. The hydrothermal fluids are influenced by subsurface serpentinization processes and as a consequence they are rich in methane and hydrogen.

MSM 04/3 was the third in a series of SPP cruises to Logatchev. The overall goal was to continue the investigations of spatial and in particular temporal variability patterns of the hydrothermal activity started with RV Meteor cruises M 60/3 and M 64/2 in January 2004 and May 2005, respectively. The main working tool of the cruise was the ROV Jason II from the Woods Hole Oceanographic Institution which was used to recover and redeploy geophysical instruments and geochemical in-situ measurement devices, and for accurate sampling of hydrothermal fluids, sediments, macrofauna and microorganisms. During 12 days of work time in the LHF area, we performed eleven successful dives with a total of 105 hours of bottom time. Other instruments used were the CTD/Rosette water sampler, Miniature Automated Plume Recorders (MAPR, NOAA) and the Kongsberg EM 120 multi-beam echosounder.

One of the major objectives of the cruise was to replace instruments which had been set up in the LHF in May 2005 for geophysical long-term measurements of microseismicity, tilt, acceleration, and temperature of the ocean floor, and temperature and pressure in the bottom-near water column. The data provide unique information on local seafloor motions for a recording period of 8 months. They serve as proxies for changes in the conditions of the fluid regime and for local spatial and temporal variability of habitats, and are essential for time series investigations of hydrothermal fluids and biological activity. With the replacement of the moorings we continue data collection until December 2007 when the instruments will be recovered by the next SPP cruise to the LHF.

By using LBL navigation with Jason II, we recalibrated the geographical positions of the hydrothermal structures and established an accurate map which revealed that the active LHF harbors one more smoking crater than previously recognized. The sampling program performed by the ROV included the recovery of hot and diffuse fluids from all active structures for geochemical and microbiological investigations, push cores from microbial mats and samples of symbiotic and other macrofauna. Other in-situ data collected included high-T-measurements with an 8 channel T-probe and small-scale profiling of physical and geochemical gradients such as T, O_2 and H_2S in hydrothermal sediments, microbial mats and mussel beds with an ROV operated profiler module.

Plume mapping with the CTD and MAPRs revealed that the major direction of the hydrothermal plume extension was N-S. Additional information on the activity patterns in a wider area around the presently known LHF vents is expected from the analyses of high resolution bathymetric mapping using the Kongsbergs EM 120 multi-beam echosounder. We continued the mapping program that was started during Maria S. Merian cruise MSM 03/2 in December 2006 and extended the observation area northwards towards the 15-20-Fracture Zone.

3.3 Narrative of the Cruise

(Christian Borowski)

Friday 19. Jan. 2007: The loading of the ROV and scientific equipment started around 11:30 and was finished some three hours later.

Saturday 20. Jan. – Monday 22. Jan. 2007: Mobilization of the ROV began Saturday 08:00 a.m. and continued during the next three days. The scientific team arrived on Monday and started setting up the laboratories and scientific instruments including the CTD and ROV periphery equipment.

Tuesday 23. Jan. 2007: Thanks to an excellent cooperation between ship crew, ROV team and science, the ROV mobilization was completed within only three days. Jason II successfully passed a harbour test in the late morning and Maria S. Merian left Fort de France as scheduled on 23 January around noon time. We rounded Martinique on the south side and took heading towards the Mid-Atlantic Ridge.

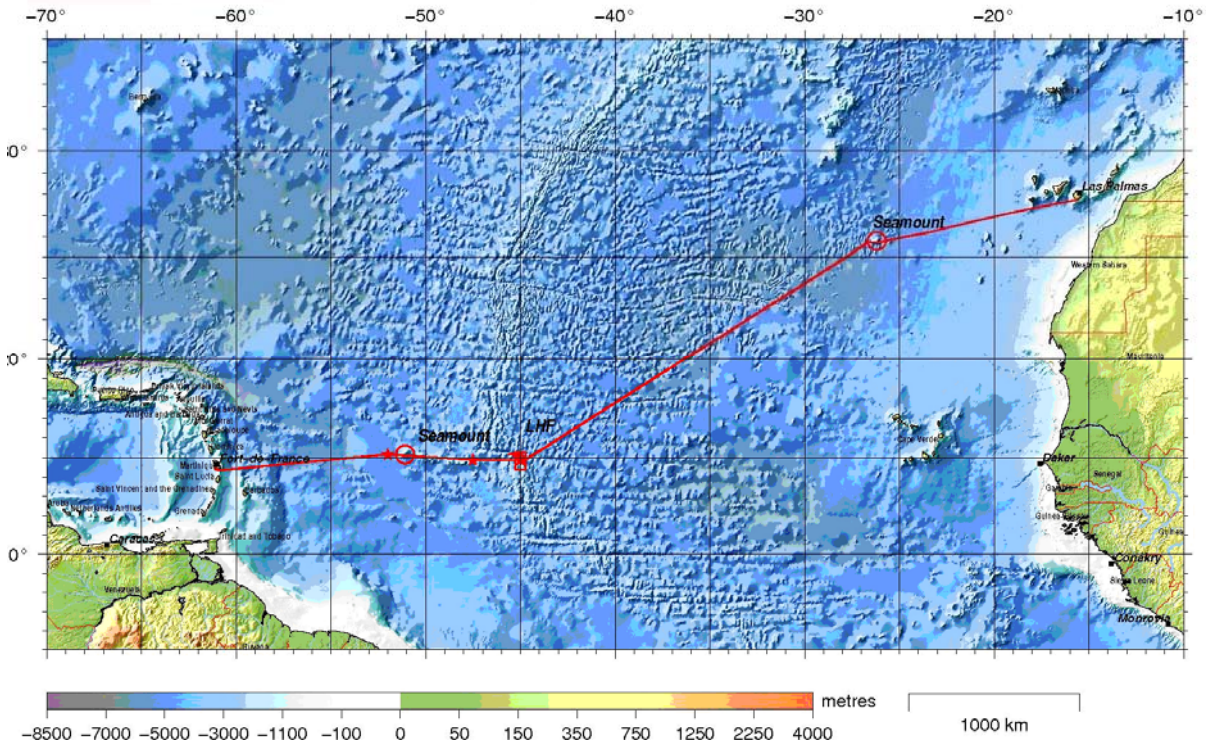


Figure 3-1. Cruise track of MSM 04/3 from Fort de France, Martinique, to Las Palmas, Gran Canaria, with the LHF target area on the MAR at 14°45’ N.

Wednesday 24. Jan. – Friday 26. Jan. 2007: During the following three days, we travelled with 12 kn and recorded bathymetry data after leaving the EEZ of Martinique. We initially followed a seamount chain at 15°N until 47°20'W where we slightly changed direction towards Logatchev (fig. 3-1). A first stop for a CTD/Rosette background cast in 5000 m water depth was made in the evening of 25 January at 15°7.68'N, 51°22.41'W.

Saturday 27. Jan. 2007: We reached Logatchev in the early morning and began station work with setting out two underwater navigation LBL transponders. Calibration of the LBL

transponders took some 6 hours and the ROV Jason II was launched for its first dive (Jason II dive no. 253) from a German vessel at 14°44.91'N, 44°58.97'W in 3074.8 m water depth. The purpose was to gain orientation in the area around the“Irina II“structure and start sampling for biota and fluids. This short dive ended successfully after 6 hours. Three CTD/Rosette casts followed during the night.

Sunday 28. Jan. 2007: Jason II dive no. 254 to “Irina II” and “OBT site”; purpose of the dive: recover moored ocean bottom pressure meter (OBP) and ocean bottom tilt meter (OBT), deploy new OBT, put out in-situ measurement devices, sampling for biota and fluids; dive time 9.5 h. An unusual incident happened in the afternoon when we received a pan-pan call from a sailing boat with a broken mast in only 35 nm distance to the north of us. They asked for support with food, water and diesel in order to be able to continue sailing with reduced speed to their destination in the Caribbean. We interrupted our work in the early evening, reached the boat around midnight and supplied the two sailors with what they needed. After reassuring ourselves that they would be able to safely continue their travel we wished them good luck and spent the rest of the night with bathymetry mapping on the northern flank of the 15-20-Fracture Zone.

Monday 29. Jan. 2007: Jason II dive no. 255 to “Irina II” and “OBT site”; purpose: deploy in-situ measurement devices, sampling for biota and fluids; dive time 10.5 h. During the night: plume mapping tow-yo on a SE-NW profile across Logatchev with CTD/Rosette / MAPRs.

Tuesday 30. Jan. 2007: Jason II dive no. 256 to “OBT site”, “Irina II” and marker “Anya” using the elevator for transport of equipment from bottom to surface; purpose of the dive: deploy new OBT, recover in situ measurement devices, sampling for biota and fluids; dive time 10.5 hours. After recovery of the elevator, bathymetry mapping of the Logatchev area.

Wednesday 31. Jan. 2007: Jason dive no. 257 to the smoking craters “Site B”, “Irina I” and “Anna-Louise” in the southern LHF area; purpose of the dive: hot fluid sampling, in situ measurements, dive time 11.5 h. During this dive we discovered that the southern hydrothermal structures include four instead of three to this date named smoking craters. All four structures had been visited by earlier cruises as it was evidenced by deep-sea markers deposited on the crater rims, but the two southernmost craters had not been recognized as independent structures. The night was spent with plume mapping by CTD/Rosette / MAPR tow-yo on a S-N profile across the Logatchev field.

Thursday 01. Feb. – Friday 02 Feb. 2007: Jason II dive no. 258 to “Irina II” and “Quest”; purpose of the dive: in situ measurements, sampling for sediments, fluids and biota using the elevator for equipment transport; dive time 24 h. After recovery of the elevator, bathymetry mapping south of the 15-20-Fracture Zone. In the evening, begin of Jason II dive 259 to “OBT site”, marker “Anya” and “Quest”; purpose of the dive: in situ measurements, sampling for sediments, fluids and biota using the elevator for transport of equipment and samples; dive time 13 h.

Saturday 03. Feb. – Sunday 04 Feb. 2007: Recovery of ROV and elevator in the morning. During the day, one plume mapping tow-yo with CTD/Rosette / MAPRs on a NE – SW profile across the Logatchev area. In the evening start of Jason II dive no. 260 to “Quest”, “Irina II” and the southern smoking craters; purpose of the dive: in-situ measurements, sampling for fluids, sediments and biota using the elevator for transport of equipment and samples; dive time: 23 h. After recovery of the elevator in the evening, bathymetry mapping south of the 15°20’ fractures zone.

Monday 05. Feb. 2007: Jason II dive no. 261 to marker “Anya”, “Irina II”, “Quest” and “Site F”; purpose of the dive: recover T-loggers, in-situ measurements, sampling for sediments, fluids and biota; dive time 12.5 h. In the evening deployment of a 25 m vertical temperature mooring midway between “Irina II” and “Site B”.

Tuesday 06. Feb. 2007: During night until morning, two CTD/Rosette casts south of Logatchev. Later in the morning, Jason II dive no. 262 to “OBT site”, “Site F”, southern smoking craters and “Site A”; purpose of the dive: deploy OBT, in-situ measurements, fluid sampling, sediment sampling using the elevator for transport of equipment; dive time 12.5 h. After recovery of the elevator, 3 CTD/Rosette casts south of LHF.

Friday 07. Feb. 2007: In the morning, deposit wood logs for a long term colonization experiment in the Logatchev field at 14°45.158’N, 44°58.696’W in 3003 m water depth using the deep-sea wire. After that, Jason II dive no 263 to “Quest” and “Irina II”; purpose: bring out long-term temperature loggers at “Quest”, sample fluids and biota; dive time: 6 h. In the afternoon, recovery of the two LBL navigation transponders. End of station work at 19:00 LT. We left Logatchev for transit back to Las Palmas with the EM 120 multibeam echosounder recording bathymetry data.

Saturday 08. Feb. - Wednesday 14. Feb. 2007: Six days of transit at an initial speed of 9.5 kn because of oncoming wind and current. The transit time was used for demounting the ROV and the scientific laboratories and for packing as far as possible. We initially headed towards a seamount at 25°50’N, 26°15’W in order to record its bathymetry. We passed the seamount on Sunday, temporarily reduced speed to 8 kn while crossing it, and continued afterwards with 12 kn speed towards Las Palmas. We reached Gran Canaria in the early morning of Wednesday and waited off the coast of Las Palmas for harbor clearance. Maria S. Merian berthed at early noon time. Unloading of the ROV and scientific equipment started immediately and was completed within the afternoon. The science group and ROV team left the ship on Thursday 15. February.

Summary of station work:

Station work time	12 days, 27. Jan. - 07. Feb
Jason II dives:	11 (incl. 2x 24 h dives)
Total ROV bottom time	100.5 h
Free-fall elevator deployments	4
CTD-MAPR tow-yos	3
CTD/Rosette stations	9
Moorings deposited	2
Moorings recovered	1
Multi-beam bathymetry surveys	6

3.4 Preliminary Results

3.4.1 Multibeam Bathymetry

(Dietmar Bürk)

Objectives, data collection and processing

Bathymetric data exist at resolutions of 100 – 200 m showing large-scale tectonic features in the larger 15-20° N area (Fujiwara et. al. 2003, Escartin and Cannat 1999) and in the rift valley around the LHF that was mapped recently during RV Meteor cruise M 60/3 (Kuhn et al., 2004). The proposed objective of the bathymtetric survey in MSM 04/3 was to use the Kongsberg EM120 echosounder for a high resolution mapping of selected key areas in the direct vicinity of the LHF in order to study the relationships between the tectonic fault pattern and hydrothermal activity. However, this goal was already to a large extent achieved by the mapping in November 2006 which was performed as a replacement program during Maria S. Merian cruise MSM 03/2. The focus of the mapping in this cruise was therefore adjusted to additionally collecting high resolution bathymetry data of the 15°20' N Fracture Zone (15-20 FZ). Due to the limited time of only 12 working days and the priority of the ROV diving operations, the bathymetric mapping of the LHF and the 15-20 FZ was limited to 4 surveys with a total of 38:47 hours. Additional bathymetric data were collected in the deep oceanic basins during the transits from Fort de France and to Las Palmas before and after the station work.

We used the Kongsberg EM120 echo sounding system that operates at a frequency of 12 kHz with a maximum ping rate of 5 Hz and processes 191 beams per ping at an opening angle of up to 150 degrees (optional equidistant or equiangular). The widths of single beams of the transmitting and receiving transducers are 1x1, 1x2, 2x2 or 2x4 degrees. Measurements of the actual depth use a combination of amplitude (near-range measurements) and phase detection (mid- and far ranges). Data acquisition was performed with the Kongsberg SIS® software and data were processed with the open source software MB-System, release 5.0.8 from MBARI and LDEO (Caress and Chayes, 1996). Various grids were produced and the final maps generated with the Generic Mapping Tools (GMT), version 4.1 (Wessel and Smith, 1998).

Transit to Logatchev

The multibeam echosounder was started after leaving the 70 nautical miles zone of Martinique (opening angle of the beams = 2 x 65 degrees, ping frequency ~ 0.05 Hz). The transit speed of the ship was 12 kn and the resolution of the along-track recording is 120 m. The initial ship track followed a seamount chain at 15° N. Between 47°20' W and 45°10' W we added a swath north to the transit bathymetry mapping performed by cruise MSM 03/2. The eastern end of this line closes the gap between the MSM 03/2 transit mapping in the south and bathymetric data collected earlier in the north (Fujiwara et. al. 2003, Escartin and Cannat 1999).

Inside Corner at the 15-20 Fracture Zone

The so-called inside corner of the south segment of the MAR marks the transition of the south segment to the 15-20 FZ zone. This area mapped during 3 nights with a number of lines (Fig. 3-2). The survey started in the night of 28/29 January following the emergency operation for the German S/V Spica with a line along the northern rim of the 15-20-transform fault. All survey lines were mapped at 8 kn ship speed and with an opening angle of 2 x 45°, with the only

exception of the initial transit from the LHF to the position of the emergency operation which was performed at 12 kn.

The map on figure 4 shows a number of topographic highs south of the 15-20 FZ possibly representing so-called megamullions which are typical features of large detachment faults located at inside corners. The map also shows that the LHF is situated in a large fault zone that can be traced from 14°43' N to almost 15°02' N. This fault zone may be associated with to date unknown hydrothermal vent activity.

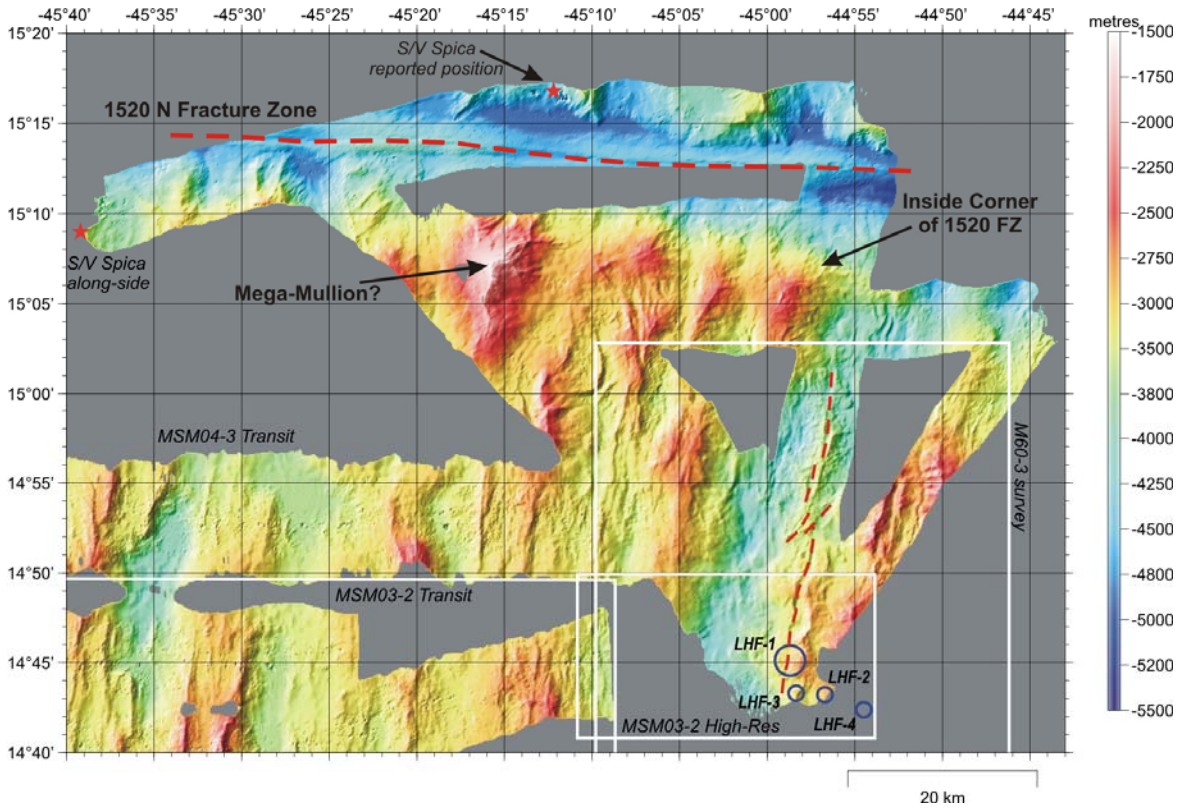


Figure 3-2. Pre-processed and gridded bathymetry data of the 15-20 FZ and inside corner down to the LHF. Gaps could not be closed due to time constraints.

High-resolution survey of LHF 1

Although the resolution of the new LHF maps produced with the new Kongsberg EM 120 echosounder during MSM 03/2 was much higher than that of existing maps, there was still a potential for a further resolution increase by optimizing the sampling strategy. The resolution of a bathymetric measurement on the seafloor is determined by the covered swath width, the number of available beams and the physical resolution which equals manly the footprint size of a single beam (i.e. in 3000 m water depth 52 m in across- and along-track directions at 1° single beam angle). Beams within one footprint area do not resolve separate seafloor features, and the potential for increasing resolution by narrowing the swath width is therefore limited. However, repeated independent sampling of the same area of sea floor with overlapping lines increases the statistical sample size and thus can be used to increase the spatial resolution. In order to increase the resolution beyond that of the MSM 03/2 mapping, we minimized footprint overlap (by choosing an opening angle of 2 x 40° vs. 2 x 11° during MSM 03/2) while we kept to 0.5 nm line spacing. The resulting 5.4-fold across-track oversampling of individual footprint measurements

lead to a 2.3-fold resolution increase (√5.4 = 2.3). At a ship speed of 4-5 kn and ping frequency of 0.12 Hz, the along-track resolution is approximately 20 m.

The survey covered an area of approximately 150 km^2 including the active hydrothermal structures of the LHF and some peripheral morphological features identified in MSM 03/2 ("Little Sophie", "Sophies Playground", "Donut Volcano"). At a scale of 1:80.000 the newly acquired bathymetry largely resembles that of the MSM 03-2 survey, with the exception that the deep depression of "Devils Arena" is missing. Post processing after the cruise has revealed that this not a result of filtering or data editing, but that this structure is actually not present in the data. (Fig. 3-3). The active hydrothermal vent structures remain below the resolution limit.

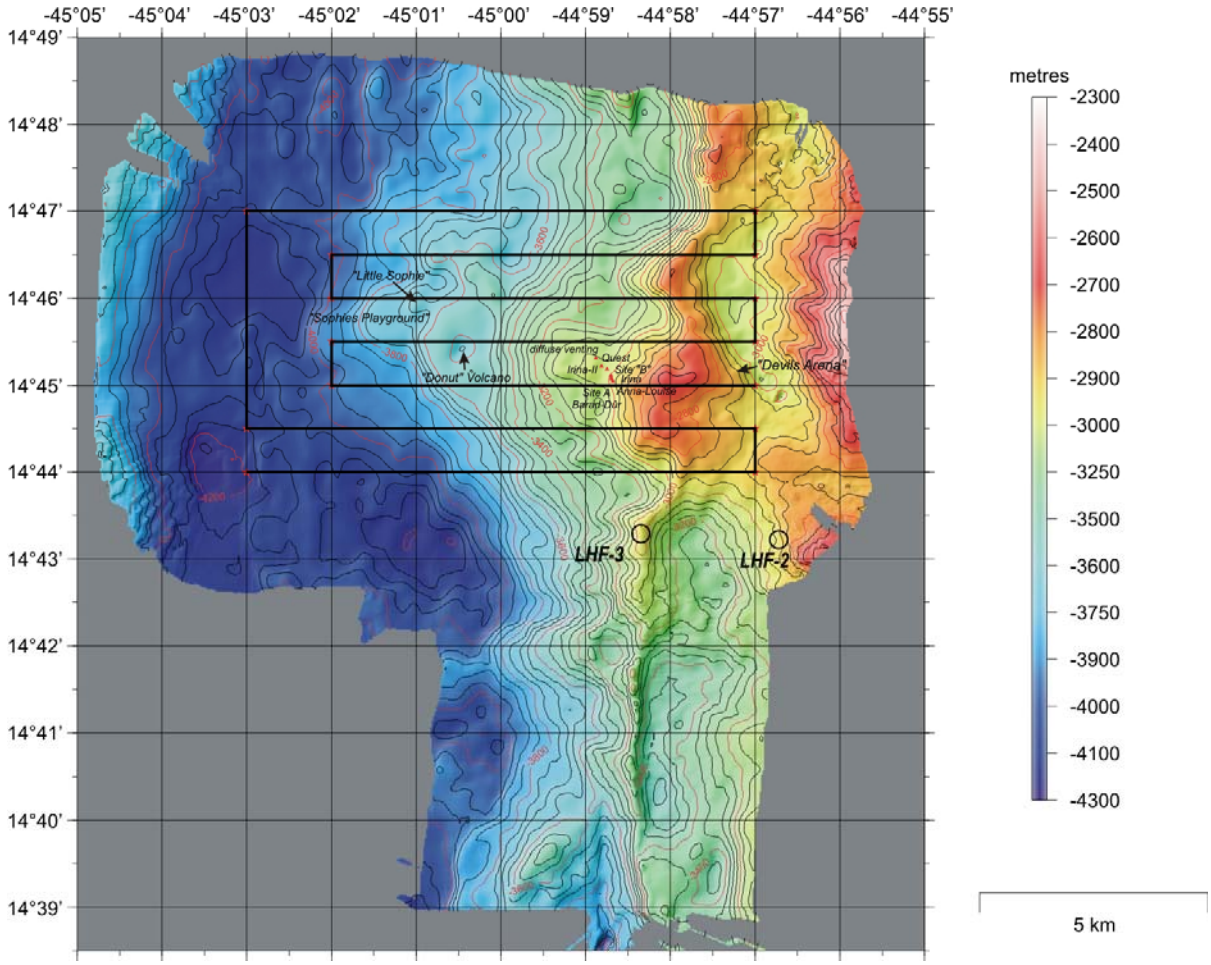


Figure 3-3. High-resolution survey at Logatchev Hydrothermal Vent Field showing vent locations and some morphological features (pre-processed and gridded data). The grid was combined with data acquired during transit to CTD casts south of LHF-1.

Determination of the minimum possible grid spacing (i.e. resolution) without using data interpolation revealed that a grid with cells of 20 x 20 m contains almost no empty cells, while a further decrease of cell size resulted in a progressive increase of empty cells. Grids with smaller cell sizes therefore rely on interpolated data and provide less resolution. A comparison with MSM 03/2 data showed that the same gridding method resulted in more gaps. The quality of the data can also be determined by plotting the number of data points in single grid cells. Figure 3-4 shows that the MSM 04/3 data are more evenly distributed and show less gaps than the MSM

03/2 data. However, despite of rather similar seeming results of the resolution tests, it is important that MSM 04/3 data to a much higher degree represent independent footprint measurements and therefore are considered much more accurate.

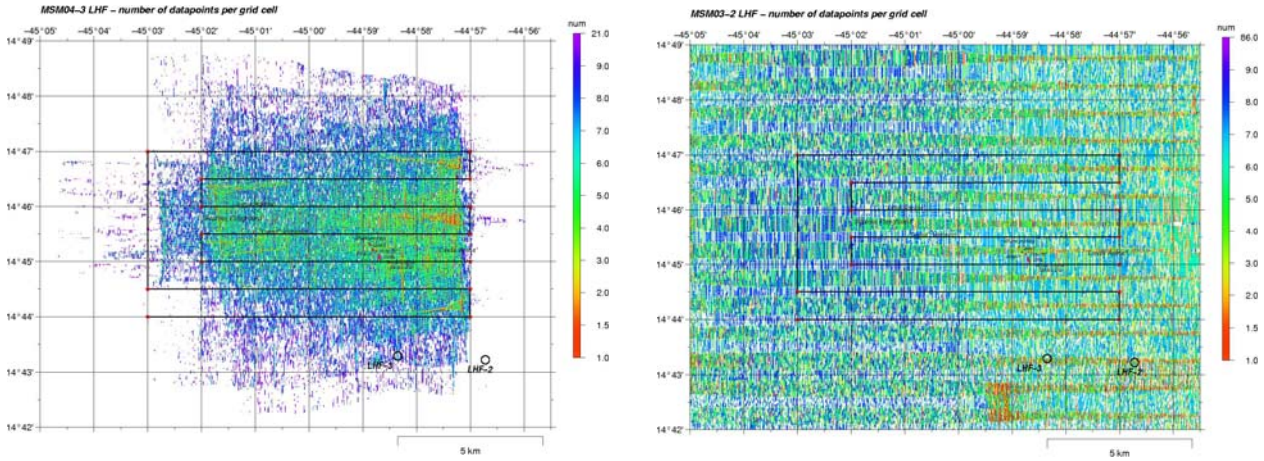


Figure 3-4. Number of datapoints per grid cell for surveys MSM 04/3 (left) and MSM 03/2 (right).

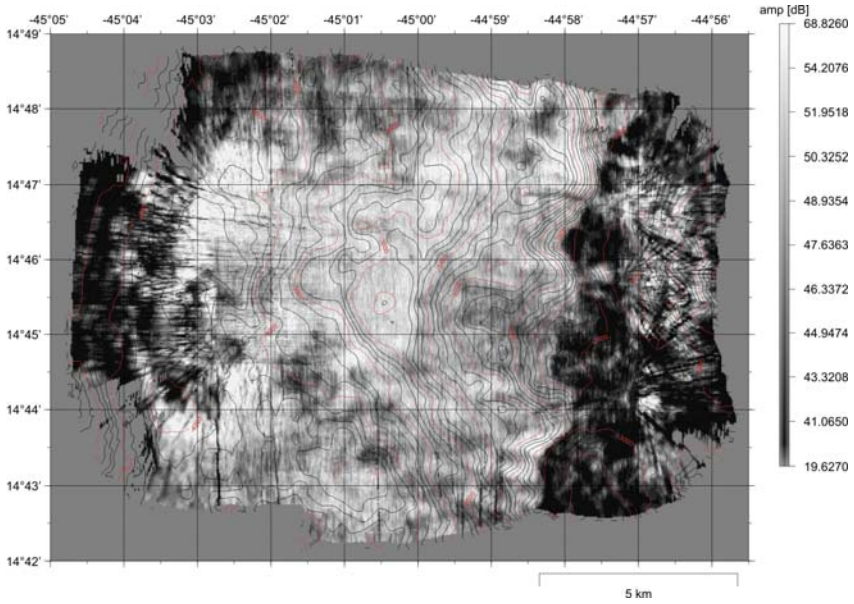


Figure 3-5. Gridded amplitude data from EM120 raw data. Color scale is in normal mode, i.e. bright tones represent high backscatter, dark tones are low backscatter. The grid size is 30 metres. Note the stong difference between the topographic highs and the Mid-Atlantic Central Valley.

Associated with the depth measurements are the amplitude values of the returning signal. Gridded and plotted on a map they show the backscatter of the seafloor, bright tones representing strong and dark tones low backscatter (Fig. 3-5). The clear backscatter difference between the topographic highs (dark) and the lower levels down to the central ridge axis indicates strong influence of the topography on the returning signal. This may represent a lithologic border between outcropping ultramafic rocks or gabbros on the topographic ridges and talus and sediments in the lower areas. The plateau with the hydrothermal vent sites appears as a dark tongue directed towards the rift valley.

Transit to Las Palmas

The transit to Las Palmas was used to map a large seamount at 26°12.00' W, 25°47.50' N with one line of swath bathymetry. The seamount rises from 5000 m to 1800 m water depth and is approximately 45 km (E-W) by 40 km (N-S) wide at its base. Despite a very large opening angle of the swath (2 x 65°), the seamount was not covered entirely. The swath width therefore varies between 21.5 km at the base of the seamount and 8.5 km on the summit. Additional lines were not recorded because of limited time.

3.4.2 Calibration of the Geographic Coordinates of the Active LHF Structures Using Jason II and Discovery of a "new" Smoking Crater

(Christian Borowski)

The ROV Jason II

Jason II is a two-body system with 6500-m depth capacity consisting of the Jason II vehicle and the depressor Medea (Fig. 3-6). The depressor serves as a shock absorber, buffering the vehicle from movements of the ship. A 10-kilometer fibre-optic cable delivers electrical power and commands from the ship through Medea down to Jason which then returns data and live video imagery. Jason II is linked to Medea via a 35-m long and 20-mm wide neutrally buoyant tether. The two-component design allows very stable positioning of Jason II in the water column, e.g., the vehicle can always keep cm-precise position in front of 3-dimensional seafloor structures without bottom contact and independent of the surface water sea state. The length of the tether determines Jason's radius for free operation around Medea, while travelling larger distances requires relocation of Medea by moving the ship. Jason II navigates with a long baseline transponder navigation system using frequencies that range between 7.5 and 14 kHz and with a RDI 300 kHz bottom-tracking Doppler Velocity Log (300 m range). Jason's video and photo imagery equipment includes one 3-chip colour camera (scientists pan & tilt), two 1-chip colour cameras (pilot's pan & tilt, Light bar) three utility color cameras (manipulator, basket, aft-looking), and a digital still camera (operated by scientists). Jason has two hydraulic 7-function manipulator arms (Kraft Predator II with force feed back and Shilling Orion), a hydraulic forward sampling drawer ("basket": 98 x 152 cm) and two hydraulic lateral swing arms (51 x 51 cm each) that can be used for storage of samples or equipment. Jason's payload for scientific instruments or samples is 130 kg. Additional equipment or sample material can be transferred between surface and seafloor with an acoustically released free-falling elevator that has 90 kg payload. Jason II was launched and recovered by RV Maria S. Merian's crane no. 3 over the starboard side, while Medea was operated via the large ship A-frame. Launching and recovery procedures required the full ROV team on deck.

Three separate ROV team watches each with a pilot, an engineer and a navigator allowed continuous shift rotation during the dives in a 4-hours-on, 8-hours-off rhythm. The operation on the seafloor additionally required three scientists in the control van (PI, protocol, video operation). Turnaround time for vehicle deployment between the dives was 12 hours. For practical reasons, we always coordinated the launching and recovery of Jason II with the same ship watch and thus kept dive times to lengths of either 12 or 24 hours.

Figure 3-6. The ROV Jason II. A: Launching of the vehicle Jason II; B: launching of Medea; C: View from Medea on Jason II during operation on the seafloor; D: Free-fall elevator.

Foto and video documentation

Video imagery of the entire dives obtained with three cameras (3-chip science, pilot and light bar) and still camera fotos are stored on DVDs (videos in NTSC and Pal formats). Frame grabs of the three video streams are accessible online together with the control van dive protocols in the "Virtual Van" on http://4dgeo.whoi.edu/jason.

Calibration of the geographical positions of LHF structures

Initial descriptions of the LHF included geological overview maps and micro-scale maps of the biologically most active structures which lacked exact coordinates (Krasnov et al. 1995, Gebruk et al. 2000). The relative positions of the vents to each other remained somewhat vague and as a consequence, the re-localization of sites during later expeditions was time consuming. The LBL navigation system of Jason II offered the opportunity to accurately map the hydrothermal vent structures and calibrate their geographic coordinates.

Two LBL navigation transponders equipped with 200-300 m long tethers in order to minimize acoustic shadows were positioned some 0.8 and 1.3 nautical miles upslope of the LHF vents in 2566 m and 2510 m water depth (14°46.188'N, 44°58.028'W and 14°45.420'N, 44°57.954'W). The additionally used Doppler Velocity Log used with the Jason DVL software provided highly accurate relative positions to the ship. During a total of 11 dives, we repeatedly visited all known hydrothermal structures that align along roughly 520 m distance in NW-SE direction between the smoking crater "Quest" and the chimney structure of "Site A". The resultant coordinates of the positions of the LHF hydrothermal vent structures are listed below (Figs 3-7, 3-8; Tab. 3-1).

Discovery of the previously unrecognized smoking crater "Candelabra"

Apart from the exact positions of the vents, the accurate navigation data also revealed that the south-eastern hydrothermal structures have been misinterpreted in the past. Gebruk et al. (2000) described the three smoking craters "Site B", "Irina I" and "Anna-Louise" aligning approximately in N–S direction in the southern part of the active LHF. Our data clearly show that a fourth smoking crater is present between "Irina I" and the double crater structure "Anna-

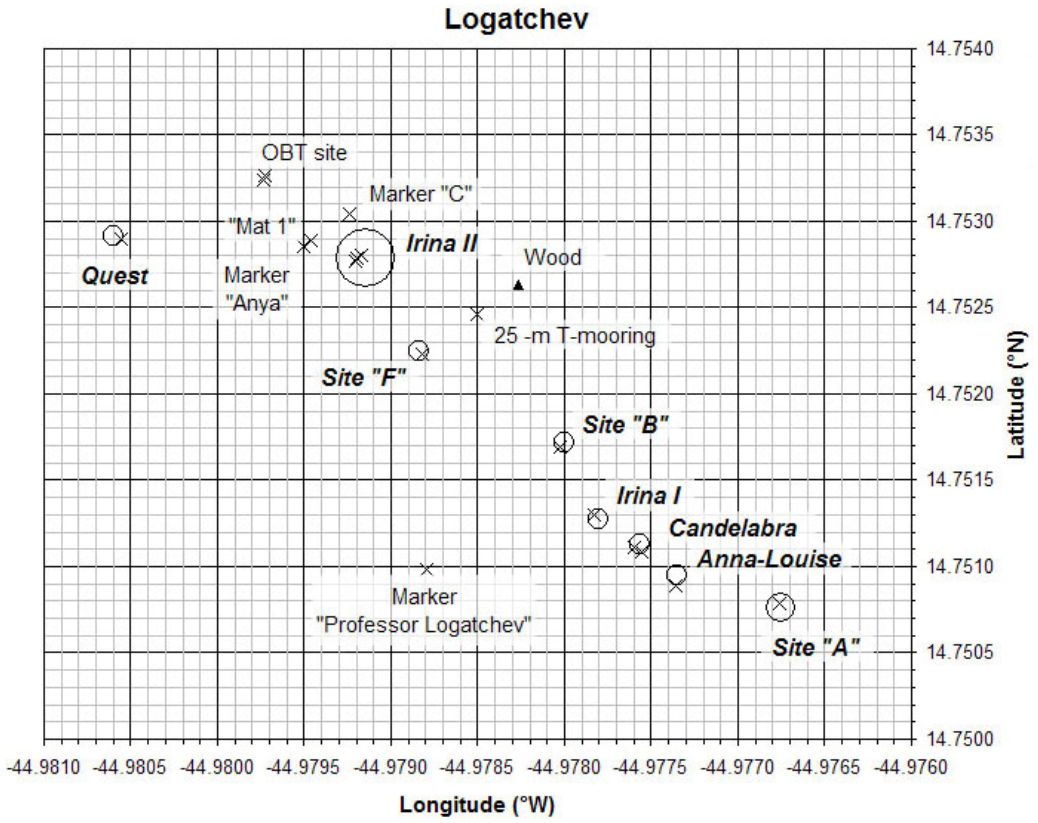


Figure 3-7. Calibrated geographic positions of active LHF structures (circles) and some markers (crosses) deposited by MSM 04/3 and earlier cruises. "OBT site" is the location of OBT and OBP deposition during M 64/2 and this cruise. Marker positions of the hydrothermal structures represent the coordinates given in table 3-1. "25-m T-mooring" marks the position of a vertical temperature logger mooring deposited during this cruise. "Wood" marks the position of a wood log deposited for colonization experiments. "Mat 1" was sampled for microbiological studies. Markers "C", "Anya", and "Professor Logatchev" were deposited during earlier cruises.

Table 3-1. New coordinates of the LHF hydrothermal vent structures obtained by LBL-navigation with Jason II.

Site	Latidtude	Longitude	Water Depth	Distance between structures
Quest	14°45.175'N	44°58.836'W	3026 m	121 m
Marker Anya	14°45.171'N	44°58.770'W	3029 m	38 m
Irina II	14°45.167'N	44°58.752'W	3021 m	67 m
Site F	14°45.135'N	44°58.728'W	2963 m	110 m
Site B	14°45.100'N	44°58.686'W	2946 m	50 m
Irina I	14°45.076'N	44°58.668'W	2935 m	33 m
Candelabra	14°45.067'N	44°58.656'W	2926 m	30 m
Anna-Louise	14°45.057'N	44°58.644'W	2911 m	70 m
Site A	14°45.046'N	44°58.608'W	2914 m	

Louise" (Figs 3-7, 3-8, Tab. 3-1). This "new" crater has been marked and sampled during earlier cruises including M 60/3 and M 64/2, but was never recognized as a separate structure and was considered by mistake either as "Irina I" or "Anna-Louise". The new structure is smaller than the double crater "Anna-Louise" and resembles "Irina I" and "Site B" in size. We named it "Candelabra" referring to a black smoker on its rim which had already been named during Meteor cruise M 60/3.

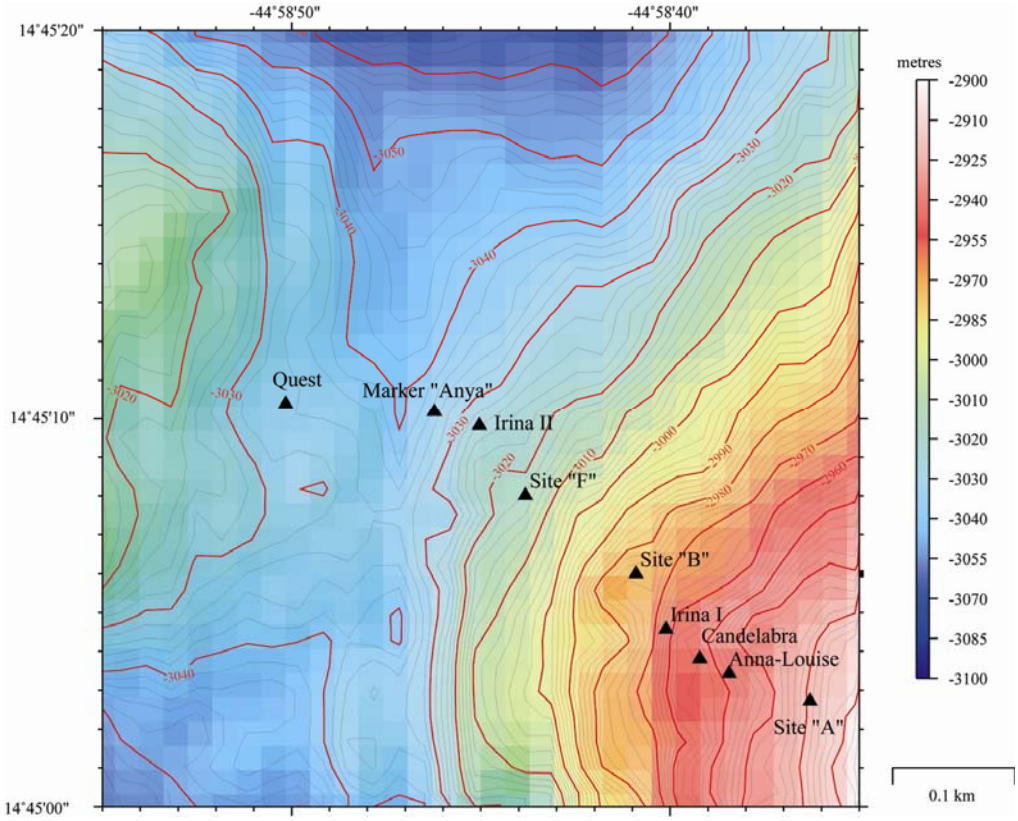


Figure 3-8. Detailed bathymetric map of the LHF including the hydrothermal structures according to Jason II LBL navigation data. Contour interval is two metres.

3.4.3 Gas Chemistry

(Robin Keir, Oliver Schmale, Peggy Wefers)

During MSM 04/3, methane and hydrogen were measured in vent fluids, in samples collected from the water column and in gas samples from experimental kinetic studies. Additional water samples were collected for helium isotope analysis at the University of Bremen, and gas samples were preserved for carbon isotope analysis on the methane component. The measurements on the vent fluids and water column samples are part of an ongoing monitoring program of the Logatchev biology and chemistry and are described in this section.

Vent fluids were obtained on nearly every ROV dive with a titanium sampling device (called a "Major", see section 3.4.6) that extracts about 600 ml of fluid with a spring-loaded piston. In total, 26 vent samples wer analyzed for methane and hydrogen. In addition 12 CTD casts were

carried out. Three of these were tow-yo deployments, in which the CTD-Rosette was raised and lowered through the plume while being towed by the ship at about 0.5 knot. The tracks of the tow-yos crisscrossed over the Logatchev vent field. Figure 3-9 shows the tow-yo tracks and the positions of the conventional CTD stations

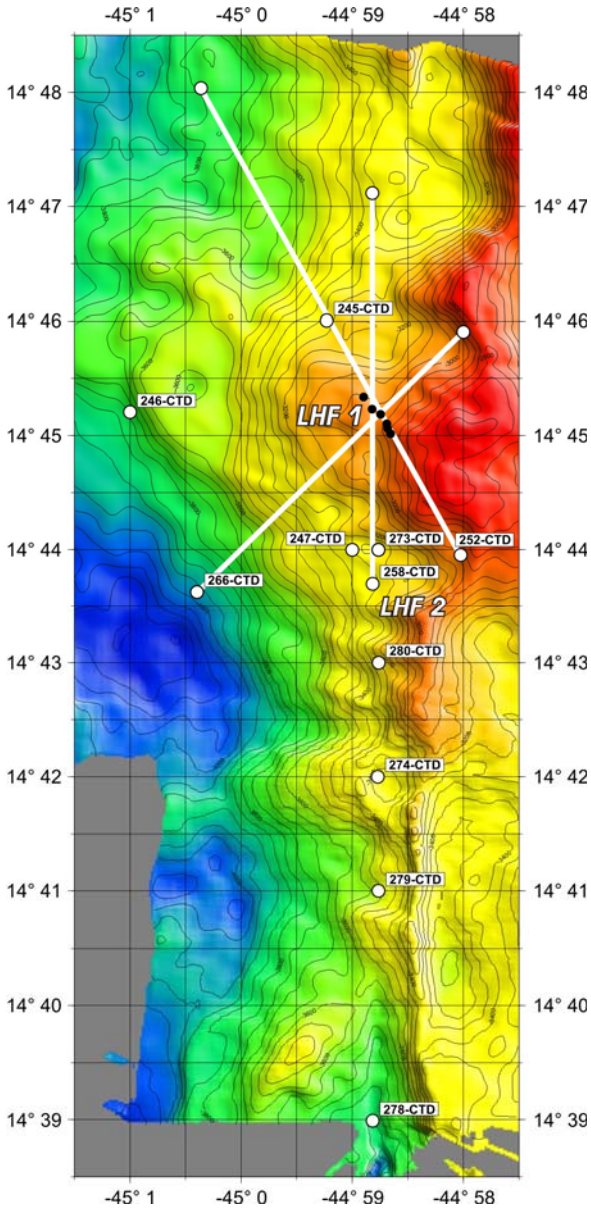


Figure 3-9. CTD positions and Tow-Yo tracks

Methods

The CTD casts were carried out using a Sea-Bird Electronics, Inc. SBE 911plus system (Table 3-2). The underwater unit was attached to a SBE 32 carousel water sampler equipped with 24 10-liter Hydrobios-Freeflow bottles. For later offshore calibration of the conductivity sensor, two or three salinity samples were taken per cast. In addition to the continuous conductivity, temperature and depth analyses of the water column, turbidity was recorded with PMEL MAPRs (NOAA / Pacific Marine Environmental Laboratory; Miniature Autonomous Plume Recorder). The MAPRs sensor data is recorded internally and was not accessible during CTD deployments.

For the on-board CH_4 and H_2 analyses of fluid samples, a modification of the vacuum degassing method described by Lammers and Suess (1994) was used to extract the gases (Rehder et al., 1999). In the case of seawater collected by the CTD-rosette, 1600 ml was drawn into pre-evacuated 2200 ml glass bottles. During this sampling, most of the dissolved gas exsolves into the remaining headspace. The amount of water taken was measured with a flow meter (Engolit Flow Control 100S/Typ DMK). The extracted gas phase was subsequently recompressed to atmospheric pressure, and the concentration of CH_4 and H_2 was determined by gas chromatography. For the determination of dissolved CH_4 a Shimadzu GC14A gas chromatograph equipped with a flame ionization detector was used in connection with a Shimadzu CR6A Integrator. Nitrogen was used as carrier gas, and separation was performed using a 4 m 1/8' SS column packed with Porapack Q (50/80 mesh) run isothermally at 50°C. The H_2 concentration of the extracted gas was determined using a TRACE Ultra gas chromatograph (Thermo Electron) equipped with HaySep Q, and Molecular Sieve 5 A columns. Helium was used as carrier gas. The run was performed isothermally at 50°C. The eluted gas was detected via PDD (pulsed discharge detector).

Table 3-2. Sample list for CTD-stations

Station	Profile	Long. W	Lat. N.	CH4	$\delta^{13}CH_4$	H_2	He
242-CTD	001	51°22.410	15°07.677	4			
245-CTD	002	44°59.229	14°46.006	20	20	20	
246-CTD	003	45°01.000	14°45.205				
247-CTD	004	44°59.001	14°43.999				
252-CTD	005	Tow-Yo		20	20	20	
258-CTD	006	Tow-Yo		23	23	23	23
266-CTD	007	Tow-Yo		22	22	22	
273-CTD	008	44°58.765	14°43.999	12	12	12	12
274-CTD	009	44°58.769	14°42.000	13	13	13	13
278-CTD	010	44°58.817	14°38.991	12	12	12	12
279-CTD	011	44°58.764	14°40.999	10	10	10	10
280-CTD	012	44°58.763	14°42.999	12	12	12	12

In order to extract the gas from the vent fluids, the outlet of the "Major" sampler was connected to an evacuated 250 ml or 500 ml flask, and after filling out the dead volume in the line, the fluid was drawn into the flask by the vacuum. Normally, vent fluid must be forced out of a "Major" by applying strong pressure to the piston. However, once the dead volume was cleared, the vacuum in the flask was sufficient to draw down the piston without pushing against the spring. Typically, 80 ml of black smoker fluid and 300 ml of diffuse vent fluid were sufficient to collect the necessary amount of gas (>15 ml). Since the CH_4 and H_2 concentrations in the gas were often very high, most of these samples were diluted by 1:1000 with Helium in a gas mouse before analysis. ROV samples are listed in Table 3-3.

Table 3-3. Sample list for ROV-stations

Station	CH_4	$\delta^{13}CH_4$	H_2	He
244	2	2	2	1
251	4	4	4	
253	4	4	4	
257	3	3	3	1
259	4	4	4	
267	3	3	3	
271	3	3	3	
275	3	3	3	1
282				1

After the analyses, the remaining gas was preserved for the determination of the stable carbon isotopic ratio in methane. These sub-samples were drawn into pre-evacuated glass vials containing 2 ml of supersaturated salt solution and sealed with a butyl rubber septum. The samples are stored upside down in order to prevent air contamination during storage.

For measurements of the He concentrations and isotopic signature, water samples were taken from Hydrobios-Freeflow bottles of the rosette and sealed head space free and gastight in copper tubes (sample volume 40 ml). Special containers for sampling fluid on a vent were tested for handling by the ROV pilots. The sampling containers can keep a pressure of more than 3·107 Pa and avoid phase separation of vent fluids and gases. He isotope measurements will be performed at the IUP, section of Oceanography, at the University of Bremen with a fully automated UHV mass spectrometric system (for details see Sültenfuß and Massmann, 2004).

Preliminary Results

The vent fluids obtained with "Major" samplers often contained very high concentrations of hydrogen and methane. The gas content of the various black smoker fluids was typically about 10% methane and 40% hydrogen. The highest dissolved concentrations of these gases were measured in a sample from Irina II, which contained 1.5 mmol L^{-1} methane and 5.9 mmol L^{-1} hydrogen. The 4:1 ratio of hydrogen to methane appears to be characteristic of all of the Logatchev black smoker fluids (Fig. 3-10).

Diffuse vent fluids, however, exhibited lower hydrogen to methane ratios. As on Meteor cruise M 64/2, a correlation was observed between particle, methane, and hydrogen concentrations at some stations. This was apparent at Station 273, 3.9 km south of the LHF (Fig. 3-11).

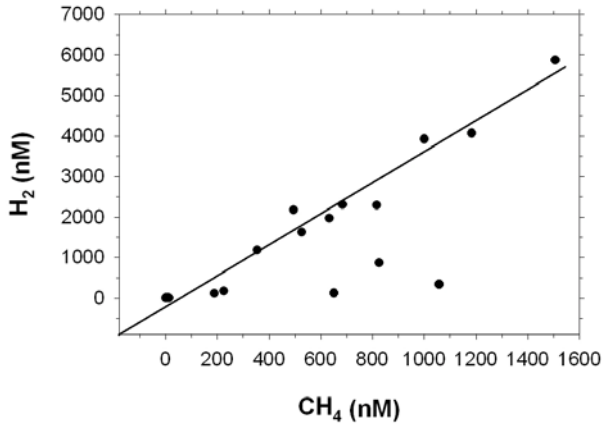
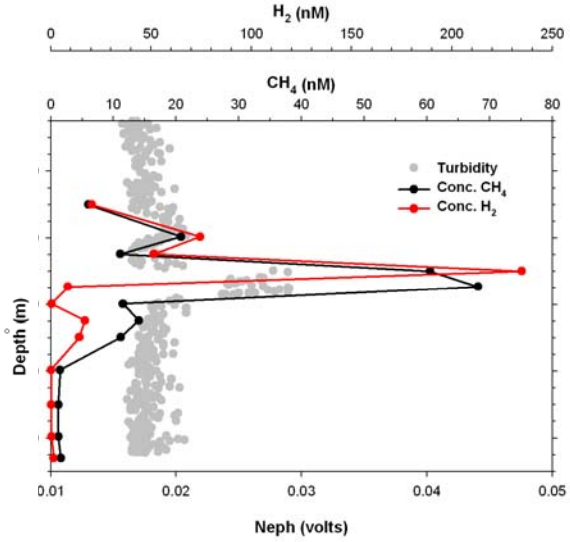


Figure 3-10. Hydrogen versus methane from black smoker fluid measurements



3-11. Particle, methane, and hydrogen concentrations at Station 273 CTD.

However, at other stations the correlation between these properties was rather poor. A scatter diagram of all water column measurements of hydrogen and methane indicates that at least some of the time near the vent field, the ratio of H_2 to CH_4 in the plume is similar to that of the black smokers, but at other times and away from the field, this ratio is lower (Fig. 3-12). Helium and carbon isotope measurements will be conducted during the next several months, and these should shed more insight on the processes controlling plume concentrations.

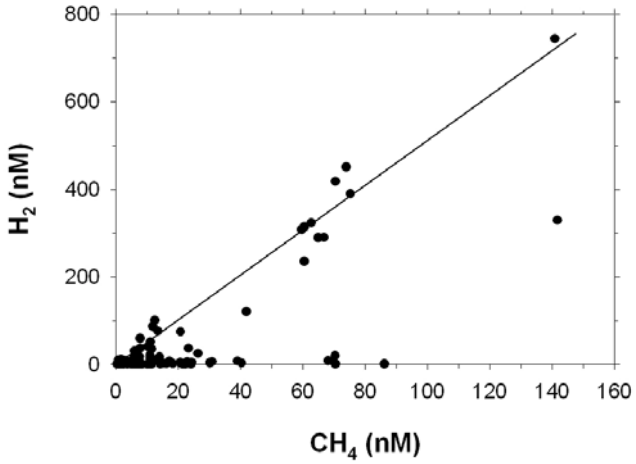


Figure 3-12. Hydrogen versus methane from water column measurements.

3.4.4 Logatchev Longterm Environmental Monitoring – LOLEM

(Marcus Fabian)

Overview

The project LOLEM monitors environmental parameters with long-term observation instruments in the Logatchev Hydrothermal Vent Field area. Ocean Bottom Tiltmeters (OBT; Fabian and Villinger, in press) continuously record sea floor tilt and low-frequency sea floor acceleration. An Ocean Bottom Pressuremeter (OBP) monitors changes in the absolute ocean bottom water pressure. A 25-m-mooring is used for vertical temperature profiling in the near bottom water column. A small-scale distributed temperature sensing system including 20 individual single-channel Miniaturized Temperature Loggers (MTL; Pfender and Villinger, 2002) and four 8-channel temperature loggers are part of a mussel-field experiment in collaboration with the MPI-Bremen. The data records are proxies for the conditions of the fluid regime (tilt, acceleration, water pressure) and also for local changes in the environment of biological communities (temperature data). The fluid regime can change when local crust deformations and micro-earthquakes alter fluid pathways in the sub-surface. This may also affect the temperature regime. The long-term monitoring data is therefore essential for all research disciplines in the SPP. Moreover, the data directly reflect local seafloor motions (tilt, acceleration, water pressure) which are forced by tectonics, hydrothermalism and micro-earthquakes on the Mid-Atlantic Ridge.

As an additional part of LOLEM, a temperature probe was developed for in situ measurements of small-scale gradients in high and low temperature environments. The probe is operated by the ROV and measure temperature profiles under real-time control with eight sensors aligned along 28 cm length. The probe can be used to measure environmental temperature gradients in e.g. bacterial mats, mussel bed communities and hot fluids of black smokers.

Cruise MSM 04/3 with RV Maria S. Merian and ROV Jason II

During this cruise, ROV Jason II recovered the OBT, OBP, 25-m temperature mooring and MTL arrays that had been deposited by RV Meteor cruise M 64/2 in May/June 2005 (Lackschewitz et al. 2005. Almost all instruments have successfully collected the expected long-

term data. Figure 3-13 provides an overview of the available data and the schedule until the next cruise MSM 06/2. The instruments spent nearly two years on the sea floor and all housings were considerably affected by strong corrosion. Five MTL were seriously damaged by very hot fluids and lost their data. OBT, OBP, the mooring and the MTL were replaced by new instruments. The ROV T-lance was used on the ROV Jason II during all dives and provided useful data for the cruise participants. Since MSM04/3 was shortened by more than a week, the basic scientific program had to be reduced and station work in the LHF was rather condensed. However, despite rather strong corrosion, the old OBT could be repaired and re-deployed. Now, the new OBT-2, the old OBT-1, the new OBP-2, a new temperature mooring, 10 new MTL for the "Irina II"-mussel field experiment and 9 new MTL for the "Quest" mussel field experiment record long-time data in the LHF. The map in Fig. 3-14 shows the positions of the new instruments in black and the old positions in grey.

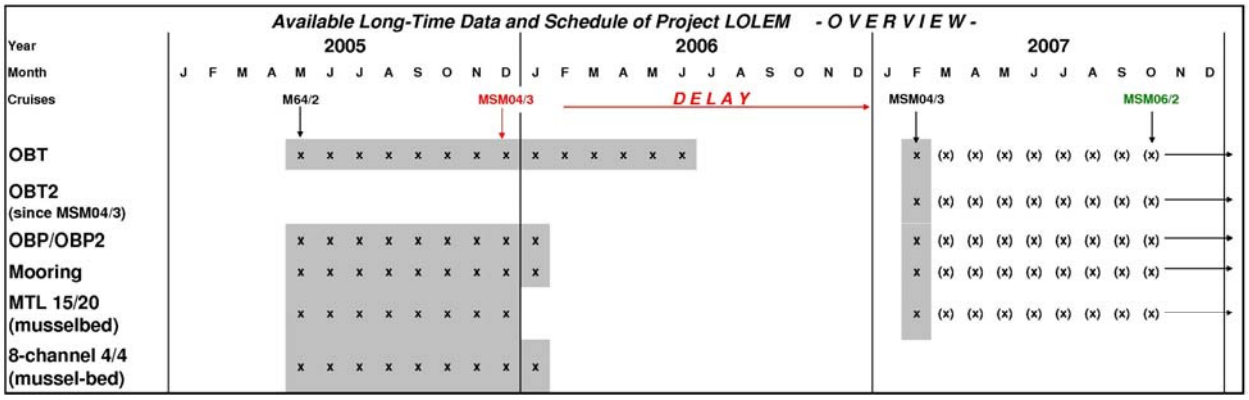


Figure 3-13: Long-term data collection by LOLEM instruments until to date and in the future. Crosses on grey background mark the available data. Crosses in brackets during 2007 mark the measurements by instruments deposited during MSM04/3. Due to the postponement of this cruise from end of 2005 to January/February 2007 there is a data gap of about one year in 2006.

OBT and OBP

OBT and OBP were deposited in 3035 m water depth. OBT measures vertical tilt in two perpendicular horizontal directions and low frequency vertical acceleration at frequencies of up to 0.5 Hz, while OBP measures absolute water pressure at a resolution of 1 mm. OBP data will be used to assess vertical sea floor displacements and therefore complete the OBT data. Tilt data show very strong steps and spike-like signal patterns in the initial record period which cannot yet be clearly interpreted (Fig. 3-15A). Water temperature fluctuations are small and appear to have no influence on the tilt measurements. At the end of the data record there is a larger step in tilt. The observed pattern may indicate an alternation of relatively calm phases with phases in which strong tilt steps appear. This hypothesis must be verified with future measurements. The OBP data show a clear tidal signal (Fig. 3-15B) and therefore need correction before an assessment of seafloor displacement. Residual data of the OBP will be compared and correlated with tilt and acceleration data and the results of SPP co-workers, which concentrate on local tectonics and earthquakes.

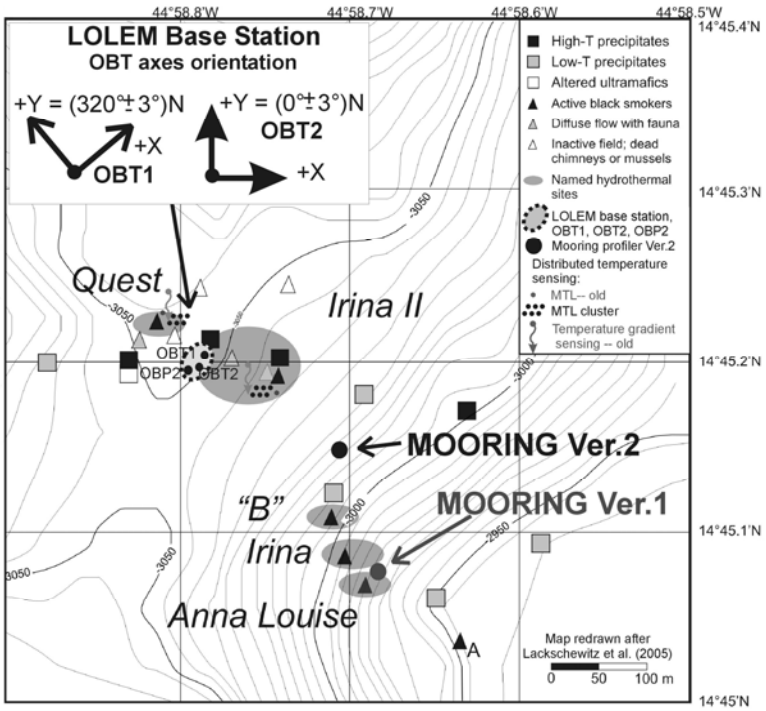


Figure 3-14: Map of the LHF with instrument positions of OBT1, OBT2, OBP2, the new mooring in version 2 and the two mussel field experiments with the distributed temperature sensing system (MTL cluster) consisting of in all 19 MTL sensors.

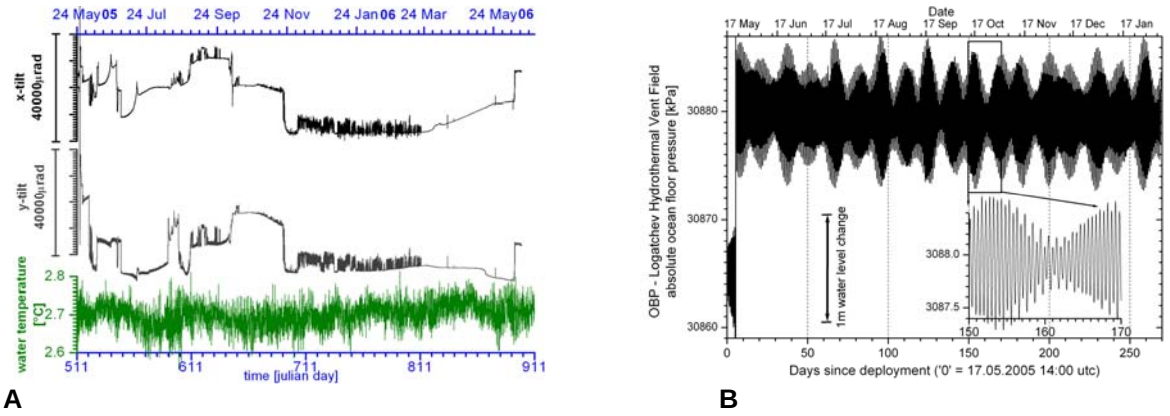


Figure 3-15. Long-term data collections in LHF of ocean bottom tilt and ocean bottom pressure fluctuations. A: Ocean bottom tilt measured for approximately 400 days by OBT: X-Tilt, Y-Tilt and water temperature. The water temperature fluctuates frequently, but within a very small range. B: Ocean bottom pressure data measured by OBP. This instrument was relocated on the seafloor a few days after deployment and finally placed next to the OBT. This movement is reflected in the suden jump in the data in the beginning of the collction interval. Tides of about 1 m water level change dominate. The enlarged view in the inset shows the very accurate tide-signal. Acceleration data will be provided later. The high frequent sampling rate of 1 Hz produced a rather large data set which will be analysed separately.

One major objective for this cruise was the replacement of the instruments on the seafloor with fresh ones. The new instruments were installed on the same positions at 14°45.194'N, 44°58.773'W. This site is marked with two white passive markers and an anchored buoy with a Sonardyne Beacon (ID 15). The recovered old OBT (OBT-1) furnished with fresh batteries and

re-deposited together with another passive marker on a new position some 30 m NE to the other instruments. The two OBTs were levelled by the ROV Jason II using a deep sea level (Fabian and Heesemann, 2006). All instruments need stable ground and therefore sit on top of small piles of rocks (Fig. 3-16).

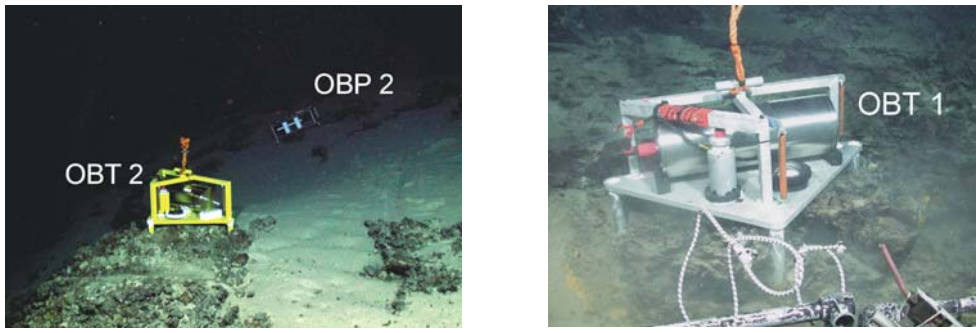
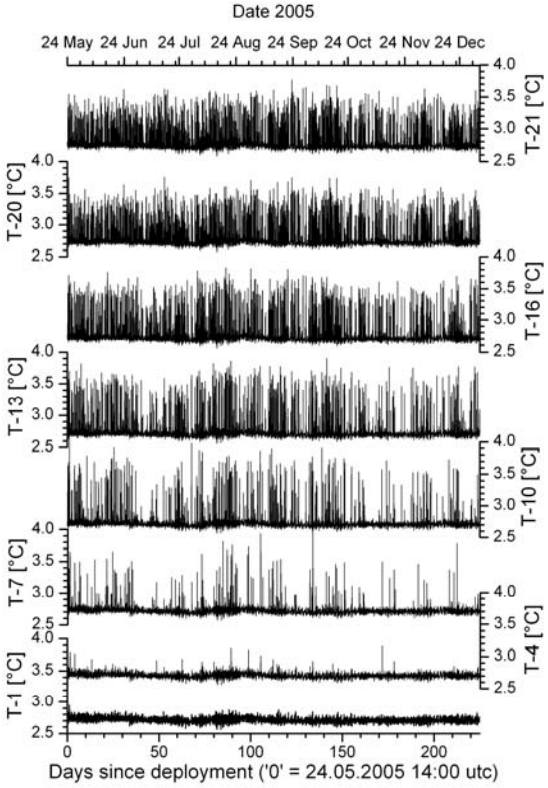


Figure 3-16. A: OBT-2, OBP-2 on the positions of OBT-1 and OBP-1. B: Old OBT-1 on its new position.

25-m-Mooring –Vertical temperature profiler

The 25 m-mooring includes 24 temperature sensors which are aligned in 1-m distance from each other along the mooring rope. The data collected are most likely directly related to the temperature anomaly caused by hot fluids of nearby black smoking craters Irina I and Anna-Louise (Fig. 3-17A). The new mooring was deposited between the active smoker sites "Irina II" and "Site B" at 14°45.149' N, 44°58.714' W in 3000 m depth (see Fig. 3-15). It is marked with a Sonardyne Beacon that is attached to the mooring rope (ID 14; Fig. 3-17B).



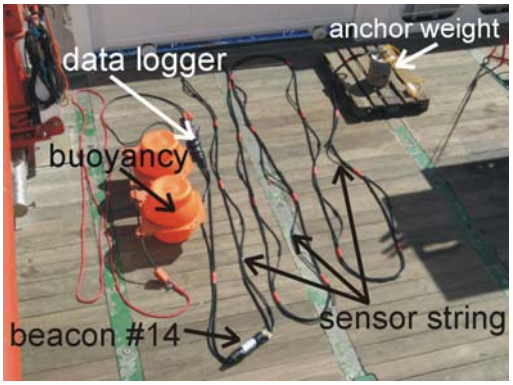


Figure 3-17. Vertical temperature mooring. Left: Temperature time series data, here as examples of every third logger in a vertical distance of 3 m, starting with logger T1 next to seafloor to loggers T20 in 20 m and T21 in 21 m height above sea floor. Temperature variations with higher values appear significantly more frequently at larger heights above seafloor. Top: Photo of the new mooring version 2 on board Maria S. Merian before deployment.

Distributed temperature sensing system

The distributed temperature sensing system serves for measurements on a meter to centimetre scale within and across mussel fields or individual mussel patches. The two sensor arrays that had been deposited by cruise M 64/2 in the "Irina II" mussel field and across a mussel patch next to the "Quest" " smoking crater were entirely recovered (For the layout of the sensor arrays see Lackschewitz et al., 2005). Figure 3-18 shows examples of the time series data collected by single channel temperature loggers (Fig 3-18A) and an 8-channel temperature logger (Fig. 3-18B). Replacement of temperature loggers during this cruise included only MTL in "Irina II"and "Quest", while no other 8-channel T-loggers were deposited. The new arrangements of the MTL arrays in "Irina II "and "Quest" are illustrated in figure 3-19.

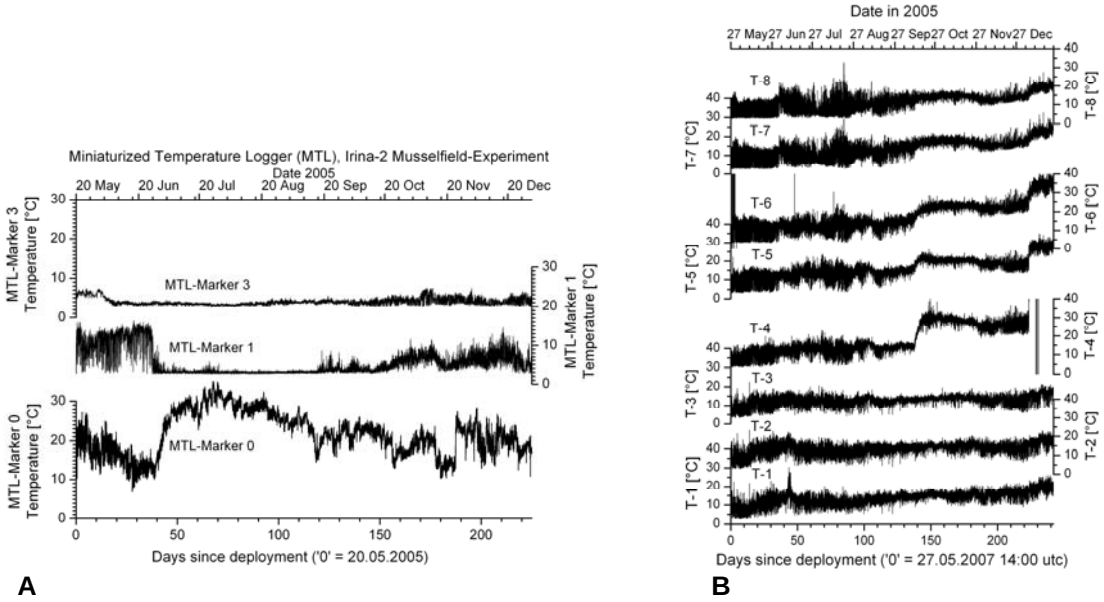


Figure 3-18. Temperature time series measurements of MTL and 8-channel loggers. A: Three time series of MTL recovered from the"Irina II"mussel field. B: Time series of an 8-Channel temperature logger from the "Quest" mussel patch. Lateral distances between the MTL are below one meter (A), and the distance between individual sensors T1 to T8 along the probe of the 8-channel logger is 4 cm (B).

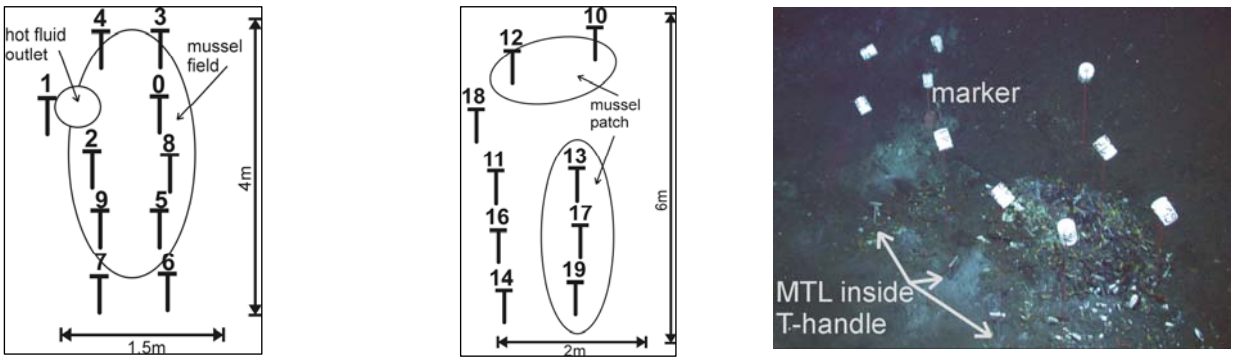


Figure 3-19. New arrangement of MTL temperature sensors. A: At site "Irina II"with 10 instruments, B: At site "Quest" with 9 instruments. The numbers correspond to individual MTL numbers. C: Photo of the "Quest"T-loggers. One of the floats is a passive marker, the other nine mark the MTL sensors.

8-channel in situ T-lance

The 8-channel in situ T-lance is a temperature measurement tool for the determination of absolute temperatures and gradients in low-temperature and high-temperature environments (Fig. 3-20). The instrument is operated by the manipulator arm of the ROV, and online control of the sensor data allows real-time observation of the in situ temperatures along the 28-cm long probe. We used this tool for direct measurements of hot fluids exiting the LHF black smokers and for measurements of temperature gradients in diffuse fluid outlets, mussel beds, sediments and under bacterial mats. The highest temperature of 349°C was measured in fluids of Anna-Louise, while maximum temperatures at other smoking craters varied between 330°C and 347°C (Tab. 3-4). The fluids exiting from "Irina II" beehives were cooler than those of other LHF vents including a separate black smoker only a few meters apart from the "Irina II" main sulphide structure. These lower temperatures are most likely influenced by mixing with ambient seawater that is either entrained through the beehive walls or by turbulences caused by the probe introduced into the thin beehive exit tubes. However, the comparable small variation between maximum temperatures of the various hot emission sites may indicate that all LHV vents are fed by the same source fluid.

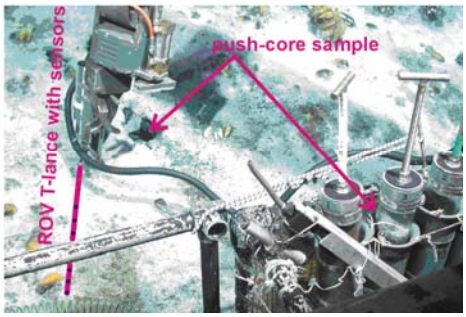
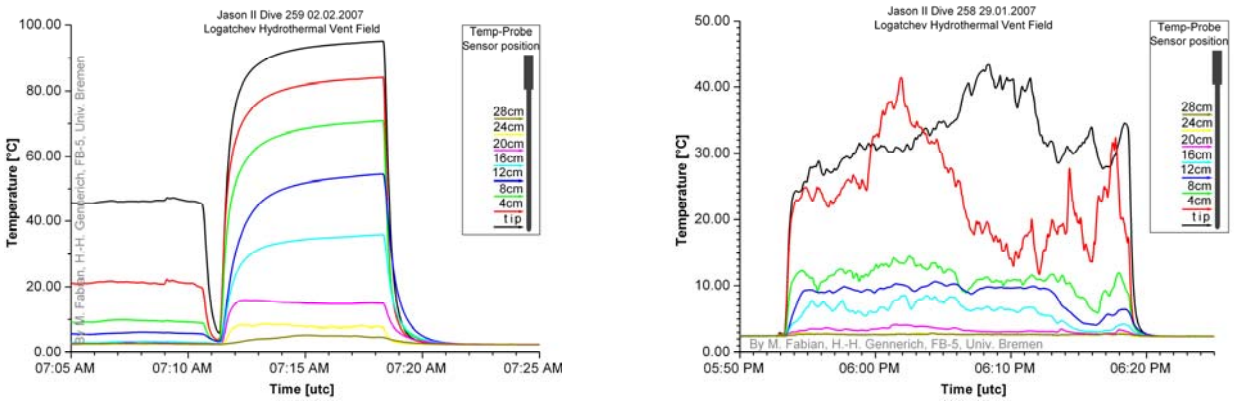


Figure 3-20. Temperature measurement with the ROV T-lance in a white mat next to a push core sample location.

Table 3-4. Maximum emanation temperatures of hot fluids at various LHF structures.

Station	T (°C)	Vent site
259-23	347	Quest
244-1	293	Irina II, beehive 1 on main structure
259-27	300	Irina II, beehive 2 on main structure
244-5	340	Irina II, separate black smoker SE of main structure
257-1	340	Site B
257-2	343	Site B
257-15	335	Candelabra
275-6	349	Anna-Louise
275-3	330	Site A

Temperature measurements in sediments below bacterial mats at site "Mat #1" and "Site F" indicated that the heat flow in the mat habitats is primarily conductive (Fig. 3-21A). The steep and stable temperature gradients of up to more than 100°C in some mat places indicate the presence of fluid close-by in the subsurface that is comparably weakly mixed with seawater. Measurements in diffuse fluid outlets in the "Irina II" mussel bed revealed also steep gradients of more 120°C within the 28 cm. Within the mussel bed layer, however, temperatures did rarely exceed 10°C. Time series measurements showed irregular temperature gradients in diffuse outlets and in the mussel beds indicating horizontal mixing of the diffuse fluids (Fig. 3-21B).



A B

Figure 3-21. Temperature profiles measured with the 8-Channel T-lance in sediment below a bacterial mat at site "Mat #1" (A) and in the "Irina II" mussle bed (B). The eight sensors are interspaced by 4 cm distance along the probe. The black line represents the temperature measurements of the sensor on the probe tip, while the "28 cm"-sensor data respesents the interface between sediment or mussel bed and water. A: The highest temperature of ~100°C occured at the tip of the probe in 28 cm sediment depth. The constant temperature decrease towards the sediment surface indicates conductive heat flow without advective fluid flow. The breakdown of the profile after 6 minutes was caused by the relocation of the probe to another spot in the bacterial mat. B: Irregular temperature profile in a diffuse hydrothermal fluid outled below the "Irina II"mussel bed. Temperatures were lower than 10°C within the mussel bed layer (top 16 cm, sensors "28 cm" to "12 cm") and increased rapidly in the diffuse fluid outled below (>24 cm depth, sensors "8 cm" to "tip"). Crossing time series data lines of the lowermost sensors "4 cm" and "tip" and also irregulate data lines of all other sensors indicate advective heat flow and variable horizontal mixing of the fluid flow below and within the mussel bed.

3.4.5 Fluid Geochemistry of Hot and Diffuse Hydrothermal Fluids

(K. Schmidt, C. Jost)

We investigate the temporal and spatial variability in the fluid geochemistry of the Logatchev field by annual sampling of hydrothermal fluids. During this cruise, all high-temperature LHF vent sites were sampled including the newly recognized smoking crater Candelabra.

Water samples for the analyses of major and trace elements, isotopic composition of selected compounds, and the analyses of organic compounds were obtained from the water column (CTD stations) and from discrete fluid emanation sites (ROV dives). Temperature measurements for hot and diffuse venting sites were conducted with the 8-channel temperature probe (s. section 3.4.4).

"Major" Water Samplers

We used "Major" water samplers (titanium syringes) operated by the Jason II manipulator arm to collect hot and diffuse hydrothermal fluids (Figs 3-22, 3-23). Six samplers were available, two of them belonging to the priority program while four samplers were provided by Jason II. All six "Majors" fit in the Jason II sample basket determining the maximum number of samples that could be retrieved during one dive. The "Majors" are designed for sampling hot water for chemical and biological analyses and are constructed of inert the materials titanium, teflon and silicon in order to preserve water chemistry. Thin black coatings in the sample chamber after

sampling hot fluids indicated sulphide precipitation. We obtained a total of 20 hot and and 18 diffuse fluid samples.

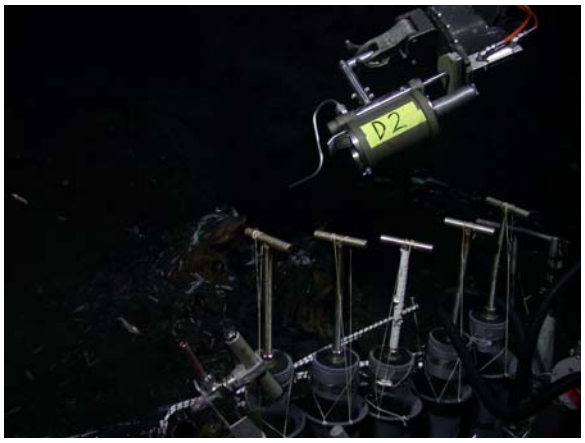


Figure 3-22: "Major" water sampler operated by the ROV manipulator arm.

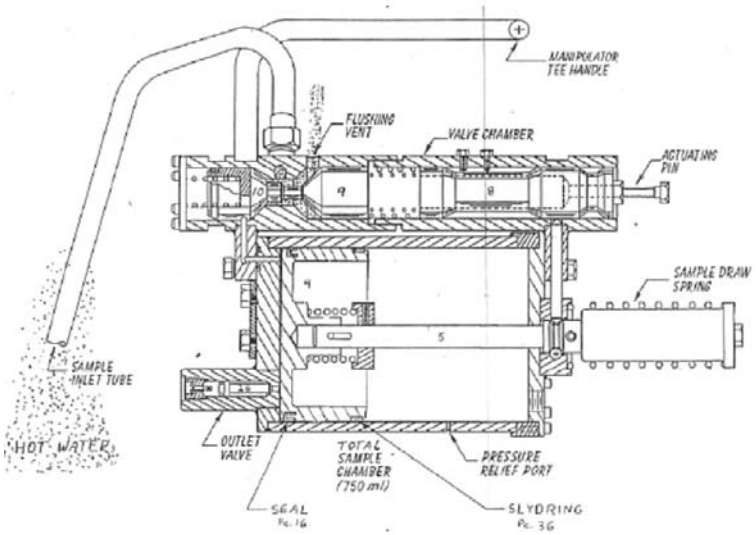


Figure 3-23. "Major" water sampler in cocked mode. Hot (and smoky) fluid passes the inlet tube and exits again through the flushing valve, indicating that the inlet tip is well positioned for sampling undiluted fluids. Pushing the actuation pin with a hydraulic piston of the manipulator arm closes the flushing valve, opens a valve to the sample chamber and releases the syringe piston. A large spring pulls the released piston and the chamber thereby fills with fluid. The sample is removed in the lab by manually pushing it out with the piston or by vacuum extraction (for gas sampling).

Treatment of fluid samples

Fluids were sub-sampled from the "Major" syringes and split into aliquots immediately upon their arrival on board. Small unfiltered aliquots (30 ml) from all fluid samples were measured directly upon retrieval for, ph, Eh, concentrations of total Fe, Fe-II, S^{2-}, Ca, Mg and Cl^-. Other aliquots served for the following chemical and isotopic analyses:

- abundance and isotopic composition of free and dissolved CH_4 and H_2: 100-300 ml
- concentrations of dissolved and particulate major and trace elements: 2x 50-250 ml
- concentrations of selected anions: 50 ml
- abundance and isotope geochemistry of sulphide: 400 ml
- abundance and isotopic composition of inorganic carbon: 10 ml
- isotopic composition of H_2 and O_2: 2x 2 ml
- identification of amino acids: 20-60 ml
- isotopic composition of Cr: 100 ml
- cultivation of microorganisms: 400 ml

For the determination of concentrations of dissolved major and trace elements, aliquots of 50-100 ml were pressure-filtrated with Nitrogen (99.999%) on polycarbonate filtration units (Sartorius, Germany) at 1 bar through pre-cleaned 0.2 µm Nucleopore PC membrane filters.

Selected sample aliquots were acidified to pH 1 was with 100 µl sub-boiled concentrated nitric acid per 50 ml (for ICP analyses) and with supra-pure HCl to pH 2 (for analysis of Cr isotopes). All work was performed in a class 100 clean bench (Slee, Germany) using only all-plastic labware (polypropylene, polycarbonate, PFA Teflon). Rinse water was ultrapure (>18.2 Mohm), dispensed from a Millipore Milli-Q system.

Methods used for on-board analyses

pH and Eh measurements

For all samples collected with either the CTD/Rosette or during ROV dives, pH and Eh were measured with WTW electrodes (Ag/AgCl reference electrode) on unfiltered sample aliquots immediately after sample recovery.

Chloride titration

In order to determine whether or not phase separation affected the chemical composition of the hydrothermal fluids, fluid samples from hot vents were subjected to chloride concentration analysis. Measurements were performed as titration with 0.1 M AgNO3 solution, using fluorescene-sodium as indicator. CTD/Rosette samples from a water column profile served as a reference.

Magnesium and calcium titration

The content of Ca and Mg was calculated after a sample titration using Erio T as an indicator and alkaline buffer medium (pH 10 with NH_4Cl/NH_3 buffer solution). The pH was first adjusted to 10 and after addition of a small amount of Erio T, the solution was titrated from red to blue with EDTA 0.1 M solution. Ca concentrations were determined using Murexid as an indicator and alkaline medium (pH ≥ 12 with NaOH 2 M solution). The pH was adjusted, Murexid was added, and the solution was titrated from red to violet with EDTA 0.1 M soluytion. The Ca content was then subtracted from the total content of Ca and Mg to obtain the Mg concentrations.

Photometric determination of iron concentrations

The principle of this method is the determination of an orange-red ferroin complex, which is formed by Fe(II) ions in the fluid sample after 15 minutes reaction time with 1,10-phenantroline at a pH range of 3 to 5. Additionally to the quantification of Fe(II), it is also possible to measure the Fe_{tot} fraction in the sample by reducing all Fe with ascorbic acid. Fe(III) is determined as difference between Fe_{tot} and Fe(II). Analyses were performed with a Biochrom Libra S12 spectral photometer. The absorption was measured at 511 nm using a quartz cell with 1 cm path length. Fe concentrations were measured only in filtered samples of hydrothermal fluids. Samples with concentrations above 100 mg L^{-1} were measured in diluted samples.

Photometric determination of sulphide

Diluted sulphide in the samples was first preserved by the addition of zinc acetate in sufficient amounts to precipitate sulphide as ZnS. Aliquots of each sample were treated with colour reagent N,N-dimethyl-1,4-phenylenediammonium dichloride and the catalyser ferric iron solution. Measurements were performed using a Biochrom Libra S12 spectral photometer and the absorption was measured at 660 nm using a quartz cell with 1 cm path length.

Voltammetric determination of trace element concentrations

Concentrations of sulphide and trace metals were analysed by voltametry. This method can differentiate with high sensitivity between different redox species and, in combination with UV digestion of the water samples, between free and complexed forms of ions in solution. All voltammetric measurements were performed using a 757 VA Computrace stand (Metrohm) with a standard PC. The three-electrode configuration included a multi-mode electrode (MME) as the working electrode, an Ag/AgCl reference electrode (3 M KCl), and a platinum wire as the auxiliary electrode. Unfiltered fluid samples were analysed for total dissolved sulphide in alkaline solution using the method after Metrohm Application Bulletin 199/3e. Manganese was determined using anodic stripping voltammetry (ASV) in borate buffer medium, according to Metrohm Application Bulletin 123/3e.

Further analyses in the home laboratories

Selected samples will be analysed at Univ. Kiel for the compositions of major elements (Mg, Ca, Ba, Sr, Na, K, Si, Fe, Mn, B, Cl) and trace elements (e.g., I, Br, Li, Al, Cs, Ba, Sr, Y-REE, Fe, Mn, Cr, V, Cu, Co, Ni, Pb, U, Mo, As, Sb, W, PGE) by ICP-OES (Spectro Ciros SOP CCD) and ICP-MS using both collision-cell quadrupole (Agilent 7500cs) and high-resolution sector-field based instrumentation (Micromass PlasmaTrace2).

The Jacobs University group will use voltammetry for further trace metal analyses (Zn, Cd, Pb, Cu, Co, Ni, Ti, V, Mo, U, Tl, Pt). ICP-MS and ICP-OES measurements of minor elements and trace metals listed above will be also performed by JUB in order to compare results between laboratories. Li and Na will be analysed by flame photometry, and photometric methods will be used to determine anionic compounds (silicate, phosphate, sulphate, chloride). The duplicate coverage of some elements with different methods will serve for an evaluation of the methods and the data.

The isotopies of sulphur (in sulphides and sulphates), oxygen (in sulphates; fluid samples), and hydrogen (fluid samples) will analysed at the Westfälische Wilhelms-Universität Münster.

At the Bundesanstalt für Geowissenschaften und Rohstoffe (BGR) in Hannover T

The concentrations of amino acids in the fluids (HPLC-FD), their racemization (GC-FID) and their isotopic composition (GC-irmMS) will be analysed for selected samples by Bundesanstalt für Geowissenschaften and Rohstoffforschung. Concentrations of ammonium and its nitrogen isotopic composition will be investigated. The concentration and carbon isotopic composition of DIC will be analysed by a Finnigan Gasbench-Delta Plus-MS coupling.

Preliminary results

The chemical and isotopic characterization of hydrothermal vent fluids strongly depends upon the sampling procedure and the sampling location in the orifice. As LHF chimney structures are often very friable and brittle (namely beehive structures at the “Irina II” main structure and smoking holes at the Irina I crater), the sampling of hydrothermal fluids was not an easy task. This is reflected in the varying sample quality with different proportions of intermixed seawater.

Fluid samples obtained with the “Major” samplers from high-temperature vents are generally of high quality (<30% seawater, estimated from Ca concentration). The pH ranged in these samples from 3.5 to 4.5 while sulphide concentrations ranged were 0.5 to 0.8 mM. Total iron

concentrations reached up to 3.5 mM. Chloride concentrations did not show significant depletion and were similar to seawater (within the range of an analytical error of 5%). Phase separation was not evident. The exact hydrothermal fluid proportion in the obtained samples will be finally quantified in the home laboratories (Mg concentration with ICP-OES). More details on the fluid concentrations of diluted sulphide and a number of trace metals analysed onboard are listed n the appendix.

The high Fe/H_2S ratios and the high concentrations of dissolved CH_4 and H_2 (up to 1.5 mM and 6 mM, respectively; see section 3.3.4: gas chemistry) fit to a hypothesis according to which alteration of ultramafic rocks occurs in the reaction zone of the LHF system. Similar to the results of previous analyses, our preliminary results do not indicate major differences between the different LHF vents. However, Fe concentrations increased significantly since Meteor cruise M 64/2 in 2005 (3.5 mM vs. 2.5 mM). The temperatures did not rise since then and therefore cannot have affected the fluid chemistry. Changes in the alteration pattern in the sub-seafloor should be considered for an alternative explanation.

3.4.6 Microbiology of Diffuse Fluids at the Logatchev Hydrothermal Field

(M. Perner)

In previous cruises to the LHF, hot hydrothermal fluid emissions have been collected from areas of smoking craters and the main chimney complex Irina II. Previous samplings served for gaining an overall view of the microorganisms present at the LHF. As hydrothermal fluids rise to the surface, they entrain microorganisms. This causes a mixture of microorganisms in the fluid samples which originate from multiple habitats along the fluid pathway. Our aim for this cruise was to identify microorganisms that are characteristic for diffuse hydrothermal fluids of specific locations. Emphasize was put on diffuse outflow from the "Irina II" main structure, the surrounding mussel patch and diffuse fluids from the mussel patch near "Quest".

Samples and methods

Fresh samples were examined on board under the microscope for the presence of microorganisms. Identification of Archaea and Bacteria and analyses of their abundances will follow in the home laboratory by constructing clone libraries and using DGGEs and Fluorescence in situ Hybridization (FISH) on the basis of 16S rRNA genes. Cultivation experiments were conducted for autotrophic prokaryotes, which use either H_2 or reduced sulphur compounds for energy generation.

Microbial Metabolisms were investigated on board by CO_2 incorporation measurements (measurements by J. Petersen). The investigation of microbial metabolisms will be continued in the home laboratory by the use of functional genes encoding key enzymes of the reverse tricarboxylic acid and Calvin Benson-Basham cycle. The CO_2 incorporation measurements were conducted for two diffuse fluid sites (main structure "Irina II" and mussel patch at Irina II) using H_2 and S^{2-} as electron donors. Functional genes encoding key enzymes of hydrogen oxidation (hynL gene) will also be investigated in the home laboratory.

Cultivation experiments have been started on board and will be continued in the home laboratory:

i. along a temperature gradient
ii. use of various electron donors (H_2, H_2S, S^0, CH_4)
iii. suitable electron acceptors (O_2, NO_3, Fe^{3+}, S^0)
iv. along a sulphide gradient

One specific culture was chosen for measurements on H_2 uptake and H_2S production (through reduction of elemental sulphur). The decline of H_2 and the increase of S^{2-} was measured over a period of 42 hours (by P. Wefers and K. Schmidt). The culture was sub-sampled at various intervals during the experiment for the analysis of the prokaryotic assemblage.

Results

Microscopic observations of microorganisms inhabiting freshly taken samples revealed relative low abundances of prokaryotes. Molecular analyses of the microbial community based on 16S rRNA and functional genes in the home laboratory will reveal abundance and activity patterns of specific bacterial and archaeal groups. The experimental enrichment of "Irina II" diffuse fluid samples with vitamins along a sulphide gradient showed that sulphide-oxidizing microorganisms are best adapted to sulphide concentrations of 50 µM (Fig. 3-24A). After enrichment of the diffuse fluid with various energy donors and electron acceptors, the majority of the prokaryotes grew optimally around 44°C (Fig. 3-24B).

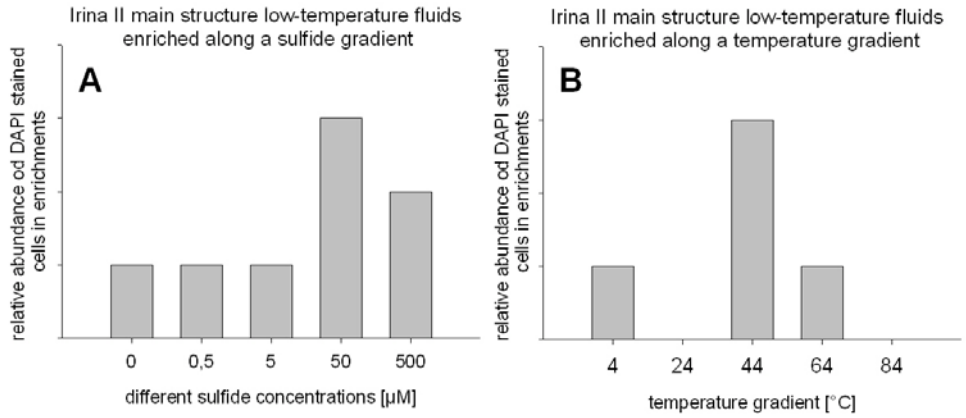


Figure 3-24. Relative abundance of DAPI stained cells after cultivation along gradients of sulphide concentration (A) and temperature (B). Samples originate from fluids of the main structure at Irina II. At 24°C and 84°C, no growth was observed in the cultures (B).

Cultivation experiments also revealed that certain microorganisms grow at temperatures of up to 95.5°C and that some groups are more characteristic for specific locations than others (Fig. 3-25A-E).

One culture from diffuse fluids at a "Irina II" mussel patch showed production of sulphide (from elemental sulphur) and was chosen for detailed analyses. The medium used selects for autotrophic Epsilonproteobacteria. At 37°C, a decline of the H_2 content and concentrations of sulphide was determined for prokaryotes inhabiting this culture (Fig. 3-26). Constant H_2 concentrations in a reference culture confirmed that the observed consumption of H_2 can be attributed to microbial uptake rather than leakage from the cultivation apparatus.

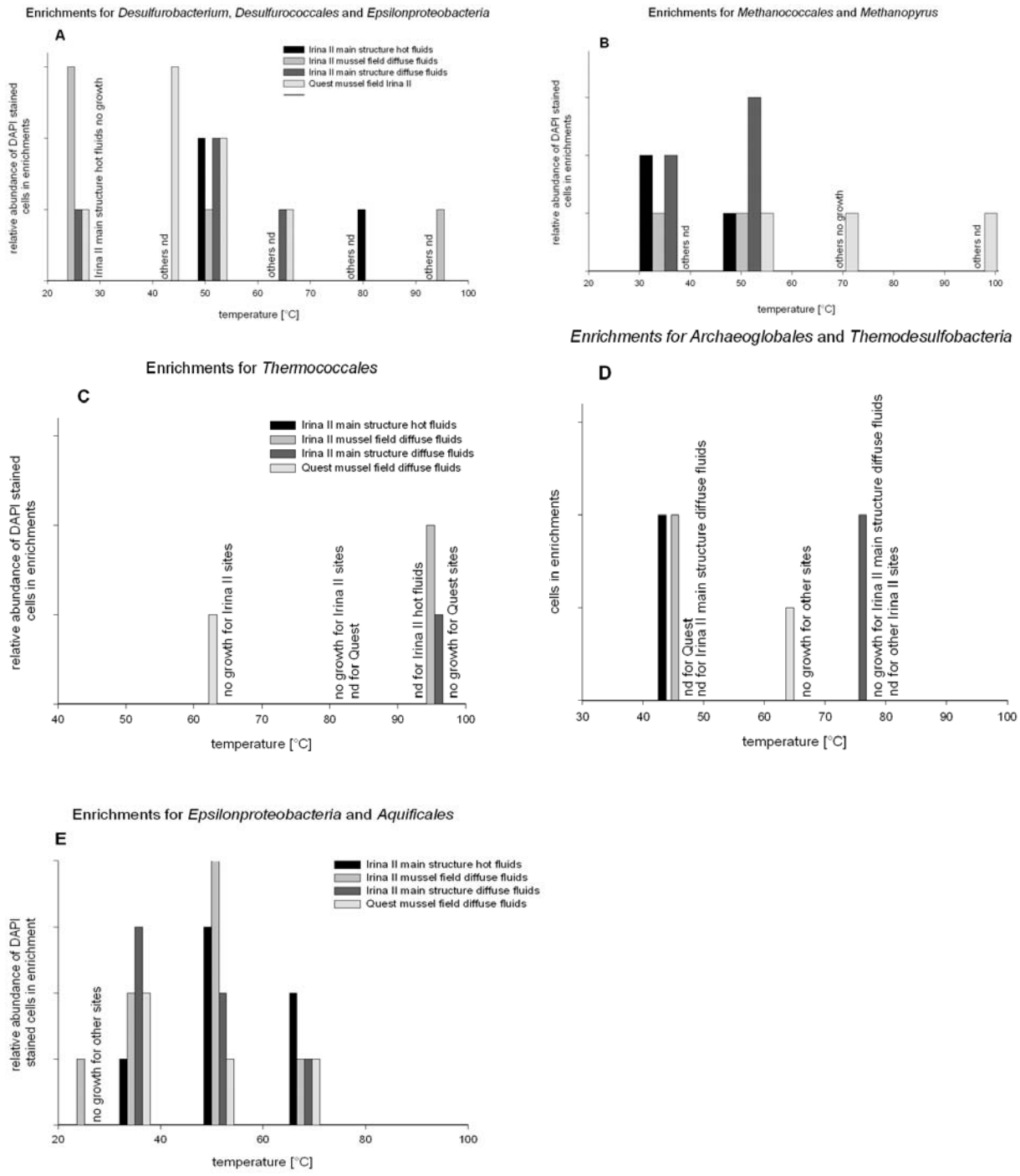


Figure 3-25. Relative abundance of DAPI stained cells in cultures enriched for *Desulfurobacterium*, Desulfurococcales and Epsilonproteobacteria (A), Methanococcales and *Methanopyrus* (B), Thermococcales (C), Archaeoglobales and Thermodesulfobacteria (D) and Epsilonproteobacteria and Aquificales (E) at various temperatures ("others no growth" = no cultures for other locations exist; nd = not determined)

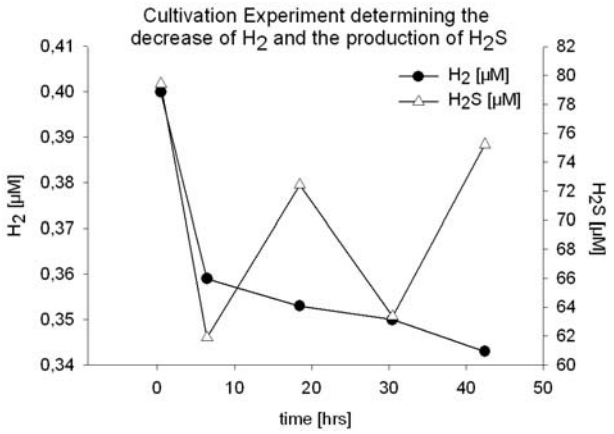


Figure 3-26. An enrichment selecting for H_2 oxidizing and S° reducing Epsilonproteobacteria at 37°C was chosen for detailed analyses of the decline of H_2 and production of H_2S over a period of time (Fluid chemistry measurements by P. Wefers and K. Schmidt).

The CO_2 incorporation experiments (conducted by J. Petersen) showed that more CO_2 is being fixed through H_2S than through H_2 (Fig. 3-27). This was observed in samples from an "Irina II" mussel patch and the main chimney structure.

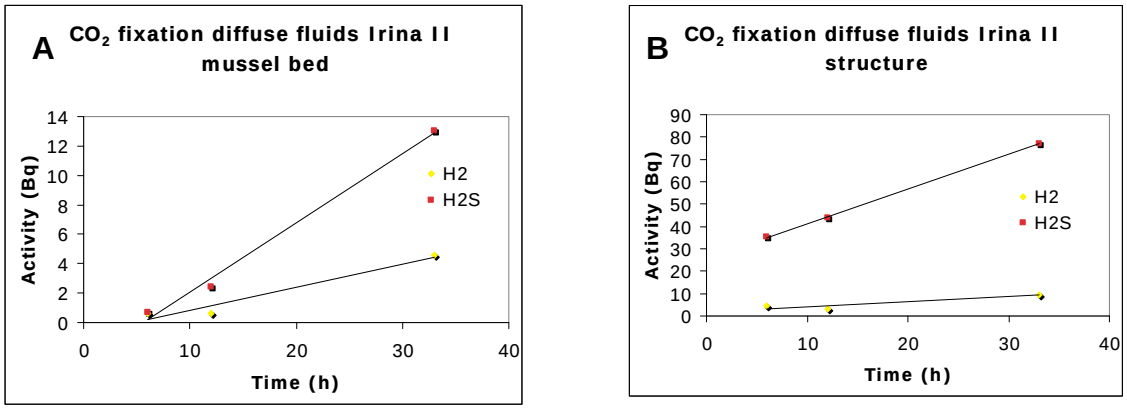


Figure 3-27. CO_2 incorporation experiments on diffuse fluids collected in an "Irina II" mussel patch (A) and the main structure (B) using H_2 and H_2S as electron donors. CO_2 incorporation experiment conducted by J. Petersen)

3.4.6 Hydrothermal symbioses

(J. Petersen, S. Wetzel)

The main goal of the symbiosis research group for this cruise was to investigate the transfer of energy from vent fluids to the dominant members of the faunal community at Logatchev, the mussels *Bathymodiolus puteoserpentis*. These mussels have greatly reduced guts, and their main source of nutrition is symbiotic bacteria that live in their gills. Two types of symbionts coexist in the gill cells: thiotrophic bacteria that use reduced sulphur compounds such as sulphide as an energy source and fix CO_2 as a carbon source, and methanotrophic bacteria that use methane as both an energy and a carbon source. The energy sources for the mussel symbioses are delivered by the hydrothermal fluids that carry high concentrations of sulphide, methane, hydrogen, and other reduced compounds. The concentrations of these energy sources vary over time and space

and play a major role in determining the biomass, activity and productivity of the vent community. We have defined these interactions between hydrothermal and biological processes as the geobiological coupling between vent fluids and symbiotic primary producers. During this cruise, we contributed to our ongoing studies of geobiological coupling at MAR vents by:

1) Identifying the energy sources used by the mussel symbionts
2) Comparing the rates at which different energy sources are used by the symbionts
3) Comparing how consumption rates of different energy sources are related to their concentrations at vent sites

To collect geochemical data at a scale relevant to the mussel community, we worked in close collaboration with the fluid and gas chemistry groups.

Mussels were collected using the ROV manipulator arm in nets at the two different sites where mussels are found at Logatchev, "Irina II" and "Quest". Table 3-5 is a summary of sampling sites with the relevant habitat parameters including profiler data (Microsensor group), temperature data (online and from in situ temperature loggers), and fluid chemistry that were measured.

Table 3-5. Mussel collection sites and corresponding in situ, temperature, and fluid data. n. d. = not detected, - = no data available

Site	Mussel sample	Incubation	Profiler data	Temperature data		Fluid data				
	Station number		Station number	Temperature logger	Online °C	Station number	$[CH_4]$ (µM)	$[H_2]$ (µM)	$[S^{2-}]$ (µM)	pH
Irina II	244 ROV/9	H_2, H_2S, CH_4								
	251 ROV/11			Logger #8	23	251 ROV/10	0,648	0,586	-	7,95
	251 ROV/14			Logger #4	33	251 ROV/13	0,875	1,724	-	8,03
	253 ROV/1			Logger #9	28	251 ROV/7	1,265	0,682	-	8,01
	253 ROV/7			Logger #2	15	253 ROV/5	0,335	0,184	n. d.	8
	253 ROV/8	H_2, H_2S, CH_4, ^{13}C		Logger #0		253 ROV/6	1,668	4,125	n. d.	7,99
	259 ROV/29	H_2S								
	263 ROV/12	H_2, H_2S, CH_4	263 ROV		148	263 ROV/10	3579,795	196,187	< 6	8,18
	267 ROV/1	H_2S								
	282 ROV/3	^{13}C				282 ROV/2	n. d.	n. d.	25	6,18
Quest	259 ROV/12	^{13}C			151					
	267 ROV/7			Logger #298	111					
	267 ROV/8			Logger #11	10 to 13					
	267 ROV/13			Logger #16	3	267 ROV/12	0,412	0,024	-	8,19
	271 ROV/5	H_2, H_2S, CH_4			113	271 ROV/4	353,836	1178,615	32	6,4

On board, the mussels were dissected and prepared for morphological and molecular analyses in the home laboratory. For on board analyses of uptake rates of energy sources, gill tissues (that contain the bacterial symbionts) were incubated in methane, sulphide, and hydrogen and the decrease of these energy sources over time was measured in the headspace or fluid of the incubation vial. Carbon fixation rates were determined radioactively, using $^{14}CO_2$ for sulphide and hydrogen, and $^{14}CH_4$ for methane. Vials with mussel foot tissue (that is symbiont free) or with only sea water were used as controls.

Although not all results from our onboard experiments were available at the time of writing, some first results can already be reported. Sulphide is clearly used as an energy source by the mussel symbionts at both "Irina II" and "Quest", based on experiments showing a much greater decrease of sulphide in vials containing mussel gill tissues than in the controls with foot tissue or seawater (Figs 3-28, 3-29). In correspondence to the linear decrease in sulphide, $^{14}CO_2$ fixation rates increased linearly until sulphide concentrations apparently became too low for further $^{14}CO_2$ fixation (Figs 3-27, 3-28). The rate of sulphide uptake was higher at "Quest" (Fig. 3-29) than at "Irina II" (Fig. 3-28), which corresponds well with the higher sulphide concentrations measured in the mussel habitat at "Quest" compared to "Irina II" (Table 3-5). This may indicate a correlation between conditions in the mussel habitat and symbiotic activity.

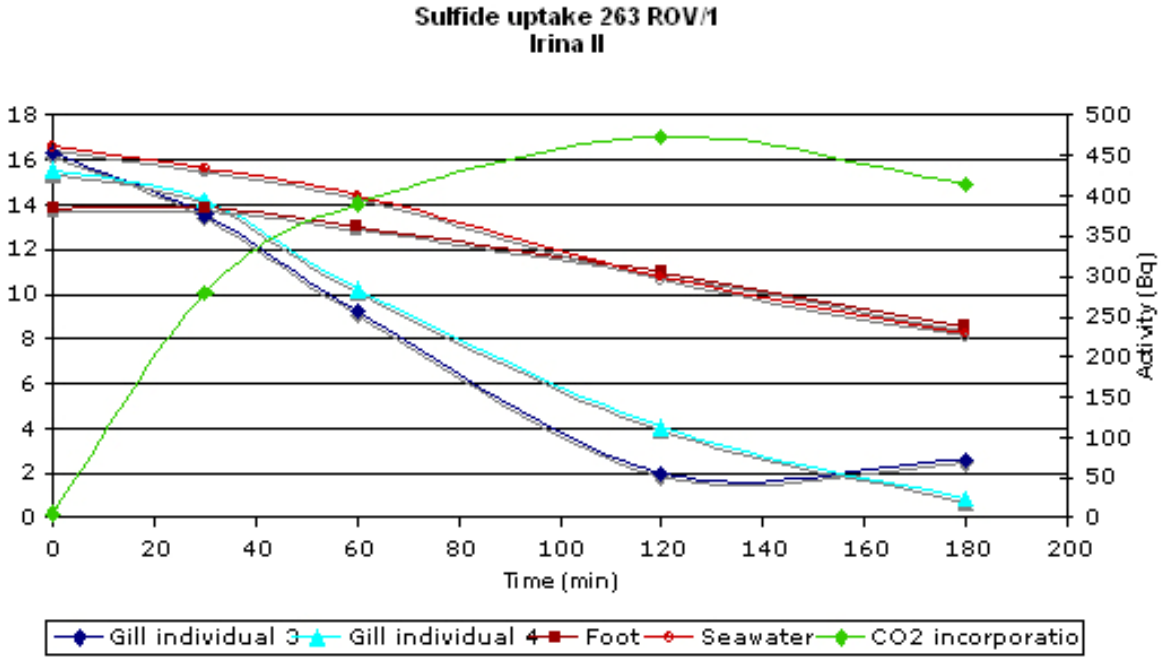


Figure 3-28. Irina II: Decrease of sulphide in symbiont-containing gill tissues from 2 mussel individuals (blue lines) is linear until approx. 3 µM sulphide, while almost no decrease of sulphide was observed in seawater (red line) and symbiont-free foot tissue (burgundy line). Fixation of $^{14}CO_2$ (green line) increased linearly, but leveled off at the end of the experiment, in correspondence to the leveling off of sulphide uptake rates.

In addition to sulphide, we were also able to show that hydrogen is used as an electron donor for CO_2 fixation by the mussel symbionts. Again in the case of hydrogen, we observe that at the "Irina II" site, measured hydrogen concentrations are lower than at "Quest" (Table 3-5), and correspondingly, that the rate of $^{14}CO_2$ incorporation by mussel symbionts in the presence of hydrogen is higher at "Quest" than at Irina II.

In summary, our first results indicate that both sulphide and hydrogen can be used as energy sources by mussel symbionts, and that the rates at which these energy sources are used correlate with their concentrations in the mussel environment. It is surprising that at Irina II that CO_2 is fixed more efficiently with sulphide than with hydrogen, as the oxidation of hydrogen provides the bacteria with more energy than the oxidation of sulphide. The reasons for this need to be investigated during future cruises.

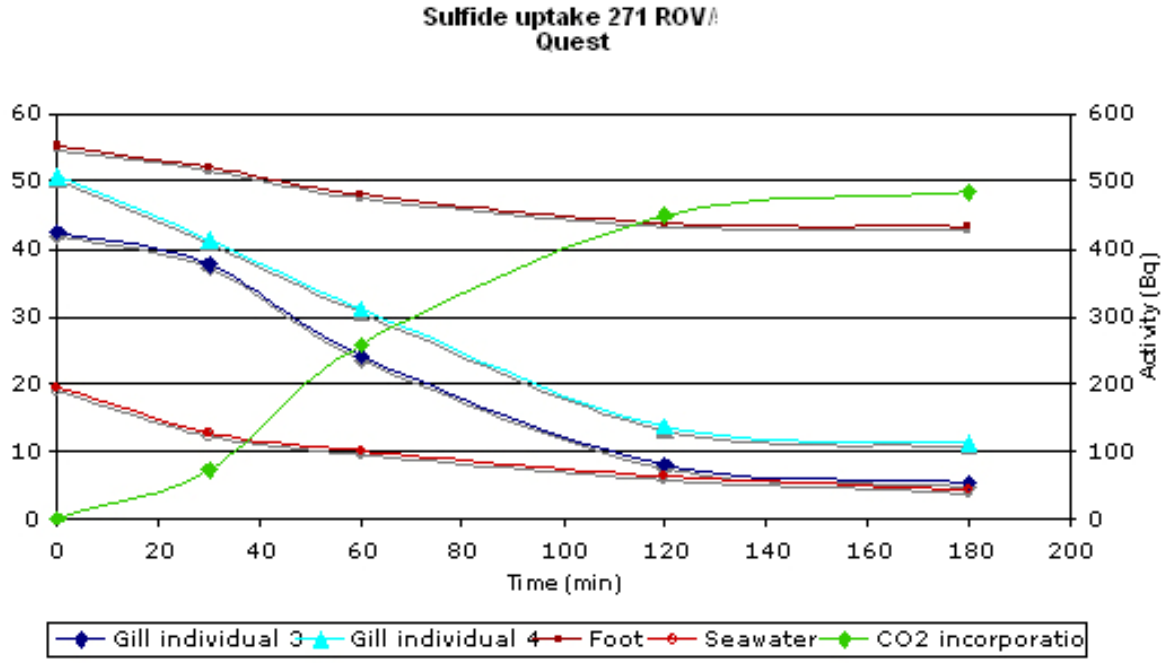


Figure 3-29. "Quest": Decrease of sulphide in symbiont-containing gill tissues from 2 mussel individuals (blue lines) is linear until approx. 10-15 µM sulphide, while almost no decrease of sulphide was observed in seawater (red line) and symbiont-free foot tissue (burgundy line). As for Irina II, fixation of $^{14}CO_2$ (green line) increased linearly, but levelled off at the end of the experiment.

3.4.7 Metagenomics: Diversity and Function of chemosynthetic microbial communities in hydrothermal vent sediments

(R. Schauer)

The main goal of the Metagenomics group was to continue the investigation of microbial communities in three different hydrothermally influenced sediment locations started with Meteor cruise M 64/2. Two sites located near or between hot smokers and that were sampled during M 64/2 (257 ROV, 263 ROV) are characterised by a white surface and are. The third site lies close to a mussel field next to "Quest". Another important task was to sample the hydrothermal buoyant plume for metagenomic analyses of the plume specific microbial community.

Molecular/ microbial methods

Sediments were sampled using the Jason II operated push cores. Immediately upon retrieval, the sediment cores were sectioned into slice of 1 or 2 cm. Sub-samples of 3 x 1 g of each slice were frozen at -20°C for DNA extraction and diversity studies. 5-10 g of sediment were frozen at -80 °C for metagenomic analyses. The rest of the slices was fixed with 50% ethanol in phosphate buffered saline (PBS) and 4% formaldehyde (FA/PBS) for 3-6 h, respectively, for cell count determination, and catalyzed reporter deposition fluorescence in situ hybridisation (CARD-FISH). A dilution series was prepared for cultivation experiments with aerobic and anaerobic media. Thiosulphate was used as an electron donor in aerobic media, while for the anaerobic

cultivation media selective for nitrate-reducers and sulphate-reducers were prepared by using various electron donors.

Deep-water collected with the CTD-rosette in the buoyant hydrothermal plume were used for metagenomic analyses of microbial plume population. Microbial diversity in the plume will be analysed from 245 CTD and 280 CTD and compared to the diversity in non-plume deep-water environment sampled with 242 CTD. Large volumes of each CTD cast (50 – 220 L) were filtered on 142-mm wide cellulaseacetate membranes (0.22 µm pores) in order to concentrate plume microorganisms. 2 L of plume water were additionally concentrated on polycarbonate membrane filters (0.22 µm pores) for DNA-extraction. The plume samples were fixed with 1% FA/PBS for 12-14 h for CARD-FISH experiments.

Samples and preliminary results

Continuing investigations of sediment samples from M 64/2 have revealed a high microbial diversity. In particular, sediments with a characteristic white surface and the brownish sediment close to "Quest" (Fig. 3-30) show strong differences in their bacterial and archaeal composition.

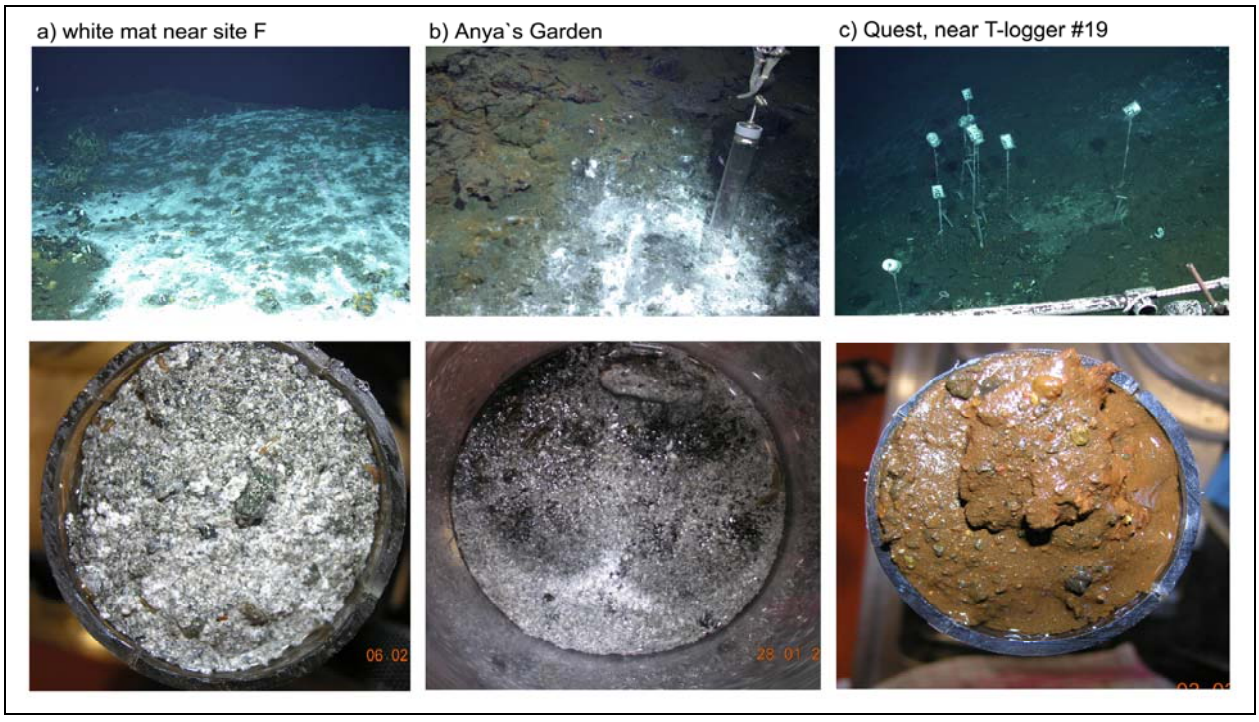


Figure 3-30. Sampling sites for hydrothermally influenced sediments and corresponding push core samples. a) White mat at "Site F"; b) "Mat #1" close to Anya`s Garden; c) brown sediment next to "Quest".

Measurements of microbial turnover rates in sediments

Turnover rates of specific microbial processes were measured experimentally with radio tracer experiments. Sub-sample mini-cores (1 cm diameter) were pushed into the core surface by vacuum sucking. Pre-drilled ports at 1 cm intervals along the length of the mini cores were sealed with a silicone based aquarium sealant. They served for the injection of radiotracers in the

various experiments: Sulphate reduction rate experiments used 5 µl (100 kBq)/injection

Table 3-6. Locations of push core samples that will be used for metagenomic analyses.

Site	**location**	**Sediment sample**	**position**	**profiler data**	**temperature data**	**Fluid data**
				Station number	station number	station number
Anya`s Garden (marker 23)	white mat	249 ROV-6 249 ROV-7 259 ROV-5 263 ROV-1 263 ROV-2 263 ROV-3	14°45.171 44°58.768 14°45.174 44°58.773 14°45.171 44°58.768	249 ROV-1	249 ROV-3 (55 °C , 28 cm) 249 ROV-4 (61 °C, 28 cm) 249 ROV-5 (31°C, 28 cm) 249 ROV-8 (65 °C, 28 cm) 249 ROV-9 (28 °C, 28 cm) 259 ROV-2 (24 °C, 28 cm) 259 ROV-3 (23 °C, 28 cm) 259 ROV-4 (22 °C 28 cm)	none
Quest	near T-logger #19	259 ROV14 259 ROV18 259 ROV21 271 ROV-7	14°45.178 44°58.900 14°45.1822 44°58.8302	None	259 ROV-15 (81 °C, 28 cm) 259 ROV-16 (17°C, 28 cm) 259 ROV-17 (48 °C, 28 cm) 259 ROV-19 (8 °C, 28 cm) 259 ROV-20 (5 °C, 28 cm) 271 ROV-9 (11 °C, 28 cm)	none
Quest	next to marker 27	267 ROV16 267 ROV17		None	none	none
White mat (marker 26)	near site F	271 ROV14 271 ROV15 271 ROV21	14°45.1356 44°58.7306	275 ROV-1	271 ROV-16 (99 °C, 28 cm) 271 ROV-17 (82 °C, 28 cm) 271 ROV-22 (5 °C, 28 cm) 271 ROV-23 (7 °C, 28 cm)	271 ROV18
Soft sediment	next to chamber	251 ROV-1	14°45.1942 44°58.7791	None	251 ROV-2	none
Irina I	bacterial mat on rock	257 ROV-9		None	none	none

radioactively labelled $^{35}SO_4^{2-}$ solution; the rates of anaerobic oxidation of methane was determined with 5 µl (0,24 kBq)/injection $^{14}CH_4$-tracer; methanogenesis rate measurements used 3 µl (111 kBq)/injection ^{14}C-labelled bicarbonate. After injection, the experiments incubated for 24 h at room temperature. Microautoradiography fluorescence in situ hybridisation experiments (MAR-FISH) used injections of 5 or 10 µl of ^{14}C-labeled bicarbonate (incubation time: 8-9 h at room temperature). For the determination of sediment porosity, the sediment cores sub-sampled with cut-off luer syringes. The syringe cores were sealed with Parafilm and stored at -20°C.

The tracer experiments will show activity patterns of sulphate reducers, anaerobic methane oxidizers (AOM) and methanogenic microorganisms along the sediment cores. MAR-FISH experiments will serve for a determination of the abundance of autotrophic bacteria, which use CO_2 as single carbon source.

Diversity analyses and metagenomics

The push core samples obtained from the sites listed in table 3-6 will be used to investigate the microbial diversity of microbial communities in hydrothermally influenced sediments. The results will be compared with existing data in order to estimate the variability of the microbial communities in hydrothermally influenced sediments. We will test if diversities are homogeneous within cores and if single cores are representative for the microbial community of entire sites. A main focus will lie on investigations of the metabolic pathways of the dominant microorganisms in the three selected sites. Fosmid libraries will be constructed and analysed for the inventory of functional genes indicating the metabolic capacities of the determined microorganisms.

Apart from sediments, we also sampled microbial mat from the surface of a rock piece collected next to the Irina I smoking crater in the southern LHF area. (Fig. 3-31). Microscopic examination revealed that this mat is dominated by *Beggiatoa*-resembling filaments with small inclusions. The size and shape of the inclusions suggest that they may consist of stored elemental sulphur, and that these filamentous microorganisms may use sulphide as an energy source which they oxidise to elemental sulphur. We expect more information on the diversity and possible ecological roles of these organisms by phylogenetic analyses on the basis of 16S rRNA including the screening of clone libraries and CARD-FISH experiments.

Fig 3-31: Bacterial mat on rock pieces. A and B: Stereo-microscopy image of the bacterial mat on rock pieces; C: light microscopy image of single microbial mat filaments from rock surfaces in A and B.

3.5. Station Lists

Table 3-7. Begin of stations and bottom contact/gear at depth/start profile. Position data in italics = Posidonia coordinates, bold italics = LBL coordinates.

Station no.	Station type	Jason dive no.	Date	Begin station (surface)				ROV bottom contact / CTD at depth / Start profile			
				Time UTC	Lat	Long	Depth	Time UTC	Lat	Long	Depth
241-EM120	Multi-Beam Echosounder		24.01.2007					01:00	14° 28.450 'N	59° 32.360 'W	3152.5
242-CTD	CTD		25.01.2007	17:05	15° 07.408 'N	51° 22.246 'W	5007.2	18:21	15° 07.408 'N	51° 22.246 'W	5007.5
243-LBL-TR	LBL Transponder Mooring		27.01.2007	03:18	14° 46.170 'N	44° 57.980 'W	2747.4		***14° 46.188 'N***	***44° 58.028 'W***	2747.4
243-a-LBL-TR	LBL Transponder Mooring		27.01.2007	04:07	14° 45.390 'N	44° 57.920 'W	2765.4		***14° 45.420 'N***	***44° 57.954 'W***	2765.4
244-ROV	ROV Dive	J2-253	27.01.2007	11:37	14° 44.546 'N	44° 58.582 'W	3074.8	13:27	***14° 45.552 'N***	***44° 59.127 'W***	3025.0
245-CTD	CTD		27.01.2007	21:45	14° 46.000 'N	44° 59.230 'W	3272.6	22:58	14° 46.010 'N	44° 59.230 'W	3275.2
246-CTD	CTD		28.01.2007	02:06	14° 45.200 'N	45° 01.000 'W	3779.9	03:29	14° 45.210 'N	45° 01.000 'W	3790.6
247-CTD	CTD		28.01.2007	05:56	14° 44.000 'N	44° 59.000 'W	3286.5	07:30	14° 44.000 'N	44° 59.000 'W	3298.6
249-ROV	ROV Dive	J2-254	28.01.2007	11:52	14° 45.030 'N	44° 58.558 'W	3021.6	13:51	***14° 45.156 'N***	***44° 58.752 'W***	3024.2
250-EM120	Multi-Beam Echosounder		28.01.2007					21:55	14° 47.210 'N	44° 59.280 'W	3493.4
251-ROV	ROV Dive	J2-255	29.01.2007	11:30	14° 45.036 'N	44° 58.564 'W	3019.8	13:17	***14° 40.030 'N***	***45° 00.033 'W***	3021.3
252-CTD	CTD / MAPR tow-yo		30.01.2007	00:10	14° 43.950 'N	44° 58.030 'W	2968.0	01:56	14° 43.950 'N	44° 58.020 'W	2959.5
253-ROV	ROV Dive	J2-256	30.01.2007	13:32	14° 45.024 'N	44° 59.006 'W	3034.8	15:21	***14° 40.007 'N***	***45° 00.005 'W***	3030.0
254-ELEV	Elevator		30.01.2007	14:23	14° 45.180 'N	44° 58.770 'W	3031.8				
255-ELEV	Elevator		30.01.2007								
256-EM120	Multi-Beam Echosounder		31.01.2007					01:37	14° 44.990 'N	44° 56.940 'W	3018.9
257-ROV	ROV Dive	J2-257	31.01.2007	11:33	14° 44.576 'N	44° 58.582 'W	3052.7	13:01	***14° 40.012 'N***	***45° 00.000 'W***	2952.5
258-CTD	CTD / MAPR tow-yo		01.02.2007	01:36	14° 43.700 'N	44° 58.820 'W	3316.2	02:55	14° 43.700 'N	44° 58.820 'W	3315.9
259-ROV	ROV Dive	J2-258	01.02.2007	11:50	14° 44.588 'N	44° 59.024 'W	3079.8	13:20	***14° 45.134 'N***	***44° 58.829 'W***	3032.3
260-ELEV	Elevator		01.02.2007	13:22	14° 45.190 'N	44° 58.750 'W	3019.9				
261-ELEV	Elevator		02.02.2007								
262-EM120	Muliy-Beam Echosounder		02.02.2007					15:15	14° 47.560 'N	44° 56.360 'W	2901.6
263-ROV	ROV Dive	J2-259	02.02.2007	23:57	14° 45.024 'N	44° 58.582 'W	3049.8	01:28	***14° 40.048 'N***	***44° 59.986 'W***	3037.2
264-ELEV	Elevator		03.02.2007	00:37	14° 45.190 'N	44° 58.750 'W	3018.1				
265-ELEV	Elevator		03.02.2007								
266-CTD	CTD / MAPR tow-yo		03.02.2007	14:45	14° 43.630 'N	45° 00.400 'W	3940.3	16:03	14° 43.363 'N	45° 00.390 'W	3939.9
267-ROV	ROV Dive	J2-260	04.02.2007	00:30	14° 44.570 'N	44° 59.024 'W	3111.0	01:57	***14° 45.118 'N***	***44° 58.786 'W***	3026.1
268-ELEV	Elevator		04.02.2007	01:20	14° 45.180 'N	44° 58.770 'W	3041.8				
269-ELEV	Elevator		05.02.2007								
270-EM120	Multi-Beam Echosounder		05.02.2007					02:17	14° 56.880 'N	45° 05.920 'W	2808.4
271-ROV	ROV Dive	J2-261	05.02.2007	11:37	14° 45.018 'N	44° 59.042 'W	3083.5	13:08	***14° 45.157 'N***	***44° 58.654 'W***	3042.5
272-MOOR-T	Temperature Mooring		06.02.2007	00:35	14° 45.096 'N	44° 58.432 'W	3013.0	02:33	*14° 45.093 'N*	*44° 58.425 'W*	3018.6
273-CTD	CTD		06.02.2007	04:36	14° 43.990 'N	44° 58.780 'W	3301.0	05:48	14° 44.000 'N	44° 58.760 'N	3273.7
274-CTD	CTD		06.02.2007	08:20	14° 42.000 'N	44° 58.760 'W	3415.3	09:33	14° 42.000 'N	44° 58.760 'W	3409.2
275-ROV	ROV Dive	J2-262	06.02.2007	11:40	14° 45.036 'N	44° 59.030 'W	3071.4	13:11	***14° 40.039 'N***	***44° 59.971 'W***	3040.2
276-ELEV	Elevator		06.02.2007	12:22	14° 45.190 'N	44° 58.760 'W	3020.8				
277-ELEV	Elevator		07.02.2007								
278-CTD	CTD		07.02.2007	01:35	14° 38.990 'N	44° 58.820 'W	3808.1	02:47	14° 38.990 'N	44° 58.820 'W	3841.1
279-CTD	CTD		07.02.2007	05:04	14° 41.000 'N	44° 58.770 'W	3530.7	06:16	14° 41.000 'N	44° 58.760 'W	3526.7
280-CTD	CTD		07.02.2007	08:34	14° 43.000 'N	44° 58.760 'W	3224.1	09:38	14° 43.000 'N	44° 58.760 'W	3199.8
281-MOOR-W	Wood Log Deposition		07.02.2007	11:39	14° 45.160 'N	44° 58.700 'W	3000.6	12:41	*14° 45.158 'N*	*44° 58.696 'W*	3014.6
282-ROV	ROV Dive	J2-263	07.02.2007	14:02	14° 45.006 'N	44° 59.066 'W	3117.5	15:30	***14° 40.006 'N***	***44° 59.990 'W***	3021.3
283-LBL-TR	LBL Transponder Mooring		07.02.2007								
284-LBL-TR	LBL Transponder Mooring		07.02.2007								
285-EM120	Multi-Beam Echosounder		07.02.2007					22:00	14° 47.620 'N	44° 54.310 'W	5373.6

Table 3.8. End of profile/mooring recoveries and end of station. Position data in bold italics = LBL coordinates.

Station no.	Station type	Jason dive no.	Date	Off bottom / End of profile / Mooring released				End of station (on deck)		
				Time UTC	Lat	Long	Depth	Time UTC	Lat	Long
241-EM120	Multi-Beam Echosounder		27.01.2007	02:52	14° 46.910 'N	44° 58.720 'W	3310.0			
242-CTD	CTD		25.01.2007					19:32	15° 07.408 'N	51° 22.246 'W
243-LBL-TR	LBL Transponder Mooring		27.01.2007							
243-a-LBL-TR	LBL Transponder Mooring		27.01.2007							
244-ROV	ROV Dive	J2-253	27.01.2007	18:36	***14° 45.201 'N***	***44° 58.782 'W***	2747.6	20:13	14° 45.420 'N	44° 58.240 'W
245-CTD	CTD		27.01.2007					00:31	14° 46.000 'N	44° 59.230 'W
246-CTD	CTD		28.01.2007					05:02	14° 45.210 'N	45° 01.000 'W
247-CTD	CTD		28.01.2007					09:09	14° 44.000 'N	44° 59.000 'W
249-ROV	ROV Dive	J2-254	28.01.2007	19:54	***14° 45.186 'N***	***44° 58.738 'W***	3033.0	21:33	14° 45.414 'N	44° 58.018 'W
250-EM120	Multi-Beam Echosounder		29.01.2007	10:47	14° 44.270 'N	45° 00.010 'W	3630.6			
251-ROV	ROV Dive	J2-255	29.01.2007	21:34	***14° 45.164 'N***	***44° 58.749 'W***	3022.6	23:25	14° 45.336 'N	44° 58.054 'W
252-CTD	CTD / MAPR tow-yo		30.01.2007	08:47	14° 48.040 'N	45° 00.310 'W	3747.0	09:55	14° 48.030 'N	45° 00.310 'W
253-ROV	ROV Dive	J2-256	30.01.2007	22:08	***14° 45.202 'N***	***44° 58.777 'W***	3033.1	00:02	14° 45.306 'N	44° 58.096 'W
254-ELEV	Elevator		30.01.2007							
255-ELEV	Elevator		30.01.2007	23:24			2984.9	01:10	14° 45.060 'N	44° 58.420 'W
256-EM120	Multi-Beam Echosounder		31.01.2007	10:44	14° 44.000 'N	45° 01.170 'W	4049.7			
257-ROV	ROV Dive	J2-257	31.01.2007	22:22	***14° 45.069 'N***	***44° 58.668 'W***	2936.8	00:02	14° 45.264 'N	44° 58.066 'W
258-CTD	CTD / MAPR tow-yo		01.02.2007	09:48	14° 47.012 'N	44° 58.820 'W		10:54	14° 47.012 'N	44° 58.820 'W
259-ROV	ROV Dive	J2-258	02.02.2007	10:08	***14° 45.210 'N***	***44° 58.786 'W***	3036.5	12:05	14° 45.444 'N	44° 58.132 'W
260-ELEV	Elevator		01.02.2007							
261-ELEV	Elevator		02.02.2007	12:40	14° 44.760 'N	44° 58.780 'W	3058.9	14:43	14° 44.840 'N	44° 58.440 'W
262-EM120	Muliy-Beam Echosounder		02.02.2007	23:23	14° 44.940 'N	44° 59.130 'W	3113.0			
263-ROV	ROV Dive	J2-259	03.02.2007	11:01	***14° 45.200 'N***	***44° 58.743 'W***	3034.2	12:49	14° 45.366 'N	44° 58.132 'W
264-ELEV	Elevator		03.02.2007							
265-ELEV	Elevator		03.02.2007	12:20	14° 45.500 'N	44° 58.380 'W	2954.7	13:56	14° 45.410 'N	44° 58.490 'W
266-CTD	CTD / MAPR tow-yo		03.02.2007	22:43	14° 45.910 'N	44° 58.010 'W		23:48	14° 45.910 'N	44° 58.000 'W
267-ROV	ROV Dive	J2-260	04.02.2007	21:26	***14° 45.181 'N***	***44° 58.764 'W***	3036.2	23:21	14° 45.366 'N	44° 58.018 'W
268-ELEV	Elevator		04.02.2007							
269-ELEV	Elevator		05.02.2007	22:30	14° 45.450 'N	44° 58.410 'W	2946.4	00:57	14° 45.670 'N	44° 58.740 'W
270-EM120	Multi-Beam Echosounder		05.02.2007	09:51	14° 58.480 'N	45° 04.500 'W	2770.2			
271-ROV	ROV Dive	J2-261	05.02.2007	22:02	***14° 45.171 'N***	***44° 58.776 'W***	3045.9	23:57	14° 45.264 'N	44° 58.048 'W
272-MOOR-T	Temperature Mooring		06.02.2007							
273-CTD	CTD		06.02.2007					07:11	14° 44.000 'N	44° 58.760 'W
274-CTD	CTD		06.02.2007					10:51	14° 42.000 'N	44° 58.760 'W
275-ROV	ROV Dive	J2-262	06.02.2007	21:58	***14° 45.125 'N***	***44° 58.734 'W***	2998.2	23:56	14° 45.306 'N	44° 57.576 'W
276-ELEV	Elevator		06.02.2007							
277-ELEV	Elevator		07.02.2007	23:30	14° 45.170 'N	44° 58.930 'W	2879.5	00:38	14° 45.530 'N	44° 58.850 'W
278-CTD	CTD		07.02.2007					04:06	14° 38.990 'N	44° 58.820 'W
279-CTD	CTD		07.02.2007					07:36	14° 41.000 'N	44° 58.760 'W
280-CTD	CTD		07.02.2007					10:51	14° 43.000 'N	44° 58.760 'W
281-MOOR-W	Wood Log Deposition		07.02.2007				3014.6	13:41	14° 45.160 'N	44° 58.700 'W
282-ROV	ROV Dive	J2-263	07.02.2007	18:00	***14° 45.160 'N***	***44° 58.748 'W***	3017.7	19:53	14° 45.324 'N	44° 58.180 'W
283-LBL-TR	LBL Transponder Mooring		07.02.2007	19:34	***14° 46.188 'N***	***44° 58.028 'W***	2944.1	20:30	14° 45.430 'N	44° 58.030 'W
284-LBL-TR	LBL Transponder Mooring		07.02.2007	20:36	***14° 45.420 'N***	***44° 57.954 'W***	5833.0	21:31	14° 46.220 'N	44° 58.090 'W
285-EM120	Multi-Beam Echosounder		13.02.2007							

6. References

Caress, D.W. and D.N. Chayes, 1996. Improved processing of HYDROSWEEP DS multibeam data on R/V Maurice Ewing. Marine Geophysical Research 18, 631-650.

Escartin, J. and M. Cannat, 1999. Ultramafic exposures and the gravity signature of the lithosphere near the Fifteen-Twenty Fracture Zone (Mid-Atlantic Ridge, 14 deg – 16.5 deg N). Earth and Planetary Science Letters 171, 411-424.

Fabian, M. and H. Villinger, in press. The Bremen Ocean Bottom Tiltmeter (OBT) - A Technical Article on a New Instrument to Monitor Deep Sea Floor Deformation and Seismicity Level. Marine Geophysical Research.

Fabian, M and Heesemann, B., 2006. Neigungswaage für Unterwasser- und Hochdruck-anwendungen (deep sea level), Deutsches Patent- und Markenamt, Gebrauchsmuster (registered design) DE202006013066U1 14.12.2006, Universtät Bremen.

Fujiwara, T., J. Lin, T. Matsumoto, P.B. Kelemen, B.E. Tucholke and J.F. Casey, 2003. Crustal Evolution of the Mid-Atlantic Ridge near the Fifteen-Twenty Fracture Zone in the last 5 Ma. Geochemistry, Geophysics, Geosystems 4(3), 25 p.

Gebruk, A.V., P. Chevaldonné, T. Shank, R.A. Lutz, R.C. Vriejenhoek, 2000. Deep-sea hydrothermal vent communities of the Logatchev area (14°45'N, Mid-Atlantic Ridge): diverse biotopes and high biomass. Journal of the Marine Biological Association, U. K. 80, 383-393.

Krasnov, S. G., G.A. Cherkashev, T.V. Stepanova, B.N. Batuyev, A.G. Krotov, B.V. Malin, M.N. Maslov, V.F. Markov, I.M. Poroshina, M.S. Samovarov, A.M. Ashadze, L.I. Lazareva and I.K. Ermolayev, 1995. Detailed geological studies of hydrothermal fields in the North Atlantic, in Parson, L. M., Walker, C. L., and Dixon, D. R., eds., Hydrothermal Vents and Processes: London, Geological Society Special Publication 87, 43-64.

Kuhn, T., B. Alexander, N. Augustin, D. Birgel, C. Borowski, L.M. de Carvalho, G. Engemann, S. Ertl, L. Franz, C. Grech, R. Hekinian, J.F. Imhoff,. T Jellinek, S. Klar, A. Koschinsky, J. Kuever, F. Kulescha, K. Lackschewitz, S. Petersen, V. Ratmeyer, J. Renken, G. Ruhland, J. Scholten, K. Schreiber, R. Seifert, J. Süling, M. Türkay, U. 2004. Mineralogical, geochemical, and biological investigations of hydrothermal systems on the Mid-Atlantic Ridge between 14°45‘N and 15°05‘N (HYDROMAR I). Meteor Berichte 04. Mid-Atlantic Expedition 2004, Cruise No. 60, Leg 3. 59 pp.

Lackschewitz, K.S., M. Armini, N. Augustin, N. Dubilier, D. Edge, G. Engemann, M. Fabian, J. Felden, P. Franke, A. Gärtner, D. Garbe-Schönberg, H.-H. Gennerich, D. Hüttig, H. Marbler, A. Meyerdierks, T. Pape, M. Perner, M. Reuter, G. Ruhland, K. Schmidt, T. Schott, M. Schroeder, G. Schroll, C. Seiter, J. Stecher, H. Strauss, M. Viehweger, S. Weber, F. Wenzhöfer and F. Zielinski, 2005. Longterm study of hydrothermalism and biology at the Logatchev field, Mid-Atlantic Ridge at 15°N (revisit 2005) (HYDROMAR II). Meteor Berichte 05, Mid-Atlantic Expedition 2005, Cruise No. 64, Leg 2.

Lammers, S. and E. Suess, 1994. An improved head-space analysis method for methane in seawater. Marine Chemistry 47, 115-125.

Rehder, G., R S. Keir and E. Suess, 1999. Methane in the northern Atlantic controlled by oxidation and atmospheric history. Geophysical Research Letters 26, 587-590.

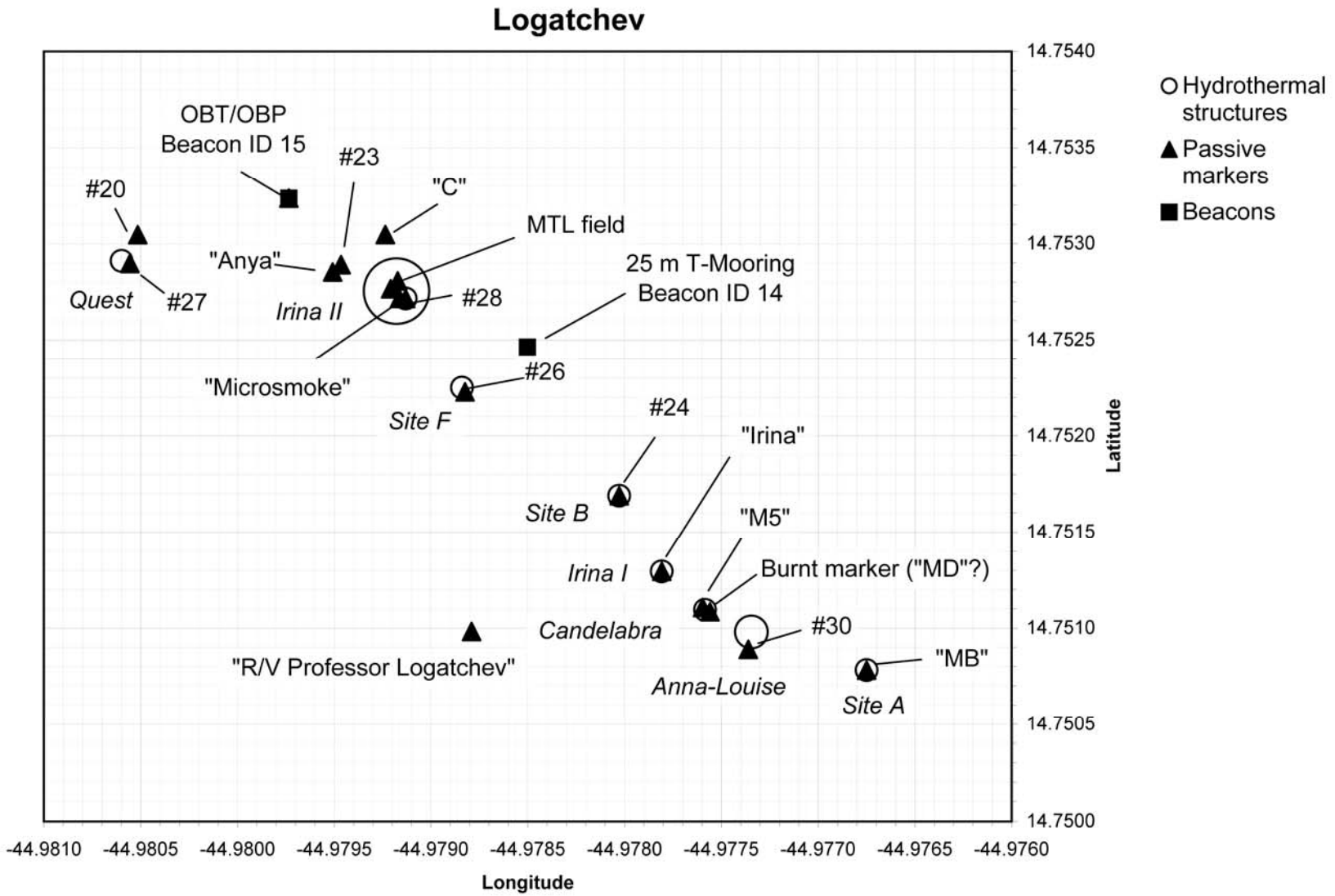
Pfender, M. and H. Villinger, 2002. Miniaturized data loggers for deep sea sediment temperature gradient measurements. Marine Geology 186, 557 – 570.

Sültenfuß, J. and G. Massmann, 2004. Datierung mit der 3He-Tritium-Methode am Beispiel der Uferfiltration im Oderbruch. Grundwasser, 9(4), 221-234.

Wessel, P.; and Smith, W. H. F., New improved version of generic mapping tools released, EOS, Trans. Amer. Geophys. U. 79 (47), 579, 1998.

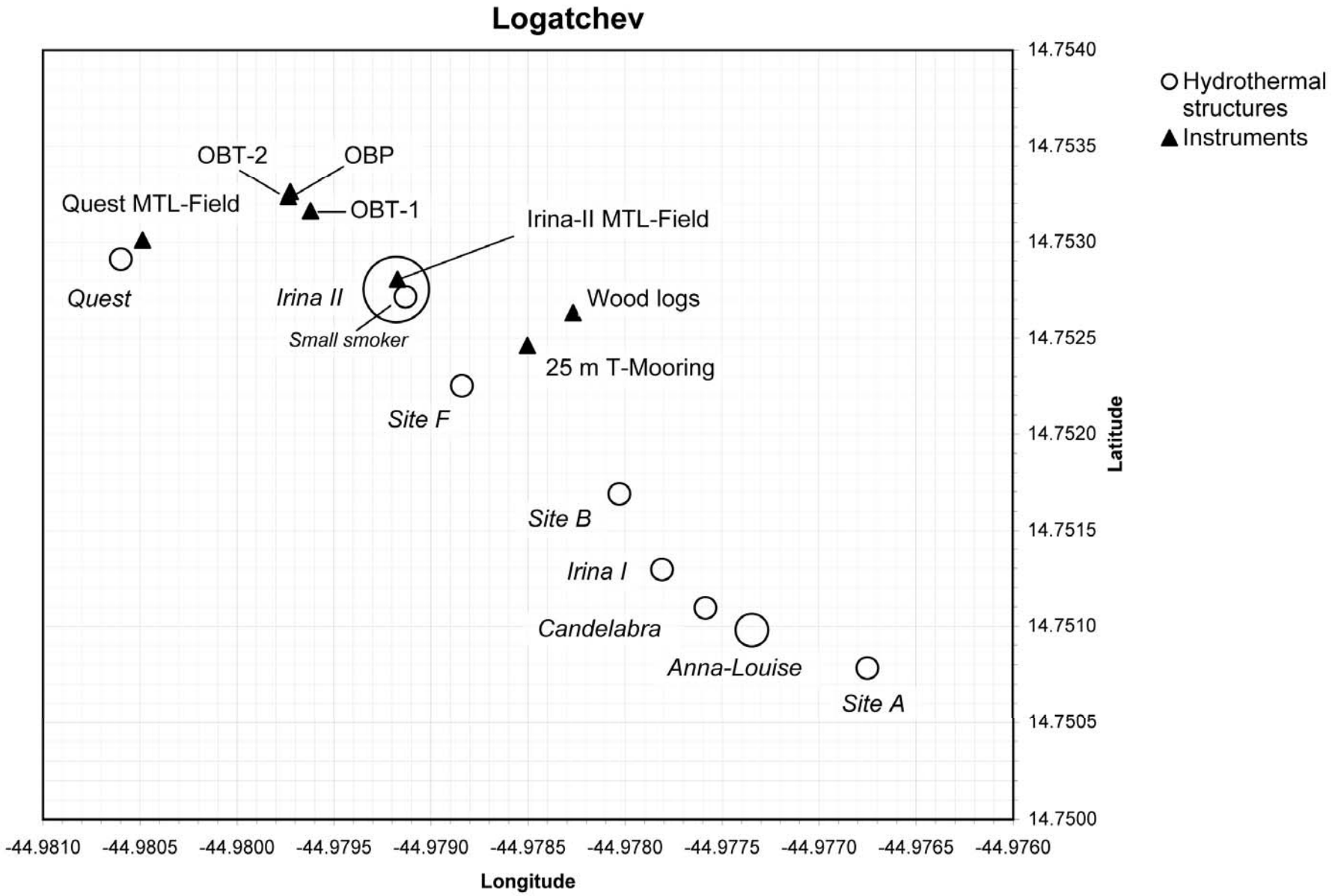
Appendices to Cruise Report MSM 04/3

Appendix 1: Positions of markers left by MSM04/3 and previous cruises


Logatchev
OBT/OBP
Beacon ID 15
#23
"C"
#20
MTL field
"Anya"
25 m T-Mooring
Beacon ID 14
Quest
#27
Irina II
#28
"Microsmoke"
#26
Site F
#24
"Irina"
Site B
"M5"
Irina I
Burnt marker ("MD"?)
Candelabra
#30
"R/V Professor Logatchev"
"MB"
Anna-Louise
Site A
Hydrothermal structures
Passive markers
Beacons
14.7540
14.7535
14.7530
14.7525
14.7520
14.7515
14.7510
14.7505
14.7500
Latitude
-44.9810
-44.9805
-44.9800
-44.9795
-44.9790
-44.9785
-44.9780
-44.9775
-44.9770
-44.9765
-44.9760
Longitude

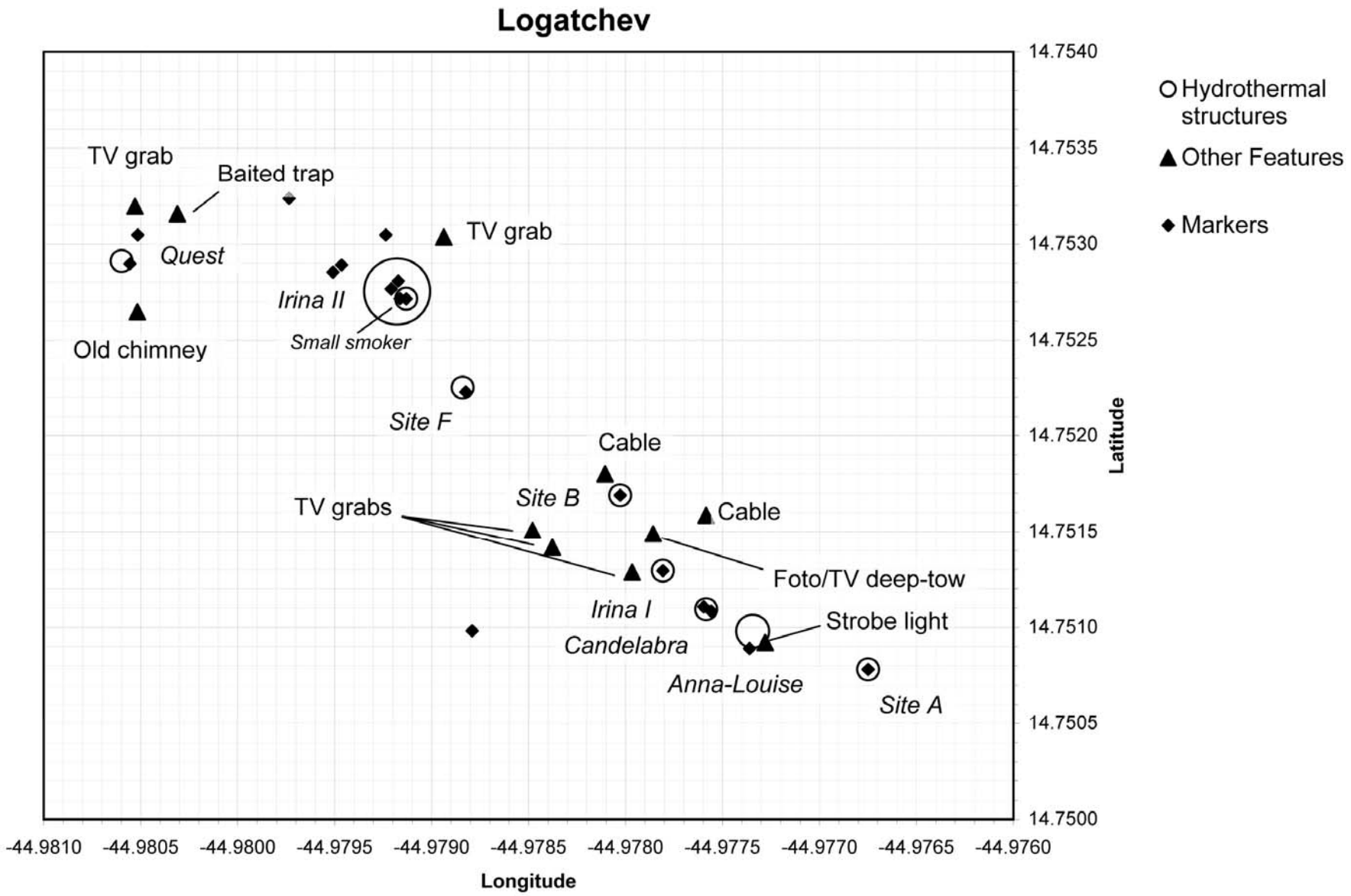
Marker	Site	Description	Deposited by	Date of Deployment/ Encounter	UTC	Station	Lat	Lon	Lat	Lon	Nav Data	Water Depth
OBT/OBP Beacon ID 15	OBT Site	Next to OBT-1, OBT-2, OBP	MSM 04/3	30.01.2007	15:48	253-ROV	14.753236	-44.979735	14°45.1942'N	44°58.7841'W	LBL	3038 m
"C"	Irina II	N-slope of Irina II mussel field		27.01.2007	14:22	244 ROV	14.753047	-44.979237	14°45.1828'N	44°58.7542'W	LBL	3033 m
#20	Quest	Quest T-logger field	MSM 04/3	05.02.2007	17:19	271-ROV	14.753046	-44.980515	14°45.1629'N	44°58.7478'W	Doppler	2029 m
#27	Quest	SE crater rim	MSM 04/3	01.02.2007	22:21	259-ROV	14.752897	-44.980555	14°45.1738'N	44°58.8333'W	LBL	3024 m
#23	"Mat #1"	White bacterial mat near Marker Anya	MSM 04/3	29.01.2007	16:16	251-ROV	14.752891	-44.979465	14°45.1735'N	44°58.7679'W	LBL	3039 m
"Anya"	Anya's Garden			29.01.2007	16:17	251-ROV	14.752853	-44.979508	14°45.1712'N	44°58.7705'W	LBL	3036 m
#22	Irina II	T-logger Field, lower boundary	MSM 04/3	30.01.2007	19:15	253-ROV	14.752807	-44.979172	14°45.1684'N	44°58.7503'W	Doppler	3022 m
#29	Irina II	Mussel field	MSM 04/3	01.02.2007	19:09	259-ROV	14.752766	-44.979208	14°45.1660'N	44°58.7525'W	Doppler	3018 m
#28	Next to small separate smoker	Replacement for 8-channel T-logger 2.96	MSM 04/3	01.02.2007	14:45	259-ROV	14.752717	-44.979163	14°45.1630'N	44°58.7498'W	Doppler	3018 m
"Mikrosmoke"	Irina II	SW slope of Irina II mussel field	"Microsmoke" Cruise	02.02.2007	08:17	263-ROV	14.752716	-44.979130	14°45.1629'N	44°58.7478'W	LBL	3017 m
T-Mooring Beacon ID 14	Mid-way Sites F and B	Attached to 25 m T-mooring	MSM 04/3	06.02.2007	02:32	272-MOOR-T	14.752464	-44.978502	14°45.1478' N	44°58.7101'W	LBL	3001 m
#26	Site F	S-boundary of bacterial mat	MSM 04/3	06.02.2007	21:49	275-ROV	14.752228	-44.978824	14°45.1337'N	44°58.7294'W	LBL	2996 m
#24	Site B	Replacement for burnt marker "MA"	MSM 04/3	31.01.2007	16:45	257-ROV	14.751690	-44.978028	14°45.1014'N	44°58.6817'W	LBL	2963 m
"Irina"	Irina I	S-crater rim, overgrown with bacterial mat		31.01.2007	18:26	257-ROV	14.751294	-44.977808	14°45.0776'N	44°58.6685'W	LBL	2946 m
"M5"	Candelaber	W crater rim	M 64/2	31.01.2007	19:53	257-ROV	14.751107	-44.977597	14°45.0664'N	44°58.6558'W	LBL	2936 m
"MD"(?)	Candelaber	Burnt marker, SE rim	M 64/2	31.01.2007	19:59	257-ROV	14.751084	-44.977559	14°45.0651'N	44°58.6535'W	LBL	2934 m
"R/V Professor Logatchev"	Off Southern Craters	8-m tall, W of Candelabra and Anna-Louise; 134 m off marker "M5"		31.01.2007	13:17	257-ROV	14.750982	-44.978791	14°45.0589'N	44°58.7274'W	LBL	2990 m
#30	Anna-Louise	Replacement for burnt marker "M4"	MSM 04/3	06.02.2007	21:14	275-ROV	14.750890	-44.977361	14°45.0534'N	44°58.6417'W	LBL	2924 m
"MB"	Site A		M 64/2	06.02.2007	17:55	275-ROV	14.750782	-44.976749	14°45.0469'N	44°58.6050'W	LBL	2911 m

Appendix 2: Instruments left on the seafloor


Logatchev
OBT-2
OBP
Quest MTL-Field
OBT-1
Irina-II MTL-Field
Quest
Irina II
Wood logs
Small smoker
25 m T-Mooring
Site F
Site B
Irina I
Candelabra
Anna-Louise
Site A
Hydrothermal structures
Instruments
14.7540
14.7535
14.7530
14.7525
14.7520
14.7515
14.7510
14.7505
14.7500
Latitude
-44.9810
-44.9805
-44.9800
-44.9795
-44.9790
-44.9785
-44.9780
-44.9775
-44.9770
-44.9765
-44.9760
Longitude

Instrument	Site	Description	Deployment			Lat	Lon	Lat	Lon	Nav Data	Water Depth
			Date	UTC	Station						
OBP	OBT Site	NW of Irina II; same position as M 64/2 deployment; Homer Beacon ID 15	28.01.2007	16:07	249-ROV	14.753262	-44.979725	14°45.1957'N	44°58.7835'W	LBL	3034 m
OBT 1	OBT Site	NW of Irina II; same position as M 64/2 deployment; Homer Beacon ID 15	06.02.1007	13:37	275-ROV	14.753162	-44.979621	14°45.1897'N	44°58.7772'W	Doppler	3038 m
OBT-2	OBT Site	NW of Irina II; same position as M 64/2 deployment; Homer Beacon ID 15	03.02.2007	02:11	263 ROV	14.753236	-44.979735	14°45.1942'N	44°58.7841'W	LBL	3038 m
25-m Temperature mooring	Mid-way between Site F and Site B	Sediment area; Homer beacon ID 14	06.02.2007	02:32	272-MOOR-T	14.752464	-44.978502	14°45.1478'N	44°58.7101'W	LBL	3001 m
MTL	Irina II	Below Irina II main structure; same position as M 64/2 deployment	04.02.2007	13:44	267-ROV	14.752807	-44.979172	14°45.1684'N	44°58.7503'W	Doppler	3022 m
MTL	Quest	Around mussel patch NW of Quest; same position as M 64/2 deployment	07.02.2007	15:43	282-ROV	14.753010	-44.980487	14°45.1806'N	44°58.8292'W	Doppler	3029 m
Wood log	Irina II	30 m NE of T-Mooring	07.02.2007	12:41	253-ROV	14.752633	-44.978267	14° 45.158 'N	44° 58.696 'W	Posidonia	3015 m

Appendix 3: Other special features encountered on the seafloor


Logatchev
TV grab
Baited trap
TV grab
Quest
Irina II
Small smoker
Old chimney
Site F
Cable
Site B
TV grabs
Cable
Foto/TV deep-tow
Irina I
Strobe light
Candelabra
Anna-Louise
Site A
Hydrothermal structures
Other Features
Markers
Latitude
Longitude
14.7540
14.7535
14.7530
14.7525
14.7520
14.7515
14.7510
14.7505
14.7500
-44.9810
-44.9805
-44.9800
-44.9795
-44.9790
-44.9785
-44.9780
-44.9775
-44.9770
-44.9765
-44.9760

Feature	Description	Faced			Lat	Lon	Lat	Lon	Nav Data	Water Depth
		Date	UTC	Station						
TV Grab	Grab outcrop N of Quest; 22.5 m off marker #20	01.02.2007	19:29	259-ROV	14.753195	-44.980529	14°45.1917'N	44°58.8318'W	LBL	3032 m
Baited trap	Left by 64/2; NE of Quest; 39.5 m off marker #27 (SE crater rim)	01.02.2007	19:24	259-ROV	14.753156	-44.980311	14° 45.1894' N	44° 58.8187' W	Doppler	3041 m
TV Grab	Grab outcrop NE of Irina II; 43 m off marker #28 / small smoker	04.02.2007	12:50	267-ROV	14.753036	-44.978937	14°45.1821'N	44°58.7362'W	LBL	3026 m
Old Chimney Structure	S of Quest; 28 m off marker #27 (SE crater rim)	02.02.2007	01:51	259-ROV	14.752648	-44.980517	14°45.1589'N	44°58.831'W	LBL	3017 m
Geoelectric cable	N of site B; 15 m off marker #24 (S crater rim)	06.02.2007	16:42	275-ROV	14.751801	-44.978106	14°45.1081'N	44°58.6863'W	LBL	2967 m
Geoelectric cable	NE of Irina I; 41 m off marker "Irina"	04.02.2007	17:44	267-ROV	14.751585	-44.977585	14°45.0951'N	44°58.6551'W	LBL	2957 m
TV Grab	SW of Site B; 54 m off marker #24	31.01.2007	14:38	257-ROV	14.751505	-44.978480	14°45.0903'N	44°58.7088'W	LBL	2978 m
Foto/TV deep-Tow	N of Irina I; 22 m off marker "Irina"	06.02.2007	16:44	275-ROV	14.751487	-44.977858	14°45.0892'N	44°58.6715'W	LBL	2957 m
TV Grab	SW of Site B; 49 m off marker #24	31.01.2007	15:12	257-ROV	14.751417	-44.978378	14°45.085'N	44°58.7027'W	LBL	2973 m
TV Grab	W of Irina I; 18 m of marker "Irina"	31.01.2007	14:09	257-ROV	14.751287	-44.977966	14°45.0772'N	44°58.678'W	LBL	2956 m
Strobe light	10 m E of marker #30	04.02.2007	17:55	267-ROV	14.750922	-44.977280	14° 45.0553' N	44° 58.6368' W	Doppler	3020 m

Appendix 4: Sample lists of Jason II dives

Station	**244 ROV**
Jason no.	**J2-253**
Date	**27.01.2007**
On bottom	**13:27**
Lift up	**18:15**
Bottom time (h:min)	**04:48**

Sample no.	Time	Lat.	Long.	Lat.	Long.	Water depth (m)	Vent locality	Specific site	Sample type	Sample description
244ROV-1	15:07	14.7529580	-44.9790611	14°45.178'N	44°58.744'W	3118.5	Irina II	Broken beehive	Jason T-lance (single-channel)	Beehive at main structure 293°C
244ROV-2	15:12	14.7529550	-44.9790600	14°45.177'N	44°58.744'W	3118.5	Irina II	Broken beehive	Hot fluid	Same beehive as above, major 2
244ROV-3	15:26	14.7529540	-44.9790600	14°45.177'N	44°58.744'W	3118.5	Irina II	Broken beehive	Hot fluid	Same beehive as above, major 1(?)
244ROV-4	15:49	14.7529540	-44.9790600	14°45.177'N	44°58.744'W	3118.5	Irina II	Broken beehive	Helium	Same beehive as above. Not sure whether opening was well above outflow
244ROV-5	16:03	14.7529050	-44.9790630	14°45.174'N	44°58.744'W	3119.5	Irina II	"Microsmoker"	Jason T-lance (single-channel)	Small smoker separate from Irina II main structure, 339°C
244ROV-6	16:06	14.7529050	-44.9790610	14°45.174'N	44°58.744'W	3119.6	Irina II	"Microsmoker"	Hot fluid	Major 3, same location as above
244ROV-7	16:15	14.7529090	-44.9790570	14°45.175'N	44°58.743'W	3119.5	Irina II	"Microsmoker"	Hot fluid	Major 4, same location as above
244ROV-8	16:31	14.7530080	-44.9790970	14°45.181'N	44°58.746'W	3022.4	Irina II	T-logger field	Mussel scoop	left of small mound next to upper T-loggers. Scoop net dropped, sample lost
244ROV-9	16:47	14.7530040	-44.9790930	14°45.180'N	44°58.746'W	3021.9	Irina II	T-logger field	Mussel scoop	2nd try at same location, success, stored in left bio box

Station	**249 ROV**
Jason no.	**J2-254**
Date	**28.01.2007**
On bottom	**13:51**
Lift up	**19:54**
Bottom time (h:min)	**6:02**

Sample no.	Time	Lat.	Long.	Lat.	Long.	Water depth (m)	Vent locality	Specific site	Sample type	Sample description
249ROV-1	14:58	14.7528911	-44.9794647	14°45.174'N	44°58.768'W	3038.6	Downslope (SW) Marker Anya	"Mat #1"	Profiler deployment, start profiler	White patch on sediment, ca 1.5 m diam.
249ROV-2	17:42	14.7528911	-44.9794647	14°45.174'N	44°58.768'W	3038.2	Downslope (SW) Marker Anya	"Mat #1"	8-Channel T-Lance	See sample #1; next to profiler sensors 1-3:10°C, 5°C, 2.8°C
249ROV-3	18:00	14.7528911	-44.9794647	14°45.174'N	44°58.768'W	3038.2	Downslope (SW) Marker Anya	"Mat #1"	8-Channel T-Lance	See sample #1; centre mat; 5-min measurements, max T at tip (28 cm depth): 55°C
249ROV-4	18:40	14.7528911	-44.9794647	14°45.174'N	44°58.768'W	3038.2	Downslope (SW) Marker Anya	"Mat #1"	8-Channel T-Lance	See sample #1; more to edge of mat, max T= 61°C at tip
249ROV-5	18:12	14.7528911	-44.9794647	14°45.174'N	44°58.768'W	3038.2	Downslope (SW) Marker Anya	"Mat #1"	8-Channel T-Lance	See sample #1; off edge of mat (outside mat); max T = 31°C
249ROV-6	18:28	14.7528911	-44.9794647	14°45.174'N	44°58.768'W	3038.2	Downslope (SW) Marker Anya	"Mat #1"	Push Corer	15 cm core, white mat on top
249ROV-7	18:35	14.7528911	-44.9794647	14°45.174'N	44°58.768'W	3038.2	Downslope (SW) Marker Anya	"Mat #1"	Push Corer	See sample #1; centre mat
249ROV-8	18:48	14.7528911	-44.9794647	14°45.174'N	44°58.768'W	3038.2	Downslope (SW) Marker Anya	"Mat #1"	8-Channel T-Lance	Mid-way between push cores #6 and #7, measurement until 18:59, max T = 65.2°C at tip

Station	**249 ROV (continued)**
Jason no.	**J2-254**
Date	**28.01.2007**
On bottom	**13:51**
Lift up	**19:54**
Bottom time (h:min)	**6:02**

Sample no.	Time	Lat.	Long.	Lat.	Long.	Water depth (m)	Vent locality	Specific site	Sample type	Sample description
249ROV-9	19:04	14.7528911	-44.9794647	14°45.174'N	44°58.768'W	3038.2	Downslope (SW) Marker Anya	"Mat #1"	8-Channel T-Lance	Outside mat further on profile of T-measures #3 and #4, max T (tip) = 29.7°C
249ROV-10	19:17	14.7528911	-44.9794647	14°45.174'N	44°58.768'W	3038.2	Downslope (SW) Marker Anya	Next to Mat #1	Scoop net	Scoop of rusty brown surface precipitaes next to mat around T-measurement #9

Station	**251 ROV**
Jason no.	**J2-255**
Date	**29.01.2007**
On bottom	**13:17**
Lift up	**21:34**
Bottom time (h:min)	**8:16**

Sample no.	Time	Lat.	Long.	Lat.	Long.	Water depth (m)	Vent locality	Specific site	Sample type	Sample description
251ROV-1	15:47	14.7530094	-44.9794459	14°45.181'N	44°58.767'W	3034.3	OBT site	sediments off OBTsite	Push corer	Next to incubation chamber
251ROV-2	15:51	14.7529074	-44.9796831	14°45.174'N	44°58.780'W	3034.3	OBT site	sediments off OBTsite	8-Channel T-Lance	at push corer position
251ROV-3	16:43	14.7528150	-44.9796593	14°45.169'N	44°58.780'W	3022.0	Irina II	T-Logger field	Rock sample	Increase Jason payload; from inactive smoker next to Irina II T-Loggers
251ROV-4	17:14	14.7527569	-44.9796850	14°45.165'N	44°58.781'W	3019.2	Irina II	T-Logger field	Diffuse fluid	Black diffuse outflow hole next to logger 0; Major 2; for Mirjam

Station	**251 ROV (continued)**
Jason no.	**J2-255**
Date	**29.01.2007**
On bottom	**13:17**
Lift up	**21:34**
Bottom time (h:min)	**8:16**

Sample no.	Time	Lat.	Long.	Lat.	Long.	Water depth (m)	Vent locality	Specific site	Sample type	Sample description
251ROV-5	17:35	14.7527241	-44.9797072	14°45.163'N	44°58.782'W	3019.2	Irina II	T-Logger field	Diffuse fluid	same spot, Major D2; for Mirjam
251ROV-6	17:53	14.7527043	-44.9797413	14°45.162'N	44°58.785'W	3019.1	Irina II	T-Logger field	8-Channel T-Lance	same spot; top ring of T-lance at surface mussel bed; 24 min measurment (end 18:17 power loss)
251ROV-7	19:38	14.7527146	-44.9798692	14°45.163'N	44°58.792'W	3022.0	Irina II	T-Logger field	Diffuse fluid	At logger #9, Major 3
251ROV-8	19:48	14.7527257	-44.9798973	14°45.164'N	44°58.794'W	3022.1	Irina II	T-Logger field	8-Channel T-Lance	At logger #9 (19:48-19:53), top ring of lance at musel bed surface. max T =28°C.
251ROV-9	19:55	14.7527283	-44.9799109	14°45.164'N	44°58.795'W	3022.0	Irina II	T-Logger field	8-Channel T-Lance	At logger #8, top ring of lance at musel bed surface. max T =23°C.
251ROV-10	20:10	14.7527296	-44.9799247	14°45.164'N	44°58.796'W	3022.0	Irina II	T-Logger field	Diffuse fluid	At logger #8, Major D1
251ROV-11	20:28	14.7527678	-44.9799459	14°45.166'N	44°58.797'W	3022.0	Irina II	T-Logger field	Mussel scoop	At logger #8
251 ROV-12	20:55	14.7527560	-44.9791460	14°45.165'N	44°58.749'W	3020.3	Irina II	T-Logger field	8-Channel T-Lance	At logger #4; top ring of lance at mussel bed surface, max T = 33°C
251 ROV-13	21:09	14.7527540	-44.9791450	14°45.165'N	44°58.749'W	3020.2	Irina II	T-Logger field	Diffuse fluid	At logger #4, Major1
251 ROV-14	21:15	14.7527530	-44.9791450	14°45.165'N	44°58.749'W	3020.6	Irina II	T-Logger field	Mussel scoop	At logger #4

Station	**253 ROV**
Jason no.	**J2-256**
Date	**30.01.2007**
On bottom	**15:21**
Lift up	**22:08**
Bottom time (h:min)	**6:47**

Sample no.	Time	Lat.	Long.	Lat.	Long.	Water depth (m)	Vent locality	Specific site	Sample type	Sample description
253ROV-1	19:06	14.7532239	-44.9797297	14°45.193'N	44°58.784'W	3021.5	Irina II	T-Logger field	Mussel scoop	At Logger #9, mussels appear entirely dead
253ROV-2	19:36	14.7532224	-44.9797325	14°45.193'N	44°58.78'W	3020.5	Irina II	T-Logger field	8-Channel T-Lance	At Logger #2, 10 min measurement; max T = 15.37°C
253ROV-3	19:47	14.7532225	-44.9797326	14°45.193'N	44°58.784'W	3020.5	Irina II	T-Logger field	8-Channel T-Lance	At Logger #0, 5 min measurement
253ROV-4	19:52	14.7519433	-44.9785594	14°45.117'N	44°58.714'W	3020.5	Irina II	T-Logger field	8-Channel T-Lance	in black diffuse outflow (Mirjam's diffuse site); 20 min measurement
253ROV-5	20:18	14.7519435	-44.9785596	14°45.117'N	44°58.714'W	3020.4	Irina II	T-Logger field	Diffuse fluid	At T-logger #2, Major #2
253ROV-6	20:24	14.7519440	-44.9785596	14°45.117'N	44°58.714'W	3020.5	Irina II	T-Logger field	Diffuse fluid	At T-logger #0, Major #1
253ROV-7	20:32	14.7519441	-44.9785599	14°45.117'N	44°58.714'W	3020.4	Irina II	T-Logger field	Mussel scoop	At logger #2
253ROV-8	20:50	14.7528308	-44.9792022	14°45.170'N	44°58.752'W	3020.5	Irina II	T-Logger field	Mussel scoop	At logger #0
253ROV-9	21:14	14.7528305	-44.9792020	14°45.170'N	44°58.752'W	3018.5	Irina II	"Microsmoker"	Hot fluid	Major #3
253ROV-10	21:28	14.7528303	-44.9792021	14°45.170'N	44°58.752'W	3018.5	Irina II	"Microsmoker"	Hot fluid	Major #D2

Station	**257 ROV**
Jason no.	**J2-257**
Date	**31.01.2007**
On bottom	**13:01**
Lift up	**22:22**
Bottom time (h:min)	**09:21**

Sample no.	Time	Lat.	Long.	Lat.	Long.	Water depth (m)	Vent locality	Specific site	Sample type	Sample description
257ROV-1	15:46	14.7517013	-44.9781135	14°45.102'N	44°58.689'W	2964.3	Site B	Small smoker on SW crater rim	1-Channel Jason T-Lance	340.4°C
257ROV-2	15:49	14.7516814	-44.9780882	14°45.101'N	44°58.685'W	2964.3	Site B	Small smoker on SW crater rim	8-Channel T-Lance	Same smoker as above; 3 min
257ROV-3	15:54	14.7516945	-44.9780922	14°45.102'N	44°58.686'W	2964.4	Site B	Small smoker on SW crater rim	Hot fluid	Same smoker as above; Major #1
257ROV-4	16:08	14.7516595	-44.9780505	14°45.010'N	44°58.68'W	2964.3	Site B	Small smoker on SW crater rim	Hot fluid	Same smoker as above; Major #D1
257ROV-5	16:25	14.7516932	-44.9781016	14°45.101'N	44°58.686'W	2964.6	Site B	Small smoker on SW crater rim	Helium	Same smoker as above; lower handle loose, possibly bad samply
257ROV-6	16:36	14.7517012	-44.9781288	14°45.102'N	44°58.688'W	2964.6	Site B	Small smoker on SW crater rim	Rock	Off-broken peace from same smoker as above
257ROV-7	16:40	14.7516644	-44.9781066	14°45.010'N	44°58.686'W	2964.6	Site B	Small smoker on SW crater rim	Rock	Other peace same smoker (still cam photo)
257ROV-8	16:50	14.7516716	-44.9780745	14°45.100'N	44°58.685'W	2964.6	Site B	Small smoker on SW crater rim	Rock	Other peace same smoker; lost before safe storage
257ROV-9	17:50	14.7513157	-44.9778291	14°45.079'N	44°58.670'W	2948.6	Irina I	Next to unlabeled M64/2 marker	Rock	Peace of rock from ground ~20x30 cm; overgrown with bactrerial mat
257ROV-10	18:00	14.7513085	-44.9778199	14°45.079'N	44°58.669'W	2948.1	Irina I	Next to unlabeled M64/2 marker	Mat slurp	Slurp bacterial mats from rock next to sampled peace and from surface of unlabeled marker. Slurp container w/ 200 µm mesh. Not very successful.

Station	**257 ROV (continued)**
Jason no.	**J2-257**
Date	**31.01.2007**
On bottom	**13:01**
Lift up	**22:22**
Bottom time (h:min)	**09:21**

Sample no.	Time	Lat.	Long.	Lat.	Long.	Water depth (m)	Vent locality	Specific site	Sample type	Sample description
257ROV-11	18:29	14.7512622	-44.9779011	14°45.076'N	44°58.674'W	2946.1	Irina I	Smoker 5 m right to unlabelled marker	8-Channel T-Lance	290°C, not very good
257ROV-12	19:00	14.7512578	-44.9778505	14°45.076'N	44°58.671'W	2946.7	Irina I	Smoker 5 m right to unlabelled marker	Hot fluid	Same smoker as above; Major #2
257ROV-13	19:10	14.7512252	-44.9778251	14°45.074'N	44°58.670'W	2946.5	Irina I	Smoker 5 m right to unlabelled marker	Hot fluid	Same smoker as above; Major #3
257ROV-14	19:23	14.7512261	-44.9778498	14°45.074'N	44°58.671'W	2946.6	Irina I	Smoker 5 m right to unlabelled marker	8-Channel T-Lance	255°C? Too low
257ROV-15	20:23	14.7510655	-44.9775660	14°45.064'N	44°58.654'W	2936.4	Candelabra (cruise working name: "Anna-Louise")	Small smoker next to "Candelabra" smoker	8-Channel T-Lance	
257ROV-16	20:29	14.7510373	-44.9775646	14°45.063'N	44°58.654'W	2936.4	Candelabra (cruise working name: "Anna-Louise")	Small smoker next to "Candelabra" smoker	8-Channel T-Lance	Probe held horizontally above opening for measuring hori. gradient
257ROV-17	20:44	14.7510585	-44.9775816	14°45.064'N	44°58.655'W	2935.7	Candelabra (cruise working name: "Anna-Louise")	Small smoker next to "Candelabra" smoker	Hot fluid	Same smoker; Major #4
257ROV-18	20:52	14.7510280	-44.9775450	14°45.062'N	44°58.653'W	2936.1	Candelabra (cruise working name: "Anna-Louise")	Small smoker next to "Candelabra" smoker	Hot fluid	Same smoker; Major #D2; nozzle broke => no sample

Station	**259 ROV**
Jason no.	**J2-258**
Date	**01./02.02.2007**
On bottom	**13:20**
Lift up	**10:08**
Bottom time (h:min)	**20:47**

Sample no.	Time	Lat.	Long.	Lat.	Long.	Water depth (m)	Vent locality	Specific site	Sample type	Sample description
259ROV-29	14:21	14.7527661	-44.9791507	14°45.166'N	44°58.75'W	3020.4	Irina II	Mussel field, near Mikrosmoke marker	Mussel grab	Mussels grabbed with claw and transferred to incubation chamber at beginning of dive but numbered at end
259ROV-1	15:59	14.7527049	-44.9791762	14°45.162'N	44°58.751'W	3019.8	Irina II	T-logger field	Mussels	Mussels attached to 8-channel T-logger 2.97
259ROV-2	16:30	14.7528845	-44.9795377	14°45.173'N	44°58.772'W	3038.0	Off Marker Anya	profiler mat site	8-Channel T-Lance	T-measurment outside mat
259ROV-3	16:36	14.7528813	-44.9795376	14°45.173'N	44°58.772'W	3038.0	Off Marker Anya	profiler mat site	8-Channel T-Lance	Edge of mat
259ROV-4	16:42	14.7528786	-44.9795353	0°45.173'N	44°58.772'W	3038.1	Off Marker Anya	profiler mat site	8-Channel T-Lance	Centre of mat
259ROV-5	16:50	14.7528784	-44.9795340	14°45.173'N	44°58.772'W	3038.1	Off Marker Anya	profiler mat site	Push corer	Centre of mat
259ROV-6	16:52	14.7528791	-44.9795344	14°45.173'N	44°58.772'W	3038.2	Off Marker Anya	profiler mat site	Push corer	Edge of mat
259ROV-7	17:30	14.7527641	-44.9791869	14°45.166'N	44°58.751'W	3020.0	Irina II	Top of Irina II structure	8-Channel T-Lance	Diffuse flow temperatures side top Irina II in Rimicaris swarm: Lance tip 23°C, all other sensors 4°C
259ROV-8	17:43	14.7527634	-44.9791867	14°45.166'N	44°58.751'W	3020.3	Irina II	Top of Irina II structure	Diffuse fluid	Same location as above; Major #1
259ROV-9	17:51	14.7527636	-44.9791865	14°45.166'N	44°58.751'W	3020.2	Irina II	Top of Irina II structure	Diffuse fluid	Same location as above; Major #2
259ROV-10	21:06	14.7528912	-44.9805470	14°45.174'N	44°58.833'W	3025.2	Quest	Diffuse outlet, marker 27	Mussel slurp	200 µm mesh container, not successful

Station	**259 ROV (continued)**
Jason no.	**J2-258**
Date	**01./02.02.2007**
On bottom	**13:20**
Lift up	**10:08**
Bottom time (h:min)	**20:47**

Sample no.	Time	Lat.	Long.	Lat.	Long.	Water depth (m)	Vent locality	Specific site	Sample type	Sample description
259ROV-11	21:30	14.7528908	-44.9805502	14°45.173'N	44°58.833'W	3025.2	Quest	Diffuse outlet, marker 27	Mussel slurp	2 mm mesh container, slurp hose cloggs
259ROV-12	21:41	14.7528902	-44.9805457	14°45.173'N	44°58.833'W	3025.2	Quest	Diffuse outlet, marker 27	Mussel scoop	Scoop mussel patch with associated fauna
259ROV-13	21:59	14.7528949	-44.9805474	14°45.1732N	44°58.833'W	3025.2	Quest	Diffuse outlet, marker 27	8-Channel T-Lance	T-measurement in crack below former mussel patch; max T at Lance tip = 151°C
259ROV-14	23:23	14.7529800	-44.9805489	14°45.179'N	44°58.833'W	3224.3	Quest	White mat next to T-logger field	Push corer	Centre of mat
259ROV-15	23:39	14.7529827	-44.9805391	14°45.179'N	44°58.832'W	3223.9	Quest	White mat next to T-logger field	8-Channel T-Lance	max T = 81°C
259ROV-16	23:43	14.7529823	-44.9805347	14°45.179'N	44°58.832'W	3216.6	Quest	White mat next to T-logger field	8-Channel T-Lance	Centre mat next to push corer hole; 17°C
259ROV-17	00:02	14.7529779	-44.9805052	14°45.179'N	44°58.830'W	3214.4	Quest	White mat next to T-logger field	8-Channel T-Lance	Just oustside of white ; 48°Cmat
259ROV-18	00:04	14.7529832	-44.9805016	14°45.179'N	44°58.830'W	3223.4	Quest	Brown mat next to T-logger field	Push corer	Mat next to pld T-logger 19; brown sediment
259ROV-19	00:16	14.7529876	-44.9804855	14°45.179'N	44°58.829'W	3026.7	Quest	Brown mat next to T-logger field	8-Channel T-Lance	Same mat as above; Max T = 8°C
259ROV-20	00:27	14.7529788	-44.9804799	14°45.1787'N	44°58.829'W	3025.9	Quest	Brown mat next to T-logger field	8-Channel T-Lance	Same mat area; 4,7°C
259ROV-21	00:39	14.7529888	-44.9804897	14°45.179'N	44°58.829'W	3024.0	Quest	Brown mat next to T-logger field	Push corer	Same mat, far right
259ROV-22	00:40	14.7529884	-44.9804877	14°45.179'N	44°58.829'W	3024.0	Quest	Brown mat next to T-logger field	8-Channel T-Lance	to to pushcore 21; 3 min measurement; 5.8°C

Station	**259 ROV (continued)**
Jason no.	**J2-258**
Date	**01./02.02.2007**
On bottom	**13:20**
Lift up	**10:08**
Bottom time (h:min)	**20:47**

Sample no.	Time	Lat.	Long.	Lat.	Long.	Water depth (m)	Vent locality	Specific site	Sample type	Sample description
259ROV-23	00:59	14.7529083	-44.9805376	14°45.175'N	44°58.832'W	3024.0	Quest	Small chimney at Quest rim	8-Channel T-Lance	Reading after 4 min: 347.7°C
259ROV-24	01:12	14.7529072	-44.9805439	14°45.174'N	44°58.833'W	3024.0	Quest	Small chimney at Quest rim	Hot fluid	Same chimney as above; Major #3
259ROV-25	01:22	14.7529078	-44.9805427	14°45.175'N	44°58.833'W	3024.0	Quest	Small chimney at Quest rim	Hot fluid	Same chimney as above; Major #D1
259ROV-26	02:42	14.7527133	-44.9790648	14°45.1623'N	44°58.744'W	3020.3	Irina II	Main structure	Shrimp slurp	Not good because hose still clogged
259ROV-27	03:31	14.7527582	-44.9791433	14°45.166'N	44°58.749'W	3018.2	Irina II	Main structure	8-Channel T-Lance	Small beehive on top Irina II; beehive breaks; T = 280°C
259ROV-28	03:43	14.7527584	-44.9791430	14°45.166'N	44°58.749'W	3018.1	Irina II	Main structure	Hot fluid	Same small beehive, Major #4; other fluid sampling fails because Major D1 breaks

Station	**263 ROV**
Jason no.	**J2-259**
Date	**02./03.02.2007**
On bottom	**1:28**
Lift up	**11:01**
Bottom time (h:min)	**9:33**

Sample no.	Time	Lat.	Long.	Lat.	Long.	Water depth (m)	Vent locality	Specific site	Sample type	Sample description
263ROV-1	05:46	14.7529203	-44.9794571	14°45.175'N	44°58.767'W	3038.0	Downslope (SW) Marker Anya	"Mat #1"	Push corer	Centre mat; ~10 cm from provious core hole
263ROV-2	05:51	14.7529015	-44.9794619	14°45.174'N	44°58.768'W	3037.9	Downslope (SW) Marker Anya	"Mat #1"	Push corer	Centre mat
263ROV-3	05:54	14.7529209	-44.9794663	14°45.175'N	44°58.768'W	3037.9	Downslope (SW) Marker	"Mat #1"	Push corer	Centre mat
263ROV-4	06:36	14.7529323	-44.9805581	14°45.176'N	44°58.834'W	3024.3	Quest	Small chimney at Quest rim	Helium	Same smoker as sampled for hot fluids during previous dive
263ROV-5	06:55	14.7528308	-44.9804954	14°45.170'N	44°58.830'W	3025.5	Quest	Diffuse outlet, marker 27	8-Channel T-Lance	Crack ~1 m from mussel scoop site 259RV-12; max T = 45°C
263ROV-6	07:12	14.7528646	-44.9805030	14°45.172'N	44°58.830'W	3025.5	Quest	Diffuse outlet, marker 27	8-Channel T-Lance	Crack mussel scoop site 259RV-12; T1-8 = 94.2°, 83.8°, 70°, 53,3°, 35,3°, 14.9°, 7.9°, 4.9°
263ROV-7	07:29	14.7529167	-44.9805480	14°45.175'N	44°58.833'W	3025.6	Quest	Diffuse outlet, marker 27	Diffuse fluid	Same crack as above; Major #4 does not release = no sample
263ROV-8	07:40	14.7529097	-44.9805211	14°45.175'N	44°58.831'W	3025.8	Quest	Diffuse outlet, marker 27	Diffuse fluid	Same crack as above; Major #2, ok
263ROV-9	07:49	14.7529329	-44.9805508	14°45.176'N	44°58.833'W	3025.8	Quest	Diffuse outlet, marker 27	Diffuse fluid	Same crack as above; Major #3, ok

Station	**263 ROV (continued)**
Jason no.	**J2-259**
Date	**02./03.02.2007**
On bottom	**1:28**
Lift up	**11:01**
Bottom time (h:min)	**9:33**

Sample no.	Time	Lat.	Long.	Lat.	Long.	Water depth (m)	Vent locality	Specific site	Sample type	Sample description
263ROV-10	10:21	14.7530097	-44.9794061	14°45.181'N	44°58.764'W	3034.6	Downslope (SW) Marker Anya	"Anya's crack"	Diffuse fluid	Profiler position; sample spot where sensors had hit the mussel bad; Major #1
263ROV-11	10:28	14.7529733	-44.9793864	14°45.178'N	44°58.763'W	3034.6	Downslope (SW) Marker Anya	"Anya's crack"	8-Channel T-Lance	Same spot as above; T1-8 = 148.6, 146.3, 141.5, 129.6, 101.2, 25.6, 41.5, 3.7
263ROV-12	10:47	14.7529590	-44.9793711	14°45.178'N	44°58.762'W	3034.68	Downslope (SW) Marker Anya	"Anya's crack"	Mussel scoop	Same spot as above, but larger area because mussels clump together

Station	**267 ROV**
Jason no.	**J2-260**
Date	**03./04.02.2007**
On bottom	**1:57**
Lift up	**21:26**
Bottom time (h:min)	**19:28**

Sample no.	Time	Lat.	Long.	Lat.	Long.	Water depth (m)	Vent locality	Specific site	Sample type	Sample description
267ROV-1	02:37	14.7530241	-44.9794304	14°45.181'N	44°58.766'W	3033.8	Downslope Marker Anya	"Anya's crack"	Mussel grab	Mussels grabbed w/ claw, transferred to incubation chamber ~30 m apart
267ROV-2	08:47	14.7530268	-44.9804664	14°45.182'N	44°58.83'W	3024.0	Quest	T-logger field	8-Channel T-Lance	Next to logger 2.98, T8 = 111°C, T1 = 3.9°C
267ROV-3	08:51	14.7530142	-44.9804510	14°45.181'N	44°58.827'W	3024.0	Quest	T-logger field	8-Channel T-Lance	next to logger 2.95, T8 = 115°C
267ROV-4	09:03	14.7529972	-44.9804461	14°45.180'N	44°58.827'W	3024.0	Quest	T-logger field	8-Channel T-Lance	next to logger 2.95, T8 = 120°C
267ROV-5	09:12	14.7529992	-44.9804480	14°45.180'N	44°58.830'W	3024.0	Quest	T-logger field	Diffuse fluid	T-logger field; Major #2
267ROV-6	09:20	14.7530013	-44.9804445	14°45.180'N	44°58.827'W	3024.0	Quest	T-logger field	Diffuse fluid	T-logger field; Major #3
267ROV-7	09:36	14.7529961	-44.9804362	14°45.180'N	44°58.826'W	3024.0	Quest	T-logger field	Mussel scoop	Next to logger 2.98
267ROV-8	09:45	14.7530106	-44.9804521	14°45.181'N	44°58.827'W	3024.0	Quest	T-logger field	Mussel scoop	Next to logger 11
267ROV-9	10:13	14.7530049	-44.9804402	14°45.180'N	44°58.826'W	3024.0	Quest	T-logger field	8-Channel T-Lance	At logger 17; T1 (tip)
267ROV-10	10:16	14.7530030	-44.9804430	14°45.180'N	44°58.827'W	3024.0	Quest	T-logger field	8-Channel T-Lance	At logger 16; T1 (tip) = 3°C
267ROV-11	10:20	14.7530063	-44.9804505	14°45.180'N	44°58.827'W	3024.0	Quest	T-logger field	8-Channel T-Lance	At logger 13; T1 (tip) = 3°C
267ROV-12	10:25	14.7529764	-44.9804349	14°45.179'N	44°58.826'W	3024.0	Quest	T-logger field	Diffuse fluid	At T-logger 16; Major #1
267ROV-13	10:42	14.7529913	-44.9804333	14°45.180'N	44°58.826'W	3024.0	Quest	T-logger field	Mussel scoop	At T-logger 16
267ROV-14	10:57	14.7530038	-44.9804826	14°45.180'N	44°58.829'W	3024.0	Quest	T-logger field	8-Channel T-Lance	At logger 19, max 4°C
267ROV-15	11:00	14.7530106	-44.9804854	14°45.181'N	44°58.829'W	3024.0	Quest	T-logger field	8-Channel T-Lance	At logger 18, max 3°C
267ROV-16	11:16	14.7529376	-44.9805005	14°45.176'N	44°58.830'W	3026.0	Quest	Marker 27	Push corer	Brown sediment; 3 m from marker 27

Station	**267 ROV (continued)**
Jason no.	**J2-260**
Date	**03./04.02.2007**
On bottom	**1:57**
Lift up	**21:26**
Bottom time (h:min)	**19:28**

Sample no.	Time	Lat.	Long.	Lat.	Long.	Water depth (m)	Vent locality	Specific site	Sample type	Sample description
267ROV-17	11:17	14.7529376	-44.9805005	14°45.176'N	44°58.830'W	3026.0	Quest	Marker 27	Push corer	Same spot as above
267ROV-18	15:08	14.7529237	-44.9804942	14°45.175'N	44°58.830'W	3020.0	Irina II	Main structure	Hot fluid	Small smoker in upper edifice; not successful
267ROV-19	15:54	14.7527886	-44.9791461	14°45.167'N	44°58.749'W	3019.7	Irina II	Main structure	Shrimp slurp	Upper structure, Rimicaris and Mirocaris
267ROV-20	21:15	14.7530344	-44.9794204	14°45.182'N	44°58.765'W	3036.4	Downslope Marker Anya	"Anya's crack"	8-Channel T-Lance	Mussel patch at profiler site; one side of patch; max T = 90°C (at T2)
267ROV-21	21:17	14.7530343	-44.9794208	14°45.182'N	44°58.765'W	3036.5	Downslope Marker Anya	"Anya's crack"	8-Channel T-Lance	Same spot as above; centre mussel patch; max T = 7.9°C (at T4)
267ROV-22	21:21	14.7530341	-44.9794204	14°45.182'N	44°58.765'W	3036.4	Downslope Marker Anya	"Anya's crack"	8-Channel T-Lance	Same spot as above; lefthand side mussel patch; max T =60°C (at T1 = tip)

Station	**271 ROV**
Jason no.	**J2-261**
Date	**05.02.2007**
On bottom	**13:08**
Lift up	**22:02**
Bottom time (h:min)	**8:53**

Sample no.	Time	Lat.	Long.	Lat.	Long.	Water depth (m)	Vent locality	Specific site	Sample type	Sample description
271ROV-1	14:20	14.7530170	-44.9805128	14°45.181'N	44°58.831'W	3122.0	Quest	T-logger field	8-Channel T-Lance	Mussel patch at Logger 11, 10-15°C
271ROV-2	14:26	14.7530301	-44.9805182	14°45.182'N	44°58.831'W	3027.9	Quest	T-logger field	8-Channel T-Lance	At Logger 11, just beind the mussel patch, sediment with fluid outflow; max T = 113°C
271ROV-3	14:52	14.7530232	-44.9805067	14°45.181'N	44°58.830'W	3029.8	Quest	T-logger field	8-Channel T-Lance	Mussel patch at Logger 11; 197°C at T3
271ROV-4	15:04	14.7530485	-44.9805098	14°45.183'N	44°58.831'W	3028.4	Quest	T-logger field	Diffuse fluid	Same mussel patch at Logger 11, Major #1
271ROV-5	15:11	14.7530329	-44.9805033	14°45.182'N	44°58.830'W	3028.4	Quest	T-logger field	Musel scoop	At Logger 11
271ROV-6	15:22	14.7530537	-44.9805956	14°45.183'N	44°58.836'W	3028.4	Quest	T-logger field	Crab scoop	Same spot as above
271ROV-7	15:40	14.7530238	-44.9805086	14°45.181'N	44°58.831'W	3028.0	Quest	T-logger field	Push core	Red-brown sediment plane near Logger 19
271ROV-8	15:50	14.7529811	-44.9805019	14°45.179'N	44°58.830'W	3027.9	Quest	T-logger field	8-Channel T-Lance	Same spot as push core #7; max T = 13.3°C
271ROV-9	15:51	14.7529921	-44.9805118	14°45.180'N	44°58.831'W	3028.0	Quest	T-logger field	8-Channel T-Lance	A few cm away from push core #8
271ROV-10	17:30	14.7529780	-44.9804576	14°45.179'N	44°58.828'W	3029.2	Quest	T-logger field	Crab scoop	Mussel patch at Logger 11
271ROV-11	18:46	14.7527929	-44.9791091	14°45.168'N	44°58.747'W	3019.5	Irina II	Main structure	Hot fluid	Beehive on W-wall, Major #3
271ROV-12	19:03	14.7527973	-44.9791170	14°45.168'N	44°58.75'W	3019.7	Irina II	Main structure	Shrimp slurp	W-wall; upper structure area
271ROV-13	19:50	14.7522537	-44.9788597	14°45.135'N	44°58.732'W	3000.9	Site F	White mat	8-Channel T-Lance	Outside white mat; max T = 36°C

Station	**271 ROV (continued)**
Jason no.	**J2-261**
Date	**05.02.2007**
On bottom	**13:08**
Lift up	**22:02**
Bottom time (h:min)	**8:53**

Sample no.	Time	Lat.	Long.	Lat.	Long.	Water depth (m)	Vent locality	Specific site	Sample type	Sample description
271ROV-14	20:02	14.7522526	-44.9788502	14°45.135'N	44°58.73'W	3000.4	Site F	White mat	Push core	On white mat
271ROV-15	20:06	14.7522400	-44.9788511	14°45.134'N	44°58.731'W	3000.4	Site F	White mat	Push core	Same spot as #14
271ROV-16	20:13	14.7522674	-44.9788579	14°45.136'N	44°58.732'W	3000.5	Site F	White mat	8-Channel T-Lance	White mat next to hole #15, max T at T1 = 99.6°C
271ROV-17	20:17	14.7522630	-44.9788829	14°45.139'N	44°58.733'W	3000.4	Site F	White mat	8-Channel T-Lance	White mat next to hole #14, max T = 82°C
271ROV-18	20:23	14.7522786	-44.9789044	14°45.137'N	44°58.734'W	3000.5	Site F	White mat	Diffuse fluid	Sampled over white mat; Major #2
271ROV-19	20:30	14.7522544	-44.9788567	14°45.135'N	44°58.731'W	3000.5	Site F	White mat	Diffuse fluid	Sampled ober white mat; Major #4
271ROV-20	20:36	14.7522445	-44.9788366	14°45.135'N	44°58.730'W	3000.7	Site F	White mat	Mat slurp	Clean ~1/4 m² of white mat
271ROV-21	20:48	14.7521936	-44.9788274	14°45.1316'N	44°58.730'W	3000.9	Site F	White mat	Push core	Outside of white mat
271ROV-22	20:54	14.7522504	-44.9789281	14°45.135'N	44°58.736'W	3003.1	Site F	White mat	8-Channel T-Lance	20 cm away from hole 21, max T = 4.6°C
271ROV-23	21:03	14.7522167	-44.9788918	14°45.133'N	44°58.734'W	3003.2	Site F	White mat	8-Channel T-Lance	Max T = 6.5°C

Station	**275 ROV**
Jason no.	**J2-262**
Date	**06.02.2007**
On bottom	**13:11**
Lift up	**21:58**
Bottom time (h:min)	**8:46**

Sample no.	Time	Lat.	Long.	Lat.	Long.	Water depth (m)	Vent locality	Specific site	Sample type	Sample description
275ROV-1	16:09	14.7522039	-44.9788611	14°45.132'N	44°58.732'W	2997.4	Site F	White mat	Push core	Next to profiler
275ROV-2	18:03	14.7507637	-44.9767448	14°45.046'N	44°58.605'W	2915.7	Site A	Barad Dûr	8-Channel T-Lance	Below top of chimney; 230°C
275ROV-3	18:43	14.7507484	-44.9767383	14°45.045'N	44°58.604'W	2914.4	Site A	Barad Dûr	8-Channel T-Lance	Below top of chimney; 330°C
275ROV-4	18:54	14.7507486	-44.9767357	14°45.045'N	44°58.604'W	2914.4	Site A	Barad Dûr	Hot fluid	Below top of chimney; Major #3
275ROV-5	19:05	14.7507529	-44.9767355	14°45.045'N	44°58.604'W	2914.4	Site A	Barad Dûr	Hot fluid	Below top of chimney; Major #4
275ROV-6	20:04	14.7508855	-44.9773649	14°45.053'N	44°58.642'W	2924.3	Smokey Strobe	Smoker next to burnt marker	8-Channel T-Lance	Smoker next to marker 30; 349°C
275ROV-7	20:09	14.7508858	-44.9773740	14°45.053'N	44°58.642'W	2924.3	Smokey Strobe	Smoker next to burnt marker	Hot fluid	Smoker next to marker 30; Major #1
275ROV-8	20:19	14.7508805	-44.9773681	14°45.053'N	44°58.642'W	2924.4	Smokey Strobe	Smoker next to burnt marker	Hot fluid	Smoker next to marker 30; Major #D1
275ROV-9	20:35	14.7508640	-44.9773547	14°45.052'N	44°58.641'W	2924.6	Smokey Strobe	Smoker next to burnt marker	Helium	Smoker next to marker 30
275ROV-10	21:21	14.7512970	-44.9778431	14°45.078'N	44°58.671'W	2945.5	Irina I	Small smoker	Hot fluid	Major #2

Station	**282 ROV**
Jason no.	**J2-263**
Date	**06.07.2007**
On bottom	**15:30**
Lift up	**18:00**
Bottom time (h:min)	**2:29**

Sample no.	Time	Lat.	Long.	Lat.	Long.	Water depth (m)	Vent locality	Specific site	Sample type	Sample description
282ROV-1	16:23	14.7529589	-44.9806444	14°45.178'N	44°58.839'W	3023.9	Quest	Small chimney at Quest rim	Helium	Same smoker as for hot fluid samples 259ROV-24, -25
282ROV-2	17:16	14.7527910	-44.9791391	14°45.168'N	44°58.748'W	3020.7	Irina II	Mussel patch left from T-loggers	Diffuse fluid	Major #1
282ROV-3	17:22	14.7528580	-44.9791591	14°45.172'N	44°58.750'W	3023.7	Irina II	Mussel patch left from T-loggers	Mussel scoop	For incubation experiments

Appendix 5: Onboard fluid geochemistry measurements: Gases

Station number ROV	Name of the field	syringe number	sample volume/l	water depth (m)	Remarks	Ave. CH_4 mmol/L	H_2 µmol/L
244-ROV 2	Irina 2 "Main Structure"	2	0.225	3020	Temp.Fluide 293°C 1:1 verd. R10	1057.44	338.73
244-ROV 6	Irina 2 "Black Smoker"	3	0.275	3018	Temp. Fluide 340°C 1:10 R100	825.58	862.36
251-ROV 4	Irina 2 "diffuse outflow"	2	0.325	3020		224.76	174.63
251-ROV 7	Irina 2 "musselfield" Temp.Logger 9	3	0.320	3020		1.26	0.68
251-ROV 10	Irina 2 "musselfield" Temp.Logger 8	D1	0.325	3020	Schnorchel bei Beprobung abgebrochen Kontamination möglich	0.65	0.59
251-ROV 13	Irina 2 "musselfield" Temp.Logger 4	1	0.355	3020		0.88	1.72
253-ROV 5	Irina 2 "musselfield" Temp.Logger 2	2	0.255	3020	1:1000 Verdünnung R1	0.33	0.18
253-ROV 6	Irina 2 "musselfield" Temp.Logger 0	1	0.190	3020	1 :1000 Verdünnung R1	1.67	4.13
253-ROV 9	Irina 2 "Black Smoker"	3	0.100	3020	1 :1000 Verdünnung R1	1506.86	5863.36 5842.20
255-ROV 3	"Site B"	1	0.080	2963	1:1000 Verdünnung R1	817.06	2286.91
255-ROV 13	"Irina 1"	3	0.085	2950	1 :1000 Verdünnung R1	1000.79	3918.21
255-ROV 17	"Anna Louise"	4	0.090	2945	1 :1000 Verdünnung R1	1183.73	4062.36

Station number ROV	Name of the field	syringe number	sample volume/l	water depth (m)	Remarks	Ave. CH_4 mmol/L	H_2 µmol/L
259-ROV 8	Irina 2 "Main Structure"	1	0.270	3020	1:1000 Verdünnung R1	188.79	111.56
	Diffuse venting		0.270				102.69
259-ROV 24	"Quest"	3	0.090	3035	1 :1000 Verdünnung R1	495.47	2166.44
			0.090				1767.69
259-ROV 28	Irina 2 "Main Structure"	4	0.130	3020	1 :1000 Verdünnung R1	525.85	1626.77
	Black Smoker		0.130				1643.60
263-ROV 8	"Quest"	2	0.295	3035		6.47	9.09
	diffuse venting		0.295				8.84
263-ROV 10	Marker Anya	1	0.31	3037		3579.80	196.19
	Diffuse venting		0.31				182.85
267-ROV 12	"Quest"	1	0.3	3035	unverdünnt, Probengefäß war dichtgesetzt mit Sediment	0.41	0.02
	diffuse Musselfield, Temp.logger 16						
267-ROV 5	Temp.Logger 295	2	0.33	3035	1 :1000 Verdünnung R1	9.01	7.40
			0.33				7.40
267-ROV 6	"Quest" diffuse	3	0.3	3035	1 :1000 Verdünnung R1	13.19	1.89
			0.3				1.84
271-ROV 18	Site "F"	2	0.3	3005	unverdünnt, R1	1.11	0.02
	Bakterienmatte						
271-ROV 4	"Quest"	1	0.325	3026	1 :1000 Verdünnung R1	353.84	1178.62
	Musselfield						
271-ROV11	"Irina2"	3	0.095	3035	1 : 1000 Verdünnung R1	651.76	122.06
	Main Structure						
275-ROV 4	Site "A"	3	0.1	2917	1:1000 Verdünnung R1	633.01	1973.74
275-ROV 7	Smokey Strobe	1	0.11	2926	1 :1000 Verdünnung R1	683.92	2304.74
275-ROV10	Irina 1	2	0.11	2945	1 :1000 Verdünnung R1	3.98	17.98

Appendix 6: Onboard fluid geochemistry measurements: Metals

Station	Location	Working Group	Volume (ml)	Filtered	Acidified *Acid?*	ph	eh	Sulfide volt. (mg/l)	Sulfide volt. Ac (mg/l)	Sulfide photo (mg/l)	Fe2 (mg/l)	Fe3 (mg/l)	Fe total (mg/l)	Mg (Mg+Ca?)	Ca (g/l)	Cl (mM)	Mn (II) (µg/l)
242 CTD	W of Log.	*IUB*	500	-	HNO3	7.9											
		IUB	500	x	HNO3												
244 ROV-2	Irina II	*Keir*	300														
	beehive	*Perner*	200														
		IUB	100	-	-												
		IUB	30	-	-	4.2	100.4	0.156		<2.5	35.5	6.6	42.1	1.02	0.801	544	
		BGR	100	-	-												
244 ROV-3	Irina II	*Perner*	200														
	beehive	*IUB*	50	-	-												
			100	x	x												
			20	x	-												
			30	-	-	4.8	144			<2.5	33.4	11	44.4	1.07	0.801	544	
		Kiel	50	-	-												
			100	x	x												
244 ROV-6	Irina II	*Strauss*	300														
	black smoker	*Keir*	300														
		IUB	30	-	-	3.94	179	12.4		3.25	60.6	14.35	74.9	0.826	1.04	544	
244 ROV-7	Irina II	*Strauss*	8	-	-												
	black smoker		2	x	-												
			2	x	-												
		IUB	50	-	-												
			100	x	x												
			30	x	-												
			50	-	-	4.01	181	15-22		12.25	61.4	20.35	81.75	0.826	1.04	536	
		Kiel	50	-	-												
			100	x	x												
251 ROV-4	Irina II	*Keir*	300														
	diffuse	*BGR*	100	-	-												
		IUB	30	-	-	6.75	16.3	0.38	0.43		7.8	1.5	9.4			554	148
		Perner	200														
251 ROV-5	Irina II	*BGR*	100	-	-												
	diffuse	*Strauss*	8	-	-												
			2	x	-												
			2	x	-												
		IUB	30	-	-	7.71	-40.2	<0.2			-	~0.8	~0.8			566	
			100	-	x												
251 ROV-7	Irina II mussel	*IUB*	100	-	x												
			40	-	-	8.01	-57.7										
		Keir	300														
251 ROV-10	Irina II mussel	*IUB*	100	-	x												
			40	-	-	7.95	-54.2										
		Keir	300														

Station	Location	Working Group	Volume (ml)	Filtered	Acidified *Acid?*	ph	eh	Sulfide volt. (mg/l)	Sulfide volt. Ac (mg/l)	Sulfide photo (mg/l)	Fe2 (mg/l)	Fe3 (mg/l)	Fe total (mg/l)	Mg (Mg+Ca?)	Ca (g/l)	Cl (mM)	Mn (II) (µg/l)
251 ROV-13	Irina II mussel	*IUB*	100	-	x												
			40	-	-	8.03	-58.3										
		Keir	300														
253 ROV-5	Irina II mussel	*IUB*	100	-	x												
			40	-	-												
			30	-	-	8	-57	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	1.604	0.401		
		Keir	300	-	-												
253 ROV-6	Irina II mussel	*IUB*	100	-	x												
			40	-	-												
			30	-	-	7.99	-56	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.		0.401		2.9
		Keir	300	-	-												
253 ROV-9	Irina II	*Keir*	250														
	Black smokerer	*Kiel*	100	-	-												
			100	-	x												
		IUB	100	-	-												
			50	x	x												
			30	x	-	4.02	175	17.1	5.6	19.5	149	51	189	0.826	1.042		
253 ROV-10	Irina II	*Hannover*	200	x	x												
	Black smokerer	*Kiel*	200	-	x												
		IUB	100	x	x												
			100	-	x												
			40	-	-												
			30	-	-	3.78	190	13.9	3.5	12	137	19	156	0.826	1.042		
		Strauss	8	-	-												
			2	x	-												
			2	x	-												
		BGR	60														
257 ROV-3	Site B	*Keir*	100														
(Corrected		*IUB*	50	-	-												
original:			50	x	x												
255-3)			50	-	x												
			30	-	-	4.17	166.3	25.8		9.75**	146	44.7	191	0.826	1.042	550	
		Kiel	50	-	-												
			50	-	x												
		Strauss	8	-	-												
			2	x	-												
			2	x	-												
		Hannover	200	x	x					** not enough ZnAc used for fixation							
257 ROV-4	Site B	*IUB*	250	-	x												
(Corrected			80	x	x												
original:			40	-	-	3.57	201	18.4	3.5	6.5**	150	2.74	153	0.826	1.042	538	
255-4)		*Kiel*	250	-	x					** not enough ZnAc used for fixation							

Station	Location	Working Group	Volume (ml)	Filtered	Acidified *Acid?*	ph	eh	Sulfide volt. (mg/l)	Sulfide volt. Ac (mg/l)	Sulfide photo (mg/l)	Fe2 (mg/l)	Fe3 (mg/l)	Fe total (mg/l)	Mg (Mg+Ca?)	Ca (g/l)	Cl (mM)	Mn (II) (µg/l)
257 ROV-12																	
(Corrected	Irina I	*IUB*	200	-	-												
original:			100	x	x												
255-12)			30	-	-	5.19	107	0.99		0.9	58	20	78.2	1.36	0.72	544	
		Kiel	200	-	x												
			100	-	x												
257 ROV-13	Irina I	*Keir*	100														
(Corrected		*Strauss*	400														
original:		*IUB*	50	-	-												
255-13)			40	-	-	5.3	101	0.25		2	78	15	93	1.167	0.801	546	
257 ROV-17	Candelabra	*Keir*	200														
(Corrected	(Corrected	*Strauss*	8	-	-												
original:	original:		2	x	-												
255-17)	Anna Louise)		2	x	-												
		BGR	30														
		IUB	50	-	-												
			50	x	x												
			30	x	-												
			40	-	-	4.22	163	20.7		8.0**	138	4.5	143	0.826	1.042	538	
		Kiel	50	-	-												
			50	-	x					** not enough ZnAc used for fixation							
259 ROV-8	Irina II	*IUB*	50	-	x												
	Main structure		30	-	-	6.85	10.3	10.16	1.6	3	5.46	1	6.46			556	
	diffuse	*Perner*	200														
259 ROV-9	Irina II	*IUB*	50	-	x												
	Main structure		30	-	-	6.93	6	0.7	0.52	0.5	3.07	2.6	5.67			554	
	diffuse	*Strauss*	250														
		BGR	60														
		Perner	200														
259 ROV-24	Quest	*Keir*	100														
		Strauss	400														
		IUB	100	-	x												
			40	-	-	6.26	44.8	n.d.	n.d.	n.d.	21.6	7.76	29.35			558	
		Kiel	100	-	x												
259 ROV-25	Quest	*Strauss*	8	-	-												
			2	x	-												
			2	x	-												
		BGR	40														
		IUB	180	x	x												
			150	-	-												
			30	x	-												
			30	-	-	3.52	204	77.8	21.72	21.67	132	13	145.5	0.826	1.042	544	
		Kiel	180	-	x												
			150	-	-												

Station	Location	Working Group	Volume (ml)	Filtered	Acidified *Acid?*	ph	eh	Sulfide volt. (mg/l)	Sulfide volt. Ac (mg/l)	Sulfide photo (mg/l)	Fe2 (mg/l)	Fe3 (mg/l)	Fe total (mg/l)	Mg (Mg+Ca?)	Ca (g/l)	Cl (mM)	Mn (II) (µg/l)
259 ROV-28	Irina II	*Keir*	100														
	Main structure	*IUB*	120	-	-												
			120	x	x												
			30	x	-												
			30	-	-	6.34	40.3	3.2*	3.2*	1.67	43	6.15	49.75	0.826	0.561	554	
		Kiel	100	-	x												
			100	-	-				* no clear signal								
263 ROV-8	Quest	*Strauss*	8	-	-												
	diffuse	*IUB*	30	-	-	6.27	44.7			7.18						556	
		Keir	300														
		Perner	200														
263 ROV-9	Quest	*BGR*	60														
(snorkel boken)	diffuse	*IUB*	50	-	x												
			30	-	-	8.19	-67.8									542	
		Perner	200														
263 ROV-10	Diffuse near Anya	*IUB*	50	-	x												
			30	-	-	8.18	-67.6									556	2.05
		Keir	300														
267 ROV-5	Quest diffuse	*Keir*	300														
		IUB	100	-	x												
			30	-	-	7.83	-46.6									560	
267 ROV-6	Quest diffuse	*IUB*	30	-	-	8.16	-65.2									560	
		Keir	300														
267 ROV-12		*IUB*	30	-	-	8.19	-67.1									560	
			40	x	x												
		Keir	300														
271 ROV-4	Quest diffuse	*Keir*	300														
		IUB	40	-	-	6.45	33.1			s	3.3	0.8	4.12			513	
			50	-	-												
			50	x	x												
271 ROV-11	Irina II	*Keir*	100														
	Main structure	*BGR*	40														
		Strauss	8	-	-												
			2	x	-												
			2	x	-												
		IUB	40	-	-	4.59	141			20	120	20.5	140.5			544	
			30	x	-												
			60	x	x												
			50	-	-												
		Kiel	100	-	x												
271 ROV-18	Site F	*Keir*	300														
		IUB	40	-	-	8.01	-57				n.d.	n.d.	n.d.			564	
			50	x	x												

Station	Location	Working Group	Volume (ml)	Filtered	Acidified *Acid?*	ph	eh	Sulfide volt. (mg/l)	Sulfide volt. Ac (mg/l)	Sulfide photo (mg/l)	Fe2 (mg/l)	Fe3 (mg/l)	Fe total (mg/l)	Mg (Mg+Ca?)	Ca (g/l)	Cl (mM)	Mn (II) (µg/l)
271 ROV-19	Site F	*IUB*	40	-	-	8.06	-59.9				n.d.	n.d.	n.d.			570	
275 ROV-4	Site A	*Keir*	100														
		Strauss	400														
			30	-	-	4.51	145.6			26	75	1	76	0.826	0.962	544	
275 ROV-5	Site A	*Strauss*	8	-	-												
			2	x	-												
			2	x	-												
		IUB	30	x	-												
			60	x	x												
			100	-	-												
			30	-	-	4.41	151			25.37	72.5	2.75	75.25	0.826	0.962	548	
		Kiel	100	-	x												
			100	-	-												
275 ROV-7	Anna-Louise	*Keir*	100														
	(corrected from	*Strauss*	8	-	-												
	original:		2	x	-												
	smokery Strobe)		2	x	-												
		IUB	30	-	-	4.19	164.5			24.37	124	5.4	129.8	0.826	0.802	548	
			30	x	-												
			60	x	x												
			100	-	-												
		Kiel	60	-	-												
			60	-	x												
275 ROV-8	Anna-Louise	*IUB*	30	-	-	4.8	128.3			9.75	104	0.25	103.75	0.923	0.882	554	
	(corrected from		50	-	-												
	original:	*Kiel*	50	-	x												
	smokery Strobe)																
275 ROV-10	Irina 1	*Keir*	100														
		IUB	30	-	-	7.94	-53.4			n.d.	n.d.	n.d.	n.d.			554	
			250	-	-												
282 ROV-2	Irina II diffuse	IUB	30	-	-	6.18	47.1			0.86							

Appendix 6: List of microbiological samples

Date	station	sample number	sample	DNA	FISH	cultures	t [°C]	name of culture	DMSO	Glycerin	Agar plates
27.01.2007	**Rov 244**	244-2 244-3	Irina II main structure - hot fluids	1 x 100ml	1 x 100ml	Desulfurobacterium Desulfurococcales Epsilonproteobacteria	26	D1			
	J2-253			1 x 100ml			55	D2			
							70	D3			
						Methanococcales Methanopyrus	38	M1			
							55	M2			
							70	M3			
						Thermococcales	70	T1			
							88	T2			
						Aquificales Epsilonproteobacteria	25	A1			
							37	A2			
							55	A3			
							70	A4			
						Thermodesulfobacteria Archaeoglobales	50	Arch1			
							70	Arch2			

Date	station	sample number	sample	DNA	FISH	cultures	t [°C]	name of culture	DMSO	Glycerin	Agar plates
29.01.2007	**Rov 251**	251-4 251-5	IRINA II mussel field - diffuse fluids; taken from schwarzer fleck near original marker/t-logger #0	1 x 100ml	1 x 200ml	Thermales Aeropyrum	50	251A	1ml	1ml	5 ASW 5 ASW1 5 TSB
	J2-255			1 x 100ml			70	251B			
						Desulfurobacterium	25	251C			
						Desulfurococcales Epsilonproteobacteria	55	251D			
							95	251E			
						Methanococcales	37	251F			
						Methanopyrus	55	251G			
							70	251H			
							90	251I			
						Thermococcales	70	251J			
							90	251K			
						Aquificales	25	251L			
						Epsilonproteobacteria	37	251M			
							55	251N			
							70	251O			
							90	251P			
						Thermodesulfobacteria	50	251T			
						Archaeoglobales	75	251U			
						CH4 oxidizers	20	251V			
							40	251W			
31.01.2007	**Rov 257**	257-9	rock with white mat	Regina Schauer (MPI)		S2- (1ml - 5mM)		1	1ml	1ml	5 ASW 5 ASW1
	J2-257	17:50				S2- (0,1ml - 5mM)		2			5 TSB
						S2- (0,01ml - 5mM)		3			
						TS (1ml)		4			
						S°		5			

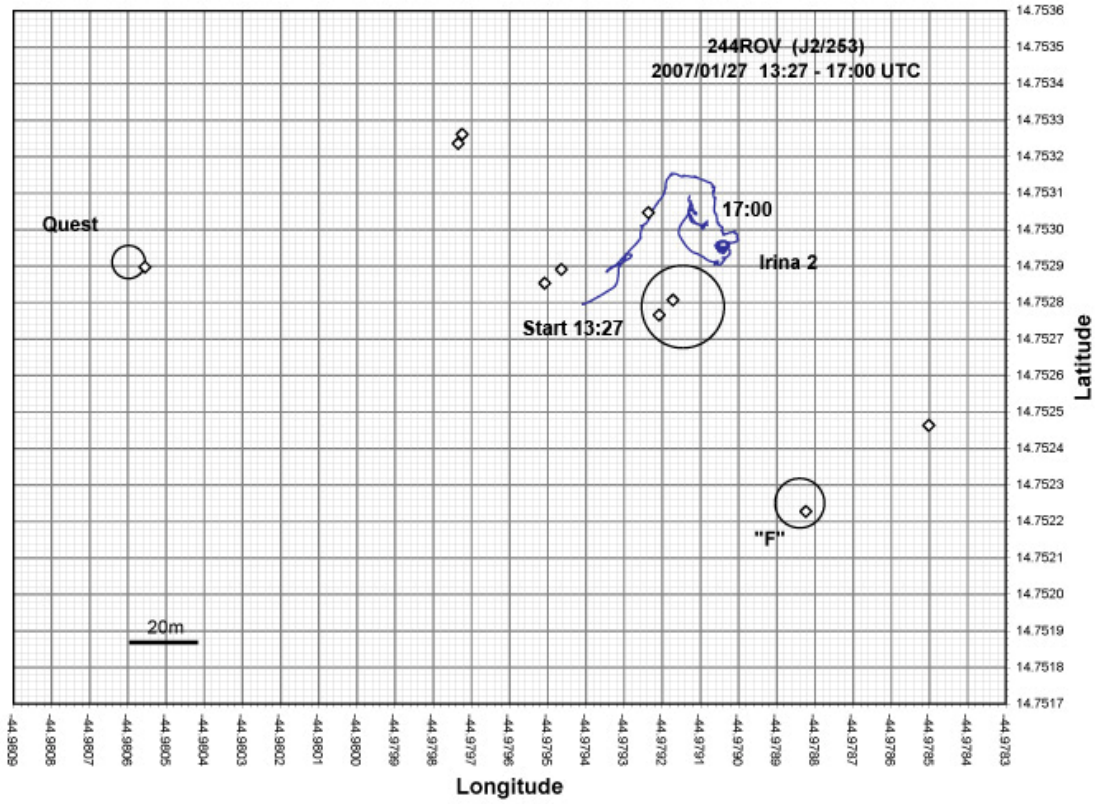
Date	station	sample number	sample	DNA	FISH	cultures	t [°C]	name of culture	DMSO	Glycerin	Agar plates
02.02.2007	**Rov 259 J2-258**	259-8	IRINA II main structure diffuse fluids	1 x 100ml 1 x 100ml	1x 200ml	Desulfurobacterium Desulfurococcales Epsilonproteobacteria	25 55 70	259-1 259-2 259-3	1ml	1ml	5 ASW 5 ASW1 5 TSB
						Methanococcales Methanopyrus	37 55 70	259-4 259-5 259-6			
						Thermococcales	70 90	259-7 259-8			
		259-9				Aquificales Epsilonproteobacteria	25 37 55 75 25 37 55 75	259-9 259-10 259-11 259-12 259-13 259-14 259-15 259-16			
						Thermodesulfobacteria Archaeoglobales	50 75	259-17 259-18			
						CH4 oxidizers	20 40	259-19 259-20			
						diffuse fluids with different S2- concentrations	1ml S2- 0,1ml S2- 0,01ml S2- 1µl S2- 0µl S2-	S1 S2 S3 S4 S5			
						diffuse fluids along temperature radient; all in MJ with 200µM S2- and 0,02ml S°	4°C 24°C 44°C 64°C 84°C	T1 T2 T3 T4 T5			
		259-	t-logger #5	1ml	1ml				Hans Roy (MPI) microscopy		

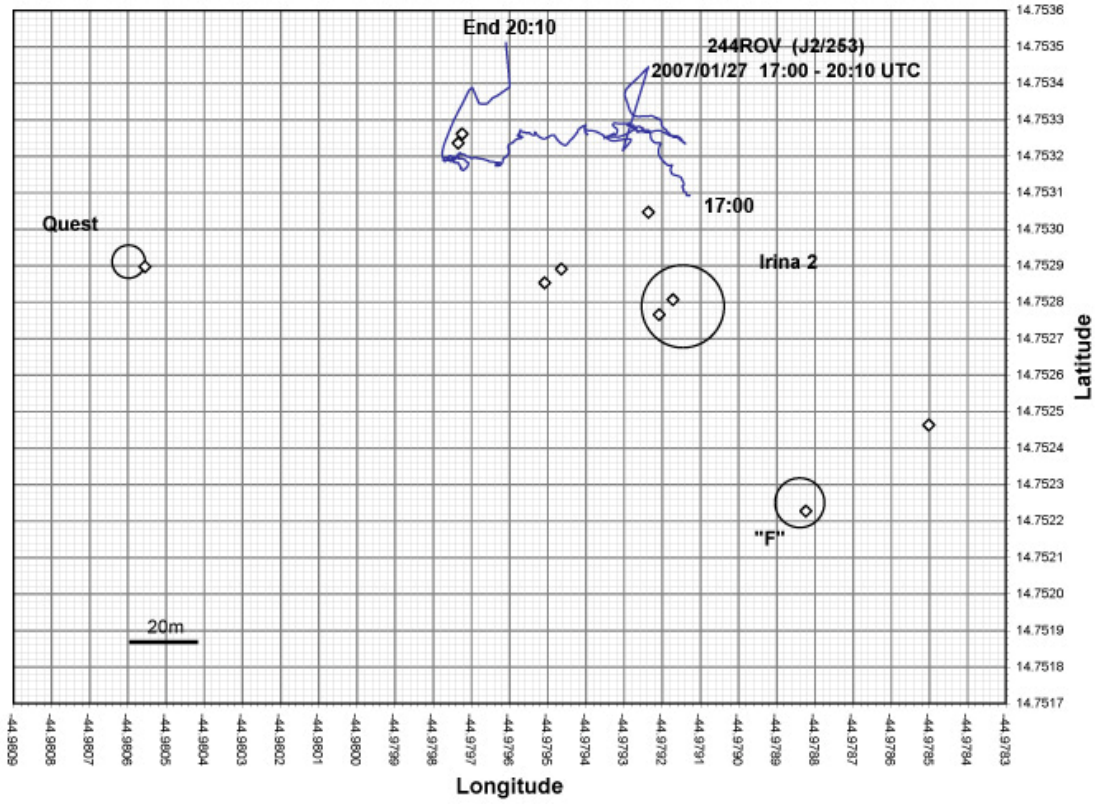
Date	station	sample number	sample	DNA	FISH	cultures	t [°C]	name of culture	DMSO	Glycerin	Agar plates
03.02.2007		263-8	QUEST mussel field	1 x 100ml	2 x 50ml	Desulfurobacterium Desulfurococcales	25	263-1			
				1 x 100ml	1 x 100ml	Epsilonproteobacteria	55	263-2			
					1 x 25ml		70	263-3			
						Methanococcales Methanopyrus	37	263-4			
							55	263-5			
							70	263-6			
						Thermococcales	70	263-7			
							90	263-8			
						Aquificales Epsilonproteobacteria	25	263-9			
		263-9					37	263-10			
							55	263-11			
							70	263-12			
							80	263-13			
						Thermodesulfobacteria Archaeoglobales	55	263-14			
							80	263-15			
						CH4 oxidizers	4	263-16			
							15	263-17			
						diffuse fluids along temperature radient; all in MJ HCO3, VS, NaNO3, NaSO4, S2, S2-, CH4, H2	4	263-18			
							40	263-19			
							70	263-20			

Date	station	sample number	sample	DNA	FISH	cultures	t [°C]	name of culture	DMSO	Glycerin	Agar plates
05.03.2007		271-9 271-10		300ml	300ml						
07.02.2007		282-2	diffuse fluids from Irina II mussels used as Blank for CO2 experiments	4 x 100ml	1x 100ml 1x 80ml						

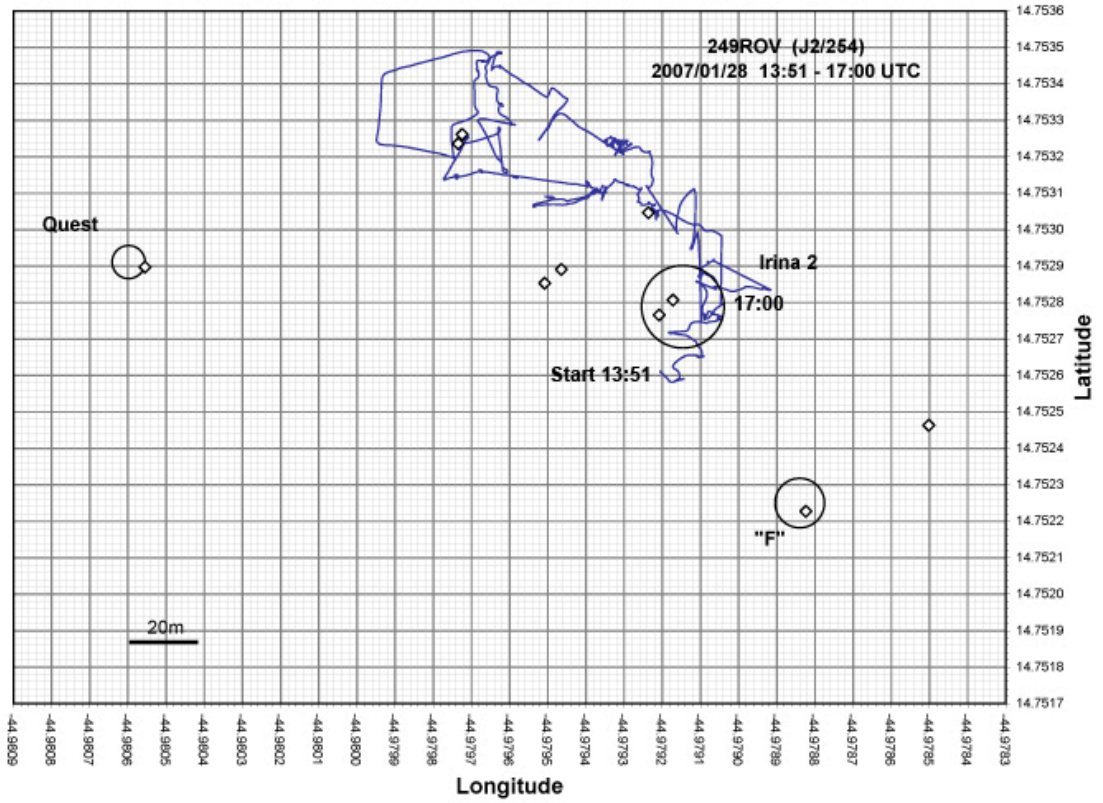
Appendix 7: Jason II dive track maps (compiled by S. Petersen)

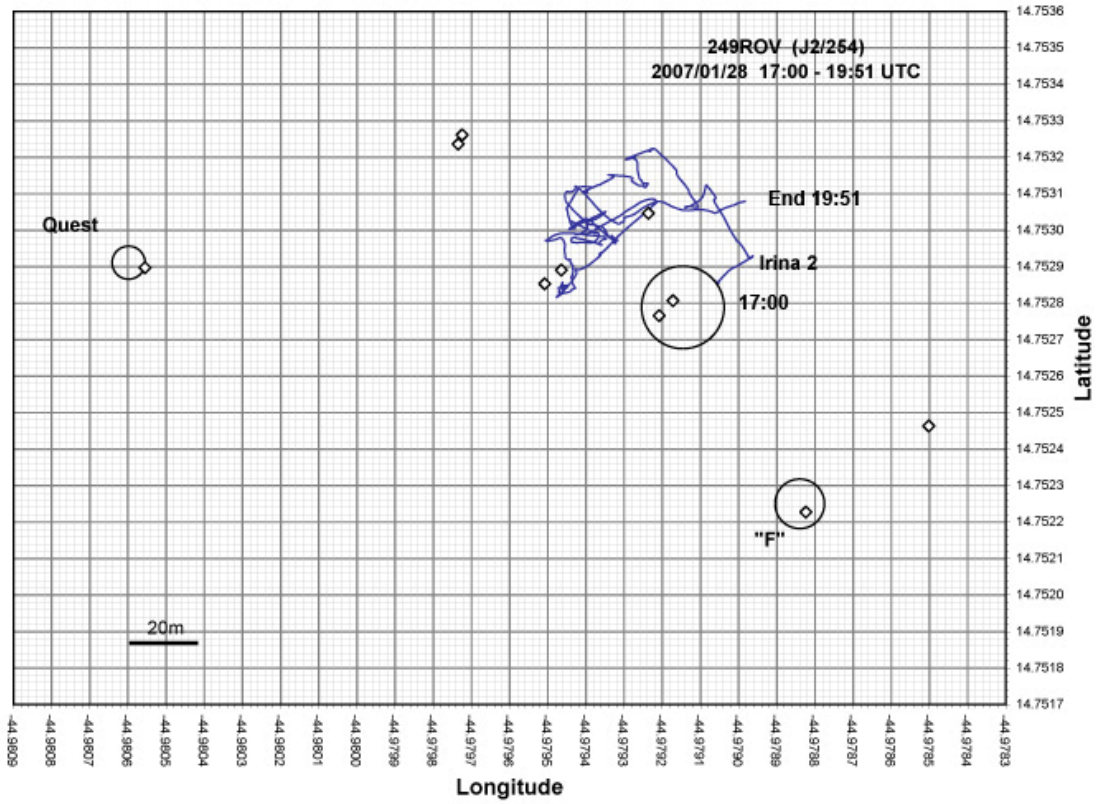
244-ROV / J2-253 (2 maps)



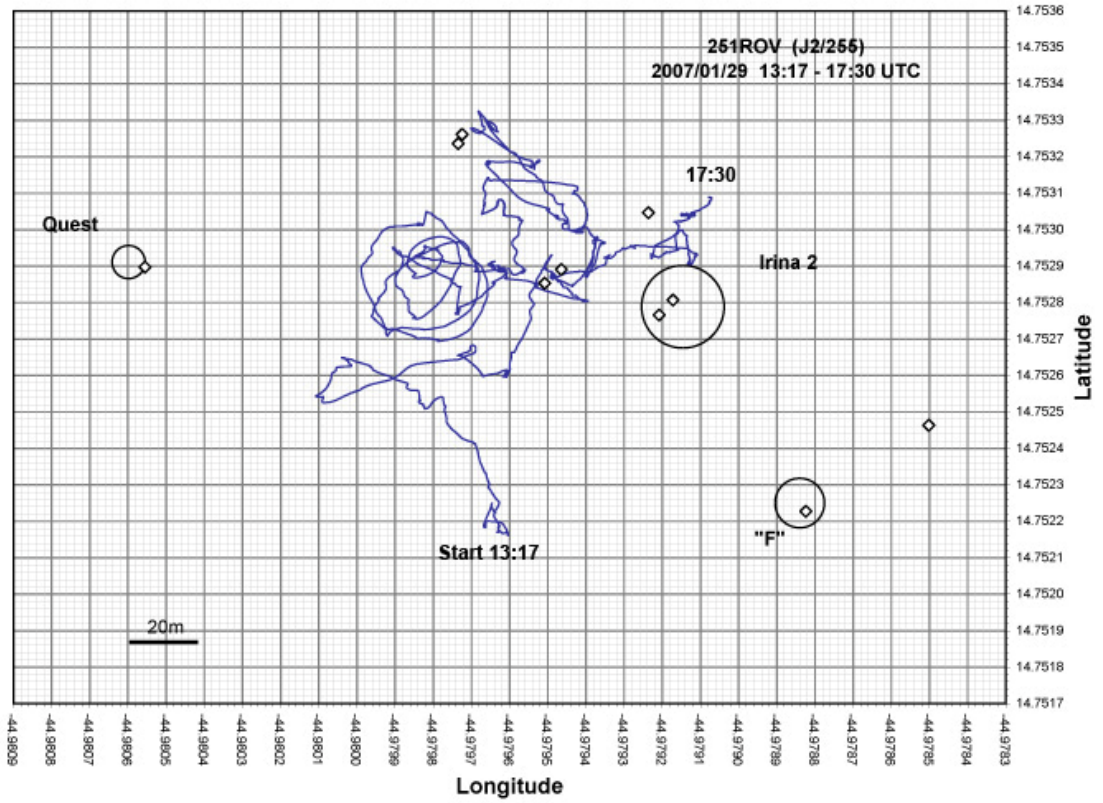


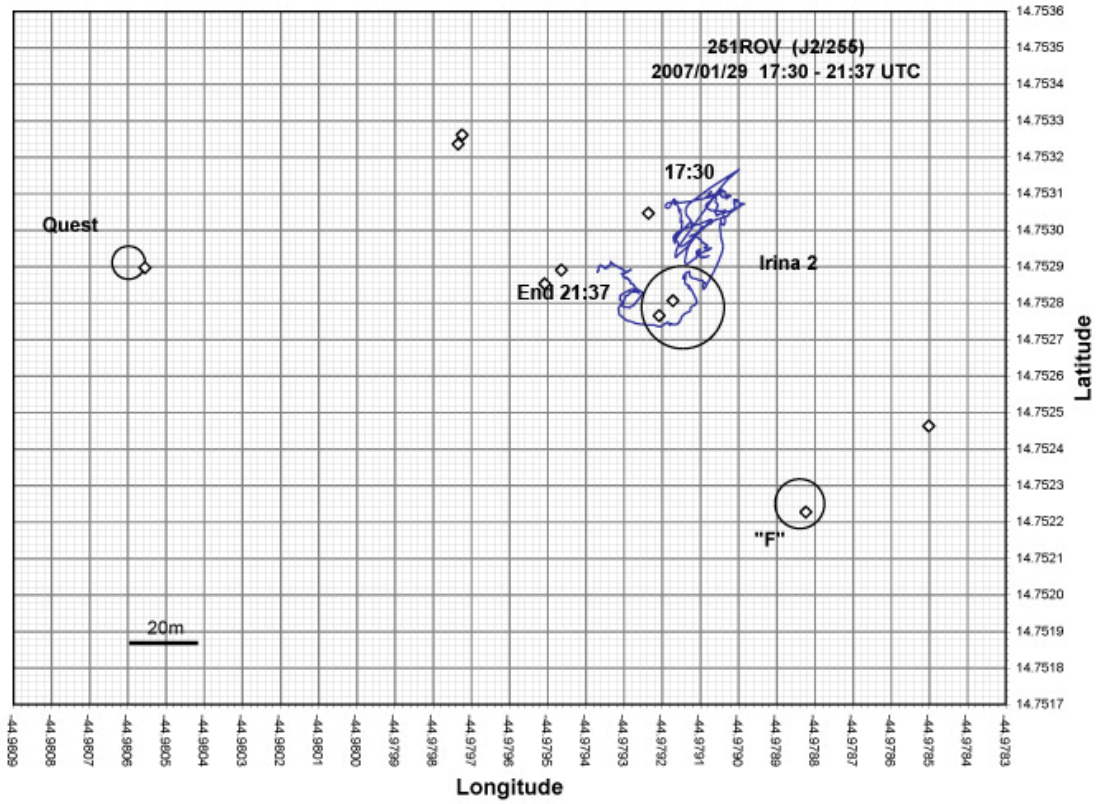
249-ROV / J2-254 (2 maps)



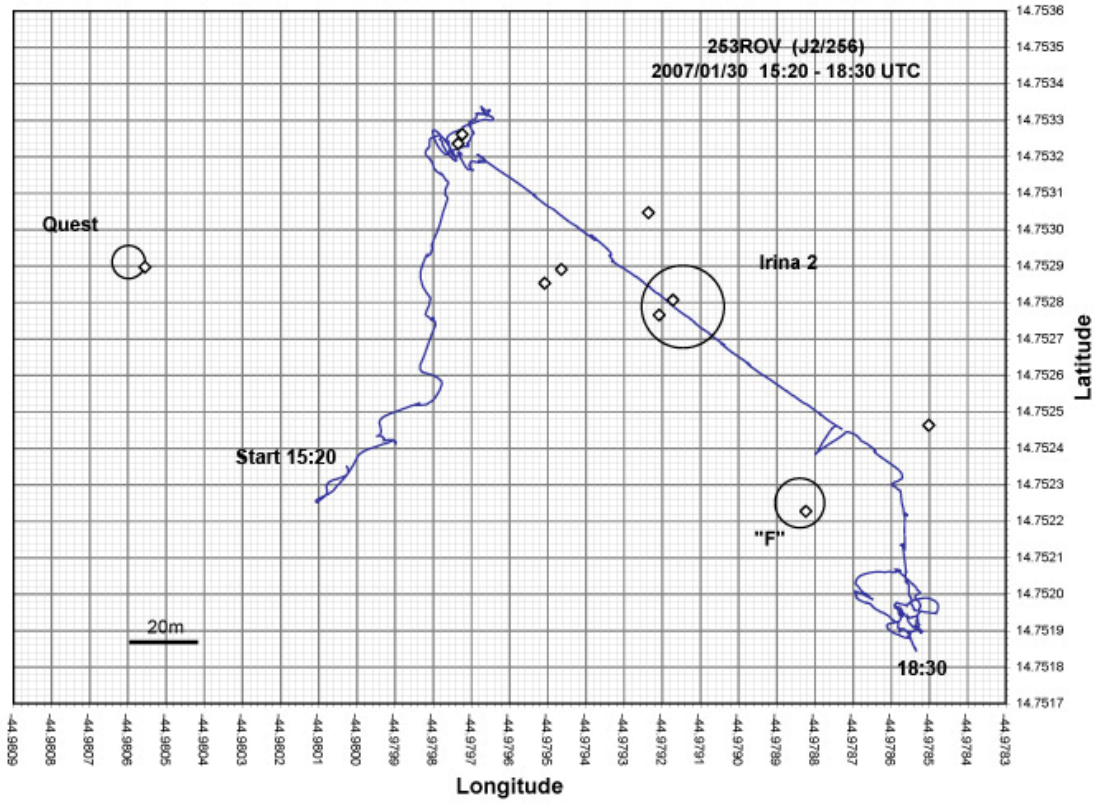


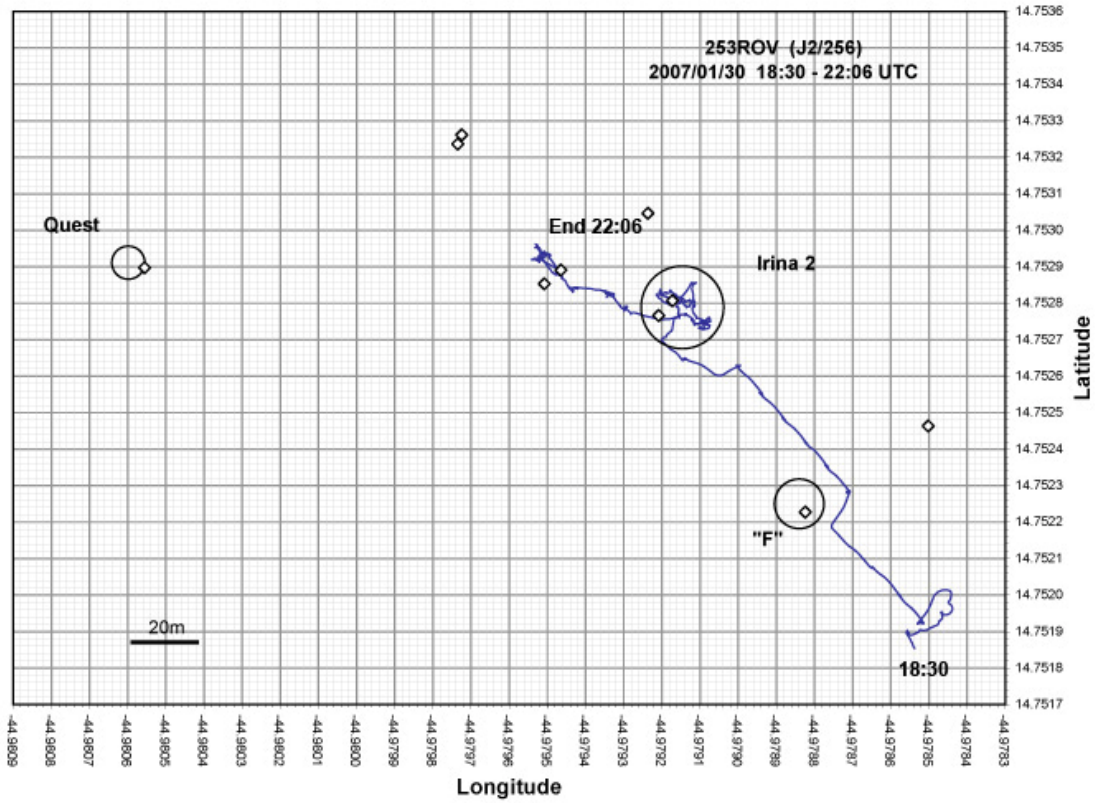
251-ROV / J2-255 (2 maps)



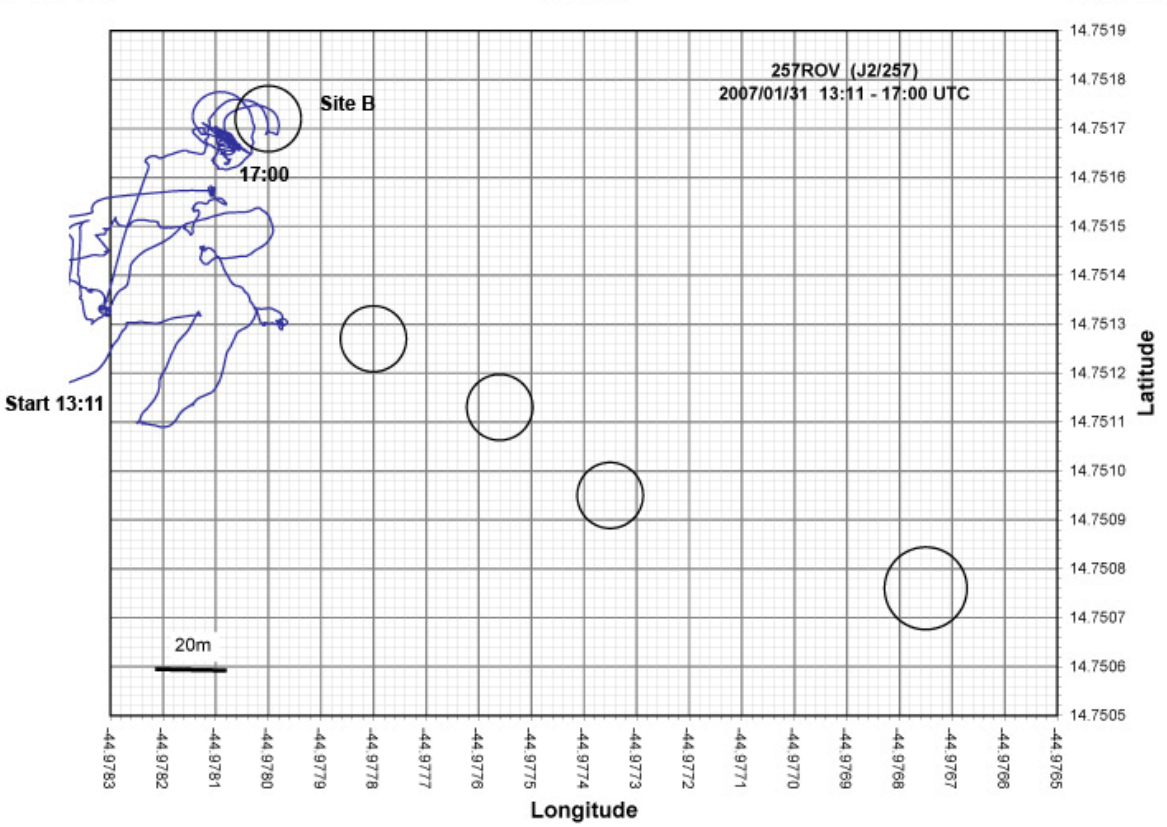


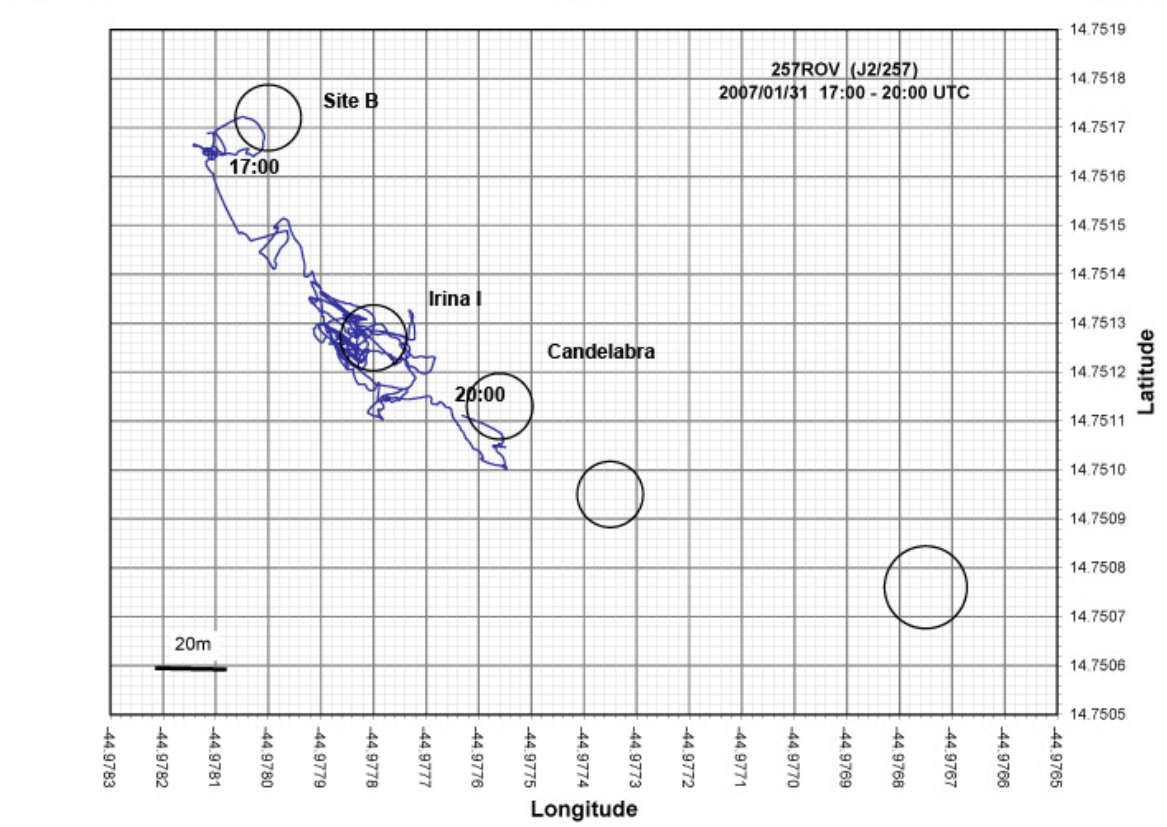
253-ROV / J2-256 (2 maps)



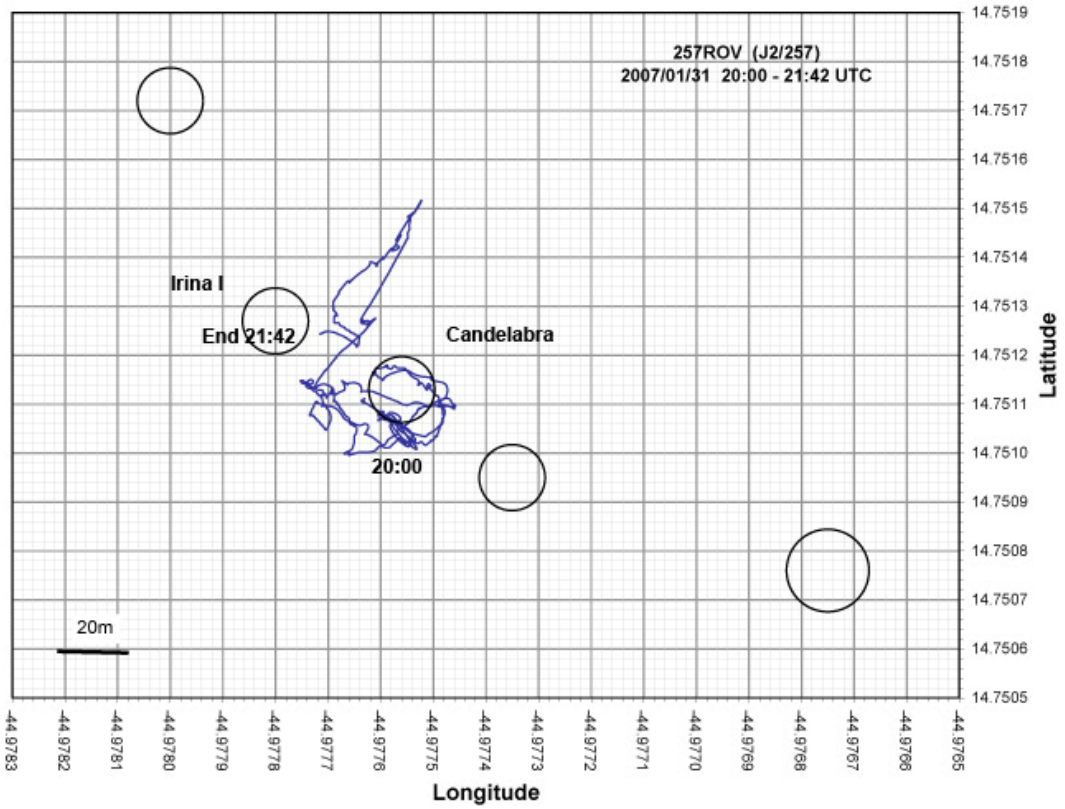


257-ROV / J2-257 (3 maps)

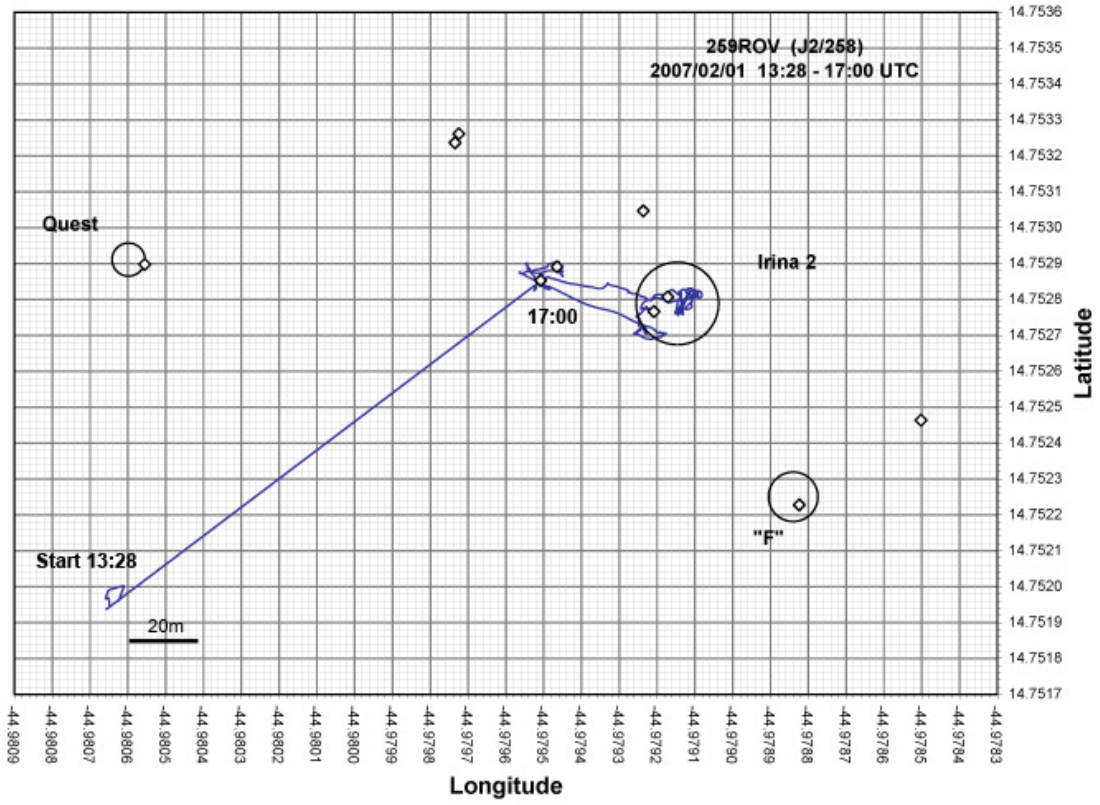


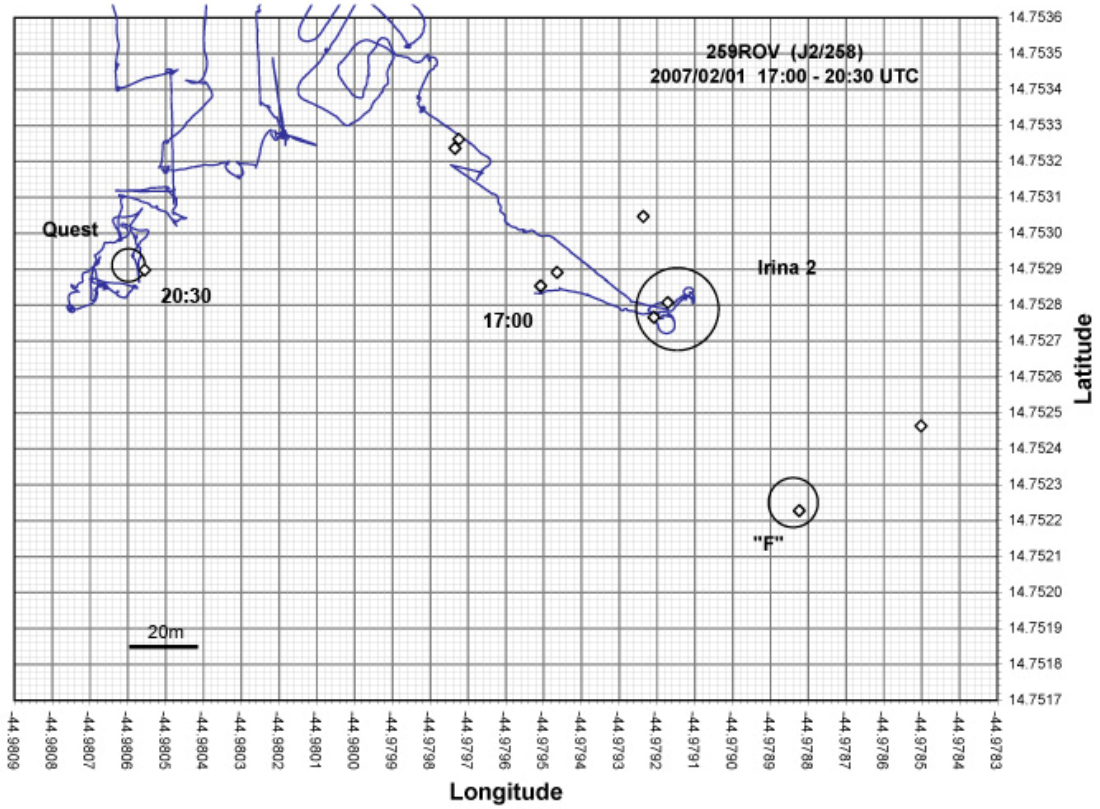


257-ROV / J2-257 (continued)

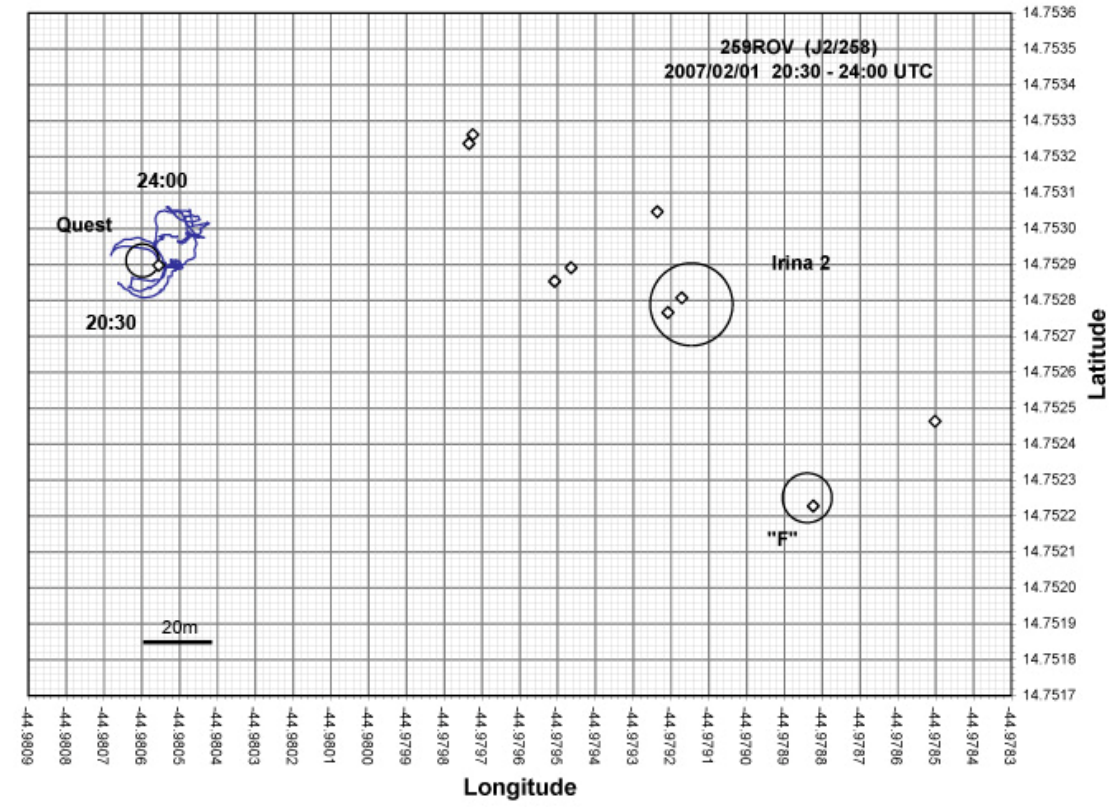


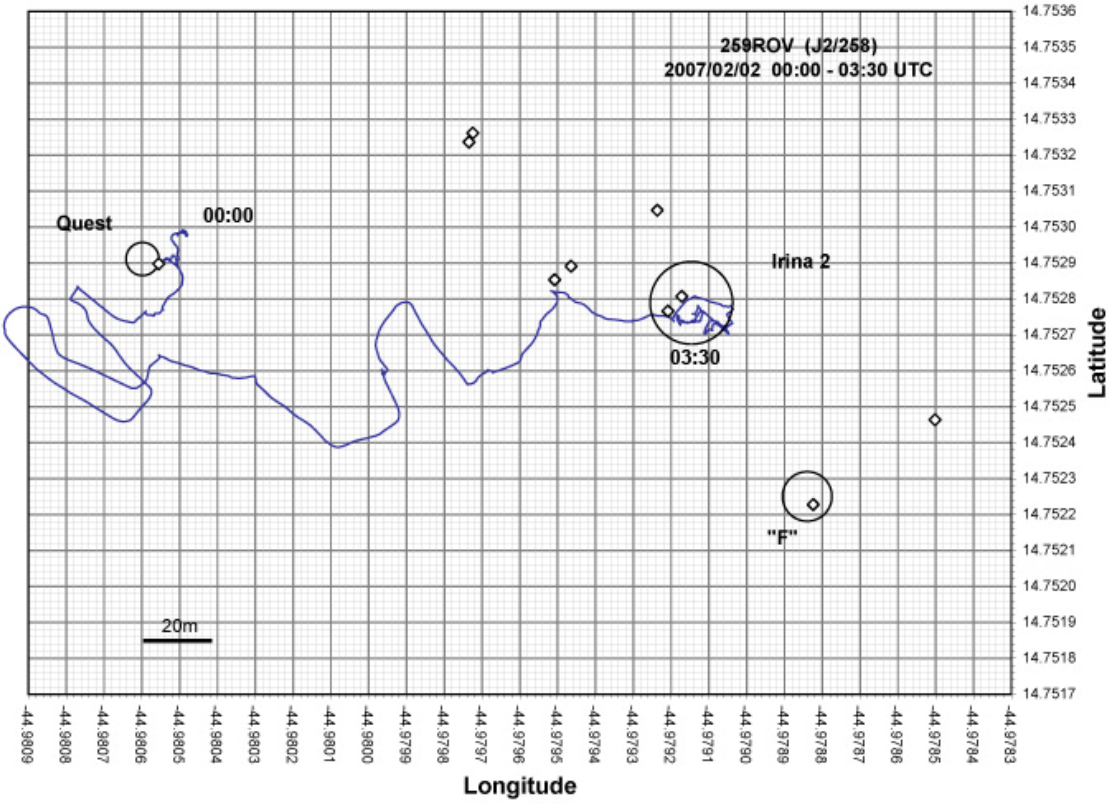
259-ROV / J2-258 (6 maps)



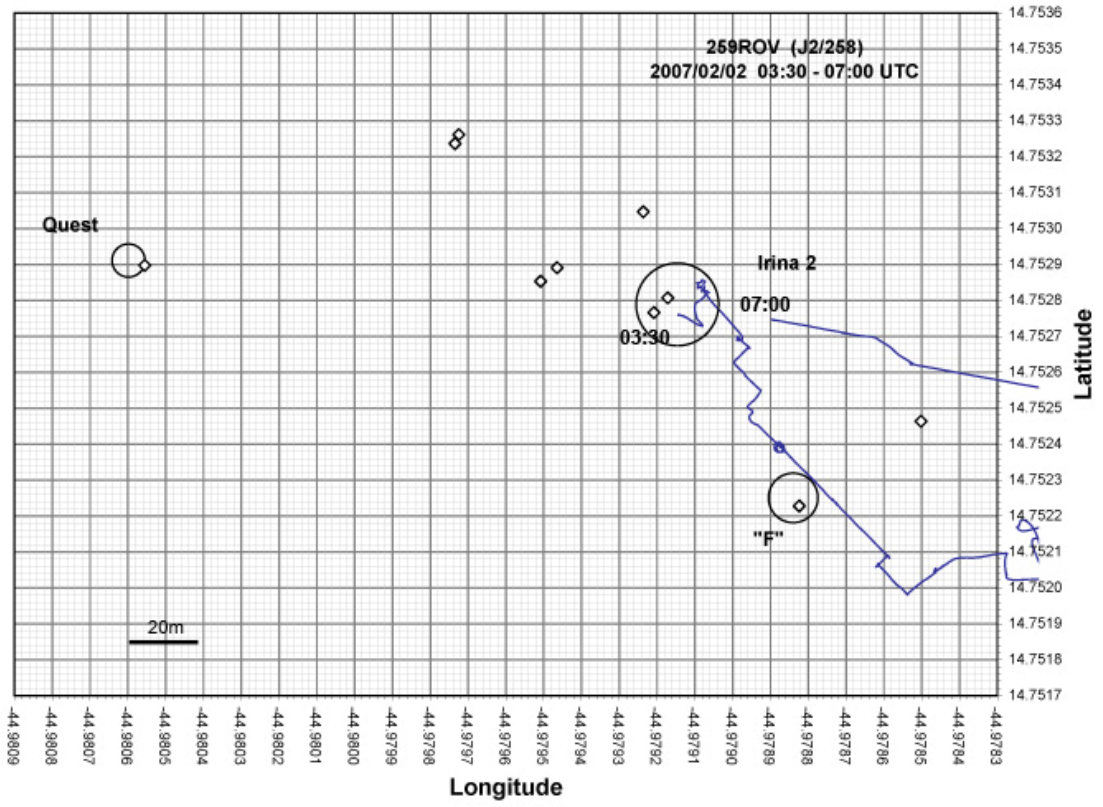


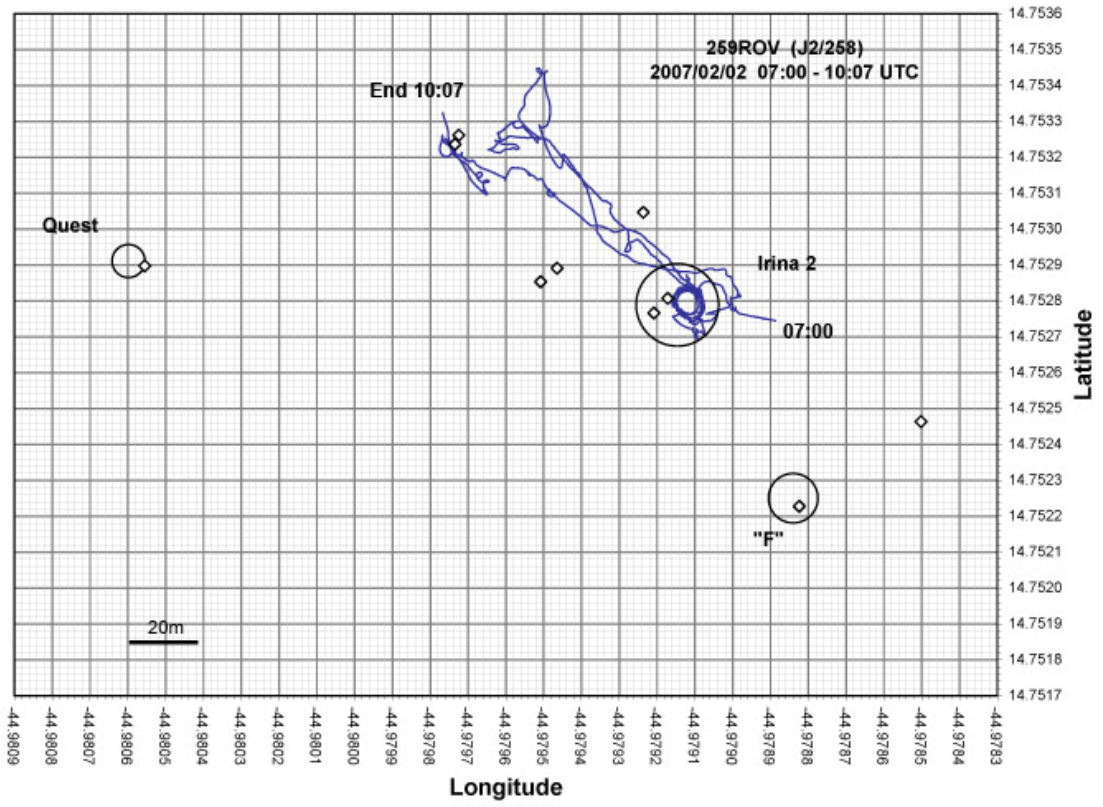
259-ROV / J2-258 (continued)



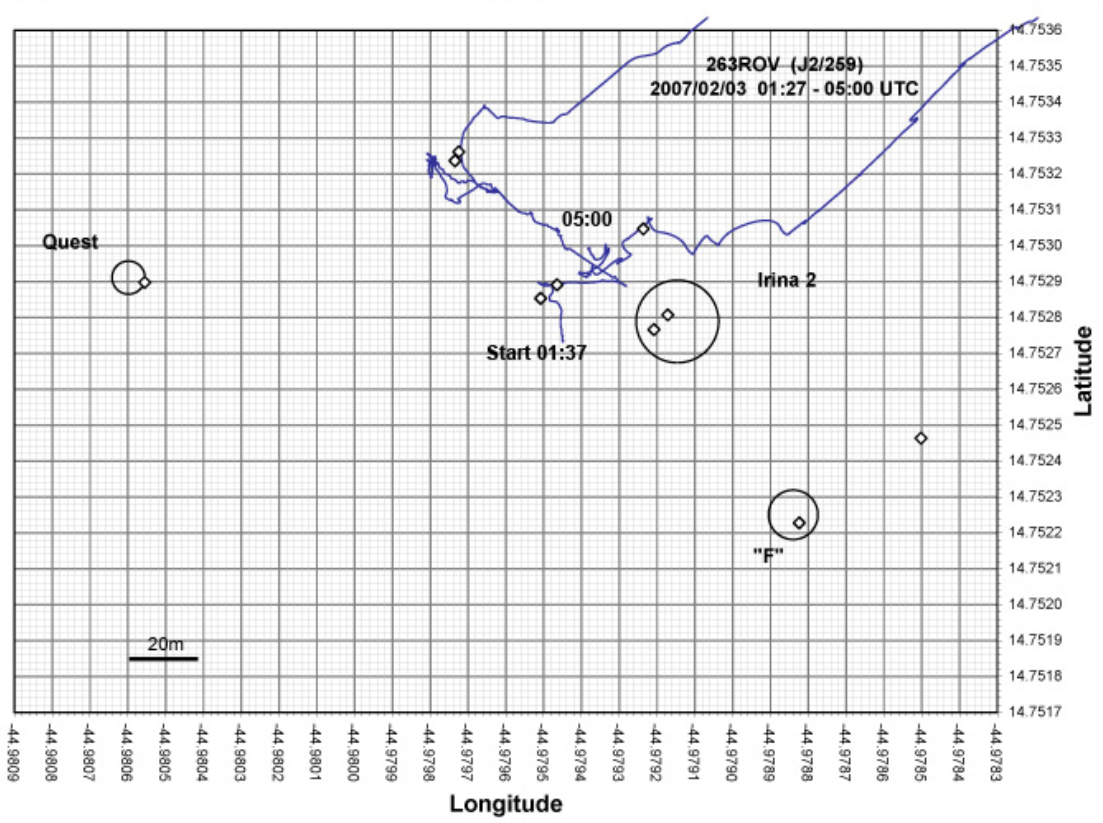


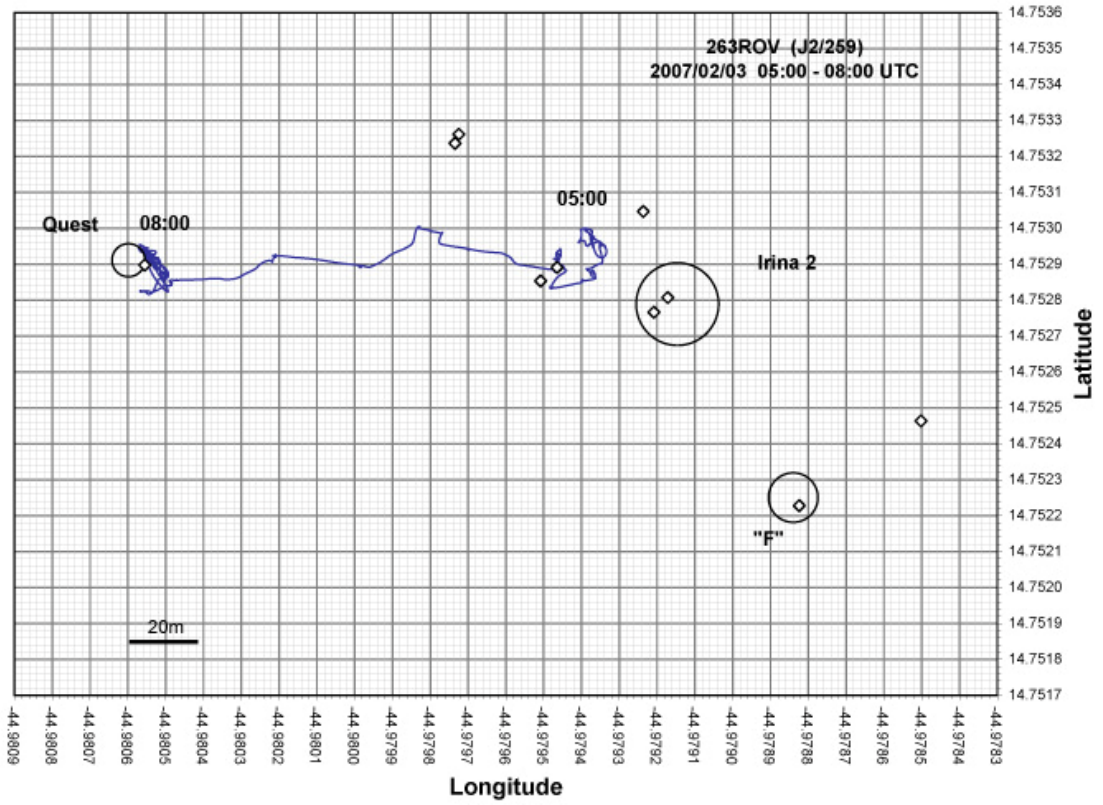
259-ROV / J2-258 (continued)



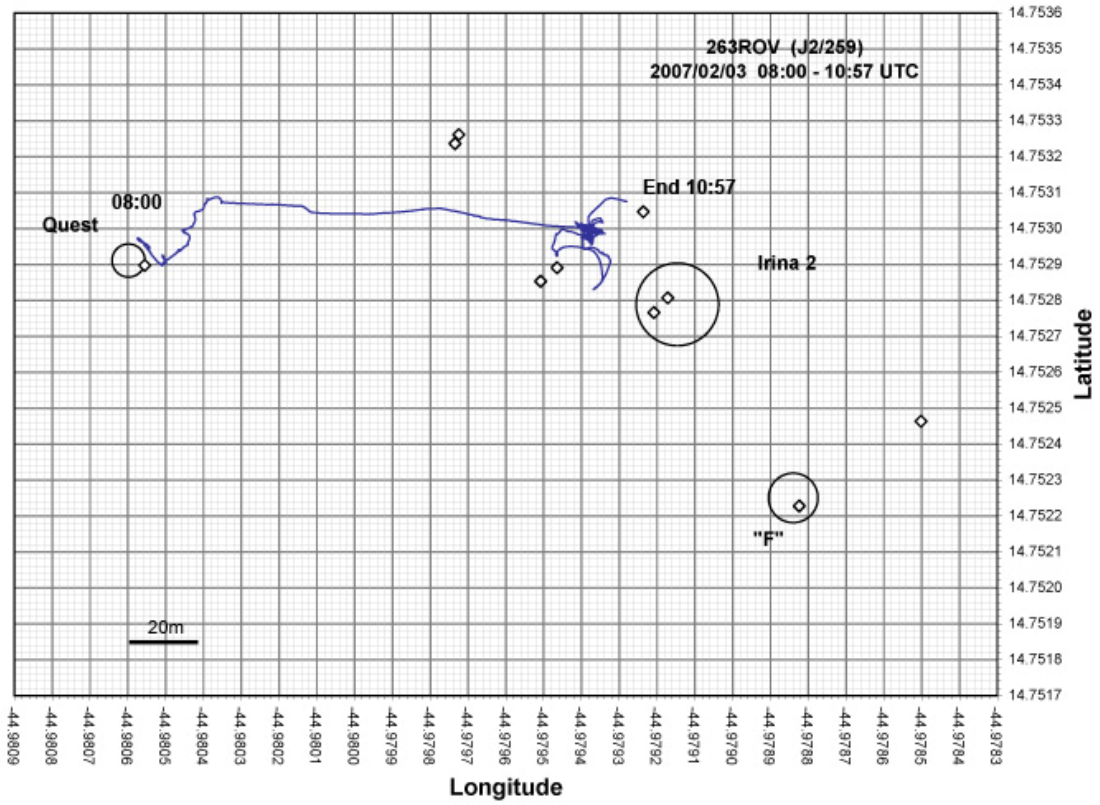


263-ROV / J2-259 (3 maps)

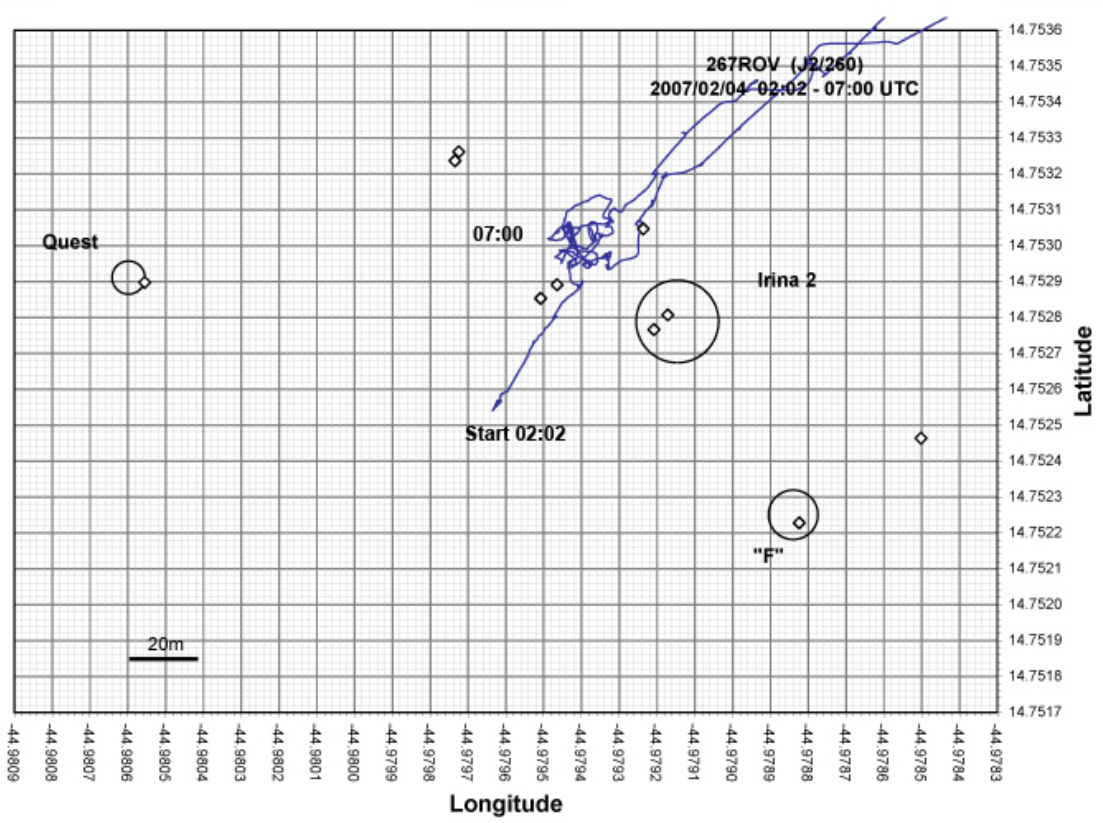


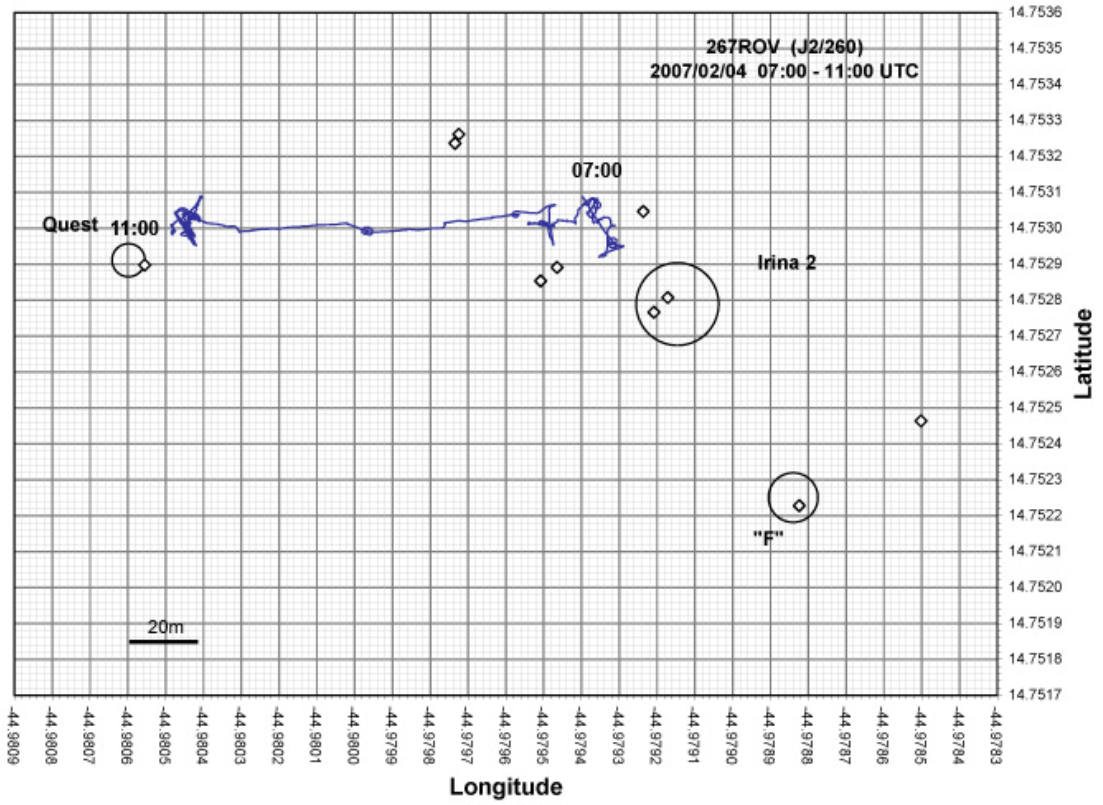


263-ROV / J2-259 (continued)

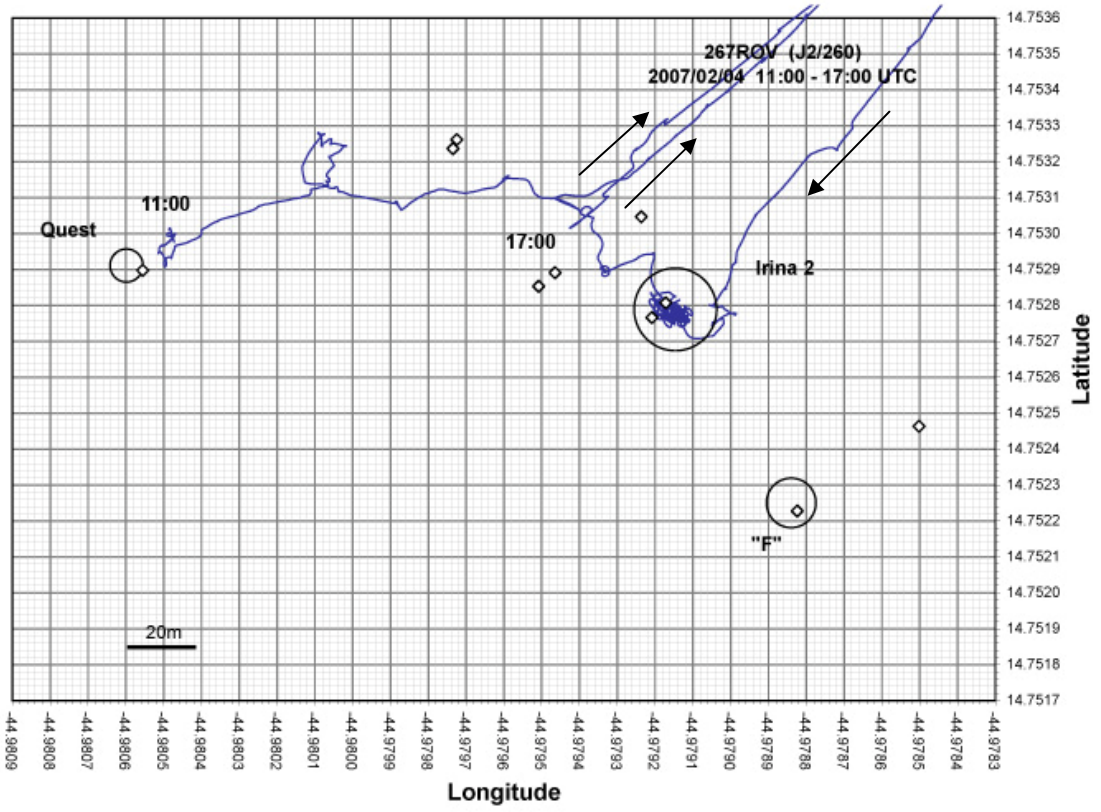


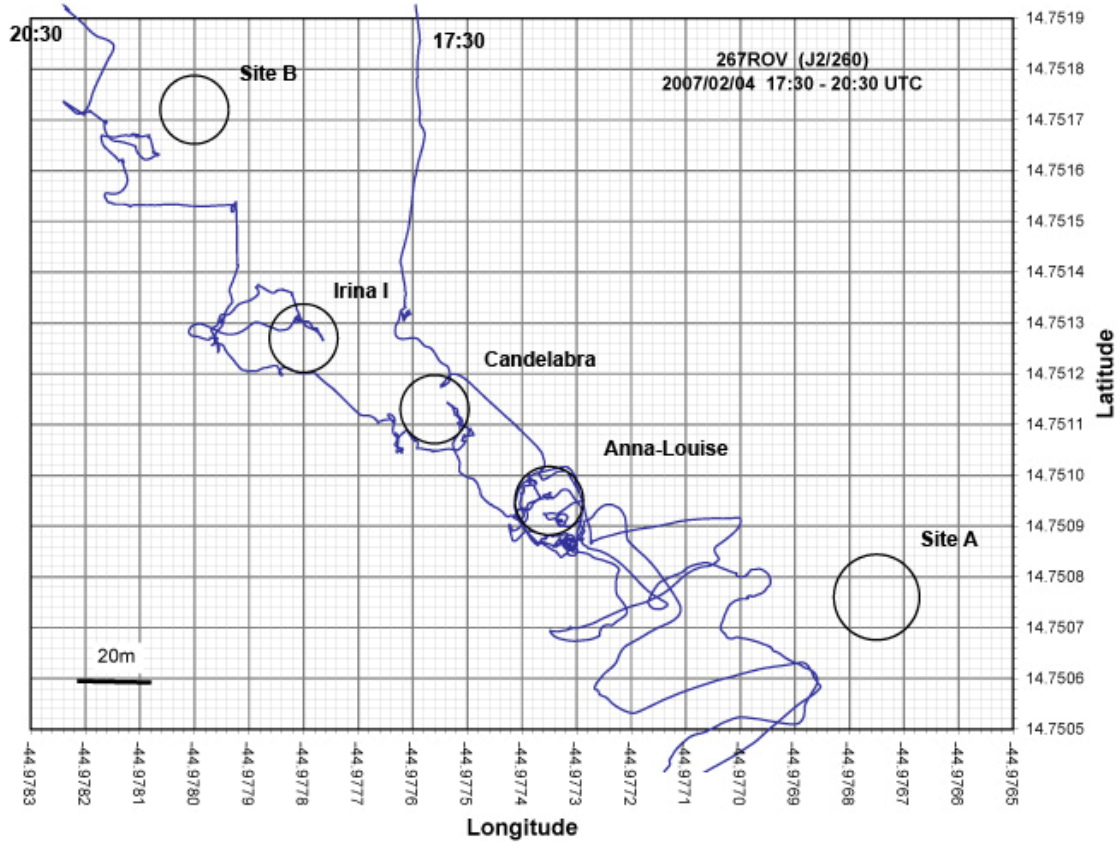
267-ROV / J2-260 (5 maps)



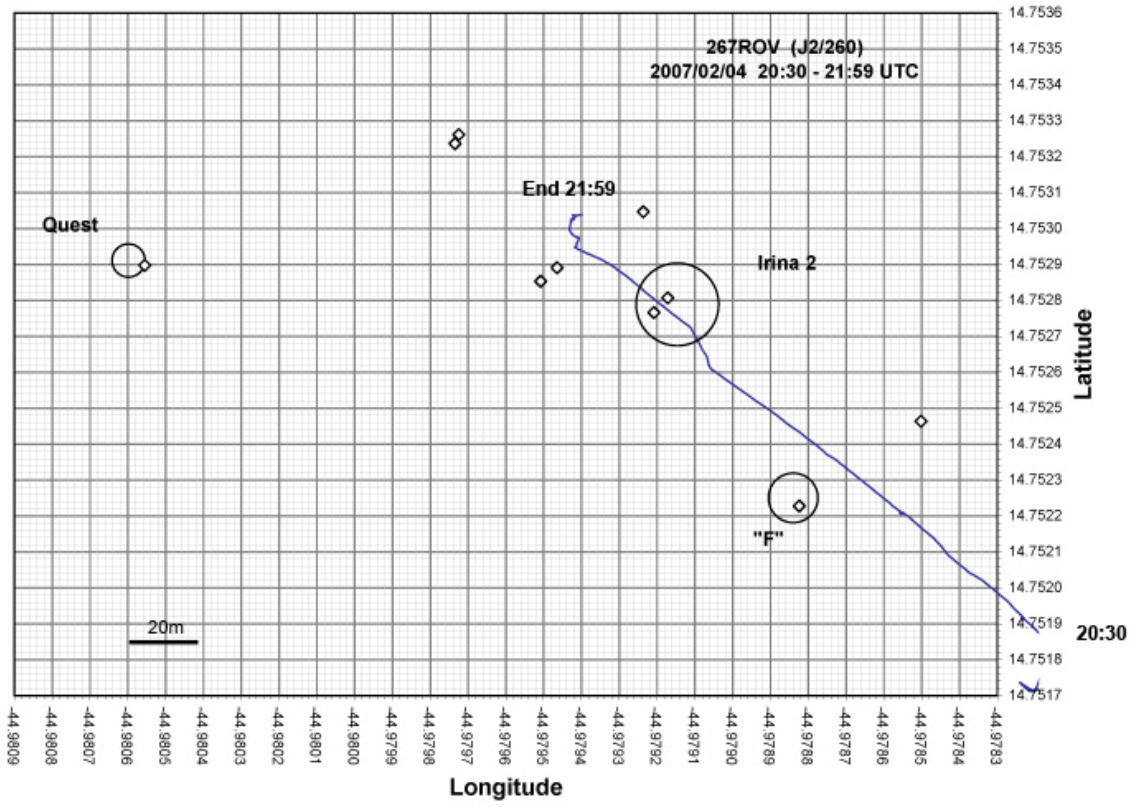


267-ROV / J2-260 (continued)

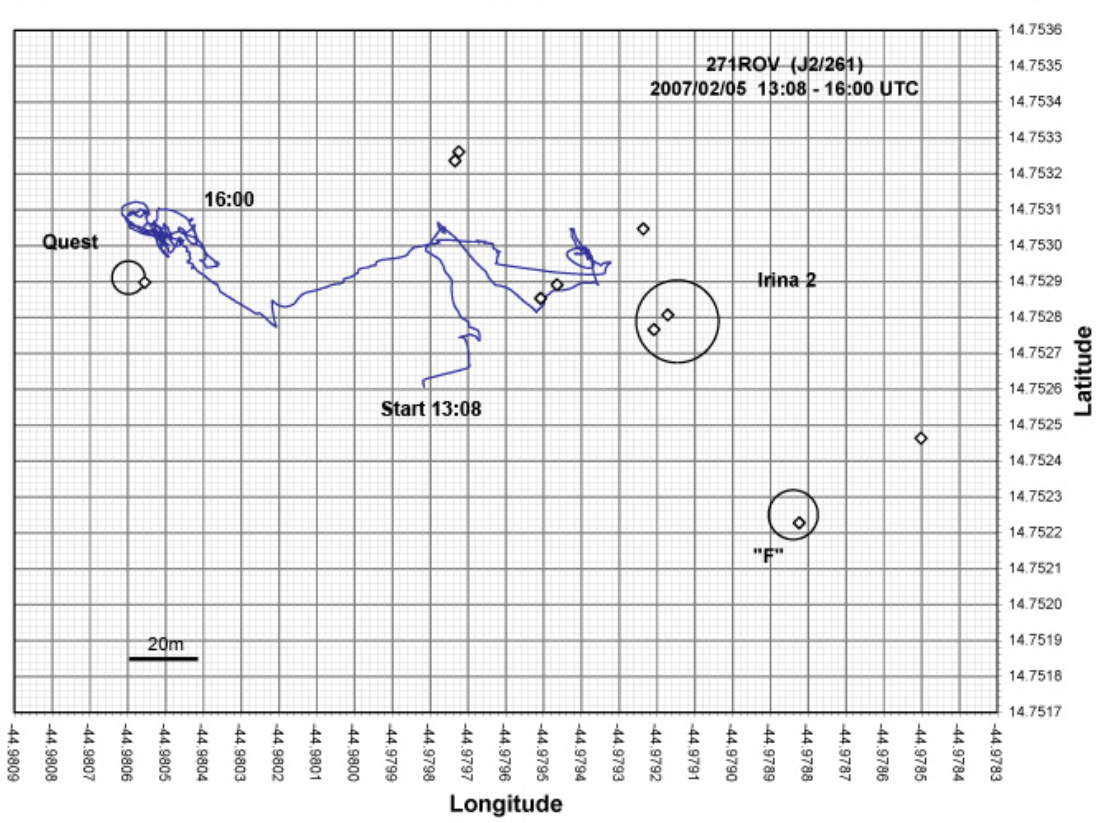


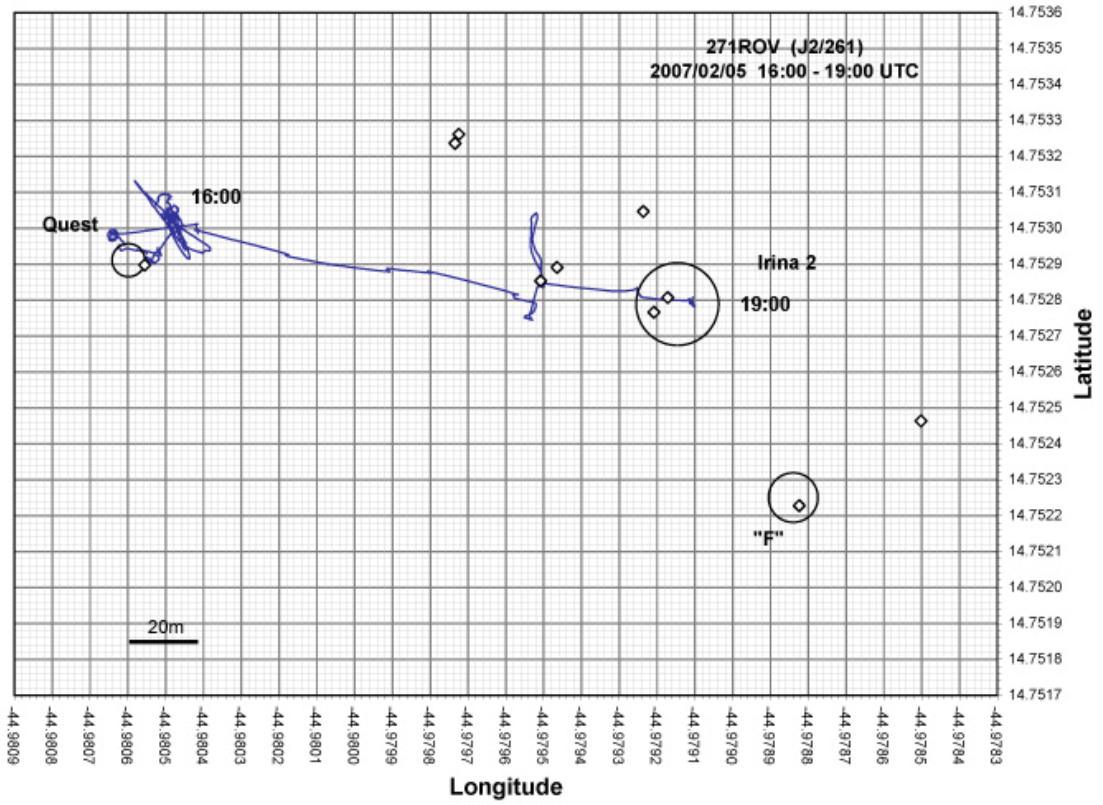


267-ROV / J2-260 (continued)

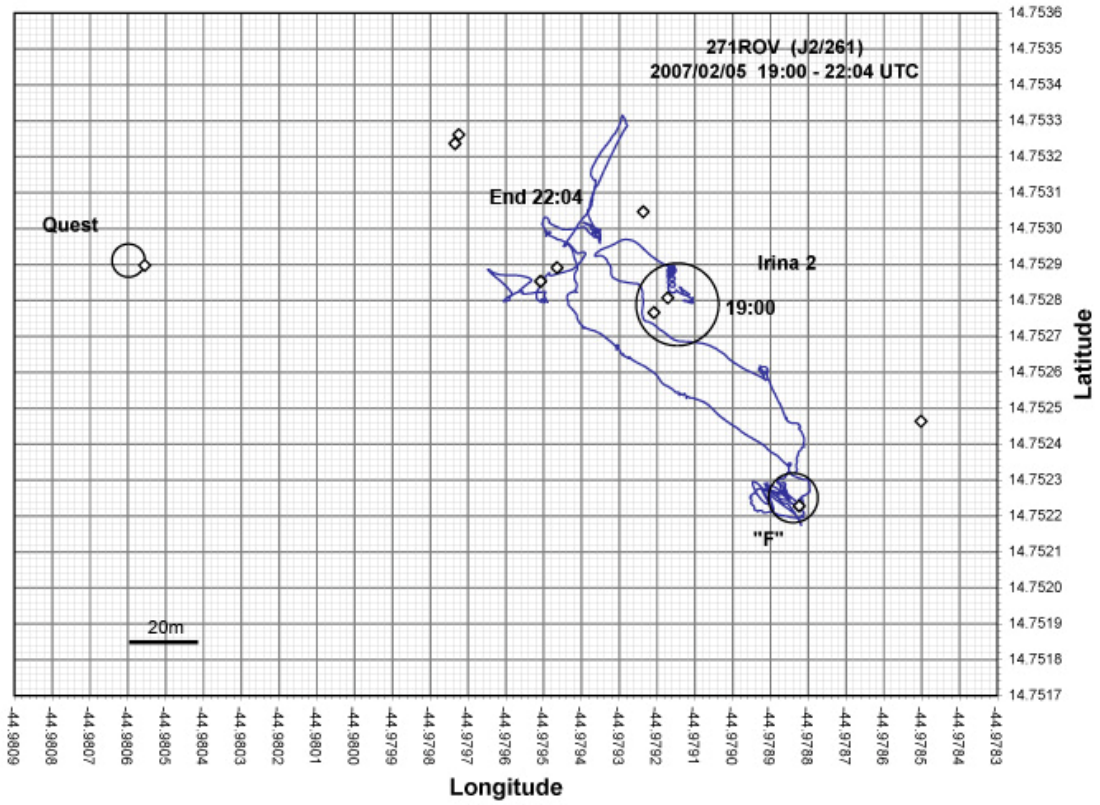


271-ROV / J2-261 (3 maps)

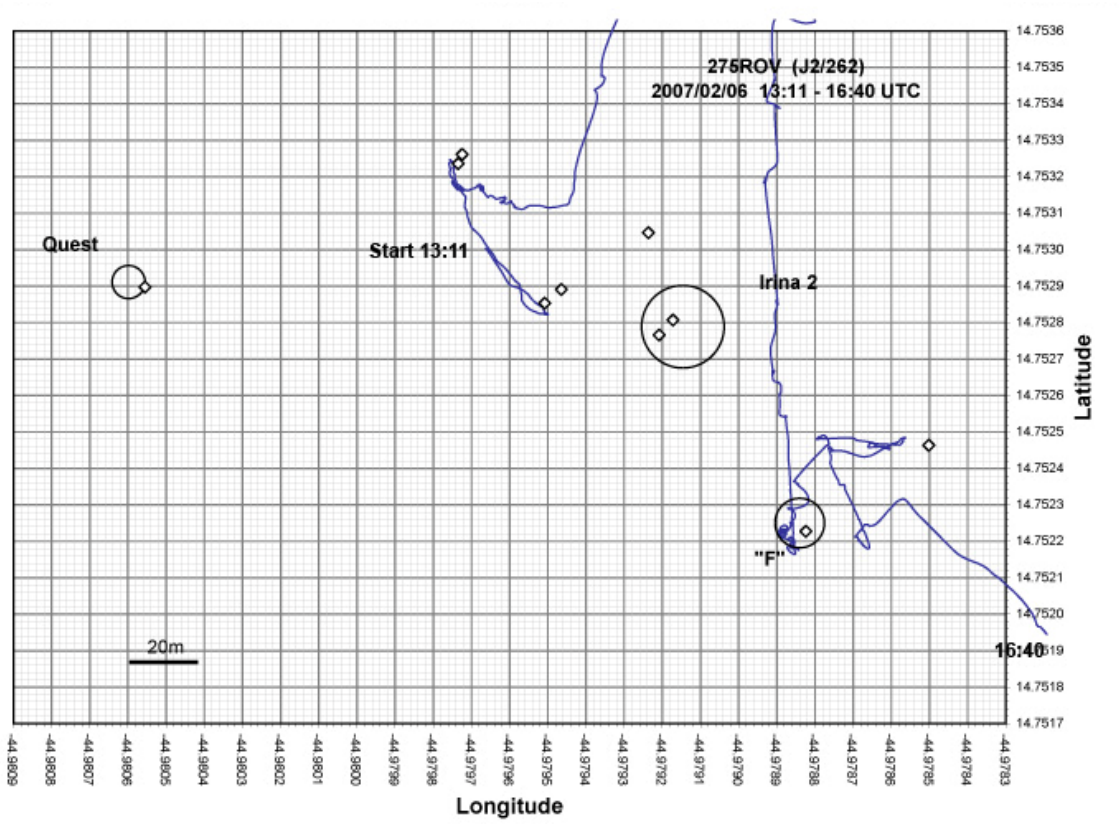


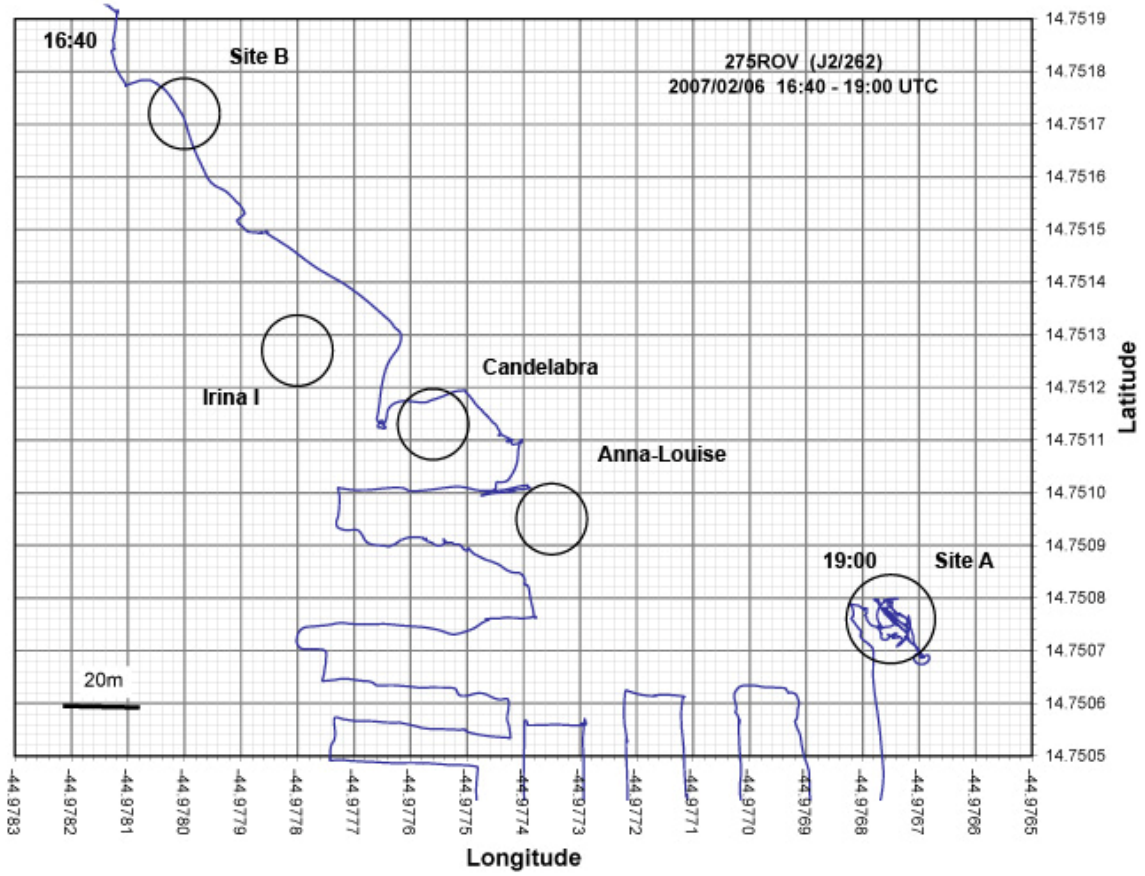


271-ROV / J2-261 (continued)

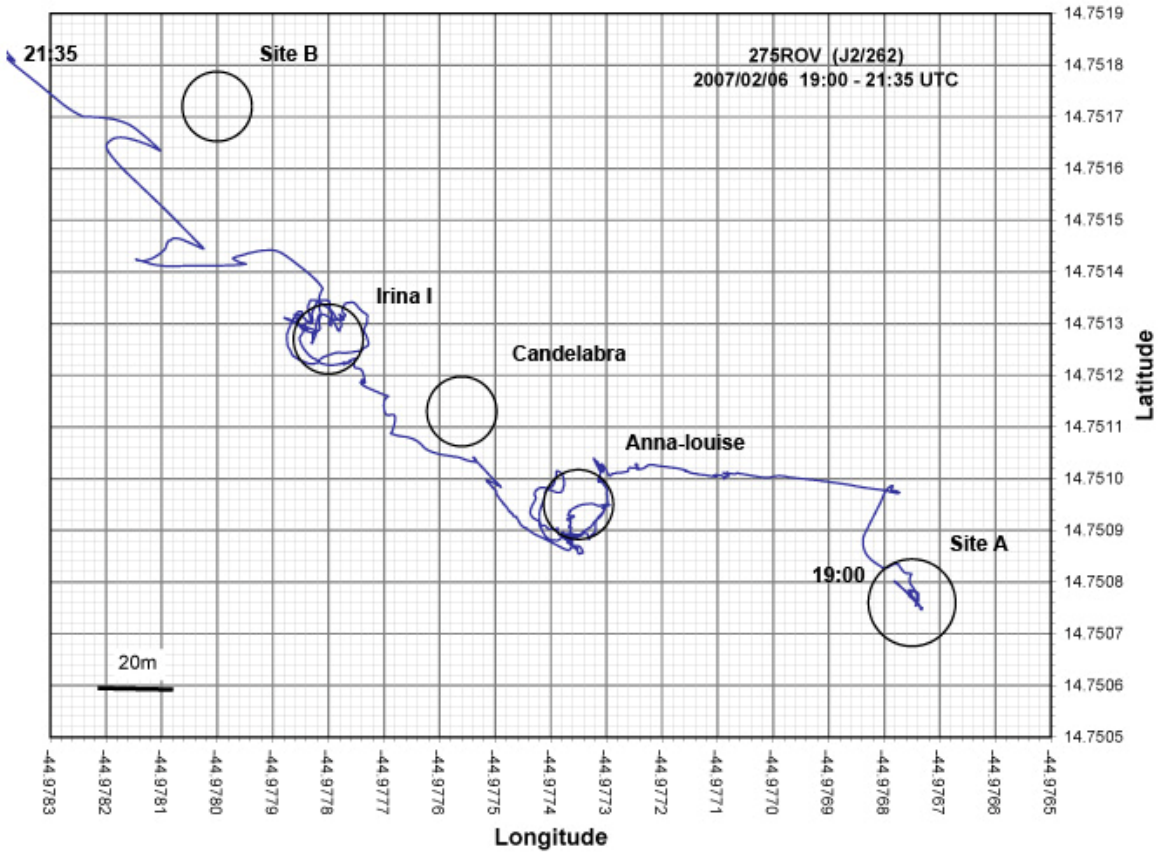


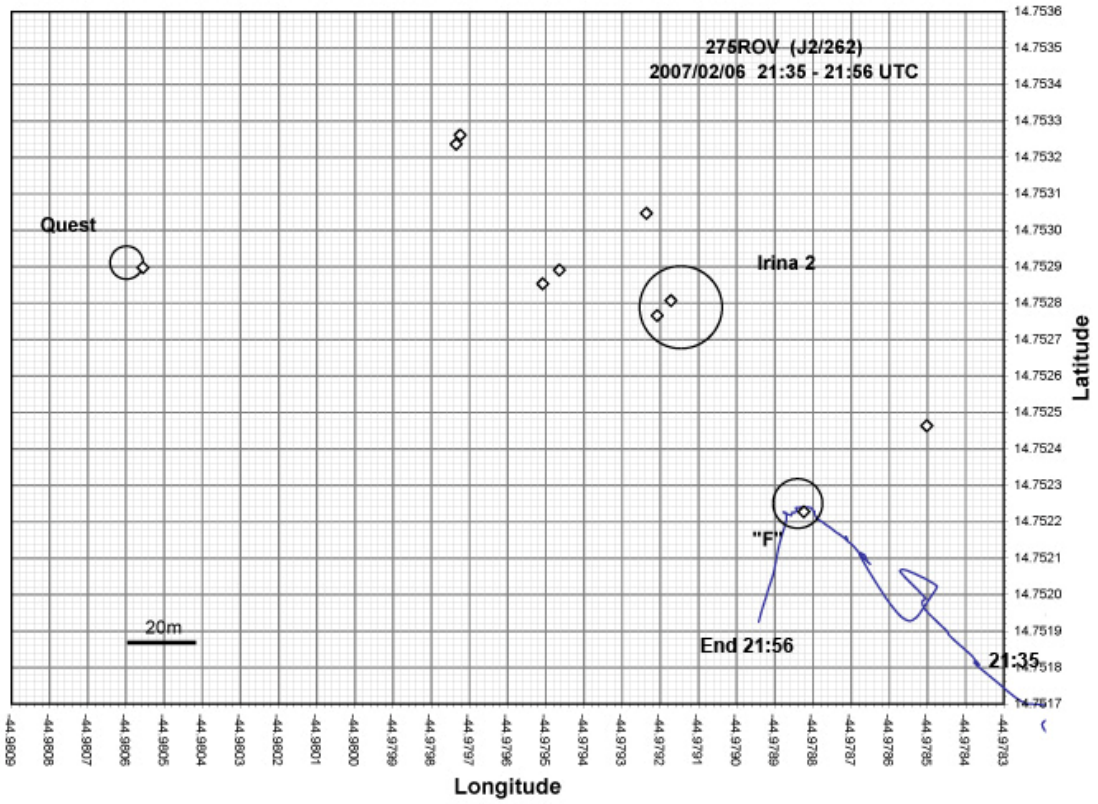
275-ROV / J2-262 (4 maps)



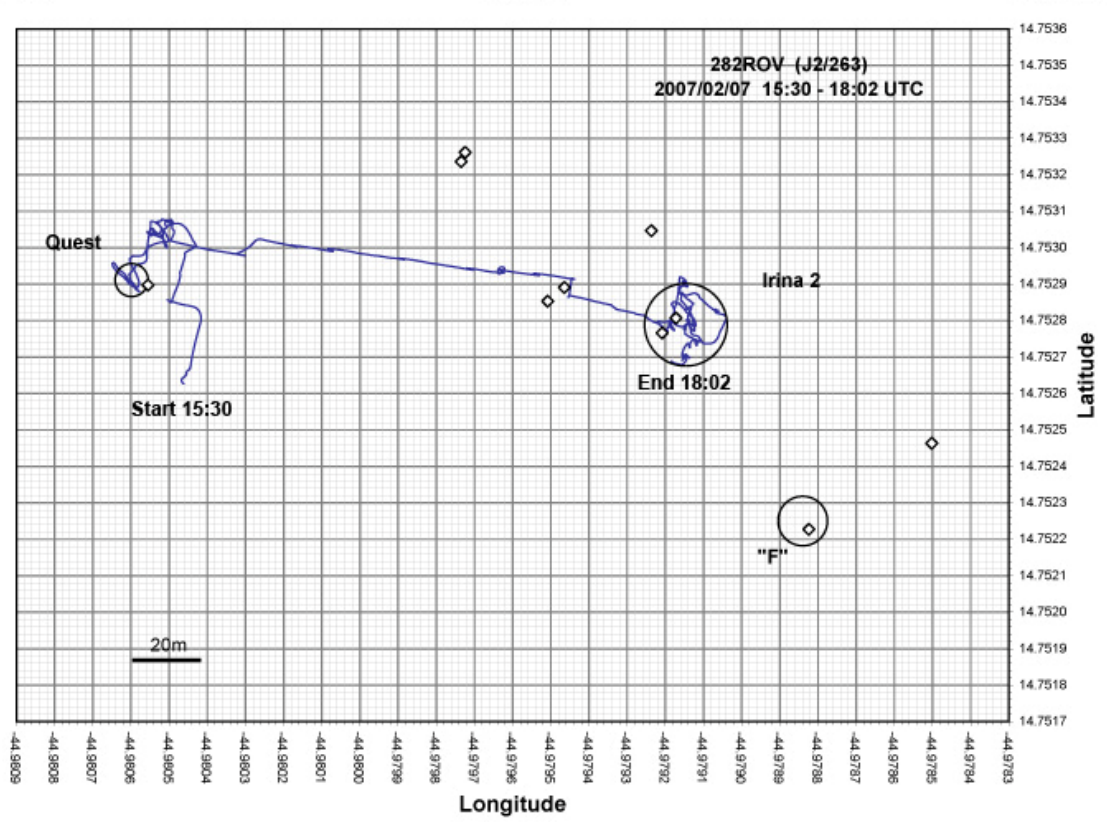


275-ROV / J2-262 (continued)





282-ROV / J2-263



Appendix 8: Narratives of the Jason II dives reconstructed from Virtual Van fotos and videos

Station **244 ROV**
Jason # **J2-253**
Date **27.01.2007**

Time	Sample	Comment
13:27		Touch down on sedimented area near Irina II, transit towards Irina II
14:13		Fisrst mussel shells in sight, approching Irina II
14:22		**Marker "C"**
14:29		Patches of white mat and mussel shells
14:32		Bathymodiolus clumps indicative for diffuse outflow
14:35		**Irina II** T-logger field in sight
14:38		Flying over and around Irina II sulphide structure
15:07	244-1	High-T sample #1 with Jason single-channel lance
15:13	244-2	Hot fluid sample #2, major #2
15:24	244-3	Hot fluid sample #3, sampler number not identifyable
15:48	244-4	He-sample #4
16:02	244-5	High-T sample #5, "Microsmoker", with Jason single-channel lance
16:06	244-6	Hot fluid sample #6, "Microsmoker", major #3
16:15	244-7	Hot fluid sample #7, "Microsmoker", major #4
16:29		Arrive at Irina II T-logger field
16:31	244-8	Mussel scoop #8
16:36		Open left bio box
16:37		Drop scoop net while trying to store in bio box
16:40		Grab scoop net from seafloor, mussels slip out, sample #8 lost
16:49	244-9	Mussel scoop #9
16:51		Store mussel scoop #9 in left bio box
16:58		Lift up from Irina II T-logger field
17:05		Fly across mussel field, heading towards OBT site
17:31		Reach "Rugby-Marker" buoy with Homer beacon at OBT site
17:35		**OBT** in sight
17:41		Check OBT
17:49		Drop triangular counting frame
17:52		Drop "current meter" flags
18:01		Last bottom view, before lift-up

Station **249 ROV**
Jason # **J2-254**
Date **28.01.2007**

Time	Sample	Comment
13:51		Touch down near Irina II, transit towards Irina II
14:04		At Irina II, transit to Mat #1
14:38		Reach **Mat #1**
14:54	249-1	Deployment/start profiler
15:04		Transit to **OBT** site
15:56		Pick up old OBP
15:59		Deploy new OBP
16:07		Pick up old OBT
16:21		Transit to Iriana II

16:49		At I**rina II** T-logger field; iInitial plan: T-measurements / fluid sampling, BUT craft arm strikes
		Power loss
17:10		Transit back to profiler
17:22		At **mat #1**
17:42		Start sampling program (s.above)
14:58		Start profiler program (sample #1) on white mat patch
17:42	249-2	8-Channel T-Lance #2 next to profiler
18:00	249-3	8-Channel T-Lance #3 centre of mat
18:40	249-4	8-Channel T-Lance #4 more to edge of mat
18:12	249-5	8-Channel T-Lance #5 outside of mat
18:28	249-6	Push Corer #6, 15 cm long sediemnt core, white mat on top
18:35	249-7	Push Corer #7, centre of mat
18:48	249-8	8-Channel T-Lance #8, midway between cores #6 and #7
19:04	249-9	8-Channel T-Lance, outside of mat
19:14		Drop marker #23 next to "mat #1"
19:17	249-10	Scoop net, precipitates next to mat #1

Station **251 ROV**
Jason # **J2-255**
Date **29.01.2007**

Time	Sample	Comment
13:19		Touch down, move to profiler/ OBT site
13:53		Pass Profiler
15:11		Reach **OBT site**
15:24		Put out in situ chamber
15:48	251-1	Push corer 251ROV-1
15:50	251-2	T Lance #2
16:00		Transit to Irina I
16:28		Arrive at **Irina II** microsmoke Marker
16:43	251-3	Rock sample #3 next to T-loggers(not on photos)
17:15	251-4	Diffuse fluid sample #4 T-loggers major 2
17:39	251-5	Diffuse fluid sample #5 T-loggers major D2
17:53	251-6	#6 T-Lance
18:21		Power loss (no photos)
19:03		Repositioning to Irina II,
19:27		Back at T-logger field
19:38	251-7	Diffuse fluid sample #7 Major 3
19:47	251-8	T-Lance #8 at logger 9
19:55	251-9	T-Lance #9 at logger 8
20:08	251-10	Diffuse fluid sample #10 Major D
20:28	251-11	Scoop #10 at logger #8
20:55	251-12	#12 T-lance at logger #4
21:09	251-13	#13 diffuse fluids at logger #4
21:15	251-14	#14 mussel scoop at logger #4
21:34		End of dive

Station	**253 ROV**
Jason #	**J2-256**
Date	**30.01.2007**

Time	Sample	Comment
15:22		Touch down
15:26		Drop weight
15:37		Reach **OBT** site
15:41		Pick up marker 21
15:44		Drop new OBT
15:54		Move to insitu chamber
15:57		Arrive at chamber
16:04		Drop marker 22
16:09		Pick up in situ chamber
16:12		Back at **OBT site,** pick up M64/2 OBT-markers, store in left bio box(?)
16:24		Drop M64/2 markers and pick up homer baecon w/ rugby float
16:26		Transit to elevator
17:09		Arrive at **elevator**
17:29		Store insitu chamber on elevator
17:52		House keeping elevator/Jason
18:33		Store homer beacon on elevator
18:33		Drop marker 25 at elevator's place (no photo)
18:34		Transit to Irina II
18:54		Reach **Irina II** mussle field
18:59		Sit at T-loggers
19:06	253-1	Mussel scoop #1 trangle-net at logger 9
19:15		Place marker 22 next to logger #9
19:18		Remove logger #9, re
19:35	253-2	T-lance #2 at logger #2
19:47	253-3	T-lance #3 logger #0
19:52	253-4	T-lance #4 in diffuse outflow hole (Mirjam's location)
20:18	253-5	Diffuse fluid #5 sampling at T-logger #2, major #2
20:23	253-6	Diffuse fluids #6 at logger #0, major 1
20:27		Remove logger #0?
20:32	253-7	Mussel scoop #7 at logger #2
20:50	253-8	Mussel scoop #8 at logger #0
20:57		Move around logger field, to “Microsmoker”
21:13	253-9	Hot fluids #9 from “Microsmoker”, major 3
21:24	253-10	Hot fluids #10 from “Microsmoker”, major D2
21:31		Lift up from “Microsmoker”, housekeeping
21:37		Transit to profiler
21:44		Reach **profiler** on mat Site F
21:52		Pick up profiler, house keeping
22:06		Start ascent

Station	**257 ROV**
Jason #	**J2-257**
Date	**31.01.2007**

Time	Sample	Comment
13:01		On bottom; transit to southern area
13:43		Bottom view on transit
13:15		Pass R/V Professor Logatchev marker
15:19		Reach **Site B** (marker w/o label)
15:46	257-1	Jason T-Lance #1 smoker Site "B"
15:49	257-2	8-Channel T-Lance #2 same smoker
15:54	257-3	Hot fluid sampel #3, same smoker, Major #1
16:11	257-4	Hot fluid sample #4, same smoker, Major D1
16:26	257-5	He sample #4, same smoker
16:43	257-6	Rock sampel #6 for H Strauß, same smoker, bio box
16:50	257-7	Other rock sample '#7, lost
16:50	257-8	Rock sample #8 for Harald Strauß, same smoker, in bio box
17:03		Drop marker 24 at Site B
17:08		Round trip counterclockwise around site B
17:14		Leave site B, transit to Irina I
17:24		Reach **Irina I** at overgrown marker
17:27		Roundtrip Irina I
17:31		Back to marker, check marker label: no writing
17:48	257-9	Rock sample #9 with bacterial mat next to marker, bio box
17:57		Slurping mat from marker
18:00	257-10	Slurping #10 mat from rock
18:16		Trip around Irina I clockwise (VV protocol)
18:15		Move to smoker ~ 10 m right of marker
18:29	257-11	8-Channel T-lance #11 in above smoker , max 290°C T-measurment not very successful
18:44		moving around at Irina I
19:00	257-12	Hot fluids #12, same smoker, Major #2
19:10	257-13	Hot fluid sample #13, Major #3
19:23	257-14	8-Channel T-Lance #14, same smoker, 255 °C?
19:40		Transit to Candelabra (misinterpreted as "Anna-Louise" during the cruise)
19:45		Pass **T-mooring** between Irina II and Candelabra (misinterpreted as "Anna-Louise" during the cruise)
19:49		Arrive at crater **Candelabra** (misinterpreted as "Anna-Louise" during the cruise)
19:50		Reach Marker M5
19:56		Another marker at Candelabra (misinterpreted as "Anna-Louise"): Burnt marker MD
19:58		Smoker „Candelabra“
20:05		Trip around crater Candelabra (misinterpreted as "Anna-Louise" during the cruise)
20:07		Marker M5
20:14		Back at smoker „Candelabra“
20:23	257-15	8-Channel T-Lance # 15, small smoker right to smoker Candelabra
20:29	257-16	8-Channel T-Lance, #16, same smoker, horizontally in smoke ~10 cm above outlet
20:44	257-17	Hot Fluids #17, crater Candelabra (alias "Anna-Louise), same smoker, major #4
20:52	257-18	Major D2: snorkel broke before sampling => #18 failed / no sample (no photo; comment 20:52 VV protocol)
20:55		Back direction T-Mooring
20:57		At **25-m T-mooring**
21:01		Inspection of T-mooring floats and swim line
21:06		Back at marker M5 on crater Candelabra (alias "Anna-Louise")
21:10		Leave Candelabra (alias "Anna-Louise")
21:15		At Rim of **Anna-Loiuse** (misinterpreted "Smokey Strobe" during the cruise)

21:16	Short inspection of Anna-Loiuse (misinterpreted "Smokey Strobe" during the cruise)
21:20	Back to **Candelabra**
21:29	Back at **T-mooring**
21:33	Prepare recovery T-mooring
21:41	Start ascent

Station **259 ROV**
Jason # **J2-258**
Date **01.02.1007**

Time	Sample	Comment
13:20		On bottom; Transit to **Marker Anya**
13:29		Passing marker Anya, further towards Iriana II
13:32		Passing marker #23 on "**mat #1**"
13:33		Lower slope of mussel field, empty shells
13:44		Approaching **Irina II** smokers
13:51		Passing "Microsmoke" marker
14:00		Drop insitu chamber on mid-slope mussel field
14:21	259-29	Fill incubation chamber with mussels; this sample was only counted at the end of the dive => sample #29
14:28		Some more mussles for incubation; still sample #29
14:36		Clean mussles in chamber with slurp gun
14:38		Close chamber
14:45		Leave chamber, go to Irina II T-loggers
14:51		Start collecting all T-loggers
15:25		Done with T-loggers, fly up, go to 8 chammnel logger w/ marker 2.96
15:42		At 8-channel logger/marker 2.96
15:46		Collect 8-channel logger/marker 2.96, drop marker #28
15:59	259-1	Collect 2nd 8-channel logger/marker 2.97, mussel attached = sample #1
16:10		Fly up, transit to profiler mat
16:18		Pass **marker Anya**
16:30	259-2	8-Channel T-Lance #2 outside profiler mat
16:36	259-3	8-Channel T-Lance #3 edge profiler mat
16:42	259-4	8-Channel T-Lance #4 centre profiler mat
16:50	259-5	Push core #5, centre profiler mat
16:52	259-6	Push core #6, edge profiler mat
16:54		Leave profiler mat, go to Irina II
17:06		At **Irina II** structure
17:30	259-7	8-Channel T-Lance #7, in diffuse flow along side of top structure (*Rimicaris* swarm), tip 23°C, all other sensors 4°C
17:43	259-8	Diffuse fluid sample #8, same place, Major #1, for Mirjam
17:51	259-9	Diffuse fluid sample #9, same place, Major #2, for Mirjam
17:58		Leave Irina II structure, go to **incubation chamber**
18:02		Check chamber syringes
18:09		Open chamber, wash with slurp, and close again
18:18		Leave chamber, transit to Quest
18:34		Pass **OBT site**
19:25		Pass baited trap M64/2
19:51		Arrive at **Quest** T-logger field
20:04		At rim of Quest, marker line without marker
20:05		Roundtrip Quest counterclockwise
20:07		Back at marker line

21:06	259-10	Mussel slurp #10 at diffuse outlet next to Quest, red container: 200 µm mesh
21:30	259-11	Mussel slurp #11, orange container: 2 mm mesh; stop slurping because hose cloggs
21:41	259-12	Scoop mussel patch #12
21:59	259-13	8-Channel T-Lance #13 where mussel patch has been: max 151°C
22:19		Drop marker 27 on diffuse outflow where mussel patch has been
22:27		Move to T-loggers
23:07		Push core failed, too rocky
23:23	259-14	Push core #14 next to T-logger 17?, no Virtual Van pictures
23:39	259-15	8-Channel T-Lance #15 near bacterial mat, 81 deg C
23:43	259-16	T-Lance measurement #16 next to push core hole: 17°C
00:02	259-17	8-Channel T-Lance measurement #17 just outside of white mat, 48° C
00:04	259-18	Push core #18, looks brown-red
00:16	259-19	8-Channel T-Lance #19, still brown mat near loger 19, T = 8°C
00:27	259-20	8-Channel T-Lance #20, still at Quest oush coring site: 4.7°C
00:36		Push core sample discarded
00:39	259-21	Push core #21, far right on mat
00:43	259-22	8-Channel T-Lance #22, until 00:43; 5.8°C
00:54		Move from brown mat to Quest rim to take fluid samples
00:59	259-23	8-Channel T-Lance #23 Quest small chimney
01:03		T-reading #23 = 347.7°C
01:12	259-24	Hot fluid sample #24, at same small smoker, Major #3
01:22	259-25	Hot fluid sample #25, at same small smoker, Major D1
01:36		Leave Quest, go to Irina II
02:26		Reach microsmoke marker, sea incubation chamber behind
02:20		At **incubation chamber**
02:32		Chamber survice, change water w/ slurp
02:37		Go to **Irina II** main strucure
02:42	259-26	Shrimp slurp #26; not good sample because slurp hose clogged
02:50		Move around Irina II, look for fluid sample site
03:31	259-27	8-Channel T-Lnace #27, small beehive on top Irina II, beehive breaks, T = 280°C
03:43	259-28	Hot fluid sample #28 same small beehive, Major #4
04:01		Try for hot fluid sample, same beehive, major D1 damaged; no sample
04:10		Move to in **situ chamber**
04:18		Check syringes: 2 out of 4 have fired
04:26		Pick up chamber
04:32		Go to elevator
05:28		At **elevator**
05:28		Housekeeping at elevator: store chamber, mussel scoops, majors, take homer beacon
06:39		Leave elevator, go back to Irina II/OBT site
07:03		Pass Irina II
07:27		Reach **OBT site**
07:31		Homer beacon check: beacon 15 responds
07:40		Collect current vanes and triangle-frame from OBT site
07:41		Leave OBT site, go to **Irina II** mussel field
08:10		Drop bated trap next to marker 22
08:22		Drop 2nd baited trap next to “Microsmoker”
08:23		Drop triangle-frame between Irina II and “Microsmoker”
08:28		Still cam surveys „Microsmoker“
08:30		Round trips around Irina II: Photo survey?
09:34		Drop current vanes on north side of Irina II structure
09:40		Go to OBT site
09:52		At **OBT**
09:57		Pick up new OBT
10:04		End dive

Station	**263 ROV**
Jason #	**J2-259**
Date	**02.-03.02.2007**

Time	Sample	Comment
01:28		On bottom; Marker Anya, transit to OBT site
02:01		Reach **OBT site**
02:11		Drop new OBT on old position
02:22		Level OBT
02:42		Leave OBT site transit to elevator
03:50		At elevator, housekeeping, exchange weights
04:03		Pick up profiler from elevator
04:09		Pick up basket w/ notched mussels from elevator
04:14		Transit to Marker Anya
05:01		Reach mussel crack profiler position downslope **marker Anya**
05:10		Drop profiler on mussel crack
05:28		Leave profiler, transit to **"mat #1"**
05:46	263-1	Push corer #1 on "mat #1", centre mat, 10 cm from previous core hole
05:51	263-2	Push core #2 on "mat #", centre mat
05:54	263-3	Push core #3 on "mat #1", at more to periphery
05:56		Leave 'mat #1", transit to **Quest**
06:21		Reach Quest
06:24		Drop baskets w/ notches mussels next to marker 27
06:36	263-4	He sample #4 at same small smoker as major sampling during previous dive
06:55	263-5	8-Channel T-Lance #5 in crack ~1 m from mussel baskets/marker 27, max T = 45°C
07:12	263-6	8-Channel T-Lance #6 in crack 0.5 , left from = sampling sites of notched mussels max T = 94.2°C at tip
07:29	263-7	Try for diffuse fluid sampling #7 w/ major #4, same spot, does not release => no sample
07:40	263-8	Next try diffuse fluid same spot #8, major #2, ok, for mirjam
07:49	263-9	Diffuse fluid **#9**, same spot, major #3, ok, fpor Mirjam
08:35		Load baskets w/ balllast rock
08:27		Leave marker 27/ notches mussels, transit to mussel crack/**marker Anya**
08:34		Pass Quest T-loggers
08:54		Approach profiler on mussel crack
08:55		Photo mosaicking around crack
09:47		Close up of sensors on mussel bed
10:01		End of profiler prgram, sensors lift up
10:14		Pick up profiler, store on porch
10:21	263-10	Diffuse fluid sample #10 in mussel crack at senors position, major #1
10:28	263-11	8-Channel T-Lance #11 same spot max T = 148.6°C
10:47	263-12	Mussel scoop #12 on same spot
10:56		Leave mussel crack, end dive

Station	**267 ROV**
Jason #	**J2-260**
Date	**04.02.2007**

Time	Sample	Comment
02:00		On bottom; transit to **Marker Anya**
02:16		Pass marker Anya
02:26		Drop incubation chamber downslope marker Anya+B28
02:37	267-1	Grab mussels **#1** from mussel crack for incubation
02:40		Fill mussels in chamber, wash with slurp gun 02:43 and close lid 02:47
02:51		Leave chamber, transit to lost transponder
03:21		Pass elevator
03:31		At transponder
03:36		Pick up transponder, transot to elevator
03:54		At elevator, store transponder on elevator, housekeeping elevator
05:02		Pick up profiler from elevator, transit to chamber near Anya
06:36		Drop profiler ~30 m from chamber near Anya
07:24		Exchange water in chamber with slurp
07:30		Closed the chamber, heading now to quest
08:03		Reach **Quest** T-loggers
08:14		Photo mosaicking Quest T-loggers
08:47	267-2	8-Channel T-Lance #2 next to logger 2.98, T8 = 111°C, T1 = 3.9°C
08:51	267-3	8-Channel T-Lance #3 next to logger 2.95, T8 = 115°C
09:03	267-4	8-Channel T-Lance #4 next to logger 2.95, T8 = 120°C
09:12	267-5	Diffuse fluid #5 next to T loggers, Major #2
09:20	267-6	Diffuse fluid #6 next to T loggers, Major #3
09:36	267-7	Scoop #7 next to marker 2.98
09:45	267-8	Scoop #8 at marker 11;
10:13	267-9	8-Channel T-Lance #9 at logger 17; T1 (tip) = 13°C
10:16	267-10	8-Channel T-Lance #10 at logger 16; T1 (tip) = 3°C
10:20	267-11	8-Channel T-Lance #11 at logger 13; T1 (tip) = 3°C
10:25	267-12	Diffuse fluid #12 at T-logger 16; Major #1
10:42	267-13	Scoop net #13 at T-logger 16
10:57	267-14	8-channel T-Lance #14 at logger 19, max 4°C
11:00	267-15	8-channel T-Lance #15 at logger 18, max 3°C
11:15		Transit to **Quest** near marker 27 for push core sampling
11:16	267-16	Push core #16 in brown sediment 3 m off notch mussels baskets
11:17	267-17	Push core #17, same spot
11:18		Transit to **Irina II**
11:36		Transit to **elevator**
12:03		At elevator
12:08		Pick up t-loggers from elevator
12:17		Store majors 1, 2 and 3 on elevator
12:32		Store mussels on elevator
12:32		Transit to **Irina II** T-logger area
13:03		At T-looger field start photo survey (pre MTL-deployment survey)
13:44		T-logger 4 next to marker 29
14:39		End (?) T-logger positioning
15:08	267-18	Hot fluid #18 Irina II main structure, Major D2; not successful
15:54	267-19	Shrimp slurp #19, Irina II main structure
16:08		Drop ballast, move to **incubation chamber**
16:12		Pick up incubation camber, transit to **elevator**
16:42		Store incubation chamber on elevator, housekeeping elevator
17:18		Transit to **Candelabra** (misinterpreted as "Anna-Louise" during the cruise)
17:55		While searching for Site A come across crater with yellow thing on seafloor =>

		Strobe light, not clear where we are
18:22		Away from crater still searching for site A
18:25		Back to crater; rock sample (not in hand-written protocol)
18:32		Roundtrip around crater; still confusion where we are, speculation if site A might also harbor a crater
18:44		Marker(s) suggest that M64/2 was confuswd, but where are we? (Irina I, Anna-Louise, Site A?)
18:45		Original comment: "It is becoming clear that this is an unamed crater NW of Anna-Louise: New name **Smokey Strobe**" Correction after reinvestigating Jason-videos: The souternmost crater is Anna-Loiuse; the crater between Irina I and Anna-Louise is **Candelabra**; the name "Smokey Strobe" is invalid. Heading back towards Irina I - Site B - profiler
19:15		At marker M5 on **Candelabra** (misinterpreted as "Anna-Louise" during the cruise)
20:16		Pass **Site B**
20:20		Transit to profiler
20:47		Reach **profiler near Anya**
20:52		Pick up profiler
21:15	267-20	8-Channel T-Lance #20 at profiler site mussel patch; side of mussel patch; max T = 90°C (at T2)
21:17	267-21	8-Channel T-Lance #21 at profiler site, centre mussel patch; max T = 7.9°C (at T4)
21:21	267-22	8-Channel T-Lance #22 at profiler site, lefthand side mussel patch, max T =60°C (at T1 = tip)
21:26		End of dive, start ascend

Station	**271 ROV**
Jason #	**J2-261**
Date	**05.02.2007**

Time	Sample	Comment
13:08		On bottom; Transit to Anya's crack
13:25		at **Anya's crack**
13:33		Drop profiler on crack musselbed
13:51		Transit to Quest
14:15		At **Quest** T-loggers
14:20	271-1	8-channel T-Lance #1, mussel patch at T-logger 11; 10-15°C
14:26	271-2	8-channel T-Lance #2, just behind patch, ouflow in sediment; 113°C in sediment
14:52	271-3	8-channel T-Lance #3 mussel bad again (logger 11?); 197°C at T3
15:04	271-4	Diffuse fluid #4 same mussel patch logger 11, major #1
15:11	271-5	Mussel scoop #5 logger 11
15:22	271-6	Crab scoop #6 same spot
15:40	271-7	push core #7 on red-brown sediment near logger 19
15:50	271-8	8-Channel T-Lance #8 at same spot as push core 7; 13.3°C
15:51	271-9	8-Channel T-Lance #9 a few cm away from #8; 10:8°C
16:20		Collection of T-loggers 2.98, 2.95, 11, 19
17:19		Marker #20 replaces T-logger 19
17:30	271-10	Crab scoop #10 mussel patch former logger #11; 7-9 crabs
17:52		photo mosaicking of former T-logger field After that leave Quest, transit to Irina II
18:40		**Irina II** main structure
18:46	271-11	Hot fluid #11 at beehive on W-wall, Major #3
19:03	271-12	Shrimp slurp #12 on W-wall of Irina II structure
19:27		Transit to Site F

19:46		At **Site F**
19:50	271-13	8-Channel T-Lance #13 outside white mat: 36°C
20:02	271-14	Push core #14 on white mat
20:06	271-15	Push core #15 on white mat; same spot
20:13	271-16	8-channel T-Lance #16 white mat; next to hole #15; T1 = 99.6°C
20:17	271-17	8-channel T-Lance #17 white mat; next to hole #14; max T = 82°C
20:23	271-18	Diffuse fluid #18 sampled over white mat, Major #2
20:30	271-19	Diffuse fluid #19 sampled over white mat, Major #4
20:36	271-20	Mat slurp #20; blue container
20:48	271-21	Push core #21 outside of white mat
20:54	271-22	8-channel T-lance #22 20 cm away from hole #21; max T = 4.6°C
21:03	271-23	8-channel T-lance #23 max 6.5°C
21:05		Transit to "Anya's crack"
21:24		pass marker Anya
21:29		at profiler on **Anya's crack**, sensors are still down => program not yet terminated
21:41		pick up profiler allthough program still running
21:44		leave Anya's crack with direction Anya's Garden
21:53		passing canyon at **Anya's Garden**
22:01		End dive

Station **275 ROV**
Jason # **J2-262**
Date **06.02.2007**

Time	Sample	Comment
13:11		On bottom; go to OBT site
13:15		At **OBT site**
13:37		Drop old OBT
13:47		Level old OBT
13:58		Drop horse shoe marker at old OBT,
13:59		Leave OBT site, transit to elevator
14:32		**At elevator**
14:42		Collect markers from elevator
14:48		Pick up profiler from elevator
15:08		Leave elevator; transt to site F
15:45		Arrive at **Site F**
15:58		Drop Elevator on Site F mat
16:09	275-1	Push core #1 Site F mat, next to profiler
16:10		Leave Site F
16:18		To 16:23: pass new T-mooring at 3000 m water depth
16:29		Transit to Anna Louise
16:43		Pass **Site B**
16:51		Pass Marker M5: Candelabra (misinterpreted as "Anna-Louise" during the cruise); Search for Site A
17:47		At **Site A**
18:03	275-2	8-Channel T-Lance **#2** Barad Dur: 230 °C
18:19		Photo mosaicking Barad Dur
18:43	275-3	8-Channel T-Lance **#3** Barad Dur: 330 °C
18:54	275-4	Hot fluid #4 Barad Dur; Major #3
19:05	275-5	Hot fluid #5 Barad Dur; Major #4
19:20		Identify marker MB at Site A
19:24		Leave Site A, had to Anna-Louise (misinterpreted as "Smokey Strobe" during the cruise)
19:35		At **Anna-Louise** (misinterpreted as "Smokey Strobe" during the cruise)

20:04	275-6	8-Channel T-Lance #6, Anna-Loiuse; smoker next to burnt marker; 349°C
20:09	271-7	Hot fluid **#7**, same smoker as above; Major #1
20:14		Drop marker 30 next to burnt marker Anna-Louise (alias Smokey Strobe)
20:19	271-8	Hot fluid **#8** , Major #D1
20:35	271-9	He Sample **#9**, sam smoker next to marker 30 Anna Louise (alias Smokey Strobe)
20:43		Leave Anna-Louise (alias "Smokey Strobe")
20:50		Pass **Candelabra** (alias "Anna-Louise")
20:57		Arrive **Irina I** overgrown marker
21:21	271-10	Hot fluids #10 Irina I, Major 2
21:27		Leave Irina I, transit to Site F
21:47		Arrive at **Site F**
21:49		Drop marker 26 on Site F
21:51		Pick up profiler from Site F
21:58		End dive

Station **282 ROV**
Jason # **J2-263**
Date **07.02.2007**

Time	Sample	Comment
15:30		On bottom; transit to Quest
15:38		At empty **Quest** T-logger field, marker 20
15:43		Start placing the T-loggers
15:45		T-Loggers 19, 17, 13 (middle of mussel patch), 11, 16, 14, 10, 13(?), 18
16:11		Photo series of new loggers
		Relocate to Quest smokers
16:14		At **Quest smokers**
16:23	282-1	He #1 sample, same smoker as sampled for hot fluid: 259ROV#24, 259ROV-25
16:37		Transit to **Irina II**
17:03		Collect baited trap form mussel field
17:16	282-2	Diffuse fluid #2 from diffuse outflow at mussel patch, mound left from T-loggers, Major #1
17:22	282-3	Mussel scoop #3, from same mussel patch
17:26		Start cleaning tour
17:32		Pick up current vanes
17:39		Pick up baker baskets
17:45		Pick up triangular photo frame
17:48		Pick up 2nd baited trap 1
18:00		End dive

Appendix 9: Original Jason II dive protocols (Control Van)

244-ROV
J2-253, 27.02.2007

Date	UTC	Lat	Long	Depth	Comment
27.01.2007	10:08:42	14.6666667	-45	2.6	J2-253 Pre-dive
27.01.2007	10:55:18	14.6666667	-45	2.7	testing
27.01.2007	11:55:02	14.7589608	-44.985321	329.1	J2-253 Descending
27.01.2007	12:00:59	14.7590184	-44.985318	545.4	testing
27.01.2007	13:21:25	14.7588906	-44.985213	3001.8	test
27.01.2007	13:21:55	14.7590539	-44.985283	3008.8	started sinking through plume at 1320
27.01.2007	13:21:59	14.7590756	-44.985292	3009.9	FrameGrab
27.01.2007	13:22:11	14.7591027	-44.985307	3011.8	FrameGrab
27.01.2007	13:26:28	14.7592087	-44.98545	3021.2	test
27.01.2007	13:27:15	14.7592025	-44.985445	3025.0	on the bottom
27.01.2007	13:27:37	14.7592119	-44.985422	3024.9	sediment
27.01.2007	13:29:08	14.7592479	-44.985432	3027.3	pinging the beacons 14/15
27.01.2007	13:29:30	14.7592495	-44.985425	3027.2	fish on science camera
27.01.2007	13:30:22	14.7592341	-44.985435	3026.9	homer 14 doesn't answer
27.01.2007	13:31:27	14.7591955	-44.985467	3025.9	FrameGrab
27.01.2007	13:32:06	14.7591663	-44.985489	3026.4	rocky outcrop
27.01.2007	13:38:50	14.7592524	-44.98548	3030.0	fish on science cam
27.01.2007	13:41:17	14.7592524	-44.98548	3030.0	power down
27.01.2007	13:59:44	14.75901	-44.98561	3020.2	getting systems online after power outage
27.01.2007	14:10:29	14.7593805	-44.985322	3030.2	back on the bottom
27.01.2007	14:10:45	14.759386	-44.985318	3030.2	same stuff
27.01.2007	14:11:54	14.7594486	-44.985249	3030.5	mussels
27.01.2007	14:14:03	14.752931	-44.979281	3030.3	those mussels are empty shells
27.01.2007	14:14:58	14.7529167	-44.979294	3031.0	empty shells are > 10cm
27.01.2007	14:17:25	14.7529445	-44.979284	3030.9	hole from tv grab
27.01.2007	14:20:11	14.75301	-44.979256	3032.3	barnacles on rock on seafloor
27.01.2007	14:21:31	14.7530234	-44.979239	3032.2	brown-orange sediment
27.01.2007	14:22:06	14.7530352	-44.979232	3031.9	orange deposit on dead mussel shells
27.01.2007	14:22:15	14.7530346	-44.979234	3032.1	snail
27.01.2007	14:22:18	14.7530353	-44.979236	3032.2	FrameGrab
27.01.2007	14:22:56	14.7530467	-44.979237	3033.7	marker c
27.01.2007	14:27:33	14.7531165	-44.979192	3030.3	white patches on sediment
27.01.2007	14:28:25	14.7531166	-44.979191	3030.3	live mussels - small clumps
27.01.2007	14:29:32	14.7531537	-44.979176	3030.3	crack in the ground?
27.01.2007	14:29:52	14.7531489	-44.979175	3030.5	moving up the slope towards irina 2
27.01.2007	14:30:33	14.7531484	-44.979142	3029.6	anemones on a rock
27.01.2007	14:31:36	14.7531459	-44.979113	3028.8	lots of white mats
27.01.2007	14:31:48	14.7531448	-44.979115	3028.6	shimmering water
27.01.2007	14:32:16	14.7531413	-44.979106	3028.1	brown-orange deposits
27.01.2007	14:32:55	14.7531264	-44.979072	3027.0	small chimneys
27.01.2007	14:33:15	14.7531174	-44.979069	3026.6	the chimneys are completely covered with anemones
27.01.2007	14:33:33	14.7531154	-44.979067	3026.8	crab on chimney
27.01.2007	14:34:21	14.7530896	-44.979065	3025.8	munidopsis
27.01.2007	14:35:07	14.7530609	-44.979064	3024.8	field of markers found
27.01.2007	14:38:16	14.7529915	-44.979041	3020.9	Test Event Button Pressed
27.01.2007	14:38:43	14.7529904	-44.979041	3020.9	temperature loggers found 1436
27.01.2007	14:39:13	14.7529898	-44.979041	3020.9	found irina 2 structure at 1436

27.01.2007	14:40:27	14.7529851	-44.97904	3020.8	at irina 2 structure
27.01.2007	14:40:56	14.7529855	-44.97904	3020.8	masses of shrimp
27.01.2007	14:42:09	14.7529852	-44.97904	3020.9	beehive structures
27.01.2007	14:43:34	14.7529852	-44.97904	3020.8	new beehive structure
27.01.2007	14:44:39	14.7529851	-44.97904	3020.8	black smoke coming out of the ground
27.01.2007	14:47:55	14.7529791	-44.979004	3021.1	getting set up to take fluid samples
27.01.2007	14:50:14	14.752965	-44.97903	3018.9	dig still changed from program to auto
27.01.2007	14:51:26	14.7529644	-44.979029	3018.7	white crap sitting on new beehive structure
27.01.2007	14:56:38	14.7529525	-44.979035	3019.0	moving 10 m out to reset rov equipment
27.01.2007	14:57:26	14.7529526	-44.979058	3018.9	disturbed sediment
27.01.2007	15:00:07	14.7529515	-44.979036	3019.2	chimney structure coming back into view
27.01.2007	15:04:22	14.7529584	-44.979061	3018.7	taking fluid sample at new beehive structure
27.01.2007	15:05:45	14.7529583	-44.979061	3018.6	sparkly water
27.01.2007	15:06:00	14.7529583	-44.979061	3018.7	new beehive structure knocked down
27.01.2007	15:06:09	14.7529582	-44.979061	3018.6	sampling fluid
27.01.2007	15:07:35	14.7529582	-44.979061	3018.6	measuring 286 deg c
27.01.2007	15:07:43	14.7529583	-44.979061	3018.7	haven't sampled yet
27.01.2007	15:07:52	14.7529582	-44.979061	3018.6	293 deg
27.01.2007	15:09:43	14.7529575	-44.97906	3018.6	setting up to sample fluids
27.01.2007	15:10:37	14.7529577	-44.97906	3018.6	sample number 1 - temp measurement
27.01.2007	15:14:56	14.7529564	-44.97906	3018.6	started sampling
27.01.2007	15:18:15	14.7529559	-44.97906	3018.6	sample 2 done
27.01.2007	15:19:31	14.7529557	-44.97906	3018.6	prepare sample
27.01.2007	15:21:36	14.7529554	-44.97906	3018.6	grab major 1-white for sample 3
27.01.2007	15:24:53	14.7529548	-44.97906	3018.6	approach snorel to vent opening
27.01.2007	15:26:31	14.7529541	-44.97906	3018.6	release trigger sample 3: fluids broken beehive Irina II
27.01.2007	15:28:26	14.7529535	-44.97906	3018.6	sample 3 done
27.01.2007	15:31:55	14.7529527	-44.979059	3018.5	setting up to take helium sample
27.01.2007	15:36:59	14.7529528	-44.97906	3018.6	test
27.01.2007	15:40:25	14.7529523	-44.97906	3018.6	trying to get helium sampler valves open
27.01.2007	15:48:59	14.7529522	-44.97906	3018.5	taking sample number 4
27.01.2007	15:49:05	14.7529523	-44.97906	3018.5	closing helium sampler
27.01.2007	15:52:11	14.7529526	-44.97906	3018.5	leaving irina 2
27.01.2007	15:53:19	14.7529536	-44.979034	3020.0	heading to smoking chimney structure
27.01.2007	15:54:23	14.7529237	-44.979039	3019.3	found smoking chimney - short chimney
27.01.2007	15:54:49	14.7529231	-44.97904	3019.2	orange deposit on the rock surrounding the chimney
27.01.2007	15:55:36	14.7529234	-44.97904	3019.2	found marker 2.96
27.01.2007	15:56:07	14.7529227	-44.979041	3019.2	white 'fluff' on the marker
27.01.2007	15:56:59	14.7529227	-44.979041	3019.2	starting temp measurement at small black smoker
27.01.2007	15:58:01	14.7529226	-44.979042	3019.2	315 deg measured
27.01.2007	15:59:25	14.7529228	-44.979042	3019.2	some shrimp on the small smoker
27.01.2007	15:59:45	14.7529229	-44.979043	3019.2	dead mussel shells lying around the base of small smoker
27.01.2007	16:01:37	14.7529048	-44.979064	3019.5	clump of living mussels behind small chimney
27.01.2007	16:02:44	14.7529052	-44.979063	3019.5	measuring temp
27.01.2007	16:02:46	14.7529052	-44.979063	3019.5	FrameGrab
27.01.2007	16:04:01	14.7529051	-44.979063	3019.6	temp measurement was sample 5
27.01.2007	16:05:03	14.7529048	-44.979062	3019.6	setting up for sample 6
27.01.2007	16:08:00	14.7529065	-44.97906	3019.6	flushing tit. syringe
27.01.2007	16:09:52	14.7529079	-44.979059	3019.6	temp probe showing -4.9 deg
27.01.2007	16:10:19	14.7529084	-44.979058	3019.6	closing tit. syringe
27.01.2007	16:11:59	14.7529083	-44.979058	3019.5	setting up for sample number 7
27.01.2007	16:18:50	14.7529105	-44.979055	3019.5	finished sampling hot fluids

27.01.2007	16:19:40	14.7529104	-44.979055	3019.5	finished at small smoker site
27.01.2007	16:22:40	14.7529109	-44.979055	3019.5	white crab on science cam
27.01.2007	16:23:08	14.752914	-44.979054	3019.6	heading to temperature logger field
27.01.2007	16:25:06	14.7530424	-44.979115	3024.4	bacterial mat about 50 cm diameter
27.01.2007	16:26:13	14.7530486	-44.979131	3025.7	big pile of empty mussel shells
27.01.2007	16:26:54	14.7530134	-44.979102	3022.5	heading up to temp loggers
27.01.2007	16:28:25	14.7530021	-44.979096	3022.3	still some clumps of living mussels around the temp loggers
27.01.2007	16:30:13	14.7530075	-44.979097	3022.3	setting up for mussel net sample
27.01.2007	16:30:54	14.7530077	-44.979097	3022.4	sample 8 - mussel net 4
27.01.2007	16:33:03	14.7530071	-44.979095	3022.3	sampling mussels
27.01.2007	16:33:43	14.7530113	-44.979095	3022.6	mussel net going into port side biobox
27.01.2007	16:39:41	14.7530129	-44.979087	3021.6	net fell out while trying to put it into the biobox
27.01.2007	16:40:42	14.753013	-44.979083	3021.5	recovering mussel net
27.01.2007	16:40:51	14.753013	-44.979083	3021.6	all mussels fell out
27.01.2007	16:45:53	14.7530228	-44.979082	3021.3	about to take sample number 9
27.01.2007	16:46:43	14.7530054	-44.979094	3021.9	snails in amongst the mussels
27.01.2007	16:48:58	14.7530078	-44.979092	3021.8	nice mussel net!! now going into the biobox on the port side
27.01.2007	16:55:12	14.7530071	-44.979093	3021.8	finished mussel net
27.01.2007	16:56:12	14.7530064	-44.979093	3021.7	mussels covered in black deposit on sciencecam
27.01.2007	16:57:24	14.7530066	-44.979093	3021.7	heading off to look for obt obp down slope
27.01.2007	17:07:55	14.7532268	-44.979208	3030.9	heading down the slope to look for obp/obt
27.01.2007	17:08:14	14.7532372	-44.979219	3031.5	seeing bacterial mats with small
27.01.2007	17:09:18	14.7532855	-44.979277	3034.3	sediment on the slope
27.01.2007	17:09:59	14.7532691	-44.979262	3033.6	metal weight with chain
27.01.2007	17:11:26	14.7532713	-44.979266	3033.7	waiting for medea to move position
27.01.2007	17:13:49	14.7532574	-44.979337	3035.2	moving along a 'ridge' on the mound
27.01.2007	17:17:22	14.753251	-44.97916	3030.9	a few empty mussel shells lying around
27.01.2007	17:20:05	14.7533981	-44.979282	3035.1	still setting up with medea
27.01.2007	17:21:30	14.7532678	-44.979374	3035.8	sediment with current ripples
27.01.2007	17:22:05	14.7532624	-44.979399	3036.0	rock outcrop
27.01.2007	17:23:47	14.7532825	-44.979402	3035.8	3034 rock outcrop on sediment surface
27.01.2007	17:24:34	14.7532331	-44.979449	3036.4	fragmetns up to 1m big
27.01.2007	17:29:19	14.7532527	-44.979574	3035.9	still lookimg for
27.01.2007	17:30:26	14.7531946	-44.979615	3035.6	Marker
27.01.2007	17:31:57	14.7531811	-44.979628	3035.4	OBT detected
27.01.2007	17:33:12	14.7531813	-44.979628	3035.3	FrameGrab
27.01.2007	17:33:12	14.7531813	-44.979628	3035.3	FrameGrab
27.01.2007	17:33:13	14.7531813	-44.979628	3035.3	FrameGrab
27.01.2007	17:33:31	14.7531812	-44.979628	3035.3	FrameGrab
27.01.2007	17:33:31	14.7531812	-44.979628	3035.3	FrameGrab
27.01.2007	17:33:32	14.7531812	-44.979628	3035.3	FrameGrab
27.01.2007	17:33:53	14.7531812	-44.979628	3035.3	OBT depth 3032
27.01.2007	17:35:56	14.7532071	-44.97973	3033.5	approaching OBT
27.01.2007	17:37:26	14.7531972	-44.979751	3033.8	observing OBT - looks ok
27.01.2007	17:39:40	14.7531895	-44.979771	3034.6	OBTstill looks levelled
27.01.2007	17:47:49	14.7531669	-44.979728	3033.4	current meter and photo target are placed at markes for saving space
27.01.2007	17:50:31	14.7531668	-44.979728	3033.4	placing photo triangle on seafloor near marker (beacon 14 - not working)
27.01.2007	17:52:13	14.753167	-44.979728	3033.4	placing current meter on seafloor
27.01.2007	17:53:40	14.7531669	-44.979728	3033.4	both instruments are place properly on SF
27.01.2007	17:55:21	14.7531901	-44.979746	3033.3	back to the OBT
27.01.2007	17:58:04	14.7531955	-44.979774	3033.9	pilots control dead - crash of computer
27.01.2007	17:58:15	14.7531955	-44.979774	3033.9	science camera dead

27.01.2007	18:00:02	14.7531955	-44.979774	3033.9	we see winXP login screens
27.01.2007	18:02:05	14.7531955	-44.979774	3033.9	pilot and engineer computers still booting
27.01.2007	18:03:48	14.7531955	-44.979774	3033.9	problem with UPS (uniteruptable power supply)
27.01.2007	18:05:38	14.7531955	-44.979774	3033.9	still looking at black screens
27.01.2007	18:09:25	14.7531955	-44.979774	3033.9	computer are alive again
27.01.2007	18:09:47	14.7531955	-44.979774	3033.9	science cameras work again
27.01.2007	18:11:16	14.7531955	-44.979774	3033.9	cameras (pilot
27.01.2007	18:14:05	14.7531955	-44.979774	3033.9	half an hour break of scientific program because of problem fixing
27.01.2007	18:36:49	14.7533502	-44.9797	2747.6	problems not fixed
27.01.2007	18:37:21	14.7533493	-44.979698	2731.2	problem probably too low voltage
27.01.2007	18:46:29	14.7533487	-44.979698	2400.1	test
27.01.2007	18:49:34	14.7533501	-44.9797	2290.7	FrameGrab

249-ROV
J2-254, 28.01.2007

Date	UTC	Lat	Long	Depth	Comment
28.01.2007	11:19:17	14.666667	-45	0.0	Preparing for J2-254
28.01.2007	11:55:54	14.666638	-45.000062	3.2	Deployed @11.53 UMT
28.01.2007	12:00:45	14.666656	-45.000027	67.0	Dive!
28.01.2007	12:02:44	14.66668	-45.000008	124.2	Dive nr.254
28.01.2007	12:03:52	14.666683	-45.000005	162.5	Profiler Homer on WHOI15
28.01.2007	12:05:06	14.666683	-45.000005	162.5	Power loss
28.01.2007	13:48:40	14.752624	-44.979216	3021.7	Dobbler resetto LBL
28.01.2007	13:51:10	14.752603	-44.979198	3024.2	On seafloor
28.01.2007	13:55:10	14.752652	-44.979096	3023.7	trimming jason
28.01.2007	13:58:40	14.752718	-44.979175	3027.7	plume passing by
28.01.2007	13:59:21	14.752719	-44.979172	3027.2	mussel shells
28.01.2007	14:04:48	14.752761	-44.979054	3022.8	outcropping rock white spors (mussels)
28.01.2007	14:05:01	14.752764	-44.979044	3021.6	marker 396
28.01.2007	14:07:17	14.752757	-44.979087	3023.6	T loggers in front
28.01.2007	14:08:18	14.752789	-44.979051	3021.2	Iina II main structure in front
28.01.2007	14:08:44	14.752981	-44.979045	3020.3	reset yesterdays position
28.01.2007	14:11:02	14.753039	-44.979212	3028.3	move ship w. bearing 351 by 30 m
28.01.2007	14:15:49	14.753067	-44.979253	3033.8	white stuff
28.01.2007	14:16:19	14.753092	-44.979263	3036.8	many many open mussel shells
28.01.2007	14:18:48	14.753113	-44.979265	3034.5	pilot cam close ups show live mussel
28.01.2007	14:20:01	14.753122	-44.979292	3035.7	still photos still too dark
28.01.2007	14:22:15	14.753137	-44.979324	3036.3	30 m NW of Irina II structure mussle-free areeas larger than mussel patches
28.01.2007	14:23:03	14.753121	-44.979357	3037.7	outcropping rock mussel patches
28.01.2007	14:24:21	14.7531	-44.979379	3039.0	marker anya
28.01.2007	14:25:38	14.753098	-44.979378	3038.9	try to turn marker with arm abd read it - score
28.01.2007	14:28:43	14.753101	-44.979384	3226.5	gym exersizes with craft arm
28.01.2007	14:30:48	14.7531	-44.979384	3226.1	craft has slight technical problems
28.01.2007	14:32:30	14.75309	-44.979404	3039.2	move ship on bearing 370 for 20 m
28.01.2007	14:33:16	14.753084	-44.979473	3041.6	correction: bearing 270
28.01.2007	14:34:56	14.753072	-44.979528	3045.6	now 10 m W from marker Anya
28.01.2007	14:37:05	14.75311	-44.979377	3039.4	white patch . the mat?
28.01.2007	14:37:22	14.753112	-44.979371	3039.7	marker anya right below us
28.01.2007	14:38:01	14.753103	-44.979348	3040.7	bearing 21
28.01.2007	14:40:51	14.753126	-44.979392	3039.2	mat searching for a location in this mat with less slope
28.01.2007	14:41:38	14.753127	-44.979394	3039.2	total width of mat more than 4 m(?)

28.01.2007	14:43:04	14.753127	-44.979393	3038.7	found a math patch some 80 cm across
28.01.2007	14:45:03	14.753126	-44.979393	3038.8	start to place the profiler
28.01.2007	14:54:57	14.753133	-44.9794	3038.7	placing profiler directlz above the white patch
28.01.2007	14:55:29	14.753133	-44.9794	3038.6	taken picture
28.01.2007	14:57:35	14.753132	-44.9794	3038.6	starting profiler
28.01.2007	14:58:07	14.753132	-44.9794	3038.6	taken picture
28.01.2007	14:59:05	14.753131	-44.9794	3038.6	3037 water depth
28.01.2007	15:04:38	14.753148	-44.979588	3041.8	flying west
28.01.2007	15:06:04	14.753145	-44.97958	3042.4	transit to OBP
28.01.2007	15:06:28	14.753145	-44.97958	3042.4	rock fragments on sediment surface
28.01.2007	15:12:13	14.75314	-44.979738	3045.3	Profiler: 249-1
28.01.2007	15:18:54	14.753253	-44.979714	3043.1	power loss
28.01.2007	15:20:17	14.753253	-44.979714	3043.1	again power loss
28.01.2007	15:23:04	14.753253	-44.979714	3043.1	try to re-connect ROV
28.01.2007	15:33:43	14.753161	-44.979617	3041.2	ROV online again
28.01.2007	15:36:56	14.753289	-44.979594	3038.1	bottom view
28.01.2007	15:38:45	14.75329	-44.979594	3038.2	waiting for medea
28.01.2007	15:39:15	14.75329	-44.979594	3038.0	fish
28.01.2007	15:41:03	14.75332	-44.979627	3039.9	Marker OBP
28.01.2007	15:41:38	14.753341	-44.979619	3038.2	and OBT
28.01.2007	15:43:53	14.753489	-44.97972	3038.9	picture taken
28.01.2007	15:50:49	14.753434	-44.979684	3038.7	after moving the ROV again marker reached
28.01.2007	15:51:54	14.753461	-44.979673	3037.9	left: OBP
28.01.2007	15:53:18	14.753461	-44.979672	3037.7	OBP picure taken
28.01.2007	15:53:54	14.753479	-44.979636	3035.7	looking E
28.01.2007	15:54:32	14.753484	-44.979624	3035.5	more OBP pictures
28.01.2007	15:56:09	14.753483	-44.979624	3035.2	start to replae old OBP with new OBP
28.01.2007	15:56:23	14.753484	-44.979625	3035.3	grab OBP
28.01.2007	15:58:39	14.753484	-44.979626	3035.3	deployment of the new OBP in the same orientation
28.01.2007	15:59:52	14.753485	-44.979626	3035.3	waiting for clear view
28.01.2007	16:02:30	14.753489	-44.979631	3035.5	sucessful deployment
28.01.2007	16:04:52	14.753444	-44.979642	3036.0	moving to OBT
28.01.2007	16:05:18	14.753446	-44.979627	3035.5	picture taken
28.01.2007	16:07:20	14.753446	-44.979626	3035.4	rust on OBT?
28.01.2007	16:07:39	14.753446	-44.979626	3035.3	uptake of OBT
28.01.2007	16:09:50	14.753446	-44.979626	3035.3	Marker deployed: number 21
28.01.2007	16:11:14	14.753444	-44.979624	3035.3	transit to Irina II
28.01.2007	16:21:41	14.753388	-44.979486	3034.4	discussion: rescue of a sailor with a broken mast?
28.01.2007	16:26:09	14.753238	-44.979349	3036.3	mussels
28.01.2007	16:26:51	14.753209	-44.979303	3036.4	cracks
28.01.2007	16:27:28	14.75321	-44.979308	3036.5	power loss
28.01.2007	16:28:20	14.75321	-44.979308	3036.5	cracks marked with white mats
28.01.2007	16:29:24	14.75321	-44.979331	3036.4	try to get ROV online again
28.01.2007	16:30:31	14.753222	-44.979313	3036.7	power loss
28.01.2007	16:35:00	14.753118	-44.979239	3035.2	try to get ROV online
28.01.2007	16:40:10	14.752875	-44.979102	3031.6	bottom view - mussels
28.01.2007	16:40:30	14.752817	-44.9791	3031.9	moving towards south
28.01.2007	16:40:56	14.752764	-44.979099	3030.8	rock outcrop
28.01.2007	16:42:19	14.752832	-44.979085	3033.5	oxidized surface
28.01.2007	16:42:32	14.752842	-44.979091	3034.5	mussels
28.01.2007	16:42:52	14.752855	-44.979104	3034.6	crack with white mat
28.01.2007	16:45:05	14.752831	-44.97902	3029.4	white patch
28.01.2007	16:47:07	14.752912	-44.979072	3025.3	microsmoke marker irina
28.01.2007	16:47:17	14.752912	-44.97908	3025.4	Irina II main structure

28.01.2007	16:49:15	14.75286	-44.979101	3023.6	flying of t-loggers
28.01.2007	16:49:29	14.752863	-44.979101	3023.6	shimmering water
28.01.2007	16:51:35	14.752866	-44.979065	3022.3	fish
28.01.2007	16:54:52	14.752859	-44.979062	3022.0	start temperature measurement 249 - 2
28.01.2007	16:57:43	14.752859	-44.97906	3021.9	picture taken
28.01.2007	17:01:15	14.752859	-44.979056	3021.9	Kraft arm does not work anymore
28.01.2007	17:03:19	14.752858	-44.979053	3021.9	alternative: transit to Lander west of marker Anya
28.01.2007	17:08:50	14.752856	-44.979056	3021.8	discussion
28.01.2007	17:11:34	14.752896	-44.979016	3023.6	moving
28.01.2007	17:13:33	14.752941	-44.978982	3022.4	47m 326 degrees
28.01.2007	17:22:17	14.753161	-44.979163	3032.2	still transit
28.01.2007	17:22:38	14.753197	-44.979193	3034.0	decision to help the sailors
28.01.2007	17:24:42	14.7532	-44.979286	3036.0	234 degrees 20 m towards Lander
28.01.2007	17:25:02	14.753202	-44.979273	3035.7	sediment view
28.01.2007	17:25:25	14.753198	-44.979275	3035.6	approaching profiler from the north
28.01.2007	17:26:08	14.753139	-44.979258	3035.2	rock fragment
28.01.2007	17:26:28	14.753129	-44.979242	3034.3	russian steel
28.01.2007	17:27:37	14.753146	-44.979286	3035.0	270 degrees
28.01.2007	17:31:09	14.753106	-44.979405	3036.5	
28.01.2007	17:31:29	14.753104	-44.979397	3036.6	fragmented
28.01.2007	17:32:52	14.75309	-44.979434	3036.3	moving south
28.01.2007	17:33:22	14.75305	-44.979448	3036.6	rock fragments on the surface
28.01.2007	17:33:45	14.75302	-44.979441	3036.9	fish
28.01.2007	17:34:00	14.753016	-44.979428	3036.8	lander approached
28.01.2007	17:34:51	14.753003	-44.979365	3036.2	small inactive chimney 2 or 3m north of lander
28.01.2007	17:35:08	14.752995	-44.979354	3035.8	also E of the lander
28.01.2007	17:36:31	14.75297	-44.979323	3034.7	Marker Anya south of lander
28.01.2007	17:36:41	14.752966	-44.979322	3034.6	big white mat
28.01.2007	17:38:58	14.752981	-44.979333	3194.5	marker anya
28.01.2007	17:39:48	14.752983	-44.979335	3194.5	ready to take pushcores
28.01.2007	17:41:24	14.752983	-44.979334	3135.2	temperature probe
28.01.2007	17:43:34	14.752973	-44.979319	3034.8	10 degrees in white mat
28.01.2007	17:45:44	14.753007	-44.97943	3034.3	moving around
28.01.2007	17:47:18	14.752968	-44.979436	3034.3	measured 10 degrees within the white big mat probably not a true value
28.01.2007	17:48:27	14.752966	-44.979376	3032.1	lokking for the instrument
28.01.2007	17:50:42	14.752977	-44.979351	3033.2	fish
28.01.2007	17:50:55	14.752975	-44.97935	3033.3	white mat
28.01.2007	17:55:58	14.752838	-44.979436	3036.4	moving around the lander to find the righ position
28.01.2007	17:57:22	14.752845	-44.979465	3038.3	white mat with red
28.01.2007	17:57:54	14.752844	-44.97946	3038.1	oxidized sulfides
28.01.2007	17:58:57	14.752844	-44.979459	3038.3	temperature measurement planned
28.01.2007	18:03:37	14.752844	-44.97946	3038.3	249-3: temperature measurement
28.01.2007	18:04:25	14.752844	-44.97946	3038.2	55 degrees
28.01.2007	18:04:55	14.752844	-44.97946	3038.2	56 degrees final
28.01.2007	18:06:04	14.752844	-44.97946	3038.2	249-4: temperature measurement 20cm away within the same mat: picture taken
28.01.2007	18:09:18	14.752845	-44.979459	3038.2	61 degrees
28.01.2007	18:11:22	14.752845	-44.97946	3038.3	next temperature measurement a few centimenters beside the white mat within the oxidized sulfide talus
28.01.2007	18:13:35	14.752845	-44.979459	3038.2	249-5: cooler than white mat!
28.01.2007	18:15:08	14.752845	-44.979459	3038.2	slightly shimmering out of the hole
28.01.2007	18:16:57	14.752845	-44.979459	3038.2	31 degrees
28.01.2007	18:17:36	14.752845	-44.979459	3038.2	wenn wir noch ne Stunde warten

28.01.2007	18:20:17	14.752845	-44.979459	3038.2	249-6:pushcore within the same white mat
28.01.2007	18:25:19	14.752846	-44.979459	3038.2	taking the sample
28.01.2007	18:27:28	14.752846	-44.979459	3038.1	loosing the bottom of the core
28.01.2007	18:28:19	14.752847	-44.979459	3038.2	core loss
28.01.2007	18:29:38	14.752847	-44.979459	3038.1	taking the sa
28.01.2007	18:34:47	14.752847	-44.979459	3038.3	249-7: second core within the white mat
28.01.2007	18:41:04	14.752848	-44.979459	3038.2	249-8: temperature-probe in the center of the mat
28.01.2007	18:42:24	14.752848	-44.979459	3038.2	black color underneath the white mat
28.01.2007	18:56:22	14.752855	-44.979462	3037.8	60 degrees
28.01.2007	18:58:15	14.752856	-44.979462	3037.8	63 degrees
28.01.2007	18:59:37	14.752856	-44.979462	3037.8	65 degrees
28.01.2007	19:05:49	14.752849	-44.97945	3038.5	249-9: temperature meassurement within the sulfide taluspicture taken
28.01.2007	19:07:36	14.752849	-44.97945	3038.4	30 degrees
28.01.2007	19:08:56	14.752849	-44.97945	3038.5	29.3
28.01.2007	19:12:15	14.752849	-44.97945	3038.4	249-10: sampling oxidized rock fragments
28.01.2007	19:14:50	14.752848	-44.979453	3038.5	before that deployment of a marker 23
28.01.2007	19:22:32	14.752848	-44.979452	3038.6	rock sammpling
28.01.2007	19:38:45	14.752826	-44.979467	3040.2	finished sience
28.01.2007	19:54:05	14.753105	-44.978969	3033.0	dive up

251-ROV
J2-255, 29.01.2007

Date	Time	Lat	Long	Depth	Comment
29.01.2007	10:23:23	14.753346	-44.978596	2.4	J2-255 Predive
29.01.2007	12:55:17	14.666646	-44.999988	2990.7	test
29.01.2007	13:01:17	14.66705	-45.000422	3010.2	MSM 04/3 station ROV 251
29.01.2007	13:01:43	14.666979	-45.000395	3008.9	Jason dive 255
29.01.2007	13:05:49	14.667023	-45.000459	3010.5	Blackout
29.01.2007	13:17:24	14.667167	-45.000548	3021.3	bottom view
29.01.2007	13:18:27	14.667121	-45.000566	3020.8	rock outcrop
29.01.2007	13:19:05	14.667078	-45.000522	3018.5	moving towards bacterial mat near marker anya
29.01.2007	13:20:10	14.75279	-44.979437	3019.2	reset Jason to its ship (LWL)
29.01.2007	13:23:28	14.752859	-44.979437	3021.3	waiting for the ship
29.01.2007	13:24:45	14.752908	-44.979453	3025.0	start transit
29.01.2007	13:25:07	14.752918	-44.979453	3025.3	seafloor covered by massive rock fragments
29.01.2007	13:27:21	14.753047	-44.979519	3036.4	sediment surface
29.01.2007	13:27:38	14.753064	-44.979519	3037.1	moving towards north
29.01.2007	13:28:15	14.753067	-44.97952	3037.2	fish
29.01.2007	13:29:37	14.753069	-44.979578	3037.2	fragmented rock outcrop
29.01.2007	13:31:37	14.75309	-44.979606	3037.2	315degrees
29.01.2007	13:32:16	14.753098	-44.979628	3036.8	transit
29.01.2007	13:34:30	14.753161	-44.979728	3039.1	crack in the seafloor
29.01.2007	13:35:54	14.753169	-44.979741	3040.3	waiting
29.01.2007	13:36:52	14.753192	-44.979789	3041.9	moving again
29.01.2007	13:37:23	14.753161	-44.979825	3040.6	270 degrees
29.01.2007	13:37:39	14.753155	-44.979848	3040.1	patch of fragmented rocks
29.01.2007	13:40:35	14.753199	-44.979427	3042.9	massive
29.01.2007	13:42:26	14.753178	-44.979458	3046.7	waiting
29.01.2007	13:45:58	14.753188	-44.97941	3046.5	rock fragments are covered by thin sediment layer
29.01.2007	13:46:01	14.753189	-44.979404	3046.7	moving
29.01.2007	13:46:27	14.753188	-44.979403	3044.8	scarp in massive rock outcrop

29.01.2007	13:47:38	14.753184	-44.979394	3043.6	2-3 m change in height
29.01.2007	13:48:08	14.753213	-44.979373	3039.6	downslope
29.01.2007	13:49:10	14.753297	-44.979306	3042.8	crack within rock fragments NW-SE
29.01.2007	13:49:37	14.753336	-44.979287	3044.5	no
29.01.2007	13:50:02	14.753377	-44.979277	3044.6	mussels
29.01.2007	13:50:17	14.753399	-44.979259	3044.5	coming from NE
29.01.2007	13:50:25	14.753409	-44.979252	3044.3	no
29.01.2007	13:50:40	14.753425	-44.979238	3042.6	white mat
29.01.2007	13:53:39	14.753092	-44.979371	3042.3	reset doppler log based on marker Anya
29.01.2007	13:53:56	14.753092	-44.979371	3041.0	profilrt
29.01.2007	13:55:08	14.753092	-44.97937	3039.6	picture laken
29.01.2007	13:57:19	14.753129	-44.979458	3039.5	moving 315 degrees
29.01.2007	13:58:05	14.753143	-44.979492	3039.1	rock fragments of very different size
29.01.2007	13:58:23	14.753134	-44.979494	3039.5	290 degrees
29.01.2007	14:01:57	14.753151	-44.97966	3045.5	sediment surface with big rock fragments
29.01.2007	14:03:27	14.753163	-44.979707	3045.4	transit to OBP
29.01.2007	14:05:26	14.753193	-44.97973	3044.8	patches with rock fragments
29.01.2007	14:07:31	14.753105	-44.979747	3044.0	fragmented rock outcrop
29.01.2007	14:09:06	14.753226	-44.979702	3043.8	moving in a circle
29.01.2007	14:11:59	14.753094	-44.979783	3040.1	rock outcrops
29.01.2007	14:15:19	14.753232	-44.979652	3042.8	mussel patch
29.01.2007	14:17:46	14.753025	-44.979732	3045.8	picture of rock fragment
29.01.2007	14:18:29	14.75303	-44.979789	3043.4	rock fragments
29.01.2007	14:20:03	14.753083	-44.97987	3037.1	tin
29.01.2007	14:26:33	14.753169	-44.979606	3044.3	sediment
29.01.2007	14:45:32	14.753101	-44.979463	3044.3	back to the Profiler
29.01.2007	14:50:04	14.75322	-44.979395	3037.5	rough surface
29.01.2007	14:50:33	14.753216	-44.979395	3037.2	picture taken
29.01.2007	14:50:57	14.753218	-44.979393	3037.7	seafloor covred by fragmented rocks
29.01.2007	14:52:28	14.75323	-44.979424	3037.1	mussels
29.01.2007	14:58:37	14.752962	-44.97951	3037.2	changeover - jill now logging
29.01.2007	15:01:44	14.752961	-44.979508	3037.1	waiting for ship to move position
29.01.2007	15:07:22	14.753072	-44.979498	3036.9	grey sediment with dark patches
29.01.2007	15:11:36	14.753099	-44.979565	3037.2	football marker in sight
29.01.2007	15:16:13	14.753163	-44.979546	3035.5	searching for a site to put down the in situ chamber
29.01.2007	15:18:08	14.753243	-44.979565	3033.7	found a clear patch of sediment
29.01.2007	15:20:15	14.753244	-44.979568	3033.6	preparing to set chamber onto the sediment
29.01.2007	15:24:01	14.753246	-44.979574	3033.6	setting the chamber down on it's side
29.01.2007	15:24:28	14.753246	-44.979574	3033.8	grabbing monkey fist to turn the chamber up the right way
29.01.2007	15:27:22	14.753246	-44.979574	3033.7	setting chamber down on sediment
29.01.2007	15:33:12	14.753248	-44.979607	3033.4	chamber not going down into the sediment
29.01.2007	15:33:49	14.753248	-44.979608	3033.5	pulled the chamber back out of the sediment
29.01.2007	15:35:28	14.753249	-44.97961	3033.5	trying to put the chamber back into the sediment again
29.01.2007	15:37:44	14.753251	-44.979609	3033.5	pushing the chamber down into the sediment with rov arm
29.01.2007	15:38:47	14.75325	-44.979609	3033.4	chamber placed into sediment
29.01.2007	15:43:43	14.75324	-44.979601	3034.3	setting up to take a push core to the left of the chamber
29.01.2007	15:48:27	14.753233	-44.979606	3034.3	taking pushcore
29.01.2007	15:48:28	14.753233	-44.979606	3034.2	FrameGrab
29.01.2007	15:50:40	14.753234	-44.979607	3034.3	sample number 2
29.01.2007	15:53:52	14.753235	-44.979607	3034.1	temperature measured 4.82 deg c
29.01.2007	16:00:00	14.753263	-44.979731	3034.2	temperature measurement was number 251-2

29.01.2007	16:01:32	14.753214	-44.979698	3034.1	moving towards Irina II
29.01.2007	16:09:48	14.752945	-44.979408	3035.3	marker 23
29.01.2007	16:10:20	14.752945	-44.9794	3034.9	white matprofiler
29.01.2007	16:13:28	14.752955	-44.979432	3036.3	marker Anya
29.01.2007	16:19:49	14.752907	-44.979517	3036.8	reset Jason
29.01.2007	16:20:01	14.752909	-44.979491	3037.0	moving towards Irina II
29.01.2007	16:20:04	14.752908	-44.979484	3036.7	white mat
29.01.2007	16:21:30	14.752929	-44.979393	3033.3	oxidized talus
29.01.2007	16:24:30	14.752938	-44.979317	3030.6	moving southeast
29.01.2007	16:24:39	14.752937	-44.979315	3030.8	inactive
29.01.2007	16:27:28	14.752929	-44.97931	3030.6	try to take a sample to get more payload
29.01.2007	16:28:34	14.752883	-44.979203	3026.1	mussels
29.01.2007	16:29:51	14.752816	-44.979175	3022.3	marker Irina microsmoke
29.01.2007	16:29:56	14.752816	-44.979177	3022.3	inactive chimney
29.01.2007	16:31:47	14.752814	-44.979181	3021.8	fully oxidized
29.01.2007	16:32:10	14.752809	-44.979177	3021.8	or Fe-oxide chimney
29.01.2007	16:35:54	14.752806	-44.979175	3021.9	discussion
29.01.2007	16:41:29	14.752815	-44.979176	3022.0	sampling the inactive smoker
29.01.2007	16:49:36	14.752806	-44.979246	3025.0	prepare for diffuse fluid sampling within the mussel field
29.01.2007	17:11:41	14.752748	-44.979167	3019.2	location: diffuse outplowlrft of T.-Logger 0
29.01.2007	17:11:59	14.752745	-44.97915	3019.2	251-4: major 2
29.01.2007	17:15:05	14.752738	-44.979174	3019.2	triggered
29.01.2007	17:19:09	14.752723	-44.979176	3019.2	finished
29.01.2007	17:29:14	14.752696	-44.979096	3019.2	next: same spot:251-5 Major D2
29.01.2007	17:37:27	14.752658	-44.979087	3019.2	triggered
29.01.2007	17:39:42	14.752723	-44.979176	3019.2	done
29.01.2007	17:49:11	14.75268	-44.979125	3019.2	251-6: temperature measurement in the same spot
29.01.2007	17:53:30	14.75265	-44.979109	3019.1	start T. measurement
29.01.2007	18:21:21	14.752689	-44.979202	2993.3	power loss
29.01.2007	18:25:07	14.752689	-44.979202	3031.4	temperature probe still hold by the arm
29.01.2007	18:25:35	14.752689	-44.979202	3033.2	try to get ROV online again
29.01.2007	18:30:45	14.752689	-44.979202	3032.5	bottom view
29.01.2007	18:31:29	14.752689	-44.979202	3030.3	mussels and white mat
29.01.2007	18:38:18	14.752968	-44.979117	3027.8	repositioning
29.01.2007	18:45:21	14.753036	-44.97912	3030.5	rock outcrop
29.01.2007	19:01:17	14.752781	-44.979016	3020.9	dust is settling
29.01.2007	19:03:57	14.752809	-44.979057	3021.4	irina II
29.01.2007	19:04:57	14.752772	-44.979043	3020.9	mussel field
29.01.2007	19:07:02	14.752765	-44.979041	3020.7	temperature probe back in ROV
29.01.2007	19:08:54	14.752723	-44.979025	3019.6	going around mound and small smoker
29.01.2007	19:10:24	14.75267	-44.97909	3019.4	small smoker visible
29.01.2007	19:14:30	14.752784	-44.979214	3025.2	going over small mussel field
29.01.2007	19:15:40	14.752801	-44.979173	3023.2	markers of temperature probes visible
29.01.2007	19:17:28	14.752787	-44.979163	3022.4	searching for marker zero (top most)
29.01.2007	19:17:43	14.752787	-44.979163	3022.4	mussels on markers
29.01.2007	19:18:05	14.752792	-44.979166	3022.6	pictures of mussels colonizing markers
29.01.2007	19:20:16	14.752751	-44.979178	3022.3	marker 9
29.01.2007	19:22:21	14.752751	-44.979177	3022.3	overview of marker field
29.01.2007	19:23:32	14.75275	-44.979177	3022.1	navigating medea
29.01.2007	19:27:24	14.752751	-44.979175	3022.2	plan to take 4 temp probes
29.01.2007	19:30:23	14.752751	-44.979174	3022.1	major no 3 sample 251-7
29.01.2007	19:38:15	14.752752	-44.979172	3022.0	probe triggered
29.01.2007	19:42:04	14.752752	-44.979172	3022.0	probe closed
29.01.2007	19:47:53	14.752752	-44.97917	3022.1	temp probe 251-8 in

29.01.2007	19:53:42	14.752752	-44.979172	3022.0	28 degrees C
29.01.2007	19:54:24	14.752752	-44.979171	3021.9	snails near temp probe phynorynchius
29.01.2007	19:56:19	14.752752	-44.979171	3022.0	251-8 temp probe in
29.01.2007	20:00:31	14.752752	-44.97917	3022.0	maximum 23 degree C
29.01.2007	20:07:14	14.752751	-44.979167	3022.1	major D1 - broken inlet
29.01.2007	20:07:37	14.752751	-44.979167	3022.2	breaking inlet of major D1
29.01.2007	20:08:18	14.752751	-44.979166	3022.2	major D1 probe 251-10
29.01.2007	20:12:31	14.752753	-44.979165	3021.9	probe finished
29.01.2007	20:19:56	14.752751	-44.979163	3021.8	temp log 0 and 9 are left for later orientation
29.01.2007	20:28:06	14.752754	-44.97916	3022.0	taking scoop net on temp logger 8
29.01.2007	20:28:30	14.752754	-44.979162	3021.9	net no2
29.01.2007	20:33:08	14.752753	-44.979159	3021.8	second try
29.01.2007	20:35:15	14.752753	-44.97916	3021.7	net in box
29.01.2007	20:40:09	14.752754	-44.979159	3021.8	pulling out temp logger 8
29.01.2007	20:42:02	14.752754	-44.979157	3021.7	scoop net was no 251-11
29.01.2007	20:55:10	14.752756	-44.979146	3020.3	temperature measurement Logger 4: 251-12
29.01.2007	21:07:24	14.752753	-44.979145	3020.2	GEO.Hydrothermal Active White Smoker TXT 33 degrees
29.01.2007	21:08:02	14.752753	-44.979144	3020.2	wrong event logged
29.01.2007	21:09:58	14.752754	-44.979145	3020.2	251-13: water sampling Major Number 1
29.01.2007	21:10:13	14.752753	-44.979145	3020.2	at Logger 4
29.01.2007	21:12:16	14.752753	-44.979145	3020.6	triggered
29.01.2007	21:15:01	14.752753	-44.979146	3020.1	finished
29.01.2007	21:15:39	14.752753	-44.979145	3020.6	251-14 net for mussels at T.-logger 4
29.01.2007	21:34:20	14.752737	-44.979155	3022.6	the end
29.01.2007	23:28:33	14.752997	-44.978783	135.8	Jason on Deck - End J2-255

253-ROV
J2-256, 30.01.2007

Date	UTC	Lat	Lon	Depth	Comment
30.01.2007	15:14:43	14.666827	-45.000058	3031.9	`
30.01.2007	15:19:25	14.666806	-45.00003	3030.7	at 1510 - moving through plume
30.01.2007	15:21:05	14.666782	-45.000087	3030.0	on the seafloor
30.01.2007	15:21:19	14.66677	-45.000087	3029.9	sediment and small rocks
30.01.2007	15:26:24	14.666669	-44.999994	3031.6	dropping weight
30.01.2007	15:28:08	14.752512	-44.979883	3036.7	doppler reset to lbl
30.01.2007	15:29:57	14.7527	-44.979779	3049.8	rocky outcrop
30.01.2007	15:30:31	14.75277	-44.979764	3050.2	slope goes down to the right
30.01.2007	15:35:39	14.753058	-44.979746	3043.6	moving over rocky seafloor
30.01.2007	15:36:14	14.753127	-44.979731	3039.4	spotted the football marker
30.01.2007	15:37:40	14.75324	-44.979765	3037.1	moving to the small marker up the hill from the football marker
30.01.2007	15:39:07	14.753249	-44.979734	3035.0	looking for a site to land to set out obt
30.01.2007	15:40:00	14.753249	-44.979734	3034.8	landed next to small marker
30.01.2007	15:40:51	14.753249	-44.979734	3034.9	small marker is number 21
30.01.2007	15:41:40	14.753249	-44.979733	3034.8	removing marker 21
30.01.2007	15:42:15	14.75325	-44.979733	3034.8	marker 21 placed in basket
30.01.2007	15:50:05	14.75325	-44.979732	3034.9	obt placed on seafloor
30.01.2007	15:51:27	14.75325	-44.979732	3034.9	tilt indicator looks like it might be full of water
30.01.2007	15:53:10	14.75325	-44.979732	3034.8	obt will have to be recovered in a later dive
30.01.2007	15:54:21	14.753272	-44.979707	3034.1	leaving obt
30.01.2007	15:56:01	14.753308	-44.979629	3032.8	heading to chamber
30.01.2007	15:57:36	14.753295	-44.979625	3033.1	setting down to pick up the chamber
30.01.2007	15:59:23	14.753294	-44.979624	3173.5	recovering chamber

30.01.2007	16:04:47	14.753294	-44.979622	3033.1	placing marker 21 at chamber site
30.01.2007	16:09:33	14.753285	-44.979627	3033.0	chamber recovered
30.01.2007	16:10:50	14.753209	-44.979646	3034.3	heading to football marker
30.01.2007	16:13:01	14.753202	-44.979648	3034.4	removing marker from port biobox
30.01.2007	16:18:38	14.753201	-44.979657	3035.0	marker with two cylindrical floats set down next to football marker
30.01.2007	16:20:44	14.753188	-44.979677	3035.8	arm and biobox getting tangled in the marker lines
30.01.2007	16:24:06	14.753191	-44.979653	3035.3	picking up football marker with port arm
30.01.2007	16:26:31	14.75316	-44.979627	3034.9	moving towards elevator
30.01.2007	16:30:12	14.753171	-44.979603	3034.5	ship and medea repositioned
30.01.2007	16:34:30	14.753063	-44.979475	3036.7	empty mussel shells
30.01.2007	16:35:45	14.752987	-44.979384	3036.2	flying over white mats
30.01.2007	16:36:02	14.75298	-44.979374	3035.9	mussels - cracks in the seafloor
30.01.2007	16:39:10	14.752888	-44.979298	3033.0	rocky seafloor
30.01.2007	16:40:37	14.752827	-44.979243	3030.8	still flying over cracks in the seafloor
30.01.2007	16:41:32	14.752804	-44.979216	3028.3	field of markers
30.01.2007	16:42:26	14.752789	-44.979197	3027.0	empty mussel shells everywhere
30.01.2007	16:43:58	14.752713	-44.979109	3020.8	flying through a smoke plume
30.01.2007	16:45:53	14.752625	-44.979004	3019.5	nav seems to be working well now
30.01.2007	16:46:54	14.752561	-44.978928	3014.0	pockmarked sediment
30.01.2007	16:53:29	14.752359	-44.978697	3003.3	rocky outcrop
30.01.2007	16:57:39	14.752205	-44.978609	2994.1	38 m from elevator
30.01.2007	16:59:05	14.752152	-44.97861	2992.6	visibility very poor
30.01.2007	17:04:53	14.752044	-44.978608	2993.3	detect a weired instrument on the ground
30.01.2007	17:05:45	14.751977	-44.978601	2989.6	reached the lift
30.01.2007	17:09:47	14.751905	-44.978599	2985.6	elevator is sitting on a steep hill
30.01.2007	17:13:40	14.751876	-44.978613	2984.5	rock outcrop at elevator's place
30.01.2007	17:14:30	14.751875	-44.97861	2984.8	red colored
30.01.2007	17:23:01	14.751899	-44.978564	2983.8	placing chamber on the elevator
30.01.2007	17:33:09	14.751892	-44.978568	2983.8	takes some time
30.01.2007	17:45:32	14.751911	-44.978597	2985.2	transit to Irina II
30.01.2007	18:00:27	14.751913	-44.978599	2986.2	start transit
30.01.2007	18:25:17	14.751899	-44.978571	2982.7	still packing the elevator
30.01.2007	18:33:56	14.751907	-44.978564	2983.3	Marker 25 left at elevator's place
30.01.2007	18:41:05	14.752112	-44.978678	2992.4	transit
30.01.2007	18:53:47	14.752688	-44.97913	3021.7	mussels
30.01.2007	18:54:53	14.752757	-44.979157	3025.2	Irina II
30.01.2007	18:55:02	14.752768	-44.979147	3024.8	coming from south
30.01.2007	18:58:46	14.752811	-44.979171	3021.5	prepare to sample mussels and water within the mussel field
30.01.2007	19:09:09	14.752812	-44.979167	3021.6	253-1: mussel sampling
30.01.2007	19:12:55	14.75281	-44.979171	3021.8	mussel sampling from T.-Logger Nr. 9
30.01.2007	19:15:13	14.752807	-44.979172	3022.2	Marker 22 placed at former T.-Logger Nr. 9
30.01.2007	19:22:08	14.752811	-44.979172	3021.6	recovery of T.-Logger 9
30.01.2007	19:34:44	14.752822	-44.97915	3020.5	253-3: T-Logger 2 temperature measurement
30.01.2007	19:36:48	14.752821	-44.97915	3020.5	picture taken
30.01.2007	19:46:18	14.752822	-44.979147	3020.4	15. 37 degrees
30.01.2007	19:47:20	14.752823	-44.979147	3020.5	253-3: temperature measurement at T.-Logger 0
30.01.2007	19:55:26	14.752824	-44.979145	3020.4	3 degrees
30.01.2007	19:56:11	14.752824	-44.979145	3020.5	neue Messung an Mirjam diffuse site: 105 grad
30.01.2007	19:57:21	14.752824	-44.979145	3020.5	new measurement at Mirjams site 252 ROV with diffuse fluid: 105 grad
30.01.2007	20:12:35	14.752828	-44.979141	3020.4	measurement as Nr. 253-4
30.01.2007	20:17:56	14.752829	-44.97914	3020.4	253-5: Major 2 at T.-Logger 2
30.01.2007	20:18:25	14.752829	-44.97914	3020.4	triggered

30.01.2007	20:20:22	14.75283	-44.979139	3020.4	finished
30.01.2007	20:22:38	14.752832	-44.979138	3020.4	253-6: Major 1 T.-Logger 0
30.01.2007	20:27:12	14.752834	-44.979137	3020.4	finished
30.01.2007	20:31:31	14.752832	-44.979136	3020.4	253-7: mussel sampling Nr. 2
30.01.2007	20:41:52	14.752854	-44.979103	3020.6	mussel net
30.01.2007	20:42:52	14.752854	-44.979103	3020.7	mussel sample
30.01.2007	20:47:06	14.752853	-44.979103	3020.6	mussel sampling 253-8: T.-Logger 0
30.01.2007	20:55:09	14.752847	-44.979118	3021.3	picture taken
30.01.2007	21:14:22	14.752806	-44.979065	3018.5	fluid sample MAJOR
30.01.2007	21:15:13	14.752805	-44.979064	3018.5	253 9 Major 3
30.01.2007	21:28:03	14.752799	-44.979065	3018.6	Sample Major D2
30.01.2007	21:49:06	14.752972	-44.979427	3039.2	payload overboard
30.01.2007	21:53:34	14.75298	-44.979434	3038.1	pick up profiler
31.01.2007	00:03:43	14.753491	-44.979406	198.0	Jason on deck - end of dive J2-256

257-ROV
J2-257, 31.01.2007

Date	UTC	Lat	Lon	Depth	Comment
31.01.2007	10:23:33	14.753537	-44.979385	2.4	J2-257 Predive
31.01.2007	11:10:16	14.6666667	-45	0.0	Camera test
31.01.2007	13:01:06	14.6668622	-44.999995	2952.5	bottom view
31.01.2007	13:01:38	14.6669067	-45.000041	2952.6	sediment surface
31.01.2007	13:02:44	14.6670297	-45.000178	2952.6	no bottom view
31.01.2007	13:08:44	14.6674365	-45.000596	2983.9	target area: Irina I
31.01.2007	13:11:53	14.6674454	-45.000704	2985.9	bottom view
31.01.2007	13:13:19	14.7510328	-44.978739	2988.0	reset doppber logtrack on sediment N-S
31.01.2007	13:13:55	14.7510945	-44.978736	2989.4	track lined by something white
31.01.2007	13:16:44	14.7510147	-44.97879	2989.2	Marker: RV Prof. Logatchev
31.01.2007	13:17:10	14.7510121	-44.9788	2990.3	picture
31.01.2007	13:19:21	14.7510213	-44.978762	2987.3	SPB. RU
31.01.2007	13:19:31	14.7510061	-44.978755	2986.6	picture taken
31.01.2007	13:20:35	14.751047	-44.978791	2988.7	2991 m water depth of the marker
31.01.2007	13:22:21	14.7511075	-44.978752	2990.4	track again
31.01.2007	13:23:12	14.7511077	-44.978751	2990.3	probably caused by an instrument 45 degrees bearing
31.01.2007	13:24:40	14.7511084	-44.978747	2990.0	picture taken
31.01.2007	13:25:36	14.7511258	-44.97872	2989.2	moving 45 degrees
31.01.2007	13:29:19	14.7511759	-44.978661	2988.2	some oxidized pebbles
31.01.2007	13:29:27	14.7511804	-44.978655	2988.1	rock fragment
31.01.2007	13:37:32	14.7512264	-44.978717	2987.9	weight removed from the ROV< reset the doppler to the lbl
31.01.2007	13:39:52	14.7512915	-44.978656	2986.5	coarse sediment
31.01.2007	13:42:06	14.7513329	-44.978632	2985.6	bottles on the seafloor!
31.01.2007	13:42:21	14.751337	-44.978626	2985.4	red color coarse sediment
31.01.2007	13:47:13	14.7513476	-44.978511	2980.6	moving upslope 90 degrees
31.01.2007	13:47:30	14.7513487	-44.978497	2979.9	red colored coarse sediment
31.01.2007	13:52:04	14.7513282	-44.978521	2980.7	moving 100 degrees
31.01.2007	13:54:14	14.7513166	-44.978413	2975.5	rock outcrop
31.01.2007	13:56:53	14.7511789	-44.978374	2972.5	massive rock outcrop
31.01.2007	13:58:11	14.7513001	-44.978269	2967.5	talus no sediment picture taken
31.01.2007	13:58:31	14.7513075	-44.978249	2966.5	fish
31.01.2007	14:00:12	14.751305	-44.978137	2961.5	steep uphill
31.01.2007	14:04:08	14.7510944	-44.978138	2959.2	coarse sediment
31.01.2007	14:05:08	14.7511438	-44.97808	2956.5	massive rocks

31.01.2007	14:05:16	14.7511596	-44.978072	2956.4	oxidized
31.01.2007	14:06:26	14.7513133	-44.978011	2956.0	massive rock
31.01.2007	14:07:27	14.751309	-44.977976	2954.6	looks like serpentinite
31.01.2007	14:07:48	14.7512948	-44.977974	2954.1	picture
31.01.2007	14:18:26	14.7514435	-44.978123	2961.9	massive rock
31.01.2007	14:18:57	14.7514441	-44.978124	2962.1	rough topography
31.01.2007	14:21:36	14.7514286	-44.978042	2960.3	uphill again
31.01.2007	14:22:08	14.751455	-44.977997	2959.4	massive rock
31.01.2007	14:23:01	14.75152	-44.978066	2962.9	massive rock outcrop
31.01.2007	14:35:39	14.7513416	-44.978434	2974.1	soft sediments
31.01.2007	14:38:16	14.7515033	-44.978446	2974.8	TV grap spure
31.01.2007	14:42:07	14.7514835	-44.97834	2972.2	massive rocks
31.01.2007	14:42:21	14.7514895	-44.97833	2971.6	pictures
31.01.2007	14:49:42	14.7515259	-44.978216	2968.1	massive rock uphill
31.01.2007	14:51:43	14.7515265	-44.978156	2965.3	picture
31.01.2007	14:53:11	14.7515134	-44.978143	2964.6	massive rock boulders
31.01.2007	14:57:10	14.7515596	-44.978132	2965.6	very rough surface
31.01.2007	14:58:01	14.7515595	-44.978132	2965.7	waiting for Medea
31.01.2007	15:06:23	14.7515681	-44.978087	2966.8	bedrock outcrop
31.01.2007	15:20:22	14.7517272	-44.978064	2965.8	two black smokers Marker without label
31.01.2007	15:22:36	14.7516716	-44.977978	2962.8	depth 2962
31.01.2007	15:32:36	14.7516526	-44.978066	2964.6	waiting in front of the bl. smoker next to the marker
31.01.2007	15:35:56	14.7516667	-44.97806	2963.9	Station 255#1-heat probe with 8-Channel Uni-Bremen Lance
31.01.2007	15:36:58	14.7516674	-44.978059	2963.8	correction: heat probe with ROV Lance 1/Channel
31.01.2007	15:37:31	14.7516676	-44.978059	2963.9	313 C
31.01.2007	15:38:54	14.7516672	-44.978059	2963.9	reinjection of the heat probe for a new measurement
31.01.2007	15:39:34	14.7516664	-44.978059	2963.9	330 C
31.01.2007	15:39:44	14.7516664	-44.978059	2963.9	next try heat probe
31.01.2007	15:40:05	14.7516665	-44.978059	2963.9	damaging the smoker with heat probe
31.01.2007	15:43:45	14.7516873	-44.978054	2964.3	temperature measurment in second black smoker with Jason heat probe
31.01.2007	15:46:01	14.751688	-44.978057	2964.3	340 C
31.01.2007	15:47:27	14.7516883	-44.978058	2964.3	new temp' test with uni/Bremen Heat Probe 255#2
31.01.2007	15:49:20	14.7516904	-44.97806	2964.3	new insertion of heat probe
31.01.2007	15:51:06	14.7516915	-44.978063	2964.3	3343 C
31.01.2007	15:54:16	14.7516932	-44.978061	2964.4	fluif probe from second smaller black smoker with 343 C
31.01.2007	15:54:33	14.7516934	-44.978061	2964.4	probe no. 255#3
31.01.2007	15:57:35	14.7516949	-44.97806	2964.4	fluid bottle No. 1
31.01.2007	16:01:16	14.7516974	-44.978059	2964.4	end of fluid probe
31.01.2007	16:04:40	14.7516987	-44.978064	2964.4	taking a second fluid probe 255#4 same smoker major D1
31.01.2007	16:19:17	14.7516997	-44.978066	2964.4	helium probe 255#5
31.01.2007	16:27:58	14.7516924	-44.978065	2964.5	of helium tube
31.01.2007	16:33:33	14.7516844	-44.978068	2964.5	helium tube probably not completely closed or over turned valve
31.01.2007	16:41:16	14.7516963	-44.978073	2964.6	sample of small smoker 255#6 in left bio-box
31.01.2007	16:41:39	14.7516951	-44.978073	2964.6	here
31.01.2007	16:44:56	14.7516992	-44.978076	2964.6	second rock sample 255#7 also in left bio box, fotos

31.01.2007	16:47:57	14.7516961	-44.978068	2964.6	sample 255#7 may be lost, new rock sample 255#8
31.01.2007	16:57:27	14.7516989	-44.978	2963.1	survey of site B
31.01.2007	17:03:35	14.7516878	-44.978074	2964.2	place a new MARKER No. 24, written in a cirkle, marker has refecting foil and a brick as weight, next to the old marker
31.01.2007	17:08:22	14.7516764	-44.978073	2965.4	tour counterclockwise around site B
31.01.2007	17:09:36	14.7516804	-44.978006	2964.1	on the roundtrip
31.01.2007	17:13:50	14.7516914	-44.978088	2964.5	site b is a crater with a wall around and about five black smoking holes in the center
31.01.2007	17:15:54	14.7516394	-44.978082	2964.8	we go to Irina 1
31.01.2007	17:16:08	14.751611	-44.978076	2965.7	rock, outcrop in sight
31.01.2007	17:24:15	14.7513616	-44.977854	2949.0	Marker found
31.01.2007	17:30:05	14.7512488	-44.977818	2945.5	AT Irina five black smoking holes in center of crater
31.01.2007	17:30:49	14.7512862	-44.9778	2944.3	The black smoking holes are clearly separated from each other,
31.01.2007	17:41:02	14.7513254	-44.977847	2948.2	nothing written on the marker, marker overgrown with biological material.
31.01.2007	17:41:11	14.751325	-44.977847	2948.2	stopping in front the marker
31.01.2007	17:41:39	14.7513246	-44.977847	2948.2	here: rock sample No. 255#9
31.01.2007	17:49:34	14.7513252	-44.977842	2948.2	of rock sample 255#9
31.01.2007	17:50:53	14.7513289	-44.977847	2948.6	rock sample 255#9 in right bio-box
31.01.2007	17:55:23	14.7513288	-44.977847	2948.7	probe of bacteria mat at marker with slurp gun: Sample No. 255#10, in slurp gun filter/port No. RED
31.01.2007	17:58:25	14.751327	-44.977845	2948.1	slurpimg the marker
31.01.2007	17:58:43	14.7513273	-44.977846	2948.1	maker turn out to be MARKER IRINA
31.01.2007	18:00:20	14.7513272	-44.977846	2948.1	from slurping
31.01.2007	18:08:54	14.7513293	-44.977854	2948.1	rping also the sediment between the rocks
31.01.2007	18:16:39	14.7512606	-44.977784	2945.4	trip around Irina clockwise
31.01.2007	18:27:49	14.7512572	-44.97786	2946.2	temperature measyremeasurement with 8-channel Probe Uni-Bremen No.255#11
31.01.2007	18:31:21	14.7512581	-44.977858	2946.1	heat probe inserted
31.01.2007	18:31:28	14.751258	-44.977858	2946.1	re-inserted
31.01.2007	18:31:49	14.7512581	-44.977858	2946.1	small entry hole, difficult to insert probe
31.01.2007	18:33:48	14.7512566	-44.977857	2946.1	again, heat probe re-inserted
31.01.2007	18:35:24	14.7512569	-44.977857	2946.1	temperature measurement not very successful
31.01.2007	18:44:02	14.7512272	-44.977772	2944.7	moving around at Irina
31.01.2007	18:56:54	14.7512107	-44.977802	2946.6	after short seeking back at the small smoker in Irina
31.01.2007	18:57:36	14.7512104	-44.977802	2946.8	major 2, fluid sample 255#12
31.01.2007	18:59:59	14.7512505	-44.977842	2946.7	taking the fluid sample
31.01.2007	19:02:48	14.7512513	-44.97784	2946.7	with marker Irina in background
31.01.2007	19:06:59	14.7512514	-44.97784	2946.6	FrameGrab
31.01.2007	19:07:24	14.7512515	-44.977839	2946.6	second fluid sample with major 3, 255#13
31.01.2007	19:10:01	14.751252	-44.977839	2946.5	nozzle inserted
31.01.2007	19:14:03	14.7512533	-44.977836	2946.6	some shrimps in front of smoker
31.01.2007	19:18:15	14.7512548	-44.977834	2946.5	of bacteria mat
31.01.2007	19:22:15	14.7512559	-44.977833	2946.6	temperature measurement at the same smoker as fluid sample
31.01.2007	19:22:40	14.7512551	-44.977833	2946.5	temperature measurement with 8-channel heat probe 255#14
31.01.2007	19:28:59	14.7512564	-44.977831	2946.5	temperature lance reinserted in other hole
31.01.2007	19:30:44	14.7512564	-44.97783	2946.4	temperature measurement difficult
31.01.2007	19:41:54	14.7512069	-44.977838	2948.5	leaving site Irina, moving to Anna Louise

31.01.2007	19:43:40	14.7511806	-44.977808	2947.0	searching for the Temperature Morring bz sonar
31.01.2007	19:44:40	14.7511988	-44.97773	2943.8	locating the MORRING
31.01.2007	19:46:24	14.7511411	-44.977685	2941.2	nomat the mOOring
31.01.2007	19:48:09	14.7511387	-44.977625	2937.4	from the moorings weight
31.01.2007	19:50:20	14.751132	-44.977612	2940.3	marker in sight, foto of marker
31.01.2007	19:50:50	14.7511162	-44.977601	2939.6	Marker M5
31.01.2007	19:52:06	14.7510633	-44.977558	2938.3	different smokers
31.01.2007	19:53:45	14.7510579	-44.977519	2936.3	mussel bed
31.01.2007	19:53:53	14.7510564	-44.977517	2936.2	mostly, dead mussels
31.01.2007	19:54:14	14.7510872	-44.977533	2936.3	anoth marker in sight but not yet identified
31.01.2007	19:56:16	14.7510969	-44.977523	2936.5	a lot of smokers and a mussel field, fotos
31.01.2007	19:57:40	14.7511044	-44.977515	2935.6	a down burned marker of cruise M64/2
31.01.2007	20:05:44	14.751156	-44.97753	2937.0	taking a turn aroun of Anna Louise
31.01.2007	20:08:48	14.7511551	-44.977588	2938.4	Marker M5 also at Anna Louise
31.01.2007	20:09:04	14.7511435	-44.977591	2938.2	The bruned out marker may be Marker MD
31.01.2007	20:12:20	14.7511305	-44.977495	2935.5	of mussel bed Anna Louise
31.01.2007	20:19:10	14.7510754	-44.977579	2936.3	temperature measurement 255#15 8-channel
31.01.2007	20:23:15	14.751084	-44.977578	2936.4	nozzle of temp/probe inserted
31.01.2007	20:24:18	14.751084	-44.977578	2936.4	of crab in fron of smoker
31.01.2007	20:24:40	14.7510839	-44.977578	2936.4	T = 335 C
31.01.2007	20:25:30	14.7510836	-44.977577	2936.4	horizontal temperature measurement on same smoker
31.01.2007	20:28:30	14.7510841	-44.977577	2936.5	horiz. T-Probe 255#16
31.01.2007	20:30:41	14.751084	-44.977576	2936.4	starting fluid sampling at Anna Louise
31.01.2007	20:31:36	14.7510839	-44.977576	2936.5	still horiz. Temp-Measurment
31.01.2007	20:33:20	14.7510834	-44.977577	2936.5	final end of temperature measurements
31.01.2007	20:33:31	14.7510819	-44.977579	2936.6	NOW starting fluid sampling
31.01.2007	20:41:48	14.751075	-44.97757	2935.7	first fluid sample with major 4, 255 #17
31.01.2007	20:55:20	14.7510743	-44.977571	2936.1	253-18: Major 2, snorkel broken before sampling
31.01.2007	20:58:57	14.7511197	-44.977719	2941.2	back at the mooring
31.01.2007	21:00:20	14.7510988	-44.977732	2940.7	of glass spheres
31.01.2007	21:05:08	14.7511639	-44.977733	2944.3	going back to Anna Lousie mussel field
31.01.2007	21:08:30	14.7510738	-44.977631	2938.7	of marker M5
31.01.2007	21:09:34	14.751029	-44.977648	2940.7	of a TV-Grab
31.01.2007	21:17:52	14.7511254	-44.977671	3118.9	moving aeound on site Anna Louise,
31.01.2007	21:18:10	14.7511456	-44.977694	2938.9	a lot of dead mussels and broken mussel shells
31.01.2007	21:25:55	14.751513	-44.977509	2949.7	strt of recovery of mooring
31.01.2007	21:35:15	14.751266	-44.977681	2943.8	of mooring recovery
31.01.2007	21:43:03	14.7512433	-44.977685	2942.4	of a small piece of yellow rock

259-ROV
J2-258, 01.02.2007

Date	UTC	Lat	Lon	Depth	Comment
01.02.2007	10:25:19	14.750181	-44.978064	2.6	J2-258 Predive
01.02.2007	14:05:45	14.752768	-44.979132	3020.6	positioning chamber for in situ mussel experiments near Irina II main structure
01.02.2007	14:31:28	14.752806	-44.979106	3022.2	collecting mussels from near main structure Irina II for chamber
01.02.2007	14:50:54	14.752770	-44.979219	3021.7	collection of mussels for chamber experiment 258-1
01.02.2007	14:53:02	14.752769	-44.979219	3021.5	collection of temperature loggers at the musselpatch at Irina II
01.02.2007	14:56:22	14.752767	-44.979220	3021.6	temperatureloggers in biobox right
01.02.2007	14:58:11	14.752765	-44.979220	3021.7	collecting t-logger #5

01.02.2007	14:58:36	14.752765	-44.979220	3021.6	collecting t-logger#1
01.02.2007	15:02:07	14.752762	-44.979215	3021.5	collecting t-logger #2
01.02.2007	15:03:37	14.752762	-44.979215	3021.0	collecting t-logger #3
01.02.2007	15:07:44	14.752762	-44.979214	3021.0	collecting t-logger #7
01.02.2007	15:14:58	14.752767	-44.979206	3021.2	collecting t-logger #9
01.02.2007	15:15:00	14.752767	-44.979206	3021.2	FrameGrab
01.02.2007	15:21:24	14.752765	-44.979210	3021.2	Placed marker number 29
01.02.2007	15:21:50	14.752765	-44.979210	3021.2	Removing temp logger 0 (replaced by marker 29)
01.02.2007	15:23:36	14.752766	-44.979210	3021.2	temp logger 0 being placed in the right biobox
01.02.2007	15:25:27	14.752766	-44.979209	3021.2	shimmering water at the t-logger mussel bed
01.02.2007	15:43:55	14.752704	-44.979178	3019.8	8 channel T._Logger 296 in mussel bed shimmering water
01.02.2007	15:44:44	14.752704	-44.979178	3019.8	picture taken
01.02.2007	15:45:48	14.752704	-44.979178	3019.8	new marker at the same position Nr. 28
01.02.2007	15:45:59	14.752704	-44.979178	3019.8	picture taken
01.02.2007	15:46:58	14.752704	-44.979177	3019.8	recovery of T.-Logger Nr 256
01.02.2007	15:47:25	14.752704	-44.979177	3019.7	mussel bed destroyed
01.02.2007	15:51:18	14.752704	-44.979176	3019.8	picture
01.02.2007	16:01:06	14.752705	-44.979176	3019.8	data logger 297
01.02.2007	16:01:31	14.752705	-44.979176	3019.8	removed
01.02.2007	16:03:34	14.752707	-44.979184	3020.9	data logger 297 in left biobox
01.02.2007	16:10:56	14.752706	-44.979185	3020.8	259-1 mussel sample at T.-Logger 297
01.02.2007	16:12:40	14.752705	-44.979185	3021.0	transit to Profiler near marker Anya
01.02.2007	16:14:20	14.752705	-44.979185	3020.8	picture taken main strukture
01.02.2007	16:14:40	14.752708	-44.979193	3021.4	picture
01.02.2007	16:16:17	14.752802	-44.979421	3032.3	325 degrees
01.02.2007	16:16:57	14.752829	-44.979486	3038.0	Marker Anya
01.02.2007	16:20:59	14.752852	-44.979522	3039.9	small white mat
01.02.2007	16:22:25	14.752873	-44.979556	3038.3	Marker 23
01.02.2007	16:23:09	14.752889	-44.979493	3037.7	picture
01.02.2007	16:26:35	14.752883	-44.979539	3038.2	picture of the mat whre the profiler was placed before - -pushcore shall be taken
01.02.2007	16:30:27	14.752885	-44.979538	3038.0	259-2 Temperature measurement besides the mat
01.02.2007	16:30:38	14.752885	-44.979538	3038.0	picutures
01.02.2007	16:36:27	14.752881	-44.979537	3038.0	24 grad max.
01.02.2007	16:36:59	14.752881	-44.979537	3038.0	259-3 temperature measurementat the rim of the mat
01.02.2007	16:37:21	14.752881	-44.979537	3038.1	picture
01.02.2007	16:41:37	14.752879	-44.979535	3038.1	23 degrees
01.02.2007	16:42:35	14.752878	-44.979535	3038.1	259-4 Temperature measurement within the mat picture taken
01.02.2007	16:43:38	14.752878	-44.979535	3038.1	picture taken
01.02.2007	16:47:51	14.752878	-44.979534	3038.2	22.88 degrees measured
01.02.2007	16:48:57	14.752878	-44.979533	3038.2	259-5 pushcore
01.02.2007	16:49:04	14.752878	-44.979533	3038.1	pictures
01.02.2007	16:49:53	14.752878	-44.979534	3038.1	placed within the mat
01.02.2007	16:50:02	14.752878	-44.979534	3038.1	pictures
01.02.2007	16:50:32	14.752878	-44.979534	3038.1	white colored
01.02.2007	16:50:51	14.752878	-44.979534	3038.2	successful
01.02.2007	16:51:33	14.752879	-44.979535	3038.1	259-6 pushcore 2 (the second from the left)
01.02.2007	16:52:23	14.752879	-44.979534	3038.1	placed within the mat
01.02.2007	17:05:41	14.752775	-44.979234	3022.0	transit to Irina II
01.02.2007	17:12:57	14.752777	-44.979201	3021.0	survey around the Irina II structure
01.02.2007	17:23:05	14.752754	-44.979203	3020.7	photo of potential sampling area for diffuse fluids

01.02.2007	17:29:32	14.752764	-44.979187	3020.1	measuring temperature of the potential sampling area of diffuse fluids at Iriina II
01.02.2007	17:31:08	14.752764	-44.979187	3019.9	temperature measurement 259-7
01.02.2007	17:31:42	14.752764	-44.979187	3020.0	photo of Irina II diffuse fluids site
01.02.2007	17:36:41	14.752765	-44.979187	3019.8	Rmicaris exoculata assemblage t2=2-13 degrees
01.02.2007	17:37:43	14.752765	-44.979187	3020.2	t1= 15-23 degrees (sitting on sulfide structure
01.02.2007	17:38:08	14.752765	-44.979187	3020.1	all other t= sensors measuring 4 degrees
01.02.2007	17:38:26	14.752765	-44.979187	3019.8	T2 = max temperature 19 degrees
01.02.2007	17:43:13	14.752764	-44.979187	3020.3	259-8 taking low temperature fluid sample of main Irina II structure (major #1)
01.02.2007	17:46:23	14.752764	-44.979187	3020.3	stopped sampling of diffuse fluids
01.02.2007	17:47:11	14.752764	-44.979187	3020.2	taking second major (#) of diffuse fluids at main structure Irina II
01.02.2007	17:49:43	14.752764	-44.979187	3020.2	second major number 2; 259-9
01.02.2007	17:55:16	14.752764	-44.979186	3020.3	finished fluid sampling with major 2
01.02.2007	17:59:34	14.752805	-44.979160	3020.7	transit to the chamber
01.02.2007	18:02:58	14.752810	-44.979103	3022.4	checking chamber; syringes working
01.02.2007	18:09:36	14.752821	-44.979122	3022.6	openening chamber
01.02.2007	18:10:35	14.752818	-44.979123	3022.7	refresh the water in the chamber
01.02.2007	18:10:59	14.752818	-44.979123	3022.6	slurp out dirt
01.02.2007	18:17:26	14.752815	-44.979124	3022.7	closing lid of chamber after refilled with fresh ambient water
01.02.2007	18:19:35	14.752819	-44.979132	3022.4	transit to Quest
01.02.2007	18:25:58	14.752908	-44.979380	3030.8	arrived at Quest
01.02.2007	18:29:31	14.752996	-44.979516	3036.0	not arraived at Quest but north of Irina II where live mussels are observed
01.02.2007	18:34:56	14.753190	-44.979747	3034.6	reached OBT
01.02.2007	18:46:31	14.753506	-44.979898	3037.1	found newspapers
01.02.2007	19:02:46	14.753747	-44.980177	3041.8	smooth sediment
01.02.2007	19:11:37	14.753274	-44.980185	3038.6	rock fragment patch covered with white stuff
01.02.2007	19:14:23	14.753440	-44.980211	3040.6	big rock fragments
01.02.2007	19:14:49	14.753385	-44.980204	3039.5	fragmented rock outcrop
01.02.2007	19:15:27	14.753285	-44.980191	3039.5	mussels
01.02.2007	19:15:46	14.753280	-44.980187	3040.1	sitting within rocks fragments
01.02.2007	19:24:55	14.753156	-44.980311	3041.2	baited trap
01.02.2007	19:26:16	14.753190	-44.980341	3040.2	coarse sediment with white fragments
01.02.2007	19:27:10	14.753189	-44.980382	3038.9	white rock outcrop
01.02.2007	19:27:56	14.753177	-44.980465	3034.1	black colored coarse sediment
01.02.2007	19:29:06	14.753183	-44.980493	3032.4	TV grab
01.02.2007	19:29:26	14.753184	-44.980495	3032.5	big hole
01.02.2007	19:37:00	14.753656	-44.980537	3031.5	weight
01.02.2007	19:38:22	14.753680	-44.980628	3028.0	rock outcrop
01.02.2007	19:40:19	14.753492	-44.980630	3027.5	rock outcrop fragments of different size boulder
01.02.2007	19:40:29	14.753464	-44.980632	3027.3	sediment surface
01.02.2007	19:43:32	14.753444	-44.980487	3034.6	fragmented rock outcrop
01.02.2007	19:46:26	14.753102	-44.980477	3034.6	T.-Loggers Quest 3035m
01.02.2007	19:48:45	14.753117	-44.980525	3033.1	red colored coarse sediment
01.02.2007	19:54:19	14.753032	-44.980480	3032.3	shimmering water
01.02.2007	20:02:04	14.752980	-44.980623	3027.1	mussel patch near the crater
01.02.2007	20:03:24	14.753032	-44.980587	3029.2	waiting for MEDEA
01.02.2007	20:06:24	14.752937	-44.980587	3024.5	crater at 3025m
01.02.2007	20:17:33	14.752832	-44.980630	3023.1	moving around on site Quest
01.02.2007	20:19:05	14.752874	-44.980698	3024.8	several fotos
01.02.2007	20:34:52	14.752899	-44.980537	3025.5	arriving at the mussel field with temperature loggers on site Quest
01.02.2007	20:36:01	14.752907	-44.980554	3025.4	fotos of smokers

01.02.2007	20:36:59	14.752918	-44.980560	3025.6	tour around site Quest
01.02.2007	20:38:50	14.752948	-44.980620	3025.0	fotos
01.02.2007	20:45:00	14.752849	-44.980559	3024.5	mussels in patches
01.02.2007	20:45:12	14.752837	-44.980575	3023.6	mussel patches arraged in circles and ovals
01.02.2007	20:47:09	14.752837	-44.980636	3021.7	dust clouds
01.02.2007	20:48:50	14.752855	-44.980583	3023.2	white mat with some mussels
01.02.2007	20:50:53	14.752890	-44.980539	3025.4	mussel patches around central smoker arrangement
01.02.2007	20:51:59	14.752895	-44.980541	3025.5	fotos from mussels
01.02.2007	21:05:07	14.752892	-44.980547	3025.2	jill takes over protocol
01.02.2007	21:06:49	14.752891	-44.980547	3025.2	Slurping sample number 10
01.02.2007	21:09:20	14.752890	-44.980548	3025.2	crab in slurp!!!
01.02.2007	21:30:53	14.752890	-44.980548	3025.2	slurp is clogged
01.02.2007	21:32:14	14.752891	-44.980548	3025.2	sample 11 orange chamber (slurp sample) Quest
01.02.2007	21:38:43	14.752890	-44.980546	3025.1	slurp gun blocked by mussels
01.02.2007	21:42:42	14.752890	-44.980545	3025.1	collecting mussels with net number 1 (258-13)
01.02.2007	21:43:38	14.752890	-44.980546	3025.1	mussel collection not 258-13 but 258-12
01.02.2007	21:54:59	14.752896	-44.980547	3025.2	placing net sample (12) onto the porch
01.02.2007	21:57:54	14.752896	-44.980548	3025.2	temperature measurement sample 259/13
01.02.2007	22:03:36	14.752894	-44.980546	3025.2	its hot!!! 150 deg c
01.02.2007	22:16:10	14.752887	-44.980505	3026.2	sediment/rocky seafloor patches of white mats and mussels
01.02.2007	22:21:20	14.752897	-44.980548	3025.2	placing marker 27 at the mussel bed where sample number 12 was taken. This is the mussel bed with many many seastars
01.02.2007	22:29:14	14.752915	-44.980469	3026.6	quest temp loggers in sight
01.02.2007	22:31:54	14.753012	-44.980429	3030.6	heading to marker 19 to take pushcores
01.02.2007	22:59:57	14.752986	-44.980483	3030.0	white furry mat on rocks like the mat sampled during 257
01.02.2007	23:01:54	14.752986	-44.980483	3030.1	pushcore third from the left 259 ROV 14
01.02.2007	23:04:40	14.752986	-44.980483	3030.0	tried to sample pushcore seafloor too rocky
01.02.2007	23:07:28	14.752986	-44.980483	3030.0	sample 14 not taken yet seafloor is rock
01.02.2007	23:09:11	14.753028	-44.980489	3031.7	moving up the hill to another white patch
01.02.2007	23:14:44	14.752971	-44.980547	3224.7	have found a white patch that looks softer we'll try a pushcore here
01.02.2007	23:23:59	14.752979	-44.980548	3224.3	pushcore sample 14 is taken
01.02.2007	23:39:40	14.752983	-44.980538	3223.9	temperature measurement near bacterial mat - sample 259-15
01.02.2007	23:43:46	14.752982	-44.980532	3216.6	sample 259-16 temp measurement next to push core hole
02.02.2007	23:47:11	14.752978	-44.980521	3215.9	temp measurement 17 degC
02.02.2007	00:02:42	14.752977	-44.980506	3214.4	temp measurement sample 259-17 just outside of white mat 46 deg C
02.02.2007	00:04:52	14.752986	-44.980501	3223.4	48 deg c
02.02.2007	00:10:04	14.752986	-44.980495	3220.0	sample 259-18 push core 4th from left
02.02.2007	00:11:02	14.752986	-44.980495	3220.0	push core (sample 18) looks brown-red
02.02.2007	00:18:18	14.752985	-44.980484	3222.8	sample 259-19 temperature
02.02.2007	00:19:45	14.752984	-44.980484	3219.1	8 deg c
02.02.2007	00:32:46	14.752974	-44.980481	3224.6	push core sample number 21 far-right push core
02.02.2007	00:35:00	14.752975	-44.980481	3212.8	push core sample 21 discarded
02.02.2007	00:39:34	14.752989	-44.980489	3222.9	sample 21 push core far right taken
02.02.2007	00:46:55	14.752987	-44.980489	3225.3	temperature measurement #22 5.4C
02.02.2007	00:54:34	14.752891	-44.980507	3024.7	moving on to smoking crater to take fluid samples
02.02.2007	00:55:26	14.752917	-44.980512	3025.1	found small chimney for fluid sampling

02.02.2007	00:59:03	14.752908	-44.980538	3024.0	sample 23 temp measurement quest small chimney
02.02.2007	01:02:36	14.752907	-44.980540	3024.0	340 deg c
02.02.2007	01:03:30	14.752906	-44.980541	3024.0	347.4 deg c
02.02.2007	01:12:56	14.752907	-44.980544	3024.0	sample number 24 major at small chimney quest major number 3
02.02.2007	01:12:57	14.752907	-44.980544	3024.0	FrameGrab
02.02.2007	01:22:39	14.752908	-44.980542	3024.0	sample number 25 major D1 small chimney quest
02.02.2007	01:29:28	14.752909	-44.980542	3023.9	picture of black smoker
02.02.2007	01:38:55	14.752760	-44.980554	3020.6	nice crack with bacterial mats or minerals
02.02.2007	01:39:22	14.752761	-44.980565	3020.2	stone with backterial mat (photo)
02.02.2007	01:42:39	14.752774	-44.980702	3018.7	going back to Irina II
02.02.2007	01:43:57	14.752778	-44.980757	3018.5	yellow stuff on seafloor (pilot camera)
02.02.2007	01:46:41	14.752520	-44.980758	3018.9	soft sediment seafloor
02.02.2007	01:49:12	14.752725	-44.980842	3015.5	nice seafloor
02.02.2007	01:49:38	14.752650	-44.980823	3014.6	rocky? seafloor
02.02.2007	01:51:20	14.752633	-44.980556	3017.8	pillow like seafloor structures
02.02.2007	01:52:07	14.752642	-44.980554	3017.7	pictures of old black smoker?
02.02.2007	01:54:30	14.752643	-44.980554	3017.6	inactive black smokers
02.02.2007	02:08:44	14.752686	-44.979980	3038.9	going uphill rocky seafloor
02.02.2007	02:12:32	14.752602	-44.979685	3047.3	sandy seafloor
02.02.2007	02:14:46	14.752596	-44.979670	3047.5	white pebbles (shells)
02.02.2007	02:17:49	14.752781	-44.979427	3040.6	bacterial mats whitish
02.02.2007	02:23:50	14.752807	-44.979139	3024.7	fish
02.02.2007	02:26:49	14.752807	-44.979138	3024.7	marker Irina II microsmoke
02.02.2007	02:31:04	14.752776	-44.979039	3021.4	chamber found
02.02.2007	02:35:45	14.752774	-44.979038	3021.4	chamber service slurping ??
02.02.2007	02:37:50	14.752773	-44.979036	3021.4	finished chamber service
02.02.2007	02:42:40	14.752713	-44.979065	3020.3	station 259-26: slurping shrimps
02.02.2007	03:03:19	14.752721	-44.979091	3019.9	going to fluid sampling site
02.02.2007	03:10:44	14.752715	-44.979094	3019.3	ROV 259-27 major no4
02.02.2007	03:25:53	14.752780	-44.979129	3020.4	at beehive structure
02.02.2007	03:31:56	14.752758	-44.979144	3018.2	temperature probe 259-27 at beehive structure
02.02.2007	03:36:02	14.752759	-44.979144	3018.1	temp probe finished: max 280 deg
02.02.2007	03:44:33	14.752759	-44.979143	3018.1	ROV 259-28: major no4 (finally) at location of temp probe
02.02.2007	03:55:31	14.752760	-44.979143	3018.1	major finished
02.02.2007	04:01:28	14.752759	-44.979142	3018.1	ROV 259-29: major no D2 same location
02.02.2007	04:05:10	14.752760	-44.979142	3018.1	major damaged - not taken!
02.02.2007	04:10:10	14.752825	-44.979079	3021.2	going back to incubation chamber
02.02.2007	04:13:13	14.752826	-44.979080	3021.3	at chamber: syringes fired
02.02.2007	04:18:25	14.752826	-44.979082	3021.2	correction: only 2 out of 5 syringes have fired
02.02.2007	04:32:55	14.752840	-44.979084	3022.2	going to elevator
02.02.2007	05:20:02	14.752378	-44.977910	2992.6	elevator in sight
02.02.2007	05:22:50	14.752448	-44.977864	2993.5	approaching elevator
02.02.2007	05:28:25	14.752475	-44.977829	3105.9	putting chamber on elevator
02.02.2007	05:32:10	14.752473	-44.977832	3106.0	fixing chamber on elevator
02.02.2007	05:36:22	14.752461	-44.977854	2994.2	chamber fixed on elevator
02.02.2007	05:36:35	14.752461	-44.977854	2994.1	taking beacon from elevator
02.02.2007	05:56:51	14.752478	-44.977841	2994.3	putting clams in bio box
02.02.2007	06:07:49	14.752476	-44.977840	3145.6	closing bio box
02.02.2007	06:08:36	14.752475	-44.977840	2994.2	going again around elevator
02.02.2007	06:14:17	14.752480	-44.977819	3184.0	placing weights on ROV
02.02.2007	06:15:01	14.752480	-44.977819	3184.0	putting majors on to elevator
02.02.2007	06:40:40	14.752513	-44.977984	2995.8	deep sea snow

02.02.2007	07:08:35	14.752880	-44.979017	3022.0	at Irina II
02.02.2007	07:26:52	14.753246	-44.979622	3034.9	current meter in sight
02.02.2007	07:28:12	14.753245	-44.979627	3034.9	OBP OBT in sight
02.02.2007	07:31:37	14.753236	-44.979591	3035.2	Homer 15 on OBT answers
02.02.2007	08:10:12	14.752829	-44.979110	3022.2	drop bait trap
02.02.2007	08:11:17	14.752829	-44.979110	3022.2	bait trap next to marker 22
02.02.2007	08:21:54	14.752719	-44.979095	3019.4	bait trap set SE of IR2 microsmoker
02.02.2007	08:28:10	14.752722	-44.979105	3019.8	camera survez IR2 micro smoker
02.02.2007	09:34:21	14.752864	-44.979135	3020.8	current vanes stand on nortth side of structure
02.02.2007	09:46:21	14.753156	-44.979539	3036.5	going to obt site
02.02.2007	09:52:51	14.753204	-44.979717	3036.7	arriving at obt position
02.02.2007	09:59:54	14.753259	-44.979769	3035.9	picking up obt
02.02.2007	10:04:46	14.753108	-44.979655	3038.1	end of dive going back to surface

263-ROV
J2-259, 02.-03.02.2007

Date	UTC	Lat	Lon	Depth	Comment
02.02.2007	23:36:35	14.666646	-45.000019	2.7	J2-259 Pre-dive
03.02.2007	23:36:50	14.666646	-45.000019	2.7	#NAME?
03.02.2007	01:28:24	14.667462	-44.999769	3037.2	reached the seafloor
03.02.2007	02:06:58	14.753206	-44.979797	3035.9	obp im sight
03.02.2007	02:11:01	14.753226	-44.979802	3035.2	place for obt deployment reached
03.02.2007	02:12:19	14.753226	-44.979802	3035.2	obt placed on seafloor
03.02.2007	02:37:14	14.753163	-44.979766	3036.0	OBT installed on old position
03.02.2007	02:42:09	14.753361	-44.979656	3032.1	going to the elevator
03.02.2007	03:47:33	14.754313	-44.977728	3024.4	arriving at the elevator
03.02.2007	04:07:59	14.75433	-44.977608	3022.9	picking up profiler on porch of Rov
03.02.2007	04:40:20	14.753139	-44.978861	3018.3	moving from the elevator to Irina 2 mussel collection
03.02.2007	04:46:20	14.753096	-44.979199	3030.0	still moving to target - booring
03.02.2007	04:53:52	14.752981	-44.979391	3035.1	marker no. ?? in sight
03.02.2007	04:53:57	14.752919	-44.979396	3035.9	mussle field
03.02.2007	04:57:33	14.753017	-44.979399	3034.6	mussle patch in a fissure
03.02.2007	05:21:03	14.753019	-44.979398	3034.3	deploy profiles on mussel patch
03.02.2007	05:26:46	14.753016	-44.979384	3033.8	profiler has been starterd
03.02.2007	05:43:51	14.752907	-44.979555	3038.0	ROV263-1 taking 2 Pushcordes at first profiler deployment site
03.02.2007	05:52:04	14.752917	-44.979553	3037.9	push-core sample 260rov#1
03.02.2007	05:53:37	14.752916	-44.979547	3037.9	push core sample was 263rov#1
03.02.2007	05:53:54	14.752917	-44.979547	3037.9	next push core on same site 263rov#2
03.02.2007	05:55:15	14.752913	-44.979538	3037.9	hans takes push core sample 263rov#3
03.02.2007	05:57:28	14.752848	-44.979545	3040.7	heading to Quest (115m)
03.02.2007	06:16:23	14.752869	-44.980457	3028.4	rock fragments
03.02.2007	06:17:01	14.752866	-44.980532	3026.0	white mat
03.02.2007	06:19:48	14.752867	-44.980575	3024.2	white rock fragments
03.02.2007	06:20:55	14.752876	-44.980599	3021.9	Quest site coming from south
03.02.2007	06:21:04	14.752897	-44.980591	3023.0	mussel field
03.02.2007	06:27:15	14.752965	-44.980612	3024.3	263=4 helium sample
03.02.2007	06:29:39	14.752963	-44.980612	3024.3	picture
03.02.2007	06:42:20	14.75297	-44.980614	3024.4	same smoker as 259 ROV fluid sample
03.02.2007	06:49:30	14.752916	-44.980521	3025.5	marker 27 mussel patch
03.02.2007	06:53:15	14.752916	-44.98052	3025.5	263Rov5 temperature measurements
03.02.2007	07:01:18	14.752914	-44.980524	3025.5	45 degrees

03.02.2007	07:12:07	14.752913	-44.980528	3025.5	263-6 Temperature Measurement diffuse outflow at mussel patch site for Mirjam's Majors
03.02.2007	07:16:02	14.752913	-44.980529	3025.5	picture
03.02.2007	07:16:20	14.752913	-44.980529	3025.6	94 degrees
03.02.2007	07:19:02	14.752914	-44.980528	3025.6	263-7 fluid sampling at the same spot
03.02.2007	07:21:57	14.752914	-44.980528	3025.6	major 4
03.02.2007	07:26:04	14.752911	-44.980529	3025.6	picture
03.02.2007	07:33:00	14.752912	-44.980529	3025.6	number 4 not triggered
03.02.2007	07:34:52	14.752912	-44.980528	3025.7	colelctong other major for fluid sampling
03.02.2007	07:39:43	14.752912	-44.980528	3025.8	major #2 259-8 collecting diffuse fluids
03.02.2007	07:48:55	14.752912	-44.98053	3025.8	collecting major number 3 station number 259-9
03.02.2007	07:54:51	14.75291	-44.980531	3025.7	mussel deposit at the same spot
03.02.2007	07:59:57	14.752909	-44.98053	3025.7	collecting rocks as weights for baskets with mussels
03.02.2007	08:06:55	14.752904	-44.980525	3025.8	mussel field surrounded by red iron oxides
03.02.2007	08:10:32	14.752898	-44.980526	3025.6	replacing marker #27 into mussel box
03.02.2007	08:14:49	14.752904	-44.980529	3025.7	pictures taken
03.02.2007	08:20:56	14.7529	-44.980527	3025.6	replacement of the mussel boxes
03.02.2007	08:23:02	14.752899	-44.980527	3025.5	picture
03.02.2007	08:27:41	14.752928	-44.98049	3027.2	transit to the profiler position
03.02.2007	08:42:21	14.752985	-44.979984	3045.4	sediment
03.02.2007	08:43:14	14.752981	-44.979908	3045.0	rock fragment
03.02.2007	08:47:36	14.752963	-44.979724	3042.2	white mussel shells
03.02.2007	08:49:52	14.752953	-44.979664	3040.8	masiive rock fragment outcrop
03.02.2007	08:52:55	14.75294	-44.979577	3037.7	white mat
03.02.2007	08:53:02	14.752939	-44.979571	3037.5	profiler
03.02.2007	08:55:57	14.75292	-44.979426	3036.4	photo mosaiking around the crack where the profiler sits
03.02.2007	08:57:19	14.752919	-44.979421	3036.2	diffuse outflow
03.02.2007	09:05:01	14.752966	-44.97937	3034.2	start of photo mosaiking
03.02.2007	09:06:12	14.752967	-44.979371	3034.3	place surrounded by red talus
03.02.2007	09:14:44	14.753	-44.979398	3035.4	two series from the south
03.02.2007	09:19:28	14.753005	-44.979379	3034.2	photo mosaiking from the other side (south) before it was fromNE
03.02.2007	09:22:39	14.752976	-44.979382	3035.1	lookimg at the sensors
03.02.2007	09:34:09	14.752972	-44.979375	3034.8	slurpen
03.02.2007	09:44:36	14.752989	-44.979481	3037.5	white mat with patch1 of very small mussels diffuse venting
03.02.2007	09:44:58	14.752984	-44.979464	3037.4	several mussel patches in this area
03.02.2007	09:45:09	14.752979	-44.979448	3037.1	around the profiler
03.02.2007	09:47:43	14.752976	-44.979373	3034.4	back at the profiler waiting for finish of the measurement
03.02.2007	10:10:11	14.752975	-44.979368	3034.4	sensors are moving
03.02.2007	10:14:25	14.752977	-44.979374	3034.7	recovery of the profiler
03.02.2007	10:15:45	14.752978	-44.979373	3034.6	picture of sensors
03.02.2007	10:18:38	14.75298	-44.979373	3034.6	263-10 fluid sampling Major 1
03.02.2007	10:23:09	14.752981	-44.979372	3034.7	at profiler position
03.02.2007	10:26:10	14.752982	-44.979372	3034.6	263-11 Temperature measurement
03.02.2007	10:29:44	14.752982	-44.979372	3034.7	temperature probe placed within the sediment below the shimmring water
03.02.2007	10:32:38	14.752982	-44.979372	3034.6	148 degrees celcigrade mx.
03.02.2007	10:34:56	14.752982	-44.979371	3034.6	263-12 mussel net
03.02.2007	10:54:05	14.752984	-44.979379	3035.4	Mussels in the box

267-ROV
J2-260, 04.02.2007

Date	UTC	Lat	Lon	Depth	Comment
04.02.2007	02:00:20	14.751886	-44.98001	3037.6	at seafloor
04.02.2007	02:03:32	14.751951	-44.979921	3039.4	begin ROV-267
04.02.2007	02:03:57	14.751942	-44.979931	3039.5	heading towards lost transponder
04.02.2007	02:16:03	14.752176	-44.979777	3041.7	marker (without number) found
04.02.2007	02:17:42	14.752851	-44.979506	3040.4	marker Anyas garden
04.02.2007	02:20:58	14.752976	-44.979464	3035.1	looking for a place for the chamber
04.02.2007	02:24:21	14.753011	-44.979453	3226.8	looking for a place for the chamber
04.02.2007	02:27:49	14.753032	-44.979436	3035.0	placing the chamber in Anyas garden
04.02.2007	02:29:12	14.753031	-44.979446	3035.1	opening chamber
04.02.2007	02:30:43	14.752969	-44.979443	3035.3	moving to a mussel bed
04.02.2007	02:34:57	14.752972	-44.979401	3033.8	taking some mussels with an arm to transfer them into the chamber; 267ROV/1
04.02.2007	02:35:56	14.752972	-44.979401	3033.8	only 2 or 3 mussels release and try again
04.02.2007	02:37:29	14.752972	-44.979401	3033.8	no new sampling number; it's 267/1
04.02.2007	02:40:25	14.753036	-44.979446	3035.4	moving back to chamber and place mussels inside
04.02.2007	02:43:43	14.753035	-44.979448	3035.2	water exchange in the chamber with the slurp gun
04.02.2007	02:45:17	14.753033	-44.979445	3035.1	flush through black filter
04.02.2007	02:48:01	14.753027	-44.979443	3035.2	closing the chamber
04.02.2007	02:54:26	14.75307	-44.979272	3031.2	looking for the lost transponder
04.02.2007	03:01:50	14.753263	-44.979092	3033.7	loosing one piece weight
04.02.2007	03:04:03	14.75335	-44.978977	3035.0	correction: it was a formerly placed weight on the ground; taking it up now
04.02.2007	03:10:24	14.753536	-44.97845	3019.1	still searching for the transponder
04.02.2007	03:18:09	14.75406	-44.97799	3027.9	the right arm is broken
04.02.2007	03:21:23	14.754127	-44.978053	3031.0	reaching the elevator
04.02.2007	03:24:21	14.754246	-44.977848	3027.4	looking noe precisely for the transponder
04.02.2007	03:26:32	14.75423	-44.977959	3031.2	only dark grey view
04.02.2007	03:28:27	14.754325	-44.977908	3029.7	plume clowd
04.02.2007	03:30:08	14.75439	-44.977885	3027.7	viewing transponder
04.02.2007	03:30:56	14.75441	-44.977825	3032.2	it's lying on rocks
04.02.2007	03:35:36	14.754387	-44.977806	3029.6	taking of some weight
04.02.2007	03:36:31	14.754394	-44.977808	3029.6	taking the transponder
04.02.2007	03:37:09	14.754395	-44.977809	3029.6	placing the transponder on the ROV
04.02.2007	03:41:00	14.754396	-44.977858	3028.1	moving to the elevator
04.02.2007	03:48:57	14.754173	-44.978007	3031.2	viewing elevator
04.02.2007	03:53:05	14.754133	-44.978104	3032.6	reaching elevator
04.02.2007	03:55:29	14.754128	-44.978105	3032.5	trying to transfer transponder to elvator
04.02.2007	04:16:44	14.754111	-44.978091	3031.2	transponder fixed on elevator
04.02.2007	04:26:21	14.754119	-44.978099	3030.9	trying to pick up the elevator
04.02.2007	04:34:34	14.754135	-44.978058	3032.0	cable mismatch in umbilical from medea??
04.02.2007	04:43:26	14.754092	-44.978123	3030.8	cable problem solved
04.02.2007	04:47:36	14.754121	-44.978099	3126.8	giving up to move the elevator
04.02.2007	04:50:47	14.754115	-44.978112	3229.0	picking up profiler from elevator
04.02.2007	05:02:41	14.754118	-44.978114	3219.9	jill takes over logging
04.02.2007	05:10:03	14.75411	-44.978111	3030.2	profiler on board; heading off
04.02.2007	05:56:29	14.753071	-44.979541	3036.9	lbl not working trying to find our position at anyas garden with markers
04.02.2007	06:14:19	14.752991	-44.979487	3035.8	found a nice mussel patch for the profiler; along a crack with patches of white mat in the surrounding area

04.02.2007	06:25:48	14.752981	-44.979483	3035.8	mussel patches too high for profiler; taking profiler back on board
04.02.2007	06:36:40	14.752959	-44.979488	3036.5	trying again with another mussel patch; putting lander down
04.02.2007	06:49:07	14.753014	-44.979446	3035.1	profiler started
04.02.2007	06:58:07	14.753009	-44.979442	3223.8	opening in situ chamber
04.02.2007	07:00:53	14.753007	-44.979443	3218.3	pilot watch change
04.02.2007	07:24:42	14.753043	-44.979445	3035.9	circulating water in the chamber
04.02.2007	07:30:10	14.753042	-44.979445	3035.9	closed the chamber; heading now to quest
04.02.2007	08:03:16	14.753039	-44.980401	3032.3	temperature loggers in sight
04.02.2007	08:14:57	14.753059	-44.98043	3031.9	photo documentation of temp loggers
04.02.2007	09:40:55	14.753037	-44.980436	3030.9	scoop net 3 at t -logger 289; store in starboard biobox
04.02.2007	09:45:42	14.753039	-44.98044	3031.0	sample 8: large round scoop net at t-logger 11
04.02.2007	09:45:42	14.753039	-44.98044	3031.0	FrameGrab
04.02.2007	09:53:31	14.753042	-44.980434	3031.4	largw scoop net = net 1
04.02.2007	10:04:47	14.753041	-44.980435	3031.5	net 1 goes into port biobox
04.02.2007	10:07:32	14.753033	-44.980429	3031.7	sample 9
04.02.2007	10:12:33	14.753018	-44.980427	3030.5	sample 9: t-lance at t-logger 17
04.02.2007	10:16:33	14.753018	-44.980427	3030.5	sample 10: T-measurement at t-logger 16; 3 degrees at tip (T1)
04.02.2007	10:21:40	14.75302	-44.980429	3031.0	sample 11: tlamce ar logger 13; max temp 3 degrees (T1 tip)
04.02.2007	10:25:33	14.753019	-44.980431	3030.5	sample 12: major 1 at t-logger 16
04.02.2007	10:42:24	14.753018	-44.98043	3030.4	sample13 scoop net 4 at t-logger 16
04.02.2007	10:46:57	14.75302	-44.980428	3031.5	sample 13 goes into starboard biobox
04.02.2007	10:57:48	14.753019	-44.980474	3217.6	sample 14: t-lance at logger 19; max T= 4 degrees
04.02.2007	11:00:52	14.753018	-44.980468	3223.9	sample 15: tlance at logger 18
04.02.2007	11:04:51	14.753021	-44.980442	3220.9	temperature probe; sample no. 15; 3 deg C.
04.02.2007	11:10:15	14.753021	-44.980427	3030.2	transit to Quest for push core sample
04.02.2007	11:16:44	14.752943	-44.980469	3025.8	push core taken; sample no. 16
04.02.2007	11:17:25	14.752944	-44.980467	3025.9	push core taken; sample no. 17
04.02.2007	11:18:28	14.752976	-44.980453	3025.4	transit to Irina 2
04.02.2007	11:36:03	14.753071	-44.979757	3041.6	transitto elevator
04.02.2007	12:03:32	14.754097	-44.978079	3226.2	reached elevator
04.02.2007	12:08:47	14.754089	-44.978106	3032.6	picked up the Temp-Loggers
04.02.2007	12:17:42	14.754086	-44.978104	3032.5	major 1; 2 and 3 put on elevator
04.02.2007	12:25:23	14.754114	-44.978083	3033.7	mussles put into the elevator bio box
04.02.2007	12:32:31	14.753989	-44.978209	3030.8	transit to Irina 2; Temp. Log area
04.02.2007	12:51:21	14.753037	-44.979024	3025.2	TV grap
04.02.2007	12:51:44	14.752995	-44.979045	3025.0	fish
04.02.2007	12:52:49	14.752936	-44.979069	3022.9	mussel shells
04.02.2007	12:55:54	14.75284	-44.979126	3020.3	marker 28
04.02.2007	12:58:18	14.752813	-44.979081	3019.2	passing marker 33
04.02.2007	13:03:10	14.752816	-44.979136	3020.5	reached temp. log field
04.02.2007	13:11:44	14.752798	-44.979132	3022.0	start photo survey temp. log field
04.02.2007	13:30:18	14.752803	-44.979143	3022.4	photo servey t-logger array Irina II
04.02.2007	13:44:38	14.752829	-44.979116	3020.5	temp log 4 pushed in the sea floor next to marker 29
04.02.2007	13:46:49	14.752828	-44.979116	3020.6	temp log 3 pushed in the sea floor next to marker 29
04.02.2007	13:51:32	14.752826	-44.979121	3020.4	temp log 0 pushed in the sea floor next to marker 29
04.02.2007	14:05:05	14.752832	-44.979132	3021.0	temp log 2 placed
04.02.2007	14:08:54	14.752837	-44.979129	3020.7	temp. Logger Nr 8 placed

04.02.2007	14:11:22	14.752834	-44.979137	3021.3	temp log 9 placed
04.02.2007	14:15:22	14.752803	-44.979126	3020.3	rock sample taken
04.02.2007	14:23:09	14.752819	-44.97913	3020.6	temperature logger 5 placed
04.02.2007	14:26:55	14.752836	-44.979146	3021.9	temp. logger 7 placed
04.02.2007	14:39:20	14.752824	-44.979147	3021.7	temp profiler 9 set
04.02.2007	15:08:39	14.752782	-44.979117	3020.0	Major D2 sampling 267 ROV Nr. 18
04.02.2007	15:21:44	14.752771	-44.979107	3018.6	sampling not successful looking for other vent
04.02.2007	15:21:57	14.752768	-44.979108	3018.8	beehive touched by ROV
04.02.2007	15:42:27	14.752767	-44.979102	3019.0	D2 Sampling not sucessful
04.02.2007	15:54:47	14.752771	-44.979099	3019.7	Slurp Sampling Shrimp
04.02.2007	15:56:09	14.752771	-44.979098	3019.7	Slurp sample Shrimp 2
04.02.2007	15:58:19	14.752769	-44.9791	3020.0	Sample 19 (Slurp)
04.02.2007	16:08:08	14.753058	-44.979367	3233.8	ballast overboard
04.02.2007	16:12:25	14.753057	-44.979367	3222.1	pick up incubation chamber
04.02.2007	16:42:36	14.754052	-44.978102	3207.9	incubation chamber onto elevator
04.02.2007	16:59:26	14.754054	-44.978105	3230.5	preparation of the elevator
04.02.2007	17:18:27	14.754032	-44.978075	3031.1	going to Anna Louise
04.02.2007	17:32:52	14.752934	-44.977816	3001.7	grabbing bottle (beer?) from seafloor
04.02.2007	17:44:05	14.751579	-44.977576	2956.7	geoelectric cable on seafloor
04.02.2007	17:46:02	14.751294	-44.977616	2946.0	beercan on seafloor
04.02.2007	17:48:18	14.7513	-44.977607	2946.4	rock sample ROV 267-20
04.02.2007	17:51:53	14.751132	-44.977516	2936.9	examining white (carbonatic) stuff on seafloor - turned out to be soft
04.02.2007	17:55:54	14.750922	-44.97728	2924.3	yellow thing on seafloor (2 pictures)
04.02.2007	18:22:47	14.750725	-44.97714	2927.8	searching for site A (Bara-Dur)
04.02.2007	18:25:57	14.750844	-44.977273	2925.8	grabbing rock sample ROV267-21
04.02.2007	18:32:37	14.75088	-44.977302	2925.5	probably at site A; no BaraDur found yet
04.02.2007	18:32:50	14.750872	-44.977279	2923.6	travelling around the rim of crater
04.02.2007	18:45:15	14.750984	-44.977329	2925.8	confusion: location could be Anna Louise (from last year); Site A, or Inina I
04.02.2007	18:45:31	14.750993	-44.977298	2925.8	temporarily named smoking strobe
04.02.2007	19:15:12	14.750982	-44.977355	2928.1	at russian strobe - smoking strobe
04.02.2007	19:31:55	14.751082	-44.97759	2939.0	Marker M5; listed as Irina
04.02.2007	19:46:54	14.751299	-44.977757	2947.0	at Marker Irina
04.02.2007	19:53:04	14.751296	-44.977758	2947.4	heading to next navigation point - site B
04.02.2007	20:16:25	14.75167	-44.977983	2965.3	site b
04.02.2007	20:20:25	14.751713	-44.978075	2968.5	transit to profiler
04.02.2007	20:47:10	14.752962	-44.979411	3037.1	found profiler
04.02.2007	20:52:22	14.752997	-44.979421	3036.4	collecting profiler
04.02.2007	21:09:55	14.753004	-44.979417	3036.5	temp measurement at profiler site; sample number
04.02.2007	21:15:03	14.753006	-44.979418	3036.4	temp measurement is sample number 20; max temp T2 90 deg c
04.02.2007	21:16:45	14.753006	-44.979418	3036.5	temp measurement in the middle of profiler mussel patch last measurement (sample 20) was at the edge of mussel patch
04.02.2007	21:17:22	14.753006	-44.979418	3036.5	sample 21 temp 7.9 deg c T4
04.02.2007	21:21:25	14.753006	-44.979417	3036.4	sample 22 temp profiler mussel patch T1 60 deg c

271-ROV
J2-261, 05.02.2007

Date	UTC	Lat	Lon	Depth	Comment
05.02.2007	13:08:51	14.752613	-44.977569	3042.5	reached seafloor
05.02.2007	13:11:05	14.752705	-44.977521	3047.8	massive rock outcrop fragmented up to 1 m big
05.02.2007	13:12:44	14.752769	-44.977566	3050.0	transit to Anya's crack
05.02.2007	13:15:13	14.753017	-44.977604	3043.6	mussels
05.02.2007	13:18:58	14.752873	-44.977475	3043.4	Marker Anya
05.02.2007	13:19:41	14.752904	-44.979627	3044.6	canyon striking SE-NW
05.02.2007	13:25:29	14.753016	-44.979464	3035.7	crack reached
05.02.2007	13:33:58	14.752965	-44.97943	3034.3	deployment of the profiler onto mussels in the crack
05.02.2007	13:36:38	14.752966	-44.979429	3034.4	pictures
05.02.2007	13:41:23	14.752967	-44.979427	3034.3	pictures
05.02.2007	13:44:23	14.752969	-44.979423	3034.4	profiler started
05.02.2007	13:51:50	14.752954	-44.9794	3032.0	series of pictures taken
05.02.2007	13:51:56	14.752944	-44.979406	3031.8	transit to Quest
05.02.2007	13:53:28	14.752959	-44.979691	3039.7	fish
05.02.2007	13:54:01	14.752983	-44.979686	3038.9	mussel patch
05.02.2007	14:02:43	14.752961	-44.98006	3040.8	can on the sediment seafloor
05.02.2007	14:05:40	14.752848	-44.98029	3032.4	fish
05.02.2007	14:09:08	14.752965	-44.98047	3027.2	T-loggers Quest
05.02.2007	14:09:23	14.752962	-44.98047	3027.0	Gill is very tired
05.02.2007	14:10:25	14.752991	-44.980482	3027.8	Jill ...
05.02.2007	14:15:33	14.753022	-44.980545	3027.9	looking for a mussel patch to take a scoop net
05.02.2007	14:16:57	14.75302	-44.980549	3027.4	picture
05.02.2007	14:19:18	14.753022	-44.980541	3147.1	mussel patch near Marker 11 shall be taken
05.02.2007	14:20:41	14.753021	-44.98054	3122.0	269-1 temperature measurement
05.02.2007	14:23:57	14.753025	-44.980543	3220.4	it is 271 ROV #1
05.02.2007	14:24:27	14.753026	-44.980542	3178.2	picture of the mussel patch
05.02.2007	14:24:51	14.753026	-44.980543	3225.7	10 to 15 degrees celcigrade
05.02.2007	14:26:42	14.753026	-44.98054	3027.9	271 #2 temperature measurement just behind the patch within the sediment
05.02.2007	14:29:29	14.753039	-44.980521	3030.2	replacement of Jason waiting for settling down of sediment
05.02.2007	14:32:28	14.753034	-44.980518	3030.2	temp. probe placed in the sediment
05.02.2007	14:36:36	14.753034	-44.980519	3030.1	113 degrees celcigrade max
05.02.2007	14:48:17	14.753011	-44.980487	3029.8	back at the mussel field again
05.02.2007	14:57:42	14.753033	-44.980578	3028.4	271 #3 T-measurement in the same mussel patch197 degrees celcigrade T3
05.02.2007	15:04:29	14.753035	-44.980506	3028.4	271 #4 Fluid sampling mussel patch Nr 11
05.02.2007	15:11:36	14.75303	-44.980515	3028.4	271 #5 scoop net
05.02.2007	15:15:37	14.753028	-44.980513	3028.3	Sample 5 Net 3
05.02.2007	15:16:35	14.753028	-44.980513	3028.3	in left Biobox
05.02.2007	15:22:16	14.753035	-44.980508	3028.4	271 #6 scoop net same patch crab
05.02.2007	15:22:25	14.753036	-44.980508	3028.4	pictures taken
05.02.2007	15:29:21	14.753029	-44.98051	3028.4	stored in the left biobox
05.02.2007	15:32:24	14.753038	-44.980507	3028.4	271 #7 pushcore next to logger 19
05.02.2007	15:45:01	14.753024	-44.980515	3028.0	placed on reddish sediment surface
05.02.2007	15:45:26	14.753024	-44.980515	3027.9	picture taken
05.02.2007	15:46:59	14.753024	-44.980515	3028.0	271 #8 Temperature measurement where core was taken
05.02.2007	15:50:49	14.753025	-44.980515	3027.9	13.3 degrees celcigrade
05.02.2007	15:51:31	14.753025	-44.980515	3028.0	271 #9 Temp.-measurement at the same plase a few centimenters apart
05.02.2007	15:54:10	14.753024	-44.980515	3027.9	10.8 degrees celcigrade

05.02.2007	15:59:29	14.753032	-44.980511	3028.6	pictures taken from the mussel field with markers
05.02.2007	16:02:18	14.753052	-44.98047	3031.6	pictures taken from SW
05.02.2007	16:03:16	14.753055	-44.980464	3032.2	series of pictures
05.02.2007	16:10:05	14.75304	-44.980487	3029.9	right biobox opened for recovery the T-Loggers
05.02.2007	16:12:05	14.75304	-44.980487	3029.9	298 first logger
05.02.2007	16:21:07	14.753041	-44.980492	3029.9	295 next logger (8-channel)
05.02.2007	16:31:00	14.753042	-44.980496	3029.9	number 11 is coming next
05.02.2007	17:19:07	14.753008	-44.980497	3029.0	marker 20 replaces temp logger 19
05.02.2007	17:30:11	14.753019	-44.980501	3029.2	Crab scoop taken
05.02.2007	17:52:14	14.753016	-44.980503	3028.8	FrameGrab
05.02.2007	17:52:14	14.753016	-44.980503	3028.8	FrameGrab
05.02.2007	17:52:14	14.753016	-44.980503	3028.8	FrameGrab
05.02.2007	17:52:14	14.753016	-44.980503	3028.8	FrameGrab
05.02.2007	17:52:15	14.753016	-44.980503	3028.8	FrameGrab
05.02.2007	17:52:15	14.753016	-44.980503	3028.8	FrameGrab
05.02.2007	17:52:15	14.753016	-44.980503	3028.8	FrameGrab
05.02.2007	17:52:15	14.753016	-44.980503	3028.8	FrameGrab
05.02.2007	17:52:15	14.753016	-44.980503	3028.8	FrameGrab
05.02.2007	17:52:15	14.753016	-44.980503	3028.8	FrameGrab
05.02.2007	17:52:15	14.753016	-44.980503	3028.8	FrameGrab
05.02.2007	17:52:16	14.753016	-44.980503	3028.8	FrameGrab
05.02.2007	17:55:50	14.753011	-44.980499	3029.0	Sample Number 10 (Crabs)
05.02.2007	18:40:40	14.752764	-44.979235	3026.4	Irina II
05.02.2007	18:44:55	14.752759	-44.979119	3019.6	271 #10 fluid sampling
05.02.2007	18:46:51	14.75276	-44.979118	3019.5	271-11 major 3 instead of 271-10
05.02.2007	19:03:09	14.752764	-44.979119	3019.7	Shrimp slurp irina 2 sample number 12
05.02.2007	19:20:16	14.752769	-44.979113	3019.7	shrimp slurp irina 2 still sample 12
05.02.2007	19:27:08	14.752774	-44.979116	3020.1	finished slurping will head now to bacterial mat site 'F'
05.02.2007	19:43:21	14.752303	-44.97885	3001.5	dead chimney
05.02.2007	19:43:38	14.752303	-44.97885	3001.5	correction: inactive chimney
05.02.2007	19:45:50	14.752248	-44.978902	3001.0	bacterial mat sighted
05.02.2007	19:46:18	14.752248	-44.978901	3000.9	patch of empty mussel shells next to the white mat
05.02.2007	19:50:17	14.75224	-44.978888	3000.9	temp measurement
05.02.2007	19:52:46	14.75224	-44.978887	3000.9	271/13
05.02.2007	19:52:57	14.75224	-44.978887	3000.9	some live mussels in the mat
05.02.2007	20:02:14	14.752232	-44.978873	3000.4	sample number 14
05.02.2007	20:06:27	14.752232	-44.978873	3000.4	sample number 15
05.02.2007	20:13:45	14.752235	-44.978877	3000.5	sample number 16 temp measurement
05.02.2007	20:17:11	14.752233	-44.978877	3000.4	sample number 17 temp next to hole from push core sample 14 82 deg c
05.02.2007	20:23:20	14.752233	-44.978877	3000.5	major number 2 sample number 18 fluid sample over white mat
05.02.2007	20:30:01	14.752234	-44.978878	3000.5	sample number 19 major 4 fluid sample over white mat
05.02.2007	20:36:05	14.752237	-44.97888	3000.7	sample number 20 slurp of mat surface blue chamber
05.02.2007	20:48:52	14.752231	-44.978845	3000.9	sample number 21 push core outside the mat push core number 4
05.02.2007	20:54:07	14.752259	-44.978901	3003.1	Sample number 22 temp measurement 20 cm away from sample 21 hole
05.02.2007	21:00:02	14.752259	-44.9789	3003.1	sample 22 temp 46degC
05.02.2007	21:03:53	14.752258	-44.9789	3003.2	sample 23 temp 65degC
05.02.2007	21:05:57	14.752257	-44.978898	3003.3	moving towards Anyas Garden
05.02.2007	21:10:49	14.752166	-44.978844	2998.3	moving over a ridge covered with white mat
05.02.2007	21:22:16	14.752697	-44.979255	3030.5	moving to the position of the profiler

05.02.2007	21:24:55	14.752817	-44.979302	3040.8	Marker Anya
05.02.2007	21:28:06	14.752986	-44.979379	3037.7	white ground and white clouds
05.02.2007	21:29:12	14.752984	-44.979335	3037.0	reaching profiler
05.02.2007	21:31:39	14.752968	-44.97922	3035.1	sensors still in musselbed
05.02.2007	21:37:53	14.752981	-44.979355	3035.2	decision: recover the profiler although the sensors are still down
05.02.2007	21:41:42	14.752986	-44.979351	3035.1	recover the profiler
05.02.2007	21:42:30	14.752984	-44.979354	3035.3	looks like all sensors are broken
05.02.2007	21:44:25	14.752974	-44.979362	3034.8	moving in a straight line to Anyas Garden
05.02.2007	21:47:40	14.752998	-44.979359	3033.5	first fixing the profiler om the ROV
05.02.2007	21:53:53	14.752985	-44.979441	3036.5	moving through the canyon
05.02.2007	22:01:15	14.752796	-44.97959	3046.9	finishing the dive
05.02.2007	22:02:22	14.752847	-44.979596	3045.9	leaving the ground
05.02.2007	22:06:35	14.752594	-44.979955	3039.8	
06.02.2007	22:07:54	14.752708	-44.980145	3039.2	
	00:04:26	14.752532	-44.979955	110.7	####End of Dive J2-261#####

275-ROV
J2-262, 06.02.2007

Date	UTC	Lat	Lon	Depth	Comment
06.02.2007	13:11:44	14.667322	-44.999515	3040.2	reached the seafloor
06.02.2007	13:16:11	14.753187	-44.979732	3037.1	reached obt-side
06.02.2007	13:48:42	14.75317	-44.979603	3036.7	deployed the obt
06.02.2007	13:58:10	14.753154	-44.979591	3036.9	deployed marker near the obt
06.02.2007	13:59:07	14.753165	-44.97946	3035.9	travel to elevator
06.02.2007	14:05:28	14.753489	-44.979334	3033.5	heading of OBT1 Y-axis is 320 deg. North
06.02.2007	14:05:58	14.753534	-44.979325	3032.7	sediments with rocky outcrop or rock pieces in between
06.02.2007	14:06:16	14.753576	-44.979306	3032.9	going 22.6 deg. nortrh
06.02.2007	14:10:37	14.753835	-44.979217	3032.8	OBT1 crashed down on the proch of Jaspn in the beginning of installation
06.02.2007	14:10:53	14.753836	-44.979217	3032.9	dtill going to the elevator
06.02.2007	14:11:04	14.753836	-44.979216	3032.8	rocks and booring sediments
06.02.2007	14:14:16	14.754091	-44.979165	3033.7	rock outcrop
06.02.2007	14:17:44	14.754279	-44.979063	3038.1	large rock
06.02.2007	14:18:07	14.754349	-44.97902	3039.7	foto
06.02.2007	14:23:24	14.754395	-44.979032	3040.7	Rock sample 2??rov#1
06.02.2007	14:27:24	14.754891	-44.978758	3047.6	Sample Number of rock sample is 275rov#1
06.02.2007	14:28:07	14.754921	-44.978784	3048.3	arriving at the elevator
06.02.2007	14:42:14	14.755041	-44.978981	3237.8	collecting markers from the elevator
06.02.2007	14:43:29	14.755026	-44.978987	3051.6	puts the rock samples 275rov#1 in the milk bottle box on the elevator
06.02.2007	14:48:13	14.755063	-44.978973	3053.5	now Jason takes the profiler from the elevator
06.02.2007	15:08:27	14.754747	-44.978965	3045.3	leaving elevator
06.02.2007	15:08:45	14.754715	-44.978964	3045.0	heading to sample place for profiler
06.02.2007	15:15:56	14.754622	-44.978924	3043.5	Jason moves with profiler to target area site F
06.02.2007	15:21:31	14.75407	-44.978847	3038.5	Rock; may be outcrop
06.02.2007	15:22:20	14.754044	-44.978843	3037.8	fish
06.02.2007	15:24:11	14.753978	-44.978849	3035.8	second fish
06.02.2007	15:26:55	14.754063	-44.978803	3027.3	fish
06.02.2007	15:35:46	14.752881	-44.978887	3020.1	transit to site F
06.02.2007	15:41:30	14.75247	-44.978855	3007.3	massive rock
06.02.2007	15:43:32	14.752388	-44.97885	3002.6	sedimented mussel sells
06.02.2007	15:45:36	14.752309	-44.978847	3000.1	white mat
06.02.2007	15:58:16	14.752218	-44.978867	2998.5	deployment of the profiler

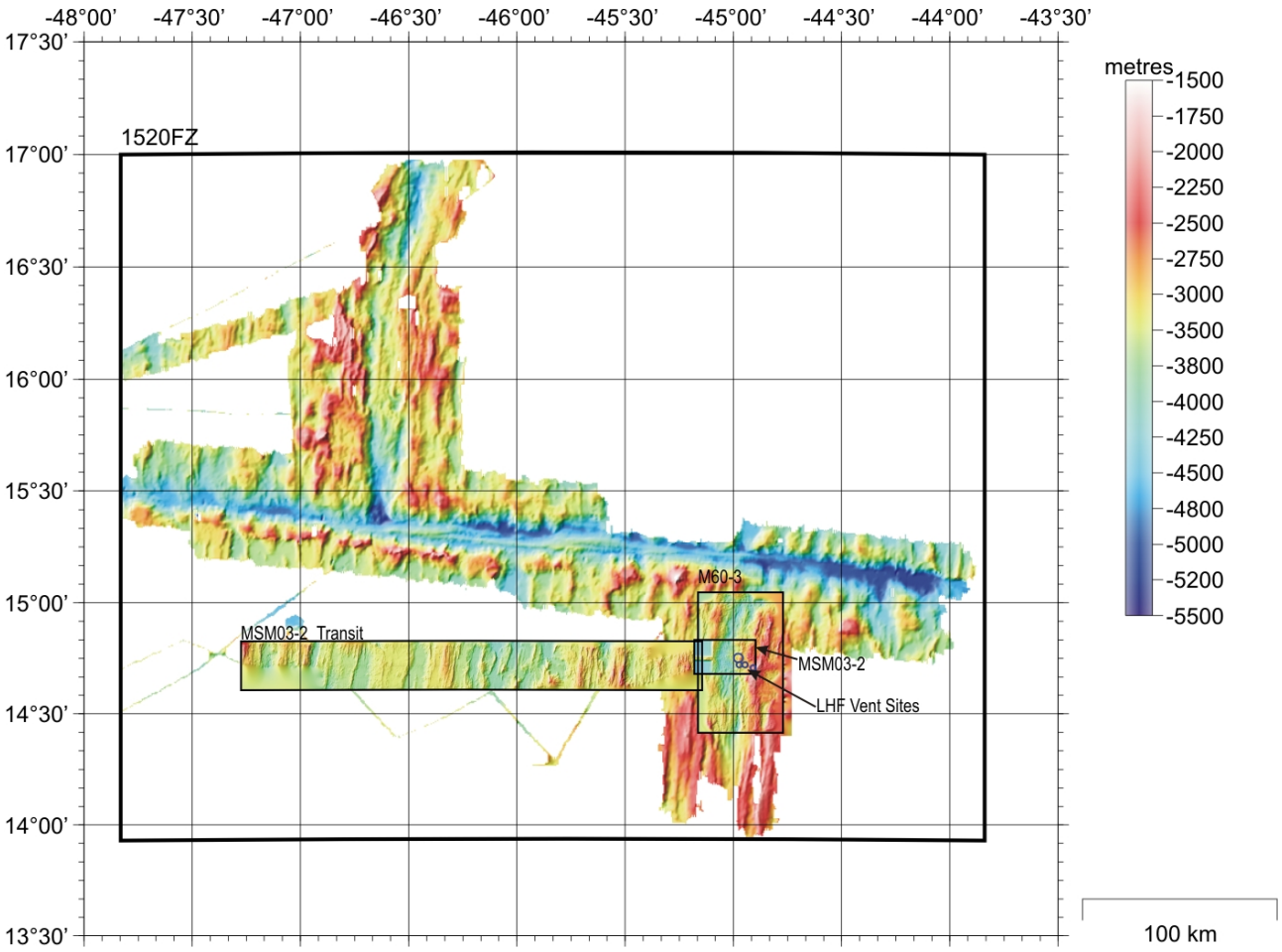
06.02.2007	16:03:35	14.752219	-44.97887	2998.2	diffuse flow
06.02.2007	16:05:18	14.752219	-44.97887	2998.2	profiler started
06.02.2007	16:09:01	14.752217	-44.978859	2997.4	275-#1
06.02.2007	16:09:31	14.752217	-44.978859	2997.3	pushcore within the white mat
06.02.2007	16:11:15	14.752334	-44.97882	2999.6	transit to the new mooring
06.02.2007	16:18:08	14.752463	-44.978602	3000.6	mooring located
06.02.2007	16:23:36	14.752484	-44.97857	3000.3	sediment with rock fragments small pipe
06.02.2007	16:23:57	14.752469	-44.978589	2999.8	small pipe was base of the mooring
06.02.2007	16:27:42	14.75243	-44.978751	3003.2	mooring is at 3000m water depth
06.02.2007	16:28:40	14.752421	-44.978764	3003.7	Lat: 14 45.149214 N
06.02.2007	16:29:00	14.75242	-44.978762	3003.0	Lon: 44 58.713822 W
06.02.2007	16:29:21	14.752419	-44.978761	3001.8	transit to Aaan louise
06.02.2007	16:37:11	14.751947	-44.978224	2980.2	sediment surface rock outcrop
06.02.2007	16:39:36	14.751896	-44.978108	2972.9	red sediment
06.02.2007	16:42:20	14.751751	-44.978064	2966.9	cable on ground
06.02.2007	16:42:28	14.751754	-44.978046	2966.3	smoker in sight
06.02.2007	16:43:29	14.751583	-44.977937	2961.2	site B here
06.02.2007	16:44:29	14.751493	-44.977874	2956.6	old russian OFOS
06.02.2007	16:44:49	14.751479	-44.97784	2955.0	foto
06.02.2007	16:47:40	14.751437	-44.977755	2951.6	rock; outcop
06.02.2007	16:47:49	14.75142	-44.97773	2950.1	foto
06.02.2007	16:49:18	14.751177	-44.977627	2939.9	some singular mussels
06.02.2007	16:49:32	14.751147	-44.977627	2940.3	foto
06.02.2007	16:50:42	14.751138	-44.977616	2940.0	rather brittle rock
06.02.2007	16:51:15	14.751138	-44.977616	2940.0	jason takes ballast
06.02.2007	16:53:06	14.751208	-44.977455	2937.5	DVD handling error: decks finalized too early
06.02.2007	16:53:30	14.751172	-44.977425	2935.6	singular widespread mussels
06.02.2007	16:53:48	14.751141	-44.977397	2933.4	foto
06.02.2007	16:54:59	14.751126	-44.977394	2932.5	strange looking rock - old smoer ???
06.02.2007	16:55:51	14.751104	-44.977406	2932.5	foto
06.02.2007	16:56:49	14.751104	-44.977406	2932.5	jason is excavating
06.02.2007	17:05:11	14.750985	-44.977486	2931.0	smokers in sight; Anna louise
06.02.2007	17:08:28	14.750865	-44.977481	2930.8	fish
06.02.2007	17:10:22	14.750833	-44.97737	2928.3	Anna Lise
06.02.2007	17:10:53	14.750822	-44.977378	2926.6	looking for site A
06.02.2007	17:14:58	14.750686	-44.977733	2943.4	booring rocks and sediments
06.02.2007	17:16:01	14.750658	-44.977658	2941.8	cable
06.02.2007	17:17:36	14.750653	-44.977466	2935.9	cable again
06.02.2007	17:22:16	14.750468	-44.977558	2938.3	track
06.02.2007	17:22:50	14.750471	-44.977493	2935.8	sediments; some rocks
06.02.2007	17:24:39	14.750377	-44.977588	2938.6	cable
06.02.2007	17:26:25	14.750275	-44.977721	2942.6	TV-Grab
06.02.2007	17:35:00	14.750295	-44.977212	2927.4	cable
06.02.2007	17:38:13	14.750613	-44.977079	2924.3	fish
06.02.2007	17:44:17	14.750577	-44.976883	2920.9	bear bin
06.02.2007	17:48:09	14.750777	-44.976794	2918.7	found site a!! Mound with structure on top
06.02.2007	17:50:09	14.750788	-44.97677	2916.7	chimney has become smaller since last visit
06.02.2007	18:08:45	14.750786	-44.976721	2916.1	sample number 2; temp measurement at site A structure 230 deg c
06.02.2007	18:19:08	14.750757	-44.976736	2916.5	photo survey of site A structure
06.02.2007	18:44:25	14.750789	-44.976737	2914.4	sample 3; temp measurement site A; 330 deg c
06.02.2007	18:54:05	14.750788	-44.976737	2914.3	sample number 4; major 3; site A
06.02.2007	19:05:33	14.75077	-44.976724	2914.5	sample number 5; major 4; site A
06.02.2007	19:20:34	14.750759	-44.976708	2915.9	marker 'mb' seen at site A
06.02.2007	19:20:35	14.750759	-44.976708	2915.9	FrameGrab
06.02.2007	19:28:56	14.750981	-44.977066	2927.1	heading now to smoky strobe

06.02.2007	19:29:04	14.750981	-44.977064	2927.1	rocky outcrop
06.02.2007	19:35:13	14.750962	-44.977262	2926.5	found smokey strobe
06.02.2007	20:04:33	14.750885	-44.97738	2924.4	sample number 6; temp at smokey strobe; 349 deg c
06.02.2007	20:09:54	14.750887	-44.977372	2924.4	taking major #1 275-7
06.02.2007	20:14:38	14.750889	-44.977374	2924.4	placed marker 30 at smokey strobe
06.02.2007	20:19:00	14.750895	-44.977363	2924.4	sample 275-8; major d1; smokey strobe
06.02.2007	20:42:15	14.750932	-44.977414	2924.4	sample 9; helium sample; smokey strobe
06.02.2007	20:54:49	14.751252	-44.977765	2945.1	tranfer to Irina 1
06.02.2007	20:59:57	14.751286	-44.977829	2946.5	reached Irina 1
06.02.2007	21:21:31	14.751282	-44.977824	2945.4	major 2; sample 275-10 at Irina 1
06.02.2007	21:27:25	14.7514	-44.977984	2955.9	transit to profiler site 4
06.02.2007	21:49:54	14.752167	-44.978878	2998.4	marker 26
06.02.2007	21:56:37	14.752155	-44.978887	2998.3	profiler recovered
06.02.2007	21:57:28	14.752154	-44.978881	2998.8	profiler taken
06.02.2007	21:58:01	14.752074	-44.978896	2998.2	the end

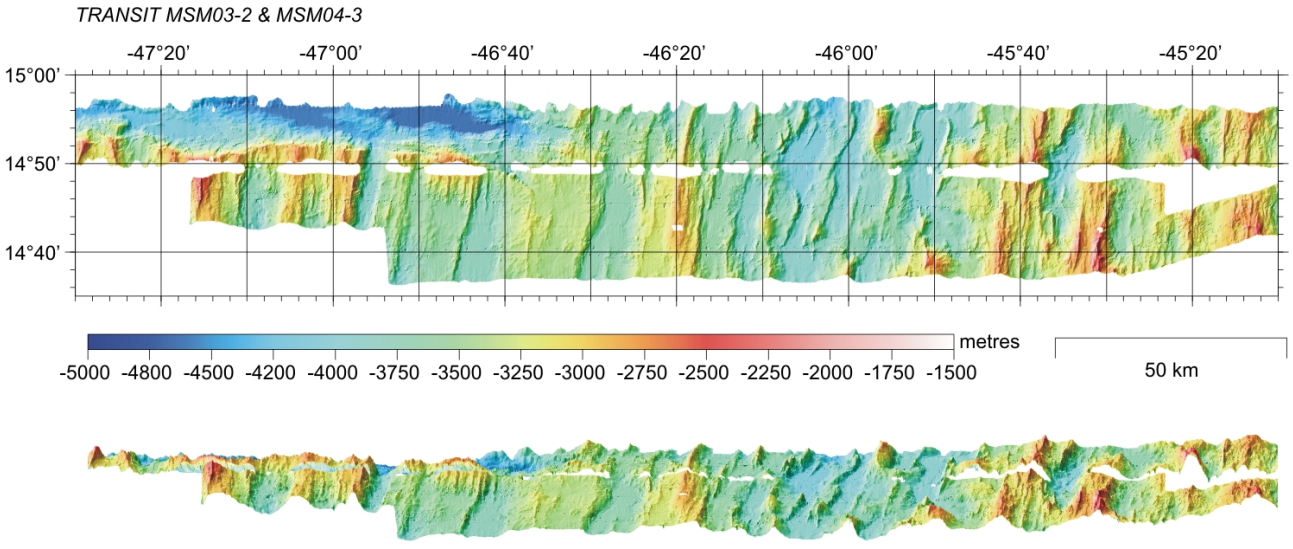
282-ROV
J2-263, 07.02.2007

Date	UTC	Lat	Long	Depth	Comment
07.02.2007	14:24:48	14.666708	-44.999919	713.4	##Start of Dive J2-263##
07.02.2007	15:30:41	14.666772	-44.999833	3021.3	bottom view
07.02.2007	15:36:47	14.752932	-44.980488	3025.7	transit to Quest
07.02.2007	15:38:18	14.753046	-44.980515	3031.8	Marker 20
07.02.2007	15:45:37	14.75302	-44.980528	3029.9	T.-Logger 19 put into the seafloor at mussel field Quest
07.02.2007	15:46:48	14.753019	-44.980528	3029.8	T.-Logger 17 deployed
07.02.2007	15:49:02	14.753019	-44.980529	3030.1	T.-Logger 13 follows
07.02.2007	15:51:34	14.753019	-44.980529	3029.9	Marker 13 in the middle of a mussel patch at diffuse outflow
07.02.2007	15:55:12	14.75302	-44.98053	3029.8	T.-Logger 11 follows
07.02.2007	15:55:46	14.753019	-44.98053	3029.8	T.-Logger 16 follows
07.02.2007	15:56:59	14.753019	-44.98053	3029.8	T.-Logger 14 follows
07.02.2007	16:01:57	14.752999	-44.980526	3029.2	T.-Logger 10
07.02.2007	16:05:19	14.753007	-44.980523	3029.4	T.-Logger 13
07.02.2007	16:10:31	14.753033	-44.980523	3031.1	T.-Logger 18 follows
07.02.2007	16:11:02	14.753041	-44.980532	3030.9	pictures
07.02.2007	16:12:10	14.753037	-44.980505	3031.9	series of pictures of the mussel field with T.-Loggers
07.02.2007	16:14:38	14.752932	-44.980599	3025.0	next stop: smokers Quest - helium sample
07.02.2007	16:17:11	14.752924	-44.980617	3023.9	same smoker as sampled for fluids before
07.02.2007	16:23:11	14.752917	-44.980618	3023.9	282 ROV #1 Helium sample
07.02.2007	16:37:54	14.752947	-44.980581	3025.7	transit to Irina II
07.02.2007	17:00:49	14.752822	-44.979266	3023.0	trap for macrofauna
07.02.2007	17:04:20	14.752822	-44.979264	3022.9	recovered; crab
07.02.2007	17:05:02	14.752829	-44.979219	3020.3	Irina II main structure
07.02.2007	17:06:51	14.752868	-44.97922	3022.0	diffuse outflow at mussel patch - fluid sampling
07.02.2007	17:21:35	14.752817	-44.979138	3020.7	282 ROV #2 Major 1
07.02.2007	17:21:47	14.75284	-44.979152	3022.6	scoop net
07.02.2007	17:22:07	14.752851	-44.979163	3023.7	282 ROV#3
07.02.2007	17:24:28	14.752852	-44.979163	3024.0	stored in the left biobox
07.02.2007	17:31:12	14.752852	-44.979102	3020.3	recovery of the current meter
07.02.2007	17:46:03	14.752745	-44.979113	3019.8	recovery of the triangle
07.02.2007	17:48:38	14.752715	-44.979094	3019.2	recovery of next trap at marker 31
07.02.2007	18:00:07	14.752664	-44.979134	3017.7	leaving the botto

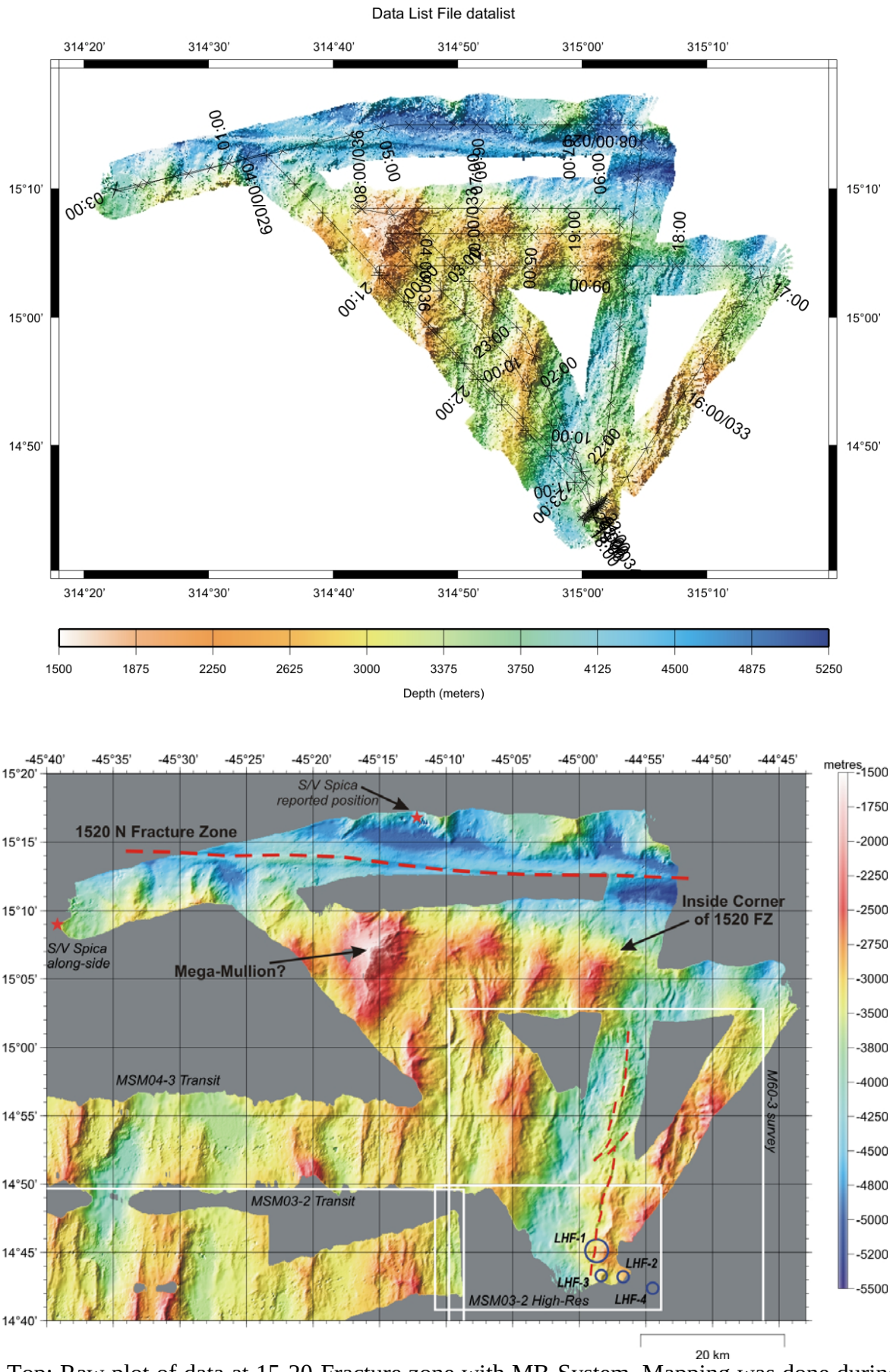
Appendix 10: Bathymetric maps produced with the Kongsberg EM120 multibeam echosounder



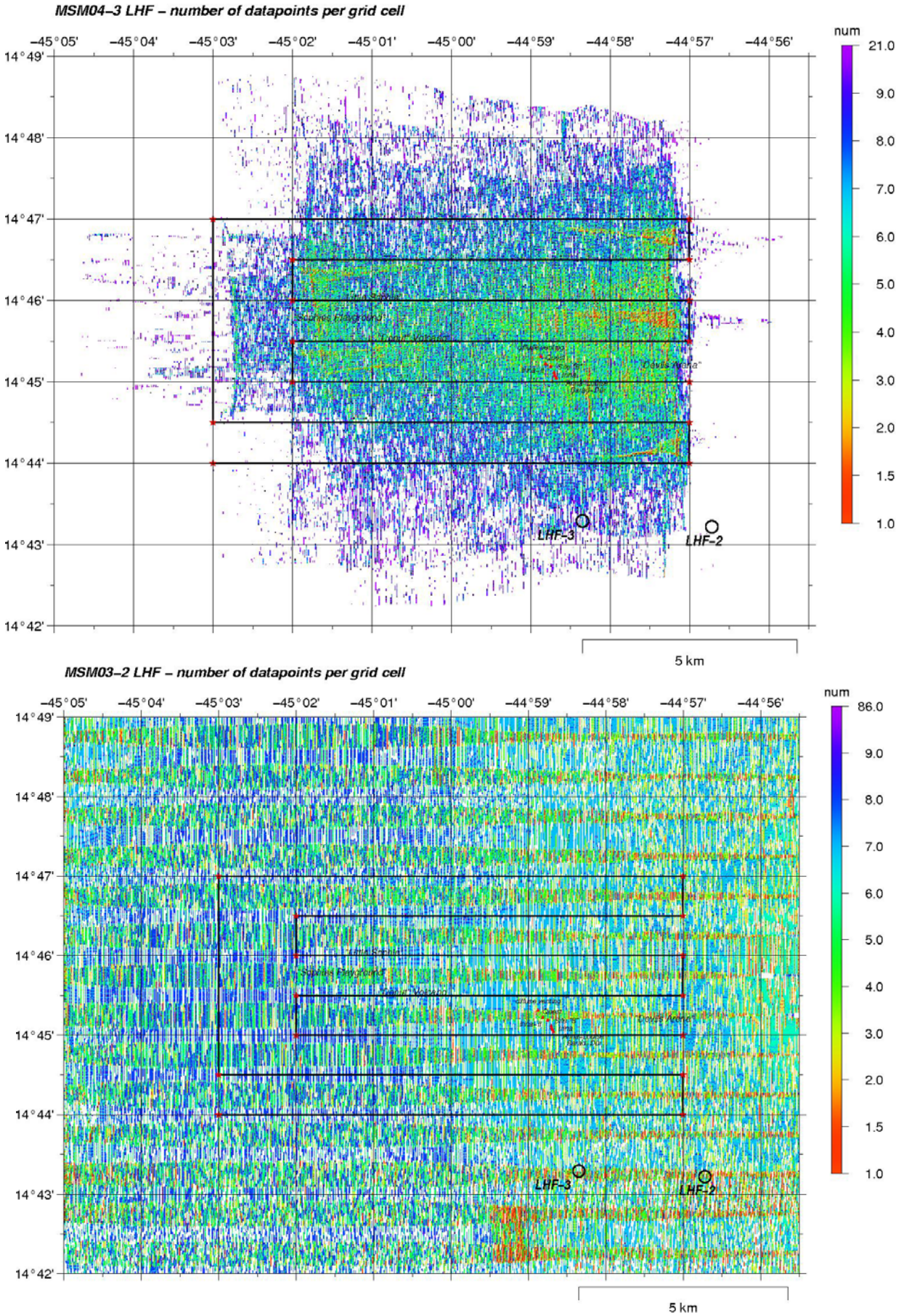
I. Existing bathymetry around the Logatchev Hydrothermal Vent Field. The rectangles mark the borders of the various grids. 1520FZ: Data collected from R/V Yokosuka and R/V Atalante; M60-3: Data collected during Meteor 60 cruise; MSM03-2: Data collected during MSM 03/2, on transit to LHF, and during high-resolution survey around LHF. Small blue circles mark the LHF 1, 2, 3 and 4 areas.



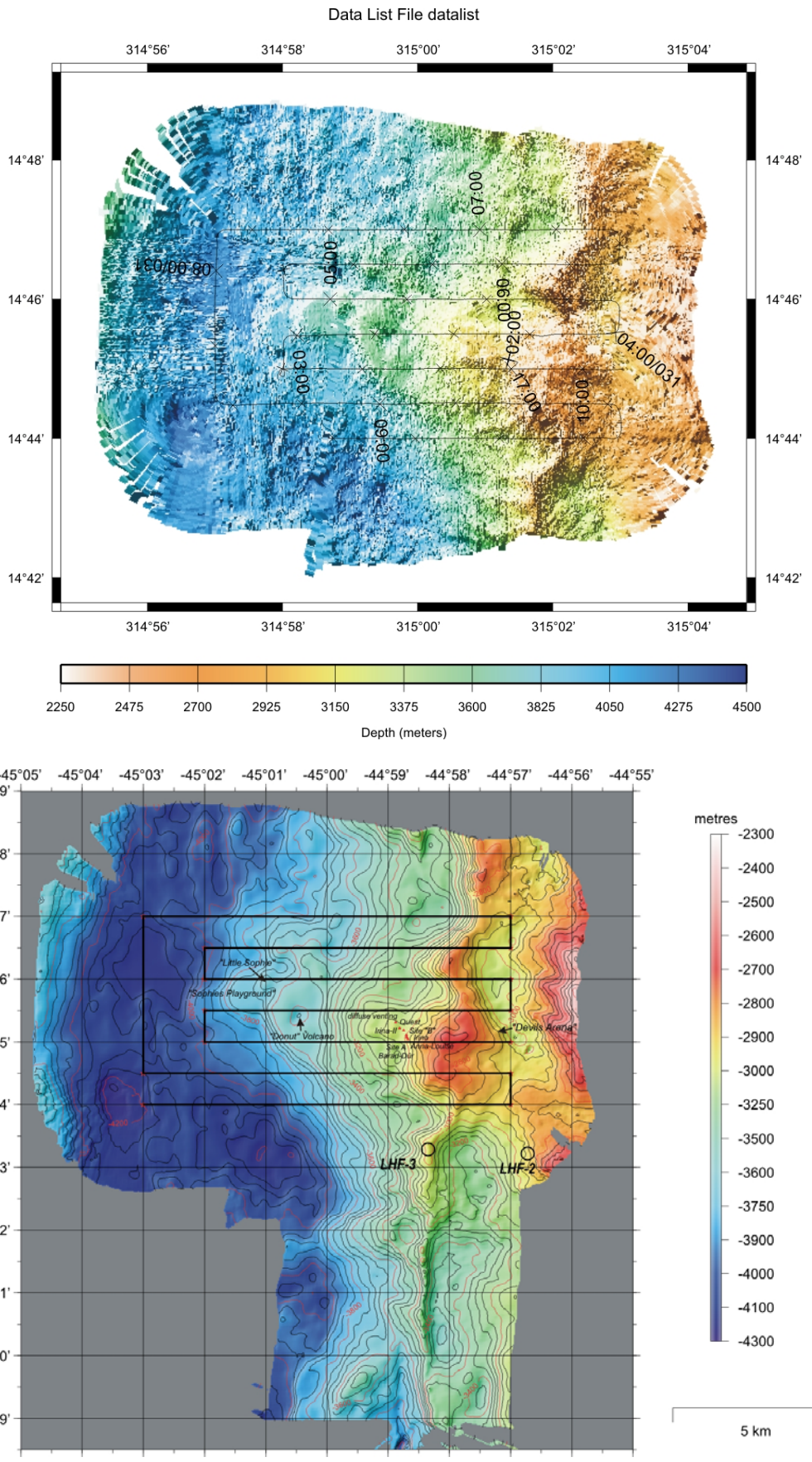
II. Multibeam data acquired during the transit to the Logatchev Hydrothermal Field, closing the gap between the transit data from MSM03-2 and the french and japanese bathymetry.



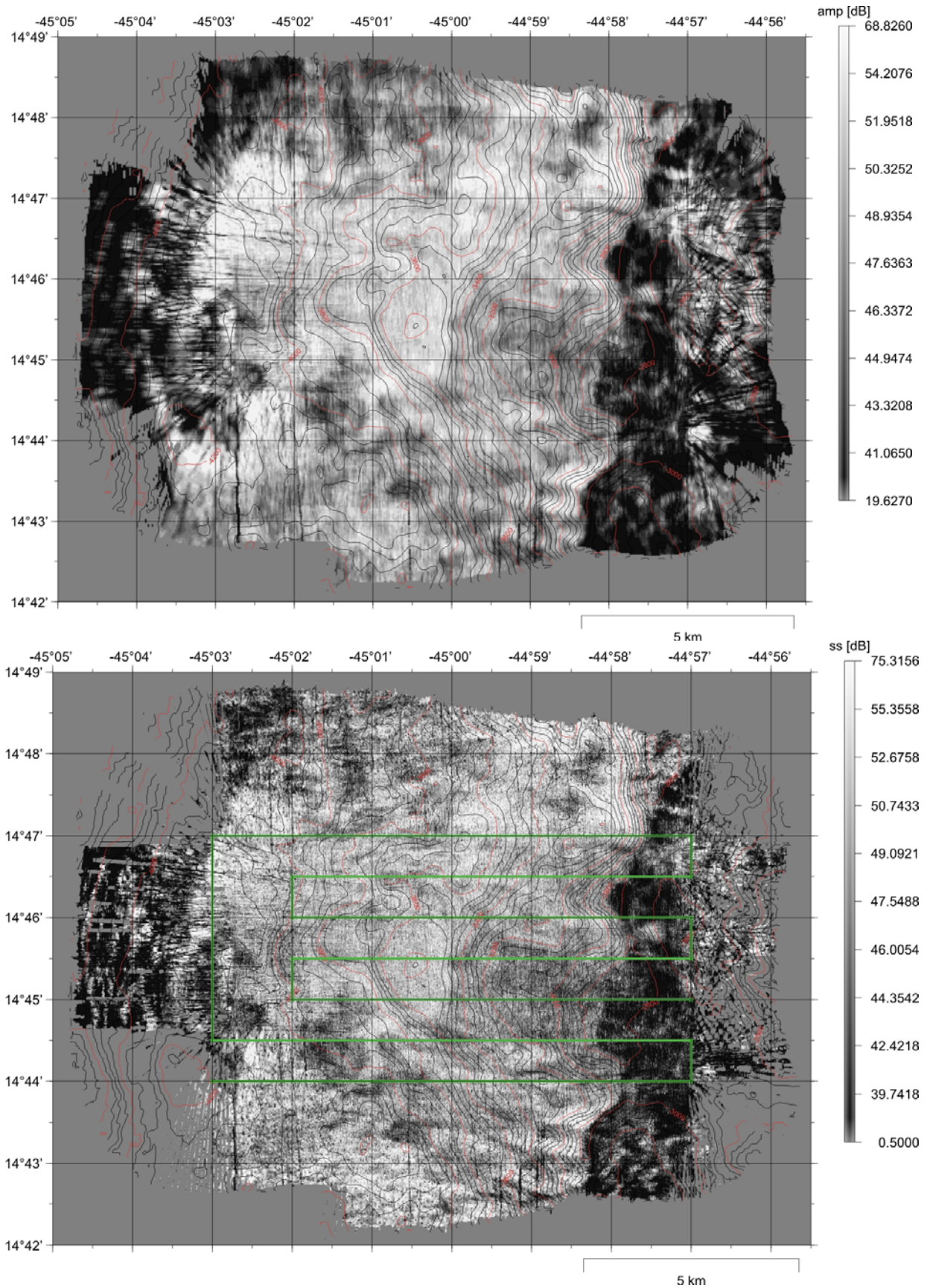
III: Top: Raw plot of data at 15-20-Fracture zone with MB-System. Mapping was done during 3 nights. Last line could not be closed due to time constraints. Bottom: Pre-processed and gridded data showing location of LHF and inside corner of fifteen-twenty fracture zone.



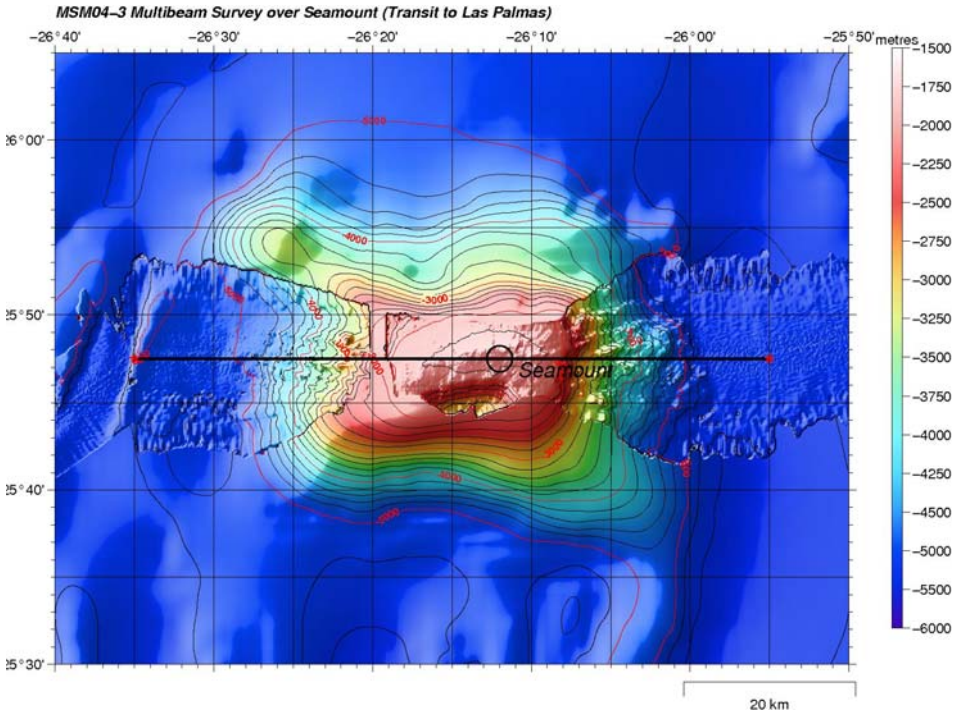
VI. Number of datapoints per grid cell for surveys MSM04-3 (top) and MSM03-2 (bottom).



V: Top: Raw plot of the data from high-resolution survey at LHF 1. Track lines are shown. Bottom: Pre-processed and gridded data showing vent locations and morphological features. The grid was combined with data acquired during transit to CTD casts south of LHF-1.



VI. Top: Gridded amplitude data from EM120 raw data. Color scale is in normal mode, i.e. bright tones represent high backscatter, dark tones are low backscatter (grid size = 30 m). Note the stong difference between the topographic highs and the Mid-Atlantic Central Valley. Bottom: Gridded sidescan data inherent in the raw EM120 data. The grid size is 10 metres.



VII. Bathymetric profile over seamount on transit back to Las Palmas. Background data are GEBCO 1' grid.